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# How Can Informal Environmental Education Curriculum and Pedagogy Be More Inclusive for Autism Spectrum Disorder (ASD) Students?

Claire Dobie

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by

Claire Dobie

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Capstone Research Facilitator: Julia Reimer, Shelley Orr
Content Expert: Marla Richter

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## Introduction

### Introduction

Asking parents or grandparents about their education they may mention a trip to an Environmental Learning Center (ELC) they took or a class on survival that was offered as an elective. Environmental education (EE) and outdoor learning have been around for decades. EE began as a way to prepare for survival or to learn a hobby. Enrichment of critical thinking, problem solving, and creative learning are common themes found in the EE today. Teamwork and collaboration are also important goals found in EE curricula that encourage cooperation amongst students. Though some reminisce on fond memories of EE experiences, not all can say they benefited from these opportunities.

### Research Question

The focal point of this capstone project is producing professional development training for informal environmental educators that will allow students with autism spectrum disorder (ASD) to participate in informal environmental education. Participating in such activities can also help individuals increase their ability to problem-solve and think creatively. My research question to address this goal is: *How can informal environmental education curriculum and pedagogy be more inclusive for autism spectrum disorder (ASD) students?*[1] Implementing this research will allow more individuals to fully participate in challenging and engaging curriculum, opening EE up to

[1] Research was done to consider if ASD should be referred to as individual or condition first. As a result of mixed response this paper will use both individual and condition format.

more students and providing a chance for a more sustainable future. To make decisions based on self-guided research and consider multiple perspectives is to consider what is best for more than just one's self, which is important for a sustainable society. Some individuals have difficulty participating in a curriculum that reaches these goals and have separate learning styles from what is considered in the classroom.

In the curriculum that is created at ELCs, it can be difficult to find adaptations or extensions that help more students participate in the courses offered. This is because they serve hundreds of students that visit for a day trip, or a few nights stay. With a constant turnover of learning styles, it becomes difficult to cater lessons to a specific audience. For example, a hike around the lake may be difficult for a student that cannot walk. Students with ASD tend to need support in an EE setting just as much as when put into a traditional classroom setting, and curriculum created in ELCs may not have this in mind.

This chapter will explain my personal and professional background that led me to this research question. It will also describe my current position, inspiration, and rationale for this project. Lastly, it will summarize the chapter and explain what to expect of the following chapters.

**Personal Background**

There was not a specific moment in time that I realized how important the natural world would be for shaping the person I am today. My first memories of being in nature included family camping trips and accompanying my dad and older brother on hunting trips. During these interactions my curiosity ran wild, and I was genuinely excited to learn. I am thankful that my dad's passion for the outdoors was so strong, and that he was

equally excited to answer my many questions. Looking back today, I can see how my curiosity led to concern and care for the environment.

As I grew older, my desire to learn more about the natural world increased as well. Hunting, fishing, camping and other outdoor activities became more central in my life, and I was able to participate in some of these activities with close friends. Outdoor recreation and immersion offered relaxation, joy, challenge and gave me the greatest sense of worth in life. In my later high school years, I began to realize that I wanted to pursue a career that allowed me to be outside, kept me active, and worked to maintain wildlife at some scale. Hunting was one of my favorite outdoor activities at the time, and I wanted to help conserve the animals that were involved. This desire was how I began my professional journey.

**Professional Background**

North Dakota State University was my first stop on my way to becoming a wildlife biologist. The Natural Resources Management program was a great way to prepare for the field. After a year there, I decided to transfer to the University of Wisconsin-River Falls (UWRF) to pursue a degree in conservation. I was taking courses that connected me with environmental issues and deepened my concern for the natural world. My focus shifted from conserving wildlife to include the conservation of plants, animals, water systems, the climate and everything in between.

The summer after my sophomore year I was offered an internship with the Naturalist Corps at Itasca State Park, Minnesota. There, I learned more about the environment by shadowing wildlife management groups and discovered a passion for

education as I conducted educational programs. My time at Itasca reshaped my goals for my career. I realized that I wanted to do more than work towards conservation as an individual; I wanted to teach others about how they could interact with the environment in a sustainable way. I not only saw the importance of education for environmental sustainability, but I enjoyed sharing what I knew with others. At Itasca I taught a range of classes to people of different ages and backgrounds. Archery, fishing, plant identification hikes and building tours were a few of my favorite programs to teach. I pursued my interest in education when I took a position at the outdoor recreation facility at UWRF. I learned to rock climb and teach people of all ages/abilities various outdoor skills and activities.

My coursework began to reflect my change of heart; I did not change my major but included courses like Environmental Education into my credits. After I wrote my senior seminar paper on the importance of outdoor education on children's cognitive development, I continued looking for ways to increase my efficiency as an educator. This search led me to Hamline University's graduate program for Natural Science and Environmental Education. After graduation from River Falls, I stepped right into coursework at Hamline.

It was the beginning of 2021, and Coronavirus was still a credible threat to lives, work and play. I struggled to find work related to my goals but was able to find a position as a Paraeducator in Fargo, North Dakota. There, I worked with students with various learning styles in the Elementary School setting. While I had not planned on this position, it transformed my view of environmental education. By looking through the eyes of my

students, I noticed barriers to learning that the traditional EE curriculum overlooked. Often, it is assumed that students learn in a similar fashion, but my experience revealed that this was not the case. Examining lessons with a critical lens revealed how I could implement accommodations that supported a broader group of students. Through this opportunity I began to consider how my previous ideas of EE were not as impactful in creating members of society that could make decisions that affect the environment to all learners. This position and my course work at Hamline forced me to reconsider my view of EE: EE needs to be able to effectively engage a wide range of learners, which requires critically analyzing and differentiating curriculum to meet student needs.

**Current Position**

Through patience and persistence, I found my dream position as a Naturalist. Recently, I started at Long Lake Conservation Center (LLCC) where I provide EE to a range of students, but mostly 5th and 6th graders. LLCC is an ELC that allows schools to stay for multiple days to experience outdoor education in its authentic form.

After working with 4th and 5th graders at my previous position, I knew the importance of providing engaging educational experiences to this age group, and the setting of LLCC was perfectly poised to fill this need. From physical activities such as archery and canoeing to applying engineering principles while constructing a survival shelter to the excitement of viewing new animals like snakes and frogs, LLCC provides students opportunities to engage in experiences not available in the urban setting. An important aspect of our work at LLCC is helping students become leaders and bond with classmates using group work. Facing our cooperation challenge course is just an example

of how students work together to achieve difficult goals on site. Yet, there are times when the nature of outdoor education inherently limits who can participate. For example, on the challenge course we offer there is a high degree of physical activity involved, which can prevent individuals with mobility issues from taking part. Climbing over walls, trusting classmates to guide one another along a trail while blindfolded, and crossing an imaginary lava river with planks in the woods are examples of how we challenge students in this course to work together. While there are elements of the course that are not so rigorous, the majority requires a higher degree of agility.

**Inspiration**

My goal to be an environmental educator began with my joy of sharing information and desire to learn more about what I cared about. I have come to realize that this goal reaches beyond myself. As an educator, I am entrusted with teaching individuals to think critically about important issues and help them become members in society capable of making important decisions. It is my job as an educator to provide opportunities to look at these issues and supply tools to come to their own conclusions. It is only through this process that I can foster curiosity in the next generation, just as my father did for me.

In Fargo, I worked with students for whom our 20-minute recess was their only time spent outside. This is a common issue for many students in urban areas, and unfortunately it is also a luxury for students to be able to attend ELCs like the one I currently work at. This has inspired me to make the most of what school groups can come to our campus to experience remote outdoor education and try to impact as many students

as possible. While reading through the Long Lake curriculum, a student who I spent a great deal of time with kept coming to mind. This student was on the autism spectrum, and I became familiar with how this may alter learning styles. Social skills important for classroom interaction, moving past the lack of confidence when completing activities and troubles showing frustration in healthy ways were a few examples of what we worked to overcome at school. As I went through topics offered at Long Lake, I began trying to update aspects of the course that may prevent this student from learning. While this student may never make it to LLCC, making these changes is an important step to increase inclusivity for a range of learning styles and capabilities.

While completing research for this capstone project, I was officially diagnosed with attention-deficit/hyperactivity disorder (ADHD). Though I knew I always struggled to learn in a traditional classroom setting, I was dismissed for not meeting the typical hyperactive traits found in ADHD individuals. I know that I am one of many who learn differently than what is presented in the traditional classroom and so I wanted to use this unique position to offer inclusive education for more learning styles. I believe that this position granted me valuable past experiences to research and complete this project.

**Rationale**

To effectively engage a larger audience, environmental educators need to make curriculum more inclusive for students with learning needs. Though the specifics of the field involve different goals and methods from one educator to another, conservation and sustainability are common goals. Increasing inclusivity of curriculum is an important step towards sustainability because it allows more individuals to engage in meaningful

learning experiences that foster a care for the natural world, and then provide steps on how to turn that concern into action. Environmental Education (EE) can alter a student's values, and if done right the student may begin to care for the environment and society. My research question is vital because it expands the inclusivity of the curriculum to more individuals, potentially creating a lifelong passion to learn about and care for the natural world.

**Summary**

From early childhood to college, my experiences in nature have forged a passion for caring for the environment. Now, as a naturalist, I seek to make meaningful environmental learning experiences accessible to all students. Through my undergraduate and graduate course work and work as an educator in various settings I now understand how important EE is for a sustainable future. Environmental education enables individuals to examine real-world issues from multiple perspectives while also providing opportunities for collaboration and creative problem solving. These experiences prepare individuals to make critical decisions that will impact the future of our shared environment.

In Chapter Two, I will describe a brief history of the research. I will then investigate literature on the basics of ASD, what traditional classrooms are doing to be more inclusive, the current state of EE, and how environmental educators are working on inclusivity. Chapter Three will describe the project created based on the research, and Chapter Four will provide a reflection on the construction of my project.

# CHAPTER TWO

## Literature Review

### Introduction

As discussed in Chapter One, the question of this paper is: *How can informal environmental education curriculum and pedagogy be more inclusive for autism spectrum disorder (ASD) students?* Through this literature review, the intention was to gain a quality reference of understanding of each of the main components of this question. The first section will address ASD and the specifics of ASD in middle school. Knowing what is common for this stage of life can help educators that work with students to recognize and consider their learning patterns. Though middle school is not the focal point of this paper, many informal environmental educators interact with this age group that work at ELCs. Next, traditional classroom education will be researched with respect to special education and specifically middle school special education. Knowing how traditional classrooms help to include students is beneficial for educators in informal settings to emulate and make consistent. The final section is an analysis of EE. The history of EE, types and education being provided at Environmental Learning Centers (organizations that offer informal environmental education) are also integral to answering the question of how to be more inclusive in informal education centers like residential ELCs.

### Autism Spectrum Disorder (ASD)

ASD is a complex intellectual condition with a history of different conceptualizations (Hong et al., 2019). A common obstacle for students with autism is

participation in social activities and communication (Reszka et al., 2019). This section will provide information on signs and indicators of ASD. This will be followed by the history of the understanding of ASD in order to learn the various frameworks of understanding produced by research over the last few decades. The last section will discuss autism in middle school and how to recognize it. Understanding ASD and what to look for is important for environmental educators to be able to provide programs that are inclusive and enjoyable for all students.

### *Signs and Indicators*

ASD presents a range of signs and indicators (Hong et al., 2019). A popular understanding of ASD is that it presents challenges for communication and socialization in neurotypical settings (Braun et al., 2018; Cihak et al., 2012; Hong et al., 2019; Humphrey & Symes, 2013; Knutsen et al., 2018). According to Cihak et al. (2012), ASD individuals may find it difficult to hold conversations and are viewed differently based on their conversational ability. The authors add social skills are important for not only succeeding in school but also for life; they make collaboration and teamwork possible in all settings. As social interaction is such an integral aspect of society, it is challenging for people with ASD to achieve success in school, work and life when not given the tools to do so, Cihak et al. reports. The inability to interpret social cues from others and difficulty with defining individual needs are frustrating and constant for ASD individuals, and they may show this frustration through disruptive actions and words (Cihak et al., 2012).

Another indicator of ASD is struggling to use imagination and creativity (Humphrey & Symes, 2013). Imagination is used to spark other cognitive skills and to aid

in problem-solving and creation. Without this tool it is difficult and frustrating to develop and perform in school where these processes are constant. Repetition of different behaviors is also a common indicator of ASD (Braun et al., 2018; Cihak et al., 2012; Hong et al., 2019). Examples of repetitive behaviors include chair rocking, fidgeting with an item and the restating of the same phrase or sound to name a few. A reason for these behaviors may be due to sensory processing deficits that ASD individuals have (Hong et al., 2019). Cihak et al. (2012), state this repetition is often considered a distraction in the classroom and a sign of disinterest, when it is possibly a tool used to soothe in overstimulating situations. With repetitive behaviors, individuals also find comfort in learning specific topics according to the authors. An individual with ASD will often become an expert in a specific topic such as a video game, animal, location, or other specific topic of interest (Cihak et al., 2012).

In a study by Carnahan and Williamson (2013), a wide range of vocabulary is also prevalent with ASD. Individuals will collect these words/phrases as they are used in their surroundings and use them in future situations. But while their ability to retain the word/phrase is high, it is often not accompanied by comprehension of what they are saying (Carnahan & Williamson, 2013).

Not all signs and indicators would be viewed as “setbacks” for individuals with ASD. ASD presents an enhanced ability to recognize information in the form of visuals (Cihak et al., 2012; Thiemann-Bourque, 2010). Thiemann-Bourque adds communication of emotions using emoticons, learning about how to socialize and problem-solve with classmates through a video example and learning to count by using tangible objects are

examples of how visualization of ideas is embraced in ASD learning. This is an important trait to capitalize on for people with ASD as they struggle to interpret verbal cues (Thiemann-Bourque, 2010). Braun et al. (2018) recognize verbalization is a heavily utilized mode of providing information in education, but it is a barrier for ASD students to achieve high marks in school. Therefore, unfortunately, another indication of ASD is a lower score for tests, grades, and the Intelligence-Quotient (IQ) (Braun et al., 2018).

Reszka et al. (2019) report if ASD goes unrecognized or is not given appropriate consideration, symptoms may arise that impact the individual and people around them. If ASD is not recognized early enough, it can prevent development of core learning that will snowball into constantly being left behind in education and society (Reszka et al., 2019). Inability to regulate behavior and aggression are two common symptoms that may appear (Klaiman et al., 2014). According to the authors, these symptoms can create harmful environments for the individual and cause possible threats to those who are around the individual. Other symptoms that could be involved are anxiety and depression (Klaiman et al., 2014). These are serious mental disorders that if not addressed can be dangerous to the individual. Not all individuals will have such symptoms, but if society does not continue to create a more inclusive environment, we will allow for room for increased suffering from symptoms that can be avoided with proper care and practice. In conclusion of the signs and indicators of ASD, the next section will provide a brief history.

***History***

Braun and coauthors explain important studies involving ASD were first published roughly 60 years ago when concern that it was a serious condition was increasing. It was considered a mental disability that held individuals back in life. In its infancy, autism was diagnosed as a specific set of characteristics that impacted intellectual ability (Braun et al., 2018). Hong and coauthors of a study report autism was confined to a set of traits that made it difficult for individuals to fit into the traditional neurotypical society. Early speculations surrounding ASD involved an inhibited ability to process physical senses. The authors add this includes the ability to comprehend what a person can hear, see, and feel around them. The comprehension of these environmental factors influences how an individual reacts – for individuals with ASD this creates tension in communication, socialization, and response (Hong et al., 2019).

Beyond sensory processing, ASD was further defined in relation to cognitive functionality and social capability (Hong et al., 2019). Braun et al. (2018) state with increased research and understanding came the categorization of autism as a part of the umbrella term ASD. The spectrum of characteristics under this term meant that the number and intensity of limitations presented is highly variable (Braun et al., 2018). Included in ASD are the "five subtypes of autism, including autistic disorder, Asperger disorder, pervasive developmental disorder–not otherwise specified (PDD-NOS), childhood disintegrative disorder, and Rett's disorder" as according to the Diagnostic and Statistical Manual of Mental Disorders (DSM), Fourth Edition (Braun et al., 2018, p. 2). The first 3 of the 5 subtypes were specific to ASD. In 2013 the DSM Fifth Edition was

published which indicated ASD as its own disorder, the authors report. With this individual classification were also changes in the diagnostic process (Braun et al., 2018; Klaiman et al., 2014). DSM Fifth Edition lists two criteria as characteristic of ASD which are social interaction deficits and repetitive behavioral patterns. Within each criterion are specific indicators of severity and other indicators (Klaiman et al., 2014).

The number of cases diagnosed over the years is increasing (Braun et al., 2018; Carnahan & Williamson, 2013; Cihak et al., 2012). This is a result of multiple factors including increased understanding, research, and access to resources the authors add. A push for increased inclusion in public spaces has also made these factors more prevalent and demands further investigation of how to recognize and improve inclusivity efforts (Cihak et al., 2012). While the progress of understanding is noticeable for ASD, there is still much to learn in this area and researchers should and are continuing to investigate the questions that have been left unanswered.

### *ASD in Middle School*

During adolescence, individuals are expanding their cognitive capabilities and using ground-level knowledge to broaden understanding Klaiman and coauthors share. This makes ASD easier to recognize during this stage as the social deficits are becoming more prevalent in school and other social settings (Klaiman et al., 2014). Social deficits appear to have a larger impact on males in this age range compared to females with ASD, being that females are on average more equipped to interpret non-verbal cues and emotional response (Lawson, 2019). Klaiman et al. (2014) add this is a time when children are beginning to increase their abilities to work as a team and present learning in

front of peers, which can make difficulties in social interactions more frustrating and intense. This is also a time when they begin to utilize abstract learning. This means the symptoms (like aggression and anxiety) that result from ASD struggles may be greater in intensity (Klaiman et al., 2014).

During this stage of life there is also an increased recognition of restricted and repetitive behaviors (RRBs) (Lawson, 2019). According to some studies, Lawson adds ASD is more likely to be diagnosed in males during this time as males are more likely to present this criterion, and at this age the RRBs often represent stereotypical interests assigned to males and females respectively (Lawson, 2019). This observation presented inconclusive for other studies, which provided support for no significant difference in RRBs between different sexes (Knutsen et al., 2018). Further investigation of ASD in relation to sex and age is recommended by Lawson. It is also recommended that the difference of sex when considering sensory processing deficits in this age group is investigated more, as the few studies done are conflicted in results, with a possible lean towards greater deficit in females (Lawson, 2019). This research is a reminder that autism is a spectrum and that it may present itself in different ways for different individuals.

Other indications of ASD in middle school are presented through inattention, elopement (leaving the classroom without permission), and impulsivity (Klaiman et al., 2014). Within this age it may not be uncommon for ASD individuals to have a double diagnosis with attention deficit hyperactivity disorder (ADHD) states Klaiman. The Diagnostic and Statistical Manual of Mental Disorders (DSM) makes note of this possibility to help professionals recognize and understand how ASD is interconnected

with other neurological capabilities (Klaiman et al., 2014). These symptoms show impact on testing and functional capabilities in middle school-aged children.

The complexity and range of ASD presents challenges in how to adjust the status-quo of education to better suit inclusivity efforts. Understanding the specific signs and indicators of ASD, how our current understanding of the subject has developed historically, and the specifics of ASD in middle school can better equip professionals and educators to meet the needs of ASD students. This brief analysis of information regarding ASD can lead environmental educators and RELCs to answer the question of *How can informal environmental education curriculum and pedagogy be more inclusive for autism spectrum disorder (ASD) students?* Students with ASD cannot be provided an improved experience until a recognition and an appreciation for what makes their learning style unique is accepted.

**Traditional Classroom Education**

Through federal legislation (specifically the Americans with Disabilities Act (ADA) and the Individuals with Disabilities Education Act (IDEA)) educators are required to provide reasonable accommodations to help them succeed in school (Lang & Persico, 2019). The IDEA was passed into law in 1975 and the ADA was passed in 1990. Over the last several decades there has been a variety of ideas on how best to provide this chance at an equal opportunity in the classroom setting. The first part of this section will go over the history of how schools allow for inclusivity in the classroom for ASD students. Next will be an explanation of special education practices followed by specifics on special education in middle school. Knowing what has been done in school to include

students is essential for educators at Environmental Learning Centers (ELCs) to know so that they may be consistent with inclusivity in programs. The last part will cover how schools prepare to bring students with different learning styles on field trips. It is useful for ELC educators to know what resources can be provided by visiting schools, and how they can work together to improve efforts.

***History***

Ashby (2010) notes increasing inclusivity for students with different learning styles such as ASD gained traction in the 1970s. Though initial intentions were to include students, this was only done socially, and academic inclusivity was left behind (Ashby, 2010). A majority of ASD education research is focused on early childhood education techniques (LEAP and TEACCH academic models for example) but many of these tools are carried into the following years of education (Boyd et al., 2013). Ashby (2010) adds students were given more opportunities to interact with peers and learn communication skills, but were not learning math, science, and other subjects at the same level and/or setting as their peers. This is a superficial improvement in education as it does not fully accommodate (within reason) equal opportunities in education as outlined by federal legislation according to Ashby. Holding all students to the same level of achievement in academics should be standard through the successful implementation of inclusivity efforts (Ashby, 2010).

In the past, students with ASD have been looked at as a challenging group to include in education by educators Humphrey and Symes (2013) documented. Educators often do not feel equipped to integrate their ASD students into the classroom, and this

may cause tension in the relationship between the educator and student (Humphrey & Symes, 2013). The authors go on to add that though neither the fault of the educator that has not been trained for inclusivity, nor the fault of the neurodivergent student, this strain can have a significant impact on the students' learning experience. Educators may also view the behavioral signs and indicators as a lack of interest in learning, which can also further strain the relationship state the authors. If the quality of the relationship with the ASD student and teacher is poor, this can also impact how peers interact with the student, causing a negative result on inclusivity (Humphrey & Symes, 2013).

With time, energy and resources spent on research to understand ASD and other unique learning styles, trial and error has also been applied to the classroom to determine what may work and what doesn't for increasing successful academic settings. While inclusivity has been increasing for ASD learners in education (Hart et al., 2017), it is not enough to be content with.

***Special Education Practices***

Special Education (SPED) teachers specialize in providing education for students with varying learning styles. The process of educating these individuals looks different from one student to the next and is based on support practices identified through their Individualized Education Program (IEP) report Humprey and Symes (2013). The IEP may provide support for spending most of the individual's day in a SPED room separate from the traditional classroom, integration of both settings, one-on-one support throughout the day, and other combinations to suit the needs of the student and capabilities of the school the authors add. While SPED educators are well-equipped with

training and qualifications, parents and researchers find that teacher preparation programs that prepare them for supporting SPED students are equally as important (Humphrey & Symes, 2013).

There are a number of methods that are used in SPED that especially cater to the needs of ASD students. ASD students present an enhanced ability to recognize information in the form of visual-aids (Cihak et al., 2012; Hart et al., 2017; Schreibman et al., 2000; Thiemann-Bourque, 2010). The use of visuals such as videos and pictures can be used to display best practice for social behavior, and as a how-to guide to explain a task (Cihak et al., 2012, Schreibman et al., 2000). An example of this would be showing a video on how to properly read a book from the top to bottom and left to right respectively. Another example is showing a student a video of them going through the lunch line the correct way as a reminder (showing the student in the situation is more relatable). This method has produced positive outcomes on behavior and assignment completion expectations as according to both students and staff involved (Cihak et al., 2012, Schreibman et al., 2000). ASD individuals struggle to comprehend changes, and so educators can utilize visuals to map out a consistent routine for their daily activities and classes (Hume, 2006; McGlynn & Kelly, 2017; Thiemann-Bourque, 2010). Knowing what to expect with the aid of pictures, videos or other visual tools can reduce the number of overwhelming experiences a ASD student has throughout the day. Educators recognize this strength and utilize it to help improve educational practices for ASD individuals.

Educators may view the goal of improving social interactions for students as the most important step in their education (Ashby, 2010; Hart et al., 2017). While social

skills are worth devoting time and attention to, it is equally important that ASD individuals have an opportunity to learn the same information as their peers in the same setting (which can also improve opportunities to communicate with peers) , states Ashby (2010). The author adds parents of students with ASD have identified Special Education practices that look promising on paper but are not as impactful on developing the individual. One example from research conducted by Ashby (2010) informs readers of an ASD student that was asked to copy information as provided by the teacher to complete an assignment. The student was able to write the information exactly as provided by the teacher but did not know the content of the subject they were copying. In short, the student's work looked the same as all their classmates that completed the assignment, but the individual did not know the content of the assignment as their classmates did. The ability of the student to copy and produce a written assignment masked the shortcoming of providing the student with knowledge of the subject (Ashby, 2010).

The ability for all students to learn in the same setting by diversifying teaching techniques would provide more opportunities for ASD students to interact in the classroom. Therefore, training all teachers to prepare for differing learning styles is beneficial (Humphrey & Symes, 2013). When a better understanding of the students is formed, teachers may find they do not feel so strained to teach students that are neurodivergent, the authors point out. This can transform the tension between ASD students and teachers, and further create a more inclusive classroom (Humphrey & Symes, 2013).

Creating this inclusive environment may shift the way that educators assess content understanding(Ashby, 2010). Ashby (2010) finds where some may view the ability to produce answers onto a worksheet or the capability to read lines on a script in class as the end-all sign of participation/understanding, others believe that alternative measures of cognition could be beneficial. Utilizing strengths that ASD students possess to produce assignments that display understanding of material is another way that educators are beginning to increase inclusivity (Ashby, 2010; Hart et al. 2017).

***Special Education in Middle School***

In middle school, students are beginning to use basic information they learned throughout Elementary School and beyond to conceptualize, observe and formulate new ideas in learning (Thiemann-Bourque, 2010). This is a time when group projects, teamwork and peer review is introduced, and can be a challenging time for ASD students. Depending on the school, this may also be a time of increased responsibility on the students end in the form of lockers and transitioning from teacher to teacher, adds the author. Some educators and other parties involved may decide that a one-on-one support professional could help them with these transitions, or a fidget toy may be recommended to soothe over-stimulation and help with focus (Thiemann-Bourque, 2010). Many techniques for helping these individuals began in early childhood education, as most cases of ASD are detected in the early years of life (Boyd et al., 2013).

In middle school the focus on developing social skills is continued by practicing interaction with peers with the goal of being able to take part in team-oriented learning that is introduced at this stage (Thiemann-Bourque, 2010). The author adds the use of

scripts to practice such interactions, pictures to hint at what to say/do in specific events, and videos that display traditional classroom communication are all tools utilized by educators to help ASD integration. With practice on how to work with classmates, ASD students use their ability to systemize and visually memorize information to prepare them to interact in traditional classrooms (Thiemann-Bourque, 2010). Subjects such as science are driven by social inquiry from middle school on, and so the ability to take part in such processes is important for ASD individuals to be included in the traditional classroom setting (Hart et al, 2017).

***Field Trips***

Changes in routine can be a challenge for ASD students to react to. Any change from moving to a new town, eating at a restaurant different from the predetermined location, to putting on a new pair of shoes can be overwhelming if it catches an individual with ASD off guard (Hume, 2006; McGlynn & Kelly, 2017; Thiemann-Bourque, 2010). Going on a field trip takes students from the typical learning environment where they follow a schedule and brings them to a new location with new ideas and expectations. For many this is an exciting way to spark learning, but for some it may just be too much.

Time and consideration have been put into the routine for ASD students by their educator, so when a field trip is coming up the educators must consider how to prepare all their students, especially those who struggle with change. Hume (2006) finds one tip educators have used to face this challenge is by priming their students. There are multiple ways of priming students for a trip, including going over the itinerary, according to

Hume. By giving ASD students a copy of this itinerary, they can begin to process the change before it happens. It is also worth making a schedule with pictures to utilize the strengths ASD students have when learning (Hart et al., 2017; Hume 2006; McGlynn & Kelly, 2017). Showing photos of the location, a video that goes over the layout of the trip, or any other preparatory visuals are also beneficial for creating familiarity (Hume et al., 2006).

Schools or the lead educator for the trip should be in contact with the organization of where the field trip is taking place (McGlynn & Kelly, 2017). This way specific details may be discovered that could help better prepare students the authors share . For example, learning about designated areas for students to calm down or remove themselves from overstimulation could help teachers. Designating a chaperone/teacher to be the students go-to when in need of support or to just have as a familiar adult-figure is recommended to ease tension (McGlynn & Kelly, 2017). This adult could be their homeroom teacher, their one-on-one educator, or even their parent/guardian if feasible. This adult figure may also be prepared with a bag of tools that work for the student in their typical learning setting (such as fidget toys or a weighted pillow for grounding as recommended by the student's IEP). The adult can also recognize and help move the child to a separate area when overstimulation or negative reactions may occur. These were a few practices I implemented during my time as a paraeducator.

Keeping an open line of communication between the school and field trip location is beneficial for both parties to know what to expect. No matter what accommodations

need to be made (dietary, mobility or mental) it is important that both sides of the process work together to ensure a smooth and successful trip for all.

As formal schools follow federal legislation on how to conduct their efforts to provide reasonable accommodations for equal opportunity in the classroom, there is much that environmental educators in the informal setting can learn and model. Environmental educators at ELCs should understand what works and does not work in schools to teach ASD students, because EE is not free from making sure to include every individual in the process of education. Knowing what ASD are learning in special education, specifically middle school education, and how they may prepare for a field trip is important for ELC staff to better accommodate unique learning abilities.

**Environmental Education (EE)**

Though the intensity and direction of environmental education (EE) has not been clarified over the years, a recognition of the need for EE was realized in the mid-1900s with the understanding of the approaching environmental crisis (Gough, 2014). This section will begin with the history of environmental education and then a description of environmental education. Where EE began is important for understanding what the goals of EE are and how to achieve them. This section will then discuss the different types of EE. Environmental Learning Centers (ELCs) provide informal education that often takes place in an outdoor setting. The last part of this section is on ELCs and specifically what residential ELCs provide for middle school students. This information is crucial to know when considering different learning styles and preferences.

***History***

Calls for conservation and preservation of the natural world can be traced back to the late eighteen-hundreds on from the works of public figures such as Aldo Leopold, John Muir and Gifford Pinchot. Education in relation to the environment consisted of appreciating nature and gaining a passion for being outside. The introduction of a formal conversation to map out the specifics of EE came to light during the rise in social justice movements around 1960 (Gough, 2014; Marques Koury, 2005). There began a recognition of the depletion of natural resources, destruction of landscapes and depletion of the ozone layer. Rachel Carson's book *Silent Spring*, which was published in the 1960s pointed to industrialization as the root of these issues, and the public responded with a plea to change after reading this and other environmental works (Gola, 2017; Marques Koury, 2005).

To pinpoint an exact beginning of the formal creation of EE worldwide, one should look to the Tbilisi Conference of 1977, where world policymakers got together to piece out a plan for environmental education (Fraser et al., 2015; "Text of Tbilisi", 1977). There a declaration was created to map out the future of EE as it relates to human interactions on a global scale. An equal level of understanding and determination from all the nations was requested by this declaration, as well as increasing awareness of the environment with research as the provider of such information. The declaration includes a request that EE be provided for all ages and all kinds of individuals in both a formal and informal setting ("Text of Tbilisi", 1977).

The Tbilisi Declaration was important for getting the world's nations in agreement that there is a need for EE because of human impact and destruction on the earth ("Text of Tbilisi", 1977). In the 1980s justice for the environment was intertwined with social justice movements, political activism, and economic issues (Goldman et al., 2013; Fraser et al., 2015). An understanding of how environmental issues can disproportionately impact minorities and lower income communities was communicated as an essential addition to the EE process. Adding in the different ethical lenses one may view the environment through, and special interests of individual entities involved, and a recipe for a muddled understanding of what the goals and priorities of EE should be (Fraser et al., 2015; Gola, 2017).

***Description of EE***

The definition and goals of EE have been unclear and debated for years. Critics and educators alike are in disagreement about whether the intentions of EE are to produce environmental advocates, research driven individuals, specific political/social changes, effective decision-makers, environmental literacy, some of each trait or none at all (Dada et al., 2018; Fraser et al., 2015). A conference held in Stockholm by the United Nations in 1972 promised to work towards sustainability in relation to human needs. The Tbilisi Declaration mentions the Stockholm declarations statement "to defend and improve the environment for present and future generations", which would require a new process for development in all countries ("Text of Tbilisi", 1977, p. 196). The numerous goals of EE could be an indirect method of reaching sustainability, as sustainability is the overarching goal of EE.

Environmental educators recognize the importance of environmental literacy (EL) in achieving sustainability, the goal of EE (Dada et al., 2018; Fraser et al., 2015; Goldman et al., 2013). EL means being able to comprehend the core concepts of environmental issues and history, which in turn creates informed individuals that can make decisions on such issues. It is becoming common for teachers of all subjects to gain training or take courses that specifically help them integrate environmental education into their core subject (Dada et al., 2018). Science has been made the default subject for a majority of EE to take place, as scientific literacy is a heavy component of EE. It is such an integral part of the science classroom that EL is presently considered a priority goal in science curricula (Goldman et al., 2013).

How an individual interacts with and feels about the environment depicts their literacy, experiences, and values in relation to the environment (Goldman et al., 2013). How much time a child spent outside with their family, the hobbies they enjoyed, the school trips they went on and so on are examples of experiences that tailor a person's thoughts and feelings towards the environment. In school, the depth and type of EL a student may receive is variable. For example, a teacher may have an anthropocentric ethic (human centered) for themselves when it comes to the environment and may omit other ethics and frameworks due to a lack of time or interest. This would mean that from this classroom, only a specific point of view in terms of environmental ethics is taught, but the goal of EL is to create a broad understanding of environmental concepts (Gola, 2017). Knowing more than one perspective and framework of thinking is important for

producing citizens that have enough EL to make informed decisions on environmental issues.

### *Types of EE*

Informal EE and formal EE offer different paths to achieve that same goal of sustainability. Informal EE takes place at a range of locations including parks, zoos, and ELCs. Formal EE is mostly found in K-12 classrooms as well as universities. Informal education is viewed as an important supplement to formal education, and can offer flexibility in setting, format and details that is not as easily afforded in formal education (Gola, 2017; Goldman et al., 2013; Paraskeva-Hadjichambi et al., 2020). An example of this would be a sixth-grade field trip to a conservation center to learn more about the environment outside of the classroom in a remote outdoors setting.

In the formal setting, schools are required to cover a specific set of standards set by the state to be successful (Hart et al., 2017). As mentioned before, standards include EL as something to be learned in science courses. Hart adds a science class is not capable of encompassing the scope of EE and its components such as social, political, and economic issues. Much of the pieces of the puzzle that are covered in a science course involve research, observation and questioning, which allow students to interpret environmental frameworks and research for themselves (Hart et al., 2017). The solutions to such barriers include adding components of EE to other class subjects or outsourcing that task to separate entities (Goldman et al., 2013). Another solution that parents may choose is to put their child into a forest preschool or school that specializes in

experiential learning (Gola, 2017). This option gives students more opportunities to interact with the environment and learn outside.

When parents, educators or students decide it is time to supplement their formal environmental education, they often turn to zoos, museums and other institutions that specialize in offering unique education opportunities. ELCs were created to offer this out of the ordinary opportunity for students to gain skills, learn and participate in nature that could help them appreciate, advocate for and respect the environment (Paraskeva-Hadjichambi et al., 2020). Each student comes from a unique set of experiences that influence how prepared they may be to take part in a field trip to an ELC. For some students, going to a remote location in the wilderness is something they have never done before, while others grew up going on outdoor trips with family. Either way each student will have the chance to learn and grow in a place that is different from the routine school atmosphere when taking part in informal education.

***Environmental Learning Centers***

ELCs are one of many informal education routes that offer a chance to enhance nature immersion with their location and for many, an opportunity to spend the night at a residential center. While there are many forms of EE, this capstone will focus on EE offered at ELCs. Most residential ELCs focus most of the education on middle school groups, as this is an exceptional age for learning and experiencing (Dettmann-Easler & Pease, 1999). While the range of programs offered at these centers is wide (from wilderness survival courses to pond studies) they are all experiential and provide a

chance to carry over concepts from program to program due to the extra time made available to participate (Dettmann-Easler & Pease, 1999).

Like the importance of social interactions and discussion for middle school science class, residential ELCs provide programs that require teamwork and collaboration (Hart et al., 2017; James & Bixler, 2008). At LLCC, collaboration is required in almost every program. Anything as small as reading a dichotomous key as a group to identify a lake bottom organism to working as a team to build a fire to cook lunch in the wilderness are done to help strengthen leadership and social skills. School groups that attend ELCs will usually be placed in groups that resemble their classrooms, this is effective for increasing familiarity and building on collaboration practices that may have already taken place in the formal classroom (Dettmann-Easler & Pease, 1999). Some formal educators will ease students into the trip by teaching them important concepts around the activities they will be participating in, which is just another beneficial way to maximize the experience (James & Bixler, 2008).

As the confusion around what constitutes EE lingers from a history of perspectives, the idea that EE should work to achieve sustainability is held constant. How educators achieve sustainability depends on their own experience with EE, their EL, the time and their location to educate. As a reminder sustainability is the ability to protect the environment so that it can be maintained, utilized, and enjoyed in the future. Everyone should benefit from sustainability efforts, and so it makes sense that everyone should take part in being sustainable. Providing all individuals with as many opportunities to be environmentally literate and furthermore sustainable is important for environmental

educators to do, as it increases the outcome for all. That is why the research question *How can informal environmental education curriculum and pedagogy be more inclusive for autism spectrum disorder (ASD) students?* is crucial for educators to consider. EE needs as many participants as possible, and ASD students deserve to learn about the environment. Informal environmental educators considering how to help ASD individuals gain more from an experience that presents many challenges is beneficial for all.

**Summary**

Students with ASD face many challenges when learning in traditional learning environments. ASD students also possess a range of strengths to help them overcome such challenges and learn at a pace consistent with their peers. Thanks to decades of study, educators have found ways to utilize ASD strengths and help integrate students into classroom inclusion, though the research is not yet done to fully include ASD individuals into the social picture. We have investigated the challenges and strengths in ASD learning and how they are being addressed, and we learned the history and scope of EE.

EE is the locomotive for spreading the word on sustainability. EE needs to include as many individuals as possible to be successful in its goal. A sustainable future is one that involves all people of diverse backgrounds, which means not only do diverse minds need EE for a future, but EE depends on the diversity we have to achieve sustainability. The challenges presented at this time in informal EE prevent a relevant group of diversity from becoming as literate as their peers. Therefore, informal environmental educators must bridge this gap by understanding how to accommodate various learning abilities.

To be an environmental educator in an informal setting, one does not always need a teaching degree/license. Many institutions hire naturalists with a background in an environmental field. This means that many environmental educators in the informal setting most likely do not take coursework in education, which can be important when needing to know different learning styles. Therefore, the information in this chapter will be important for creating a solution by providing this insight to informal educators who do not have the background in special education for students like those with ASD. Now that the information regarding the components of the research question have been addressed, Chapter Three will provide a detailed description of the project to improve on this issue.

# CHAPTER THREE

## Project Description

### Introduction

Parents of ASD children and researchers alike have pointed to training for educators as an important tool for increasing inclusivity (Humphrey & Symes, 2013). Formal educators often receive this training throughout their undergraduate coursework and/or through staff training opportunities. In the formal setting, coursework in education and a teaching license is a must. As for informal environmental educators, while teaching/educator experience through school and work is a plus, it is oftentimes not a requirement for employment. Naturalists, Zoo interpreters and other informal environmental educators will often carry a degree in biology, ecology, natural resources or another environmental field. This means that they may have never experienced coursework or training on being an educator. If it were not for my time as a paraeducator or coursework through Hamline University, the details of pedagogy would not have been as important to me. In order to fill this gap, I have created a professional development for environmental educators that seeks to address the question: *How can informal environmental education curriculum and pedagogy be more inclusive for autism spectrum disorder (ASD) students?* This chapter will provide details of the staff development training to be implemented and explain the decisions that determined the methodology

The first section of this chapter will investigate research on andragogy (adult learning) and the best practices for this project. Understanding how adults learn best is

important for knowing how to produce an effective workshop that answers the research question. The next section is a specific breakdown of what the project will look like. Having a detailed plan for implementation for the project provides quality for those who seek to benefit from it. The following section is a description of the audience and setting to use this project, because knowing who would benefit from the project allows for more detail and thought to go into the process of project creation. Holding accountability for the project completion will be answered in the next section regarding the timeline. The last section will determine the quality of the project by explaining how it will be assessed.

**Research on Andragogy**

While the term pedagogy refers to education in which the student is reliant on the guidance of the teacher, andragogy is considered self-motivated learning. In simple terms, pedagogy is the concept of learning for children while andragogy is learning for adults (Forrest & Peterson, 2006; Knowles & Associates, 1984). According to Forrest & Peterson (2006), the difference between pedagogy and andragogy is denoted by age and use of the learning being presented. Children are looked to as students that learn to complete classroom requirements while adults are viewed as workers, parents and more identities who learn to improve their understanding of the various labels they hold (Forrest & Peterson, 2006). Understanding the difference between andragogy and pedagogy for this project was necessary as the environmental educators benefit from the research done on andragogy to help them improve their own work to be more inclusive in their field.

Andragogical learning provides the student the opportunity to be an active component in the direction of the learning (Forrest & Peterson, 2006). Growing up with a history of pedagogical learning environments may make students wary of learning because they may have never been allowed to be a part of the developmental process, the authors add. This is one reason why andragogy is implemented with the understanding that the learners' goals are first (Forrest & Peterson, 2006). Adult learning also involves the past experiences and ideas that the learner collects throughout their various identities (Forrest & Peterson, 2006; Knowles & Associates, 1984). Utilizing such experience can provide a fresh perspective and ideas to investigate a topic. Andragogy benefits from a use of collaboration and support from other adult learners to further enhance the experience of learning (Knowles & Associates, 1984).

Knowing that adults are shaped and motivated by their individual experiences, that they benefit from the choice to learn over force, and that equal opportunity to plan the learning process is helpful can provide evidence for the framework of this project. The concept of andragogy reveals that the proposed staff development training should be a collaborative effort from multiple informal environmental educators to foster an improved understanding as a group. This can be done by having the adult learners establish the goals of the training, the literature to review and the method by which the goals are achieved so that it can be catered to the personal learning experience as defined by andragogy. Knowing this information on adult learning is critical for the next section that describes the project in detail.

**Project Description**

In this section a detailed description of the project will be provided. The andragogy framework is used in the process of defining who, what, when, where and how of the project. Adult learners do not benefit from passive education, but rather active involvement in the process. This means that the individual experience will have a great influence on the direction of the professional development described in this section.

The staff development training is provided as a workshop for organizations to have their staff complete as a group, but this development can also be self-guided. A presentation was created that guides the group through important concepts of ASD student learning understanding, recommendations, and resources. Within this presentation there are prompts for collaborative conversation about research and information covered. Learners can choose to discuss as a group or record their independent understanding of the content. Being as collaboration is important for learning (Knowles & Associates, 1984), it would be recommended to complete this as an educational team to achieve maximum benefit.

The content of this workshop utilizes the research conducted in the literature review. Each of the sections researched (Autism Spectrum Disorder (ASD), Traditional Classroom Education and environmental education (EE)) along with their subsections are summarized. This is how the staff improve their understanding of ASD, pedagogy and standards.

Utilizing the concept of self-guided learning, the amount of time this training takes for the learner to complete varies depending on the goals and direction of the staff

using this workshop. If adult learners experience the best results by controlling multiple facets of their learning as andragogy implies, then the amount of time devoted to such learning should reflect the choices of the learners. The idea is that this training can be completed in five separate sessions (each session at least an hour in duration) but can be expanded if desired. Being that the informal environmental educators either choose to complete this workshop, or the workshop will be headed by the coordinator of the agency as a desire to complete it, the training varies in time limit. A general format for the completion of this workshop is provided.

***Workshop Session One***

The first session introduces the intentions of the training, followed by the concepts of ASD, Traditional Classroom Education and EE. This session takes roughly one hour to complete. First the group (or individual) makes clear the goals and objectives of completing this workshop. Self-determined expectations personalize the benefits of the workshop. A general list of objectives is provided to supplement the goals created by the learners. Then they either discuss or record individually their current understanding of the subjects, past experiences, or comments/concerns regarding the content of this workshop. A general introduction to the topics is provided as a presentation for the learner to view once the previous step is completed. After watching the presentation there is room for another discussion/recording to dissect the information provided. The initial funneling of general information and discussion is important even though it goes against the self-guided experience. Once this is completed the staff is prompted to end the meeting

and complete a literature review of their own to learn more about ASD, Traditional Classroom Education and EE before the second session is conducted.

***Workshop Session Two***

At the second session of the workshop the group should be prepared to discuss the research that was conducted in reference to the last session. As this project pulls from andragogy concepts, the staff is free to decide which topics they would like to research and how long this discussion lasts. They determine their motivation to expand on the general knowledge provided to them.

This discussion on research and the presentations provided should include what the participants already knew about the topic, and what is new information. This sets the stage for just how much or little the work team has factored ASD into their work. With this presentation of personal research and following discussion, this workshop takes roughly one hour, and the group will be prepared for the third day (third workshop).

***Workshop Session Three***

After the discussion on research the group brainstorms ideas on how their organization/education can improve inclusivity efforts for students with ASD that visit. Once that is done another audio presentation provides an example of how Long Lake Conservation Center chose to be more inclusive for students with ASD in their informal environmental education practices. Showing a specific example of the research in action helps add another perspective outside of their staff team, another effort towards collaboration which is important for adult learning (Forrest & Peterson, 2006; Knowles & Associates, 1984). The staff then goes back and assesses their brainstorming efforts and

add/subtract as needed. The third workshop is concluded and they meet the next available date for session four.

***Workshop Session Four***

For the fourth session staff split up areas of their curriculum and pedagogy that can be reviewed to improve inclusivity. Those groups (or individuals) then get to take a look at their respective areas. This takes at least an hour to complete, but it is encouraged to take more time to ensure a thorough investigation. In this session staff are taking notes, pictures and other evidence to bring back to the group and share. A recommendation in preparation for session five is to have each group prepare a presentation of their findings.

***Workshop Session Five***

The fifth session is the final session of this workshop. The staff members present and discuss their ideas on how to create inclusivity for ASD students at their organization. The group is prompted to be detailed with their ideas and to record them. The will decides which changes can be made immediately or need more time, and create a rough timeline for completion (this excludes ongoing change). They are then asked to look back at the goals that were set in session one to see how their efforts complete the goals. A questionnaire is provided for the group to complete regarding the impact that this workshop had on their organization, and how they intend to use this workshop moving forward.

Workshop Session One lays the groundwork for the following sessions by providing foundational research and introductory discussion. The second workshop session allows for the staff to expand on what was learned and cater the research to their

own experiences and provide examples on how to act on their understanding. The third workshop provides tangible examples of the research at work, and changes that can be made. Session four allows for creativity and a creation of a plan that is research based. The fifth session holds the staff accountable by having them act on their research and learning by updating their work conditions as they see appropriate. Now that the description of the project has been addressed, the audience and setting are next.

**Intended Audience and Setting**

This training is offered for all informal environmental educators and has specific details catered to those who work with middle school age groups. Being as the format and details of this professional development are decided on an individual basis as andragogy allows, this training can also be a useful tool for formal environmental educators. The reason for this professional development having a specific focus on middle school age and informal environmental educators is because it is a common age group for ELCs to encounter and as mentioned before entry-level informal environmental educators have an overall lower amount of experience with education related training.

The development is provided as a workshop for organizations to have their education staff complete as a team. As mentioned before, the workshop allows for individual decision on the direction of the learning, but collaboration with colleagues is necessary. This provides the experience of multiple perspectives, develops informal education as a team, and strengthens the chance of meaningful change through group accountability. The workshop can be completed as a work organization in the setting in which the team is located. Offering the workshop in an online format provides easier

access to the materials and an increased opportunity to reach more informal environmental educators.

Offering specific details to ELCs that this project is intended for is important, and equally important is the opportunity for other informal environmental educators to learn from this project. Therefore, this project prompts discussions that are inclusive of more than just improving the inclusion of middle school ASD students. This is also a way of allowing self-directed learning to take place as instructed by Knowles and Associates (1984) and Forrest and Peterson (2006). Now it is time to review details on the project's timeline.

**Timeline**

As previously mentioned, the workshop spans between five separate sessions at a minimum of an hour each. It is at the discretion of the learner to decide what specific days/times would work best to complete the workshop. This can be completed in five consecutive days, but it is recommended that the staff has ample time to conduct research as the concept of self-direction is critical to andragogical learning (Forrest & Peterson, 2006; Knowles & Associates, 1984). The creation of this specific project was conducted throughout the Spring 2022 semester at Hamline University as a requirement for course completion. The timeline presented in the Capstone Project course syllabus is what was used in pacing the completion of this project. To further hold this project up to a standard of quality, the next section describes how it is assessed.

**Assessment**

Assessment of the workshop is collected from each staff member who participated in the workshop. The assessment is included at the end of the fifth workshop with a request to fill out a Google Form. A mix of short answer and rating questions is asked and a space for additional comments is provided. The assessment is used to update the presentation, information, and format of the workshop to better serve informal environmental educators and their places of work.

**Summary**

Knowing how best to reach the intended audience is critical for producing a quality project to answer the research question: *How can informal environmental education curriculum and pedagogy be more inclusive for autism spectrum disorder (ASD) students?* The concepts of andragogy as described by Knowles and Associates (1984) and Forrest and Peterson (2006) laid the groundwork for providing this quality. This project aims to specifically address the concepts of self-direction and collaboration as strengths in adult learning, and the description of this project references these concepts frequently.

As environmental educators aim to impact as many individuals as possible, this project has specific details and open-ended prompts to provide quality and inclusivity to more informal environmental educators looking to be a part of this workshop. The online setting also increases accessibility so more educators can benefit, further meaning more ASD individuals may benefit. The flexibility and self-direction provided in the workshop's timeline is also an accessibility benefit for busy educators. Lastly, the

assessment of this workshop provides meaningful insight from those in the field on how to improve this project. The following chapter will provide a conclusion and reflection of the research and related project.

# CHAPTER FOUR

## Reflection

### Introduction

The purpose of this capstone project was to provide answers to the question, *How can informal environmental education curriculum and pedagogy be more inclusive for autism spectrum disorder (ASD) students?* The research and methods found in prior chapters were used to provide a project that will hopefully create motivation and excitement in educators to be more inclusive. With examples and explanations, I believe this project does a quality job of achieving this goal.

The contents of this chapter will provide a reflection of the project. The first section of this chapter will define my major learnings throughout this process as a researcher, writer and learner. The following section revisits the literature reviewed by defining what sources and sections of the review were most influential in creation of the project. The next section is an investigation of limitations that developed from this project. After this, a section on future ideas for projects in reaction to this one, and how it could inspire more research in the field. With that is a paragraph on recommendations based on my findings. This chapter will conclude with a summary of this reflection and a final statement of this process.

### Major Learnings

Throughout the process of completing my capstone project, there were notable learning experiences. As a researcher, I learned that it takes practice and attention to detail when finding information to complement the project. Though it would be nice to

throw every detail of ASD into this project so everyone would be experts on the topic, there is only so much time, space and ability to learn involved. This is why the literature review is a synopsis of ASD and its relationship to informal EE. The information that I did not add to the literature review while researching was not left out due to lack of importance, but rather a decision to condense learning to the scope of what this project is to help achieve.

In the process of writing I found it challenging, yet crucial to look back on my past writings to keep the project consistent. As the paper was written and the project created, there were times where my project would slightly shift in perspective, or a change in common language throughout the paper. It is good that I was finding ways to improve my project and writing, but with every change came the need to look over all the completed content to make necessary changes. I also learned that while peer editors are a key benefit to the writing process, it is important to sift through comments that may deviate from my own writing style and not have an impact on the correctness of the writing.

As a learner it was clear from the start that while I had a decent understanding of the topics of my research question, I had much more to learn, and I am still learning. As a naturalist I find myself explaining to others that I know a little about a lot, and for this project I feel no different. I know that my knowledge, due to my past experiences and this project, is above the average person when it comes to EE and ASD, but I would not classify myself as an expert. This project is a steady reminder to continue to learn and grow in my learning.

One unexpected learning from this project was that I did not struggle as mucha s I thought I would to complete this project. I believe my passion for the subject and the support system I had throughout this journey made this process enjoyable, and I found myself excited to complete each step. With the help of my content expert, instructors, peer editors and others I felt equipped to produce a quality product.

This learning opportunity provided me with expected and unexpected insight, and has reminded me of the importance of conducting research on topics in the field I am passionate about. The following section will revisit the literature review conducted in Chapter Two.

**Revisiting the Literature Review**

All parts of the literature review were important for laying a foundation of understanding for the project. With that in mind I found that I would rely heavily on the sections describing ASD and formal education practices to be crucial. This project was intended to increase inclusivity by helping informal environmental educators to understand and adapt to ASD learning. This meant that providing information on what ASD entails and how those who interact with ASD individuals each day make the most of the experience was at the forefront of information needed. Though some informal environmental educators may have a background in this area due to past experiences, it is not required or guaranteed that informal environmental educators are aware of this topic.

A source that was influential for my project was “Using video social stories™ to increase task engagement for middle school students with autism spectrum disorders” (Cihak et al., 2012). This article was useful in identifying key signs and indicators of

ASD while also providing tips to improve education at the middle school level. Though my project is intended for all informal environmental educators to learn from, a specific section on middle school was included to provide detail for ELCs that specialize in middle school groups. This resource was a base for my literature review, as it covered much of what was essential for this project, it was good to compare this resource with others as I collected them to provide appropriate information.

A new connection I formed in relation to the literature review is that it is not the end all be all of this topic. Though I went through a thorough investigation of the topics, I know that with more studies and time this information can evolve. With this I learned that I should attempt to stay in touch with research on this topic and update my understanding as new findings present themselves.

While all of the research provided in the literature review felt essential to providing a complete understanding of this subject, there were sections and sources that became more influential than others. The following section contains limitations found during the construction of this project.

**Limitations**

During the creation of this project, some limitations did arise. One limitation is that while I wished to provide the workshop as a product that can be used without my presence, I found that as the individual that already understands the topic, it would be better to facilitate in person workshops. The reason why I found my first option to be ineffective is because I would not be there to answer questions as they arise, or ensure that the audience is getting the most from this opportunity. This means that my presence

would be optimal, but I would entertain the option for myself to call in, or zoom into the workshop to avoid travel.

One other limitation to this project is the difficult balance of self guided education and covering the material necessary. As I wanted this process to include discussion time and the flexibility to shift focal points on a group to group basis, I struggled to find a way to create worksheets that accommodated both that and essential learnings. This is why I created the objectives as addressed by the project as well as objectives created by the participants.

Though this project contains note limitations, they do not hinder the ability to answer the research question. Next I would like to explain how this project might influence my future endeavors (and others), and recommendations I have.

**Future Research/Projects**

In the future this project may inspire projects of a similar or related nature. I could investigate other conditions that impact learning, such as ADHD. I could also consider other conditions like hearing loss, blindness, and mobility constraints. With the goal of increasing inclusivity, expanding the opportunity to more individuals is key. The inclusivity of the program could also relate to a students socioeconomic status, race, gender, and lifestyle. The environmental field can always seek to improve efforts to involve as many individuals as possible.

Another topic of interest I may consider researching in the future is how informal environmental education opportunities can be beneficial for ASD students. If this informal way of learning can create a positive learning environment for more students, it

may be worth considering the chance to incorporate more informal education programs into the traditional learning environment.

One recommendation I would make regarding my findings would be to remember that this condition is a spectrum, and that not all students will present the same signs and indicators, if any at all. I would suggest offering the different learning choices created for increasing inclusivity to all students, this not only creates a comfortability with the choice but also reduces the informal educators desire to misinterpret indicators. Even if the student does not have ASD, they may benefit from these tools and increase their learning experience, and that is worth offering. I would also recommend being flexible in the process of creating an inclusive environment. Try learning from the students and find new and exciting ways to educate based on their experiences.

The process of creating this project inspired thoughts of other improvements to be made in this field, and I am hopeful that myself and others will take this inspiration and create more useful developments in the future. The last section before the summary of the chapter will explain how I believe this project benefits the profession.

**Benefit to the Profession**

It is my hope that my project will provide the opportunity for informal environmental educators to expand on their ability to impact neurodiverse students. This project is intended to fill the possible gap informal educators experience due to their path to informal education. I have interacted with informal educators who never took a course or completed a workshop involving pedagogy. This does not mean they are not wonderful educators, but rather they may not know how to interact with different learning styles. I

also hope that this project sparks creativity in the minds of informal educators to provide opportunities for students that make for an enjoyable learning experience.

Knowing that my hard work to complete this project could have a positive impact on the parties involved is a rewarding concept to take in. Many educators are seeking to continue to grow in their practice and I am excited to do my part to help them. The following section will entail a summary of chapter 4 and final thoughts.

**Summary**

This chapter was an overview of how the process of completing this project went. With major learnings about myself, the process and the topic, I feel that this project had benefits that expanded beyond answering the immediate questions of improving inclusivity. I improved on my ability to conduct and produce an effective literature review, and found sources that were major influences on my topic. Though some limitations were met, this project also sparked ideas for future research and projects to help the field. This project will hopefully reach the minds of many informal educators, and cause an overall increase in who participates in informal environmental education.

This process, while challenging, was the most rewarding assignment of my academic experience. I am once again grateful for those who assisted me, supported me and believed in the benefits of this project. I hope to use this motivation to continue to improve as an informal educator.

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