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Shannon Bjorge
St. Catherine University

Tracy Hannah
St. Catherine University

Peggy Rekstad
St. Catherine University

Tara Pauly
St. Catherine University

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The Behavioral Effects of Learning Outdoors

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Shannon Bjorge, Tracy Hannah, Peggy Rekstad, and Tara Pauly

St. Catherine University

St. Paul Minnesota

Abstract

A growing number of schools around the United States have begun adding outdoor learning to their curriculum in hopes to improve the education of K-12 students. Teachers are not only focusing on what is available in the classroom, but also looking at nearby surroundings that could benefit their students. Lund and Gaigher (as cited in Palavan, Cicek, and Atabay, 2016), state that learning outdoors is defined as a method of experimental learning through all senses by way of exposure to the natural environment and provides students with more opportunities from which to learn. Learning outdoors is an authentic experience for students allowing them the chance to explore and investigate the world from outside the classroom (Bourne, 2000; Lieberman & Hoody, 1998; Louv, 2008; Sobel, 2005). This research found learning outdoors could have benefits not only to students, but also teachers. The natural world is available and accessible for all to learn from and appreciate.

Introduction

Elementary-aged students are naturally inquisitive about the world around them. This makes outdoors a well-suited environment for student learning because the outdoors provides opportunities to explore, touch, and learn about things through a different experience other than in the norm of a classroom. Outdoor learning can be a valuable teaching tool for children, providing students with necessary skills that can be used in other areas of their lives.

A growing number of schools around the United States have begun adding outdoor learning to their curriculum (Lieberman & Hoody, 1998). It is hoped behavioral issues within the classroom will become less evident when students get the opportunity to learn in the outdoors. By using their outdoor surroundings for learning, students are getting the chance to get up, move around, explore the world outside and develop critical thinking skills while partaking in a different type of learning environment.

Many children struggle to sit still and/or listen while being in a confined area, such as in a classroom. By taking them outdoors, this offers students a uniquely rich context to frame their learning and provides them with movement, stimulation and grabs their attention so they can focus on their learning. If students are more focused, it is less likely for them to cause disruptive behaviors.

Behaviors can have a domino effect. They can be triggered by the lack of academic interest, stimuli and confidence, which then can affect their motivation to learn and stay on task. Using the outdoor setting for different learning experiences can impact greatly those students who struggle in the classroom setting. It can increase student motivation to learn and build confidence, which in turn, can improve student behavior. James and Williams (2017), state

these hands-on experiences with nature give children who have different learning abilities or who may have behavioral difficulties, an opportunity to experience a sense of achievement.

Problem Statement

Learning outdoors can mean different things to different individuals. Schools around the country have begun adding outdoor learning to their curriculum to potentially improve students' education (Lieberman & Hoody, 1998). Teachers are not only focusing on what is available in the classroom, but also looking at nearby surroundings that could benefit their students, both academically and behaviorally.

Teachers have long dealt with undesirable behaviors within the classroom. Little information is available on whether bringing students outdoors for learning changes behaviors when back inside the classroom. Therefore, the purpose of this action research study will explore whether bringing students outdoors for learning creates favorable behaviors that are conducive for learning when brought back into the classroom setting. We will work to answer the following question: What effect can exposure to learning outdoors have upon elementary students' behavior within the school environment?

Literature Review

Defining Learning Outdoors

Learning outdoors can mean different things to different individuals. For some, it can be referred to as, environment based learning (EIC), placed based learning (PBL), outdoor learning or experience, or environmental education (EE) (Lieberman & Hoody, 1998; Potter, 2010; Sobel, 2005). For Lund and Gaigher (as cited in Palavan, Cicek, & Atabay, 2016), learning outdoors is defined as a method of experimental learning through all senses by way of exposure to the natural environment and provides students with more opportunities from which to learn. This

learning can be done by means of audio-visual and through all physical senses improving the retention of knowledge in students (Palavan et al., 2016). Sobel (2005), stresses learning outdoors as a hands-on, real-world learning experience that increases academic achievement. Although defining learning outdoors is different from person to person, the common thread of this style of learning is an authentic experience for students that allow them the chance to explore and investigate the world from outside the classroom (Bourne, 2000; Lieberman & Hoody, 1998; Louv, 2008; Sobel, 2005).

In a study done by The Nature Conservancy (2011), 88% of American youth are not spending as much time in nature as they spend on other indoor activities. Amidst that, 66% of American youth say they “have had a personal experience in nature” making them appreciate nature more (The Nature Conservancy, 2011, p. 3). It is suggested that if youth are given more opportunities to have a meaningful experience outdoors, they will be more likely to value nature, engage with it, and feel empowered to do something about it (The Nature Conservancy, 2011). Being outdoors gives students a chance to have fun and provides them a place to escape their stresses and fears (The Nature Conservancy, 2011). In a different study conducted by Palavan, Cicek, and Atabay, (2016), additional benefits for learning outdoors were cited. They write about how learning outdoors provides students with better self-confidence, concentration, knowledge retention, and comprehension as well as social, language, communicative, and physical skills (Palavan et al, 2016).

Learning Outdoors at the Elementary Level

Learning outdoors can appear differently within each grade level, classroom, and school. For some, it is simply taking books outside to read (Wirth & Rosenow, 2012). For others, it is doing science experiments in the outdoors. And then for some, it is combining

science, math, reading, and writing and providing students with a different opportunity to learn (Liebermann & Hoody, 1998). No matter how one chooses to implement learning outdoors, it must still be held to the same standards as an educator would conduct lessons within the school building: with a plan and a purpose (Bourne, 2000).

As in the concept of a community garden, this outdoor learning experience is not limited to just science, it provides enrichment in all areas of learning (Starbuck & Olthof, 2008). Students actively learn the names of plants while observing and making predictions (Starbuck & Olthof, 2008). They use math skills by counting seeds and plants, measuring, and experience sequencing as the plants change over time (Starbuck & Olthof, 2008). During harvesting, students compare, sort, and classify (Starbuck & Olthof, 2008). They develop art skills by drawing the stages of the plant growth in their journals along with writing about it (Starbuck & Olthof, 2008).

Students do artwork, journal writing, and science activities inside the classroom; there is room in an outdoor setting for these same types of learning experiences (Starbuck & Olthof, 2008). This holds true for basic routines and procedures. Whether the class is inside or out, students have to be taught and have time to practice the process of science: quiet observation, listening, watching, and patience (Bourne, 2000). Teachers need to take a step back and let students become the facilitator to decide what it is that inspires them and how they want to figure things out (Bourne, 2000). This responsibility empowers students and gives them more confidence (Ernst & Monroe, 2004). Children need to be given time to observe, explore, discuss, and write each time they are involved in an investigation (Bourne, 2000).

Behavioral Impacts of Learning Outdoors

Positive impacts for students

Louv (as cited from Eick, Tatarchuk, & Anderson, 2013) states that getting children outside to learn and experience nature has to become a national priority because of the many potential benefits being outdoors provides for children. Studies show that active, subject-integrated, and experiential; in-context learning is the most effective way to reach students (Bass, Yumol, & Hazer, 2012; Bredderman, 1983; Chen & Chou, 2015; Fägerstam, 2014; Haury & Rillero, 1994; Jones et al, 2015; Parry, 2011; RAFT, 2013; Scott et al., 2013; Thornburn & Marshall, 2014; Wiggins & McTighe, 2008 (as cited in James & Williams, 2017)). This can be achieved by providing an engaged area for an outdoor learning experience within the school setting (Broda, 2011). Learning outdoors promotes imagination and creativity, increases motivation for learning to take place, and enhances social relationships (Broda, 2011). It also engages active, in-context learning that is exciting, demonstrates higher levels of motivation and interest, and a deeper and more effective learning of the material (Bass et al., 2012; Bredderman, 1983; Chen & Chou, 2015; Fägerstam, 2014; Haury & Rillero, 1994; Jones et al, 2015; Parry, 2011; RAFT, 2013; Scott et al., 2013; Thornburn & Marshall, 2014; Wiggins & McTighe, 2008 (as cited in James & Williams, 2017)). Students having physical contact with plants and animals in an outdoor setting improve retention and recall of learned material in addition to encouraging their motivation to learn (Broda, 2011).

Students who struggle with traditional classroom settings can gain the most through outdoor learning experiences (James & Williams, 2017). Instead of experiencing struggles with motivation, confidence, lack of attention, or social skills inside the classroom, these students gain these particular skills through learning outdoors and can even thrive and take on the leadership role through outdoor hands-on experiences (James & Williams, 2017). These hands-on experiences with nature also give children who have different learning abilities or who may have

behavioral difficulties, an opportunity to experience a sense of achievement (James & Williams, 2017). Applying what is learned in the classroom to real-life experiences leads to a deeper understanding of critical thinking skills (James & Williams, 2017).

Not only does learning outdoors support educational development, but it also supports a child's physical development (Starbuck & Olthof, 2008). For younger students, exploring the outdoors through gardening develops their gross and fine motor skills by digging holes, sorting seeds, watering the plants, and pulling weeds (Starbuck & Olthof, 2008). Gardening contains many science concepts and many opportunities for language and literacy development (Starbuck & Olthof, 2008). Math skills are also evident through counting, recording, measuring, and charting information (Starbuck & Olthof, 2008). Students also experience sequencing and spatial relationships through gardening over an extended period of time (Starbuck & Olthof, 2008).

A study done by Lieberman and Hoody (1998), suggests students learn more effectively while learning outdoors than within a traditional education framework. Lieberman (1998) also writes that integrating the environment into the learning context greatly improves students' academic performance and standardized test scores. When learning is active and applied to real-world situations, it becomes more memorable to the students (Broda, 2011). When students are able to apply what they have learned, their understanding is deepened and they start developing critical thinking skills (Broda, 2011).

Positive impacts for teachers

Educators that provide outdoor learning experiences have noticed more attentive students, student's actively participating, collaborative decision-making, and students becoming emotionally attached to the natural environment (Gibson, 2011). Liebermann and Hoody's study

(1998) revealed an increased enthusiasm for learning in student, which in turn reduced classroom management challenges for educators. Teachers know their students and observe them better in an environment, where the students feel free and relaxed away from any tension (Palavan et al., 2016). This can only happen, however, if educators understand the value of children's "firsthand investigations of the natural environment" (Wirth & Rosenow, 2012, p. 46). Teachers also reported they were able to have a deeper understanding of their students as they are closely involved with the students instead of playing a supervisory role (Wirth & Rosenow, 2012). Teachers also expressed a new enthusiasm for teaching (Louv, 2008). With teacher burnout on the rise, the impact of outdoor learning cannot be overlooked (Louv, 2008).

Positive impacts for the school community

Learning outdoors can create school unity with cross grade collaboration (Broda, 2011). This can integrate a school population much like a large family displaying more responsibility and caring for one another (Gibson, 2011). As cited by Broda (2011), cross-grade learning or 'buddies' can be beneficial for learning and exploring the outdoors. The older students mentor and encourage thinking of the younger partner. Broda (2011) also states that constructive relationships between staff members and the students are formed. The caring and responsibility of one another becomes evident through this collaboration (Broda, 2011). This new method of learning creates enthusiasm and successful relationships among staff and students (Gibson, 2011).

Teachers teaming together create another positive partnership (Liebermann & Hoody, 1998). Students can learn about cooperative work and group dynamics by observing the collaborative efforts among their teachers, parents, and school administrators (Lieberman & Hoody, 1998). When students observe this type of collegial, respectful behavior, they are more

likely to emulate it than if they just hear their teachers talking about cooperation (Lieberman & Hoody, 1998). In Texas, for instance, in the first year of implementing outdoor learning, teachers made 560 disciplinary referrals to the office (Lieberman & Hoody, 1998). The next year, as program implementation expanded, that number dropped to 160 (Lieberman & Hoody, 1998). The following year, with the curriculum fully established, administrators reported only 50 disciplinary referrals (Lieberman & Hoody, 1998). Both the principal and teachers attribute these decreases in behavioral problems to students' increased engagement in outdoor learning (Lieberman & Hoody, 1998).

Barriers to Learning Outdoors

Why do teachers avoid taking students outdoors to learn despite the benefits? External and logistic barriers, such as lack of time, have become a factor (Ham & Sewing, 1987-1988; Ko & Lee, 2003 (as cited in Kim & Fortner, 2006)). Today's busy classrooms and copious curriculum standards have left little room for nature (Louv, 2008). Many schools are restricted to stick to the basics of writing, reading, and math (Louv, 2008). However, there are also internal and personal barriers, such as attitudes and comfort, with learning outdoors (Kim & Fortner, 2006). Teachers are uncomfortable with the idea of being put in an unfamiliar situation that would expose their own lack of knowledge and confidence, which could be apparent to their students (Scott, Boyd, & Colquhoun, 2013). Many also feel apprehensive about this concept as they do not feel their classroom management strategies would apply when instructing outdoors (Scott et al., 2013).

Another area that can be troubling for schools are maintenance and safety issues (Wirth & Rosenow, 2012). This does not need to be a burden for the school, students, or educators. Students should be a part of the maintenance of the outdoor learning sites, as this is

an opportunity for them to develop confidence and gain a sense of responsibility (Wirth & Rosenow, 2012). As with recess, it is clearly important to make students aware of the behaviors that are expected so safety issues can be avoided. This can be established through not only close supervision but with establishing boundaries and procedures (Wirth & Rosenow, 2012).

Additional Influential Impacts of Learning Outdoors

Academics

Using the environment as an educational context helps students become engaged and enthusiastic about learning, which results in increased attention to school work (Lieberman & Hoody, 1998). Children, who experience outdoor learning, demonstrate higher levels of motivation and interest in learning about the environment than students who did not have an outdoor learning experience (Drissner, Haase & Hille, 2010 (as cited in Scott et al., 2013)). In addition to motivating students, outdoor learning can greatly improve students' academic performances and standardized test scores (Kail, 2006).

Teachers and students agree that outdoor learning and exploration are important aspects of building critical thinking skills (Ernst & Monroe, 2004). It provides opportunities for connecting their learning between different subject areas to the world around them (Ernst & Monroe, 2004). Students are able to hypothesize, investigate issues, build understanding and conduct research through open-ended projects (Ernst & Monroe, 2004). When students were given the opportunity to be involved in the learning process, it changed the dynamics from teacher-centered to learner-centered (Ernst & Monroe, 2004). Through this, students became empowered and took responsibility for their own learning (Ernst & Monroe, 2004).

Greater community

Any time the community and school district are able to form a partnership, positive results occur (Ferreira, Grueber, & Yarema, 2012). Johnston, (as cited in Ferreira et al., 2012) pointed out that creating a sense of community is an essential aspect of being eco-friendly and living in a sustainable manner. Collaboration with community, families, students, and coworkers are key when wanting results that will help others and increase learning (Ferreira et al., 2012). Connecting with supportive community partners can also expand the vision for outdoor learning through volunteer expertise, donations, and teaching support (Eick et al., 2013).

When students conducted investigations, particularly in the outdoors, they were more engaged in the local environment, became stewards of their environment, and improved their skills in several educational disciplines; all while preparing themselves for 21st-century jobs (Haines, 2016). In addition, emphasizing hands-on, real-world learning experiences enhance students' appreciation for the natural world and creates a heightened commitment to serving as active, contributing citizens which in turn shapes caring adults (Sobel, 2005). When people have exposure to the outdoors as children, they are more likely to care about it as adults (Louv, 2008; Louv, 2011).

Health

Louv (2008) defines nature deficit, not as a medical diagnosis, but rather as the reality that human, especially children, are spending less time outdoors resulting in a wide range of behavioral and health problems. This can have profound impacts on our children's mental health (White, 2008). Being outdoors has many benefits for healthy child development (Louv, 2008). It can stimulate all the senses while informal play connects with formal learning (Louv, 2008). According to Moore (as cited in Louv, 2008), multi-sensory experiences in the outdoors help to build the cognitive constructs necessary for sustained intellectual development. Time in

the outdoors improves a child's coordination and self-esteem (White, 2008). A recent study indicates that playing outside even reduces the severity of symptoms of Attention Deficit/Hyperactivity Disorder (ADHD), which affects millions of American children (White, 2008). There has been an increase of antidepressants prescribed to kids and adolescents recently, overshadowing the alternatives to the outdoors (Louv, 2008). What was once thought of as a belief that outdoors had a direct positive impact on human health is going from idea to evidence and from evidence into action (Louv, 2011). Some health care providers have begun to promote nature therapy for illnesses and disease prevention by exposing children to the outdoors as an alternative to medication for depression (Louv, 2011). Research supports that this form of therapy helps control pain and stress (Louv, 2011). The connection of body, mind, and the outdoors is referred to by Louv (2011), as vitamin N, which is used to help enhance physical and mental health.

Nature deficit can also impact children's physical health (Louv, 2008; Louv, 2011). Over the past 20 years, time spent playing outdoors has been cut in half, but the obesity rate in children has more than doubled and it has tripled in adolescents (White, 2008). White (2008) states that for the first time in American history, doctors warn there may actually be a decrease in the life expectancy because of the health impacts of the current childhood obesity epidemic. This research has linked childhood obesity to a lack of playtime outdoors (White, 2008). Although physical activity through sports can help address the obesity issue, the medical community recognizes that unstructured free time outdoors has added health benefits to children (White, 2008). Those who play outside are more active and more physically fit than those who do not (White, 2008).

Conclusion

Learning outdoors provides an immediate and real experience for students that sparks questions, offers avenues of exploration and investigation, and is available at little to no expense to everyone (Bourne, 2000). Although this may look different from classroom to classroom, the benefits are the same. Bourne (2000) explains that children who go outside regularly notice the cycles and patterns of nature, the habits of animal life, the beauty of the world around them. Learning from routine outdoor experience is not just deliberate, it is natural (Bourne, 2000). According to Lieberman and Hoody's (1998) study, benefits of learning outdoors include academic achievement, reduced classroom management problems, and more importantly, increased enthusiasm for learning. It balances the intentional with the casual, the planned and the serendipitous (Bourne, 2000). Learning outdoors builds physical fitness, strengthens one's senses and mental health, while relieving some of the everyday pressures that may lead to childhood depression. (Louv, 2008; Louv, 2011). It builds on children's intrinsic curiosity and their need to interact with real objects and events (Bourne, 2000). And when we enlist the community in the development and maintenance of the outdoor learning experience, the entire community will benefit (Mayes, 2010). The lasting pleasures of contact with the natural world are not reserved for scientists, but are available to anyone who will place himself under the influence of earth, sea, and sky and their amazing life (Bourne, 2000). "Those who contemplate the beauty of the earth find reserves of strength that will endure as long as life lasts" (Carson, as cited by Wirth & Rosenow, 2012, p. 42).

Methodology

This study used indoor and outdoor classroom observations using Tally Sheets (See Appendix C) as well as pre- and post-Attitude Assessment Scales (Attitude Assessment) (See

Appendix B) conducted anonymously to learn about the students' background to outdoor experiences. This study is considered to be experimental in nature.

Four different lessons occurred during this study. Each lesson was typical to our curriculum and standards-based; contained science and writing components; and occurred outdoors. Observational data was collected before, during and after each lesson to examine frequency of on- and off-task behaviors. Since each researcher (teacher) instructs a different grade level of students, each lesson was adjusted according to age appropriateness, with the objectives remaining the same. The first lesson focused on observations of a rainy day and then using the observations to write a story. The second lesson included a nature-based scavenger hunt, which utilized technology. A nature walk where items were collected to create a character and develop a story was the third lesson. The final lesson included observations outdoors and then the culmination of a diamante poem.

The sample of this action research study consisted of twenty elementary age students ranging in grades 2-4. Students chosen to participate in this study had a history of off-task behaviors. Prior to the study, all students in each class were initially observed for frequency of off-task behaviors. There were a total of four girls and sixteen boys chosen to participate in the study according to their propensity to off-task behavior in a classroom setting. The history of these students' off-task behavior was confirmed by viewing the School-Wide Information System (SWIS) data for each student from the previous school year.

In order to answer the research question, data was collected in multiple ways. Prior to starting the outdoor learning activities, all students were given a Time Spent Outside of School Student Survey (Survey) (See Appendix A) to provide background information on student

interest in the outdoors. In addition to the Survey, all students were given an Attitude Assessment before outdoor learning activities to determine attitudinal change.

Finally, researchers used Tally Sheets to collect observational data to inform the researchers on the level of engagement of participating students throughout the day. The initial observation occurred one-hour before the outdoor lesson. The second observation occurred during the outdoor lesson. The last observation occurred indoors one-hour after the outdoor lesson. These observed behaviors aided in determining if outdoor learning time significantly affected indoor learning behaviors.

All students were given the Survey and the Attitude Assessment via Google Forms on iPads during the second and tenth week of school. Starting the 4th week of the school year, researchers started to take students outdoors for learning. Each lesson lasted fifteen to twenty minutes each with two lessons happening each week. On occasion, 30-40 minutes were needed for nature walks. Since each researcher worked with a different age group of elementary students, researchers worked to align activities for comparable data collections. Upon completion of each outdoor experience, observational Tally Sheets were completed while students worked to complete an in-the-classroom activity related to the outdoor learning activity.

Data Analysis

Observation Data

Raw observational data was collected before, during, and after outdoor learning experiences on the Tally Sheet (See Appendix C). Researchers observed students prior to going outdoors while giving instructions for the outdoor learning experience. While outdoors, teachers continued to observe students using the Tally Sheet. Tally Sheet observations continued when

students returned indoors to determine whether behaviors changed in a positive way, negative way or in no way at all. At the end of the day, teachers reviewed the Tally Sheet and put data results into a spreadsheet.

Behavioral Data

The primary use of the behavioral data was for initial selection of students; however, it was used during the study for validation. During this process, initial observations occurred for off-task behaviors, observational data from the Tally Sheet, and School-Wide Information System (SWIS) data were compared through the process of triangulation to establish validity and credibility. The information gained was used to determine if the outdoor learning experience contribute to a positive behavioral change for students.

Attitude Assessment Data

Prior to participation in the research, each student completed an Attitude Assessment to determine his/her attitude of the outdoors. After students completed each of the four lessons that were presented during the first nine weeks of school, they were then given the Attitude Assessment once again. This information indicated whether students' attitudes toward the outdoors changed from the first week to the last week of our outdoor activities.

Time Spent Outdoors Outside of School Data

Each student completed a survey about how s/he spends time outdoors. The intention for this survey was to gauge students' comfort level in the outdoors. Knowing the comfort level and activities students engaged in can assist in deciding which outdoor learning activities may be appropriate so as not to deter from the core content.

Reporting Findings

The purpose of this study was to examine potential effects exposure to learning outdoors had upon elementary students' behavior within the school setting. As part of this research, data was collected in the forms of teacher observations to determine behavioral change and student surveys designed to measure students' attitudes and perceptions of their experiences as participants in learning outdoors, as well as their interests.

This research study consisted of twenty elementary-aged students ranging in grades 2-4. A total of four girls and sixteen boys were chosen to participate in this research according to teacher observations of off-task behaviors and student behavioral history confirmed by School-Wide Information System (SWIS) data. See Table 1 for a breakdown of student demographics per grade level.

Table 1
Student Demographics

| Grade | Males | Females |
|-------|-------|---------|
| 2 | 4 | 1 |
| 3 | 8 | 2 |
| 4 | 4 | 1 |

Effects of Outdoors Learning

The research question addressed focused on the effects exposure to learning outdoors had upon elementary students' behavior within the school setting. To answer this question, researchers observed students before, during, and after an outdoor learning experience. The observations were recorded, compiled, and compared with past and present behavioral history. Reviewing SWIS data from the Fall of 2016 and comparing it to the Fall of 2017, there was a 62% overall decrease in student referrals for students previously having one or more infractions from the 20 students that we studied.

Four lessons were implemented during the study that took students outdoors to meet objectives. In the following information, each lesson will highlight behavior data before and after the outdoor lesson via a bar graph as well as a comparison via a table of before, during and after on task behavior. In the bar graphs, each grade level is distinguished by color. In the table, the twenty students were collectively examined. The data in these figures and tables comes directly from teacher’s observational data collectively compiled from the Tally Sheets.

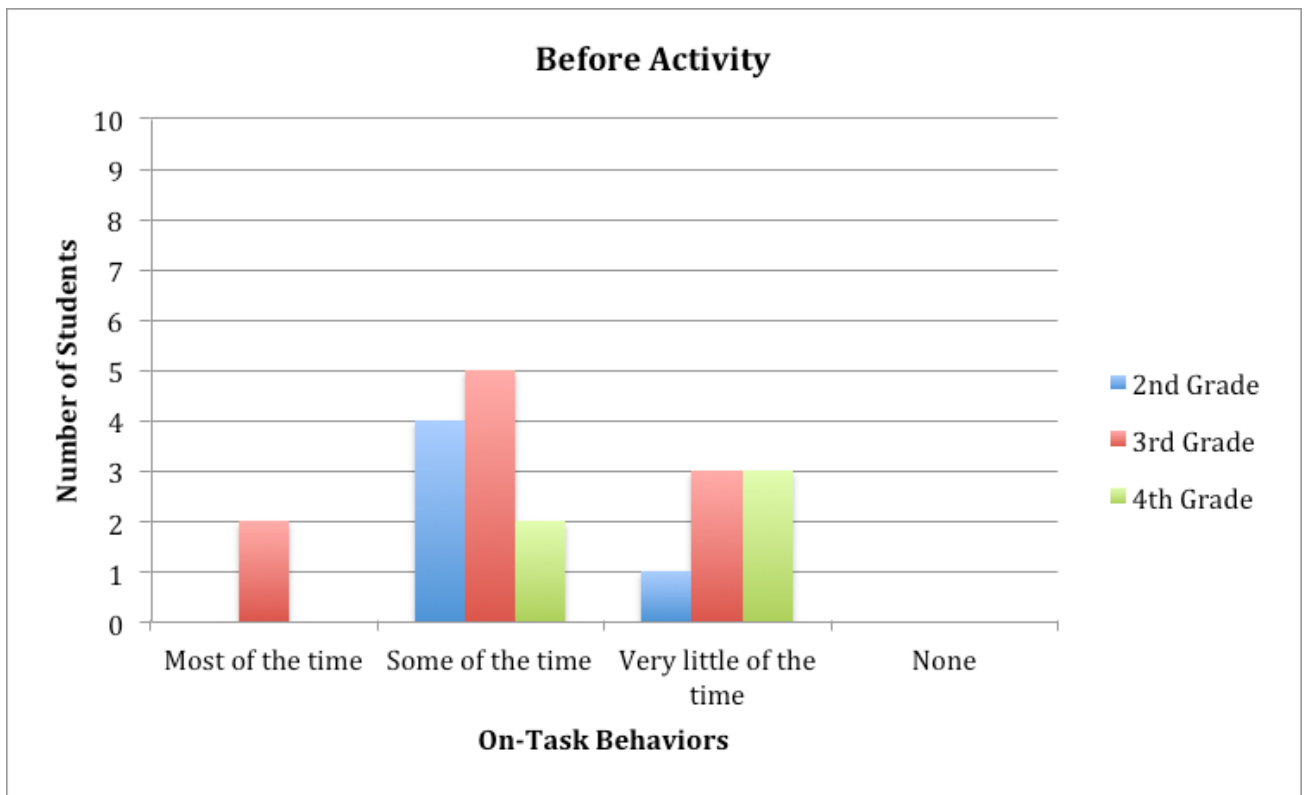


Figure 1A. Observations of on-task behaviors conducted before rainy day lesson.

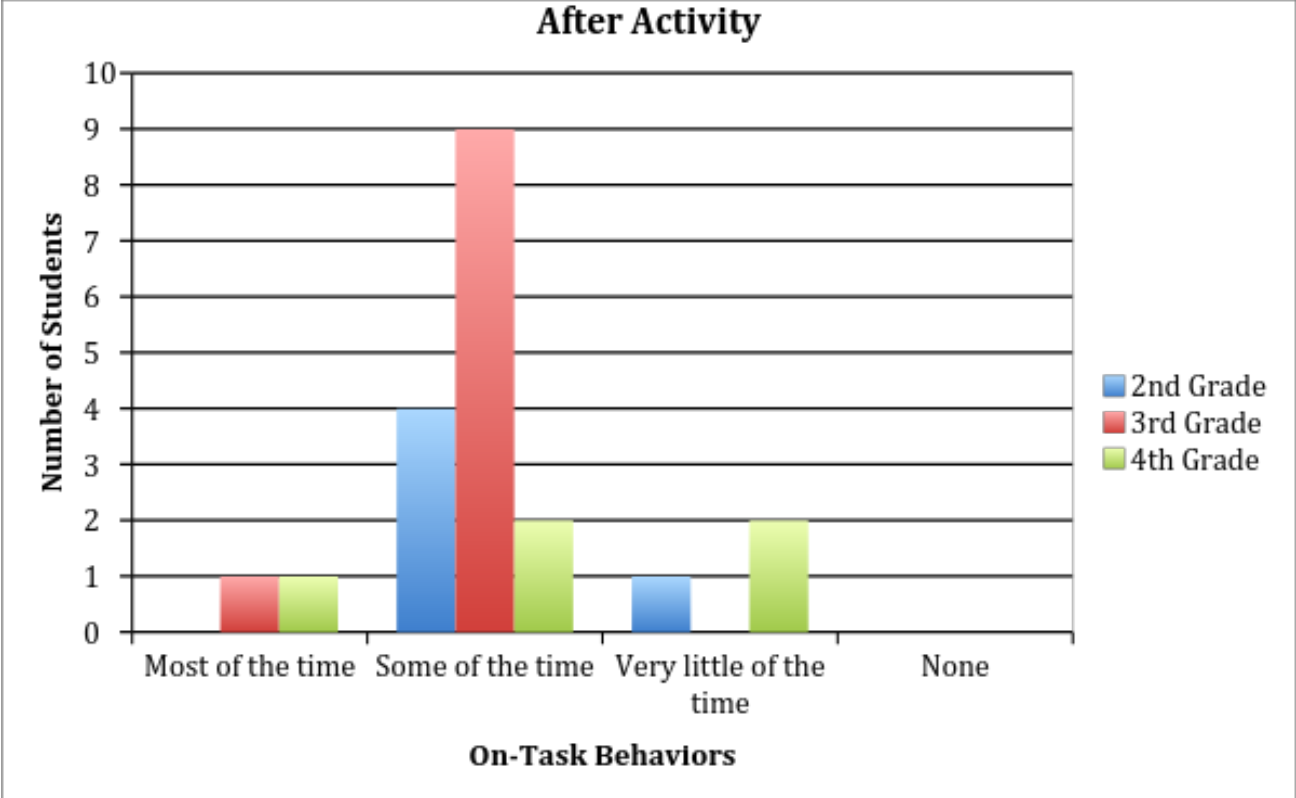


Figure 2B. Observations of on-task behaviors conducted after rainy day lesson.

Table 2
On Task Behavior for Most or Some of Time of 2nd, 3rd and 4th Grade Students

| Before | During | After |
|--------|--------|-------|
| 65% | 65% | 85% |

Data for Figures 1A and 1B and Table 2 were taken from the observational data using the Tally Sheets. These particular Figures focus on the Rainy Day Observation Lessons. Figures 1A and 1B show that more on-task behaviors were noticed between 3rd grade and 4th grade after the Rainy Day Observation Activity. There was no change in the 2nd grade behavior for this activity. Additionally, when analyzing on-task behavior during the experience, there was no change from before the activity as indicated in Table 2; however, there was a gain of 20% in on-task behavior following the outdoor learning experience.

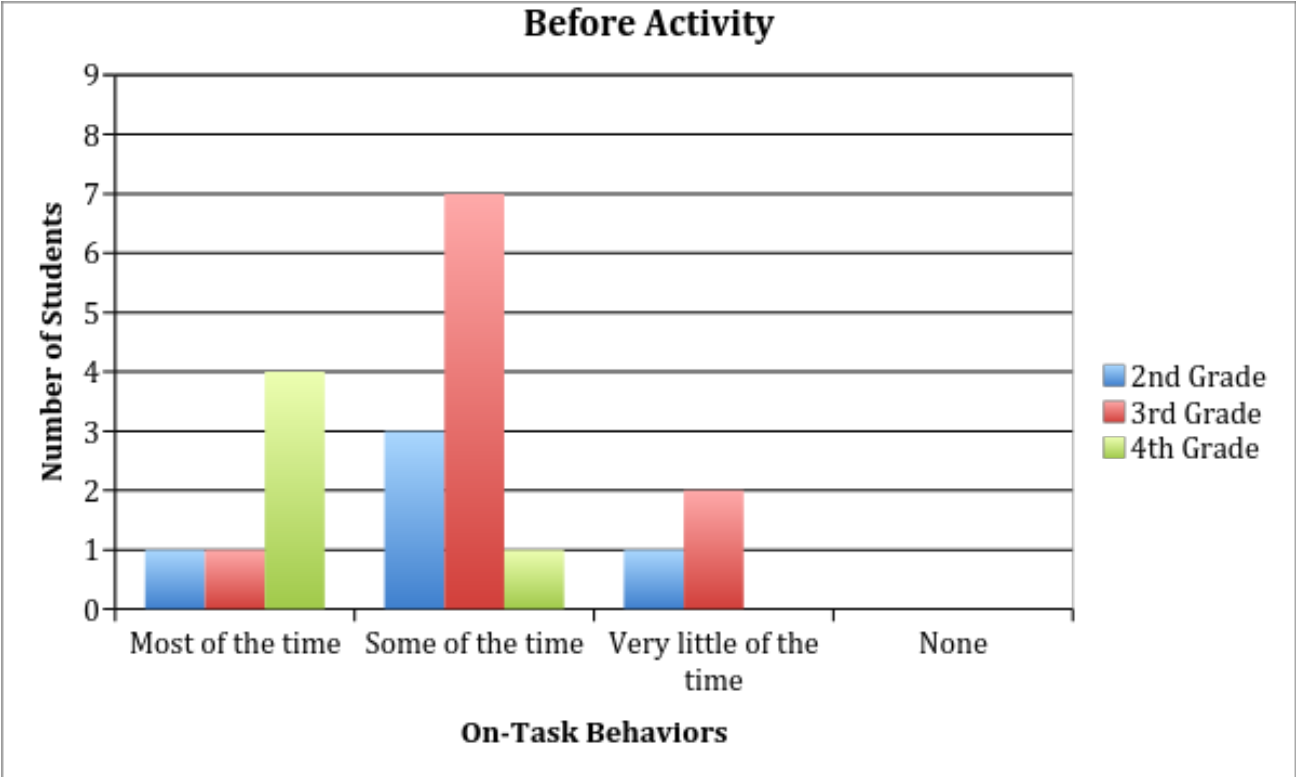


Figure 2A. Observations of on-task behaviors conducted before nature scavenger hunt lesson.

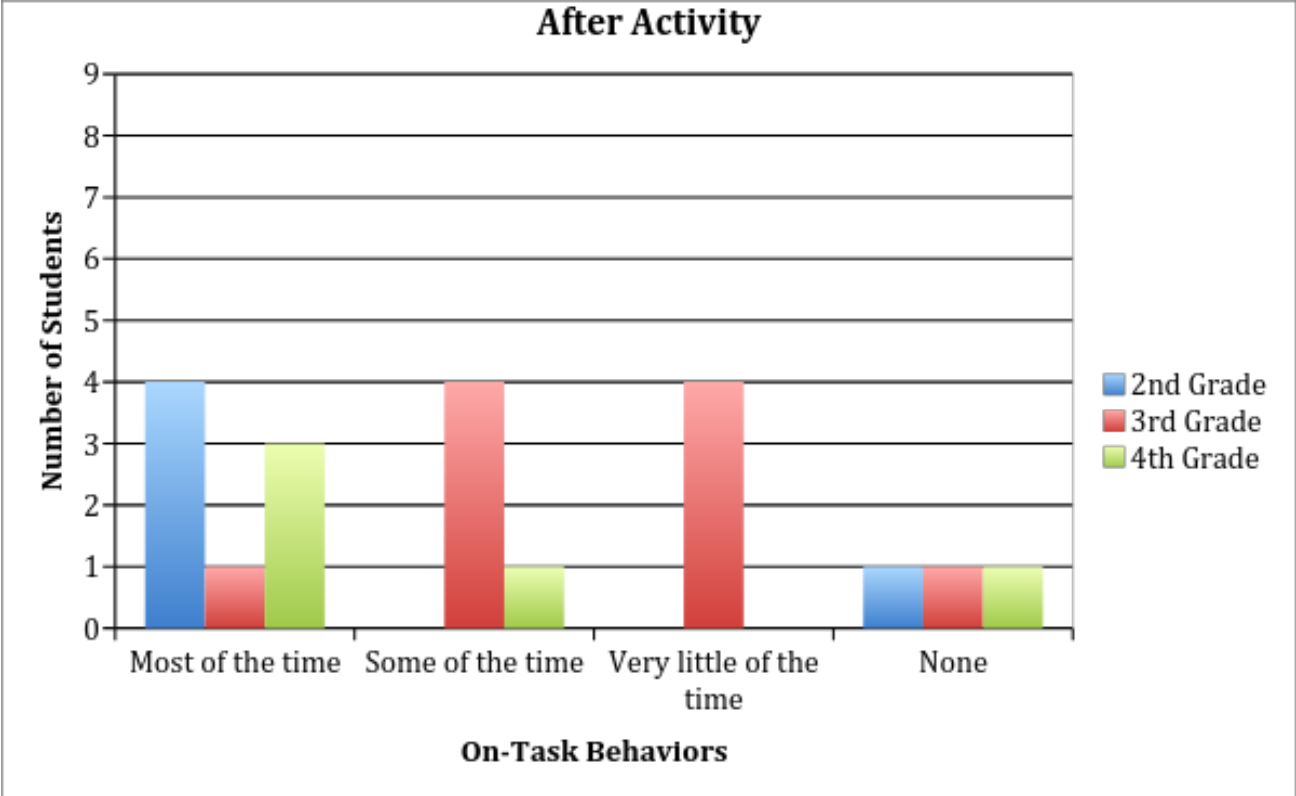


Figure 2B. Observations of on-task behaviors conducted after nature scavenger hunt lesson.

Table 3
On Task Behavior for Most or Some of Time of 2nd, 3rd and 4th Grade Students

| Before | During | After |
|--------|--------|-------|
| 80% | 95% | 65% |

Data for Figures 2A and 2B were taken from the observational data using the Tally Sheets. These particular Figures focus on the Nature Scavenger Hunt Lessons. Figures 2A and 2B show students in all grades had a small decrease in on-task behaviors before the Nature Scavenger Hunt compared to after this activity. Additionally, when analyzing on-task behavior during the experience, there was a significant increase of 15% from before the activity as indicated in Table 3. Interestingly however, there was a significant decrease of 30% in on-task behavior following the outdoor learning experience compared to during the lesson. .

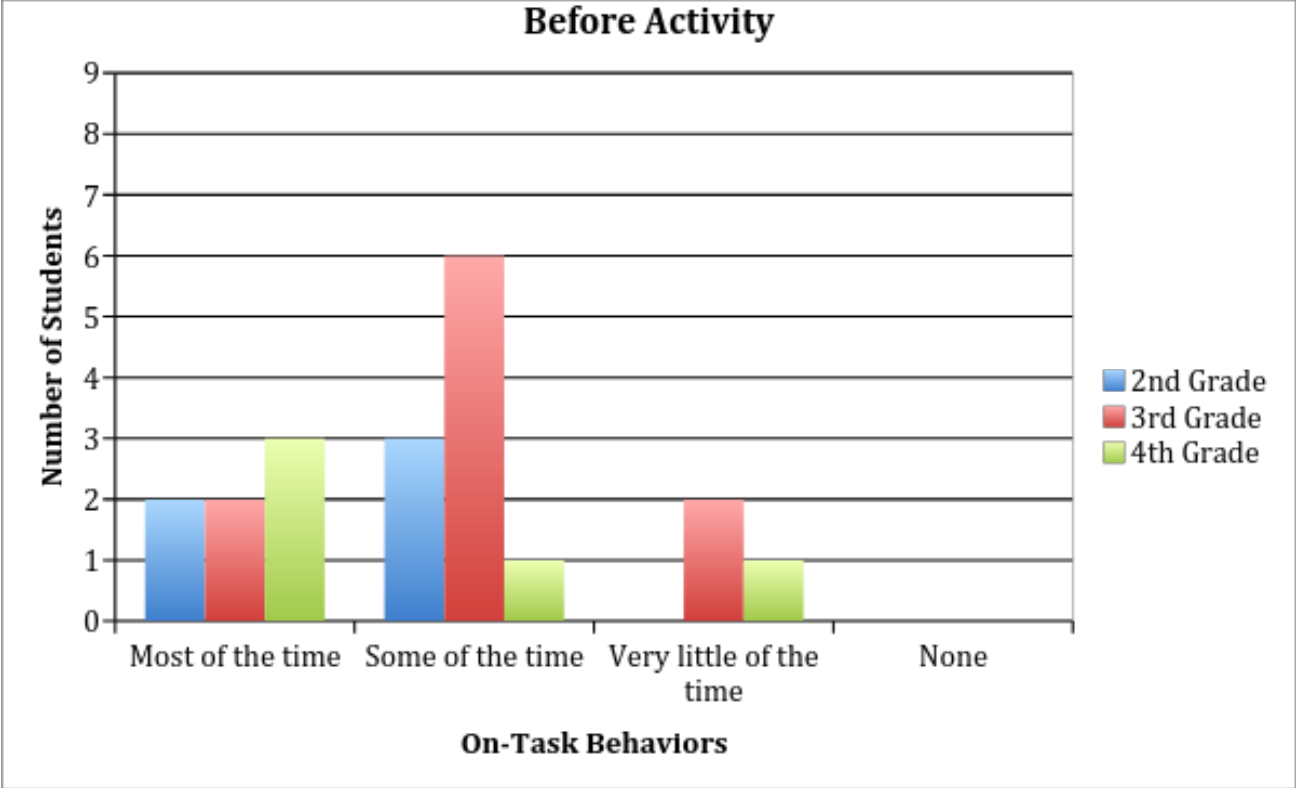


Figure 3A. Observations of on-task behaviors conducted before nature walk/collection lesson.

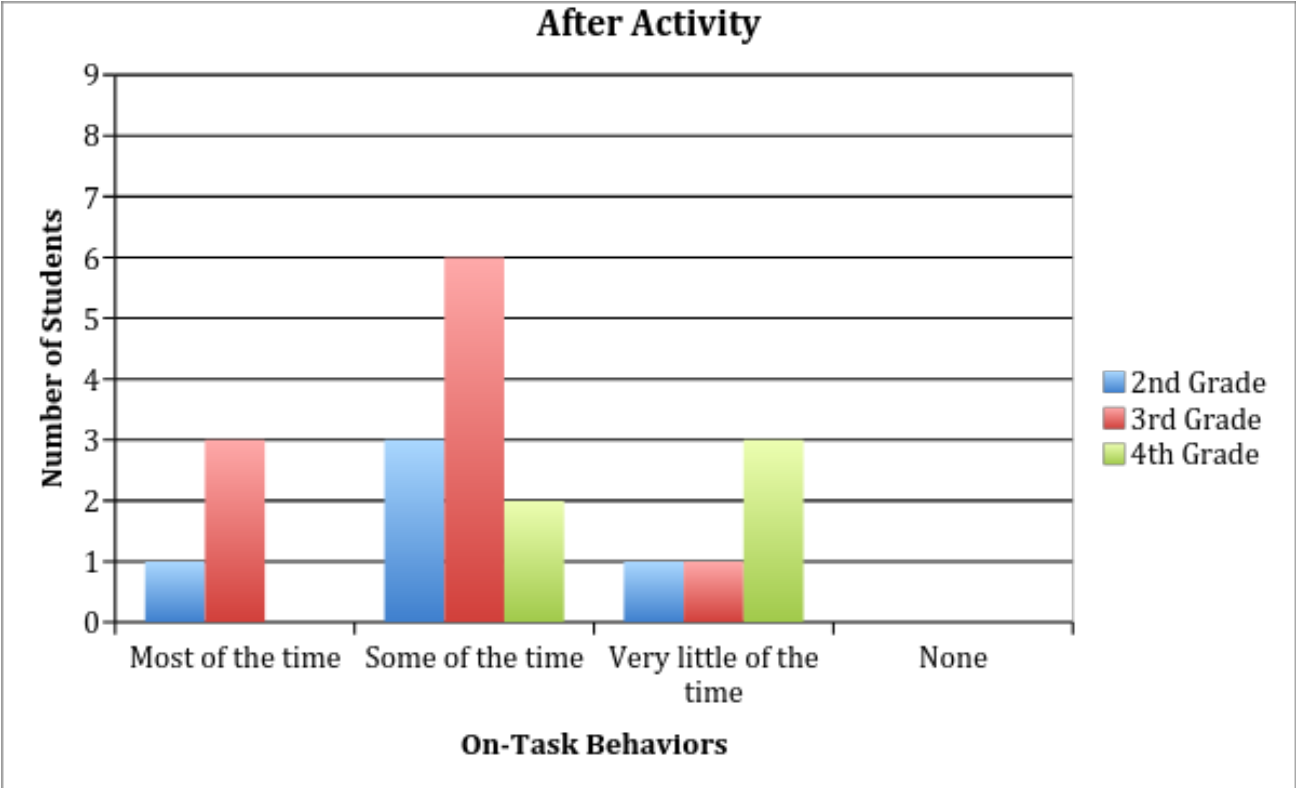


Figure 3B. Observations of on-task behaviors conducted after nature walk/collections lesson.

Table 4

On Task Behavior for Most or Some of Time of 2nd, 3rd and 4th Grade Students

| Before | During | After |
|--------|--------|-------|
| 85% | 90% | 75% |

Data for Figures 3A and 3B were taken from the observational data using the Tally Sheets. These particular Figures focus on the Nature Walk/Collection Activities. Figures 3A and 3B show a slight increase in on-task behaviors in 3rd graders after the Nature Walk/Collection. In contrast, 2nd grade and 4th grade had a slight decrease in on-task behaviors among students after the Nature Walk/Collection. Additionally, when analyzing on-task behavior during the experience, there was a marginal increase of 5% from before the activity as indicated in Table 4. As indicated in the Rainy Day lesson previously highlighted, there was once again a significant decrease, 15%, in on-task behaviors after the outdoor learning experience when compared to during the outdoor learning experience. In the case for this lesson, there was a decline from before lesson on-task behaviors to after lesson on-task behaviors of 10%.

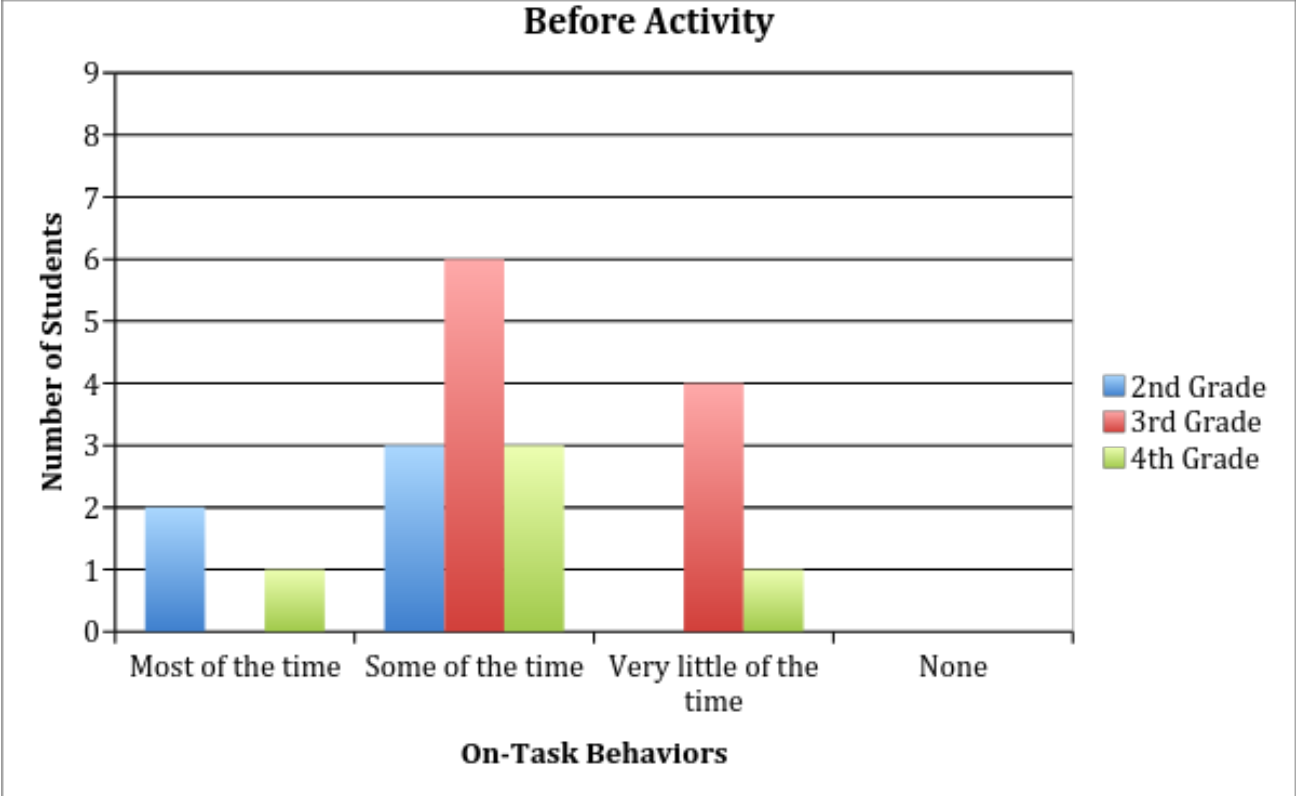


Figure 4A. Observations of on-task behaviors conducted before nature bathing/diamante poem lesson.

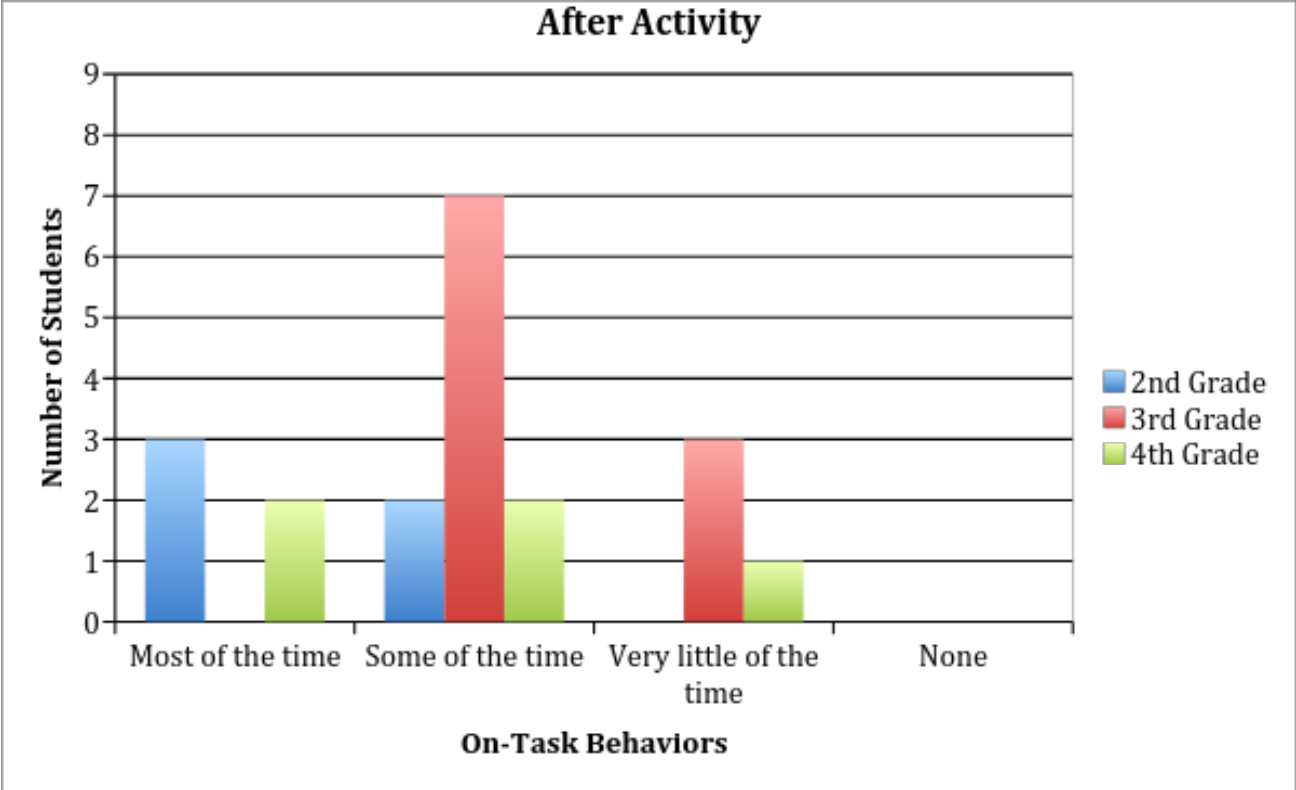


Figure 4B. Observations of on-task behaviors conducted after nature bathing/diamante poem lesson.

Table 5
On Task Behavior for Most or Some of Time of 2nd, 3rd and 4th Grade Students

| Before | During | After |
|--------|--------|-------|
| 75% | 90% | 80% |

Data for Figures 4A and 4B were taken from the observational data using the Tally Sheets. These particular Figures focus on the Nature Bathing/Diamante Poem Activities. Figures 4A and 4B show a modest increase (5%) in on-task behaviors for students in all grades after the Nature Bathing/Diamante Poem activity. Additionally, when analyzing on-task behavior, there was a 15% increase from before the activity to during the activity as indicated in Table 5. Also, there was a 5% increase from before the lesson on-task behavior to after the outdoor lesson on-task behavior.

When comparing all the figures above, it can be stated there was a marginal increase of on-task behaviors observed throughout 2nd, 3rd, and 4th grade after completing an outdoor learning lesson. In three of the four activities, the on-task behavior shown by the students compared from before the outdoor learning activity to after the outdoor learning increased. Whereas, in the Nature Scavenger Hunt, there was a decrease in on-task student behaviors. We also discovered through our experience that the number of students liking the outdoors increased by 60% since introducing learning in the outdoors.

Conclusion

Based on the findings of this study, there are positive effects after students are experience learning in an outdoor setting. Behaviorally, when examining and comparing the SWIS data from the Fall of 2016 and to the Fall of 2017, there was a 62% overall decrease in student referrals for students previously having one or more infractions from the 20 students that we studied.

While not a cause, a possible correlation to the significant decrease in office referrals could be due to an increase in outdoor learning opportunities. This could be due to a higher level of engagement when involved in outdoor learning, as indicated in on-task behaviors and recorded in the Tally Sheets. On average, there is a 9% increase comparing on-task behavior during an outdoor lesson to before the lesson. This same average, 9%, holds true when comparing on-task behavior during an outdoor lesson to after the lesson. Students are more likely to exhibit on-task behaviors during outdoor lessons then before or after. In conclusion, students are more engaged and less likely to display off-task behaviors during lessons occurring outdoors. Through the Attitude Assessment, we discovered students were more apt to have an overall better attitude after being exposed to the outdoors.

Learning outdoors promotes imagination and creativity, increases motivation for learning to take place, and enhances social relationships (Broda, 2011). This was witnessed in higher levels of student creativity, imagination, and new relationships. One student, who is usually quietly seated in his desk drifting away from lessons, was found up in front leading the class to the trail and interacting with students whom he would otherwise shy away from. High participation was observed during most outdoor activities as students asked more questions and were more involved with looking for answers about the things we were discussing. Students were seen collaborating, searching, and writing about their finding.

An increase in enthusiasm amongst students was noticed for outdoor learning. Comparing the Attitude Assessment pre-assessment to the post-assessment, the number of students liking the outdoors increased by 60%. Teachers and students both looked forward to the outdoor learning times. Student requests for more outdoor learning time increased as lessons progressed. Students shared with parents and others about their positive experiences of being in the outdoors. Other teachers, not included within this research, inquired about the outdoor lessons taught and showed interest in conducting their own lessons with their students.

As cited by White (2008), time in the outdoors improves a child's coordination and self-esteem. Quiet, timid students were observed taking on new roles while in the outdoors. They demonstrated a personal ownership in the lessons and for some, took on a leadership role. It seemed as if being outdoors opened them up a little bit more. These students would see things that interested them or they knew lots of information about and they exploded with excitement to share their knowledge with others around them. Something that would not otherwise be seen in the classroom.

Recommendations

This research study aimed to help with the understanding that outdoor learning has a positive effect on students. It would be interesting to continue this research throughout the school year to see if additional positive changes are presented in students. This could give insight to see if the longevity of the activities forms a positive habitual routine for students. One could also study to see if the weather plays a role in student behavior. A study conducted by Haines (2016), states that when students conducted investigations, particularly in the outdoors, they were more engaged in the local environment, became stewards of their environment, and improved their skills in several educational disciplines; all while preparing themselves for 21st-century jobs. It would be interesting and insightful to expand the research into these parameters of engagement and stewardship of the local environment beyond the school day. Additionally, research could continue into multiple content areas to seek whether there is positive impact when combined with outdoor learning.

We agree with Broda (2011), that learning outdoors can create school unity with cross grade collaboration. Collaborate with staff members on what has been done and form new ideas for future activities. Veteran teachers, especially science teachers are full of background knowledge and usually are happy to help. Involving student mentors can also add in on the benefits, as would obtaining resources from community experts.

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Appendix A

Time Spent Outside of School Student Survey

Where do you like to spend your free time?

indoors

outdoors

When indoors, what do you like to do?

read

watch tv

play video games

play card/board games

play with my toys

When outdoors, what do you like to do? (check all that apply)

running/biking

playing yard games

playing sport games

gardening/yard work

just playing

Do you belong to any community groups? (check all that apply)

Boy/Girl Scout

4H

Kinship

Boys & Girls Club

Youth Groups (Kiwanis/church)

In the last year, have you visited... (check all that apply)

Pine Grove Zoo/Park

Maple Island Park

Lindbergh State Park

Crane Meadows Wildlife Reserve

Fishing Museum

About how much time do you spend outside each day? (not counting school time)

30 minutes or less

30-60 minutes

more than an hour

Appendix B

Attitude Assessment Scale about Learning Outdoors

Please read and answer the following questions about learning outdoors.

When you hear that you'll be going outdoors for learning, how does it make you feel?

Excited

Disappointed

Whatever

What do you like best about going outdoors for learning?

What do you like least about going outdoors for learning?

I wish my teachers took me outdoors more for learning.

Agree

Disagree

Not Sure

I feel I can focus better when learning outdoors.

Agree

___ Disagree

___ Not Sure

Why did you answer the way you did for question #5? Please be specific.

Appendix C

Teacher Observation Recording Sheet

Date: _____

Class/Lesson: _____

Time: _____

Type of Activity: Small Group Large

Group Alone

| Student Name | (before) Attentive to instruction/teacher | (during) Displayed on-task behaviors. | (after) Participated in class discussion. |
|--------------|--|--|--|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Words used to describe attentiveness, on-task behaviors, and participation: Most of the time, Some of the time, Very little of the time, None

Comments:
