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Utilizing Technology With Nature-Based Learning In The Elementary School Classroom

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UTILIZING TECHNOLOGY WITH NATURE-BASED LEARNING IN THE ELEMENTARY SCHOOL CLASSROOM

by

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DEDICATION

To all my students in South Korea who helped spark a passion in me for education. Those first two years of teaching were life changing. To my family for their encouragement and never-ending support. And to my classmates and professors for allowing me to see the beauty in education and that there are still great teachers out there.

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CHAPTER ONE

Introduction

Opening

I began my teaching career abroad in 2015 teaching English in the public schools of South Korea. I worked with students between third and sixth grade. I learned about their education system and the values that they hold in education. Very quickly, I came to realize that there were vast differences between the Korean school system and the US school system. A difference I found is the use of technology and nature in the elementary school classrooms. A vast difference I found is that many schools do not provide tablets for their students. There are public computers in the computer room but there are not 1:1 tablets within the actual elementary school classrooms. I also found that it was not as common for students to explore outdoors for learning, unless it was for a science course. Our culture values creativity in the classroom with using technology and using the outdoors in educating has become much more prevalent in today's classroom.

It is a passion of mine for students to be able to incorporate technology as well as be able to express learning through the outdoors and I feel that the two topics can mirror one another. In the interest of finding out more information regarding students using technology in nature, I decided to research the following question: *How can nature-based learning and technology be combined to enrich learning experiences in elementary school classrooms?* In this chapter I will present my own journey and story on how my experiences and background have shaped my interest in getting students outdoors with technology.

Overview

First, I will clarify what I am considering when I mention technology. When I refer to technology I am encompassing everything that involves using technology in the classroom, from iPads, smartphones, computers and cameras. I would also like to clarify that I will be referring to children as elementary school students. There are four sections that compose the introduction to my capstone. The first section consists of a description of my background and what brought me to education. This section also covers my first two years working as an English teacher in the public school system in Gwangju, South Korea. This is an important section to me as it also explains my passion for this research topic and what initially sparked my curiosity in getting students outdoors with technology. The second section of the introduction is my rationale for why I want to research the benefits of getting students outdoors with technology. The last two parts of this introduction will summarize the contents as well as give a brief introduction to Chapter Two.

My Background and Experiences

I originally went to the University of Minnesota - Twin Cities with the intention of majoring in Elementary Education but changed my major in my junior year of college to Communication Studies and Journalism. I graduated and began working in the corporate world for four years. I knew within the first year of working that I was meant to be a teacher. I did not like the feeling of constantly sitting in a cube with no freedom or creativity. I craved the outdoors and the positive, cheerful faces of young students. It was then that I realized I wanted to pursue my career in teaching. I knew that I wanted to teach abroad in South Korea before I began graduate school for teaching as I felt that it

would help broaden my experience and viewpoint on the education system in the United States. I applied to the competitive program to teach abroad in South Korea and was accepted to begin teaching in August 2015 and stayed for two years until August 2017.

During my second year of teaching English in South Korea, I was assigned to teach a month-long mentor program with high school students at the Gwangju Natural Science High School in Gwangju during their winter vacation. I was warned from other teachers in my elementary school that this is where students that were “trouble-makers” would go or who did not fit the conventional high-school student who went to school for 12 hours straight and then studied competitively for 4 more hours every night before bed. I walked in nervously the first day not sure what to expect.

The school was within walking distance from my apartment and yet I had never noticed there was a hidden high school behind the fields of grass, gardens and farmland. The school was built for students who wanted to go into agriculture, baking, or animal pet care. It was surrounded by fields of farmland, plants and animals within and around the school walls. The school had specific rooms for dogs, cats, fish, and other small creatures. I walked up the path of long grass and gardens into the entrance of the school and could hear chirps and barks in the distance. It was filled with beautiful pictures of nature along the walls and plants everywhere. It was unlike any other school I had ever seen.

I waited in the classroom anxiously not knowing what to expect. Eight students walked in with excited and anxious smiles on their faces and shyly said “hello.” They all introduced themselves and told me their hobbies and passions that ranged from farming,

baking, and their love of animals. I was instantly reminded of the stereotypes that other schools had of this school. I told the students that I loved that this school was filled with nature and animals. I asked the students to explain why they wanted to come here. Most students explained that their love of farming and animals brought them here. One student told me, “I didn’t do very well at the other school but I am really happy to be here because my passion is to work with animals and we get to do that everyday. And be outside in nature.”

That last sentence stuck with me. I thought about all of the students in South Korea who spent countless hours indoors everyday studying hour after hour. They only have 1 hour a week of gym class in high school but most students skipped that hour to study instead. I thought about the beauty of Korea and how the country is built on seventy percent of mountainous regions, yet how very rare it is to see young students on the hiking trails, going for nature walks or utilizing the beautiful surrounding areas with students and teachers. It was in that classroom that I felt the importance of being able to bring students outdoors to learn and grow.

I went home that evening brainstorming how I could incorporate nature into my lesson plans for that month. An important part of teaching English is to not only incorporate speaking, but also reading and writing. I put together a treasure hunt game that involved the students using a small journal booklet I had made with blank spaces to fill in what they found outdoors by using descriptive words and sentences. The students were allowed to use their cellphones to take pictures of items around the school campus. After they finished the treasure hunt, they had to use their personal pictures of the items

and their journal entries to put together a slideshow on PowerPoint that the students then had to present to the class. The students went above and beyond what I imagined and the research and beautiful photography skills they had were breathtaking. They told me how much fun it was to be able to use their cellphones for a project and how they felt it was very creative and useful in learning. They were also able to print off the pictures at school and paste them into their journals. They said that they planned to keep their journals forever. I never imagined the power that technology and nature could have together until I worked with these dear students of mine at the Environmental School.

Growing up in Minnesota, I spent my entire summers in northern Minnesota at our cabin. I spent long days swimming, fishing, hiking, and exploring the outdoors with my siblings. Filling buckets, digging up dirt, finding bugs and worms, and figuring out which leaf matched which tree. I loved science class and exploring the school grounds while doing science projects such as raising a caterpillar into a monarch butterfly. My love of nature has grown as I have become older but it has always stemmed from when I was a curious, young child. Photographing nature has always been a past hobby of mine and it has been an important way to share the beauty as well as educate others. With teaching abroad in Korea, I was able to utilize photography and sharing it in my classroom as well as with my family back home. I realized the strength that technology brought into the classroom and being able to explain historical references to the pictures as well as share on social media the beauty behind it. It gave a better visual for my students to be able to see videos and pictures of Minnesota. I have always found that

using technology in nature has been a very important aspect in my life and I wanted to find a way to incorporate it into my own classrooms.

The Purpose of My Research

It is important for me to find out how teachers are able to enrich learning by allowing students outdoors with technology. I want to know the pros and cons of using technology in a classroom as well as the pros and cons of getting students outdoors with nature-based learning. And finally, I would like to understand better the benefits that getting students outdoors with technology can have. Technology is an ever-growing part of our society and educational apps represent about 10% of the total apps downloaded in the iOS App Store, as there were over 150,000 educational apps as of March 2015 (Zhang, Trussell, Tillman, & An, 2015). It is important as teachers to understand and utilize technology however I find it even more important to be able to ensure that students are still able to experience the outdoors and the benefits that it has for students. I feel that if teachers have the resources and understanding regarding students learning with technology and nature, that our classrooms will provide stronger collaborating, increase knowledge in our students and provide a strong roadmap for students to learn and grow. In my capstone I hope to answer: *How can nature-based learning and technology be combined to enrich learning experiences in elementary school classrooms?* Often when students and adults alike think of nature and learning outdoors, they think of science class. But I want students to be able to learn outdoors in other classes, such as literature, writing, and even mathematics while utilizing technology. I have found the

benefits of journaling for students to be very beneficial and I would like to see how they can all be incorporated into one another.

The purpose of this paper is to explore the different avenues with technology and getting students outdoors with nature-based learning, how it can be incorporated into our everyday classroom and to understand the benefits that this may have on our students. I'd like to know how we, as teachers, can better utilize both of these forms of old and new and incorporate them together to build a better learning environment for students.

Summary of Chapter One

My experiences from childhood as well as teaching abroad in South Korea have all played an important role in finding this research topic. Currently, I only have my own personal experiences and observations to explain the benefits I have seen with nature-based learning combined with technology. My goal with this capstone is to create a website that will allow teachers to become a resource for teachers to utilize nature-based learning with technology. I want to ensure that there is evidence and research to help provide the benefits of getting students outdoors with technology and help future teachers learn better ways of incorporating the outdoors with technology.

Preview of Chapter Two

In Chapter Two of my capstone I will review current literature on benefits of getting students outdoors using technology. I will discuss the pros and cons of using technology in the classroom. I also look at current trends and the pros and cons of having students learn outdoors in nature. I will research current statistics on students using technology as well as getting outdoors. I will also gather information on the current needs

and concerns elementary school students. Finally, I look at what the overall pros and cons of getting students outdoors using nature-based learning incorporated with technology.

CHAPTER TWO

Literature Review

Introduction

Chapter one was centered on exploring my own personal background and experiences and identifying that reason I chose to explore the research question: *How can nature-based learning and technology be combined to enrich learning experiences in elementary school classrooms?* Chapter one explained the purpose of my capstone project and the importance of building a curriculum for my Capstone Project that will provide lesson plans that incorporate nature-based learning and technology. It is important to find out the benefits that getting students outdoors with technology can have. I want to know the pros and cons of using technology in a classroom as well as the benefits and disadvantages of having students learn in outdoor nature-based learning. And finally, I would like to understand better the benefits that getting students outdoors with technology can have.

Chapter Two will review current literature on the benefits of getting students outdoors. This chapter will discuss the pros and cons of using technology in the classroom. I also look at current trends and the pros and cons of having students learn outdoors in nature. I research current statistics on students using technology as well as learning outdoors in relation to nature-based learning. I will also gather information on the current needs and concerns of elementary school students. Finally, I look at what the overall pros and cons of getting students outdoors using nature-based learning incorporated with technology.

Nature

Research in nature-based curriculum in elementary school classrooms will provide information on the benefits and disadvantages that students may have in learning outdoors. The first part of this section will discuss the use of nature in different classroom curriculums in elementary schools. It will discuss the benefits for elementary school students to be in nature and how nature can play an important role in the classroom as well as bringing nature into the classroom. The second section will discuss any disadvantages of being in nature and incorporating nature-based learning in the classroom. It will discuss the possible outcomes that can happen when students are confronted with different factors that determine outdoor learning in the classroom. The last section will discuss factors that may help motivate students in the opportunities to learn outdoors in all different subjects.

Benefits of nature. There are many different ways of thinking about learning in nature and outdoor nature-based curriculums in elementary school. Nature-based learning can involve classrooms stepping into nature to learn or bringing nature into the classroom as well. One of the main benefits of outdoor play in nature is providing students with the space to move freely and one of the most natural and powerful modes of learning for young children (Maynard & Waters, 2007). Erickson and Ernst (2011) found the following:

> Nature play is not just outdoor play. While children might spend time on a playground, this type of play is unlikely to put them into direct contact with

> nature and offers a different set of benefits. Nature play is children playing with nature and it has many benefits. (p. 97)

Maynard and Waters argued that in the outside environment children have better relationships with their classmates, as they are able to easily move away from confrontation outside and are less likely to show signs of frustration and lack of cooperation. Nature can help strengthen emotional bonds between classmates. Elementary school students have more opportunities for negotiating, sharing, problem-solving, and working together (Erickson & Ernst, 2011). Activities in nature outdoor learning can range from nature walks, observing an item for science class in groups or writing a reflection in your journal after being outdoors. Students are able to collaborate with one another and compare and contrast their findings in partner work or whole group work. Students learning outdoors also provides first-hand environmental education. Students are able to see and touch real nature and better understand and form an increasing interest in environmental issues by developing a positive and caring attitude towards nature (Maynard & Waters, 2007).

Many children spend hours that they used to spend playing outdoors watching television, playing video games, and playing on screens such as iPads and mobile devices. There are many cognitive benefits to learning outdoors. While running and jumping outdoors can help students reap the benefits of helping to avoid depression, obesity and shortened attention spans, exposure to plant and animal life help in the actual classroom with allowing students to have increased attention spans after being outdoors

(Jacobi-Vessels, 2013). As Jacobi-Vessels stated, “This migration from playing in the yard to playing a video game is called Nature Deficit Disorder” (p. 5).

Disadvantages of nature. Although there are many positive benefits in getting elementary students to learn outdoors, there are disadvantages as well. Parental concern is a factor that comes into play with having elementary students outdoors and learning. Many parents may not feel comfortable allowing their children to play outside when they are at home due to the safety of the neighborhood and finding appropriate areas of access to parks (Jacobi-Vessels, 2013). It is important for teachers to be transparent with parents and legal guardians as to what their plans are for bringing students outdoors in elementary school. Teachers can help educate parents about different lesson plans they will be doing outdoors as well as put together a list of benefits that teachers find for bringing students into nature and doing nature-based lessons outdoors (Louv, 2009).

It is also good for parents to be aware that safety precautions are always being considered when bringing elementary students outside. Jacobi-Vessels suggested that appropriate supervision and teacher interaction and taking weather conditions into consideration when deciding whether or not to go outside is very important. If it is a warm day, then going outdoors early in the morning is very important in the case that the weather becomes too hot throughout the day. If the weather is cold, then ensuring that all students have the correct clothing to bundle up in. Teachers should also make students aware of different poisonous plants that may be outdoors and the appropriate etiquette when bringing students outdoors for their safety.. As Richard Louv stated,

> Our sense of urgency grows. In 2008, for the first time in history, more than half the world's population lived in towns and cities. The traditional ways that humans have experienced nature are vanishing, along with biodiversity. (p. 44)

As research has helped conclude, there are many benefits for students to learn in outdoor nature. Outdoor learning can be a valuable teaching tool for students, providing them with skills to use within the classroom, as well as in everyday life. Further exploring these help to begin to answer: *How can nature-based learning and technology be combined to enrich learning experiences in elementary school classrooms?* Evidence suggests that having students connect to nature can help students become calmer, more curious, better balanced children into the classroom. Getting outside is also a great stress reducer for teachers (Louv, 2009). By taking students outdoors, it offers students a rich framework to allow students movement, keep their interest, and grow their learning in different subjects in the elementary school classroom in unique ways that a traditional classroom may not be able to provide. If teachers are unable to bring students outdoors, then teachers are able to still bring different nature-based activities into the classroom, such as bringing in rocks or plants for observations.

Technology

When defining and researching the use of technology in the classroom, technology refers to any usage of computers, iPads, mobile devices like smartphones and tablets, digital cameras, social media platforms and networks, software applications, and the internet (Pitman & Gaines, 2015). It is important to understand the use of technology in today's elementary school classroom. "Technology is transforming students into

explorers and teachers into guides" (Armstrong, 2014, p. 41). The first part of this section will provide an overview of the benefits of using technology in the classroom. The second part of this section will discuss the disadvantages of using technology in the classroom. Lack of funding, resources, too much screen time and lack of understanding can all play a role in negative aspects of technology. The last part of this section will explain how technology is integrated into everyday lesson plans in elementary school classrooms.

Benefits of technology. In today's fast changing world, technology has become a strong component of everyday learning in elementary schools. In an elementary school setting, technology should be thoughtful and intentionally used to support learning and help build different skill sets in students. Technology can improve reading, mathematics science, and motor skills (Daugherty, Dossani, Johnson & Wright, 2014). When looking at the benefits between the classroom and technology, technology is helping to transform students into researchers and explorers (Armstrong, 2014, p. 41). According to research conducted by the U.S. Department of Education, teachers nearly "universally" agree that laptops and tablets have been shown to improve class participation by empowering students to take control of their own learning (Armstrong, 2014).

Tech-savvy students tend to like sharing their information and knowledge with their peers which helps give students a sense of accomplishment as well as responsibility. It also helps collaboration between students with learning to help each other (Armstrong, 2014, p. 41). Although there is a digital divide between schools, districts, and students, it can be beneficial for students to use technology within elementary schools, especially if

they are unable to have these resources at home (Pitman & Gaines, 2015). According to a 2009 national survey by the National Center for Education Statistics (NCES), 99% of teachers had computers either in the classroom or that could be brought into the classroom every day, and 95 % of the computers had Internet access. However, even with this improved technology availability and access in classrooms, only 40 % of the K-12 teachers surveyed across the country reported using technology ‘‘often’’ in instructional settings (Pitman & Gaines, 2015). With the use of more mobile devices within the classroom, students express a stronger interest in STEM (science, technology, engineering and mathematics) subjects than students who do not use these devices in the classroom (Armstrong, 2014).

Students are able to have opportunities for creativity with assignments using iPads such as creating videos, podcasts, recording voices, and creating speech bubbles in apps such as Bookcreator and My Story (Dunn & Sweeney, 2018). Students also have opportunities to work in small group settings when using the iPad as a part of writing or the use in projects. There are also great opportunities for teachers to share access and connection between home and school life. Parents are able to be connected to their students' lives at school and have quick access to their child's teachers with the use of apps such as SeeSaw and Schoology. Students are also able to record their own voices which helps with speech and language difficulties, allowing students to hear and record their voice (Dunn & Sweeney, 2018). As the articles show in the first section, there are many benefits to using technology in the classroom and a clear link between opportunities for academic success.

Disadvantages of technology. Although technology is becoming more abundant across elementary schools, there are still many schools that are not utilizing technology to their full capability as there is a technology gap among many schools. A lack of funding, bandwidth, technical support, mobile devices, software, teacher acceptance, and district policies are among the reasons that more students are not using technology more often at schools (Armstrong, 2014; Pittman & Gaines, 2015). As tablets and smartphones become more prevalent in households and classrooms in the United States and globally, parents, teachers, and students may need more information on how to use these devices for educational purposes in their classroom and in the student's homes (Zhang, Trussell, Tillman, & An, 2015).

Some school districts use 1:1 technology, which means that students are each given a tablet or iPad to use within the classroom. Other school districts are implementing "rent-to-own" programs, which allow students to purchase rental fees for tablets (Pittman & Gaines, 2015). The digital divide within schools, districts, and students can be felt among students and teachers alike. A study by Pittman and Gaines on technology integrated into third, fourth, and fifth grade classrooms in Florida school districts found that no significant correlations were found between the level of technology usage and the teachers' professional development related to technology, age, or years of experience. By far, the largest number of participants reported lack of available computers/hardware to be the strongest barrier to technology integration (Pittman & Gaines, 2015).

Students may rely heavily on search engines for research projects, homework, book reports, and paper but lack the understanding on how to find reliable sources and judge the quality of information they access (Armstrong, 2014). Elementary school students should be educated on what makes a source credible and the understanding that the internet is full of biases and fake news. Teachers need to help and encourage students to understand navigating the online world and be able to incorporate it into their own classroom usage. In regards to the research question, *How can nature-based learning and technology be combined to enrich learning experiences in elementary school classrooms?* It is important to understand that there is a strong need for both nature and technology in the classroom and that can be implemented consistently with the help of teachers and resources. This next section will look into the use of nature and technology within the classroom.

Nature and Technology

Research on technology and nature will provide information on different ways to incorporate the use of technology in outdoor learning. The first part of this section will discuss technology use in science courses. It will also expand outside of science and explore literacy and other technology-enhanced activities for elementary school classrooms. The second part of this section will research different mobile applications that are used in the classroom setting and the use of them in combination with outdoor nature-based learning. The final section will discuss the importance that nature can play a role in different activities within the classroom, such as journaling, nature walks or observations.

Nature and technology combined. Students can spark their interest and creativity in developing stories with the help of nature (Holloway & Mahan, 2012). Students can read or listen to stories about nature and compare them with real life nature surrounding their school grounds. Students can observe natural objects outdoors and make observations while writing about them and compare their observations with partners in their class. Nature walks can be a great exercise to get students outdoors and observe the world around them. Nature walks can be observed within the school boundaries, the playground, trees or plants outdoors, as well as even the cracks in the sidewalks near the school (Holloway & Mahan, 2012). Students should take notes while they are walking and listen to the surrounding sounds, notes of what they see and objects they can touch and feel. After students take note of these items, students are able to write it down within a notebook in their classroom and begin the notion of sharing their story digitally. Students can then collaborate with other students to pick specific similarities they found within their nature walk and produce these photos on digital apps such as SeeSaw or finding digital information online and producing a story on PowerPoint to the class regarding their nature walk (Holloway & Mahan, 2012). Students are able to work on collaboration with one another intertwining their experiences in nature with the use of technology.

Mobile applications in the classroom. Many 1:1 classrooms are using iPads starting as early as kindergarten and children are spending less time outdoors learning and more time indoors learning. Today's 8 to 18-year-olds spend an average of seven hours and 38 minutes per day on entertainment media such as TV, video games,

computers and cellphones, leaving little time for nature exploration or much else (Holloway & Mahan, 2012). It is important for teachers to have the resources to allow for the opportunity for students to learn outdoors while still being able to utilize technology. According to a 2018 study done by Hougham, Nutter, and Graham, outdoor lesson planning did not detract from students' learning experiences and helped to increase students' confidence and interest in digital tool uses. It is important for students to understand how to utilize technology in an outdoor setting academically, as many students have only used digital platforms as an entertainment factor in home settings (Hougham, Nutter, & Graham, 2018).

The application, Geocaching, is a popular app that provides students with real-world treasure hunts that utilize a GPS device in which to search for hidden caches at specific locations. The application, Geocaching, is a great resource for students to work on their skills of following directions, decoding clues, understanding latitude and longitude and also teachers are able to create academic scavenger hunts within the application (Bryne, 2014). Bryne also discussed other applications that are useful in the classroom, such as Spring. Spring is an application where students are able to record observations about temperature, barometric pressure, and humidity. Students are also able to make their own Weather Channel style videos where students can practice their knowledge and vocabulary with weather using keywords and terms that they are learning within the classroom. These different applications are very useful to incorporate nature into the classroom. They are also useful to use within different subjects across science, literacy, reading, and even mathematics. Students are able to make observations about the

weather and use those key vocabulary terms in writing and discussion with their partners and whole class group work.

There are many different applications that are used across classrooms on iPads and tablets. Nearpod is an app that allows teachers to create multimedia presentations with interactive features and control the activity with the company's mobile app. LanSchool is also used on most tablets and smartphones, which helps teachers curb abuse and distractions of students using iPads or tablets within the classroom. This app has the ability to black out screens, limit what students can and cannot do; send messages to students; allow silent, individualized help sessions; and take quick polls (Armstrong, 2014.). These applications help teachers take control of what the students are using their tablet devices for and ensure that students are using the appropriate applications for their specific school work and subject.

There are many apps that help integrate technology into the classroom and allow an opportunity for more communication between students, teachers and parents alike (Dunn & Sweeney, 2018). As we begin to dive deeper into understanding more of the research question, *How can nature-based learning and technology be combined to enrich learning experiences in elementary school classrooms?* This next section will take a look at the different needs of specific elementary school students in their classrooms and additional safety concerns that guardians or parents may have been working with outdoor nature-based learning and technology.

Needs of Elementary School Students

Needs of elementary school students refers to where students and teachers are at professionally and developmentally when it relates to technology and nature-based learning. The first section will focus on solidifying the need of using technology and nature in elementary school and focus on teachers' knowledge and the ever-changing technology that is placed within classrooms. It will also discuss aspects of differentiation and where students are developmentally, from different grades and ages within elementary school to students with special needs. The second section will focus on safety concerns between students and outdoor learning and technology as well as parental concern.

Elementary school concerns. There are many factors that play into the importance of using technology and nature within the schools and differentiation that takes place within elementary school classrooms. Teachers are able to empower students and bilingual learners with words and images that emerge from deliberate use of outdoor experiences and play while students are also exploring and discovering their world. (Arrgeuin-Anderson, Alanis, & Gonzalez, 2016). Teachers can design plans and activities that directly involve nature and outdoor learning along with technology by catering specific needs for their students and classrooms. In a young elementary school classroom, children from culturally and linguistically different backgrounds are able to learn new vocabulary with direct exposure to animals and plants (Arrgeuin-Anderson, Alanis, & Gonzalez, 2016). These activities are hands-on and allow students to acknowledge meaning of words with actual objects that they encounter in nature. As

Arrgeuin-Anderson, Alanis, and Gonzalez also stated, “Planning outdoor learning experiences, teachers can draw on students innate inclination to engage with nature and facilitate content and language development” (p. 76).

In 2011, according to the U.S. Census Bureau, 83.7% of the population lives in metropolitan areas, which can also mean living in “concrete jungles” which limits a child’s ability to explore the natural world around them (Feille, 2013). Feille also argued that creating a school garden allows all students to work collaboratively together as well as given an opportunity for positive recognition and engagement within their school and community. Depending on the different needs of students, students can be assigned to different tasks to take care of the school gardens. It is a great opportunity for students to explore learning about different plants and the life-cycle of plants while being able to make observations and learn how to care for a garden.

An important factor to remember when bringing students outdoors in nature is to establish rules before setting outdoors (Arrgeuin-Anderson, Alanis, & Gonzalez, 2016). Teachers can pair students during nature walks or arrange students in small-group settings. Connecting students together not only creates a safe barrier to explore together, but also allows students to discuss what they see, think, and what other questions may arise during their experiences exploring and learning outdoors. It gives students an opportunity to work together and share their opinions and observations and to gain additional exposure from their peers.

“Appropriate” technology use by young children has been defined largely by the amount of time a child spends using technology, a measure called screen time

(Daugherty, Dossani, Johnson & Wright, 2014). With more tablets and computers being used in the classroom, concern may be growing amongst parents and guardians as to how this knowledge is being appropriately controlled. Young students need devices that are sturdy and more easily manipulated and allow teachers access to total screen time (Daugherty, Dossani, Johnson & Wright, 2014). Although there are safety concerns using technology, the Common Core standards are also increasing integration of technology into the classroom and specific standards are directly correlated with digital literacy which is helping to normalize these technological advances for parents' understanding (Daugherty, Dossani, Johnson & Wright, 2014). Teachers also need to be educated on how to appropriately integrate technology with elementary students and understand the use of technology for pedagogy of specific subjects (Mishra & Koehler, 2006). An important factor teachers need to remember is that showing students appropriate ways of using technology will help students better learn while allowing parents to feel more at ease with students using technology as an appropriate use of time (Daugherty, Dossani, Johnson & Wright, 2014).

Summary of Chapter Two

This chapter reviewed the literature on the use of technology and nature-based learning in the elementary school classroom and helped give more information on the research question: *How can nature-based learning and technology be combined to enrich learning experiences in elementary school classrooms?* The earlier half of this chapter looked at the role of nature and outdoor learning and the pros and cons of outdoor nature-based learning. This allows me to recognize that there is a need for consistent

management systems outside of my own experience within the school where I teach. This chapter also looked into the role of technology in elementary school classrooms and the benefits and disadvantages of using technology in the classroom. This chapter also helped provide information regarding technology and outdoor nature-based learning together. It discusses the importance that nature can play as a role in activities incorporated in the classroom with technology. And finally, this chapter discusses the different needs of elementary students and focuses on the safety concerns between students and outdoor nature-based learning and technology as it pertains to guardians and parental concerns. In Chapter Three of my capstone I will provide a detailed explanation of the project I will conduct. I will give an overview of the project along with the intended audience, where the context in which the project takes place, as well as the frameworks and theories used to complete the project. The rationale behind the project will also be explained.

CHAPTER THREE

Project Description

Introduction

This chapter first explains the framework used to create this Capstone project and the different resources that depend upon to answer the research question: *How can nature-based learning and technology be combined to enrich learning experiences in elementary school classrooms?* In both chapters one and two I wanted to help find information regarding the use of technology and nature-based learning in elementary schools. They are both very contradicting to one another, but I have found the importance of including both technology and outdoor nature-based learning into classrooms. I give an overview of the project description, principles of good web design, setting and audience, the timeline of this project, as well as a conclusion.

I decided that the best way to share my research is to actually create a website where students and teachers can utilize the information in their own classrooms that intertwine both technology and outdoor nature-based learning experiences. I created a website based on the research I have found combining both topics to enrich learning experiences. This website has different lesson plans that incorporate MN State Standards for elementary school grades in several subjects. The website incorporates several different lessons instead of weekly or a whole unit as I feel it is more realistic for all teachers to be able to use these lesson plans in different public schools across the state and tie into the MN State Standards. It is available so teachers can find different lessons on different subjects for their curriculum throughout the year. It includes lesson plans for

Science, English Language Arts and Math. I categorized the lesson plans for specific units in the subjects and they can be intertwined between those subjects. All activities have the materials needed and provide the MN State Standards for the specific lesson. All activities incorporate using technology as well as outdoor learning in nature.

Project Description

In order to further explore the research question, *How can nature-based learning and technology be combined to enrich learning experiences in elementary school classrooms?* I created a website consisting of ideas and lesson plans for teachers to implement in their own classrooms using technology and nature-based learning. This website is geared towards teachers working with students in elementary school grades in Minnesota. All lesson plans coincide with the MN State Standards. I will continue to add different elementary school grade lessons in Minnesota State Standards in Science, English Language Arts and Mathematics subjects. All the ideas for lesson plans were created originally by me, otherwise any ideas and information I have gathered from other sources will be shared with specific links to the sources.

My website was created using a website builder called Weebly. It has an "about" section, which describes my project and describes the purpose of my work. Another section "Research" includes various quotes from research findings for explaining the benefits of using nature-based learning and technology together. It also lists different sources that have been found throughout research done during the literature review. Next, there is a number of lesson plans with objectives related to English Language Arts, Science and Mathematics Common Core Standards. These website pages provide

step-by-step instructions with an overview of the lesson materials, content standards and any various PDF or materials that may be provided, if needed.

These lessons include various modes of use of technology as well as nature-based learning. They include activities done with tablets, journaling, nature-walks and observations. This website provides lesson plans that can be implemented flexibility throughout the school year depending on the units. The lessons are made to incorporate the different seasons of Minnesota and will build off of key skills throughout the school year. The lessons can be modified and changed for specific units or grades. The hope is that students have more access to nature-based learning while utilizing technology and gain benefits from both learning outdoors and learning from using technology.

Building a website to help other teachers is a crucial part of teaching and ensuring that students are learning to the best of their ability. This website will be shared with future districts that I work in. I will also advertise this website by giving access to any future teachers I work with. I will create Search Engine Optimization with keywords of nature-based learning and technology to ensure that other teachers are able to find and access the information. The information on the website was created originally by me. Any lessons in the future that I create with the use of other sources will be acknowledged with a link to the original source. Whenever creating a website, many factors have to be considered including current best practices, state standards, learning targets, and your target audience. I created a website that focuses on different activities and lesson plans. This website helps to highlight research I have done and be a useful and user-friendly resource for teachers.

Principles of Good Web Design

Being an educator, teachers are constantly researching to find new ideas and resources for their classroom. An important part of this project is ensuring that the website I created is user-friendly, concise in the information provided for lesson plans and is based off of the principles of good web design. I have researched good web design practices created by the United States Department of Health and Human Services. Leavitt and Shneiderman (2006) state that content is the most critical element of a Web site. Other studies have reported that content is more important than navigation, visual design, functionality, and interactivity. It is important that the content of this website is clearly addressed and the lesson plans are clearly described with appropriate resources to be used in the classroom. I created this website based on the information I researched to be user-friendly and easy to find clear and concise information.

Setting and Audience

The intended setting for this website project is for any teachers to have access to it in an elementary school that supports both indoor and outdoor learning. It is a resource used for teachers in schools that have access to outdoor nature and outdoor learning or have the willingness to allow students to utilize this website and tools on field trips to outdoor nature centers or on their own school grounds. It can be used in science, math and literacy classrooms and be able to incorporate into different subjects across elementary schools. The intended audience is elementary school students and this specific

website provides activities for all elementary school grades. Students need access to tablets and have the ability to venture outdoors at least once a month or be able to bring different nature materials into their classroom. This website is intended to be used by teachers in the classroom as well as outdoors in nature.

Conclusion

In this chapter, I provided an overview of the project description, principles of good web design, setting and audience and the timeline including various resources to help answer the research question: *How can nature-based learning and technology be combined to enrich learning experiences in elementary school classrooms?*

In Chapter Four I will review what I have learned throughout the Capstone process by reflecting on my own personal growth, discuss my own experience with the literature review, and consider possible limitations on the project. I will also explain how I will personally use this website in my own future classroom and how this website is beneficial to future elementary school teachers.

CHAPTER FOUR

Conclusions

Introduction

My experiences from childhood as well as teaching abroad in South Korea have all played an important role in this capstone project to set out to answer the question, "*How can nature-based learning and technology be combined to enrich learning experiences in elementary school classrooms?*" During my experiences, I found the lack of resources to provide technology and nature-based lessons and felt that it was important to be able to create a website that shares resources and lesson plans that can be used in not only my future classrooms, but share with other teachers as well. The website contains three different subjects, mathematics, science and literacy. Each subject includes several lessons that coincide with MN State Standards. The purpose for creating this website is to enrich learning experiences for elementary school classrooms using nature-based learning and technology.

In this chapter, it will begin with a reflection of my own personal growth from this capstone. I will then discuss the most informational and impactful research I have found through my literature review as well as limitations I found throughout my research. Lastly, I will describe how this project is beneficial to future elementary school teachers and how I personally plan to use this capstone in my future teaching career. And finally, I will complete this chapter with a conclusion.

Personal Growth

The process of completing this capstone has led me to reflect on my own personal growth throughout this project as not only a researcher, but also a writer and creator. I have reflected often on the information I have learned throughout this process. As a researcher, I have found the importance of discovering new and relevant material to help find information on my research topic, but also to not forget that past findings are just as important. I focused on not only looking for data and information in the United States but also researching articles from Europe and other countries that Nature-Based learning is more prevalent, such as the Nordic countries. As a researcher, I have become very intentional with the time I spend finding accurate and reliable articles that help to provide accurate information to use in my project. I have also looked at various means of ways to find sources, such as libraries, the internet and reaching out to different organizations within Minnesota to learn more about utilizing nature-based learning and technology. Interviewing other teachers on their own experiences has also helped pave the way for my capstone project.

While growing as a researcher, it has also helped develop my sense of writing and creativity in creating lesson plans. I often reflected on what sort of resources and articles I read that felt user-friendly for teachers to use and how I wanted to reflect my own creation of a website to be user-friendly and allow it to be simply laid-out and easy to find information. I found that websites that were very clear and straight to the point of topics were much easier to learn from and decipher their true intentions of what the lessons or articles were about. It helped me to reflect and recognize that I wanted to build

a website that allows other teachers to easily find the subject and MN State Standard relating to that subject and use the lesson plans in their own classroom. It also leaves enough creativity of their own to change the lesson plans to modify for their own classroom, and allows for their own type of assessment for differentiation within their class.

Another important aspect I found in developing my writing is being intentional with my organization when researching. Looking through hundreds of documents, articles, and websites, I found that the best way for me to become organized was to create a filing system on Google Docs that allowed me to categorize my research findings into the different sub-categories: technology, nature-based learning, and technology combined with nature-based learning. It allowed me to easily keep track of the different articles I found depending on the topic I was researching. It also allowed me to see if I needed to find more articles on certain topics throughout the research.

Literature Review Discussion

This capstone project helped me recognize the need for more information and research based on nature-based learning and technology. I was able to research many great articles that pertained to technology in the classroom and the growth that technology has played within our elementary schools. I learned about the benefits of technology and the challenges that technology play in our schools. Multiple sources on technology were very helpful when researching. Armstrong (2014) helped to redefine the need for technology in the classroom and helped me better understand that lack of funding, resources, and teacher experience are all different factors that face the

technological gap we have in the United States. Dunn and Sweeney (2018) brought in an international perspective of using iPads in teaching literacy and the experience this brought within the classroom. These articles helped to broaden my horizon on technology use within the classroom and the benefits and disadvantages that schools have when using technology.

After researching nature-based learning, I found that many of the articles I found were based on early childhood programs such as Pre-K programs. There were many articles based on European Nordic countries that used nature-based learning in their own curriculum throughout schools. I found many great articles that helped to reinforce the importance and benefits that nature has on children. There were also some articles that discussed safety issues that may occur for students learning outdoors. Multiple sources were particularly impactful when researching. Louv (2009) and Erickson and Ernsts (2011), helped to support the use of nature in different classroom curriculums in elementary schools and helped define why nature-based learning has a positive impact in the classroom. It made me feel more strongly that our elementary schools need to incorporate nature-based learning into the curriculum to allow students to have exposure to the outdoors and the benefits of that.

While feeling like I had a solid understanding of both the pros and cons of using technology in the classroom and nature-based learning, I found that finding articles on both topics combined were harder to discover. An important article that I did find, "Enhance Nature Exploration With Technology" written by Holloway and Mahan, helped to broaden my sense of understanding the benefits of technology and nature and helped to

create ideas of how to create lessons using both. Hougham, Nutter, & Graham (2018) found that introducing technology in outdoor learning helped students feel more confident in using technologies outdoors, more knowledge of nature and technology and an increase in how to use different technology outdoors to enhance learning.

Limitations

A review of the literature found an abundance of sources supporting nature-based learning and technology as separate entities in the classroom. However, there was much less information that combined both technology and nature-based learning in the classroom and I found this to be the biggest limitation when researching. This lack of research in both nature-based learning and technology combined helped to form more excitement around my capstone project and the need that schools have to utilize technology and nature-based learning. As a teacher, it has encouraged me to think outside the box and create lesson plans that are manageable and can be used within any type of elementary school. People often feel that nature-based learning means that you must bring your class into the woods to learn or partake in a grand adventure, however you can find nature right outside your school's doorsteps.

Although there were limitations to finding research relating to both nature-based learning and technology, I found that with all of the great resources and impactful research I found through my literature review, this topic is in fact needed in elementary schools today. This journey has allowed me to view from the teacher's eyes the needs and benefits of incorporating both technology and nature into my own classroom.

Possible Implications

A possible implication that could arise from my project is the lack of technology and nature across various types of schools. Location, access to technology and access to outdoor space are all factors.. Not every school has access to technology, iPads or tablets within the classroom. Schools also may not have access to an outdoor area for nature-based learning and may not have a safe neighborhood to explore the outdoors.

Communicating Results

After researching, I am now in a position to share what I have learned and better help support other teachers in their own journey to find useful information and lesson plans to use within their own classrooms. It is important for me to help teachers view technology and nature-based learning outside of just science courses. By creating this website, I am able to show how nature and technology can also be used in mathematics and literacy. All of the subjects also include the MN State Standards to go along with the specific lessons.

There is a contact link provided in the website to allow other teachers to email me with their own lesson plans and ideas. I will then share this information on the website with credit to the original creator. I will personally share this research and capstone project with any past and future schools and teachers I have worked closely with. I will provide a link to future districts that I work in and will also encourage other teachers to use the information. This website will be available as a search engine for other teachers looking to find resources and gather information for nature-based learning and technology. I will create Search Engine Optimization with keywords of nature-based

learning and technology to ensure that other teachers are able to find and access the information through internet searches. This website will also direct teachers to multiple sites and resources to further their education on nature-based learning and technology.

Benefits for Future Teachers

This project will allow any teacher access to this website to help build future lesson plans for their classrooms. It will help teachers not only use these lesson plans in their own classroom but also share their own ideas and lesson plans for other teachers as well. It will become a tool to share ideas and information. The current lessons on the website coincide with the first grade MN State Standards, however, future grade lessons will continuously be added and shared with other teachers to add their own lessons. All future grade lessons will coincide with the MN State Standards for that specific grade. This website will be a platform for other teachers to share their own ideas and lesson plans as well.

In my own future classroom, I plan to incorporate these lesson plans into my teaching and curriculum throughout the year. It is important that I continue to collect information and continue to update the website with new activities and experiences I have found helpful to enrich student learning with nature-based learning and technology. It will be imperative that my own classroom will incorporate both technology and nature-based learning lessons in different subjects and I continue to educate myself on the benefits of nature-based learning and technology.

Summary

Chapter Four began by reflecting on my own personal growth throughout this capstone project. It discussed the most informational and impactful research found throughout the literature review as well as limitations. Lastly, it helped to describe how this project is beneficial to future elementary school teachers and how I will personally use this capstone in my own future teaching career.

This capstone project was created to answer the research question, "*How can nature-based learning and technology be combined to enrich learning experiences in elementary school classrooms?*" Through extensive research, evidence shows that nature-based learning and technology combined does help to enrich learning experiences in elementary school classrooms. This project was made with passion and hope that other teachers will utilize the tools I have provided throughout the website to incorporate nature-based learning and technology into their own classrooms. I hope that my website will help to continue to grow and educate future teachers to expand their own knowledge and create a platform where technology and nature-based learning can be intertwined to help enrich the learning experiences of students.

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