




# Teacher and student perceptions of an outdoor classroom

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## Abstract

A six-week study was conducted with two kindergarten teachers and 37 kindergarten students aged five and six to determine their perceptions of teaching and learning in a traditional indoor classroom compared to a newly constructed outdoor classroom. This mix-methods study took place in a charter school located in the southeast region of the United States. Observational data was collected in both the outdoor and indoor learning environments during the literacy block called “LMNOP time” as well as during recess or “free time.” The teachers and children were also surveyed and interviewed. Of the 37 children who participated in the study, five of the children had special needs. Quantitative observations and qualitative interview records were analyzed to compare the impact of the learning environments on children with and without disabilities. The data revealed that both the teachers and the students reported an increased perception of wellbeing, pleasure, and interest when teaching and learning in the outdoor classroom. In addition, research assistants noted that the children with disabilities were less distracted and more on-task when working in the outdoor classroom.

**Keywords** Outdoor classroom · Learning environment · Nature contact · Attention · Well-being · Disability · Special needs

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## Introduction

### Learning and well-being in outdoor learning environments

Recent research shows that physical play and well-planned outdoor learning environments are vital to children's brain development (Gill 2014; Morris 2003; Office for Standards in Education 2008; Rickinson et al. 2004). However, only 24% of children in the United States meet the recommended 60 min of physical activity per day. And only 1.7%, 7.5%, and 2.2% of elementary, middle and high schools, respectively, provide physical activity breaks beyond physical education and recess (National Physical Activity Plan 2018). Current societal and educational trends emphasize technology in children's learning, and focus less on learning in the form of play and exploration (Pedretti et al. 2012). These teaching practices contradict what researchers posit about the value of outdoor learning on students' cognitive, emotional, and social development (Dillon et al. 2006; Pedretti et al. 2012). As such, parents and educators may need to make a conscious shift in their teaching practices to allow students the opportunities for experiences in nature (Ambrose and Armstrong 2009; Simonsen et al. 2010).

Environmental design, or the type of environment to which we expose young children, has a tremendous impact on their learning and development, in addition to their well-being (Quay and Seaman 2013; Vanderloo et al. 2013). Although many educators consider an "early learning environment" to be limited to a pre-k (pre-school) or kindergarten (first grade) classroom, the range for early learning spans birth through age eight. Research shows that consideration for children's learning environments should begin as early as the infant and toddler years (Clare 2012). Effective and appropriate environments are those that nurture the young child, providing a place where they can feel safe while forming healthy attachments to the people who care for them (Denton 2008). In addition, caregivers of children at every stage of development, including the early infant and toddler years, should aim towards providing experiences in the outdoor environment (Clare 2012). Frequently there is a great deal of care and consideration towards providing outdoor learning experiences for older children, but less for very young learners (Clare 2012).

Importantly, a growing amount of research reveals how outdoor learning environments have many positive effects on student learning (Downer et al. 2007; Eick 2012; Jacobi-Vessels 2013). A narrative case study by Eick (2012) examined a third grade classroom teacher who was dedicated to enhancing science and literacy concepts through experiences in nature taught in an outdoor classroom. The researcher examined the ways in which the science and literacy curriculum were connected to lessons taught in outdoor settings, and analyzed how the study impacted state test results for meeting Annual Yearly Progress (AYP). Science lessons included studies of plants, protecting the habitat, and creating a butterfly garden. The literacy-based lessons included students' reading and writing about their experiences through non-fiction and a poetry unit on trees. Standardized test scores at the end of third grade showed that 15 of the 16 students involved in learning literacy and science lessons in the outdoor classroom met AYP on the high stakes reading tests.

Outdoor classroom design has also been a focal point of examining student growth and learning. The Department for Education and Skills (2017) in the UK defines a stimulating outdoor environment as one with ample space to play and with

opportunities to be outdoors with freedom to explore and engage in physical activity. Outdoor classrooms often provide a more authentic and engaging environment for play and learning, along with opportunities to integrate content area subjects within outdoor experiences.

In addition to child learning outcomes, children's physical and emotional health and well-being are improved through exposure to outdoor environments (Humberstone and Stan 2012). A well-planned outdoor learning space provides fewer environmental stressors such as noise, crowding, and visual overload (Evans 2006). In addition, outdoor learning classrooms provide an important health-promoting design feature – direct opportunity for nature contact (Bowler et al. 2010; Largo-Wight 2011). Exposure to the outdoors, or nature contact, has been well studied and associated with child well-being and health outcomes (Castonguay and Jutras 2009; Wells 2000; Wells and Evans 2003). A recent study found that young children learning in an outdoor classroom had better attention and focus and less behavioral redirections from the teacher than when learning the same subject in an indoor classroom (Largo-Wight et al. 2018). Another study investigated the impact among elementary and high school children of outdoor recess conducted in a more natural space when compared with time spent outdoors during lessons. This study found that exposure to the outdoors while at school reduced stress, improved social health, and promoted well-being among the children (Chawla et al. 2014).

Teachers may use an outdoor classroom setting to teach children about the importance of taking care of the environment, while at the same time gaining further knowledge of natural resources. Outdoor classrooms also provide opportunities for active, project-based learning (Eick 2012). Examples of outdoor classroom projects include, but are not limited to, spaces for gardening and digging, making bird feeders and bird baths, creating butterfly gardens, building water features, and bird watching areas (Keteyian 2015; Kimbro 2010). In addition to science infused in outdoor classrooms, the area can also include opportunities for movement, such as obstacle courses, places for climbing and concrete pads for games. Other content areas, including music, theater, drama and art easily lend themselves to learning in outdoor settings (Office for Standards in Education 2008). In fact, any content area could potentially lend itself to outdoor learning. Building on psychological and public health findings supporting the benefits of exposure to the outdoors and nature contact for child health, well-being, and attention (Bowler et al. 2010; Largo-Wight 2011; Louv 2008), outdoor learning spaces may be a priority for those focused on child health and learning.

From the research reviewed, findings support the notion that outdoor classrooms are a promising tool for teachers and schools to enhance child learning and well-being. However, research on teacher perceptions of using outdoor classrooms is mixed. Survey research conducted by Ernst (2014) explored the beliefs and practices of 46 early childhood educators from northern Minnesota. Ernst collected data on the teachers' beliefs regarding outdoor learning environments and the barriers they perceived to using outdoor settings successfully in an educational way. A majority of participants agreed that outdoor learning helped children's cognitive, social, and physical development and increased their appreciation of environmental issues. However, the researcher found that even though teachers recognized the importance of outdoor learning experiences, they were reluctant to take their students outside for learning, only accessing learning outdoors about once a month. The barriers teachers

referred to a lack of access to a comfortable and safe outdoor setting, the need for transportation to potential outdoor learning environments, bad weather conditions, and lack of time. These and other barriers express teachers' concerns with performativity, safety and management; and teachers may inadvertently limit students' learning outside because of these concerns (Fritz et al. 2014; Humberstone and Stan 2012).

This study was designed in part to better understand both teacher and child perceptions of an outdoor classroom. Past findings clearly demonstrate that nature contact and outdoor exposure positively impact children and adults (e.g., Largo-Wight 2011, Louv 2008), but it is not yet known what attitudes teachers and children hold related to using outdoor spaces for teaching. Perception and attitudes about the learning environment are important in general and especially as they relate to nature contact. In fact, more positive attitudes and perceptions about nature and time outdoors have been shown to enhance restoration and related outcomes (van den Berg et al. 2003). Therefore, this study sought to better understand teacher and child attitudes and perceptions about using the outdoor classroom.

### **The environment and children with special needs**

To date, few researchers have studied the benefits of the natural environment related to the well-being and development of children with disabilities (Harding et al. 2009; Kuo and Taylor 2004; Taylor et al. 2001, 2002; Taylor and Kuo 2009). Taylor and Kuo (2009) found that children with Attention Deficit Disorder were able to concentrate and follow directions better after having time to walk outdoors in a natural environment when compared with activity conducted in a developed neighborhood or business area. Harding et al. (2009) studied the well-being, health, and development of children with disabilities in various environments. These researchers found that the natural environment, including exposure to plants and animals, was a vital element for children with disabilities, especially when linked to recreational activities in after-school programs. Four of the six children with disabilities involved in this study reported that an outside environment (i.e., park, barnyard) was their first favorite place to be. To date there has not been a preponderance of research conducted and published which focuses on students with disabilities learning in outdoor classrooms. In addition, there is limited data on teacher and child perceptions of their experiences with outdoor classrooms within public schools in the US.

Therefore, this study was conducted to better understand the impact of learning outdoors for children with and without disabilities. Teacher and student attitudes and perceptions about learning outdoors are important to evaluating the potential impact; feeling more positive about learning outdoors is more likely to lead to positive outcomes such as well-being and learning (van den Berg et al. 2003). Therefore, this study was designed to assess the following: (1) teacher attitudes and perceptions of using an outdoor classroom for instruction; and (2) child attitudes and perceptions of using an outdoor classroom.

### **Methods**

A six-week mix-methods study was conducted with two kindergarten teachers and 37 students to determine their perceptions of teaching and learning in a traditional indoor

classroom compared to a newly constructed outdoor classroom. A tuition-free, public elementary charter school located in the southeast region of the United States was chosen as a pilot site for creating an outdoor classroom. Quantitative data was collected through online surveys completed by the teachers and through observations of children. Qualitative data was collected through child interviews, through observations of children, and via some short answer online survey questions. The observations occurred in both the outdoor and indoor learning environments during the literacy block called “LMNOP time,” as well as during recess or “free time.” Institution Review Board (IRB) approval, teacher informed consent, parent informed consent, and child assent was obtained prior to any data collection. Permission to take and share photographs was included in all approvals. All data was de-identified to protect human subjects.

## Participants

Two kindergarten teachers, Ms. Herb and Ms. Orange (pseudonyms), granted informed consent to participate in the study. Ms. Herb and Ms. Orange held Bachelor’s degrees in early childhood education (preschool through third grade) with reading and English Speakers of Other Languages (ESOL) endorsements. Both teachers were first year teachers at the school where the intervention took place. Ms. Herb taught an inclusion class with 18 students (9 boys, 9 girls); two of the children were identified as having special needs. One child was diagnosed with autism and the other child had a language impairment requiring outside speech services. Ms. Orange also had an inclusion class with a total of 19 students (11 boys, 8 girls). Three of the children in the study were diagnosed with special needs; two students with language impairments receiving speech services and one child with an “other health impairment”.

## Background and procedures

The authors of this article were awarded grant money from the Environmental Center at their affiliated university to build an outdoor classroom at the public school. After obtaining Institutional Review Board (IRB) approval, the first step was to meet with the school administrator and the teachers to ascertain what they considered necessary components of an “outdoor classroom.” During this meeting, the teachers expressed concern with seating and shade. The administrator was concerned that neither the students nor the teachers lose learning time as a result of the outdoor classroom. Therefore, the authors worked to create an outdoor classroom that met the needs of all stakeholders: the children, the teachers, and the administrator. In addition, the design of the outdoor classroom was grounded in past findings on the importance of nature contact (e.g., Dillon et al. 2006; Pedretti et al. 2012; Largo-Wight 2011). The outdoor classroom consisted of: student learning materials (such as student notebooks, books, and writing utensils), teacher tools (such as a chalkboard, chalks, file for materials) seating for children (16 X 16 in. carpet squares for seating), a shed adjacent to the outdoor classroom to contain learning materials, carpet squares, and teacher tools, several tents for shade, and landscaping materials (such as mulch, tree stumps for seating and design feature, large potted plants to surround space). Table 1 compares the major features of the outdoor classroom with that of the traditional indoor classroom at this school.

**Table 1** Features of the outdoor classroom compared to the traditional indoor classroom

Classroom features	Outdoor	Indoor
Seating	Tree stumps or carpet squares	Benches
Desks	Clipboards	Tables
Blackboard/Whiteboard	Easel with clips for paper/books	Blackboard with chalk
Barriers/Partitions	Half buried tires in a half-circle and large pots with flowers, herbs, and trees completing the circle	Defined rug space
Lighting	Natural lighting with tents and canopies for shading	Sheer curtains to control outside lighting and glare within classroom
Centers	Basket of books, basket of supplies (pencils, paper, cards), play materials (ruler, yam)	Blocks, housekeeping center, science center with pets
Personal Space	Carpet square with personalized pouch of writing supplies	Hooks and cubbies

An important aspect of creating the outdoor classroom was not only gathering input from the teachers, administrator, and past findings (e.g., Largo-Wight et al. 2018; Louv 2008), but also obtaining assistance from the children and families. Families helped transport materials from the University to the school and helped to create the outdoor classroom. In addition, students and parents worked with University researchers over the course of approximately 4 hours to develop the outdoor classroom. All the stakeholders worked to rake the grounds, spread mulch to cover the outdoor classroom's ground, and planted the pots surrounding the outdoor classroom. Parents also helped organize the learning materials in the outdoor classroom shed adjacent to the outdoor classroom. Figure 1 includes photos of the outdoor classroom compared with the traditional indoor classroom.

### Data collection

Researcher observations of the children were an important part of data collection. After establishing the outdoor classroom, teachers and researchers determined that the best time to gather observational data in both the outdoor and indoor learning environments would be during the literacy block called “LMNOP time” as well as during recess or “free time.” LMNOP time was when the teachers guided the students through a writing lesson. The children were required to copy text from the teacher's board to their journals. After copying, they were then given free time to elaborate on the topic, through writing or drawing or both, in their journals.

Observational data including student counts and qualitative notes that were collected in both classroom environments for both teachers over the six-week study period. The student counts calculated over a 10-min observation period, where each minute was divided into two 30-s intervals. Per interval, the observer would record the number of male versus female students who were not engaged in the lesson. Per each minute interval, the observer would also note the number of times the teacher would redirect any student back to the lesson.



Ms. Herb's Indoor Classroom



Foliage and Shade Protect the Outside Classroom Area



Ms. Orange's Indoor Classroom



Setting-up the Outdoor Classroom



Children in Outdoor classroom during LMNOP lesson

**Fig. 1** Photos of indoor and outdoor classrooms

At the end of the six-week observational period, Ms. Herb and Ms. Orange were emailed a link to an online survey they could anonymously complete in privacy and on their own time. Of the questions asked, 11 pertained to the teachers' perceptions of the outdoor classroom compared to the indoor classroom. Each question had five response options using a Likert scale: much worse (1), somewhat worse (2), no difference (3), somewhat better (4), much better (5). Questions asked included: (1) How worthwhile/beneficial was using the outdoor classroom during LMNOP compared to the indoor classroom?; (2) In general, how did children focus on the lesson/activity in the outdoor classroom compared to indoor classroom during LMNOP?; (3) In general, how did children follow directions in the outdoor classroom compared to

indoor classroom during LMNOP?; (4) In general, how did children interact with their peers in the outdoor classroom compared to indoor classroom during LMNOP?; (5) In general, how was quantity of child work in the outdoor classroom compared to indoor classroom?; and (6) In general, how was quality of child work in the outdoor classroom compared to indoor classroom? The survey also included an opportunity for teachers to comment, providing additional qualitative data, via a small number of open-ended questions, such as, “Please explain how the outdoor classroom impacted the children’s learning and creativity.”

At the end of the six-week observation period, 13 of the 37 children (9 boys, 4 girls) were randomly selected to participate in an informal interview conducted in the outdoor classroom. All but one child agreed to complete the interview, with consent to be involved previously obtained from parents. The invitation to participate in the interview involved reading the following IRB approved statement and circling the child’s response of yes or no: “Hi, my name is [researcher]. I am a researcher at the University. I am studying how children learn in different places, like inside and outside, or in a library or at home. I would like to ask you a few questions about how you feel about your inside classroom and the outside classroom. This will take about five minutes, but you can stop at any time. Also, you do not have to answer all the questions or any question that you don’t want to answer. You won’t get in any trouble if you don’t want to answer any questions. Do you want to work with me for a few minutes?” The interview included six questions: (1) Do you like working in your inside classroom? Why?; (2) What is your favorite part of the inside classroom?; (3) Do you like working in your inside classroom? Why?; (4) What is your favorite part of the outside classroom?; (5) Which classroom do you like better? Why?; (6) If you could work in one classroom all day, which classroom would it be? Why? Each child was interviewed individually. Questions were rephrased if the child had difficulty understanding the language used, with each child given as much time as required to answer each question.

## Data analysis

Qualitative and quantitative data from teacher survey results, student interview responses, and researcher observation field notes were analyzed for common themes. Because there were only two teacher participants and 13 child participants, the researchers were able to discuss and review the open-ended response data to analyze exact phrases pertaining to teacher and students’ perceptions of the outdoor versus indoor classrooms. Likert score responses from the teacher survey ranged from 1 “much worse” to 5 “much better”, and were reported as ordinal data, because the distance between these responses is not considered equidistant (Sullivan and Artino 2013). However, Likert scale responses provided a sufficient understanding of the teachers’ perception of the indoor versus outdoor classroom. Field notes were also reviewed for data pertaining to children with and without special needs. These notes were compared with the common themes from open-ended responses by both the children and teachers. Because the sample size was small, and only a select number of survey responses were used to determine teacher and student perceptions, the researchers did not use a factor analysis (i.e., Cronbach alpha or Cohen’s Kappa test) to calculate reliability or correlation of the survey and interview items.



## Results

### Teachers' perceptions

Both teachers anonymously reported positive perceptions of the outdoor classroom, from the perspective of both their teaching and the children's learning. For example, the results of the surveys and interviews demonstrated that both teachers enjoyed teaching LMNOP more when in the outdoor classroom *and* that the children seemed to enjoy learning LMNOP more in the outdoor setting. Both teachers also rated using the outdoor classroom during LMNOP as "usually worthwhile and beneficial". Although teachers reported that there was no difference in the quantity of work the children completed, they both perceived the creativity of the children's work, an indicator of quality of work, as "somewhat better" in the outdoor classroom. One teacher noted that although the outdoor classroom was sometimes distracting, she thought it "a beautiful environment and good for learning and creativity...".

The two teachers had minor differences in their perception of interaction with peers, learning, and quality of children's work. While one teacher perceived interactions with peers during LMNOP time as "somewhat better" (Likert option 4 of 5), the other teacher perceived "no difference" (Likert option 3 of 5) between interactions in the outdoor versus indoor classrooms. This was also true for the teachers' overall perception of child learning in the two environments. One teacher thought that "somewhat better" (Likert option 4 of 5) learning was taking place in the outdoor classroom, while the other teacher saw "no difference" (Likert option 3 of 5) at all. Finally, one teacher perceived the children's work to be "somewhat better" (Likert option 4 of 5) in quality when completed in the outdoor classroom; while the other teacher saw no difference.

One teacher noted that children focused "somewhat better" (Likert option 4 of 5) on the lesson/activity when in the outdoor classroom than the indoor classroom, especially when teaching LMNOP. This teacher also noted that there was no difference (Likert option 3 of 5) when children were asked to follow directions in the indoor versus outdoor classrooms. Overall, both teachers loved "being outside and teaching outside." They agreed that the concept of the outdoor classroom was "great." As one teacher noted, "I thought it was a good change of pace; it is always good to be outside in fresh air."

### Children's perceptions

Of the 12 children who completed the interview, six children reported they liked the outdoor classroom better than the inside classroom. Three of the remaining six children answered "both" when asked which classroom they liked better. If given the choice to learn in the indoor versus outdoor classroom all day, eight of the children would prefer to learn in the outdoor classroom. When asked "why?", the children responded that the outdoor classroom was "better" and "funner" because of the "fresh air," "plants," "carpet squares," and "new mulch." Four children stated that they liked the indoor classroom better because it was always "shady" and not hot. One child reported that the centers (i.e., area of the classroom designated for playing blocks, make-believe house, library with reading books, creative art with supplies) in the indoor classroom made it his favorite place. Yet when given the opportunity to choose one of the classrooms to learn in all-day, two of the four children chose the outdoor classroom.

The children were asked about the use of the outdoor classroom during their free time recess. Eleven of the children reported that they “played” in the outdoor classroom during recess. They played with the drawing materials and/or reading books. More children stated that they preferred reading the books in the outdoor classroom, when given the opportunity to access the classroom during their recess period.

Children with special needs in this study had similar responses as those children without special needs. One of the children with special needs reported that their favorite part of the outdoor classroom was, “coloring in the whole wide world and drawing the bees and birds.” Another child with special needs reported that he would work in the outdoor classroom all day “because of the journals.” These same children typically displayed off-task behaviors in the indoor classroom.

### Observational records

Observational records of the children were recorded over the course of the six-week study. These showed (quotes are excerpts from notes taken during observations) that the children with disabilities were “often distracted” and received “numerous redirects for behaviors such as out of seat, talking off topic, throwing objects, and/or refusing to work,” when working indoors. “However, when the lesson took place outside, these children were more engaged and focused” and “off-task behaviors occurred less often.” When children had recess or “free time,” one of the girls with a disability “spent most of her time in the outdoor classroom space looking at books.” The boys with disabilities were found using the space when “sitting and talking with the teacher’s aide.”

### Discussion

Similar to previous research, this study revealed that providing teachers and students with an opportunity to learn in an outdoor classroom offered a number of benefits. Children learn best when they are engaged and interact with others within the physical and social environment (Quay and Seaman 2013; Vanderloo et al. 2013). By providing opportunities to engage in an outdoor environment, teachers can give their students a chance to increase their nature contact; this provides a healthy exposure that has been shown to foster child development and increase learning and well-being (Downer et al. 2007; Eick 2012; Jacobi-Vessels 2013; Largo-Wight et al. 2018; Rickinson et al. 2004). The findings of this study suggest that students like the opportunity to learn in an outdoor classroom. In other words, teachers and students reported positive perceptions of learning in the outdoor space.

Children with identified special needs reported similar positive perceptions of learning in the outdoor classroom as the children without disabilities; the children in this study “liked” the outdoor classroom. In addition, the researcher observational records indicated that children with special needs, in particular, were more behaviorally engaged in the outdoor classroom than the indoor classroom. These findings suggest that children liked the outdoor classroom, but children with special needs displayed notable changes in behavior in the outdoor classroom and perhaps especially benefited from this exposure to the outdoors.

## Limitations

There are important limitations to these findings and the points raised as a consequence. First, the sample size was small, meaning that the results of this study cannot be generalized. Moreover, the two teachers were first year teachers at this school and management or other related issues may have impacted the effectiveness of the learning environment. Although there were several sources of data including teacher surveys, interviews with children, and observational records, further data that engages teacher perceptions of specific children or children with special needs would have better supported the aims of the study. Finally, because the study occurred in a real-world setting, the data collection plans had to be adjusted at times for testing, rain or bad weather, and regular events such as fire drills.

## Future research

In order to better understand the effects of an outdoor classroom on child and teacher well-being, social and emotional development, and academic outcomes, more research is needed. The findings from this study suggest that children with special needs may benefit from exposure to the outdoors. Future research should focus on environmental preferences as well as well-being and learning outcomes. The challenges with this type of research will inevitably be the vast number of variables in play and the difficulties of assessing perceptions of children and teachers, especially when comparing across sites.

## Conclusion

The findings of this study suggest that teachers and students positively perceived learning in an outdoor classroom, and that children preferred and enjoyed the opportunity to learn in an outdoor classroom. In addition, it should be noted that children with identified special needs reported similarly positive perceptions of learning in the outdoor classroom as other children. Observational records also showed that children with special needs, in particular, were more behaviorally engaged in the outdoor classroom than the indoor classroom. These findings suggest that while young children aged five to six liked the outdoor classroom, children with special needs displayed notable positive changes in behavior in the outdoor classroom. Future research could help to explicitly address how and why children with special needs may benefit from exposure to an outdoor classroom.

It has been argued extensively that exposure to the outdoors is important for healthy child development and for the well-being of teachers and students alike. If providing access to an outdoor classroom is not an option, seeking areas within an outdoor school yard that are conducive to learning, even if only for short periods of time, could provide benefits. The research evidence is continually building, supportive of the understanding that time outdoors can increase students' and teachers' well-being and positively impact learning (Downer et al. 2007; Eick 2012; Jacobi-Vessels 2013; Largo-Wight et al. 2018; Rickinson et al. 2004). The experiences of teachers and students shared through this study point to the satisfaction associated with exposure to the outdoors during the school day.

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## Compliance with ethical standards

**Conflict of interest** On behalf of all authors, the corresponding author states that there is no conflict of interest.

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