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ACTIVITY MODIFICATIONS FOR GROWING UP WILD™:
SUPPORTING YOUNG LEARNERS WITH AUTISM SPECTRUM DISORDER

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.

Hamline University

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DEDICATION

To my dad, John Coduto, for introducing me to the outdoors as a young child. Your passion for sharing the outdoors sparked within me lifelong learning and teaching. Thank you for the adventures, teachable moments, laughs, and the lifetime of memories. Through you, my goals will remain in focus and always in my front sight. Rest in peace.

“If a child can’t learn the way we teach, maybe we should teach the way they learn.”
-Ignacio Estrada

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CHAPTER ONE

Introduction

“Give the pupils something to do, not something to learn; and the doing is of such a nature as to demand thinking; learning naturally results.” -John Dewey

July. Crouched down in a tallgrass prairie with the heat so strong it feels as if I am being weighed down by its blanket of rays. Sweat is pouring down my face and back. To the left of me, a group of ten and eleven-year olds, giggling. “Shh! He’s going to hear you!” I hissed as I looked to my right to see another few adolescents slowly belly crawling ahead of me. The prey, slowly creeping our way to the “safe zone” is getting closer to the goal. I see the predator, all four foot five of him, slowly pacing back and forth along the dirt path, like a warden watching for furtive movements. “Just a little further” I say to myself, as I slink ahead half a foot at a time. “Visor! Brown hair! Blue shirt!” I hear the predator call out, all-too-quickly realizing he has recognized me and is describing what I am wearing. I stand up, thankful for the breeze I can now feel, and walk over to the four-foot five predator. I stand amongst the other “eaten” prey. A lucky prey makes it to the safe zone. I blow my whistle, and the game is over.

The next ten minutes my group of ten and eleven-year olds review the concepts of predator/prey relationships and their adaptations. We assess the possible causes of why some prey were caught. Bright clothing, moving too fast, and making too much noise were offered up as answers. I expounded on each answer, reinforcing what we had previously discussed in the classroom. It became clear that by the end of that ten-minute

debrief, my words were beginning to fall on deaf ears. Another round of “Hunt” had to be played.

I have had many experiences like this in my time spent in outdoor and environmental education. Whether it be with preschoolers or families, it is my goal to get participants involved with their learning. I have found that the best way to do this is to get learners involved through hands-on learning and direct experiences, and to connect the material to the learners themselves. Not only is experiential learning beneficial as a learning process, studies show children and adults alike benefit from being exposed to natural environments.

My experiences in non-formal education has shown me there are not many resources to support young children with disabilities in the outdoors. The aim of this project is to take an already existing, quality early childhood outdoor education resource and adapt the outside learning activities for children with ASD, thereby supporting my research question, *What are the best ways to modify the Growing Up WILD™ curriculum to best support young learners with Autism Spectrum Disorder (ASD)?*

Importance of Connecting Young Children to Nature

Young children, between the ages of two and seven years old, are in the preoperational stage of cognitive development, according to Piaget (as cited in McLeod, 2018). Children at this stage exhibit high physical activity, are becoming more self-aware, are gaining the ability to regulate their emotions, are developing prosocial behaviors, and coping skills to adverse situations and stress (Copple & Bredekamp,

2009). These great strides in development can be complemented by young children spending time learning and recreating outdoors.

Over the last decade, many studies around the world have shown the benefits of children spending time learning and recreating in the outdoors. Nature and the outdoors have shown to positively affect children's cognitive, social-emotional, psychological and physical health (Chawla, 2015). In young children, playing outside exhibits growth in areas of cognitive development and concentration (Wallin, 2017) and those children playing in green spaces exhibit more creative play versus playing on constructed equipment (New Zealand Government, 2011). Nature has the capacity to serve the whole child - cognitively, emotionally, and spiritually, as well as complementing the formal education setting. The modified activities of this capstone project will offer a resource to formal and non-formal educators allowing students of all abilities to experience meaningful play and learning outdoors.

Personal and Professional Background

I always knew I wanted to be an educator, as teaching and learning has always been a passion of mine. Initially, my teaching aspirations began in the field of physical education, as this active teaching style supported my views of "learn by doing." When I entered my undergraduate program, I was introduced to the field of environmental education. My interest was piqued in discovering more about this field where teaching was combined with the outdoors. I tried my hand at environmental education during college summers at a nature-based day camp and fell in love with the teaching philosophies and content. I learned firsthand that children (and adults) are more interested

in the material when you can make it personal and involve the learner. When college started up again in the fall, I switched programs from Physical Education to Environmental Science and Geography, with the goal of getting into the field of outdoor education professionally upon graduation.

After graduation, I began working full time as an environmental educator, delivering natural and cultural history to children from preschool to high school. I also had the responsibility to develop outdoor programming suitable for families. As I moved along professionally in my career, I was fortunate to have the opportunity to hire, train and supervise outdoor education staff, as well as manage outdoor education programming. Fortunately, the organization I was part of housed a therapeutic recreation department, where inclusion and adaptive services were offered to children and adults with special needs. I worked closely with this department to ensure every child with special needs that visited either as a day trip or overnight was included and successful in our programming. Program modifications such as one-on-one support, hiking trail modifications and visual systems were effectively employed for students.

As the years went on, my interests within the outdoor education field went from direct instruction to teaching and training others. I became a facilitator for the *Growing Up WILD™: Exploring Nature with Young Children* (Association of Fish and Wildlife, 2018) curriculum, an activity guide that offers hands-on exploratory learning to young children ages three to seven. During my trainings, I would explain my current professional role in outdoor education and explain the services we offered, including the work with the therapeutic recreation department. I started becoming cognizant of the

audience's interest in adapting current program offerings to best meet the educational goals of children with special needs. There are many excellent outdoor and nature-based curriculum guides for formal and non-formal educators to use, but very few, if any, address activity modifications for children with special needs.

Rationale

Concerning young children, studies have additionally shown that within the past 10 years the rates of autism in children have increased between 50% - 2,000% worldwide, and within the United States 1% of children (1 in 110) are diagnosed with Autism Spectrum Disorder (Kopetz & Lee, 2012). A Taiwanese study conducted in 2010 showed that outdoor activity positively impacts children with ASD (Chang & Chang, 2010). Emphasis for early childhood learning is put on whole-body learning and having positive, direct experiences that can involve the senses. Children diagnosed with ASD may exhibit difficulties with communication, social interaction, and patterned behaviors (Mayo Clinic, 2018) therefore may experience a difficult time with the learning activities.

Wanting to bridge both the needs of formal and non-formal educators and young children with special needs, my capstone project addresses the question *what are the best ways to modify the Growing Up WILD™ curriculum to best support young learners with Autism Spectrum Disorder (ASD)?* Current nature-based curriculum is centered around direct, hands-on experiences, but none address the needs of how to engage children with developmental disorders to the environment. The intent of this capstone project is to address the gap of appropriate methodologies and teaching techniques for children with

ASD to an already-established nature curriculum, *Growing Up WILD™: Exploring Nature with Young Children* (Association of Fish and Wildlife, 2018).

Growing Up WILD™ is an early childhood curriculum that offers 27 nature-based learning activities to children ages three to seven. Each activity offers the flexibility of being utilized as an entire learning unit or used as stand-alone activities. This curriculum supports a young child's sense of wonder about the world around them, and includes social, emotional, physical, language and Head Start domains. *Growing Up WILD™* also supports Developmentally Appropriate Practice that allows children to learn at their own level that is individually, socially and culturally appropriate (2018). The curriculum promotes scientific inquiry, early literacy, creative and artistic expression, math connections, and healthy habits. Within the healthy habits' promotion is the "Take Me Outside!" portion of each activity. Through my professional experience in the non-formal education field, this is where I see the biggest gap: non-formal educators not having the experience and/or resources to facilitate outdoor experiences for children with special needs, and formal educators not comfortable teaching outdoors. This section is where I will be adapting the activities to best address the needs of young learners with ASD and will be discussed further in later chapters.

Summary

Over the past decade studies have proven that young children spending time outdoors have many positive impacts on their overall physical, social/emotional, and cognitive health. Concurrently, diagnosis of ASD has also increased significantly over the past decade. The benefits of nature contact have also been demonstrated for children

with developmental disorders, but the current mainstream nature-based curriculum provides no activity modifications for children with ASD. Reflecting on my early experience playing “Hunt” with a group of adolescents many years ago, what would I have done to be inclusive of children with special needs? How would I have made that learning activity accessible to children with ASD?

My goal is to adapt the "Take Me Outside!" activities within the *Growing Up WILD™* curriculum so educators have appropriate teaching strategies and children with ASD have positive learning experiences and outcomes with nature.

Chapter Two will discuss further the literature surrounding how young children learn, ASD and sensory processing disorders, educational neurodiversity, inclusion, and the benefits of time spent outdoors. Additionally, barriers to outdoor play will also be discussed.

CHAPTER TWO

Review of the Literature

Nature can serve as a classroom, and as an educator. Nature provides lessons that aid in a child's gross motor skills, support the development of cognitive and emotional abilities, and lessen the symptoms of developmental disabilities. There are many nature-based curriculum guides that provide for quality outdoor exploration and education, but none provide adaptations for children with ASD.

Chapter two will further discuss the education of early childhood students, Autism Spectrum Disorder (ASD), and the benefits of nature to support the research question of *what are the best ways to modify the Growing Up WILD™ curriculum to best support young learners with Autism Spectrum Disorder (ASD)?*

The literature review is intended to show the linkages of how nature can support whole child development and children with ASD, and provide a framework for best practices in adapting outdoor activities in *Growing Up WILD™*, a nature-based early childhood education curriculum in Chapter Three.

How Young Children Learn

Young children in early childhood grades learn differently than that of older children and adults. According to Harvard University's Center on the Developing Child (2007), in a child's first few years of life, every second more than one million new neural connections are formed. Once this process has slowed after those initial years, brain circuitry becomes more efficient by way of "pruning." Vision and hearing are developed initially, followed by language skills and more complex cognitive abilities.

The young child learns best from direct experiences that involve the senses, and studies suggest young children learn best by using multi-sensory methods, and employing whole-body learning that incorporates movement, visual, auditory, kinesthetic and verbal approaches (Leyden et al., 2014). An understanding of their world begins to emerge from their explorations, natural curiosity, creative expression and through observation and imitation of their peers and adults with whom they interact. Educators can enrich and enhance these learning opportunities using developmentally appropriate practices.

The National Association for the Education of Young Children stated that educators can promote positive and effective learning experiences by recognizing the 12 principles of childhood development:

1. All areas of development and learning are important.
2. Learning and development follow sequences.
3. Development and learning proceed at varying rates.
4. Development and learning result from an interaction of maturation and experience.
5. Early experiences have profound effects on development and learning.
6. Development proceeds toward greater complexity, self-regulation, and symbolic or representational capacities.
7. Children develop best when they have secure relationships.
8. Development and learning occur in and are influenced by multiple social and cultural contexts.
9. Children learn in a variety of ways.

10. Play is an important vehicle for developing self-regulation and promoting language, cognition, and social competence.
11. Development and learning advance when children are challenged.
12. Children's experiences shape their motivation and approaches to learning
(National Association for the Education of Young Children, n.d.).

According to the Center on the Developing Child (2007), success in school and throughout life is intimately tied to its early years of brain development. A young child's brain is considered to have more plasticity or flexibility in earlier years, and this flexibility decreases as the child ages as the brain is managing more complex tasks. Therefore, this plasticity signifies that a child is more impressionable to new learnings and positive and negative experiences early in life and that it is more difficult to "rewire" to other behaviors and learning later as an adult. Copple and Bredekamp (2009) ascertained that the high quality, rich learning experiences that children under six receive are threatened to be reduced if not continued through third grade.

Successful students and adults, both young and old alike, rely on a learned set of behavioral skills: executive function and self-regulation. These two skills comprise three kinds of brain function: working memory, mental flexibility, and self-control (Center on the Developing Child, 2012). A school-aged child is confronted with sensory stimuli and classroom and school procedures daily. Executive functioning skills allow students to be successful in their classrooms by following multiple step directions, staying focused, successfully adjusting through transitions, and persevering through problem solving.

Appropriate behaviors are also developed by way of working as a team, decision-making, inter-and intrapersonal emotional intelligences (2012).

Children with ASD typically have a more difficult time with executive functioning skills. Spending time in nature can assist with executive function development in children with and without ASD. Early childhood nature-based activities such as storytelling, singing songs, movement, imaginary play, and quiet games “encourage preschoolers to focus attention, use working memory and practice basic self-control skills (D’Amore, 2015).”

Children with Autism Spectrum Disorder

Autism Spectrum Disorder (ASD) is categorized under the umbrella of developmental disabilities. The Centers for Disease Control and Prevention (2018c) stated that developmental disabilities “are a group of conditions due to an impairment in physical, learning, language, or behavior areas” (para. 1). The Centers for Disease Control and Prevention (2018a) characterizes ASD as “a developmental disability that can cause significant social, communication and behavioral challenges” (para. 1). In a 2018 study by Sugita, ASD is the fastest growing disability in the United States. In early 2018, the Centers for Disease Control estimated that one in 59 children are diagnosed with Autism Spectrum Disorder in the United States (Baio et al., 2014). While the seemingly growing trend of ASD diagnoses seems to be on the rise, “there are questions about how much of the growth is due to greater awareness and better diagnoses rather than a real increase in prevalence” (Organisation for Economic Co-operation and Development, 2017, p.1).

Sensory processing disorder can be an attribute to ASD. With a variety in symptoms and severity presented within ASD, educational neurodiversity looks at the human brain and celebrates the neural differences inherent within each person, and sees ASD not as a limiting factor; rather, as one way of functioning. Current inclusion practices are shifting away from the segregation of children based on cognitive differences and integrating children of all neural abilities in a classroom.

Sensory processing disorder. Children with ASD can also experience difficulties in sensory processing. Critz, Blake and Nogueira (2015) noted “research suggests sensory processing challenges are neurologically based problems stemming from the brain’s inability to integrate the sensory input it receives from the sensory systems and turn the input into effective responses” (p. 710).

A 2007 comparative study conducted by Tomchek and Dunn looked at sensory processing in children three to six-year-olds with and without ASD (2007). Tomchek and Dunn’s look into past studies and a study conducted of their own found that one of the more prevalent impairment reported is auditory processing. Hypersensitivity to touch gave intense feelings of being “overwhelming and confusing” (p. 198). Tomchek and Dunn’s 2007 study used the Short Sensory Profile (SSP), “a 38-item caregiver report measure comprising the items that demonstrated the highest discriminative power of atypical sensory processing among all the items from the long version, the Sensory Profile” (p. 193). The seven categories of the SSP in their study were Taste/Smell Sensitivity, Movement Sensitivity, Under-responsive/Seeks Sensation, Auditory Filtering, Low Energy/Weak, and Visual/Auditory Sensitivity. “Greater than 95% of

discriminate validity were demonstrated in initial studies recognizing children with and without sensory modulation difficulties” (p. 193). Additionally, a 2011 report on sensory abnormalities in autism found that hypersensitivity and an overreaction to sound was most commonly reported (Klintwall, et al, 2011).

Inclusion and educational neurodiversity. Historically, special education has focused on the abilities of what a child *cannot* do academically or physically. Separate learning environments were constructed and little interaction was had between mainstream and special education classrooms. Prior to 1975, public schools were not legally required to provide educational services for children with disabilities. A Congressional investigation in 1972 found millions of children were not receiving an appropriate education (Wright & Wright, 2010). The Bureau of Education for the Handicapped estimated that:

of the more than 8 million children . . . with handicapping conditions requiring special education and related services, only 3.9 million such children are receiving an appropriate education. 1.75 million handicapped children are receiving no educational services at all, and 2.5 million handicapped children are receiving an inappropriate education. (para. 24)

In 1975, Congress passed the Education for All Handicapped Children Act. The initial law has since been amended, and with the change in laws came a change in special education discourse, namely inclusion.

According to the Special Education Guide (n.d.), inclusion is defined as “secure[ing] opportunities for students with disabilities to learn alongside their non-disabled peers in general education classrooms” (para. 1). According to the Organisation for Economic Co-operation and Development (2007), more parents are pursuing mainstream classrooms for their children with special needs (2017). Inclusive classrooms may benefit children with ASD as it may encourage social interaction with their peers and can ease intellectual disabilities in students with deficits in social-communication (2017). Inclusion advocates assert that each person has the inherent right to be a full, contributing member of their community. Lynch and Irvine (2009) further maintained “we need to provide them with the opportunity to learn among their friends, gain social relationships, and build an adequate self-esteem” (p. 846). Neurodiversity further builds upon the inclusiveness of education by embracing the person as a whole with unique abilities inherent to themselves.

Neurodiversity is a relatively new concept that aims to detract from a person’s disability, and have it highlighted positively as anything else diverse - such as biodiversity and cultural diversity (Armstrong, 2012). Neurodiversity sets out to celebrate a child’s abilities and strengths, rather than their deficits. Extending beyond the ASD community, neurodiversity has encompassed other disability-related categories, such as ADHD and learning disabilities (2012).

With a rise in parents choosing mainstream classrooms and neurodiversity becoming more of a conversation piece within the educational community, there is a growing need for inclusive outdoor educational materials to be available to educators.

Benefits of Outdoor Learning

Outdoor learning serves as an experiential bridge to connect students to their classroom material. Hands-on learning occurring on field trips can increase “student interest, knowledge, and motivation” (Behrendt & Franklin, 2014, p. 235). It is during those field trip outings that students gain more of an appreciation for the subject matter (Behrendt & Franklin, 2014).

Copple and Bredekamp stated each learning and development domain of development and learning are important and connected (2009). Children’s contact with nature is significant and can aid a child’s wellbeing in every major way – emotionally, intellectually, physically, socially, and spiritually (Taylor & Kuo, 2006). Time spent outdoors have shown positive gains in psychological functioning can be seen in increased cognitive functioning, greater self-discipline and impulse control, and a greater resilience to stressful events (Natural Learning Initiative, 2012).

Chawla’s (2015) research included the role green space plays in a child’s development. The findings included cooperative and social play amongst children, less depression and stress, better concentration and self-regulation behaviors. All of the positive gains spending time in nature has a direct correlation to the development and education of the whole child and touches each domain. To this, a 2015 year-long Barcelona study showed positive improvements to a child’s working memory and reduced inattentiveness when they had green environments in and around their home and school (Chawla, 2015).

A 2010 study conducted by Chang and Chang looked at the benefits of outdoor activities for children with autism. Results showed various benefits in “communication, emotion, cognition, interaction, physical activity, and decreasing autistic sensitivity” (pp. 8-9). This study interviewed parents of children with autism, but stemming from the positive results, recommendations were suggested for educators and other caregivers to play and learn outdoors. While tolerances to new environments and sensory experiences may increase fears initially, the sensitivities will lessen over time with patience and child-led explorations. The overall positive emotions a child with ASD experiences by being outside overrides the negative stimulations initially felt (2010).

A 1998-1999 school year study with eight and nine-year-olds found that children who participated in at least one 15-minute recess break during the school day exhibited a decrease in undesirable classroom behaviors (Barros, Silver, & Stein, 2009). Increased attention spans, a decrease in undesirable behaviors and data recall have been shown to coincide in young children are associated with time spent in nature (Children & Nature Network, 2016). Children exposed to the outdoors receive vitamin D, fresh air, gross motor development, all in turn correlate to skeletal and muscle development and strong immune systems (Bento & Dias, 2017).

Barriers to outdoor learning. The structured classroom environment and the schedule of a school day can be disrupted when learning takes place outdoors on a field trip, resulting in undesirable behavioral problems. Studies have shown the deterrents teachers face when planning a field trip. Teacher’s concerns for traditional outdoor field trips include safety, accessibility of the setting for their special needs students, and not

conducive to English language learners (Morgan, 2015). A study conducted by Muse, Chiarelott, and Davidman further noted field trip hindrances:

Among these were (a) a lack of control by the teachers over what was learned; (b) the wide variety of inappropriate stimuli students could react to; (c) the difficulty in providing necessary feedback to each student after a particular experience; and (d) the problems associated with focusing student attention on at least a minimum set of key stimuli. (Muse, Chiarelott, & Davidman, 1982, p. 123)

Formal educators do see the value in experiential field trip experiences for their students, but the cost of such experience proved to be most prohibitive of elementary school educators (Muse, et al., 1982).

Classroom educators now have the opportunity to participate in virtual field trips. Videoconferencing enables students to virtually visit locales near and far without ever leaving the classroom (Morgan, 2015).

Virtual field trips are seeing an increase in popularity. By design, virtual field trips are low-cost and does not require students to leave school for the entire day.

Summary

Historically, children receiving special education services have been underserved in educational settings. Focus has been on what a child is not able to do, rather than embrace what they can do. Nature education can fall into the same category of underserved children with special needs, despite what research has demonstrated to be positively impactful.

According to the Centers for Disease Control and Prevention, ASD occurs in approximately 1 in 59 children, affecting all ethnicities and socioeconomic backgrounds (2018b). Children with ASD experience impairments causing significant challenges that impact their daily lives.

Young children gain positive physical, emotional and cognitive benefits from playing and learning outside. Incorporating educational lessons rich in sensory exploration and being deliberate in providing developmentally appropriate activities utilizing varying learning styles is deliberate in formal classroom curriculum and nature-based education curriculum alike.

Research has demonstrated that the more nature children are exposed to, the better. Gains in cognitive functioning, mental wellbeing, and socialization yields healthy children. With childhood ASD diagnoses on the rise, and the more time people spend indoors (both at school and at home) should result in more time spent in nature. Nature curriculum is available for educators to support these growing bodies of research, but where are the curriculum modifications to promote successful inclusion in the outdoors to children with ASD?

Barriers to outdoor learning environments include cost prohibitive field trips coupled with budgetary constraints, lack of control over students on a field trip, and undesirable student behavior has shown to all be deterrents of traditional field trip experiences.

Chapter Three will provide the scope of the Capstone project and offer modifications for 27 *Growing Up WILD™* outdoor activities. The various modifications

of each activity will allow for the inclusion of children with ASD in outdoor learning environments.

CHAPTER THREE

Project Description

Research demonstrates that time spent outdoors has positive effects on a person's health and well-being. However, there are not many curriculum or activity resources available that deal specifically with outdoor learning and young children with ASD. The aim of this project is to address the research question of, *what are the best ways to modify the Growing Up WILD™ curriculum to best support young learners with Autism Spectrum Disorder (ASD)?* This project seeks to adapt the 27 “Take Me Outside!” activities in the *Growing Up WILD™* curriculum guide and make it accessible for children with ASD through activity modifications.

Sher (2009), occupational therapist and author of *Early Intervention Games: Fun, Joyful Ways to Develop Social and Motor Skills in Children with Autism Spectrum or Sensory Processing Disorders*, described why rich sensory activities specifically geared toward children with ASD and sensory processing disorders is so beneficial. Grounded in science, the book goes into detail on the various kinds of sensory processing disorders. Additionally, Chawla (2015) provided scientific studies showing the correlation that nature contact can positively impact children's health and well-being. Kellert's (2005) work “Building for Life”, described what nature contact can do for children's cognitive capabilities. Taylor and Kuo (2006) also added to the scientific literature demonstrating that nature is important to children's psychological health.

Project Overview

In its earliest start, the activities for *Growing Up WILD™* (2018) were adaptations of activities offered in the *Project WILD* curriculum guide. Early childhood educators were participating in *Project WILD* trainings in larger numbers, and eventually trainings for dedicated activities for early childhood educators were developed.

The *Growing Up WILD™* curriculum is designed for children three to seven years old. The curriculum guide offers 27 activities that “builds on children’s sense of wonder about nature and invites them to explore wildlife and the world around them” (Association of Fish and Wildlife Agencies, n.d., para. 1). Each activity connects children to the natural world by use of centers and extension activities, bringing nature indoors, nature play, math, language and literacy connections, music and art, and healthy snacks. Each activity is developed with developmentally appropriate practices and is correlated to Head Start Domains and connections to the National Association for the Education of Young Children (NAEYC). While each activity has the same format, there are age recommendations for the activities, broken down into categories of ages 3-4, 4-5, 5-6, and 6-7. Background information for the educator is given for each activity, as well as vocabulary words, a list of materials needed for the activity, as well as home connections pages to extend learning outside of the educational setting. Each activity contained in the guide is flexible to be used as a standalone component or as an entire unit (Association of Fish and Wildlife Agency, 2018).

My project focused on each of the 27 “Take Me Outside!” activities and modifying each for children with ASD. I chose this activity section to be of greater

importance to adapt, as there is a lack of materials supporting children with special needs in outdoor learning settings. Adaptation of each “Take Me Outside!” activity focused on the following eight areas: mobility, fine motor skills, receptive and expressive communication, visual, auditory, sensory and social. Terms that fit within those eight categories were highlighted. A table with modifications for each of the eight areas were developed and included at the end of the project for reference.

An “Individualized Student Profile for Outdoor Learning” document was also created to facilitate communication between the educator and the needs of the student ensuring successful delivery of the program and intended learning outcomes.

Setting and Demographics

The intended setting is in outdoor settings located at formal and non-formal sites (such as early childhood classrooms and nature centers). Demographic considerations for the intended audience are for early childhood education students (three to seven years old) with ASD. Implementation of the activities is intended for formal and non-formal educators of early childhood students.

Timeline

I modified 27 nature-based activities within the *Growing Up WILD*[™] curriculum and it took a significant amount of time, as I needed to make sure that each activity touched on what I had also covered in my literature review (and adjusted my literature review accordingly to any new information that was uncovered during the activity modifications).

I was in contact with my content reviewers, as well as the National Office that oversees *Growing Up WILD™* to make sure I was complying with all of their copyrights. I gave much consideration to layout and formatting, as I needed to highlight the original activity but include my own modifications.

Summary

The intent of this project is to showcase the benefits of children spending time and learning in nature and to highlight the need for nature-based curriculums to be inclusive of children with ASD and sensory processing disorders. Currently, there are no standalone nature-based curriculums available that offer activities and lessons geared toward children with ASD, nor are there modifications available in current curriculum. The 27 activity modifications will be developed using developmentally appropriate practices based on our understanding of ASD and sensory processing disorders today.

CHAPTER FOUR

Conclusion

The capstone project was developed to answer the research question *what are the best ways to modify the Growing Up WILD™ curriculum to best support young learners with Autism Spectrum Disorder (ASD)?* The research focused on the education of early childhood students, Autism Spectrum Disorder, and the benefits of children being exposed to nature. The capstone project looked at an existing nature-based early childhood curriculum guide and provided modifications for mobility, fine motor skills, expressive and receptive communication, verbal and auditory, sensory, and social aspects for each “Take Me Outside!” activity. The end goal of the project was to offer a resource to non-formal educators to support children with ASD in outdoor learning.

Chapter Four presents the personal learning tied to this project, major findings of the project, influential literature, implications and limitations of the project, suggested future research, and how this particular project serves as a benefit to the profession of non-formal education.

Personal Learning and Growth

When I began the thesis and capstone project journey, I was intent on modifying curriculum for children with disabilities. Having worked in the field of outdoor and environmental education professionally for close to 15 years I can attest to the need for this type of resource to be made widely accessible for all educators. Through my years, I have encountered countless educators and caregivers who felt that the outdoors and recreation-based programming were inaccessible due to the varying needs of their

students or children. I would work closely with the in-house therapeutic recreation department to put supports and/or modifications in place to ensure the successful inclusion of every participant. Seeing the satisfaction of the educator or parent realizing that their child would not have to be excluded from another activity was matched only to seeing the child's joy in being able to participate with their peers.

This close working relationship I had with the in-house therapeutic recreation department afforded me the opportunity to work on inclusion practices and program modifications for children with disabilities. I was approached by a peer in the environmental education field who asked if I would be willing to give a presentation on program modifications for participants with disabilities at a state conference. With the collaboration of the therapeutic recreation department, we were now offering inclusion support to the professional community.

For this capstone project I needed to narrow my focus to one specific audience and topic. I chose early childhood education students and focused on ASD. Young children learn best from direct experiences that involve the senses, and studies suggest young children learn best by using multi-sensory methods, and employing whole-body learning that incorporates movement, visual, auditory, kinesthetic and verbal approaches (Leyden et al., 2014). A 2018 study by Sugita showed ASD is the fastest growing disability in the United States. In early 2018, the Centers for Disease Control estimated that one in 59 children are diagnosed with Autism Spectrum Disorder in the United States (Baio et al., 2014). These two summative statements regarding how young children learn

and ASD provided for me the catalyst to learn more about the two topics and to provide a capstone project that addressed a need in the growing fields of inclusion and ASD.

Influential Literature

The literature highlighting the myriad of benefits of children being exposed to nature is robust, but the literature supporting the benefits of children with ASD learning in nature is very lacking. Research has demonstrated the positive effects nature has on lessening symptoms of Attention Deficit Disorder (ADD) and Attention Deficit Hyperactivity Disorder (ADHD), but no other research has shown a correlation between the benefits of nature and symptom lessening of children with ASD. D'Amore's 2015 paper on fostering children's executive functioning skills through nature exposure is the closest piece of literature found to tie together ASD and the benefits of nature. Articles and research pertaining to neurodiversity and classroom inclusion bolstered support for the need for a curriculum modifications project, and as a result, my capstone project achieved this need.

Implications and Limitations

The work provided within the capstone project offers a small contribution to the literature on the benefits of young children learning and playing in nature. The existing literature is very lacking on the topic of nature benefits to children with ASD, and this project identifies that need and offers modifications to activities that are inclusive to children with ASD.

One major limitation to my project is that the modifications are of narrow focus to one particular disability. Additionally, the project focused on modifications to one aspect

of a nature-based curriculum guide. A successful modified program is also dependent on the “Individualized Student Profile for Outdoor Learning” being completed and shared with the educator before the start of the program.

Suggested Future Research

The logical next step is to use the modified *Growing Up WILD™* activities in outdoor learning environments and document the findings. The capstone project was designed to be used exclusively with the “Take Me Outside!” activities contained within the *Growing Up WILD™* curriculum. Future modifications could be conducted with the other activities contained in the guide so as to augment the entirety of the curriculum. Expansion of activity modifications is recommended for all nature-based outdoor education curricula. Activity modifications should not be limited toward children with ASD; rather, universally designed to be as inclusive as possible for all participants with disabilities.

Professional Benefits to Non-formal Education

The modifications presented in the capstone project can be utilized as a model for other outdoor education-based organizations to modify their own existing curriculum. Speaking as a professional in the field of outdoor and environmental education I can attest to the lack of materials and professional development geared toward program modifications for participants with disabilities. My intent is to use the research and capstone project to offer trainings through professional development conferences to educators wanting to modify or to create outdoor education activities to be inclusive of individuals with disabilities.

Summary

Chapter Four culminated with the capstone project's findings to answer the research question *what are the best ways to modify the Growing Up WILD™ curriculum to best support young learners with Autism Spectrum Disorder (ASD)?* Additionally, major literature pieces that influenced the project, the implications and limitations of this capstone project, the suggested future research, and the professional benefits this project serves to the field of outdoor and environmental education were discussed.

If one of our goals as educators is to create inclusive learning environments, then our curriculum to support children and learning should reflect the same practice. Reflecting back to my early days of outdoor education playing “Hunt” with a group of children, what would I have done to serve the needs of a child with a disability? Would I have known what to do? Would my mindset at that time have allowed me to let a child with ASD participate on their own terms? Would I have been disappointed that their experience was not the same as the others?

What I know now, after several more years of outdoor education experience, is that success looks different; how a child participates will vary depending on the child and the activity. We are working to achieve the same goal, but how we all get there may look a little different.

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