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UTILIZING NATURE JOURNALS IN CURRICULA AND LESSON PLANS FOR
GRADES 3-5

by

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

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DEDICATION

To my family and friends, for all that you did to support and encourage me throughout this process. To my professors, classmates, and content expert for guiding and supporting me in all of my courses. To my faith, for giving me hope in tough times and joy during my accomplishments. This Capstone would not have been completed without all of you.

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CHAPTER ONE

Introduction

Since the advent of writing, people of all walks of life have been journaling. Humans have catalogued thousands of hours and words onto pages of bound parchment. Jotting down whatever comes to mind, whether about their day or a story they have imagined from dreams, journaling has been a way to express feelings and organize thoughts. It is no surprise that the environment has been a subject for journaling over the years. Whether the musings of John Muir or the conservation thoughts of Aldo Leopold, nature journaling has had an impact on how people have learned about and interpreted nature. With the rise of book assignments and worksheets in schools, journaling has often fallen by the wayside as a means of creativity and expression.

Thinking on this, I have wondered if reintroducing nature journaling in education would reignite curiosity in nature and make cataloguing thoughts and aspects of nature more enjoyable and easier to accomplish when teaching environmental education to different age groups. My research questions is as follows: *How do we utilize nature journals for school-age children to increase students' understanding and appreciation of the natural world?* Using this with third through fifth grade will be the focus. In this first chapter, I delve into my interest in this topic, such as why I want to create a research project about nature journaling, as well as my story of how I got to where I am in respect to the environment and how this ties into my interest in nature journaling. The utilization

of nature in education for those who might be interested in nature journaling is also touched upon.

Context

Being outside and in nature has been a lifelong journey for me. It began when I was very little. I remember exploring local trails in the woods with my family, viewing gaggles of goose families, hordes of insects, and herds of deer. Even when we were not hiking as a family, I still grew up spending time outdoors. Digging in the mud and grass with friends in elementary school, and exploring the untamed woods near my house were a few of the ways I learned about the environment. One vivid memory I gained was from my younger years. It was winter, and the snow was just softly falling down around me as I laid on my back in the garden with my eyes closed. I was taking in the sounds around me and the feeling of laying in the snow and gentle breeze when I was jolted alert by a loud chattering. I had opened my eyes to find a grey squirrel not five feet from me on the nearby fence, looking at me and obviously perturbed with my presence in the garden. Since this memory, I have encountered various wildlife in similar ways and I have always had a sense of awe and wonder with the natural world.

When working as a field technician in Iowa, soon after I graduated with my undergraduate degree, I was given a small notebook to write down my observations and to collect data during the wildlife surveys that I performed. I tallied down species and numbers of individuals seen and also jotted down some species that were not the targets of our surveys. For work purposes, we called these observations “incidentals” and did enter them into our work database. When we first received these notebooks and started recording in them, I did not think much of it. It was just a tool we used to record data

without carrying pieces of paper that blew away. However, six months and two notebooks later, they became more than just a tool. These notebooks became a little personal part of me. I would flip back through them to see what I had recorded on previous days of field work. I added a few small sketches of things I saw when taking a small break out in the field. At the end of the season, instead of tossing them in the recycles, I hung onto them as a reminder of the job. Looking back on it now, I had unknowingly and unintentionally created two little nature journals.

I began volunteering at a local wildlife refuge several years after I received my undergraduate degree in wildlife biology. At the time, I was having a career crisis, as I was tired of working seasonally and the stresses of an extremely physical job was taking its toll. While performing field jobs, I had always enjoyed learning about nature and teaching what I knew to coworkers. This was how I found myself plucking up the courage to lead groups of students around the refuge and teach them about nature and different habitats. Our curriculum consisted of students visiting the refuge during three different seasons and comparing what we saw. One of the tools we used were worksheets that were incorporated into the students' nature journals, or were pasted directly into the journals as a "journal entry". Most of the teachers we partnered with for this program utilized the nature journals outside of our program during school. The journals were used at different natural areas, including a small oak savanna habitat created on school grounds. This was when nature journaling was really presented to me as a teaching method. I had heard about nature journaling prior to this but had not spent much time participating in or learning more about it. Volunteering with the environmental education program made me delve further into this nature journaling concept for education. It

seemed many of the students enjoyed the bit of freedom journals afforded them; the choice to write or draw gave them the opportunity to fill out the journal in a way that was more comfortable to them.

While helping out with the environmental education program at my local wildlife refuge, I was also introduced to the *Compass to Nature* booklet written by the U.S. Fish and Wildlife Service (n.d.) at a learning center in northern Minnesota. We used the general ideas in this booklet to guide our program at the refuge. This booklet broke outdoor learning into four compass points: place, phenology, naturalists, and journals. The booklet discussed how to use a nature journal in outdoor teaching, and also gave information on how to start journals and ideas to incorporate when the journal was being implemented. *Compass to Nature* (n.d.) gave me additional concrete insight into nature journaling, how to create one, and ideas of how to use them in the field. Journals were not just fun activities to do after I read this booklet, they were also learning tools that educators could use with their students.

I had attended a workshop about outdoor environmental education a year or so into my volunteering at the local refuge. I was intrigued about their push to use nature journals, which the workshop instructors used for formal and informal education. They began refraining from worksheets and instead tailored each journal page to reflect the lesson being taught. The journals that they created and used were simple and inexpensive. When teaching students, one instructor explained they prompted their students to set up a journal page a specific way, usually with different boxes containing plenty of room, and have them count, write, and draw what they observed. We were shown examples of different journal pages, and the staggering variety of drawings, written insights, and

amount of wildlife they counted was incredible. It was as though a journal gave them the freedom to choose whatever “language” (words, numbers, or drawings) that allowed them to learn better and express themselves more fully. One thing the instructor also pointed out was that these journals made it easy for students to refer back to previous days to compare and contrast, or to identify creatures they had previously described in the journal to the creature they were looking at now.

While obtaining my masters degree, I took several ecology-type courses, phenology and biomes. I was instructed to go to natural areas and record information on plant growth, types of plants, wildlife, and other characteristics of habitats such as soil and temperature. I instinctively went for a small field notebook to record my observations. The majority of my collected field data was written in words, but a difficult to identify plant or animal was occasionally sketched. I also recorded numbers of different species I saw, what was blooming and growing, and some observations on animal behaviors. A small notebook, as opposed to a full sheet of paper or not recording any data and relying solely on memory, was so much easier to utilize and enhance understanding. Additionally, I took many photos to augment my journal notes. Having this journal also helped me review things I had seen on previous days to make quick identification or comparison to other days’ recordings.

Rationale

The further I get into my master’s degree, and the more education I provide to students, the more I begin to understand the possibilities that journaling has in teaching and education. It has prompted me to think about how incorporation of nature journaling into lesson plans and curricula could be possible when teaching. My dabbling in nature

journaling throughout my career and life showed me the incredible versatility it holds. While in middle and high school, I remember the word “worksheet” translating to “chore” or “work”. Worksheets were tasks to quickly complete and forget about. I think using journaling, especially with science, can give students freedom to record data, observe things more closely, and get more excited about learning in different ways. Some students prefer to write, others to draw, and still others to use numbers when learning. Journaling allows them to use whatever method they are comfortable using, while still working on methods they are not as confident in. Unlike worksheets, bound notebooks can be more portable, making it easier to be brought along inside and out.

Educators could also benefit from utilizing a journal in many, but maybe not all, situations and subjects (Comstock, 1939). Journal pages can be adapted to work with many different kinds of data collection or activities. Comparisons from several days of observations could be easier, as the student need only flip to different pages instead of sifting through loose papers.

It is more important than ever to foster a connection with nature. In David Sobel’s book *Beyond Ecophobia* (1996), he pointed out that we need to cultivate a relationship between nature and children by exposing them to the local natural world and help them learn to appreciate the environment. It is apparent that fostering a love for nature will help a child not only appreciate and care about it in the future but truly understand it. Richard Louv (2005) explained in his book *The Last Child in the Woods* that nature is needed to keep children’s senses acute and expand their creativity and humility. So many skills can be learned by simply exploring nature with an interested adult (Carson, 1965),

including humility and awe (McMillan & Wilhelm, 2007; Sobel, 1996), wonder (Carson, 1965; Comstock, 1939), and patience (Warkentin, 2011).

Summary

I have always had an affinity for being in nature learning and teaching, but the idea of utilizing nature journaling in education came later in life. From using them during field jobs collecting data to working with students, nature journaling intrigues me. I decided to take nature journaling further and create a capstone project around the question *How do we utilize nature journals for school-age children to increase students' understanding and appreciation of the natural world?* to understand the benefits and how to overcome the challenges when utilizing them in education. I already have a modest glimpse into using nature journals when teaching. Making learning more fun and less of a chore for students, and prompting them to explore nature outside of the classroom is a goal for me, and learning how and why to use nature journals would aid me personally and professionally.

In the following pages and chapters, I will be breaking down nature journaling and how it applies to environmental education in both formal and informal settings. Chapter two will focus on prior literature on the subject and will also look at the history behind nature journaling through the lens of naturalists. Subtopics to be discussed are nature in education, journaling in education, naturalists who journaled, and nature journaling. These subtopics discuss benefits and drawbacks, as well as theories of each. The subsection on naturalists who journaled provides background history about many naturalists who utilized journals when exploring the environment and the implications of that toward education. Chapter three breaks down the methods of using nature journaling

in environmental education. This chapter touches on the incorporation of journaling into smaller lessons and larger curriculum for third through fifth grade teachers and their students. Chapter four reflects on the process of researching and producing the curriculum and lesson plans, and any final thoughts about nature journaling as it relates to education and beyond.

CHAPTER TWO

Literature Review

Throughout my life, I experienced meaningful moments with nature. Whether a solitary visit with squirrels or collecting data in the field, nature has touched my heart in many ways. More recently I turned my career from field research to environmental education. One of the methods I used in lesson plans while volunteering for an environmental education program was a nature journal, which was a way of recording observations while exploring and learning about wildlife and the habitats they live in. If one was to perform research on nature journaling, there are a few subtopics that would be helpful. These topics offer a strong foundation in understanding nature journaling and developing curricula or lesson plans utilizing journals.

My research question is *how do we utilize nature journals for school-age children to increase students' understanding and appreciation of the natural world?* This project focuses on incorporating nature journals into curricula for third through fifth grade. The basic components need to be broken down to create an understanding of using nature journals in education. The following topics are essential components of understanding nature journaling, and comprise the literature review: nature in education, journals in education, naturalists who journal, and nature journals. Nature and journals in education are essential subtopics when answering the central question. Also of importance are naturalists who have journaled, as they paved the way to modern nature journaling.

Rounding out the subtopics is nature journaling, which needs to be understood if the central question is to be answered. In the following sections of chapter two, literature on each subtopic is introduced, as well as their applications to answering the central question. This literature begins in the next section with nature in education.

Nature in Education

The journey to understanding nature journaling begins with the key component of nature. A background in the use of nature in education helps set the stage for understanding how to journal in it, and then how to apply it to curricula.

There are many applications nature has to teaching, including the utilization of many subjects while outdoors. This section on the subtopic of nature delves into the many benefits of its use in education, including subject integration (Comstock, 1939; McMillan & Wilhelm, 2007; McNamee & Timken, 2017; Schwab & Dustin, 2014), observation skills (Carson, 1965; Warkentin, 2011), life skills (Comstock, 1939; Dowdell, Gray, & Malone, 2011; Louv, 2005; McMillan & Wilhelm, 2007; Sobel, 2011; Warkentin, 2011), wonder and awe (Carson, 1965; Comstock, 1939; Dowdell, Gray, and Malone, 2011; McMillan & Wilhelm, 2007; Warkentin, 2011), and creativity (Comstock 1939; Dowdell, Gray, & Malone, 2011). The final area touches on the challenges of nature in education, including logistic issues (Sobel, 1996), ease of maintenance in indoor teaching and traditional playgrounds (Dowdell, Gray, & Malone, 2011; Louv, 2005; Sobel, 1996; White, 2004), time constraints (Louv, 2005), and fears parents and children harbor towards the outdoors (Louv, 2005; Sobel, 1996; White, 2004). This subtopic concludes with applications to nature in education.

Subject integration. Several subjects, such as language arts, mathematics, art, history, geography, and science, have the potential to be learned while immersed in nature (Comstock, 1939; McMillan & Wilhelm, 2007). McMillan and Wilhelm (2007) used nature as a means to incorporate into a language arts course, and also touched on its applications to science and mathematics with seventh graders. It was noticed by McMillan and Wilhelm that students had a difficult time connecting what they knew and what they needed to learn in their science and math curriculum; thus the need for incorporating multiple subjects into one assignment, which happened to be a nature study. Comstock (1939) had very similar sentiments when it came to incorporating education subjects into the study of nature. She explained that several subjects in addition to language arts can be utilized when incorporating nature into education. Comstock proposed that teaching about nature can be applied to art, as drawing is a natural way to express oneself, whether or not students are considered artists. In the publisher's forward in the twenty-fourth edition of Comstock's (1939) book *Handbook of Nature-Study*, it was pointed out that nature education is merely a form of ecology. Geography can be taught using nature as well. Comstock (1939) explained that students can better understand geography by understanding how geography affects the creatures that live under its influence. History is another subject that can be taught in nature education; one of Comstock's examples came when viewing trees. The life of a tree pushed students to think about what had happened in history when the tree was alive. Aldo Leopold (1966) displayed the history that can be learned by sawing an old oak tree in his book *A Sand County Almanac*, with his interpretation of the years being sawn through with each stroke. Mathematics being utilized in nature education was yet another point Comstock

(1939) made. She proposed that any outing in nature prompted the use of mathematics, such as studying the proportion of flowers that turned into apples on a tree. Physical education is another subject that can be taught in nature, although there has been little research on this. A study by McNamee and Timken (2017) explained that teaching outdoor physical education courses can help foster lifelong physical activity for students, which was echoed by Eaton in an article by Schwab and Dustin (2014). They found some students who struggled with traditional sports could truly thrive on physical education in nature, such as canoeing and mountain biking. One of the teachers McNamee and Timken (2017) interviewed for their research pointed out that integrating multiple subjects, including physical education and nature, can reconnect people to nature and develop a sense of place. Schwab and Dustin (2014) also pointed out the use of physical activity in nature as a restorative break from other school subjects and life's challenges.

These examples of teaching other subjects utilizing nature show that there are many applications to nature in education. Students have an opportunity to learn a subject while outside of the classroom, and in a different way than what could be accomplished in the traditional classroom.

Observation skills. Another aspect of utilizing nature in education is displayed when nature helps students use their senses to a heightened degree. Warkentin (2011) had this in mind in her study of using journaling in Central Park with her students. She started to hone these skills by having the students create a sound map of everything they heard around them. Her exercise allowed students to understand that to engage with nature, all of their senses needed to be used; this also increased their observation skills. Rachel Carson (1965) also mentioned how nature can influence the use of the senses in her book

The Sense of Wonder. Carson discussed senses other than touch that should be utilized when learning about nature. She said the sense of smell has almost more influence on our memories than any other sense. Hearing was another sense Carson touched on, and she acknowledged it can be more difficult to use than some of the other senses. She suggested stopping and listening to nature with children, as well as talking about what was heard and the implications of noise in nature to encourage students to pay attention to this important sense. Carson mentioned the sense of sight, and stressed to look at the little details of a large part of nature to better understand it. Observation skills are a necessary benefit of nature education to be honed with practice.

Life skills. Honing observation skills at a young age aids students when they are older, and life skills are no different. There are many applications nature has to students, such as fostering the life skills of humility (Louv, 2005; Warkentin, 2011), patience and attention to detail (Warkentin, 2011), sympathy (Sobel, 1996), and learning effects of risk-taking (Dowdell, Gray, & Malone, 2011). In addition to its applications to teaching, nature can foster in students social and emotional skills necessary for modern human survival.

The importance of exposing students to nature was offered by Louv (2005). Louv proposed that learning about nature fosters humility. Echoing these sentiments, a study by Warkentin (2011) observed journaling in Central Park, and she saw participants feeling small in the world, another indicator of nature fostering humility. The participants learned that humans do not run everything (Warkentin, 2011). On a similar note, Warkentin explained “naturalists are skilled in patience, attentiveness, and quiet presence” (p. 231). Warkentin postulated that because her journaling location was in the highly urbanized

area of Central Park, her students found that patience, attention, and silence required fine tuning for them to pay attention to the nature around them. Sobel (1996) pointed out that learning about nature lead students to express sympathy toward it, which leads to stewardship. Maybe not as noticeable at first, nature allowed children to engage in some risk-taking, thus helping understand the effects and consequences of actions in the real world (Dowdell, Gray, & Malone, 2011) before they become adults. Learning these skills at younger ages can help create adults prepared for the rigors of life.

Wonder and awe. Students exposed to nature in education consistently end up using and keeping their sense of wonder and awe of the natural world. This was explained most notably by Carson (1965). She pointed out that for children, there are so many moments to see things for the first time; these moments, containing discoveries and excitement, are full of wonder and awe. Carson stressed that wonder toward nature can be taught with an adult that shares an interest and excitement of the environment. Comstock (1939) noticed students found “in such a [nature] study a fresh, spontaneous interest which was lacking in formal textbook science, and the phenomenal success of her work seems to prove she was right” (p. vii).

Building on Comstock’s understanding of interest in the natural world, when comparing indoor and outdoor early education centers, Dowdell, Gray, and Malone (2011) found children had a natural fascination with nature. This was concluded because the children were constantly sharing their nature findings with the teachers. Also noted by Dowdell, Gray, and Malone, children seemed to instigate the nature searching and finding themselves.

One of the findings of McMillan and Wilhelm (2007) in a nature-observation study with students was that the consistent and everyday rhythm of nature gave students a sense of peace and time to think about their lives and how they relate to the world. Warkentin (2011) found similar ideas, noting the students' "consistent interaction with nature had influenced their perceptions of who they were in relation to the physical environment" (p. 374), and that included "awe and gratefulness" (p. 374). McMillan and Wilhelm (2007) saw that students thought no matter what humans did on a nightly basis, the moon was still there. Carson (1965) noted this most eloquently, stating "There is something infinitely healing in the repeated refrains of nature - the assurance that dawn comes after the night, and spring after the winter" (p. 38). Comstock (1939) also believed that students engaged in nature education can "realize fully that they are working units of this wonderful universe" (p. 2). This awe and wonder becomes an important aspect in utilizing nature in education and can aid in what gives the students the interest in studying subjects in nature.

Creativity. Creativity is yet another part of using nature in education. Dowdell, Gray, and Malone (2011) noted that play in natural areas created more imaginative play. Their research displayed the most common type of play observed was what they called "imaginative activities" (p. 29). An example of imaginative play was using natural elements available to the children to pretend cook; another example was the children pretending one was a bear and hiding from said bear (Dowdell, Gray, & Malone, 2011). A student fostered and created a sense of imagination when studying nature, and this sense of imagination was centered on the facts and truths they learned when outside studying nature in a hands-on way (Comstock, 1939). All of these benefits of nature

study are well and good, but there are some challenges to consider when utilizing nature in education.

Challenges of nature education. Of course, there are also a few barriers to utilizing nature in education. These include logistical difficulties such as parent permission, preparation, unruly students (Sobel, 1996), cultural acceptance of structured play areas and activities (Dowdell, Gray, & Malone, 2011; Sobel, 1996; White, 2004), organized activities taking precedence (Louv, 2005), and fear from parents and students toward nature (Louv, 2005; Sobel, 1996; White, 2004). It is important to recognize these barriers to understand the whole process of utilizing nature in education.

Sobel (1996) touched on some of these logistical issues. Going outdoors to learn involved many steps. Parents needed to give permission, teachers needed to ensure students dressed properly for field work, students were at times harder to control, and worksheets got lost or blew away in the wind (Sobel, 1996). Plus, if something occurred during the outing, there was the fear of lawsuits that prevented some schools and teachers from even considering teaching outdoors (Louv, 2005).

It was pointed out by White (2004) that many adults assumed concrete and structured playgrounds were appropriate outdoor spaces for children; these types of playgrounds were where adults could take a break from the children and keep a better eye on them, and the structures themselves were also easier to maintain. The ease of maintenance was also cited by Dowdell, Gray, and Malone (2011). Sobel (1996) stated that teaching about rainforests in the classroom was cleaner than doing a field study of a local forest.

It also seemed that more structured and organized activities took precedence over free play and learning (Louv, 2005). Louv stated “in an effort to value and structure time, some of us unintentionally may be killing dreamtime” (p. 116). The point Louv made here was that we need to value time in nature not only as a way to relax, but a way for children to learn about the world and gain essential skills for when they become adults.

One of the bigger challenges that kept children from going out in nature was fear. Parents feared allowing children to explore nature due to crime, strangers, and the possibility of children getting hurt (Louv, 2005; White, 2004). Sobel (1996) also pointed out the fear that students harbor towards nature. He believed that teaching children the problems with the world first was creating a fear of nature, what he called ecophobia. He proposed teaching youth to appreciate and love nature first, then introducing the problems nature faces when they are older, to get beyond the fear of nature that many children have (Sobel, 1996).

Summary. Exposing children to nature in play helped “strengthen the link between play and learning” (Dowdell, Gray, & Malone, 2011, p. 26). There are so many benefits to learning in and about nature. It seems that there are almost endless subjects that can be taught while outside and then recorded in a journal. Learning about all of these subjects that utilize nature might help students link different subjects to each other. The skills learned while being exposed to nature help create a well-rounded student who is more prepared for the real world and more connected to the natural world. I agree with Carson (1965) and others that keeping the wonder and curiosity in learning is important. If the student no longer yearns to learn more or gets bored of a subject, then learning will become a chore. If we work to keep that wonder, that awe of the world, students will

continue to be eager to learn and understand a wide variety of subjects. It is important to recognize the challenges of using nature in education. If the teacher and school are prepared for the different situations that can arise, and teach the students proper behavior when outside, a meaningful experience can be had by both. Moving from traditional play areas to more natural areas appears to be on the rise, and talking to schools about having a wild place for study should be important. Fear can be a difficult challenge to overcome, and can be aided through teaching students about what they fear. Part of the fear stems from not knowing anything about the item or setting, or being exposed to unsolvable problems at too young of an age.

The next section tackles the other half of nature journals. To be able to record data and make meaning, it is paramount we start by understanding how journaling has been used in education in past literature.

Journals in Education

Once we obtain a review of research on nature in education, it becomes important to transition to the other side of the nature journaling equation. Journaling in education is reviewed in this section. Because journaling can be versatile, there were many benefits observed with its use in education (Asfeldt, Hvenegaard, & Purc-Stephenson, 2018; McGough, 2013). These included increased critical thinking, reflection, inquiry, writing development, sharing journals with others, their utilization as time logs, and ownership of work. The benefits of utilizing journals in education (Asfeldt, Hvenegaard, & Purc-Stephenson, 2018; Cisero, 2006; Good & Whang 2002; McGough, 2013) listed are discussed in detail. Also of importance are the drawbacks of using journals in education

(Asfeldt, Hvenegaard, & Purc-Stephenson, 2018; Cisero, 2006; Good & Whang, 2002), which is explained in this topic.

Critical thinking and inquiry. The first benefit discussed is the application of critical thinking to journaling. McGough (2013), in her article *Journaling: A Bridge Between School and Home*, pointed out that educational thinking can be difficult to learn outside of the classroom. Journals helped students expand and critically think about the topics they learned in school (McGough, 2013). Asfeldt, Hvenegaard, and Purc-Stephenson (2018) noticed students were better at critically thinking and pondering about their experiences while group journaling. One of the major understandings about Asfeldt, Hvenegaard, and Purc-Stephenson's study was that students were able to think critically not only about their own experiences but also the experiences of others by sharing their journal entries.

Closely related to critical thinking was the development of questions. Good and Whang (2002) noted that journals allowed the student to question what they read or saw, which lead to deeper thinking and applications to the students' personal lives. Good and Whang went on to say that the journals were aids in producing reflection, deeper thinking, and questioning. These benefits lead to the use of reflection in nature journals, discussed next.

Reflection. Reflection is another method that applies to journal use. Many researchers noted the importance of reflection, and observed it most commonly through understanding reading materials assigned in class (Cisero, 2006; Good & Whang, 2002). Cisero (2006) described reflective journaling as a way to connect the reading to student experiences, break down and question the subject matter, and summarize passages or

information. Asfeldt, Hvenegaard, and Purc-Stephenson (2018) noticed similar results in their group journaling study, and observed journals helped students develop their skills at reflection.

One of Cisero's students (2006) put into words the benefits of using reflection in journals, and stated "the reflection necessary in the writing helped me better understand how I think" (p. 233). Reflection as a tool, as concluded by Cisero in her study, created potential for students to personally understand subject matter while also shaping how that student thought. Cisero also defined journal writing in a reflective way.

Writing development. Another benefit to journaling in education is the development of the language arts through writing. McGough (2013) proposed that journaling can "create dialogue through oral and written language" (p. 63). As building educational vocabulary was difficult to learn outside of the classroom, including it in curriculum and possibly through the use of journals in the form of writing increased student vocabulary (McGough, 2013). Related to this, English language learners benefited in the use of journals in school; journaling helped them work on their language through writing (McGough, 2013).

McMillan and Wilhelm (2007), in studying nature journals' effect on their seventh grade students, found a very interesting pattern. Even though the students were only required to write two sentences and provide one sketch on their moon viewing, most of the students incorporated some degree of poetry in their journal entries. The educators concluded, among other things, that nature journaling helped develop the students' language arts skills. To further this observation, it became apparent students knew the difference between what was called "aesthetic and informational writing" (p. 375), as

they kept each type of writing separate in their journal entries (McMillan & Wilhelm, 2007). It was found by McMillan and Wilhelm an increased ability of reading and understanding a variety of texts from their students because of journaling. Additional benefits of using journals in education are seen when the journals became shared, and is discussed in the following next section.

Sharing journals. When shared, journals aid students in and outside of the classroom. Asfeldt, Hvenegaard, and Purc-Stephenson (2018) found that students learned more from others' thoughts on a subject. McGough (2013) also proposed that students ended up learning when sharing their own ideas with others through writing. Researchers found that journaling created a sense of community among students; they connected with each other and shared ideas and thoughts (Asfeldt, Hvenegaard, & Purc-Stephenson, 2018). These same researchers found that when students shared their journals, they saw the same experiences from others' perspectives. *The Compass to Nature* handbook (n.d.) noted similar benefits when journals were shared with classmates, and stated an increased understanding of different learning styles and experiences. Journals were brought home and shared with parents and other family members when McGough (2013) performed her study on journals in education. The added benefit here included a student's eagerness to write and share with their parents as well as the possibility of creating new thoughts and experiments at home, on a subject taught in school (McGough, 2013). Sharing journals increased the capacity to learn for students in many ways.

Time logs. Additionally, journals are utilized as time logs, as noted by Asfeldt, Hvenegaard, and Purc-Stephenson (2018). They found journals made great time logs and allowed students to create memories with each other and their subject, as well as review

past memories and thoughts on a topic. Laws (2016) noted this phenomenon of journals becoming memory logs as well. He explained that many thoughts and experiences are forgotten by the human mind, even the ones we believe are important. Laws went further and proposed journal utilization allowed people to “burn a moment into [their] memory” (p. 2); they allowed permanent logged memories of a particular experience. Asfeldt, Hvenegaard, and Purc-Stephenson (2018), and Good and Whang (2002) saw that journals allowed students to easily review past entries for an overall reflection, or have a “meaning-making process of closure” (p. 255) on a place or topic. Good and Whang (2002) touched on the notion of journals acting as time capsules and allowing students and teachers alike to note changes and progression of thoughts and ideas. Journals have the potential to be reviewed years after creation, and can then be applied to learning new topics (Asfeldt, Hvenegaard, & Purc-Stephenson, 2018). Keeping and revisiting memories was a wonderful benefit of journals in education for additional learning and personal development.

Ownership of work. Not only did journals create time capsules, but McGough (2013) shared that students also took ownership of their learning through the use of journals. Laws (2016) discussed this sense of ownership. He stated that one can take responsibility for entries in the journal, and thus proved they experienced something. Asfeldt, Hvenegaard, and Purc-Stephenson (2018) noted ownership by the students fostered emotional health as well. All of these benefits add to the process of using journals, but there is need to consider the challenges journals pose when being used in education.

Challenges of journaling in education. Asfeldt, Hvenegaard, and Purc-Stephenson (2018) noticed a few drawbacks during their study on the effects of group journaling on learning. One was student anxiety of writing something that others would see or hear. Good and Whang (2002) also noticed some nervousness that students had regarding expressing their learning in ways that were new to them, what they called “non traditional formats” (p. 262). On a related note, McMillan and Wilhelm (2007) had some initial concerns about using regular nature journals with their students because of the high-tech society that students lived. They were concerned that the seventh-graders they were teaching would not learn anything without the use of technology. Another challenge became the concern of enough time to participate in the journaling activity (Asfeldt, Hvenegaard, & Purc-Stephenson, 2018). One of the students that participated in this study noted that it took a decent amount of time to complete the journaling process, but the pluses to utilizing it outweighed the minuses.

It was noted in a study performed by Cisero (2006) that although many students benefited from the use of reflective journals, this process did not seem to increase learning in high achieving students or the low achieving students. Cisero did think that journaling itself might not have been to blame with these results, as students need to actively participate in journaling activities to experience the benefits. Cisero also concluded that if the students do not make the effort to think reflectively, the reflective journal will not be as beneficial to them. This study applied to college age students, and may not have been indicative of younger students, as college and elementary school expectations are much different.

Summary. As quoted by a student in Asfeldt et al.'s (2018) research article, the journal was a great “facilitator of learning” (p. 250). One benefit that did not quite fit in with any of the other headings was noted by students who participated in the study by Asfeldt, Hvenegaard, and Purc-Stephenson (2018), and was that students had options to express their creativity in new ways.

All of these benefits come together to form an argument for the use of journals in education. There are many skills that students benefit from learning, and journaling fosters these skills in students of many ages. Critical thinking, asking questions, and reflection using journals in any subject can be learned and reused during future classes and outside the classroom. Writing in a journal increases writing skills, a necessary skill in school and beyond. Sharing journals or some entries in journals with other students leads to reflection on others' work as well as reflection of their own work. One of the major benefits of journaling is the creation of a time capsule. Students possess journals that are accessed at any time and aid in future experiences, remembering old memories, and to comparing progress or thoughts from one year and subject to the next. If students create ownership of their work, it means more to them than just an assignment that told them exactly what to do and then becomes forgotten. One of the takeaways that should be stressed to students is a journal does not have to be solely for school, it can be applied to life experiences as well.

The drawbacks to journaling are to be kept in mind when utilizing journals in many of these studies. Calming the fears and anxieties with learning using new concepts at the start create a more comfortable learning experience for all involved. Journaling

should by no means be the answer to every concept taught, but can be used as an aid to many.

The next section starts to connect nature in education with journaling in education. It delves into the mystery of naturalists who journaled to learn, explore, remember, and reflect. Beginning with histories of those who journaled when out in nature, the next section provides a backdrop to understanding why using journals are becoming so popular with naturalists and environmental educators today.

Naturalists Who Journal

Naturalists, defined by *The Compass to Nature* (n.d.), are people who study nature, enjoy spending time outdoors and enjoy learning about nature. This section breaks down six well-known naturalists and how they utilized nature journaling for themselves and to inspire future naturalists.

Throughout history, people who explored nature also brought along a sketchbook, among other items, that allowed them to record evidence of what they observed and to delve into questions and thoughts about the natural world. Leslie, Tallmadge, and Wessels (1996) pointed this out in the book *Into the Field: A Guide to Locally Focused Teaching*. They mentioned naturalists as well as others such as scientists and adventurers, used written and illustrated journals of what they saw and did while exploring the outdoors. Laws (2016) pointed out that journals were used by many people, including naturalists. Leslie, Tallmadge, and Wessels (1996) went on to say “the pen, pencil, or brush was the sole way of communicating what naturalists had seen on their adventures” (p. 36). People can engage in journaling just as these naturalists did, and record their findings using these tried and true techniques first utilized by those of the past (Leslie,

Tallmadge, & Wessels 1996). *The Compass to Nature* (n.d.) focused a portion of their guide on environmental education to naturalists. These naturalists aided teaching youth who explored the outdoors in using certain behaviors and gave students role models to look up to. These behaviors helped students better observe natural phenomena.

Naturalists became teachers to students and guided them in understanding how and why the natural world should be studied (*Compass to Nature*, n.d.). There were many naturalists to choose from who could be wonderful role models to understanding nature. The six discussed in this section are: Meriwether Lewis and William Clark, John Muir, Aldo Leopold, Beatrix Potter, and Rachel Carson.

Meriwether Lewis and William Clark. Meriwether Lewis and William Clark embarked on a journey to chart and explore the new Louisiana Purchase for Thomas Jefferson in 1804 (History.com Editors, 2018). They traveled an estimated 8,000 miles and the journey took them two years to complete (History.com Editors, 2018). Thomas Jefferson had Lewis and Clark keep records of their explorations and adventures across the western United States, and these records are now considered a gem in history (Moulton, 1998). Moulton stated that these journals written by Lewis and Clark contained information on geography, peoples they met, and the natural wonders they observed. Lewis and Clark were one of the first Americans to venture into the American West and keep records of their journey (Moulton, 1998). Included in these journals as noted by Moulton were maps written mostly by William Clark, botany, wildlife information, astronomy, languages and other information about Native American peoples, and more.

John Muir. John Muir, considered one of the most famous and influential conservationists in history, utilized journals in his lifetime (Sierra Club, 2018). Some of

the notable things he accomplished included co-founding the Sierra Club and influencing President Teddy Roosevelt's conservation efforts in the United States (Sierra Club, 2018). Muir used journals to describe not only the natural world he observed with words and pictures, but also to write to others and construct books to raise awareness and push others to care about and enjoy the environment (Gisel, 2002).

Aldo Leopold. Aldo Leopold also kept findings and thoughts about the natural world in journals (The Leopold Foundation, 2018). He kept detailed observations of his personal and professional experiences in nature much like Lewis and Clark (Moulton, 1998), and also created writings and essays of his thoughts on natural workings and conservation much like John Muir (Gisel, 2002). Gisel noted that his writings inspired much of how we think about conservation and conservation policies to this day. One of his most famous works, *A Sand County Almanac*, was drawn from many of his journal notes. This book detailed several observations of wildlife and plants as well as his thoughts about conservation subjects during his time on his farm in Wisconsin and adventures across the country (Leopold, 1949).

Beatrix Potter. From a very young age, Beatrix Potter was fascinated by the natural world, and documented her findings in beautiful watercolor drawings (Lear, 2014). As she grew older, she was most interested in creating watercolors of fungi and insects, and submitted many of these to museums and colleges. Some of these watercolors are still consulted to this day. Potter included observations and diagrams in many of her watercolors (Lear, 2014). Her observations and watercolors were very detailed, similarly to how many other naturalists drawings and writings were, such as Aldo Leopold and Meriwether Lewis. In her later years, Potter would be known for her

children's tales that included many watercolors of rabbits, mice, and other creatures. Her detailed works of art are great sources of inspiration to aspiring young naturalists.

Rachel Carson. Although most known for work *Silent Spring* (1962), Rachel Carson was a naturalist at heart. Similarly to Aldo Leopold, Carson explored the world and wrote about the environment and gave her interpretations of how humans live and interact with it. Carson wrote many books and articles for government organizations and newspapers, mostly about the sea she studied and loved (Lear, 1998). Her book *The Sense of Wonder* (1965) discussed using senses to explore the environment and finding the wonder and awe in nature, and that a child only needs one willing adult to take them outside for them to truly enjoy the natural world.

Summary. It may be difficult at first for students who are new to using journals and engaging in nature to know how to journal and explore. If allowed to understand and get to know those who have spent time in nature and using journals, it aids in a comfortable transition into using nature journals. Naturalists taught us so much about how to act (*Compass to Nature*, n.d.), what to observe, and how to observe it. Students have someone to emulate when exploring nature when they are introduced to naturalists. The naturalists discussed above provide ideas of how to start interpreting the possibly new world of the environment to students, and aid them in observing, understanding, and appreciating nature. *The Compass to Nature* (n.d.) summed up perfectly the reasons behind remembering and becoming a naturalist: “naturalists of the past and present help us navigate a way back into the very nature that gives us clean air to drink, nutritious food to eat, sturdy shelter to live in, safe space to play in, plus the original classroom -- an intriguing outdoor classroom -- to learn in.” (p. 15). With a background into nature in

education, journaling in education, and naturalists of the past, we can begin to put them all together and explore the additional benefits seen in nature journaling. The next section discusses a few other aspects of nature journaling.

Nature Journaling

Nature journaling is exactly what it sounds like: taking a notebook of some sort and going out and recording observations, questions, and thoughts about the natural world. All of the benefits and challenges listed in the subtopics of nature in education and journals in education apply to nature journaling, as well as a few additional subtopics. There are three areas of discussion in this section: sense of place, experiential learning, and techniques of journaling. The summary at the end will bring in areas from all the other subtopics and touch on why these topics are so important to the question at hand.

Sense of place. Nature journals in and of themselves promote an idea of place. *The Compass to Nature* (n.d.) stressed that “place takes on a central role as the main subject” (p. 16) when journaling in nature. Sobel (1996) touched on this concept of place. He noticed that youth were more connected to faraway places and wildlife than the creatures and plants that roam their own backyards. This leads to a disconnect with nature, and children would rather be indoors because they did not realize what they had in their own neighborhoods (Sobel, 1996). Sobel went on to say that we can foster a better connection with the world if we taught about local, easily seen and experienced nature. When students are not connected to the local environment, they can and try to create a local connection. Sobel explained a young girl that mistakenly assumed Ivory Soap was made of elephant tusks after learning about the plight of elephants in Africa during school and tried to take local action by creating a stewardship poster. Sobel’s point here was that

students might be better able to use this stewardship towards plants and animals that they can see and study in their own communities. He added that learning about local nature at a young age can foster empathy for the creatures and plants of faraway places later in a student's life.

Sobel (1996) noted that research shows adults who care about nature became that way through extended hours in special wild places with a caring adult. Carson (1965) also saw the benefits of children exploring natural areas nearby with an eager adult, even if that adult is exploring nature for the first time as well. Dowdell, Gray, and Malone (2011) found that children had a stronger engagement in the natural world in part to the teachers that were there to share discoveries and create activities centered around nature.

Comstock (1939) revealed that this idea of nature study is hands-on observation that leads to a deeper understanding of the world around us. Sense of place is an important aspect of nature journals, as is experiential learning. Nature journals are a form of experiential learning, which is discussed in the next section.

Experiential learning. Experiential learning means learning through experience. In their study of utilizing nature and journaling in teaching, McMillan and Wilhelm (2007) touched on the importance of experiential, or hands-on and direct, learning. They explained experiential learning had positive influences on student's learning, such as its usefulness with different learning styles and the identities of students. Leslie, Tallmadge, and Wessels (1996) explained that nature journaling was a wonderful form of experiential learning. Students were in the field, being exposed to the elements and exploring nature with their senses, and putting those senses to paper.

Students can learn and remember concepts better through experiential learning, as hands-on activities allow students to “do” as they learn, or experience what they are learning. This constitutes a large component of nature education. Instead of being told exactly what to put and what to see, nature journaling helps students write, draw, and use numbers to document what they are seeing. This act of writing, drawing, and using numbers is discussed next in the techniques of nature journals subtopic.

Techniques of nature journals. In order to present a curriculum about nature journaling, the three aspects of using one need to be broken down. This section explains why and how to use each technique when nature journaling. These techniques are words, drawings or sketches, and numbers (*Compass to Nature*, n.d.). Leslie, Tallmadge, and Wessels (1996) pointed out that naturalists use pen, pencils, and brushes to let others know what they encountered when exploring nature.

Writing is a method of nature journaling. The *Compass to Nature* (n.d.) described the many ways writing can be used, including lists, questions, and thoughts. Laws (2016) listed many of the same uses and added writing takes the form of explanations, poetry, and observations. Laws also stated writing helps increase memories of a particular outing, and pointed out that making notes about how you got to where you went and others that have gone with you can also be important to include. Another important aspect of using words in nature journals that Laws described was to note personal thoughts on what the observer saw. He stated this “increase[s] your emotional intelligence through reflection and deeper awareness” (p. 45). Laws (2016) stressed using comparisons with words in a nature journal with what you have seen before and what you are seeing now. Cornell and

Ivey (2012) noticed that many students initially needed prompts to begin learning how to write in a nature journal.

The *Compass to Nature* (n.d.) booklet described drawings as images, maps, photos, rubbings, and sketches. These are some of the ways images have been displayed in a nature journal. Laws (2016) explained the use of drawings or sketches in his book *The Laws Guide to Nature Drawing and Journaling*. Laws explained drawing helps hone observation skills and increase memory. Some of the methods he noted included projections, cross sections, and enlarging the object or parts of an object. He also pointed out that drawing is a learned skill, and one should not be concerned with making an aesthetically pleasing drawing; nature drawing in a journal was for observation and understanding. He stressed that one should “draw to see, not to make a pretty picture” (p. 86). To get better at drawing, a nature journaler needed to draw frequently (Laws, 2016).

Numbers are the third way to record information in a nature journal. Laws (2016) listed several different ways to record numbered data. These included counting, estimating, measuring, and time. He explained that counting aids in concentration and seeing patterns. Laws gave examples such as estimating numbers by counting in groups of ten or fifty and multiplying based on the space the individuals take up, measuring using a ruler, and time measured in rates, such as the number of times a bird dives for food in a given time. *The Compass to Nature* (n.d.) echoed Laws’ methods of putting numbers in journaling, and also included dates, distances, and weather data. Laws (2016) mentioned a few organizing methods such as plots and percent cover.

It is interesting to note Laws (2016) pushed his readers to use all three methods together, especially drawing and writing. He stated that using only one method can lead one away from using creativity and observation skills (Laws, 2016).

Summary. These three sections are important to nature journals. As stated, nature journals are great methods to create and foster sense of place. It is all but impossible to journal about nature without being out in nature. If students begin to create a relationship with the place they are studying, they begin to care about it. This leads to stewardship towards a place. They are in touch with the place they learn about, and can then better prepare for weather and note the changing behaviors of plants and animals in response to that weather. Nature journals are a method of experiential learning. Hands-on learning allows students to retain what they learn better. It is one thing to see a picture of a flower, but another to see the actual flower, touch it, and smell it up close. Take that plant out in its natural environment, and its role in that environment can be observed and learned. Students learn what the flower needs to survive, what eats it, how it grows, and how it moves. Journal about it, and the student can put their thoughts to something more concrete, and refer back to it when they see that plant in a new area, or when more of them appear the next year. In order to record this information in a journal, the techniques used to do so need to be understood. This is an especially important aspect of a journal's versatility.

Summary of Literature Review

All of the subtopics of nature in education including journals in education, naturalists who journal, sense of place, experiential learning, and techniques of journals are important to understand nature journaling. With this background of research in mind,

the task of answering the central question *How do we utilize nature journals for school-age children to increase students' understanding and appreciation of the natural world?* can be accomplished. This question is directed toward third through fifth grade students. So far the paper discussed why and how this topic is of interest to the author and those that might want to consider taking students outside and into nature. It has journeyed with prior researchers and applied their knowledge to the topic. Chapter three discusses the project in detail; areas included in this section are research methods, why the method was chosen, the setting and audience, and a detailed description of the project itself. It will also explain how the literature review will be utilized in the project method. Chapter three will be discussed in the following pages.

CHAPTER THREE

Project Description

Nature journaling can be a useful tool when it comes to formal and informal education. A wide range of subjects can be taught outdoors in nature including language arts, mathematics, history, and geography (Comstock, 1939; McMillan & Wilhelm, 2007). Students can hone their observation skills (Carson, 1965; Warkentin, 2011) and life skills such as humility (Louv, 2005; Warkentin, 2011), sympathy (Sobel, 1996), and wonder (Carson, 1965; Comstock, 1939). Journaling can increase critical thinking (Asfeldt, Hvenegaard, & Purc-Stephenson, 2018; McGough, 2013), inquiry (Good and Whang, 2002), and writing development (McGough, 2013). When these two aspects are joined together into nature journaling, a whole new world of options opens up. All the above benefits are noted, with the added effects of a sense of place (*Compass to Nature*, n.d.; Comstock, 1939; Sobel, 1996) and experiential learning (Leslie, Tallmadge, & Wessels, 1996; McMillan and Wilhelm, 2007). All of this can be accomplished with writing, drawing, and using numbers in a journal while outdoors in nature.

In order to be utilized properly, nature journaling needs to have structure and fit with the lesson plans already utilized in lessons or curricula. It is great to know why nature journaling is important, but it is also necessary to understand how to create curriculum with it. Chapter one has explained my personal journey that led to completing this capstone project; in other words, the context and rationale for a project on nature

journaling. Chapter two discussed prior research that has been conducted on journaling and nature in education. This chapter also introduced naturalists who have journaled, and a few other aspects that are associated with nature journaling. In chapter four, discussed in the following pages, the description of my project on nature journaling is provided. A nature journaling activity guide for grades three through five was created to answer my research question *How do we utilize nature journals for school-age children to increase students' understanding and appreciation of the natural world?* It described the rationale of a nature journaling activity guide, presented a description of the project that outlines the design and assessment techniques that can be used, went over setting and audience, and followed with the timeline for project completion.

The following section breaks down why my intended project, an activity guide, was a sound method to utilizing nature journals in curriculum and lesson plans. Rationale given by many sources was discussed and linked to the above research question and the created activity guide.

Rationale

Leslie, Tallmadge, and Wessells (1996) discussed nature journaling as a very versatile teaching tool for educators; it can accommodate several learning styles and be used in many different subjects in school. Because of this versatility, it made sense to create a series of activities, or lessons, to be used with a variety of new and established curricula in schools and nature centers. Incorporation into existing curriculum was a main goal of the activity guide.

As Sobel (1996) stated, it was usually easier and less stressful for teachers to teach about faraway places inside the classroom. This activity guide, which housed many

lessons that were used together or independently, allowed educators to ease into incorporating outdoor exploration into their classrooms and curriculum. This helped those educators who were uncomfortable with taking their class outside.

The Compass to Nature (n.d.) explained that the nature journal was a tool to understand what a student learned. This pointed to utilizing journals in education, rather than making it the center of the lesson. An activity guide lent itself to using the journal as a tool for understanding a topic. McMillan and Wilhelm (2007) stated that “openness and student choice is at the heart of both investigative projects and nature studies, we placed few stipulations on the students...” (p. 372). These two researchers allowed their students to choose how they wanted to express what they observed in their journals. Allowing students some choice expressing themselves in their journals might help them engage in the activity with more enthusiasm. Providing a small background in the activity guide on each technique in journaling and allowing all three methods to be utilized in as many lessons as possible was another goal during the creation of this project.

Sobel (1996) discussed the idea of a sense of place, and *The Compass to Nature* (n.d.) concurred with this theory. This allowed a connection to a place and pushed a student toward a deeper understanding of that place. Developing an activity guide aids in visiting a place several times. It allowed the teacher to touch on different subjects while also keeping the visits varied and interesting. This also helped the students understand that visiting the same place many times still allows them new discoveries on each visit.

Dowdell, Gray, and Malone (2011) found that children had a stronger engagement in the natural world in part to the teachers that were there to share discoveries and create activities centered around nature. This sentiment of having an adult that cares about

nature to share and experience in the child's nature explorations was shared by others (Carson, 1965; Comstock, 1939). It was important that the instructors who utilized this activity guide had a passion and wonder about the natural world. Even if it is not their strongest subject, bringing students outside to share in and reflect on what was seen fosters that wonder in them and strengthens their joy and imagination.

My capstone activity guide was based on the Project Learning Tree (2008) *Pre K-8 Environmental Education Activity Guide*. This was one of the top nature education programs in the nation that focused on experiential activities on a range of topics related to environmental education. This guide was created on the premise of teaching students "how to think, not what to think" (p. 2) about nature topics. Project Learning Tree (2008) had been utilized by over half a million formal and informal educators since 1976, and was reviewed, revised, and evaluated several times since then. This activity guide was used in many teaching and learning situations, with many learning styles, and with a variety of cultural demographics. This adaptability was in large part why I used an activity guide for nature journaling. Project Learning Tree (2008) had materials produced by experts in teaching and content, and created with research, surveys, workshops, and expert reviews. It even complied with the North American Association for Environmental Education (NAAEE) guidelines of fairness and accuracy, depth, emphasis on skills building, action orientation, instructional soundness, and usability. The activities in this guide also aligned with state and national standards. I strove to follow standards in my activity guide as well. Basing my activity guide on the framework of Project Learning Tree helped me create the best guide on nature journaling, incorporate formal and

informal education, and help educators make the best of learning outdoors and using nature journals.

Project Description

My project was an activity guide similar to the Project Learning Tree (2008) activity guide. It began with a small background on the importance and benefits of utilizing nature journaling in curriculum and lesson plans and discussed the barriers present and how to work with them or around them. Next, I broke down the general needed and extra supplies used to create nature journals, with information on how to use nature journals and how they foster sense of place and experiential learning. *The Compass to Nature* (n.d.) provided a section on naturalists as a background for traits and behaviors to follow when exploring the outdoors. A group of introductory lessons on naturalists was part of the activity I created for a foundation of how to act when observing the outdoors as opposed to recess time, as it can be hard for students to understand that they are still learning and not playing around.

The largest portion of the activity guide was the lessons. The first lesson touched on naturalists, and provided a few examples of naturalists, the senses they used while outdoors, and the behaviors they exhibited to explore nature. The second lesson described how students use their nature journals while exploring outside, and broke down the three main methods to nature journaling. The lessons that followed were broken down into the four seasons of the year. Although adaptable to any part of the world, these lessons focused on seasons experienced in Minnesota. Each lesson within each season laid out similarly to Project Learning Tree's (2008) lesson plans. Each lesson contained background information, preparation instructions, materials and time needed to perform

the lesson, numbered instructions, student pages such as identification handouts and journal page layouts, and assessment suggestions. Minnesota state Academic Standards (2007-2018), as well as NAAEE Guidelines to Excellence (2010) for third through fifth grade were included to aid in standards incorporation for existing curriculums. A section on definitions of various words was provided in the back of the activity guide, as well as a general rubric for grading and assessing the nature journal content. Including the two introductory lessons on naturalists and nature journaling, there were a total of twelve to fifteen lessons created. Each lesson was between 45-75 minutes long, and included various subjects depending on content. Subjects included in the lessons were language arts, geography, science, art, mathematics, history, and physical education. Learning outcomes varied depending on lesson content, but included understanding content, increased writing and drawing skills, appreciation and wonder for nature, and subject understanding.

Assessment

Either following each lesson or for the whole activity series, there was a rubric to aid in assessment of student understanding through the nature journals. The guide contained a section providing questions for the teacher to reflect on both the outing and what they think worked and did not work for them. Another assessment tool constructed focused on behavior while outdoors so as to work on any behavioral challenges educators may face.

A major aspect of the assessment was knowing if the project increases appreciation and understanding of the environment through the use of nature journaling. The appendix of the activity guide contained a questionnaire the instructor filled out so as

to answer that question. The instructor reviewed the student's first journal entry and answered questions pertaining to how legible and clear writing was, how advanced their use of numbers was, how detailed drawings were, if the students journaled about what was actually seen while outside, if they behaved using naturalist's observation skills, and if all they did was the minimum to get a grade or not. Partway through the school year, and especially the last entry, the instructor answered the same questions. If their writing, drawing, and use of numbers improved, if they placed items in their journals on top of what was required, and if their behavior was geared towards observing like a naturalist, the journaling activities could be viewed as a success.

Setting and Audience

The activities in the guide were to be implemented anywhere from a schoolyard to a nature center with trails. The setting needed only to be outside with as much room to roam in nature as possible. Obviously, the more nature areas to explore, the better.

The activity guide set up in a way to cater to as many settings/habitats as possible. Having a natural space to experience the environment was preferred. However, this may not be possible in an urban setting. Even places such as community gardens and small strips of grass can provide enough area to go out a couple of times a year to experience the seasons and creatures that live locally. This activity guide was created in the hopes of being adaptable to many settings, just as nature journals are adaptable to many different scenarios. The activity guide was constructed for the upper Midwest region; plant and animal species, as well as habitat preferences, were found in that area. It hopefully will be possible to create very similar lessons for different regions of the country and world.

It was preferable to have 6-8 students per adult, but one teacher to a full class was still possible. Teachers should walk the area before the students are there (a day in advance or in the morning) to get an idea of what is out there and what to point out or focus on.

The target student grades for this guide were third through fifth grade. The lessons provided in the activity guide were for those grade levels and provide the standards from the state of Minnesota (2007-2018) and the NAAEE Guidelines for Excellence (2010) for ease of use. Lessons were age appropriate.

Summary

To answer the question *How do we utilize nature journals for school-age children to increase students' understanding and appreciation of the natural world?*, an activity guide was created. An activity guide allows teachers to add nature journals and outdoor education to their existing curriculums. This activity guide focused on grades three through five, and into different subjects. Providing lessons for different subjects allowed different teachers to use nature journals, allowed for several visits to an area during the school year, and allowed applicable outdoor time with a range of topics to keep an area full of wonder and interest. This activity guide can be a bridge for nature education, place-based learning, and traditional schools. The general layout for this activity guide was based upon the Project Learning Tree (2008) activity guide. Background information on teaching outdoors and using nature journals was provided. Preparation, lesson steps, and assessment strategies were also included in each lesson.

Chapter four discusses the conclusion and major lessons learned from the creation of the activity guide and the capstone project paper. Changes made from my original

activity guide explained in chapter three are also discussed. Any new personal meanings of this project are presented, as well as what portions of the literature review ended up meaning the most during project creation. Limitations and possible future work are discussed, including the benefits of creating this activity guide.

CHAPTER FOUR

Conclusion

Even with my ever-present passion for nature and the outdoors, I would never had thought I would be completing my Master's degree for educating others about the importance of our natural resources. This project started with the question, *how do we utilize nature journals for school-age children to increase students' understanding and appreciation of the natural world?* Chapter one provided context and rationale as to why nature journals are important to me personally and to the current literature. Chapter two delved into the existing literature that was most important to the research question. Chapter three gave a background of why an activity guide was the best method for answering the research question and included a description, setting, and audience for the activity guide.

This final chapter is a reflection on the process of researching and then creating the activity guide for nature journaling. It begins with what was learned during the process, including wading through standards and decreasing the amount of work to an attainable level, and the changes from the original project description in chapter three. The second section delves into the portions of the literature review in chapter two that were the most relevant in creating the activity guide on nature journaling. The possible implications of the project are discussed next, including increasing the importance of teaching local nature to students. Limitations of the project are also presented. The last

few sections focus on how the project could be shared, how the project adds to the profession of environmental education, and ideas for future projects related to the guide.

Learning Outcomes and Project Changes

The largest lesson learned during this project creation process was that lessons take much longer to research and create than anticipated. It took me several hours to make one lesson compared to the one hour I originally thought. The research for the backgrounds in each lesson took the most time. Due to the misestimation of time, I was unable to make as many lessons as I desired. Originally I planned on making 20 lessons, then 15, then 12, and then finally settled on 10 total lessons. I was also a poor estimator of the time it practically takes to perform the lessons with students. After a discussion with my content expert, I needed to almost double the time it would take for teachers to perform each of my lessons. I had originally planned each lesson to take one hour, but increased most of them to around two hours.

Although the time underestimations were unexpected learnings, I knew beforehand that reading through and understanding the standards would be a daunting task. Thus, they took time and focus to interpret. After talking with others, I decided to try my best to find standards that applied to my lessons, but not to worry too much about getting every standard that applied to every lesson in the activity guide. It helped that the standards of my second lesson on introductory nature journaling could apply to every other lesson after it, as students journal in every lesson.

A few changes occurred from my project description in chapter three and the finished activity guide. Initially, I wanted to place a single grading rubric in the appendix that applied to every lesson. After realizing that each lesson was unique to another

(except for the use of journaling), I decided to add a grading rubric at the end of each lesson for teachers to utilize instead. My activity guide did not include all of the subjects I had intended on incorporating. Out of the seven subjects listed in chapter three, my activity guide used all except history and physical education. I decided not to include barriers to nature journaling with tips to overcome them, as I felt I lacked enough experience understanding and overcoming these barriers myself to provide advice on them. I also added ideas for each lesson for related follow up lessons or enhancements to the lessons if teachers wanted to make them longer or focus on one topic for more time. The most significant change to my activity guide involved lesson one on naturalists of history. I had initially designed the lesson so teachers introduced several naturalists to the students to better understand how naturalists act and observe while outside. After talking with my content reviewer, she felt I was cramming too much into one lesson. She thought I could have one lesson for each naturalist, as this would do proper justice to each. I agreed, and changed my first lesson to instead learn about naturalist behavior and the five senses by asking students if they know any naturalists, such as an uncle who hunts or a sister that fishes. They then learned many traits of naturalists and how to best use their five senses while exploring the outdoors.

Overall, the most important lesson learned through this process was how important teaching about nature with nature journals or other methods is. The amount of literature on nature and journaling is almost overwhelming. There are so many reasons and ways to get youth outdoors and learning about nature, and appreciating the environment. Journals are a great way for students to reflect on nature and understand it more fully. If we can get students appreciating nature at a young age, they will grow up

to become adult stewards of the environment. Young students are already fascinated by nature, and why we don't take more advantage of that for learning is baffling to me.

Traditional classrooms should be expanded to the outdoors, and state standards should move to reflect this. The number of benefits to each student by teaching about and letting them explore nature far outweighs the challenges, and creates more well-rounded people prepared for adult life.

Literature Review Connections

Out of the research conducted in chapter two, the literature review, three parts of it stood out while creating my capstone project activity guide. Sobel (1996) and his concept of sense of place in his book *Beyond Ecophobia* became a really important concept in my project. Not one, but several lessons should be used in this activity guide to get the most out of it. I designed the first two lessons to be done first, followed by a combination of the remaining lessons. This was not created as a single lesson use guide without using the other lessons contained within it. The only way to gain a sense of place is to visit the same place several times and learn something new each time. A sense of place can lead to caring about local habitats, and eventually to stewardship of those habitats.

Experiential learning was also at the forefront of the lessons. Both McMillan and Wilhelm (2007) and Leslie, Tallmadge, and Wessels (1996) agreed that hands-on learning helps most students learn deeper and faster. In all of my lessons, I have an activity directly related to the content. For example, students learned about aquatic insects, then went outside and observed live aquatic insects and were exposed to a habitat

in which they lived. This is much more real world than showing pictures of aquatic insects inside the classroom.

The three techniques of nature journaling, as described by *The Compass to Nature* (n.d.) booklet and Laws (2016), were also important to the activity guide. Prompting students to use writing, drawing, and numbers in each lesson helps students increase skills in all three techniques. It was important that students were able to find the technique they were most comfortable with and use that often, but to also use the techniques that were less comfortable, thus increasing skills while still making nature journaling fun. During the editing process of my grading rubrics for each lesson, I was reminded of McMillan and Wilhelm (2007) with their moon viewing study. They only required a few things from the students to get a grade, but the students ended up adding much more than that, including poetry. I scaled back my grading requirements so the lessons were less stressful and more engaging. Students are allowed time to add anything extra that will further enhance learning and appreciation of nature.

Implications

I hope that my activity guide will, above all, point out that local nature is very important to teach. Students who learn and engage with their local nature will hopefully care more about it, and thus work to protect it once they get older. I believe we teach too much about faraway places and nature, and bringing them back locally can let them know we have wonderful wildlife and plants here too, in their own backyards. Incorporating standards into my lessons will hopefully make it easier for teachers to include outdoor nature education into their curriculums, and get students outside learning more and more. This activity guide using nature journals could maybe reintroduce the use of journals in

traditional schools. The actions of recording what is learned, and the variety of ways it can be accomplished, seems to me like an important learning tool for students and grading tool for teachers. Overall, nature seems to be ignored in school, especially when it comes to the state standards. I would hope this activity guide allows more teachers and parents to push for incorporating nature journaling into standards, or at least to push for using nature and journaling to a certain degree in schools.

Communicating Project

This activity guide will be altered into a PDF format that will be easy to share with naturalists and teachers alike. Other educators who see this guide could print off the whole thing, or lessons they would like to teach to students. I plan on making this a living document, and modifying and adding to it in the future.

I hope to use this activity guide during my future career as a naturalist. I would also like to share it with my content expert for her to use with her classes in their extensive native habitats around their school, if some of the lessons will work with her curriculum. I am also planning on contacting my local wildlife refuge that I volunteer at to see if they would be interested in posting this activity guide on their website for teachers, parents, and other refuge visitors to read and use in their classrooms, with their children at home, and also at the refuge.

Limitations

As with any research project, there are limitations to this activity guide's use. The limited number of lessons in this activity guide might not give enough options to some teachers. More urban areas might make the guide more difficult to use, as options of green spaces can be limiting. The inclusion of standards into the activity guide is a plus,

but this activity guide and nature journaling are not requirements of schools currently.

This means it is the teacher's discretion as to if it will be used or not. It can be hard for teachers to include this on top of all of the requirements of education systems.

Future projects

There are many avenues other educators and naturalists can take on adding to the activity guide and the idea of nature journaling. The lessons could be modified to apply to grades other than three through five. Others could make it simpler for grades under third, such as using letters and words to practice spelling and writing letters as opposed to writing sentences. This could go the other way as well, creating more detailed observations and goals for grades higher than fifth, and even up to adults who would like to use nature journaling to understand nature with more clarity. Adding more lessons for each season, or adding follow up lessons to those existing would create a more extensive activity guide. One example would be to follow up lesson one, on naturalists, with lessons focusing on naturalists of the past. Students can delve into naturalists such as Aldo Leopold and Rachel Carson, and do activities based upon their writings or actions. Students could even be prompted to go home and spend time outside with a naturalist they know and learn from them, such as going hiking with an aunt who is an avid hiker. Because I did not include lessons using all of my intended subjects, additional lessons could be created for subjects such as physical education and history. Lessons pertaining to citizen science could be an awesome way to apply their observations to the scientific and local communities. Although these lessons work to be inclusive, students with intellectual disabilities could benefit from altered lessons that allow them to go out and

explore nature. Nature is for everyone, and having lessons designed for specific demographics would be a great addition to this activity guide.

Closing Statements

This journey to complete my master's degree in environmental education has had its ups and downs. It is almost hard to fathom that I have an entire paper and project about a subject I believe to be very important. We need to teach our future generations to appreciate, understand, and then care enough about the environment to protect it when they become adults. I learned a multitude of lessons while creating my activity guide, and ended up tweaking it from my initial intentions. Sense of place, experiential learning, and other portions of my literature review were present to guide me as I created my project. There are many implications for my project, most notably to teach youth that nature is awesome and full of wonder, and deserves to be protected. As with any curriculum or series of lesson plans, there were limitations. These limitations will hopefully spur future teachers to work on lessons to incorporate nature journaling into their curriculum. I will be adding to this activity guide myself in the future as well. The amount of knowledge I have gained while in the masters program at Hamline University was unbelievable, and it has helped remind me why I want to teach students about the natural world.

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