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THE IMPACT OF OUTDOOR CLASSROOMS ON STUDENTS

A MASTER'S THESIS

SUBMITTED TO THE FACULTY  
OF BETHEL UNIVERSITY

BY

MINETTE STALHEIM JOHNSON

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THE IMPACT OF OUTDOOR CLASSROOMS ON STUDENTS

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May 2023

APPROVED

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## Abstract

The learning environment for students, which has been indoors for decades, has moved outdoors in many locales. As the stakeholders contemplate the use of outdoor space for learning, questions about its benefit(s) for students have been explored. Many researchers had focused on younger students, although there were studies that looked at grade levels all the way through post-secondary. Researchers wrote about the connection between outdoor classroom time and an increase in student's well-being and mental health. Studies indicated that students also had an increase in their cognitive functions of attention, self-regulation, and academic progress when the physical setting for their classes was outdoors. The following paper investigated the deliberate use of outdoor space for part of the academic day and the implications for the emotional development, the physical and mental health status, and the academic achievement of students.

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## CHAPTER I: INTRODUCTION

### Introduction

Educators, policymakers, and parents alike state a desire to have students succeed, to contribute to society, to live in peace and prosperity, and to reach their potential. Over the years, teacher preparation programs, curriculum development, and resource availability have been the means to reach out in the attempt to address student's educational needs. Since 2001, the shift in the United States has been toward accountability through standardized test results, which has focused educational time on test preparation at the expense of opportunities to spend time outdoors in formal or informal learning activities (Coyle, 2010). Within the scope of learning systems, one area has not been fully explored for the impact it may have on student's learning successes. This area has the potential to level the opportunities for many students. It is the actual physical environment where classes are taught. Coyle (2010) noted that schools have the opportunity to shape the amount of time that children are engaged in outdoor time, which could include outdoor education time and may support an improvement in academic performance along with student well-being.

The physical environment in which students are asked to learn has increasingly moved indoors with an emphasis on digital and virtual learning platforms. The connection to the physical environment of earth, air, and water has been put to one side, as if it hardly mattered to the growing and developing brain. A student is shaped by the experience of holding earth: sand, rock, dirt, or mud; of breathing in air, which is not conditioned nor temperature controlled; and of touching water in all of its states: vapor, liquid, solid (snow and ice). What if the connection between the physical environment and the rate of learning success is the key missing element for

students? This is a good time, when schools are examining how best to reopen and stay open following the recent pandemic, to explore that connection. The following literature review will look at the impact of academic classes held outdoors on the well-being, mental health, and academic progress for students.

### **Rationale**

The following literature review seeks to look at the location for learning and the impact on students when that location is outdoors. The impact of outdoor classroom experiences on the students is particularly significant and timely as schools, not only in the United States, but around the globe have pivoted toward utilizing outdoor spaces during the recent pandemic. As educators reach out to meet the needs of students and provide learning settings that are healthy environments, which promote learning, there is a need to review the impact of outdoor classroom experiences on students.

Research suggested in Carrus et al. (2012) that when students spend a significant amount of their learning day in contact with outdoor green spaces, they have better academic outcomes. These outcomes included an increase in scores on tests, assessments, and examinations. While that outcome performance is not the ultimate goal of educators, those scores do give measurable and concrete data. The scores can give indications for successful interaction between the student and the world beyond the classroom following the years of formal learning. The data can be used as a partial measurement for schools to ensure that each student meets their individual goals and achieves all they are capable of reaching during their academic education. As schools seek to elevate the academic opportunities for students, one element is the physical classroom



environment. When the classroom environment is outdoors, the question of technology access and physical materials must be considered along with the benefits of nature.

As the educational world embraces more technology, it appears a greater reliance on learning taking place indoors would be encouraged. There has been significant discussion in education to have students stay abreast of current work in STEM, an acronym for science, technology, engineering, and math. One strength of STEM education was the emphasis on the skills, which are useful in other areas of study, namely being able to work collaboratively, use innovation, and solve problems. There are many professions that make use of the specialized knowledge from STEM education. ASU listed classroom instruction, along with labs at home and on-campus, as examples of the locations for STEM classes (“What is STEM & why is it important | ASU online”, 2020). The tools and equipment required are usually based indoors. With the mobility of the computer, a frequently used tool, STEM classes would hopefully not be limited to an indoor setting. If the high-technology classes can move outdoors, perhaps any subject could be held outside the confines of a traditional classroom set within a building.

For students, especially those who do not learn well within traditional indoor classrooms, no matter the level of technology, or perhaps because of the level of technology available, it is time to look at the evidence presented through research on how great the impact of outdoor classrooms is for the positive mental health and subsequent learning capacity of students. Being in nature can serve students well in developing healthy attitudes and life-long habits that will encourage their becoming contributors to society in the 21st century and beyond (Kuo et al., 2019).

It is important to consider outdoor classrooms as a viable, long-lasting tool in the education of children, rather than a novel approach to discard quickly. Outdoor classrooms were used in some schools solely to open schools as quickly as possible following the recent pandemic. Studies which look at both pros and cons of moving academic instruction outdoors are important. Schools need good data to justify the expenditure of revamping space and providing materials in another setting. One of the difficulties is in gathering and reviewing the literature to provide clear direction. Becker et al. (2017) reviewed four studies from Denmark, three studies from the United States, one study from Germany, New Zealand, Sweden, United Kingdom, Norway, and one study with a combined location of the UK, India, and Kenya. The students involved were between 5 and 18 years of age. One of the year long studies reviewed was a field study conducted by (Athman) Ernst and Stanek (2006), which followed two of the four classes of fifth-grade students in Fergus Falls, Minnesota for a one-year academic course in an outdoor setting. In that study, there was a control group that remained indoors for their class while the intervention group held the same class outdoors. The class work focused on science, math and writing. Standardized testing results showed higher scores in reading and writing for the outdoor group. In addition to standardized testing, the study conducted interviews of both students as well as of the parents of the students. The students were interviewed and many reported more interest in school following the year spent learning in an outdoor environment. The study also asked the parents to evaluate the success of the intervention group in the study. The parents were to state if they felt that their children had learned science, math, and writing better than in a traditional, indoor school setting. Of those within the intervention group, 98% of the parents responded positively. Becker et al.(2017) noted that longitudinal studies are helpful as schools

seek to maximize the quality of academic learning time. Schools can move forward with a focus on academic learning spaces in outdoor settings with appropriate justification based on understanding the benefits for students.

The focus of this literature review will be on the impact of outdoor classrooms and outdoor classroom experiences on students, some of the challenges and limitations faced when academic subjects are taught outdoors, and the future of outdoor classrooms. The well-being and development of students, their mental health, and/or their academic progress are main points in the literature.

### **Definitions of Terms**

Important terminology used throughout this paper:

#### **Blue Space**

Outdoor spaces with water as a prominent feature (Hunt, 2019).

#### **Gray Space**

Space that has buildings, paved areas, and a lack of vegetation (Larson et al., 2018).

#### **Green Space**

Space with vegetation. Examples include parks, lawns, gardens (Larson et al., 2018).

#### **Nature**

In this paper, nature is the outside, living world (Larson et al., 2018).

#### **Nature Versus Nurture**

Defined here to distinguish the use of “nature” in this paper: In ‘nature versus nurture’, nature refers to the genetic qualities of a person and nurture to the lived experience and

environmental factors that influence a person's development (Bergland, 2022). This paper uses "Nature" to refer to the outdoor environment of the natural world.

### **Outdoor Classroom**

A space outside, not a classroom within the school walls. The outdoor classroom could be in an interior courtyard, next to the school building, or a distance away from the building. It is a space dedicated to teaching and learning, and may require classroom supplies to be carried to it daily or stored securely onsite (Cohen et al., 2023).

### **Statement of the Question or Topic**

The guiding research question for this thesis is: How does deliberately incorporating nature into the academic setting impact child development, mental health, and academic progress?

In researching this question, it is important to focus on three areas. First, it is important to understand the effect of nature on child development. Second, it is critical to understand the impact of learning in an outdoor setting on children's mental health. Third, it is essential to review how learning outdoors impacts the academic progress for students.

## **CHAPTER II: LITERATURE REVIEW**

### **Education and the Outdoors**

In this chapter, the review of literature focused on material written post-2000 with the exception of the works by John Dewey, which date from 1899 and 1916, as well as works by Mandell (1995), which spoke to the definition of mental health, and Ulrich et al. (1991), which provided important foundational understanding to the topic. Literature was researched from ERIC, Google search, from literature references using search terms including outdoor education, outdoor classroom, and impact plus outdoor classroom. Material which focused on outdoor education adventure programs, which included travel away from the regular school building for any overnight time, was excluded due to the difference in experience when a student is on an adventure trip versus being outdoors for a partial day in the setting of their regular education building. Literature that concentrated on a deliberate use of teaching in an outdoor setting for a portion of the academic day was the primary focus for this research. The chapter follows a progression from the purpose of education to a review of the impact of the outdoor setting on children and students in their well-being and development, their mental health, and their academic achievement. The chapter concludes with the future considerations, including the limitations and challenges, for including the natural environment as part of the academic daily schedule.

#### **Dewey on Education's Purpose and Outdoor Learning**

John Dewey, a pragmatic philosopher, entered into the discussion of what purpose could be served by education within a community or within a school setting. Engaging the student was a focus that was stated. "The educator's part in the enterprise of education is to furnish the

environment which stimulates responses and directs the learner's course” (Dewey, 1916, p. 423). From that early statement on the environment, Dewey went on to emphasize the importance of the physical environment. He suggested throughout his writings that “learning by doing” was the more natural way for students to learn. Within this book, Dewey also called education a social process (Dewey, 1916). He proposed that societies tended in two directions, one desirable and one undesirable. The undesirable society placed barriers in place to hinder good communication and experience. The desirable society made it possible for its members to participate equally and provided an impetus for people to take a personal interest in various social relationships, including education (Dewey, 1916).

Dewey suggested in the course of his writing that the day to day experiences of a student, which occur outside of a school building, are not inherently connected to the classroom activities and experiences within the classroom. He wrote about the “isolation” of the student in a school setting and, indeed, the isolation of the school itself from the life of the community (Dewey, 1899). The student did not bring any interests from their home or neighborhood to the school setting. The school needed to try to connect with the student and engage the student with interests that were school centric. This disconnect made the inside of the school an initially unwelcome place. The school environment, inside a classroom, was an artificial place for the students. When the school was able to make a connection with the student, the student then needed to find ways to include what they learned into their daily life (Dewey, 1899).

In another portion of the lecture, Dewey noted that classrooms designed with rows of desks are places that are not optimized for the drawing out that education could be for students. This style of education reduced the individualism of students that Dewey espoused. Rather, the

set up of a classroom appeared designed to manage behaviors and teach uniform lessons (Dewey, 1899). Dewey wrote it was important that the “child come to school with a whole mind and a whole body, and leave school with a fuller mind and an even healthier body” (Dewey, 1899, p. 112). When students were guided and participated in their education, they were closer to the teaching method of learner-centered, which Dewey encouraged. Dewey, as an educator and philosopher, encouraged and anticipated that nature and experience would be integrated together by teachers (Jorgenson, 2016). This was accomplished most simply by moving part of the academic day outdoors. Jorgenson (2014) re-examined Dewey’s work from 1934 (*Art as Experience*), 1958 (*Experience and Nature*), and 1966 (*Democracy and Education*) in the context of today’s understanding of ecology and environmental education and wrote of the connection between curriculum and the use of natural materials. Based on the studies of Dewey’s philosophy and use of experience as a critical factor in education, Jorgenson (2014) argued for support of a curriculum that engaged students in understanding the connection between nature and the community where they live. The academic experience needed to be linked to nature in a deliberate manner to foster the knowledge of the world. Observations made during time spent in the outdoor classroom was expected to enrich the academic growth for students. Williams (2017) stated there is a teaching approach that embraces the model of community connected to education in the 21st century. Called the Responsive Classroom approach, the method was based on research. The Responsive Classroom approach focused on specific recommendations that supported the building of a positive community atmosphere. Williams (2017) noted this approach fit many of the theories that John Dewey (1938) had espoused in his writings and early work. When used consistently, the Responsive Classroom practices supported Dewey’s (1938)

emphasis on school being that place where a student's academic achievements are connected to the positive social community of a classroom (Williams, 2017).

Williams (2017) pointed out the connection between Dewey's (1938) description of learner-centered theory and the view of the classroom as a place where hands-on and learning-by-doing concepts are harder to find because of the emphasis on standardized exams and state assessments. Outdoor classroom settings provided freedom for students to explore learning without a reward or consequence system often utilized within classrooms. Rather, the freedom of students to explore gave them the opportunity to learn with intrinsic motivation (Williams, 2017). Classroom settings with an emphasis on academic time spent outdoors encouraged awareness of environmental issues through a multidisciplinary approach. The curriculum, which included outdoor components, supported relationship building between students. The students were also more aware of their relationship with the natural world around them. The development of this awareness led students to further their academic and emotional growth through critical thinking skills (Williams, 2017).

### **Outdoor Learning Impacts Emotional Well-Being and Child Development**

Educators and researchers continually explore the academic setting and environment to provide the most effective place for students to learn. Throughout the history of education, the environment in which learning occurs impacts the way students and teachers interact with the curriculum and how effective the instruction is for the students. The recent history of school settings is that students are group-graded, most commonly by age, and that these groups spend most of the learning day inside classrooms, cafeterias, gymnasiums, or auditoriums. The following studies explored the deliberate choice to move the classroom or a portion of the



academic day to an outdoor environment and the effect this outdoor learning had on the mental well-being or academic progress of students.

Researchers noted that levels of stress for students have increased over the course of the past years. Schools often turn to programs to reduce stress and anxiety and increase resilience. It was suggested that the environment was one very important area for stress reduction and that this has been demonstrated by research projects. However, Chawla et al. (2014) added that the qualitative research to look at “why” contact with nature is such a benefit for students would need further exploration and study. Chawla et al. (2014) documented the responses of students to green schoolyards in Colorado and Maryland in the United States and under three distinct conditions: young elementary school students at recess in wooded areas; older elementary school students in a naturalized habitat during science and writing; and high school students in gardening activities.

Engemann et al. (2019) wrote that green space access benefits mental health and conducted a nation-wide study in Denmark with data from all the people born in Denmark from 1985 to 2003 who were living in Denmark on their 10th birthday. The number totaled over 900,000 people. The study made use of Landsat images to determine the amount of green space. The study members were followed from their 10th birthday until a mental health event, death, move, or the end of 2013 (whichever came first) to determine if access to green space mitigated negative mental health events (Engemann et al., 2019). The highest levels of green space present during childhood were associated with better mental health according to the reported results. The authors noted the impact of this correlation for community planning to support mental health and cognitive development, which also indicated a better ability to process stress. The study

recommended continuing to look at these results in relation to planning green space near schools (Engemann et al., 2019).

In McCracken et al. (2016), the health-related quality of life of 276 children in the city of Edinburgh, Scotland was examined. The study was a more indepth look at the effect of stress and the connection to lack of outdoor activity. Stress impacts mental, emotional, and physical health. One reported result was that spending time outdoors demonstrated a reduction in the stress on these systems (mental, emotional, and physical health) as measured by an increase in positive behaviors, better general health, and fewer reports of anxiety or Attention-Deficit/Hyperactivity Disorder (ADHD) symptoms. The students also reported that when stress was reduced, they could focus more deeply on their academic work (McCracken et al., 2016).

How nature impacts mental health and well-being has been the subject of studies including one by Carter and Horwitz (2014) who reported the restorative effects of green space on the health-related quality of life based on 440 responses to their questionnaire. Through research and personal interviews conducted as part of their study in Australia, the authors found the proximity to green spaces was associated by respondents with less stress and improved or better mental and physical health (Carter & Horwitz, 2014).

In the study by Ward et al. (2015), the authors surveyed 118 youth (aged 11-14 years) in New Zealand. They noted that while they expected to find an increase in physical activity associated with proximity to greenspaces, it was the emotional well-being that was more strongly related. Their finding supported the importance of including time in the outdoors to promote healthy emotional development. Ward et al. (2015) also noted the connection between the

outdoors or green space and attention capacity found in the Wells (2000) study conducted with a sample of 17 children (aged 7 - 12 years) in the United States.

The Stress Recovery Theory (SRT) by Ulrich et al. (1991) was a landmark research study. It has been replicated since and stood the test of time and progress. The SRT researched the impact of six different environments on subjects who had viewed a stress inducing movie. The data that was collected and evaluated led to the conclusion in this psycho-evolutionary theory that recovery from stress was faster when the recovery environment was natural rather than urban (Ulrich et al., 1991). It was noteworthy that the participants in the study experienced a reduction in stress and anxiety simply by seeing nature, not even needing to be physically located in an outdoor, nature setting. The subjects for this landmark study were all adults. McCracken et al.(2016) proposed that the Stress Recovery Theory would hold true for children also due to studies on children and use of green space, which reported positive well-being such as Wells and Evans, (2003), a study of 337 rural elementary children in the United States.

An interesting component noted by McCracken et al. (2016) led researchers to explore if the distance from an urban dweller's home to a usable greenspace would have positive effects on their physical and mental health. The authors concluded that the increase and the nearness of green space to the location of the home was measurable. It was noted that the distance between an adult's home and green space, which they could easily and frequently access, improved their health. The full impact of green space and the proximity to that green space was listed as a factor for positive impact on the quality of life (McCracken et al., 2016). Research from the 1958 National Child Development Study (NDCS) conducted by Power and Elliot (2005) followed the lives of over 17,000 people born in England, Scotland, and Wales in 1958 in the same week. The

study followed them from birth with assessments at ages 7, 11, 16, 23, 33, 42, and 55. The age 62 assessment was paused because of COVID-19. Participation in the follow-up collection of information was noted. At age 16, there was 84% participation, and at age 55 there was 48% (8,958) participation in the follow-up questions. The McCracken et al. (2016) review noted the impact of childhood education on adult life, which they based on their study of the NDCS data. Future habits and behavior could be impacted by the lifestyle and educational choices made at a younger age. McCracken et al. (2016) put this into the context of children who learned to explore nearby green spaces and chose to spend time outdoors being active and how that could have a positive effect for the parents as well as for the children into their adult years. McCracken et al. (2016) furthered the question of uses of green space to its use on a daily basis and led their research to the question of incorporating the green space into the school day.

The statistics provided by McCracken et al. (2016) demonstrated the connection between availability of green space and friends. The top reported motivational reason for why a participant in the study used green space was “to play with friends” (McCracken et al., 2016, p. 214). The study detailed further connections between friendships and positive family relationships. In addition, these friendship connections and family relationships led to a higher quality of life. McCracken et al. (2016) reported that the use of green space on an everyday basis did provide a meaningful and measurable positive impact on the quality of life for children.

The research by Chawla et al. (2014) also focused on green space and the effect on stress in children. The study was narrower in scope than the work by McCracken et al. (2016). Chawla et al. (2014) looked specifically at schoolyards. A schoolyard is a place where children are gathered on a regular basis during the school year. Especially, in urban areas, the schoolyard has

a history of being a moderately sized paved space. The authors supported the move to naturalize schoolyards and advanced the use of green space.

The movement to 'green' the paved, gray spaces gained news attention during COVID-19. This has not abated. As recently as April 2021, the green schoolyard movement was given support through the National League of Cities (Zaplatosch, 2021). When naturalized, schoolyards might contain gardens, wooded areas, or spaces where nature play or learning would be focused. In addition, pathways could be added, either formal, such as labyrinths, or informal, such as a general walking path, to increase students' connections to nature. Community gardens are used by some schools for learning places and a formerly paved schoolyard would provide adequate space for such a garden. The green schoolyard movement focused attention on schoolyard use for the whole community rather than only part of the academic day. The movement's efforts supported the transformation of paved spaces into green spaces that are also used for academic learning (Greening Schoolyards, 2021).

The Wells (2000) study, located in the United States, looked specifically at how much green space was available to the students, not only during the school day, but after school hours when they were at home. The sample was small, 17 students aged 7 - 12 years (of this number six were 8 years of age) participated. The students were part of a self-help housing program and all were moving from homes with less nature visible to the students to homes with more nature visible from and/or surrounding the homes. Because the home is the first learning environment for a child, the question raised was whether green space around the home would impact cognitive development positively. If this was found to be true, it would follow that the ability of the children to focus on their academics would be expected to also demonstrate an increase. The

findings of Wells (2000) were consistent with a reported study in Sweden by Grahn et al.(1997), which compared different day care settings. In one setting, the children were outside, everyday. The children's motor coordination and ability to concentrate were measured. The students with the more extensive outdoor experiences had better results on the measurement tool developed by S. B. McCarney (1989) named the Attention Deficit Disorders Evaluation Scale (Wells, 2000).

In exploring the world around them, students respond to an outdoor learning space differently than a learning environment where there is little to no outdoor connection. A qualitative analysis by Marchant et al. (2019) based in South Wales, United Kingdom, sought to respond to the question of deliberate inclusion of curriculum-based outdoor learning for children beyond the early years. The benefits positively impacted many of the cognitive areas from attention to problem-solving to creativity, as well as the executive functions including self-regulation. One difficulty often mentioned in the studies and again found in Marchanet et al. (2019) is the need to collect longitudinal data, through evidence or formal assessment, that the benefits of the outdoor learning environment will remain with the student beyond the current academic testing cycle. That students respond to the world around them is clear, but for many schools and institutions to move education outdoors, there must be more than anecdotal accounts. There must be factual evidence of the benefits and positive impact. Marchant et al. (2019) noted a growing investment in government funding for projects such as the Natural Connections and Nature Friend Schools. The Nature Friendly Schools is a large-scale project aimed at delivering natural environment interventions for the most disadvantaged schools in England. Information was gathered from their website ("England's largest outdoor learning project reveals children more motivated to learn when outside," 2016).

As these projects continue, more research will be added to the body of studies bringing more opportunities to review literature surrounding the effect of nature on education and the evidence supporting deliberate outdoor classroom settings.

Focus groups from the three South Wales, United Kingdom schools, where at least one lesson per week was taught outdoors, were included in the Marchant et al. (2019) study. In the verbatim responses, the theme of well-being and teamwork was recorded. In addition, both student and teacher responses voiced the ability of students to keep their focus on the lessons and to be highly engaged. Teachers from Years 5 and 6, in addition to the head teachers from all three schools, participated in interviews. Improvement of behavior for students facing difficulties or learning needs were recorded by teachers. The study noted that further research would be helpful to understand barriers and implement best practices before outdoor learning would take its place in the mainstream of curriculum or general classroom learning methodology and practice. The study provided further understanding of benefits and challenges for outdoor learning and encouraged future research (Marchant et al., 2019).

Khan et al. (2020) focused on two primary schools in Bangladesh with a total population of 123 children for a study of how the school grounds could be enhanced resulting in improved academic performance for children. The study approached the question by setting up two sites in order to better track and control the data. At the intervention site, the study noted that the school ground, which was formerly devoid of places to hold outdoor classes, was redesigned with such features as garden spaces and an outdoor amphitheater. The school grounds ended up having multiple locations suitable for holding classes (Khan et al., 2020). The purpose of the study was to explore the question of academic attainment by children when their learning environment

included an improved outdoor learning space. Additionally this study explored outdoor learning for students who were in developing countries as distinct from students in developed countries. The hypothesis that the children who were taught outside in these improved areas would have significantly better academic achievement, especially in math and science, along with more opportunities for exploration and collaboration as compared to children who were not taught outside or were from the control group within this study was examined quantitatively with positive results (Khan et al., 2020).

Qualitative methods used to gather additional data centered around focus groups and responses by students and teachers. Throughout this study, the work of teaching outdoors as well as the answer to the question of whether and how extensive it was as an academic benefit for the children was measured by objective attainment scores. Only the children in the study group had outdoor lessons in the augmented and improved outdoor space, although all the students utilized the school grounds for their play time. Because the teacher was consistent for both groups, the researchers reported support for their stated hypothesis that improving and designing school property to allow classes to be held outdoors in the natural elements would show an improvement in the academic scores of the students (Khan et al., 2020). They reported significantly higher academic scores for the group of students taught outdoors. The variable for the students was the location where the lesson was taught, not a different teacher or style or curriculum. This study supported the hypothesis of outdoor learning as a positive environment for learning.

Carrus et al. (2012) turned attention to the restorative effects of nature in educational environments and focused on the very young with a study of 16 children, aged 18-36 months in a



childcare center in Rome, Italy. The authors included the physical school environment as an active component in the list of what or who influenced the learning on a given day. The study results suggested the extremely positive result of contact with nature. As a result of the contact with nature, there was less need for direct intervention from educators. Students were more independently engaged in learning and maintained their focus for longer durations of time. During the study, the researchers also noted and kept track of the level of stress in the children. The outdoor contact impacted the behaviors and reactions to stressful situations for the preschool children in a positive way, which resulted in fewer behavioral interventions and lower stress indicators. The paper noted that the sampling was small and recommended a future, larger study. The findings, though, were clear that an outdoor physical environment can impact the behavior and well-being of children in positive ways related to the levels of stress and capacity for attention in the educational setting (Carrus et al., 2012).

While the impact of being in nature, deliberately, for a portion of the academic day did have an impact and positive effect on students, documented in Carrus et al.'s (2012) study, not all students or schools have the resources to develop outdoor classrooms. For schools without the resources for a major expenditure, Gou et al. (2018) discussed the effect of viewing the outdoors through a window and how that provided an alternative opportunity for positive action. A field study of seat preference and window view was set up in a university library in Australia and reported on by Gou et al. (2018). They surveyed the decision students made when choosing where to sit in the library study section. Part of the survey included asking students for the reason behind their decision. While “quiet” was the most frequent response, the “view” was the second most mentioned important reason listed by students in answer to the survey question.

Further detail and distinction was identified by the authors when another layer of options was added. The students could choose an outdoor view of predominantly the sky or mostly greenery. The observed occupancy rate of the students in the survey was reported to be most positive for the sky view instead of the view with densely planted trees, which some students indicated felt similar to an enclosed indoor space. Being able to choose a location with outdoor views led to a greater occupancy rate for the study spaces by students. Gou et al. (2018) conducted this study by counting the number of times each study desk was used rather than relying on subjective responses. This information adds to the research for providing a positive environment for learning. This place, according to Gou et al. (2018), needs to be attractive to students and provide the resources, including the physical requirements, such as lighting or a view to the outside environment, that would encourage students to spend time at a study desk.

Even when schools have the resources to develop outdoor learning areas, there may be resistance to moving classes outdoors. Additionally, there is not a recent history of outdoor school settings as a common occurrence.

Emotional well-being, sensory development, and physical development are areas that Deaver and Wright (2018), in a study based in the United States, wrote about when detailing young children and outdoor learning. When situated outdoors, they found children's cognitive development was stimulated by the many times the learning experience was extended. Children could “be inquisitive, make observations, and learn through both guided and free play” (Deaver & Wright, 2018, p. 25). The learning experience was enriched and the development of the whole child (Dewey, 1899) was promoted when the outdoor experience was combined with and supported by indoor learning experiences and instruction. Children became very engaged when

the learning experiences were perceived as fun and when the activities were located in natural environments. The result of this combination, fun activities located in nature, helped to develop the whole child. As the children experienced outdoor activities, even when in free-play, learning was augmented by teachers encouraging new vocabulary and information (Deaver & Wright, 2018).

Nedovic and Morrissey (2013) focused a study on the effect of outdoor play, within the specific area of a natural garden and garden path. The participants of the study were the director, staff, and 18 three- to four- year olds at a childcare center in Australia. The author's recorded the observation that children would slow their pace in the garden and engage more frequently with others. The tenor of the conversation was also recorded as more kind and respectful. Nedovic and Morrissey (2013) recommended further discovery and research into the unique role nature appeared to play in the well-being and development for this group of young students. They particularly noted the development of inquisitiveness and conversation/language development. These are both highly valuable assets for students to develop early and it appeared the outdoor experience was a key component.

### **Outdoor Learning Answers Challenges**

Armbrüster and Witte (2022) noted that the outdoor school philosophy and approach are in early stages of use in Germany, the country of their focus for a multi-location field project lasting from 2014 to 2017. This project utilized both qualitative and quantitative methods to gather information and data before evaluation. The authors noted two theoretical approaches, the concept of socialization and resonance theory, which took first-hand experience, along with relationships, in support of outdoor school settings (Armbrüster & Witte, 2022). These concepts

combine in outdoor learning when students face new experiences, which may involve solving a crisis, and engage more actively with the environment, leading the students to experience resonance, or a deep relationship with the environment. While the authors' findings suggested a need for more extensive research, the outdoor learning environment has provided a platform for students to form connections between the lesson and themselves. Early supporters of outdoor schooling have drawn on the work of educational leaders such as John Dewey (1916) and the Scandinavian concept of "*udeskole* (outdoor school)" (Armbrüster & Witte, 2022, p. 337).

When outdoor settings for education are considered, both the physical environment and the materials required for the curriculum need to be considered. The tools of technology can be brought outdoors, but not all can be moved easily or with adequate access even if moved. A laptop can be carried, while a wall mounted interactive whiteboard and projector would be more difficult to relocate into an outdoor classroom. Other items found in nature can become readily available for learning tools, which would not be easily transported into a building. Trees, rocks, wind, and even the occasional animal or evidence of an animal can become a learning tool in an outdoor setting.

A challenge that was mentioned as unique to an outdoor classroom was the adaptability of the teacher when faced with changes in weather conditions (Armbrüster & Witte, 2022). The authors also noted that teachers adapted how much and how loudly they spoke to their students when situated outdoors. Rather than expanding upon the lesson, when outdoors, teachers tended toward succinct directions delivered in a louder, more directive tone of voice. There was more competition from nature sounds and other outdoor environmental sounds in addition to the immediacy of distraction from the positive elements of being in nature, such as the wind. With

an indoor classroom setting, the volume of sound entering a classroom can be controlled readily by the teacher by the simple mechanism of shutting a door, window, or turning volumes down on devices. Data showed that teachers tended to follow curriculum and written language instructions more closely when they taught indoors. The language employed when lessons were taught outdoors, by necessity, needed to engage the students quickly and needed to account for potential and real distractions and disruptions caused by the environment (Armbrüster & Witte, 2022).

Additional concerns and considerations for outdoor learning on green school grounds was the main focus for Dyment (2005) in the study located in Australia. 100 schools were invited to participate and 45 schools responded. For the individual questionnaires, 400 were invited to participate and 149 responded. Numerous considerations as part of the study included the concerns of how monetary and technology resources were allocated. A school must consider the cost of setting up a classroom. One factor was the location for the outdoor classroom and if students would be able to walk or if a form of transportation, such as a bus or use of bicycles or even public transportation (subway), would be required to access the outdoor classroom and how such a need would be funded. Another factor would be any teaching tool or support items such as power strips for laptops or whiteboards and markers, and the question if they could be kept on site or if they would need to be brought each time the space was used. An additional cost factored into outdoor classrooms was that of liability and the health and safety of students and staff. Outdoor classroom space has more opportunities for students to interact with nature, which is also an opportunity for the unknown and unplanned to happen. When students stayed indoors, there were multiple staff available, the physical setting had more built-in controls, such as walls, desks, and chairs, and the access to technology was seen as more reliable. The important aspect

brought out by this report was for schools to fully utilize outdoor learning space. The cautionary advice was for school staff to identify barriers and seek ways to remove them, rather than to allow perceived barriers to become the reason for not moving classrooms outside (Dyment, 2005).

Outdoor learning has provided one answer to the trauma of isolation experienced during COVID-19 building closures. Mulholland and O'Toole (2021) reported on the intentional use of trauma-informed practice (TIP) in combination with outdoor learning environments. In their study, based in Northern Ireland with elementary aged students, they reported on the use of TIP principles, embedded in outdoor learning environments, and the response to the experiences of students as a result of the COVID-19 pandemic. The National Child Traumatic Stress Network noted that a child's response to trauma can present in ways that appear as misbehavior. Instances of inattention and disruptive behavior could appear as defiance or disrespect instead of being recognized as a trauma response. The response to childhood trauma with the best outcome was when the child experienced positive relationships and an environment that nurtured and fostered positive reaction ("Effects," 2018).

Mulholland and O'Toole, 2012 noted the body's response to nature and how nature calmed stressors. The physical movement involved in moving to an outdoor classroom allowed children to experience this calming effect. According to the U.S. Department of Health and Human Services, the health benefits of physical activity for children of school age include: "reduced symptoms of depression ... improved cognitive functions of memory, executive function, processing speed, attention, and academic performance" (*Physical activity guidelines for American, 2nd edition*, 2018, p. 47). The act of moving to the outdoor classroom involves

physical movement, which if extended slightly, can help the students to achieve some of the benefits related to improved brain functions and these effects have proved to be long-lasting (Kuo et al., 2018). Kuo et al. (2018) examined the effects of lessons taught in nature in a third grade classroom in the Midwestern United States with a control classroom, which had the identical lesson taught indoors.

A further look at student concentration was found in the work by Kuo et al. (2018). Classroom engagement, the time when students are on-task and listening or attending to the teacher, the work, the learning, rather than being dis-engaged or distracted, was the focus of the study. Outdoor settings supported the classroom engagement and student concentration. The research documented the difference in attention to the following lesson, comparing the number of redirects required from the teacher. After children had experienced a lesson outdoors, they demonstrated longer attention times. Conversely, following a lesson taught indoors, the students needed almost twice as many redirects from their teacher (Kuo et al., 2018).

Further benefits were noted in that outdoor learning spaces can benefit schools trying to lessen the impact of the indoor classroom during a virus outbreak. Outdoor learning also empowered the child to make choices, according to the authors, and offered the potential to develop positive relationships, which strengthened their emotional well-being and ability to increase self-regulation, a key component in learning readiness (Mulholland & O'Toole, 2021).

### **Outdoor Learning Impacts Mental Health**

The perception and understanding of mental health has undergone great change since William Sweetzer used the term “mental hygiene” in 1843 (Mandell, 1995). Far from the idea that the mind is always in a stagnant state, the medical community has explored ways to

understand and treat mental illness and sustain mental health. Johns Hopkins Medical School founded the National Committee for Mental Hygiene in 1908 (Mandell, 1995). This field of study has expanded over the years. Mental health services are provided throughout the world and to all ages in multiple settings. One setting that has seen an increase in providing mental health services is the school day.

The current definition from the Centers for Disease Control and Prevention (CDC) for children's mental health listed the distinction between mental health and mental disorder. The CDC noted that mental health measurement is placed on a continuum. Attention-deficit / hyperactivity disorder (ADHD) has been the mental health disorder most commonly diagnosed during childhood.

Results from multiple studies such as Amoly et al., (2014) in Spain, Ward et al.,(2016) in New Zealand, and Zach et al., (2016) in Germany, as reviewed systematically by Vanaken and Danckaerts, (2018), who reviewed 21 studies from around the world, indicated the positive impact of outdoor instructional settings for students, especially for students who faced mental health challenges including ADHD. One very large study, the BRain dEvelopment and Air polluTion ultrafine particles in scHool childrEn (BREATHE), had a section that looked at the effect of air pollution, the use of green space, and the use of blue space on students with reported ADHD symptoms (Amoly et al., 2014). The BREATHE Project, based in Barcelona in 2012, was extensively researched. The sample was large, over 2000 students, and focused attention on time spent in both green and blue spaces. The blue spaces were identified as beaches. The authors of the study relied on a Strengths and Difficulties Questionnaire for responses from parents and formal data gathered from educators. The conclusions of the study were not able to be supported



by numerous other independent studies because there are few additional studies to draw upon for comparison. While this was noted by the authors, the depth of this study allowed it to stand as an independent work.

The BREATHE Project study was interpreted and analyzed with results that demonstrated green space had a positive effect on the incidence of ADHD. The scores for the Strengths and Difficulties Questionnaire were lower. The level of inattention was also reduced. The study expanded the survey and looked at the area surrounding the homes of students. The residential area surrounding the homes was a part of the study in addition to the green space utilized by the school setting. The project, which did not define a particular quality level, concluded that green and blue spaces were beneficial and had a measurable impact on the behavioral development and ADHD in children (Amoly et al., 2014).

Szczytko et al. (2018) looked at the student population in the United States. They noted that about 10% or roughly four million students faced the challenges of emotional, cognitive, and behavioral disabilities (ECBD). This study communicated that most former studies explored the effect of outdoor educational settings on students with ADHD, anxiety, and other forms of ECBD. Even though educators understood the positive impact of outdoor learning for students with ECBD, the most common location for instruction was still located inside school buildings. The question that Szczytko et al. (2018) explored was how to find an approach that would help decrease specific indicators of ECBD. They looked at the indicators of short attention spans and disruptive behaviors. The approach used was to include outdoor environmental education instruction, especially in science, as a method for increasing the learning while decreasing the ECBD indicators. The authors reported a potential shift in teacher perceptions towards outdoor

teaching. They noted that this is helpful for students because teacher perception can impact the amount of time students are allowed to spend in outdoor classrooms and results indicated an improvement in student behavior (Szczytko et al., 2018).

### **Outdoor Learning Impacts Academics**

Once thought to be only of use to the sciences as a place for learning, the outdoor setting has stretched a few boundaries. In Eick (2012), which followed a third grade classroom and teacher in the Southeastern United States, the study evaluated the outdoor classroom and the effectiveness in teaching/learning language arts in addition to science. The challenge in teaching language arts outdoors was how to help students make connections between nature and language arts. While the nature setting was an easy focus for the science curriculum, the teacher reported a greater effort to connect the language arts to nature. Yet, anyone who has read from the classic body of literature or listened to a symphony or viewed a landscape by a master painter has seen the influence of nature on those subject areas. The current educational trend for teaching within a classroom has limited the extensive inspiring places on the globe to a mere shadow existence on a screen. The Eick (2012) study moved the focus of educating in the language arts outside again. Following the study, the results demonstrated that students who had, in indoor classroom settings, struggled with language arts, especially with composition, had a better connection to their writing after the outdoor classroom setting. This held true even when they were writing in the more formal setting of standardized tests. Only one student in the group did not meet or exceed Annual Yearly Progress by the end of the standardized reading and grammar assessments (Eick, 2012).

Students in middle school grades participated in a study reviewed by Becker et al. (2017) who sought to understand possible benefits for students. This review looked at a multi-faceted approach throughout the school year. The results demonstrated how effective hands-on learning could be for this age group. The curriculum was geared toward outdoor economic endeavors that had students studying agricultural markets and the decision making process involved. The curriculum was particularly appropriate for an outdoor setting. It could have been taught within an inside classroom, but the self-reporting of the students on their engagement levels would have reflected the lack of connectedness that was often mentioned with the outdoor setting. Even though the outdoor setting was described as louder, the students reported a greater liking for it (Becker et al., 2017).

Becker et al. (2017) also reported on five independent studies of curriculum impacted by outdoor learning with a focus on gardening. These studies reported on all grade levels: primary, intermediate, middle, and high school aged students. Within each study, the students were reported to take the skills from the outdoor gardening experience and transfer it into other areas of their curriculum-based classes. Some studies centered their results around exit-style interviews with the students, others took the approach of using standardized assessments to measure the impact of the outdoor education approach. Reported results were that reading and writing scores were higher for the outdoor classroom students. The student questionnaire reported students had more interest in school overall, even in subjects not taught outdoors. The levels of motivation to continue learning were self-reported as well. These results showed an increase in the student's desire to learn. Motivation to learn was a transferred asset. This is harder to measure in comparison to other transferred skills such as the ability to follow directions or other skill sets

like mapping, drawing, reading, and writing. It was reported that outdoor learning was a positive motivation for students and increased their interest in school (Becker et al. (2017).

Browning and Rigolon (2019) provided an in depth review focused on academic performance and achievement. One aspect of their review was the economic level in the neighborhoods of the school districts. There was a distinct discrepancy reported in academic achievement scores between students in wealthy school districts and low-income districts. In the push to provide an appropriate education to all students, ways to level the learning experience were explored. Browning and Rigolon (2019) reported on one study in Canada, one study in Germany, one study in New Zealand, and 10 studies in the United States that looked at the “green space to academic achievement” connection. They strongly recommended further research, with robust methodology, to look at the connection between use of green space and improved academic achievement. Their findings indicated there was a link, however, they wanted to see more work and more studies to document this connection.

### **Outdoor Learning Impacts Academics for Higher Education**

The planning of a campus layout was the focus of the study by Sun et al. (2021) based at Northwest A&F University, Shaanxi, China. The question of inclusion of green space and the effect on student’s mental health, especially in response to the isolation on campus because of the COVID-19 outbreak, was their main interest. Data from student surveys included 22 items, which were assessed by a 7-point Likert scale. Students who were willing to participate (819 in all) became the study subjects and answered the questionnaire while outdoors during days with relatively good weather between May and August of 2020. The researchers evaluated the importance of green space for students who had been isolated and encouraged to remain indoors.

The researchers questioned if green space and the outdoors would help students recover their mental and emotional stability following the extended and enforced isolation, which had been imposed due to the COVID-19 outbreak. This study also encouraged the evaluation of different kinds of outdoor spaces, such as water or blue space, vegetative or green space, space dedicated to sports activities, and gray space, which is defined here as buildings, parking lots, or any constructed, non-natural space, on the mental well-being and consequent ability of possible academic achievement (Sun et al., 2021).

Sun et al. (2021) used a questionnaire to explore the relationship of the effect of the outdoors on students' mental well-being. Throughout the study, the design of campus space to encourage mental equilibrium, which would allow a focus on academic pursuits, pointed in the direction of more natural, outdoor environments. Overall, the study did demonstrate that students experienced a consistent, daily, positive response to the environment around them when it was filled with blue space, sports grounds, and green space, while the areas of gray space or buildings and paved areas all resulted in lower results in the survey results (Sun et al., 2021).

Leadbetter et al. (2019) looked at the experience of outdoor learning and the subsequent impact on students in higher education. The author's classes of undergraduate students at Edge Hill University in Lancashire, UK. were in the participant group. The exact number and length of study was not listed. A focus area for the author's was the student motivation and engagement in learning. Within the context of a primary or secondary school, student motivation can be influenced by participation in extracurricular activities, by parental involvement, or the expectations of the classroom teachers. Once a student is more responsible for their own motivation, there may be a need to encourage an increase in engagement with their learning.

Martin and Bolliger (2018) had 155 students from eight universities in the United States respond to an online survey about engagement strategies and effective learning. The strategies listed were learner-to-learner, learner-to-instructor, and learner-to-content. Because engagement was a critical component of successful learning, the study wanted to determine how students in higher education settings reacted. The most highly valued strategy was learner-to-instructor (Martin & Bolliger, 2018). Suggested throughout Leadbetter et al. (2019) was the need for an integrated outdoor learning experience with instructor guidance to increase the motivation for students in higher education settings. It was noted that students in higher learning settings would be able to process and understand the value and purpose of outdoor learning. This comprehension enabled a higher engagement and development of skills, including decision making and attention to coursework (Leadbetter et al., 2019).

Leadbetter et al. (2019) noted how appropriate preparation for visiting outdoor sites, which are related to the lesson being taught, were critical for students to integrate learning without becoming overwhelmed by any particular topic. Being able to discuss a topic with another person who holds a differing opinion was a skill that would help with future employment and successful contributions to society. The authors also noted the importance of the outdoor learning experience being a shared experience for the group. This fostered a group identity that allowed for in depth discussion and furthered the sense of belonging to a learning community. The latter is a more important aspect for higher education, which often has students living in close proximity to each other on a campus setting, than it would necessarily be for primary or secondary institutions. Leadbetter et al. (2019) pointed out the positive cognitive impact reported by participants as they participated in learning at outdoor sites.

## **Future of Learning in an Outdoor Setting**

The future of learning in an outdoor setting depends on the past, on the historical connection to the land. Theories from evolutionary biology (Wilson 1984; Buss 1995) and environmental psychology (Ulrich et al. 1991; Kaplan 1995) referenced within the work by Largo-Wight et al. (2018), which was a study in Florida in two kindergarten rooms (one stayed indoors and one went outdoors) for a daily language arts lesson. The study results were used to explain how and why nature, and being in nature, have a positive impact on people. Studies alone have not, nor will not, independently convince enough policy makers to change the emphasis in schools from the reliance on more assessments and consequent expenditure of resources toward adequate time in green spaces with the requisite material.

Quay et al. (2020) took the position of looking at some of the impacts and challenges faced by the aftereffects of a world that had experienced the isolation enforced by the COVID-19 pandemic. This is an unusual article because it is the collection of statements from 20 international members on the board of the Journal of Outdoor and Environmental Education. Responses with responses from Australia, Canada, Denmark, Japan, New Zealand, Norway, Singapore, the United Kingdom, and the United States. Throughout the reactions recorded, there was a theme that educating outdoors was beneficial in many ways. Quay et al. (2020) made the strong connection between outdoor education and environmental education. Using the experience of environmental educators to inform general education's use of outdoor classrooms could help schools when they need support for the costs of outdoor classroom setting. One of the strong concerns was that schools may turn to virtual learning and move away from natural environments. The authors noted anecdotal comments from students that indicated students did

not want to continue nor strengthen living in the isolation of virtual learning, but rather wanted the physical environment, which would allow them to experience the real touch and feel of the outdoor world (Quay et al., 2020).

The findings of Quay et al. (2020) were supported by the earlier study by Vanaken and Danckaerts (2018). Vanaken and Danckaerts (2018) noted the effects of green space could improve the mental health of children through adolescents. Further, they suggested the importance of green space for reducing aggression and thereby having a positive societal impact. As urban areas increase, the work of educators and mental health providers can be informed by studies such as this one to encourage the increase of and access to green spaces for children of all ages. Vanaken and Danckaerts (2018) identified a concern for future studies to explore the connection between use of screen time or use of green spaces and the impact each has on children's and adolescents' mental health and educational choices.

### **Limitations and Challenges for an Outdoor Setting**

Limitations for the future of learning outdoors were noted in multiple studies. Yıldırım and Akamca (2017), based their study of 35, five year old children, who were unable to attend kindergartens because of their low economic situation in a rural area of Turkey. The authors brought up security precautions and access to supplies. Safety, as a primary concern, can be dealt with in numerous ways depending on the school environment and setting. Each school would present its own unique challenges for safety concerns and its own responses. One example would be to address the safety issue of holding a class outside on a lawn/green area with no way to secure any items from anyone who might walk past the area. One solution could be to construct additional exterior walls to form interior courtyards, which could be monitored and provided



with electrical access. In the setting described by Yıldırım and Akamca (2017), because of the limitation of income and because none of the children were able to attend a school, a vehicle was transformed into a mobile learning center and filled with all the supplies needed for the activities.

Acceptance of teaching outdoors and the subsequent negative reactions from parents, was an area of apprehension noted by Alat et al. (2013) after the authors interviewed 25 preschool teachers who worked for the Turkish Ministry of Education. Even when the interviewed teachers wanted to use outdoor space, the practical concerns kept them indoors. The teachers also noted in their interviews the crowded conditions that would exist when the space was not adequate for their lessons (Alat et al., 2013). High on the list of concerns was the poor condition of physical spaces, especially if spaces had been neglected and fallen into disrepair. Continued maintenance of the outdoor classroom space was needed to avoid the space falling into a state of disrepair. Space that was neglected was underutilized, uninviting, and a safety concern (Yıldırım & Akamca, 2017).

Further complicating the use of outdoor space for children was one of the challenges noted by Muñoz, (2009) in the in-depth literature review of studies from various parts of the world focused on the link between the outdoor spaces and health of children. The challenge was the acceptance by adults of children in outdoor space, especially if the children are unaccompanied by adults. This acceptance was dependent on multiple factors influenced by society and the design of the community. An organized approach and deliberate inclusion of the natural environment served to soften some concerns. Muñoz, (2009) noted the concern for children as research subjects, but stated the need for understanding the way children interact with nature and how the positive benefits can be used by policymakers.

Karsten and van Vliet, (2006) wrote about the difficulty for children to be outdoors and engage in free play because of the shift in society. Their study was based on 79 interviews with parents from a variety of ethnic and social class backgrounds in the Netherlands. They addressed the change seen in communities with children spending more time indoors for play. While children should be able to play outdoors, the reality Karsten and van Vliet, (2006) recorded was that there is a loss for many children of the opportunity to play outdoors. The spaces such as neighborhood parks where children could independently go to play with each other were no longer considered safe by the adults in their lives. This meant that children also lost the chance to learn about the outdoor environment and to explore for themselves. Both urban and rural spaces experienced this change in how parks and green spaces were used. During the interviews this study conducted, parents stated one of the benefits of their children being outdoors was good health. Some of the communities that Karsten and van Vliet (2006) reported on had made changes within the neighborhood that allowed children a safe place to play. For many children, their time outside was now done with adult supervision. The challenge stated by the authors was for urban planners to acknowledge and plan for the needs of children to be able to play, safely, outdoors. When the need for children of school age to spend time outdoors can not be addressed by community spaces, the school can provide contact with nature via deliberately using the outdoor classroom during the academic day. Mann et al. (2022) was a review of 147 studies conducted across 20 countries. The authors reiterated the importance and value of the outdoor setting for children's learning and development. The concern was the limit of guidance for the best approach and specific outcomes to expect when implementing outdoor education into the

school day. The recommendation by Mann et al. (2022) was to reconsider how to include the experience of being in nature to successfully engage the learner across everyday contexts.

### **Limitations in Academic Literature to Support Outdoor Classrooms**

Becker et al. (2017) reported the barrier to definitive statements about the benefits of promoting outdoor classrooms was the limited number of studies. One constraint they listed was including only studies printed in English or German. They noted that other studies beyond their parameters could exist.

Browning and Rigolon (2019) examined the rigor of studies to discover those connections between outdoor classroom settings and academic performance. They were especially interested in the impact on students from low-income and racial minority areas. They raised the issue of serving disadvantaged students with the preferred outcome that those students would not perpetuate the cycle of income disparity. However, due to the low number of studies focused on academic performance as a measure, Browning and Rigolon (2019) stated that clear evidence does not yet exist regarding the connection between green spaces and academic performance. The paper pointed out that the studies reviewed were not overly strong in demonstrating the relationship between green space and academic performance. However, the connection was made.

The environmental setting, and if it included grassy lawns, shade, water features, gardens, or trees was mentioned in particular in Browning and Rigolon (2019). The information provided insight into a unique fact regarding trees. Air pollution negatively impacts health and the subsequent academic performance. Trees are one vehicle for removing pollutants from the air. The study noted the increase in academic performance when students were in areas near trees.

The study further noted that students did not necessarily need to spend time amongst the trees. The surrounding air was cleaner because of the trees. The close proximity of trees to the study areas benefited the academic performance of students even when they were merely viewing trees (Browning & Rigolon, 2019).

There were studies that looked at outdoor settings as a component of virtual learning or conversely transforming outdoor lessons into an online, virtual format, but that was outside the parameters of this review. The body of research of moving a portion of the academic classes to an outdoor learning environment, which were researched and written about prior to the pandemic years, focused on whether the benefits to students: well-being, development, mental health, and academic performance could be measured with positive and significant results. Some research looked at the question with the implications for the community context and potential policy change. These areas will continue to be studied as the primary goal of education, to educate effectively and provide a basis for students to move into the world of adult responsibilities, has not changed dramatically.

### **Outdoor Settings and the Learner for Today and Tomorrow**

Schools continue to educate and set goals for students. The philosophy of education adapts to the needs of society. Education changed focus when the world moved from a hunter / gatherer society to a farming society. It changed again when the industrial revolution began and through the many changes in the industrial revolution (Mulhern, 1959). Education, the way lessons are taught and learned, adapted for the information revolution/age and the increase of globalization. Burner (2018) utilized three large-scale studies, one from Scotland that assessed educational change and formative assessments over two time periods (1991-1999 and

1999-2005), one from England, which involved over 1,000 teachers and 4,000 students and looked deeply at the learning autonomy of students, and a second study from England (1999-2001), which reported on the pace of change in education, and noted that lasting change takes time. Burner (2018) returned to the philosophy of Dewey that research will supply the hypotheses, rather than a conclusive answer. Burner (2018) reviewed these large-scale studies and looked for patterns in how to make educational change more effective. The resultant comments were that change was interrelated and contextual. “Education forms people, who in turn form the world around them” (Burner, 2018, p. 132). Education does not stop adapting and changing and this includes the physical setting and location for classrooms.

No matter if the outdoor setting is here on earth, on the moon, or in deep space, teachers will need to find ways to engage their students in learning. Coyle (2010) listed many studies that indicated a strong correlation between time spent outdoors and greater academic achievement. The studies were focused mainly on sites in the United States. The author also noted health trends of concern as students spend less time outside. Among the concerns noted were: a growing number of students with childhood obesity, lower vitamin D levels, eyesight problems, and an increase in attention difficulties. Coyle (2010) held out hope for schools and parents. As children spend more time outside, whether in organized classroom learning, or in the unorganized freedom of recess, their health, well-being, attention, and even academic scores can see an improvement. Scottish Qualifications Authority et al. (2010) noted that outdoor learning supports and promotes inclusion and equality, especially when the outdoor learning environment is built into the curriculum. The authors also promoted the importance and benefit of working with partners in the community to widen the scope of potential areas of expertise and support for the

educational goals. Further, they stated that there was an opportunity for students to contextualize and deepen their understanding of the subject areas through outdoor learning (Scottish Qualifications Authority et al., 2010).

Students, when they move to an outdoor learning setting, may, as noted by the Scottish Qualifications Authority et al. (2010), find curriculum enriched and learning engaging, purposeful, and germane. In their learning and play, perhaps the ideals of learner centered decision making, espoused by Dewey (1899) will happen more readily when part of the day is spent outdoors. When students interact with the outdoors, according to the Scottish Qualifications Authority et al. (2010), their emotional well-being and mental health can be impacted with positive results as the children prepare for their future.

## CHAPTER III: DISCUSSION AND CONCLUSION

### Summary of Literature

The literature review sought to examine the impact and effect of deliberately teaching children in an outdoor setting. The purpose of the research was to examine what effect, if any, the location of the educational environment had on the well-being, mental health, and academic achievement for students. The research began with a review of John Dewey's (1916) writings and philosophy regarding the connection between the natural environment and learning. Dewey wrote that when formal teaching grows and becomes more complex there is the danger of a split, which he termed undesirable, between life experience and formal learning within a school setting (Dewey, 1916). Formal education has the responsibility to transmit learning and technical skills, but not in a vacuum. John Dewey's philosophy from his early lectures continues to be referenced in educational thought and practice today and has advanced the discussion of the environment's impact on learning (Dewey, 1899).

The review continued and examined literature concerned with the effect of teaching and learning outdoors on the development and well-being of children. Ulrich et al. (1991) noted the positive impact on learning by the faster recovery from stress in natural environments. The study by Amoly et al. (2014) reported on the influence of the natural environment on mental health, specifically noting the reduction of ADHD symptoms. The positive result on academic achievement outcomes was examined extensively in Eick (2012) with all but one student in the group reaching a level of meeting or exceeding the passing scores on standardized tests. The conclusion reported in McCracken et al. (2016) and supported by the literature review, was that

including time in the natural environment provided a measurable positive impact on the quality of life.

The field of educational research into the deliberate incorporation of the natural environment in the academic day needs further in depth study. There are limitations and challenges, but there are also great opportunities when education methodology looks for new horizons and reaches beyond the current circumstances and conditions in school settings.

### **Professional Application**

Educators seek to engage their students in subject areas, not merely to test the knowledge or accumulation of facts, but to excite within their students a desire to learn. The outdoor setting is different from other tools that educators use to engage their students. Digital devices, interactive white boards, manipulatives, textbooks, microscopes, virtual field trips, paintbrushes, magnets, and so many other items used each school day, are tools which enhance learning. The outdoor setting is a tool, which for many schools, does not need to be added to a requisition list; it is waiting to be used. There can be costs for this tool if it is to be used most effectively, as there are with many of the other tools in a classroom. The main difference for this, the outdoor classroom, is the impact it has on the whole of the student. Remember the admonition from Dewey (1916) to relate all learning to life, and the importance of the natural world as the classroom setting comes into focus. The inside classroom is artificial. The outdoor classroom will have components that students will recognize and be able to relate to during their time in school and throughout their life.

Students who are reading about poetry and sitting outside with the sun or wind have a different perspective than students who are sitting at a desk. The outdoor environment invites



students to make choices that are not available within a traditional, indoor classroom. The research indicates that students will be more focused and are often calmer. Teachers need to encourage students as they learn to absorb the benefits of an outdoor classroom.

The very environment that supports learning will need an adjustment by the educators as they present material. There are distractions outside that do not exist indoors. Curriculum supports may need adjustment if they are only paper and pencil or only digital based. Teachers may find that they need to condense or modify their oral instruction to accommodate for the probable inconsistency of the weather. The outdoor classroom may require teachers to be more flexible while at the same time not lessening the rigor of the academics.

Adequate time during inservice hours should be given to teachers who may need to adapt parts of their lessons for effective use in outdoor classroom settings. The administration would need to support, actively, the philosophical shift to incorporating the use of outdoor classroom space on a regular and deliberate basis.

### **Limitations of the Research**

This paper looked specifically at the outdoor classroom model and looked for its use across multiple subject and curriculum areas, as distinct from only being used in environmental studies classes. References to outdoor classroom use for subjects ranging from language arts to math to fine arts and beyond were searched. Studies considered the impact when the setting was a view of the outside from a window to when the setting was a designated classroom space located fully outdoors. There were many peer-reviewed articles that focused on wilderness learning. These were not utilized because wilderness learning in those articles was understood to take the students on multiple day trips. The topic for this paper focused attention on the

impact of taking students outside for a portion of their educational day. The intent of the research was to find articles that did not look at stepping away from school buildings for extended time, rather how to incorporate the outdoors into daily learning.

The articles were searched through databases online, as well as a review of references. The specific focus was on outdoor educational settings and the impact of being outdoors on students' well-being, academic performance, and development. Numerous articles were from international research studies. This area of research is not limited to educators in only one region of the world.

The research opened up many avenues for further research. There are many studies which focus on cognitive development, however not necessarily on the narrow area of deliberately teaching part of the academic day in an outdoor setting. Some mental health studies had a reference to the impact of outdoor learning, but did not narrow their focus to spending part of the educational day outdoors. This review was not an exhaustive search for studies on the topic. There are statements within this paper that may be found to not hold up under new and more exhaustive research and study.

### **Implications for Future Research**

There has been research on education, which looks back into the earliest civilizations and, which directs our attention forward. Mulhern wrote, "In some form or another, the school has existed among all peoples and on every social level" (Mulhern, 1959, p. 6). As education evolves, it is important to continually ask the question about which environment meets the needs of students. It is important to continually evaluate what kind of setting will give the students the best learning experience, the most innovative tools, and the most creative and engaging learning.

As with other models that do not fit readily within existing school building walls, there is a real financial cost to adopting a school wide policy to spend part of the day learning outside. In order for school boards, administrators, and the taxpayers to agree to the expenses, there will need to be research to demonstrate that outdoor learning benefits provide a measurably better educational model for the students. Future research and studies need to explore if the benefits are short-term, long-lasting, and/or life-altering. Does the time spent outdoors give students a lasting benefit, one that might impact their life many years after they have graduated.

With the new focus on health safety as a result of the most recent pandemic, COVID-19, and the pivot to virtual learning by schools, there seems to be a new focus on using the outdoors as classroom space to avoid the issues of virus contamination in the classroom. One area of future research could include relatively newly formed coalitions focused on the increase of green space in communities, including school grounds.

### **Conclusion**

Throughout these studies, which utilized various methods of data collection, the impact of outdoor learning had a positive effect on the academic measurement for students ranging in age from elementary through post-secondary. The word, restorative, and its concept, appeared in these studies and accurately described the behavior and response to the outdoors by students. Educational systems, which strove to give students of any age the best environment for learning, were examined within the limited number of studies reviewed. Among the studies, Kuo et al. (2018) looked at how lessons taught outdoors supported learner engagement, Vanaken and Danckaerts (2018) reviewed the benefits of green spaces on student's mental health, and Mann et al. (2022) explored the connection between outdoor learning and the value

for children's development and well-being, and other studies noted in the review were chosen because they did explore, in some manner, the question of moving at least a portion of the educational day outdoors. Including the outdoors either for active, intentional classroom settings, or as an environment to promote mental health and well-being, was often a positive step for educators and students. More research will be needed before definitive policies, which would mandate outdoor learning, become the normative standard for educational settings.

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