ACCESS TO AN OUTDOOR CLASSROOM AND CHANGES IN CLASSROOM ENVIRONMENT: ELEMENTARY SCHOOL TEACHERS' PERSPECTIVES

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Abstract: The current climate of education is focused on student outcomes. Outdoor and Environmental Education have been shown to positively impact academic achievement, classroom environment and culture, as well as increased engagement and motivation (Desmond, Grieshop & Subramaniam, 2002; Lieberman & Hoody, 1998; Volk & Cheak, 2003). The purpose of this study is to investigate the relationship between access to an outdoor classroom and changes in classroom environment. Teachers from two elementary schools in a moderately small community in Oklahoma completed the Teacher Version of the My Class Inventory – Short Form (Sink & Spencer, 2007) once in the September and again in February. Teachers at the treatment school had access to an outdoor classroom and teachers at the comparison school did not. Due to demographic differences between the two schools, first, pre-test differences were analyzed using a Mann Whitney U. There were no statistically significant differences in pre-test scores on the scales of competitiveness, difficulty, or peer relations between the treatment and comparison schools. There was a statistically significant difference in pre-test scores of satisfaction; however, this statistical difference was no longer present among the post-test scores. Based on the literature that shows outdoor education can be related to positive changes in classroom environment and student academic achievement, this change in satisfaction scores could be attributed to access to an outdoor classroom (Desmond, Grieshop & Subramaniam, 2002; Glenn, 2000; Lieberman & Hoody, 1998; Volk & Cheak, 2003). There were no statistically significant differences in post-test scores on competitiveness, difficulty, or peer relations. However, descriptive data illustrates a larger picture of the use and benefits of the outdoor classroom at the treatment school, further supporting previous literature about the impact of outdoor education and environmental education. This study paves the way for future research on the relationship between outdoor education and the indoor classroom environment.

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CHAPTER ONE

INTRODUCTION

The value and benefits of outdoor and experiential education have been pondered and examined for nearly as long as scholars have been attempting to make sense of human development. From Aristotle, Plato and Socrates, to Piaget, Erikson, Caillois and Huizinga, to Dewey, Kolb, Hungerford, Hahn and Petzoldt, there is a rich history of philosophers, sociologists, educators, and practitioners who have added to the body of knowledge about how humans play, how humans learn, and how those two foundations of human development overlap (Caillois, 1958/2001; Godbey, 2008; Huizinga, 1949; Ibrahim & Cordes, 2008; Martin, Cashel, Wagstaff, & Breunig, 2006; McLean & Hurd, 2012). However, scholars have said there is a divide between the traditional education setting and outdoor education (Lieberman & Hoody, 1998).

Additionally, children are spending less time outside, outdoor spaces for children are diminishing, and the outdoors are losing the competition with air conditioning and electronic devices (Moore, 1997). Furthermore, as expectations of assessment and ineffective applications of standardized teaching and learning are becoming more prevalent in our schools, teachers are searching for better ways to meet the needs of their students. Parents, community members, and others invested in the success of children are trying to fill the gap left by changes at school, changes in the culture of family and home life, and increases in electronic media (Louv, 2008). Luckily, there is a healthy

foundation of research and literature from which to draw in order to develop programs and curricula to face this challenge using evidence-based practices.

Statement of the Problem

It is easy to reflect back to a time when children and many adults spent most of their time outside. The reality is that the migration from outside to inside has been happening since the industrial revolution. First, jobs moved inside, now recreation and leisure are following suit. For children, the problem with this transition is threefold:

1. Diminishing time outside reduces opportunities for healthy exercise and motor development (Fjørtoft, 2001).
2. Early life experiences lead to environmental behavior later in life. Children are missing the experiences that make them future stewards for our planet (Ewert, Place, & Sibthorp (2005).
3. Time spent outside or views of the outdoors are restorative for a variety of ages. Access to the outdoors makes more attentive students and better learners (Berto, 2005; Dutt, 2012; Tennessen & Cimprich, 1995).

Attention has been drawn to outdoor education through *Last Child In the Woods* (Louv, 2008) and the No Child Left Inside movement and there is pressure to find ways to help children reconnect (or to connect in the first place) with nature. However, there is an evident gap in the literature as traditional education settings and outdoor education settings tend to remain separate. Extensive literature exists about the benefits of outdoor experiences on people of various ages in terms of health and fitness (American Academy of Pediatrics, 2007; Fjørtoft, 2001) as well as education and development (American Academy of Pediatrics, 2007; Berto, 2005; Dutt, 2012; Fatai, Faqih, & Bustan, 2014;

Tennessen & Cimprich, 1995). Environmental education and outdoor education have been shown to have outcomes related to positive changes in school environment and culture, (Desmond, Grieshop & Subramaniam, 2002) especially in terms of increased motivation and engagement as well as decreases in discipline problems (Glen, 2000; Lieberman & Hoody, 1998). A few studies have focused on how outdoor and environmental education are particularly impactful with at-risk students and students from diverse backgrounds (Glen, 2000; Lieberman & Hoody, 1998; Volk & Cheak, 2003). These same studies have also shown positive relationships between outdoor and environmental education and academic achievements not just limited to science, but across several disciplines (Desmond, Grieshop & Subramaniam, 2002; Eick, 2012; Glen, 2000; Lieberman & Hoody, 1998; Volk & Cheak, 2003). Similarly, there is literature about how the classroom environment impacts academic achievement (Alexander, Entwisle, & Dauber, 1993; Hoge & Luce, 1979). The problem and focus of this study is how access to an outdoor classroom impacts indoor classroom environment.

Purpose of the Study

The purpose of this study is to understand better the relationship between access to an outdoor classroom and changes in classroom environment. More specifically, this study focuses on the differences in classroom environment dimensions of competitiveness, difficulty, peer relations and satisfaction between classes at schools who have access to an outdoor classroom and schools who do not. This study will address four primary research questions:

- *Research Question 1:* Is there a difference in classroom competitiveness between classes who have access to an outdoor classroom and those who do not?
- *Research Question 2:* Is there a difference in classroom difficulty between classes who have access to an outdoor classroom and those who do not?
- *Research Question* 3: Is there a difference in classroom peer relations between classes who have access to an outdoor classroom and those who do not?
- *Research Question 4:* Is there a difference in classroom satisfaction between classes who have access to an outdoor classroom and those who do not?

Definition of Terms

The following terms will be used for the purposes of this study. The operational definitions for these terms in the context of this study are as follows:

- *Elementary School* – traditional school grades including pre-kindergarten through fifth grade.
- *Environmental Education* – "education about the total environment, including population growth, pollution, resource use and misuse, urban and rural planning, and modern technology with its demands upon natural resources" (Ford, 1986, p. 6).
- *Grade-level Teacher* – school teachers assigned to teach single grades. This term is used in the context of this study to distinguish from other teachers that have more than one class (e.g. physical education teachers, music teachers, media arts teachers, etc.).

- *Outdoor Classroom* – an outdoor setting used for structured or unstructured learning. Generally this is a designated space used outside the purposes of a playground or recess.
- *Classroom Environment* – For the purposes of this study, the classroom environment is from the perspective of the teacher. It is made up of four dimensions:
    - *Competitiveness* – "the level of perceived classroom rivalry" (Sink & Spencer, 2007, p. 132).
    - *Difficulty* – "the level of educational challenge presented to the students" (Sink & Spencer, 2007, p. 132).
    - *Peer Relations* – the level of cohesion and absence of friction among students.
    - *Satisfaction* – "the level to which students experience satisfaction (or like) in their class" (Sink & Spencer, 2007, p. 132).

SIGNIFICANCE OF THE STUDY

In 1990 Hungerford and Volk wrote, "The ultimate aim of education is shaping human behavior. Societies throughout the world establish educational systems in order to develop citizens who will behave in desirable ways" (p. 257). The outcomes of this study could bridge the gap between outdoor education and traditional education settings. With a better understanding of the ways outdoor education enhances traditional education in terms of indoor classroom environments, researchers and practitioners can find better ways to synthesize their approaches to meet their common goals of developing critically thinking, informed citizens.

Additionally, this study adds to the bodies of knowledge about teachers' perceptions of classroom environment and outdoor classrooms. It can be expected that classroom environment would change over the course of an academic year, but every classroom and population is different. The majority of the literature utilizing the My Class Inventory (Fraser, Anderson, & Walberg, 1982; Sink & Spencer, 2007) addresses differences between teacher and student perspectives or differences between environment preferences and actual perceptions. However, Fraser, Anderson, & Walberg (1982) suggest that measurement of classroom environment could be used to evaluate the effectiveness of educational innovations, specific teaching approaches, and differences in curricula. This study provides insight into changes in the classroom environments of two elementary classrooms from the teachers' perspectives. Finally, this study provides a better understanding of how often the teachers from this sample are utilizing the outdoor classroom, how the use differs between grade level role, and how the teachers are using the outdoor classroom.

ASSUMPTIONS

1. This study relies on the self-reports of teachers and assumes that they are able to remember honestly and accurately.
2. Teachers participated willingly and did not feel coerced in any way to participate or answer in any particular way.
3. Teachers who have access to the outdoor classroom utilized it with their students.

LIMITATIONS

The following limitations have been identified for the scope of this study:

1. The primary foreseeable limitation of this study is the demographic differences between the treatment and comparison schools. As this study utilizes sites within Stillwater Public Schools, district administrators were involved in some elements of the research design. One such element was the selection of a comparison school. District administrators selected the comparison school based on their criteria for research participation within the district. Although the treatment and comparison schools are demographically different, the comparison school does not have an outdoor classroom and can still serve many of the roles of a control group. This is discussed further in Chapter Three.
2. The timeline of this study was created based on the academic calendar of the elementary schools and the researcher and in order to meet commitments made to the treatment school before the end of their 2015 school year. Thus, the research was limited by school calendar, required standardized examinations, and expectations placed upon teachers to meet particular testing schedules.
3. Teachers cannot be required to utilize the outdoor classroom, so there are differences present in the treatment sample related to how and how often teachers use the outdoor classroom.

STATEMENT OF THE HYPOTHESES

A review of the literature reveals that there is a beneficial relationship between access to the outdoors or views of nature and attention capacity and academic achievement (Berto, 2005; Dutt, 2012; Tennessen and Cimprich, 1995). Additionally,

literature shows a positive relationship between desirable classroom behavior, academic achievements, and engagement and motivation and outdoor or environmental education (Desmond, Grieshop & Subramaniam, 2002; Eick, 2012; Glen, 2000; Lieberman & Hoody, 1998; Volk & Cheak, 2003). Furthermore, desirable classroom behavior and classroom environments have been shown to have a positive relationship with student academic achievement (Alexander, Entwisle, & Dauber, 1993; Hoge and Luce, 1979). Consequently, the focus of this study is on the relationship between access to an outdoor classroom and changes in indoor classroom environment.

The selected alpha level for this study is $p < .05$. The following are four hypotheses, one for each of the aforementioned research questions:

- *Hypothesis 1:* There is no difference in the distributions of post-test classroom competitiveness scores between classes who have access to an outdoor classroom and those who do not.
- *Hypothesis 2:* There is no difference in the distributions of post-test classroom difficulty scores between classes who have access to an outdoor classroom and those who do not.
- *Hypothesis 3:* There is no difference in the distributions of post-test classroom peer relations scores between classes who have access to an outdoor classroom and those who do not.
- *Hypothesis 4:* There is no difference in the distributions of post-test classroom satisfaction scores between classes who have access to an outdoor classroom and those who do not.

CHAPTER TWO

REVIEW OF THE LITERATURE

The purpose of this study is to investigate the relationship between the indoor classroom environment and student access to an outdoor classroom. This literature review examines previous studies and work related to human development, outdoor education, and classroom environment while attempting to clarify the gap in literature related to outdoor classrooms and indoor classroom environment.

First, this literature review begins with a review of human development, providing a context within which a discussion can occur about education of primary school students. Literature about human development is vast and varied. This review will focus on the theories and foundations that inform the field of outdoor and experiential education. Second, this literature review will address outdoor education, its related fields (e.g. science education, environmental education, and experiential education) and terminology. Third, this review includes an examination of previous studies of classroom environment and the tools of measurement used, most specifically the My Class Inventory (Fraser, Anderson, and Walberg, 1982). Finally, the summary will address how these fields of study overlap and are related to the purpose of this research.

Human Growth and Development

Human growth and development has been the subject of investigation and discussion for centuries. Greek and Roman philosophers proposed theories of how

humans learned and developed. Early philosophers such as Plato and Aristotle believed that play served an important role in the process of learning (McLean & Hurd, 2012). Although play itself went through stages of being viewed as a social threat, philosophers like Rousseau, Piaget, and Erikson continued to make the case for the importance of play in learning and development among humans (McLean & Hurd, 2012). Still others simply sought to define and explain play on a basic level (Godbey, 2008).

Two important voices in the definition of play are Johan Huizinga and Roger Caillois (Godbey, 2008). Huizinga sought to describe the character or spirit of play and in turn provided some of the classic characteristics used to define play. Huizinga presented play as "free activity standing quite consciously outside 'ordinary' life as being 'not serious', but at the same time absorbing the player intensely and utterly" (Huizinga, 1949, p. 13). He went on to say that play had its own boundaries of time and space, and it was inherently orderly with fixed rules. He stressed that play was not connected to material profits or interests. Finally, Huizinga suggested that play promoted the formation of social groups and that those groups often attempted to distance themselves from the "common world" using means of secrecy, such as disguises (Huizinga, 1949).

Caillois (1958/2001) responded to Huizinga, complementing some aspects of his work, but disagreeing with others. Specifically, Caillois argues that play, by its very nature, puts its players and their instruments on display. More specifically, Caillois suggests play removes mystery rather than creating secrecy. Also, Caillois (1958/2001) contends that the exclusion of material interest and profit omits games of chance, which he considers to be a noteworthy component of play in our culture (or their culture at the time). While Caillois acknowledges that Huizinga added to the field while describing the

nature of play, he challenges that there would be additional value in describing and classifying play. He proposes four categories of play based on whether the dominant element is competition (Agon), chance (Alea), simulation (Mimicry), or vertigo (Illinx) (Caillois, 1958/2001, p.12). While each of these elements comprise the overarching domain of play, Caillois does not argue that they necessarily occur in isolation. Caillois (1958/2001) provides an example of the way multiple elements can be associated with one another using a horse race. For the jockeys, the race is Agon: simply a competition. Simultaneously, the spectators have an opportunity for Mimicry and Alea through the spectacle they are watching and the opportunity for placing bets (p.72).

While some philosophers and sociologists approached play as a way to better understand and explain our culture, others continued to investigate the role that play had in our development as humans. Piaget viewed development as occurring through assimilation and accommodation. Assimilation is the way in which children take in information through external stimuli. Accommodation is the concept of how children adjust or accommodate as they incorporate the new information into their life (McLean & Hurd, 2012; Leitner & Leitner, 2012). Piaget described play as an opportunity for assimilation to occur as children reproduced their experiences in order to digest and understand them (McLean & Hurd, 2012).

In the field of psychoanalysis, the original play theory was based on the "cathartic" theory from Aristotle, wherein children used play to reconcile past frustrations and pent up emotions (Erikson & Erikson, 1998). Another explanation within the field of psychoanalysis was that children used play to practice mastery or efficacy over their toys in order to imagine mastering some alternate real life challenge (Erikson & Erikson,

1998). Erikson conceptualized play from a developmental standpoint, theorizing that play begins in the *autosphere* (play through sensations of the body) then moves into the *microsphere* (play with toys) and finally develops into the *macrosphere* (play with others). At any point, anxiety or challenge can result in a play disruption and send the child back to a previous stage of play (Erikson & Erikson, 1998). The Eriksons' (1998) developmental approach to play provides an excellent example of how human development, play, and outdoor education are connected. They write:

> Play, then, is a good example of the way in which every major trend of epigenetic development continues to expand and develop throughout life. For the ritualizing power of play is the infantile form of the human ability to deal with experience by creating model situations and to master reality by experiment and planning. It is in crucial phases of his work that the adult, too, "plays" with past experience and anticipated tasks, beginning with that activity in the autosphere called thinking. (Erikson & Erikson, 1998, p.51).

In short, many theories suggest that children learn by interacting with their environment. If their environment provides limited experiences, a child's development could be affected. One goal of this study is to investigate the ways in which children are impacted by the various possibilities of experiences associated with access to an outdoor classroom.

Leisure, Play and Children in the 21st Century

With legislation like the *No Child Left Behind Act* of 2001 (No Child Left Behind [NCLB], 2003) and the policies associated with it, schools are under pressure to meet standards, assess their students, and be more accountable for the learning that takes place

at school. Presumably as a result of this shift in public policy as well as changes in the social landscape (especially in urban areas), popular public figures such as Richard Louv have drawn attention to a decrease in the time children spend outside. Louv's (2008) national bestselling book, *Last Child in the Woods* brought to light issues related to reasons children are not playing outside anymore, his concept of nature deficit disorder and how a lack of connection to nature leads to problems indoors and, finally, ways to reconnect our children with nature. While Louv's assertions certainly brought public interest in the matter to a new level, it is slightly anecdotal. However, he provided several ideas and opportunities for research related to children and their natural (outdoor) environment.

Researchers have worked to explain the phenomena that were eventually popularized by Richard Louv. In 1997, Robin C. Moore conducted review of the literature to organize the current literature on the subject. Moore (1997) lists eight barriers to children's outdoor opportunities: traffic dangers, the Boogey Man Syndrome, lack of play space, curtailment of children's playtime, changing family relations, electronic media, air conditioning, and the commercialization of play. Traffic dangers refers to the fact that the density of traffic, even on smaller arterial streets, has increased and thus diminished the amount of play space for children (p. 204). The Boogey Man Syndrome is actually a term that was introduced originally by Richard Louv in 1990 and suggests that parents have become increasingly afraid of "children being abducted, kidnapped, or physically harmed when playing outdoors" (Moore, 1997, p. 204). Moore acknowledges that there are few empirical studies to back up this claim, but makes a few suggestions for further investigation of the Boogey Man Syndrome. The lack of play

space speaks to the expansion of commercial buildings and private residences, limiting space and opportunities for children to play. Even in 1997, Moore was addressing the issue of limited playtime due to more tightly structured activities for children. That, along with electronic media options, only seems to have increased since then.

While some research shows that structured activities are related to positive youth development (Ramey & Rose-Krasnor, 2011) and positive academic outcomes (Eccles, Barber, Stone & Hunt, 2003), other researchers ascertain that there must be a balance between structured and unstructured activities. Fatai, Faqih, and Bustan, (2014) found that unstructured play allowed for experience in cooperation as well as learning through trial and error and imitation. A 2007 report from the American Academy of Pediatrics reinforces that play is important for a child's physical, cognitive, and emotional development. Furthermore, there has to be a balance between academic enrichment and opportunities for play and that equilibrium is the responsibility of families, communities, and schools to provide those opportunities (American Academy of Pediatrics, 2007).

While play may have previously been thought to be in opposition to the learning that occurs at school, play is now securely considered an important part of the learning process, wherever learning occurs. The National PTA released a resolution on recess, not only supporting daily recess for all students, but also opposing the practice of denying recess to a student for disciplinary purposes (National PTA, n.d.). In their resolution, they cite positive benefits associated with physical activity and recess such as socialization, better physical and mental health, higher academic achievement, and better classroom behavior. The National PTA also specifies that unstructured play should not replace

structured physical activities for the purposes of skill development, again highlighting the need for a balanced approach.

The question for today's researchers and practitioners is: where is the balance? How can structured activities and unstructured activities complement each other in a manner that optimizes learning for students of all ages?

Outdoor Education

Outdoor education, environmental education, and experiential education are three fields that attempt to address the balance between structured activity and unstructured activity, mostly by allowing some unstructured hands-on exploration interwoven in structured activities. Adkins and Simmons (2002) attempted to distinguish the three related, but independent fields:

> Outdoor education is a direct antecedent of environmental education but can include other subject matter than learning about the environment. Experiential education often employs outdoor settings but can take place anywhere individuals learn by doing. Environmental education can take place outdoors using experiential approaches or indoors using a standard textbook. (Adkins & Simmons, 2002, pg. 5)

Similarly, Ibrahim and Cordes (2008) describe outdoor education as "a technique to encourage direct learning experiences that enrich the curriculum" (p.229). Ibrahim and Cordes (2008) continue to explain that outdoor education covers a range of disciplines (e.g. language arts, science, music, math, etc.), a range of time commitments (e.g. minutes, days, weeks, etc.), and a range of teaching methods (cognitive, psychomotor, and affective aspects of learning). George Donaldson coined the most common definition

of outdoor education in 1950. Donaldson describes outdoor education as "education in, about, and for the out-of-doors" (Ibrahim & Cordes, 2008, p. 229). There are several other terms and fields related to outdoor education, several of which are relevant to this study. Ibrahim and Cordes (2008) provide several definitions from the Council on Outdoor Education in 1989:

- Environmental Education – education about the total environment, perhaps distinguishable from outdoor education by encompassing more than just natural resources.
- Resident Outdoor School – is an outdoor education experience that involves taking children to a residential camp to "extend the curriculum through learning in the outdoors" (p. 331).
- Outdoor Recreation – a wide-ranging group of outdoor activities performed during leisure time for their intrinsic value to the participants.
- Adventure Education – activities that are purposefully built to provide a sense of perceived risk to the participant. Challenge or ropes courses are an excellent example of adventure education.
- Experiential Education – learning through experience, perhaps distinguishable from outdoor education because experiential education can occur either inside or outside. Experiential education may include things like outdoor or adventure education, but is not limited to those kinds of experiences.

An additional field related to this study is science education. This term generally refers to education about the field of science and is reserved by some for describing a

traditional school setting, but the term can include elements of outdoor and experiential education. While these fields share several similarities and often benefit each other, their subtle differences are important when talking about context and content.

The history of outdoor education specifically is difficult to discern, as the idea of distinguishing between indoor and outdoor education is fairly new. Some might argue that Socrates and Plato were the original outdoor educators (Ibrahim & Cordes, 2008). Others have credited John Amos Comenius of the 17th century with the basis for modern outdoor education. Some scholars trace the history of outdoor education through the Round Hill School "outing trips" in the 1800s, or even British and German outdoor schools in the 1920s and 1930s (Ibrahim & Cordes, 2008). The Round Hill School is acknowledged as a significant chapter in America's history of outdoor education as its curriculum included physical education and outdoor activities at least two hours every day (Ibrahim & Cordes, 2008). Outside of the traditional school setting, the scouting movement, as well as the Outward Bound School, also played early roles in outdoor education in America.

Martin, Cashel, Wagstaff, and Breunig (2006) describe the development of the Outward Bound Movement while explaining the history of outdoor leadership. During World War II, a British shipping tycoon named Laurence Holt noticed that when shipwrecked, the newer seamen with less experience with the harshness of the sea did not persist as well as their seasoned sailor counterparts. Kurt Hahn, the founder of Outward Bound, "concluded that it was a lack of confidence rather than a lack of skill that made the difference" (Ibrahim & Cordes, 2008, p. 348). Hahn reportedly provided the idea that Holt utilize a sea school of sorts, so younger seamen could experience physical

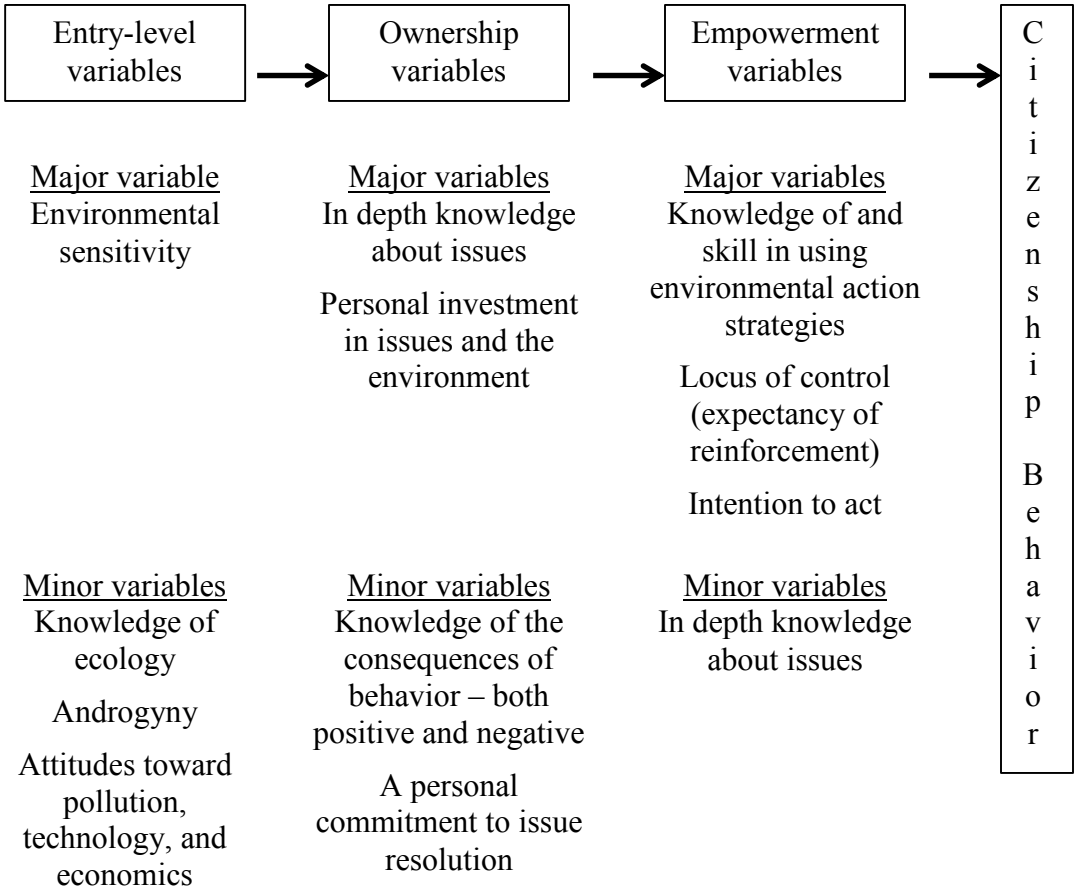
challenges and survival situations prior to facing them when the consequences were more severe. Hahn expected that these experiences might develop character and confidence, and build knowledge that could help them be more successful when at sea (Martin, Cashel, Wagstaff, & Breunig, 2006, pp 18-19). From these ideas, Hahn (with financing from Holt) developed the first Outward Bound School in 1941. The first challenge course was built by Outward Bound in the 1940s and was intended to simulate working on the high rigs of sailing ships (Martin, Cashel, Wagstaff, & Breunig, 2006, p. 152). The idea of challenge courses moved to America with Outward Bound in 1962 with the creation of Colorado Outward Bound (p. 19). In 1971, funded by a grant from the U.S. Department of Education, former Outward Bound instructors established Project Adventure, bringing challenge courses into mainstream education (p. 153).

Outward Bound also has led to other outdoor education entities in the United States. Paul Petzoldt, who was involved in the first Outward Bound School in the U.S., started the National Outdoor Leadership School (which provides college credit for some of its courses) and the Wilderness Education Association (which works closely with college and university outdoor recreation programs to promote the professionalism of outdoor leadership) (Martin, Cashel, Wagstaff, & Breunig, 2006).

A consistently significant voice in the field of environmental education is that of Harold Hungerford. Hungerford and Volk (1990) focused on the role education, more specifically environmental education, played in developing responsible citizens. Based on a substantial body of literature about variables related to behavior, Hungerford and Volk (1990) developed a flow chart (Figure 2.1) describing the major and minor variables that combine to change behavior. A significant aspect of this article is that Hungerford and

Volk challenged the widely held idea that teachers could change behavior simply by providing information. Instead, they suggest that learners need to interact more with the issues related to the environment to begin to feel "ownership" and "empowerment" (p. 267).

Figure 2.1 Environmental Behavior Model **(Hungerford & Volk, 1990)**



In 2003, Hungerford and Volk collaborated again and re-emphasized the need to move away from the outdated model that acquiring knowledge changes behavior. They suggested that to make the necessary changes, teachers need in-service training to help them modify their approach to environmental education. Additionally, teachers needed

support as they implemented the new approach. Hungerford and Volk (2003) provided a list of components for curricular design. Again, they addressed in-depth knowledge of environmental issues and concepts, as well as the relationships that existed between those, but also delved into higher order thinking skills such as investigation and evaluation of those issues as well as opportunities to "achieve some level of environmental sensitivity that will promote a desire to behave in responsible ways" (p. 4). Finally, they emphasized the need to evaluate the new program's effectiveness by evaluating the "level at which learners acquired the desired knowledge, skills, and attitudes" (p. 5).

Supporting Hungerford and Volk's ideas is the body of literature about the relationship between early life experiences and environmental attitudes in later life. Ewert, Place, and Sibthorp (2005) investigated this relationship among 533 undergraduate university students. The students represented 20 different areas of academic study. The authors looked at several different independent variables and their relationship to the participants' environmental attitude. The seven independent variables were "appreciative outdoor activities, mechanized outdoor activities, consumptive outdoor activities, formal education, media, witnessing negative environmental events, and involvement with organizations that provide outdoor experiences" (p. 226). They found that participation in appreciative and consumptive outdoor activities in early life as well as media events covering environmental issues and personally witnessing negative environmental events explained about 14% of the variance in eco-centric or anthropocentric environmental beliefs among the sample. As they anticipated, higher levels of these experiences were related to higher levels of eco-centric beliefs.

Again, this reinforces that while a presentation of information about environmental issues may establish a base of knowledge for young students, it does not have a lasting effect. Hungerford and Volk's approach is an important component in environmental education because it considers the need for something deeper than memorization of facts. In order to bring about the desired changes, teachers have to find ways to engage their students on a higher level, infiltrating their learning process in a way that is not only memorable but transferable from one issue or concept to the next. Furthermore, Ewert, Place, and Sibthorp (2005) reinforce the importance of those experiences starting early for more desirable changes to occur.

Theoretical Foundations

The theories tied to outdoor education are significantly related to experiential education. Two early educators associated with experiential education are Lewin and Dewey (Kolb, 1984). The Lewinian Experiential Learning Model is based on feedback processes from electrical engineering. It begins with an immediate, concrete experience, which provides a basis for observation and reflection, which are compiled into a new theory, which can be used for new hypotheses that lead to new experiences (Kolb, 1984). The model can be found in Figure 2.2.

Dewey created a model similar to Lewin's, but focused more on the way learning "transforms the impulses, feelings and desires of concrete experience into higher-order purposeful action" (Kolb, 1984, p. 22). Dewey's model (Figure 2.3) also portrays graphically the way the cycle continuously feeds into itself.

Figure 2.2 Lewinian Experiential Learning Model
Adapted from Kolb, 1984

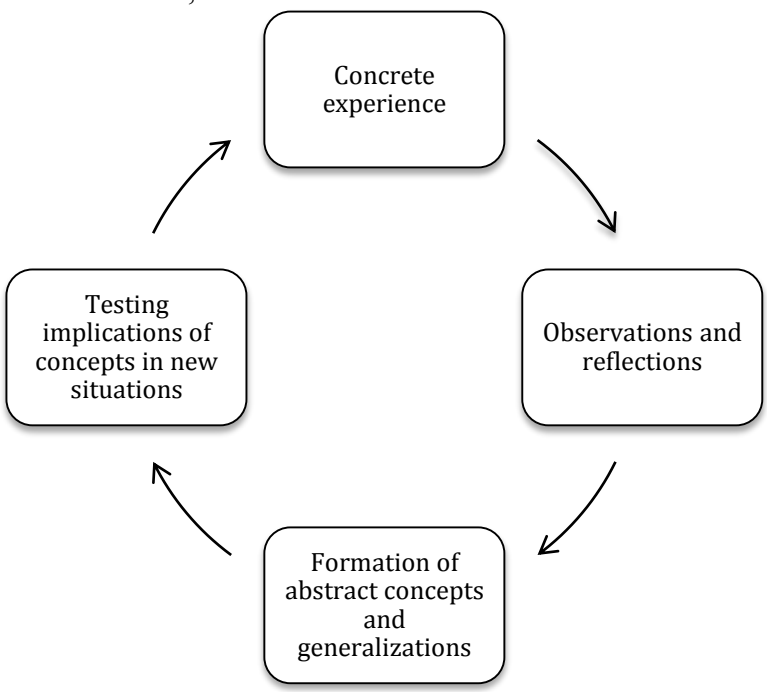
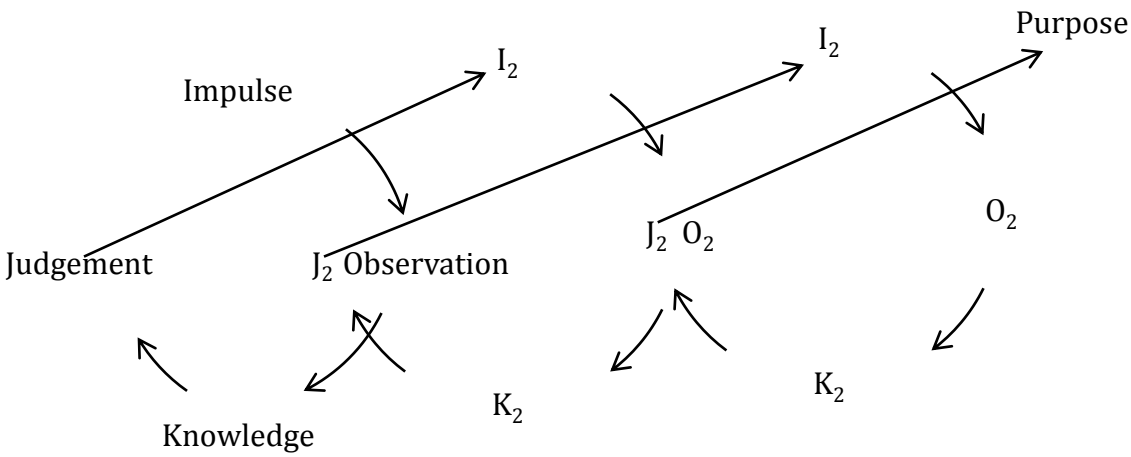


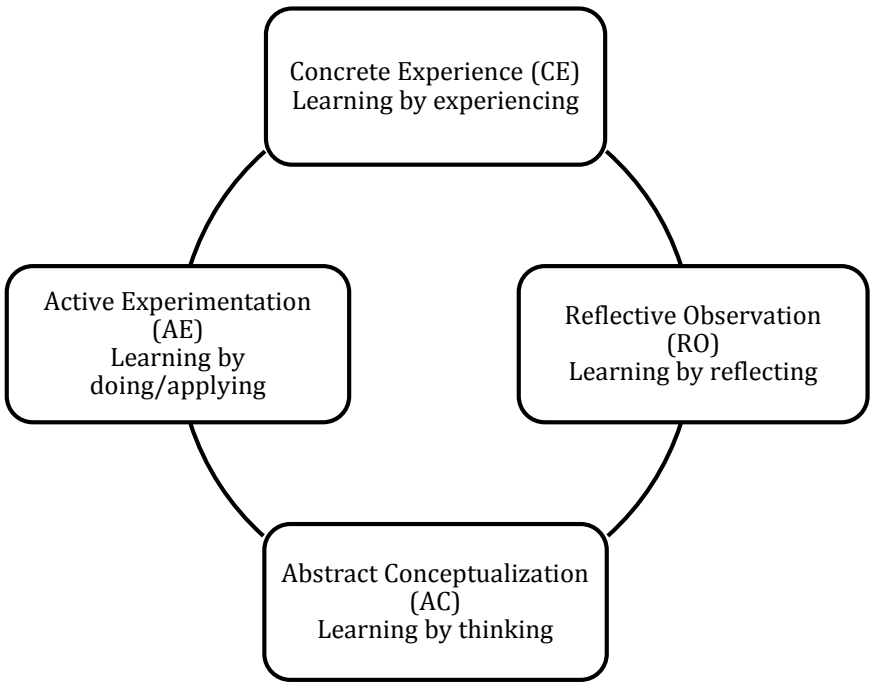
Figure 2.3 Dewey's Model of Experiential Learning
Figure adapted from Kolb, 1984



The significance of these models is in the way, in turn, they influenced future models and theories about experiential learning. One experiential learning model

commonly utilized by professionals is one by David Kolb. Kolb began his work in the 1970s and added the dimension of different learning styles (Martin, Cashel, Wagstaff, & Breunig, 2006). Kolb's Experiential Learning Cycle (Figure 2.4) also has four phases; however, there is no formal starting point. The phases are related to one another in a cyclical fashion, but different teaching methods will guide a learner to a particular phase rather than a linear experience. At the top of the model is the Concrete Experience phase, which is where the learner learns through a direct, hands-on experience. In the Reflective Observation phase, the learner reflects on an experience and makes observations from different perspectives. The Abstract Conceptualization phase allows the learner to begin thinking about an experience and how to integrate it with their previous knowledge in order to generate explanations or hypotheses. In the Active Experimentation phase, the learner tests their hypotheses or theories in new situations (Martin, Cashel, Wagstaff, & Breunig, 2006).

Figure 2.4 Kolb's Experiential Learning Cycle
Adapted from Kolb, 1984 and Martin, Cashel, Wagstaff, & Breunig, 2006



These models have influenced the field of outdoor education (along with many other fields) over the past century. The concept that experience drives the process of learning is central to outdoor education, assuming that students interact with the learning process in a more direct, hands-on way when they are in the environment about which they are learning.

In addition to the benefits of outdoor learning being more experiential, outdoor and experiential education are driven by the idea that creating disequilibrium produces an opportunity for students to reorganize and find a new balance. This effort to reestablish equilibrium produces changes in "feelings, thoughts, attitudes, and behavior patterns" (Luckner & Nadler, 1997, p. 23). Creating a mild disequilibrium by changing the setting (going outside) excites students and prepares their brains for learning and assimilating new information by prompting them to "reorder and restructure their cognitive, affective,

and behavioral maps" (p. 27). It is in this way that changes can be seen beyond an outdoor classroom. Through outdoor and experiential learning, students are making changes that reach past the immediate experience.

Interaction between nature and education

One way nature has been associated with positive benefits in education is through its restorative features. Tennessen and Cimprich (1995) studied the attention capacity of 72 students living in dormitories at a large midwestern university. They found that students with a window with a natural view were better able to avoid distractions and scored higher on measures of directed attention than those whose windows viewed a more "built" or less natural site. Berto (2005) supported those findings when she investigated the capacity of outdoor environments to be restorative. She also studied college-age students, investigating whether photos of outdoor environments could combat the effects of attention fatigue. She found that students who were exposed to photos of natural outdoor settings performed better on post-tests after a rigorous pre-test than students who were exposed to photos of urban environments.

Dutt (2012) worked with sixth and seventh grade students at a school in Vancouver. Using a qualitative approach, this study investigated the students' interaction with their indoor and outdoor surroundings. Additionally, this study addressed indoor/outdoor interfaces, where, although students were inside, they had visual access to the outdoors through windows or skylights, seaquaria, and natural materials and plants that brought the outdoors inside the building. Dutt (2012) found that students "felt a sense of freedom, moments of joy, social cohesiveness, and aesthetic pleasure in relation to indoor/outdoor interfaces and the natural places of their school site" (p. 216). These

findings seem to augment those about the restorative nature of the outdoors, by incorporating aspects of social cohesion. This also speaks to the ability of nature or natural materials to impact the indoor classroom environment

Wilson (1996) asserts that "because young children learn about the environment by interacting with it, educators and other adults must attend to the frequency, nature, and quality of child-environment interactions during the early years" (p. 2). Wilson (1996) provides two rationales for this assertion. First, children must be exposed to nature early in life to develop reverence for it and a foundation for stewardship. Second, interactions with the natural environment are associated with healthy child development. However, there is only a moderate amount of current research about the benefits of outdoor education for primary school-age students.

Fjørtoft (2001) investigated the relationship between children's play in the natural environment and their motor fitness. They researched 75 five to seven-year-old students in Telemark, Norway. The treatment group utilized the forest near their school for free play and versatile activities. The control group utilized only the traditional outdoor playground. Both groups' physical fitness were tested and Fjørtoft (2001) found a statistically significant difference between the two groups' results. The group that played in the forest had better motor skills than the group that did not, even though they had lower pre-test scores.

Taylor, Kuo, and Sullivan (2001) worked with 96 parents of children (ages seven to twelve) who had been diagnosed with Attention Deficit Disorder (ADD) or Attention Deficit Hyperactivity Disorder (ADHD). On the premise that the previous studies about the relationship between nature and attention capacity were correct, the investigators

were interested in determining whether nature had similar restorative effects on the attention of children with ADD and ADHD. Several of their analyses suggested that interaction with nature reduced the symptoms of ADD and ADHD. More specifically, not just physical activities, but those activities that took place in *green* or natural spaces provided more positive outcomes for the parents. Conversely, activities that took place in indoor settings were associated with more severe symptoms (Taylor, Kuo, & Sullivan, 2001).

Taylor, Kuo, and Sullivan (2002) investigated the relationship between access to and views of natural play areas and children's self-discipline. Specifically, they looked at three areas of self-discipline: concentration, inhibition of initial impulses, and delayed gratification. Interestingly, they found a significant relationship between "near home nature" and self-discipline among girls but not among boys (p. 58). While access to near home nature had a significantly positive effect on girls' concentration, inhibition of initial impulses, and delayed gratification, further investigation needs to be done with boys about the same relationship. The authors suggest that boys do not play as close to home and that possibly their access is different from girls' access to nature (Taylor, Kuo, & Sullivan, 2002).

Outdoor Classrooms and the Indoor Classroom

Benefits associated with access to the out-of-doors are meaningful in the context of this study. However, even more meaningful is research on the impact of outdoor classrooms and outdoor education. In the mid-1990s a group of teachers came together for the State Education and Environment Round Table. They found that much of the information about the benefits of environmental and outdoor education was anecdotal.

Although many professionals agreed environmental education was an important addition to a curriculum, without an evidence base, it lacked "pedagogical significance" and was used mostly as a supplement (Lieberman & Hoody, 1998, p. 1). They developed a study to investigate the impact of using the environment as an integrating context (EIC) in K-12 schools. Forty schools from across the country were included in the study (15 elementary, 13 middle, 12 high schools) with a diverse range of demographics. The study used general site studies, learning surveys, teaching surveys, and domain surveys and was largely qualitative. They did include some quantitative measure of academic achievement such as standardized test scores and GPAs as well. EIC "designates pedagogy that employs natural and socio-cultural environments as the context for learning while taking into account the 'best practices' of successful educators" (p. 7). EIC is not necessarily education about the environment, but uses the school's "surroundings and community as a framework within which students can construct their own learning, guided by teachers and administrators using proven educational practices" (p. 7). While EIC does not specifically represent outdoor classrooms, the context of this study is relevant in its use of the out-of-doors or the outdoor environment for education purposes. Lieberman and Hoody (1998) report a range of opportunities for EIC programs such as classrooms or labs, outdoor school campuses and playgrounds, undeveloped school properties such as fields or wetlands, or off-site community settings or natural habitats (p.8). The results of their comprehensive study were promising. They found in comparisons between academic outcomes of students who had been exposed to EIC and students who had not, the EIC students had higher academic achievement. Additionally, they found that students consistently had higher enthusiasm and engagement, improved behavior

(evidenced by a decrease in discipline and classroom management problems) and interpersonal skills, and an increase in attendance and positive attitudes about school. Teachers also reported being revitalized and more engaged by this approach. Some of these benefits could also be attributed to the implementation of best practices by the teachers (e.g. integrated instruction and learning, and collaborative instruction). However, the authors argue that the student-centered, hands-on, problem-solving based nature of this program, along with the emphasis on the environment, are an instrumental part of these successes and could help "close the achievement gap" (p. 79).

As a follow-up to Lieberman and Hoody (1998), the North American Association for Environmental Education commissioned a report in 2000 to further investigate the impact of environmental education. Glen (2000) reported on case studies from schools all over the United States (Texas, North Carolina, Wisconsin, Minnesota, Kentucky, and Florida). The results of these case studies were similar to the results of the previous report, but with a few additions. Glen (2000) showed academic improvements in reading, math, science and social studies through standardized test score increases. One specific example the author gives is from a school in Milwaukee, WI, where all third grade students from an EIC school passed the reading comprehension test, when only 25% of the total public school population passed the same test (p. 3). Glen (2000) also found similar increases in motivation and engagement along with a decrease in disciplinary problems. The new evidence showed that students exposed to the environmental education program were able to transfer and apply their knowledge in new contexts. Glen (2000) supports Lieberman and Hoody (1998) in the assertion that environmental based education is the way to reduce the gap in education. Furthermore, Glen (2000) proposed

that environmental education is the way to meet the call of American businessmen for "renaissance workers" and create high performance schools and students (p. 11). While the hands-on, problem-solving, decision-making learning, along with an integrated curriculum are associated with these outcomes, the author again reiterates that using the environment as the integrating tool is imperative to the successes of this program. The environment (which is school specific) is relevant and interesting to students; it is what engages and excites them as well as their teachers, which appears to be the key element to these programs (p.13).

In 2003, Volk and Cheak reported on an investigation of fifth and sixth grade students, parents, and teachers of an environmental education program in Molokai, Hawaii. This program involved an integrated learning process that occurred over two years and involved the students identifying an environmental issue in their community, investigating the issue, making recommendations based on their evidence, and participating in the solution. The program culminates with a community symposium led by the fifth and sixth graders to report their findings. They focused their investigation on literacy and found increases in general literacy (reading, writing, and speaking), environmental literacy, and technological literacy among the participants of this program. Furthermore, they emphasized the importance of the student-led nature of this program and how it especially meets the needs of students with diverse backgrounds who are more at risk to feel disconnected from traditional teacher-led instruction (p. 23). This echoes the assertion made by Lieberman and Hoody (1998) and Glen (2000)'s assertion that environmental education programs can decrease the gap in education experienced by at-risk students who are expected to have different needs than non-at-risk students.

Another example of outdoor education is Garden Based Learning (GBL). This approach is a bit more specific than an outdoor classroom, outdoor education, experiential education or environmental education, but is based on all of these foundations. GBL uses gardens as a means to develop "academic skills, personal development, social development, moral development, vocational and/or subsistence skills, and life skills" (Desmond, Grieshop & Subramaniam, 2002, p. 30). Desmond, Grieshop, and Subramaniam (2002) conducted a comprehensive review of GBL around the world. Most of their responses came from Europe, North America, and Australia. They too reported positive impacts on academic achievement and school environment and culture. Additionally, they found positive impacts on community links, nutrition and health, vocational education, and also a stewardship relationship between students and their environment (pp. 75-76).

Eick (2012) investigated how a third grade teacher used an outdoor classroom with her students. This research was conducted as a case study to understand better the context and outcomes of nature-study in an outdoor classroom and how a teacher met traditional standards through untraditional methods. They relied mostly on qualitative techniques, but included information about the standardized test scores as outcomes for the students. Of the 16 students in this study, 15 passed their state reading exam. This result was slightly higher than the entire school's pass rate and was comparable to the district's pass rate. However, the researchers note that this particular classroom had a higher than average number of free and reduced lunch students (which presumably indicates that they are "at-risk") and those reading exam outcomes were significant for that population. This report focused on the outdoor classroom being used as an integral

part of science education, rather than separate or supplementary. Additionally, the investigation outside lends itself to reading, writing, and drawing, which increases literacy (p. 800). The comprehensive, holistic, or *integrated* approach is similar to the approaches in previous studies and commonly produces higher order thinking skills such as analysis, evaluation and reflection.

Residential outdoor education programs provide an opportunity for urban students who do not have easy access to an outdoor classroom. Harun and Salamuddin (2014) investigated the effect of outdoor education on the social skills of adolescents in Malaysia. The participants were part of a five-day residential outdoor education program. They found that there was a significantly different increase in social skills after the adolescents were exposed to outdoor education when compared to the control group who were not exposed to an outdoor education experience. Specifically, the skills that were associated with the change were in cooperative teamwork, leadership ability, and coping with changes.

Studies have shown that nature can play an important role in the overall health of humans (Berto, 2005; Tennessen & Cimprich, 1995). Furthermore, studies have also shown that nature, in various forms, can be important to the health and normative development of children and adolescents (Dutt, 2012; Taylor, Kuo, & Sullivan, 2001, 2002; Fjørtoft, 2001; Wilson, 1996). Research is being conducted to understand better the outcomes of nature as a part of the education process through environmental education and outdoor classrooms. These promising studies have shown an association between environmental education or outdoor classrooms and increased academic achievements across disciplines, increased engagement and motivation of students and teachers, and a

decrease in classroom behavior problems (Desmond, Grieshop & Subramaniam, 2002; Eick, 2012; Glen, 2000; Lieberman & Hoody; 1998; Volk & Cheak, 2003). Not all students have access to an outdoor classroom. Harun and Salamuddin (2014) added to the body of knowledge about outdoor education with their study of a five-day residential program. While a residential program may not have the ability to impact academic achievement as directly as some of the other programs, the positive changes they found in inter and intra personal skills could impact the overall classroom environment. There is an indication that a positive classroom environment can be related to academic achievements. All of these outcomes provide an opportunity for further research over the indoor classroom environment and its relationship with access to natural spaces or outdoor classrooms.

Classroom Environment

Of the research about children's connectedness to nature, there is little information concerning how the school environment plays a role in that connection (Dutt, 2012). However, there is a large body of research related to the indoor classroom environment and student behavior and how they, in turn, are related to student academic achievement. Hoge and Luce (1979) conducted a review of studies about the relationship between classroom behavior and academic achievement. They looked at research that addresses student behavior as well as student-teacher interactions. In terms of student behavior, they found that the literature consistently reported a positive relationship between student attention and student achievement, while the inverse is true for student inattentiveness. They also found that negative interactions with the teacher were related to poor performance measures, but positive interactions with the teacher had varied

relationships with positive performance measures. Researchers and teachers have been trying for quite some time to understand the relationship between what happens in a classroom and positive outcomes for the students. Hoge and Luce (1979) showed that while there was an existing body of knowledge on the subject at the time, the research being done left a lot of questions unanswered; namely, any mediating factors between classroom behavior and academic achievement.

Researchers and teachers continue to explore the relationship between school experiences and student outcomes. The classroom environment has been the setting and subject over the years for a number of studies (Hoge & Luce, 1979). Alexander, Entwisle, and Dauber (1993) spent four years investigating the relationship between student classroom behavior and academic achievement. They utilized 790 first graders from Baltimore City for their investigation. They collected data such as reading and math grades or marks, as well as the students' California Aptitude Test scores, and compared them with teachers' ratings on three domains: interest-participation, cooperation-compliance, and attention span-restlessness in their first, second, and fourth years of school (Alexander, Entwisle, & Dauber, 1993). The researchers found interest and attention span related to differences in test scores in the first year, and differences in grades or marks over all three years. The students' behavior ratings from their first year were related to performance beyond a single year, emphasizing the importance of the longitudinal context of classroom behavior and environment.

Torquati and Ernst (2013) examined the perceptions and intentions of 110 pre-service early childhood educators in relation to the use of the outdoors with their students. They found that many of the participants reported being knowledgeable about

the benefits of nature for children and had high ratings related to their intention to use outdoor settings. They also found that the teachers preferred to use more maintained settings such as parks rather than natural settings such as forests or open fields. However, only one third of the respondents reported that natural areas provided opportunities for structured learning and fewer than 10% reported that those areas provided opportunities for unstructured learning. The majority of the participants responded that natural areas were best suited for "unstructured play for physical, health, or social benefits" (p. 203).

As outdoor education and environmental education become more prominent in the dialogue surrounding school success, a gap in the literature emerges around how outdoor experiences relate to the indoor classroom environment. If classroom behavior and environment are tied to student success, how might the outdoor environment of their schools also be related to their success?

My Class Inventory

One measurement tool often used to investigate the environment of a classroom is the My Class Inventory (MCI) (Fraser, Anderson, & Walberg, 1982). Additionally, the MCI is used because it "is economical in terms of administration and scoring, is an established practical instrument, and produces a manageable amount of data" (Blose & Fisher, 2003, p. 5). In 1998, Fraser wrote a paper addressing the use of classroom environment research in science education. He identified three applications at the time:

> (1) associations between student outcomes and environment, (2) use of environment dimensions as criterion variables (including the evaluation of educational innovations and investigations of differences between students' and

teachers' perceptions of the same classrooms) and (3) investigations of whether students achieve better when in their preferred environments (Fraser, 1998).

Additionally, Fraser (1998) noted that student perceptions of classroom environment were also being used for teacher development. He suggests that future research should be directed toward combining quantitative and qualitative data, school level environments (a bigger picture than just the classroom), school psychology, links between educational environments, cross-national studies, transition from primary to high school, teacher education, and teacher assessment.

Lee, Ng, and Phang (2002) investigated 595 fifth grade students in Singapore and their response to cooperative learning even though they were being raised in a "distinctly competitive culture" (p. 3). Teachers in the treatment group received training on cooperative learning (divided into three levels: high, medium, and low ability), while teachers in the control group did not. They used measures of academic achievement, classroom climate, and attitude to determine an outcome related to the differences in teaching. The researchers found that students in the cooperative learning group showed higher academic achievement than those in the control group. They also found higher friction among students in the cooperative learning group. They postulate that increased interaction between the students led to an increased sensation of friction. Students in the high and medium ability levels of the treatment group reported that difficulty decreased as the year passed. However, the lower ability group reported that they felt difficulty increased. The researchers suggested that this may be related to their increased interaction with students who were designated with medium or high abilities. The low ability students may have become more aware of their "low status" (p. 13). While this

study does not necessarily show positive results, it is an interesting use of the MCI in a pre-test/post-test application.

Diamantes (2002) investigated the impact of using the MCI to help inform science teachers about the perceptions of their students in order to guide the improvement of their classroom. They sampled 1,216 6^{th}-8^{th} grade science students. There were six treatment and six control groups. All of the groups completed the MCI for a pre-test in October and then again for a post-test in April. The treatment group administered the MCI again to their students, first asking for their actual perceptions of the environment and then asking for their preferred environment. The teachers of the treatment group used the differences between actual perceptions and preferred responses to guide the changes they made in their classroom. In four out of ten classes, they successfully reduced the difference between students' perceptions and preferences of their class environment.

Koch (2008) used the student and teacher versions of the My Class Inventory Short Form (revised) to investigate the impact of an elementary school counseling intervention. She did not find significant changes among the teachers, but results from the students indicate a significant increase in cohesion for kindergarten and first grade over the school year. For second and third grade, there was a significant increase in cohesion and satisfaction along with a significant decrease in friction and competition.

Several recent studies have shown that nature can play an important role in the health of humans (Berto, 2005; Dutt, 2012; Tennessen and Cimprich, 1995). Furthermore, studies have also shown that nature, in various forms, can be important to the health and normative development of children and adolescents (Taylor, Kuo, and Sullivan, 2001, 2002; Fjørtoft, 2001; Wilson, 1996). Research is being conducted to

understand better the outcomes of nature as a part of the education process through environmental education and outdoor classrooms. These promising studies have shown an association between environmental education and outdoor classrooms and increased academic achievements across disciplines, increased engagement and motivation of students and teachers, and a decrease in classroom behavior problems (Desmond, Grieshop & Subramaniam, 2002; Eick, 2012; Glen, 2000; Lieberman & Hoody; 1998; Volk & Cheak, 2003). Not all students have access to an outdoor classroom. Harun and Salamuddin (2014) added to the body of knowledge about outdoor education with their study of a five-day residential program.

Summary

There is a large body of literature related to human development, education, and outdoor experiences that extend back for several years. Some of the dominant forces such as Caillois, Huizinga, Dewey, Kolb, and Hungerford have been working for a number of years toward a holistic approach to human development and education. Unfortunately, there is still a divide in the literature as well as in practice in terms of integration of outdoor, environmental, and experiential education and the traditional education setting (Lieberman & Hoody, 1998). However, the work of these foundational philosophers, theorists, sociologists, and educators is currently being brought to the forefront by authors like Richard Louv and the No Child Left Inside movement as well as work such as the State Education and Environment Round Table.

Literature suggests that outdoor experiences have positive effects on human health through its restorative aspects and impacts on attentiveness (Berto, 2005; Tennessen & Cimprich, 1995). Specifically, outdoor experiences have meaningful

impacts on children and their behavior and self-discipline as well (Taylor, Kuo, and Sullivan, 2001, 2002). Attentiveness and self-discipline, in turn, are related to positive classroom behavior, which is related to later academic achievement (Hoge & Luce, 1979; Alexander, Entwisle, & Dauber, 1993). There is also a growing body of knowledge about the beneficial outcomes associated with outdoor and environmental education. These studies have shown outcomes related to positive academic achievements on state standardized tests and GPAs across disciplines, a decrease in classroom behavior problems, as well as increased engagement and motivation of both students and teachers (Desmond, Grieshop & Subramaniam, 2002; Eick, 2012; Glen, 2000; Lieberman & Hoody; 1998; Volk & Cheak, 2003). A valuable avenue for future research is in investigating the ways that outdoor education opportunities are related to indoor education environments. Particular interest could be paid to elementary school settings as research also indicates that early life experiences are related to behavior in later life (Ewert, Place, & Sibthorp, 2005; Wilson, 1996)

CHAPTER THREE

METHODS

This chapter will provide an overview of the methods used to investigate the relationship between exposure to an outdoor classroom and changes in indoor classroom environment. There are fives sections in this chapter that will address the participants, the instrument, the research design, the procedure, and the data analysis.

Participants

The participants in this study are elementary school teachers at two public schools in Stillwater, Oklahoma. According to the Census Bureau, the estimated population of Stillwater in 2013 was 47,186 (U.S. Census Bureau, 2014). In 2010, most census participants identified as White alone or in combination with some other race (Table 3.1). Only 4.3% of the total population in 2010 identified as Hispanic or Latino (U.S. Census Bureau, 2010). Oklahoma State University is located in Stillwater, OK. Of the 45,688 participants in the 2010 census, 28.8% of them were between the ages of 20 and 24. Another 10% of them were between 25 and 29 years old (U.S. Census Bureau, 2010). The estimated median household income in Stillwater, OK for 2012 was $31,243 and the estimated mean household income for 2012 was $47,972. Comparatively, the estimated median and mean household incomes for the entire state of Oklahoma in 2012 were $44,891 and $60,788 respectively (U.S. Census Bureau, n.d.).

Table 3.1

Stillwater Demographics by Race Alone or in Combination with One or More Other Races (U.S. Census Bureau, 2010).

Race	Percentage of the 2010 Population in Stillwater
White	84.2
Black or African American	6.0
American Indian and Alaska Native	7.0
Asian	6.4
Native Hawaiian and Other Pacific Islander	0.2
Some Other Race	1.5

Roughly 82 grade level and special teachers (e.g. music education, physical education, special education, etc.) from both schools were invited to participate in the study. The sample was a census of teachers at each elementary school, as all teachers were asked to participate and participation was voluntary. The criteria required to be included in this sample are:

- Participants must be a grade level (pre-kindergarten through fifth grade) teacher or specials teacher (music education, physical education, special education) at the treatment or comparison school
- Treatment participants must have access to an outdoor classroom
- Comparison participants must not have access to an outdoor classroom

The two elementary schools chosen for this project are part of Stillwater Public Schools in Oklahoma. The treatment school was chosen because it has recently begun developing its outdoor classroom and its new school site. The children have been at the new school site since August 2013, but the planning and use of the outdoor classroom has been somewhat inconsistent and teachers expressed a reluctance to utilize the area due to being unfamiliar with it. Beginning with the 2014-2015 academic year, the teachers had

more resources available to them to enhance their current science curriculum such as investigation materials for the students to use while they are out in the outdoor classroom, and a comprehensive map of the grounds.

Alternately, another school was chosen by administrators of Stillwater Public Schools to participate as a comparison group. While the demographics of the two schools were not matched (Table 3.2), the comparison school does not have access to an outdoor classroom and can serve many of the purposes of a control group.

Table 3.2

Treatment and Comparison School Demographics (E. Johnson, personal communication, July 14, 2014).

School Site	Percent Poverty	Percent Minority
Treatment	89	40.7
Comparison	29	29.9

Instruments

The purpose of this study is to investigate the relationship between access to an outdoor classroom and changes in indoor classroom environment. The Teacher Version of the My Class Inventory – Short Form (Sink & Spencer, 2007) was used to measure teacher perspectives of the classroom environment. The Teacher Version of the My Class Inventory – Short Form (TMCI-SF) is adapted from the My Class Inventory (MCI) and the My Class Inventory – Short Form (MCI-SF). The MCI (Fraser, Anderson, and Walberg, 1982) was developed as an appropriate alternative to the Learning Environment Inventory, which was created as a classroom environment measurement tool for high school students. The MCI was adapted and simplified from the LEI for elementary school students and included five scales: competitiveness, difficulty, cohesion, friction, and satisfaction (Fraser, Anderson, and Walberg, 1982). Sink and Spencer (2007) developed

the Teacher Version of the My Class Inventory – Short Form as a companion to the My Class Inventory – Short Form to compare teacher perspectives of classroom environment with student perspectives of classroom environment. After conducting analyses to determine the fit of the model and eliminate weak components, four scales emerged from the existing MCI scales: satisfaction, peer relations (a combination of statements from the friction and cohesion scales), competitiveness, and difficulty. The satisfaction scale is a measure of "level to which students experience satisfaction (or like) in their class" (Sink & Spencer, 2007, p. 5). As the peer relations scale is comprised of the previous friction and cohesiveness scales, it is a measure of the relationships between students in terms of collaboration and conflict. Competitiveness is "the level of perceived classroom rivalry" (p. 5). Difficulty is described as "the level of educational challenge presented to the students" (p.5). The authors added a scale related to school counselors that will not be included in this study. Sink and Spencer (2007) reported the ranges of the inter-item correlations and the Cronbach's Alphas for each scale (Table 3.3) (Sink & Spencer, 2007, p. 7). Sink and Spencer (2007) also reported that the inter-scale correlations were less than .28.

Table 3.3
Inter-item Correlations and Cronbach's Alphas

Scale	Range of inter-item correlation	Cronbach's Alpha
Satisfaction	rs = .28 to .60	α = .84
Competitiveness	rs = .32 to .47	α = .66
Difficulty	rs = .27 to .49	α = .75
Peer Relations	rs = .30 to .63	α = .80

The TMCI-SF includes statements related to each scale and asks participants to indicate how much they agree or disagree with the statement. The participants have an opportunity to choose from strongly disagree, disagree, neutral, agree, or strongly agree. There are three items in the competitiveness scale. An example of a competitiveness statement is, "Most students want their work to be better than their friend's work." There are five difficulty items and an example of a difficulty statement is, "Most students cannot complete their assignments without a lot of help." An example of a peer relations statement is, "All students in the class get along well with each other" and there are a total of five items in the peer relations scale. There are six items in the satisfaction scale. An example of a satisfaction statement is, "The students enjoy their work in the class." The total score of the instrument is meaningless and each scale is considered separately. Higher scores are desirable for the satisfaction and peer relations scales, while lower scores are desirable for competitiveness and difficulty.

Sink and Spencer (2007) provide a figure that shows their changes made to the MCI-SF (based on their analyses) and how to code each item (pp. 9-12). The following items make up the peer relations scale:

1. Students do not fight with each other
2. Everyone in the class is friends
3. All students in the class get along with each other
4. All students in the class are fond of one another
5. Students in the class do not argue with each other

Sink and Spencer's (2007) description calls for reverse coding for items one and five. Based on their chart, it appears that they carried over the reverse coding from the

previous friction scale. Reverse coding is no longer necessary when these items are combined with the cohesion statements. All of the statements favor higher scores and none of them were reverse coded for this research study.

This measurement tool was chosen because of its relevance to elementary school settings and its ease of use. The expected time needed to complete the instrument is eight to ten minutes. This feature of the instrument will probably make it more approachable to teachers.

Research Design

The research questions for this study address differences in post-test classroom inventory scale scores between a treatment group and a comparison group after checking for pre-test differences. As such, this study follows a quasi experimental design. It utilizes a pre-test and a post-test for the treatment group as well as the comparison group. The comparison group is not a true control group because the comparison classrooms and the treatment classrooms do not have similar demographics. However, the comparison classrooms will fulfill many of the responsibilities of a control group such as history (any historic event that happens to the treatment will happen to the comparison), maturation (maturation and development should be consistent across both groups), measuring instrument (any issues with the instrument will be consistent across both groups), statistical regression (both groups may regress toward the mean), and the interaction of factors (if there is any interaction of these factors, that interaction should be shared by both groups) (Key, 1997).

All teachers from each school were invited (via email) to complete a questionnaire about their classroom environment at the end of September (Appendix A)

and again in February. Follow up emails were sent six and nine days after the initial email (Appendix B). The email contained a link to the questionnaire which hosted online using Qualtrics. By clicking the link and completing the questionnaire, the teachers are agreeing to participate in the study. Qualtrics is an online platform and participants were able to complete the questionnaire from an appropriate electronic device such as a personal or public computer, a tablet, or a smart phone. In order for participants to be able to stop and restart their questionnaire at any time, the participants' IP addresses were used by the Qualtrics system. However, the questionnaire does not ask for the participants' names, so this study will maintain anonymity and confidentiality.

The questionnaire included the Teacher Version of the My Class Inventory – Short Form (Sink & Spencer, 2007) and a few questions that were used to create a code for the purposes of matching scores after completion of the post-test and descriptive analysis by grade level. The pre-test and the post-test Qualtrics survey for the comparison group as well as the pre-test for the treatment group were identical (Appendix C). The post-test for the treatment group included additional questions about how often the teacher utilized the outdoor classroom with their students, how useful and accessible it was to them, as well as how they used it in reference to their indoor classroom curriculum (Appendix D). The follow up questions also asked teachers about their perceived level of experience in the out-of-doors in case that could help describe the use patterns of this sample. Data related to the use of the outdoor classroom was used for a descriptive analysis of the treatment group.

Independent Variable

The independent variable for this study is access to an outdoor classroom. There are two levels of the independent variable present in this study: access to an outdoor classroom, and no access to an outdoor classroom.

An additional independent variable that may be included in this study is grade level. If the data allow, grade level may be used for an exploratory analysis of the interaction between grade level and access to an outdoor classroom and their relationship to classroom environment. There are seven possible levels of this independent variable (pre-kindergarten, kindergarten, and first through fifth grade). However, grade levels may be grouped in order to meet the assumptions for analysis. If this is the case, they would be divided into two groups: pre-kindergarten through second grade and third through fifth grade, because state standardized testing begins in third grade.

Finally, time spent in the outdoor classroom, or usage of the outdoor classroom could be an independent variable in this study. For the scope and purpose of this study, that data will be used only for descriptive purposes.

Dependent Variable

The dependent variable in this study is the Teacher Version of the My Class Inventory – Short Form scores. Likert scales are generally considered ordinal data. However, the analysis will be done on the total scores from each scale and as such is considered continuous data.

Procedure

Approval for this study was sought from Oklahoma State University's Institutional Review Board and was granted on August 25, 2014 (Appendix F).

Additionally, approval was sought from Stillwater Public Schools and was granted on July 14, 2014 (Appendix G). A few changes were made to the original IRB document and approval of those changes was granted on February 3, 2015 (Appendix H). The researcher met regularly with the principal of the treatment school and the Director of Federal and OSU Programs. The principals of each elementary school consented to their schools' and teachers' participation in this research (Appendix E). Prior to the dissemination of email invitations, the researcher went to each school and spoke with the teachers. The goal of this interaction was twofold: to build a rapport with the participants so they recognized the researcher's name when they received the emails, and to make the researcher available and approachable should the participants have any concerns about the research process. This interaction also provided an opportunity for the researcher to collect alternate email addresses of the participants if they preferred that the researcher use something other than the email addresses provided on the Stillwater Public School District's website.

- September 19, 2014: the researcher sent an email to all teachers at each elementary school (Appendix A). The email contained consent information about risks and benefits to the participants. Additionally, it included a link to the online Qualtrics survey.
- September 25 and 28, 2014: the researcher sent follow-up emails reminding participants to complete the survey if they had not already (Appendix B).
- September 29, 2014: pre-test data collection ended and the Qualtrics survey closed.

- February 6, 2015: the researcher sent an email inviting all teachers to participate in completing the online questionnaire for the post-test.
- February 12 and 15, 2015: the researcher sent reminder emails asking teachers to complete the questionnaire if they had not already.
- February 16, 2015: post-test data collection ended and the Qualtrics survey closed.

Protection of Data

Every effort was made to assure the confidentiality and anonymity of the participants in the study. The Qualtrics database is password protected and secure. This study utilized the IP address option provided by Qualtrics, but the IP addresses were deleted upon downloading the survey data. The only purpose for the IP addresses was to allow respondents to stop, start, and return to their respective surveys. Upon completion of the online survey portion of the study, the database was downloaded to a secure computer in a faculty office in the Colvin Center, which is also password protected. Data were retained on this computer for one year from the approval of research protocol. In order to match pairs for the pre-test/post-test, one question in the survey asked for the respondents to indicate which grade level they teach, their birth month and the last four digits of their phone number. These numbers were used to create a code to match the pairs and no identifiable information was collected at any time.

Data Analysis

This study had four primary research questions related to the four scales of the Teacher Version of the My Class Inventory (TMCI-SF) (Sink & Spencer, 2007): satisfaction, peer relations, competitiveness, and difficulty. There is no meaningful total

score for the TMCI-SF. Higher scores are preferable for satisfaction and peer relations, while lower scores are preferable for competitiveness and difficulty. Scores will be calculated for each scale by summing the values of each answer (Strongly Disagree = 1; Disagree = 2; Neutral = 3; Agree = 4; Strongly Agree = 5). Incomplete data will be handled by substituting the mean response for the item. Responses with incomplete data that is more than half of the total will be thrown out.

A Mann Whitney U was chosen to determine if there were differences between the two groups for each dependent variable. The Mann Whitney U is robust to violations of normality and can be used with samples as small as 5 per group (Nachar, 2008). The U test is similar to a t-test and is used to compare two independent samples when the assumptions for a t-test cannot be met. The Mann Whitney U has almost as much power as the t-test and is a worthy replacement for small or non-normal samples (Nachar, 2008). There are three assumptions associated with the Mann Whitney U test (Nachar, 2008):

1. The two samples are random. Because this was a census of the total population of teachers at each school and the participants volunteered, independently and mutually exclusive in response, this assumption has been met.
2. The samples are independent. This assumption is met because the treatment and comparison group are made up of different individuals and each measurement corresponds to an individual person.
3. The data are either ordinal or continuous. The TMCI-SF utilizes total scores for each scale by summing the responses to Likert style questions (Strongly Disagree = 1; Disagree = 2; Neutral = 3; Agree = 4; Strongly Agree = 5), so this assumption has been met as well.

Because the two groups have differing demographic characteristics, a Mann Whitney U was conducted on pre-test scores to expose any pre-existing differences. In the absence of a significant difference on pre-test scores, a Mann Whitney U was conducted on post-test scores for each scale. In the case of any significant differences on pre-test scores, differences scores were calculated to address any pre-test differences. A Mann Whitney U was conducted on the difference scores to reveal any significant differences. The alpha selected for this study was $p < .05$.

Wilson (1996) emphasizes the importance of exposing children to nature in their early years. A descriptive statistical analysis of variables such as grade level, average use per month, and teacher's personal outdoor experience were included to explore a possible avenue for future research of variables.

CHAPTER FOUR

RESULTS

The purpose of this study was to investigate the impact of access to an outdoor classroom on indoor classroom behavior. Using a census treatment and comparison group pre-test/post-test design, the following questions were examined:

- *Research Question 1:* Is there a difference in classroom competitiveness between classes who have access to an outdoor classroom and those who do not?
- *Research Question 2:* Is there a difference in classroom difficulty between classes who have access to an outdoor classroom and those who do not?
- *Research Question* 3: Is there a difference in classroom peer relations between classes who have access to an outdoor classroom and those who do not?
- *Research Question 4:* Is there a difference in classroom satisfaction between classes who have access to an outdoor classroom and those who do not?

Context

This study was conducted at two elementary schools in Stillwater, OK. One school is located in the middle of town and is surrounded by neighborhood streets. They have outdoor playground areas for all age levels, but they do not have an outdoor classroom. The other school is located on the edge of town. It is surrounded by nearly 80 acres of relatively undeveloped property. Through the vision and determination of the

principal, the school has developed an outdoor classroom from what was once a private home with surrounding property. Their outdoor classroom includes trails with rest areas and tree stumps for seating, a small pond, a garden, a greenhouse, and a compost pit. The property is covered in native and nonnative grasses, forbs, and woody plants. The school is in the process of developing each of the rooms of the house into themes (insects, plants, and birds). Additionally, the house serves as a waypoint between the school building and the trails for bathroom breaks or weather protection. The school has a set of 30 backpacks with tools and instruments for the students to use as they investigate and learn about their environment. There are tools for discovery, measurement, and for bringing artifacts back to the classroom. Additionally, the teachers have a comprehensive Oklahoma Plant Guide for each grade level and access to a map of the trail system and significant points of interest.

Participants

As mentioned in Chapter Three, the participants in this study were the teachers at each of the aforementioned schools. Of the 82 teachers invited to participate, 33 participated in the pre-test ($n_t = 19$ and $n_c = 14$) and 27 participated in the post-test ($n_t = 14$ and $n_c = 12$). No demographic data were collected from the teachers for two reasons: the literature did not support that the demographics of the teachers impacted the way they perceived the environment of their classroom and with a small census of teachers, the school district was especially concerned with their sense of anonymity and confidentiality. With too much demographic information, it would have been possible to deduce the identity of the participants. The teachers did report their grade level or assignment as a part of the survey. There were 14 completed pre-tests from the

comparison group and they were fairly evenly distributed across the grade levels (Table 4.1). There were 18 completed pre-tests from the treatment group and one case that left the last question unanswered. The missing data was replaced using the average score for that question among that group. Of the 19 responses, none of them were second grade teachers, and the highest percentage of them was first grade teachers (Table 4.2).

Table 4.1

Pre-Test Responses by Grade Level for Comparison Group

Grade Level	Number of Responses	Percent of Total Responses
Pre-Kindergarten	1	7%
Kindergarten	2	14%
First Grade	3	21%
Second Grade	1	7%
Third Grade	1	7%
Fourth Grade	2	14%
Fifth Grade	2	14%
Other	2	14%
Total	14	100%

Table 4.2

Pre-Test Responses by Grade Level for Treatment Group

Grade Level	Number of Responses	Percent of Total Responses
Pre-Kindergarten	2	11%
Kindergarten	2	11%
First Grade	5	26%
Second Grade	0	0%
Third Grade	2	11%
Fourth Grade	2	11%
Fifth Grade	3	16%
Other	3	16%
Total	19	100%

Table 4.3

Post-test Responses by Grade Level for Comparison Group

Grade Level	Number of Responses	Percent of Total Responses
Pre-Kindergarten	2	17%
Kindergarten	1	8%
First Grade	3	25%
Second Grade	0	0%
Third Grade	0	0%
Fourth Grade	2	17%
Fifth Grade	1	8%
Other	3	25%
Total	12	100%

Table 4.4

Post-test Responses by Grade Level for Treatment Group

Grade Level	Number of Responses	Percent of Total Responses
Pre-Kindergarten	1	7%
Kindergarten	1	7%
First Grade	2	14%
Second Grade	1	7%
Third Grade	1	7%
Fourth Grade	1	7%
Fifth Grade	3	21%
Other	4	29%
Total	14	100%

The attrition rate was lower than expected (14% for the comparison group and 26% for the treatment group); however, the overall participation was low. Of the 39 teachers invited from the comparison school, 36% participated in the pre-test and 31% participated in the post-test. Of the 43 teachers invited to participate from the treatment school, 44% participated in the pre-test and 33% participated in the post-test.

Statistical Outcomes

Changes in classroom environment were assessed using the Teacher Version of the My Class Inventory Short Form (Sink & Spencer, 2007). Because the comparison

school was not a true control group (the two schools had differing demographics), there was a concern that pre-existing differences would influence the results of the study. That is to say, any differences between the scores might be attributed to their demographic differences, rather than the treatment.

Using the IBM Statistical Package for the Social Sciences 20 (IBM SPSS 20) a Mann Whitney U was conducted first on the pre-test scores for each dependent variable (competitiveness, difficulty, peer relations, and satisfaction) to determine whether there were significant differences in the pre-test scores for those variables. The alpha selected for this study was $p < .05$. Because the sample size of each group was larger than 8, the U was converted to a Z score (Nachar, 2008). Both the U and Z scores are reported below (Table 4.5).

Table 4.5
Pre-Test Test Statistics

	Competitiveness	Difficulty	Peer Relations	Satisfaction
Mann-Whitney U	131.000	103.000	98.500	71.000
Wilcoxon W	321.000	208.000	288.500	261.000
Z	-.073	-1.112	-1.265	-2.302
Asymp. Sig. (2-tailed)	.941	.266	.206	.021
Exact Sig. [2*(1-tailed Sig.)]	.957[b]	.287[b]	.212[b]	.024[b]

There were no significant differences between the competitiveness (U_{Pre_C} = 131.00; Z = -.073; p = .957), difficulty (U_{Pre_D} = 103.00; Z= -1.112; p = .287), and peer relations (U_{Pre_PR} = 98.50; Z = -1.265; p = .212) pre-test scores of the treatment and comparison groups (Table 4.5). Accordingly, with no statistical difference in the distribution of their pre-test scores, their corresponding post-test scores can be examined for differences. Alternately, there was a statistically significant difference in the distribution of satisfaction pre-test scores of the treatment and comparison groups

(U_{Pre_S} = 71; Z = -2.302; p = .024), meaning that there is a large enough difference between the treatment school's satisfaction scores and the comparison school's satisfaction score than can be explained by chance or accident.

As Table 4.6 shows, further investigation of the satisfaction scores of each group illustrated that the mean rank of the satisfaction scores for the comparison school was higher than the treatment school (MR_T = 13.74; MR_C = 21.43). Due to this pre-test difference, a difference in their post-test scores could not be separated from pre-test differences. As such, difference scores (change scores) were calculated for matched pre-post-test scores and a MWU was used to determine if there was a difference in the changes between the two groups, accommodating for pre-test differences.

Table 4.6

Pre-Test Ranks Across Dependent Variables

	Group	N	Mean Rank	Sum of Ranks
Competitiveness	Treatment	19	16.89	321.00
	Comparison	14	17.14	240.00
	Total	33		
Difficulty	Treatment	19	18.58	353.00
	Comparison	14	14.86	208.00
	Total	33		
Peer Relations	Treatment	19	15.18	288.50
	Comparison	14	19.46	272.50
	Total	33		
Satisfaction	Treatment	19	13.74	261.00
	Comparison	14	21.43	300.00
	Total	33		

Histograms of the dependent variables show the similar distribution of pre-test scores for competitiveness, difficulty, and peer relations (Figures 4.1, 4.2, and 4.3) and the difference in the distribution of scores for satisfaction (Figure 4.4). The results of the post-test analyses for each dependent variable are discussed in terms of hypothesis testing in the next section.

Figure 4.1 Histogram of Pre-Test Competitiveness Scores

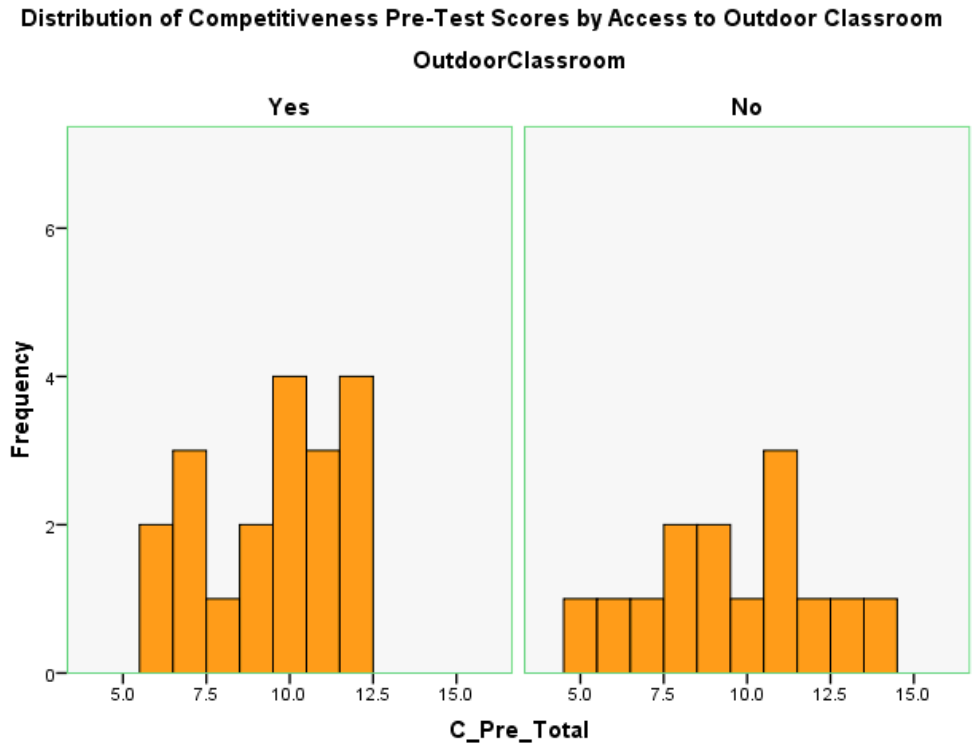


Figure 4.2 Histogram of Pre-Test Difficulty Scores

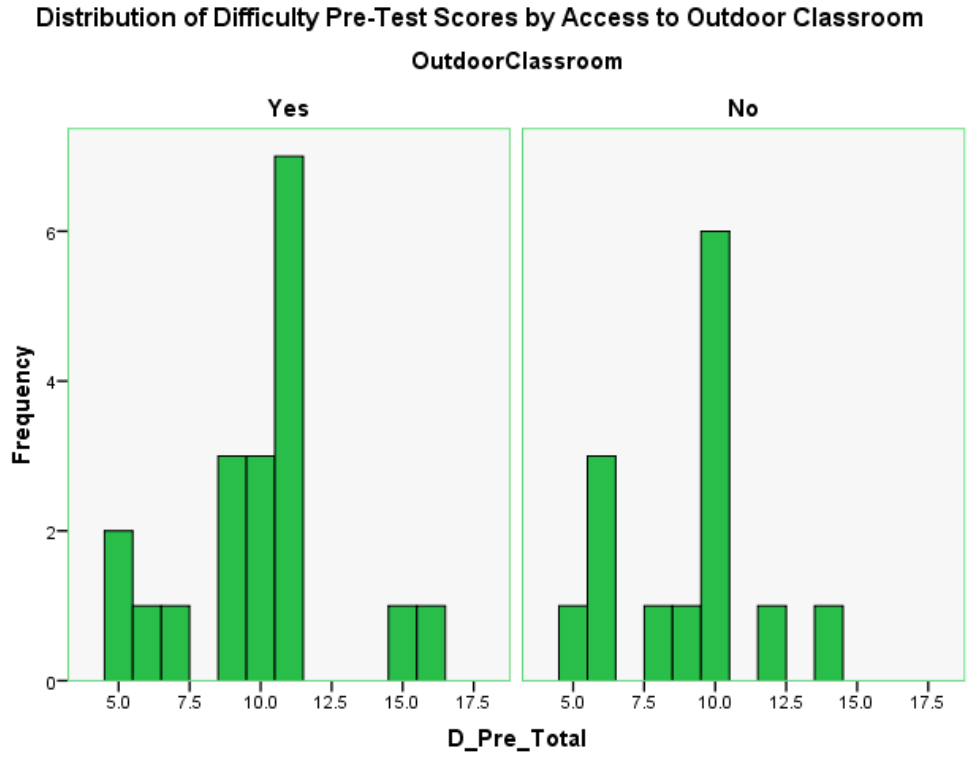


Figure 4.3 Histogram of Pre-Test Peer Relations Scores

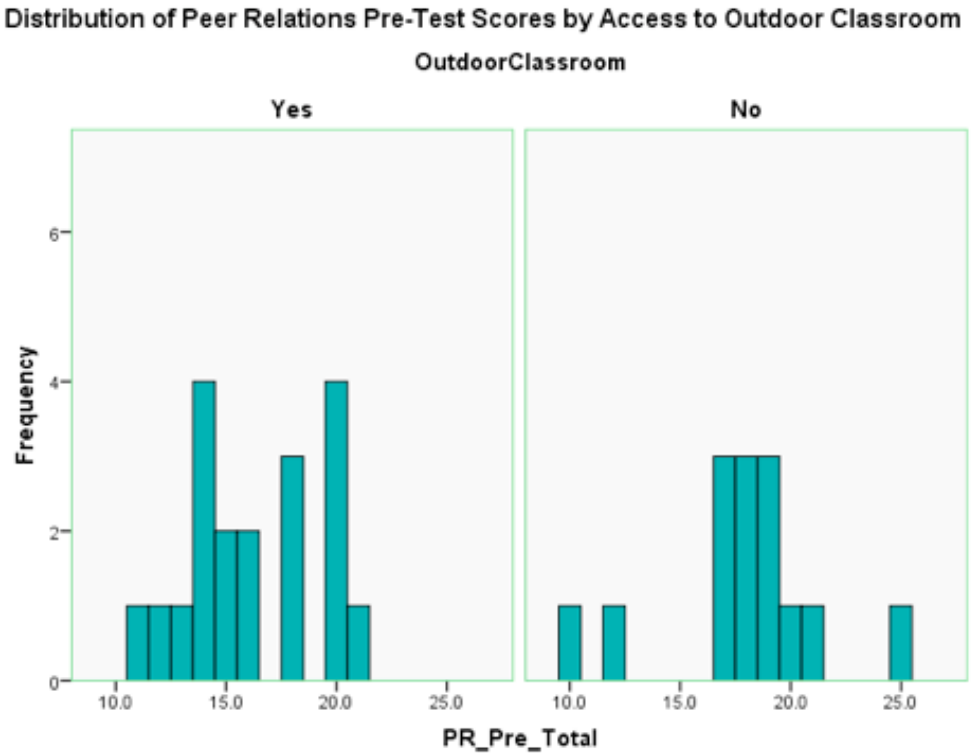
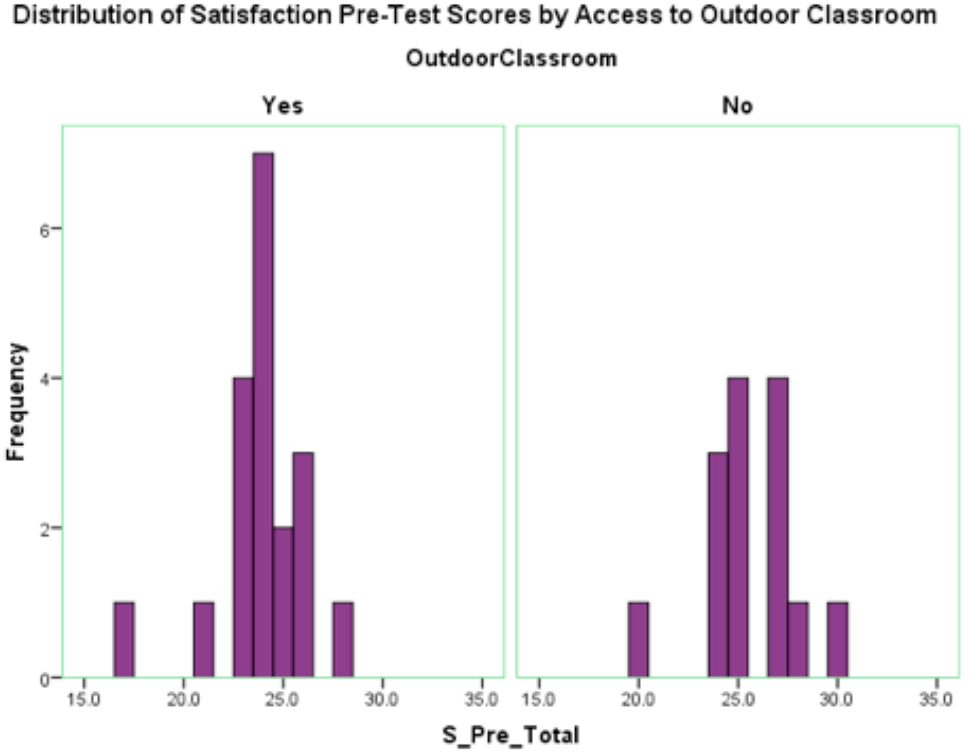


Figure 4.4 Histogram of Pre-Test Satisfaction Scores



Hypothesis Testing

- *Hypothesis 1:* There is no difference in the distributions of post-test classroom competitiveness scores between classes who have access to an outdoor classroom and those who do not.
- *Hypothesis 2:* There is no difference in the distributions of post-test classroom difficulty scores between classes who have access to an outdoor classroom and those who do not.
- *Hypothesis 3:* There is no difference in the distributions of post-test classroom peer relations scores between classes who have access to an outdoor classroom and those who do not.

A Mann Whitney U was conducted on the post-test scores of the treatment and comparison groups to test the first three hypotheses. Because there was no significant difference in the pre-test scores, differences in the post-test scores could be attributed to the treatment. However, there were no significant differences in the post-test competitiveness (U_{Post_C} = 69.50; Z= -.753; p = .462), difficulty (U_{Post_D} = 82.00; Z= -.104; p = .94), and peer relations (U_{Post_PR} = 57.50; Z= -1.372; p = .176) score distributions (Table 4.7).

Table 4.7

Post-Test Test Statistics

	Competitiveness	Difficulty	Peer Relations	Satisfaction
Mann-Whitney U	69.500	82.000	57.500	68.500
Wilcoxon W	174.500	160.000	162.500	173.500
Z	-.753	-.104	-1.372	-.810
Asymp. Sig. (2-tailed)	.452	.917	.170	.418
Exact Sig. [2*(1-tailed Sig.)]	.462[b]	.940[b]	.176[b]	.432[b]

- *Hypothesis 4:* There is no difference in the distributions of post-test classroom satisfaction scores between classes who have access to an outdoor classroom and those who do not.

Due to statistically significant differences in pre-test satisfaction scores, differences in post-test scores could not be attributed only to the treatment. To provide a meaningful analysis, difference scores (or change scores) were calculated for matched pre-post-test responses within the treatment and comparison groups to analyze the changes of each group in an attempt to minimize the effect of pre-test differences. Difference scores were calculated by subtracting the pre-test score from the post-test score (Table 4.8). Negative difference scores would be desirable for competitiveness and difficulty (the class environment should become less competitive and less difficult over time). Positive difference scores are desirable for peer relations and satisfaction (the classroom environment should become more satisfying and peer relations should increase over time).

Table 4.8

Difference Scores for Dependent Variables by Group

	Respondent	Competitiveness	Difficulty	Peer Relations	Satisfaction
Treatment n = 7	T1	4.00	1.00	3.00	-1.00
	T2	-2.00	-4.00	3.00	3.00
	T3	2.00	2.00	2.00	5.00
	T4	-2.00	1.00	-1.00	3.00
	T5	-1.00	2.00	2.00	1.00
	T6	2.00	2.00	-5.00	-1.00
	T7	-2.00	.00	.00	-1.00
Comparison n = 7	C1	2.00	-1.00	-1.00	2.00
	C2	1.00	-1.00	5.00	5.00
	C3	1.00	-2.00	2.00	1.00
	C4	.00	.00	3.00	-1.00
	C5	-1.00	.00	3.00	2.00
	C6	-3.00	.00	.00	1.00
	C7	-1.00	2.00	1.00	3.00

As Table 4.9 shows, there were no significant differences in the change scores for satisfaction (U_{Post_S} = 21.00; p = .710). There were notably fewer matched pre-post-test scores (n = 7 for each group) so the Z score is not reported.

Table 4.9

Post-Test Test Statistics for Difference Scores

	Difference in Competitiveness	Difference in Difficulty	Difference in Peer Relations	Difference in Satisfaction
Mann-Whitney U	24.000	13.000	19.000	21.000
Wilcoxon W	52.000	41.000	47.000	49.000
Asymp. Sig. (2-tailed)	.948	.132	.474	.647
Exact Sig. [2*(1-tailed Sig.)]	1.000[b]	.165[b]	.535[b]	.710[b]

Again histograms are a good way to illustrate the distributions of competitiveness, difficulty, peer relations, and satisfaction scores because they visually display the similarities or differences between the distributions (Figures 4.5, 4.6, 4.7, and 4.8).

Figure 4.5 Histogram of Post-Test Competitiveness Scores

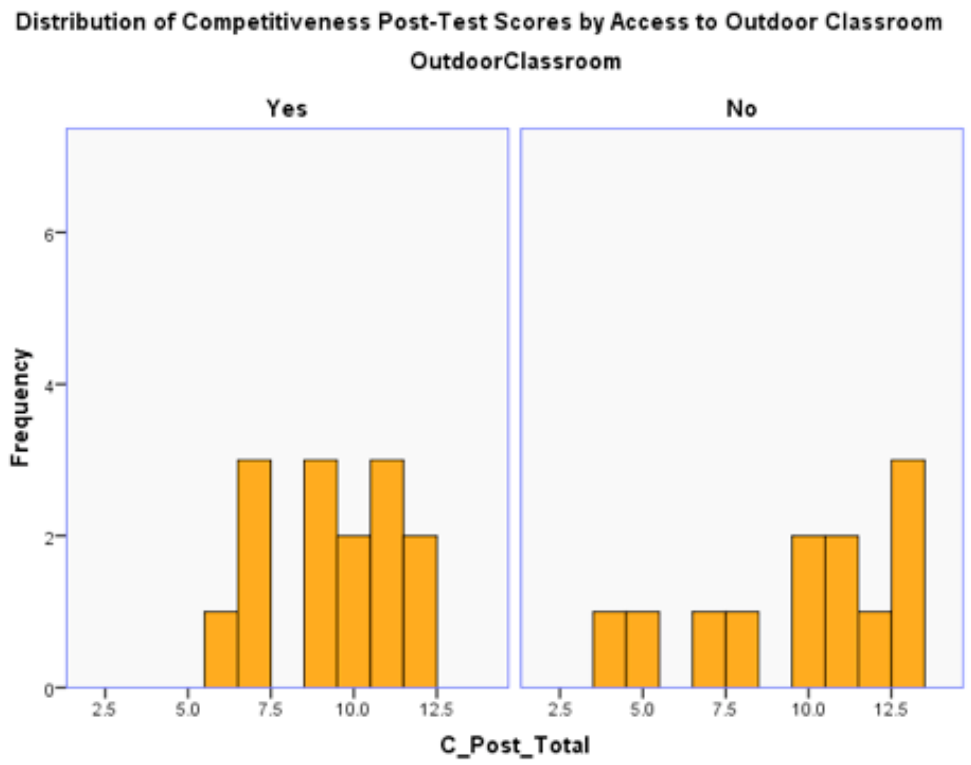


Figure 4.6 Histogram of Post-Test Difficulty Scores

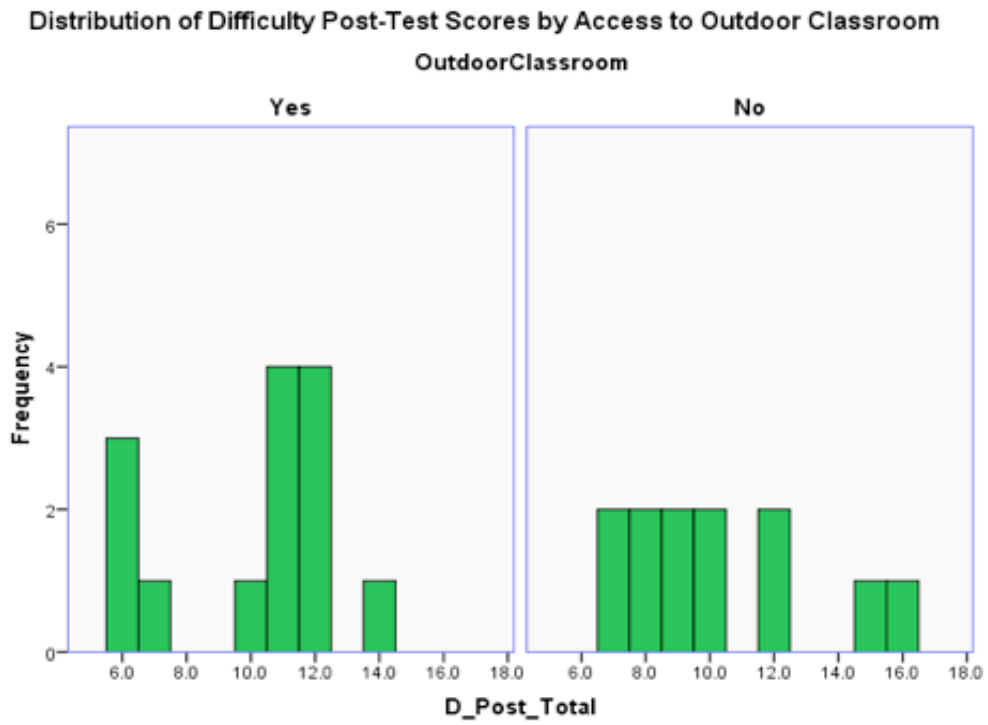


Figure 4.7 Histogram of Post-Test Peer Relations Scores

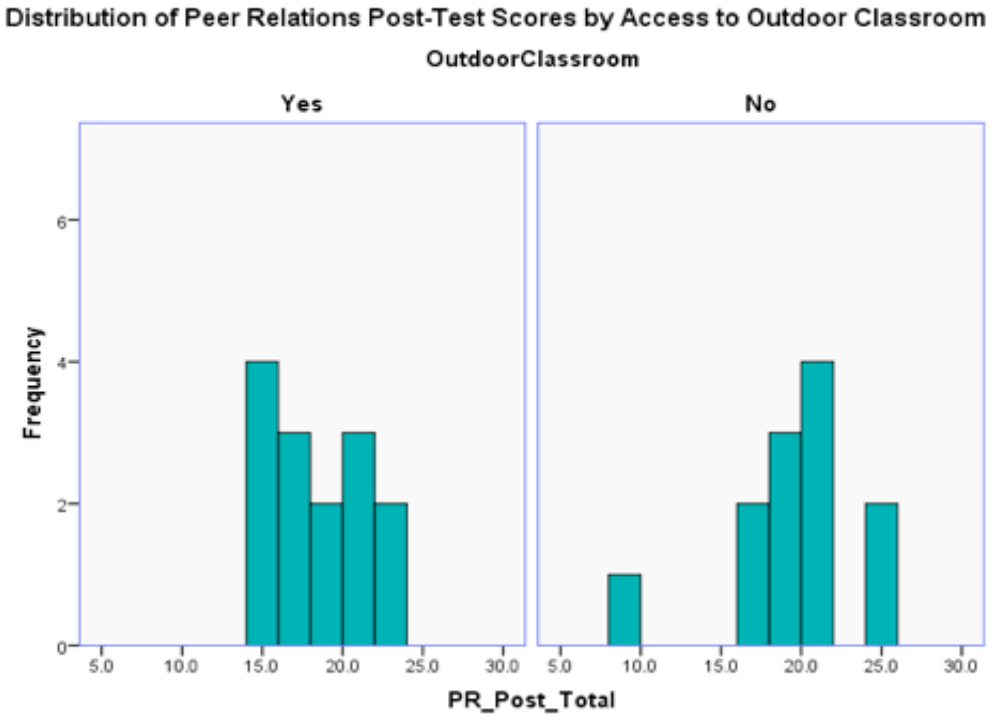
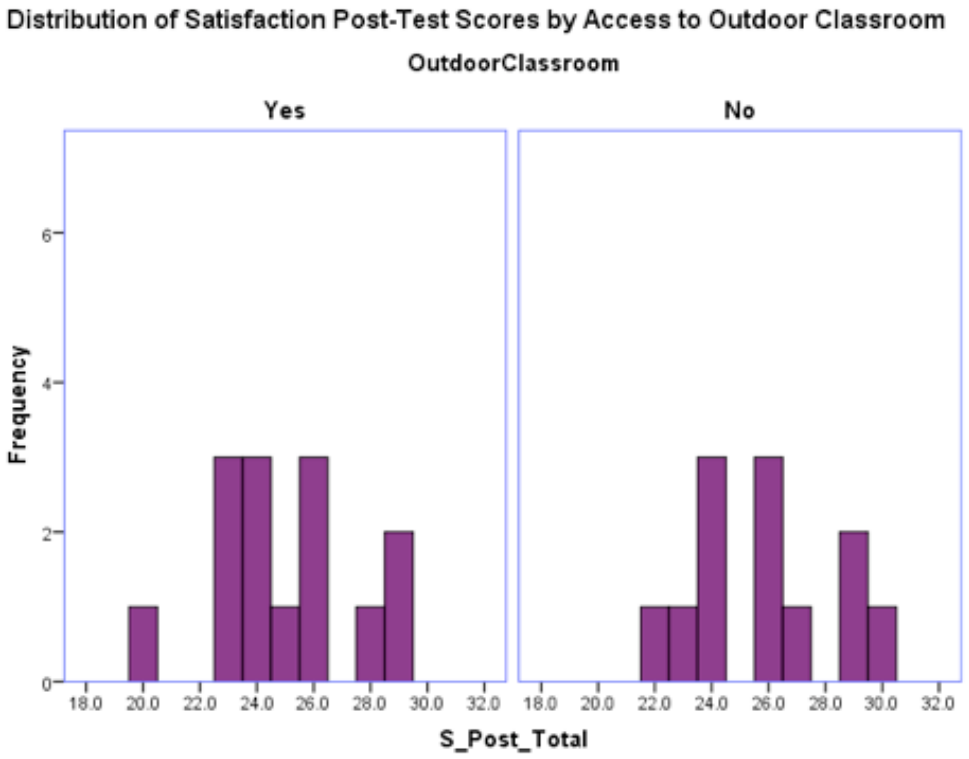


Figure 4.8 Histogram of Post-Test Satisfaction Scores



Descriptive Statistics

Although there were no significant differences in terms of hypothesis testing, descriptive statistics can provide insight to this particular sample. Table 4.10 shows that when the two groups were combined, the mean for each of the dependent variables stayed about the same, however, there was a small increase across the pre-test and post-test means of competitiveness and slightly larger increases across difficulty, peer relations, and satisfaction, which is a bit different from the dependent variable mean ranks of the two groups when they were analyzed separately (Table 4.11).

Table 4.10

Descriptive Data for Total Pre and Post Test Scores Across MCI Scales

	N	Mean	Std. Deviation	Min	Max	Median
Pre-Test Competitiveness	33	9.515	2.2929	5.0	14.0	10.000
Post-Test Competitiveness	26	9.538	2.5176	4.0	13.0	10.000
Pre-Test Difficulty	33	9.515	2.7171	5.0	16.0	10.000
Post-Test Difficulty	26	10.154	2.7523	6.0	16.0	10.500
Pre-Test Peer Relations	33	16.939	3.3348	10.0	25.0	18.000
Post-Test Peer Relations	26	18.385	3.5336	9.0	25.0	18.000
Pre-Test Satisfaction	33	24.606	2.4231	17.0	30.0	24.000
Post-Test Satisfaction	26	25.385	2.5310	20.0	30.0	25.500

Table 4.11 displays the mean rank data for the pre-test and post-test scores for each dependent variable by group. Contrary to when the groups were combined, when each group is analyzed separately, the mean ranks decrease from the pre-test to the post-test (Table 4.11).

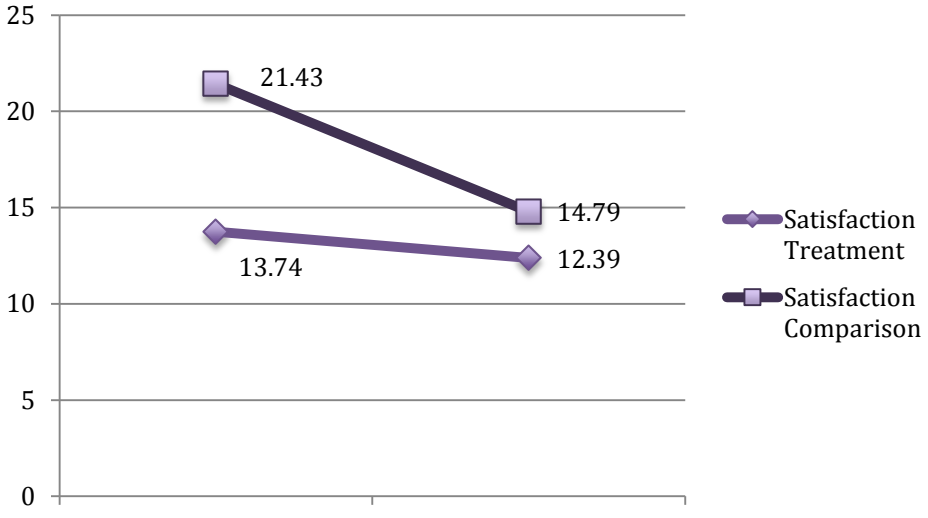
Table 4.11

Rank Data for Pre and Post Test Scores Across Groups

	Group	Pre-N	Post-N	Pre-Test Mean Rank	Post-Test Mean Rank	Pre-Test Sum of Ranks	Post-Test Sum of Ranks
Competitiveness	Treatment	19	14	16.89	12.46	321.00	174.50
	Comparison	14	12	17.14	14.71	240.00	176.50
Difficulty	Treatment	19	14	18.58	13.64	353.00	191.00
	Comparison	14	12	14.86	13.33	208.00	160.00
Peer Relations	Treatment	19	14	15.18	11.61	288.50	162.50
	Comparison	14	12	19.46	15.71	272.50	188.50
Satisfaction	Treatment	19	14	13.74	12.39	261.00	173.50
	Comparison	14	12	21.43	14.79	300.00	177.50

Figures 4.9, 4.10, 4.11, and 4.12 show the changes in mean ranks for each dependent variable. Figure 4.9 shows the difference in the satisfaction mean rank at the time of the pre-test, but that the mean ranks of the two groups were closer together at the time of the post-test. The mean rank satisfaction for the comparison school decreased by 6.64 while the satisfaction mean rank for the treatment school decreased by only 1.35.

Figure 4.9 Changes in Satisfaction Mean Ranks by Group



All of the mean ranks decreased from the pre-test to the post-test. This decrease was desirable for competitiveness and difficulty (Figures 4.10 and 4.11). That is to say, classrooms environments should have lower levels of competitiveness and difficulty.

Figure 4.10 Changes in Competitiveness Mean Ranks by Group

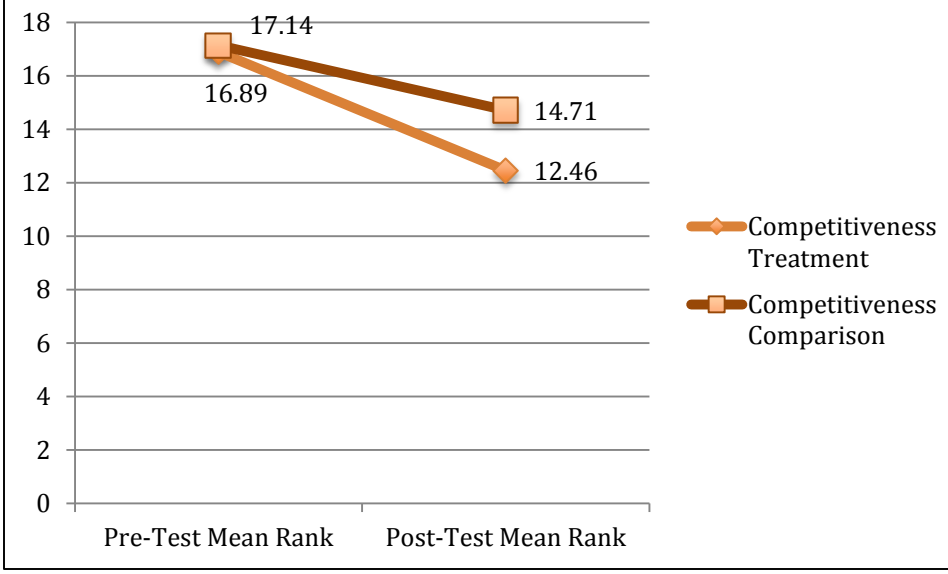
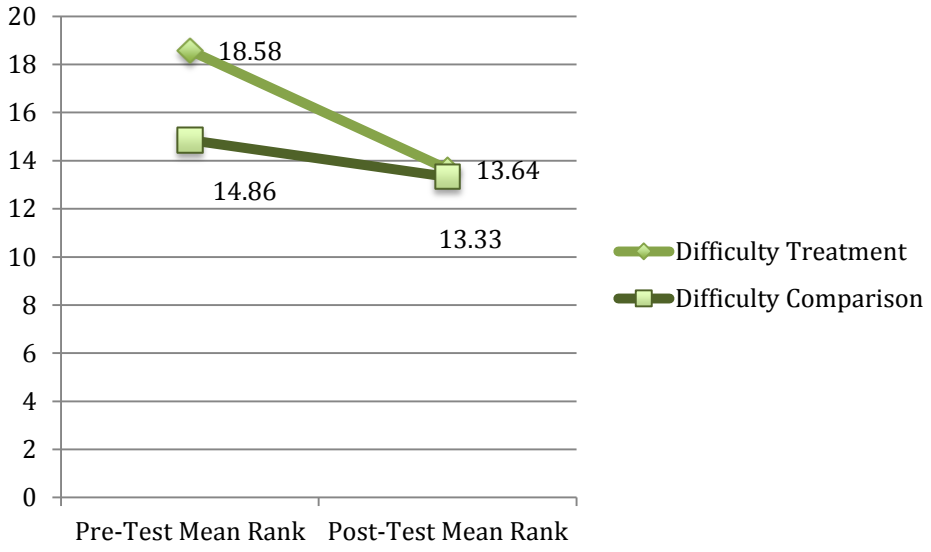
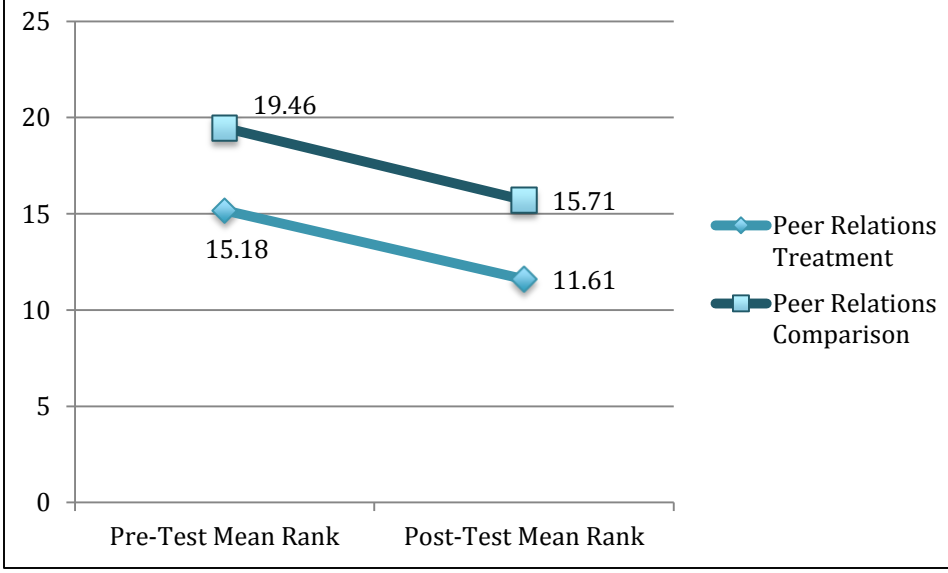


Figure 4.11 Changes in Difficulty Mean Ranks by Group



The mean ranks indicate that competitiveness and difficulty decreased more among the treatment group than the comparison group. The treatment group decreased by 4.43 on the competitiveness scale while the comparison group decreased by 2.43 (Figure 4.10). In terms of difficulty, the treatment group decreased by 4.94 and the comparison group decreased by 1.53 (Figure 4.11). The mean ranks for each group decreased almost identically for the peer relations scale (Figure 4.12)

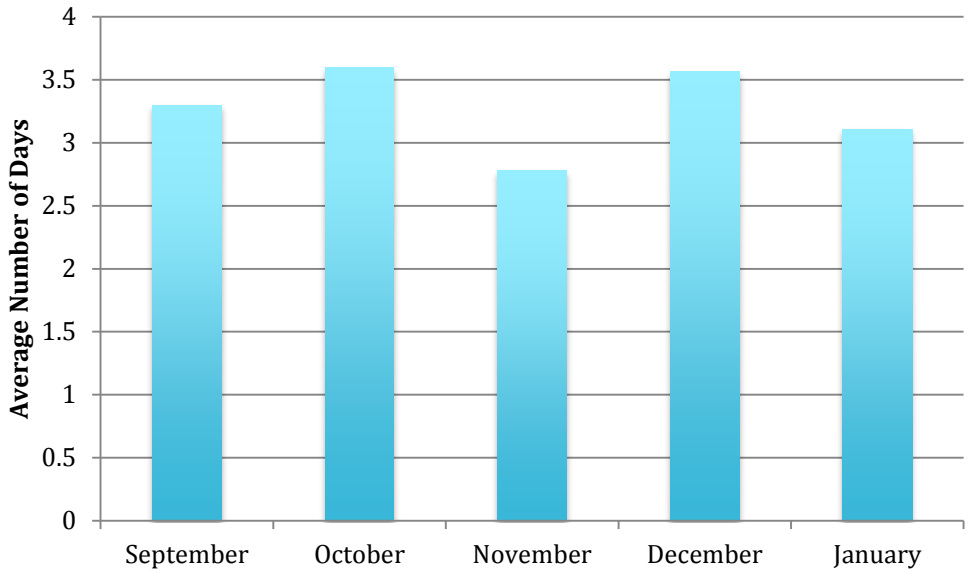
Figure 4.12 Changes in Peer Relations Mean Ranks by Group



Assessment Data from Treatment School

In addition to the TMCI-SF, the teachers at the treatment school responded to questions about their use of the outdoor classroom. First, teachers indicated how many days a month they used the outdoor classroom. Average use each month (September through January) is very similar, although there was a small decrease in November (Figure 4.13).

Figure 4.13 Average Use of the Outdoor Classroom by Month



The descriptive statistics for usage provide insight into the fact that some teachers use the outdoor classroom often and some do not. The minimum and maximum response values and standard deviations demonstrate how the use varied (Table 4.12).

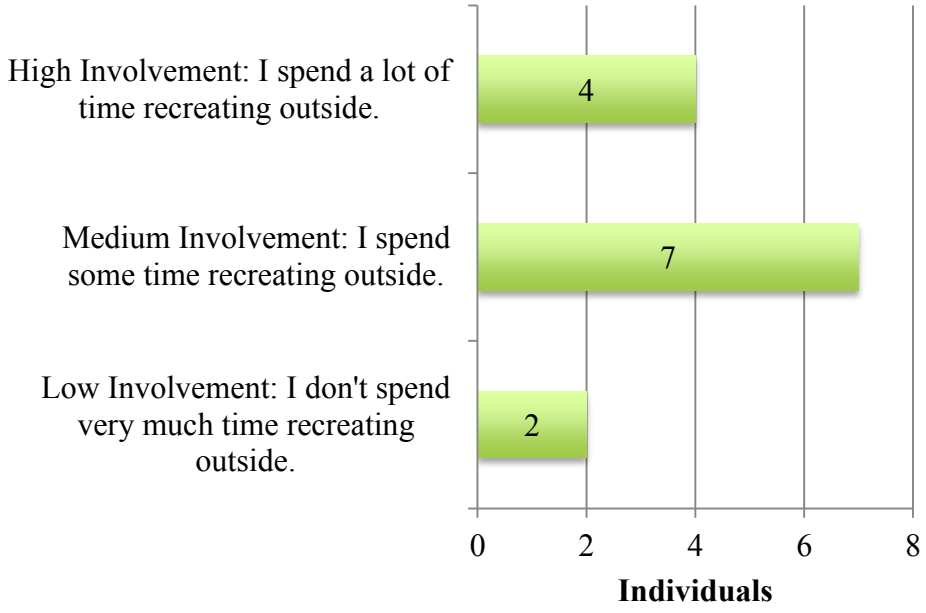
Table 4.12

Descriptive Statistics for Outdoor Classroom Usage by Month

	Min Value	Max Value	Average Value	Standard Deviation	Responses
September	0	10	3.3	2.83	10
October	0	13	3.6	3.75	10
November	0	13	2.78	3.9	9
December	0	12	3.57	4.86	7
January	0	10	3.11	3.1	9

Teachers were also asked about their personal experience with and in the out-of-doors. Figure 4.14 shows that the majority of the teachers identify with a "Medium Involvement" level.

Figure 4.14 Teacher-Reported Outdoor Experience Level



The teachers' use of the outdoor classroom as it is associated with their personal experience level can be seen in Figures 4.15, 4.16 and 4.17. None of the teachers who identified with low involvement responded to the questions about how often they used the outdoor classroom. For this sample, there is a small trend that those teachers who identify with high involvement seem to use the outdoor classroom more often (Figure 4.15). Because this is such a small group, an average (mean) could be a bit skewed, so Figure 4.16 shows the use per month for each respondent. The blue bars represent medium outdoor experience and the orange bars represent high outdoor experience (Figures 4.15 and 4.16).

Figure 4.15 Average Use Per Month by Personal Experience Level

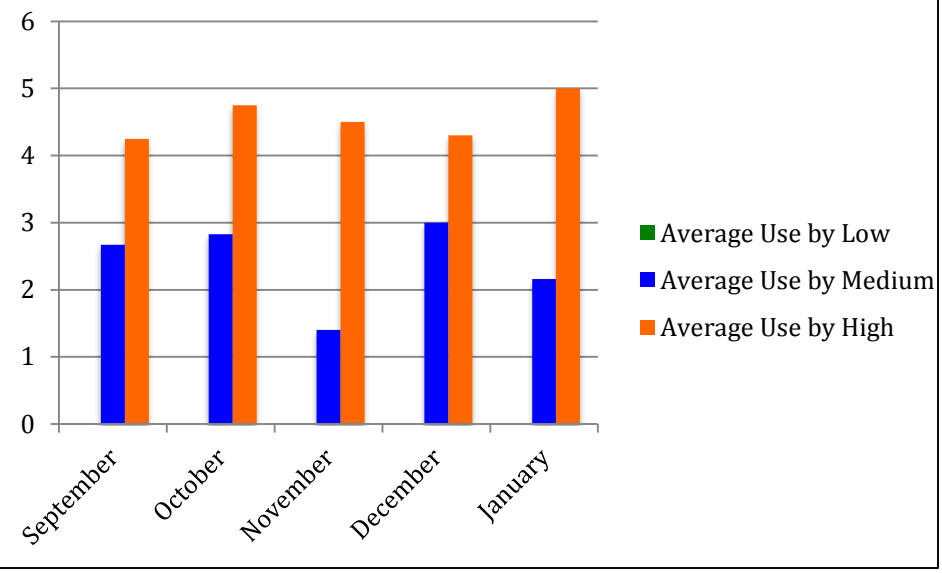
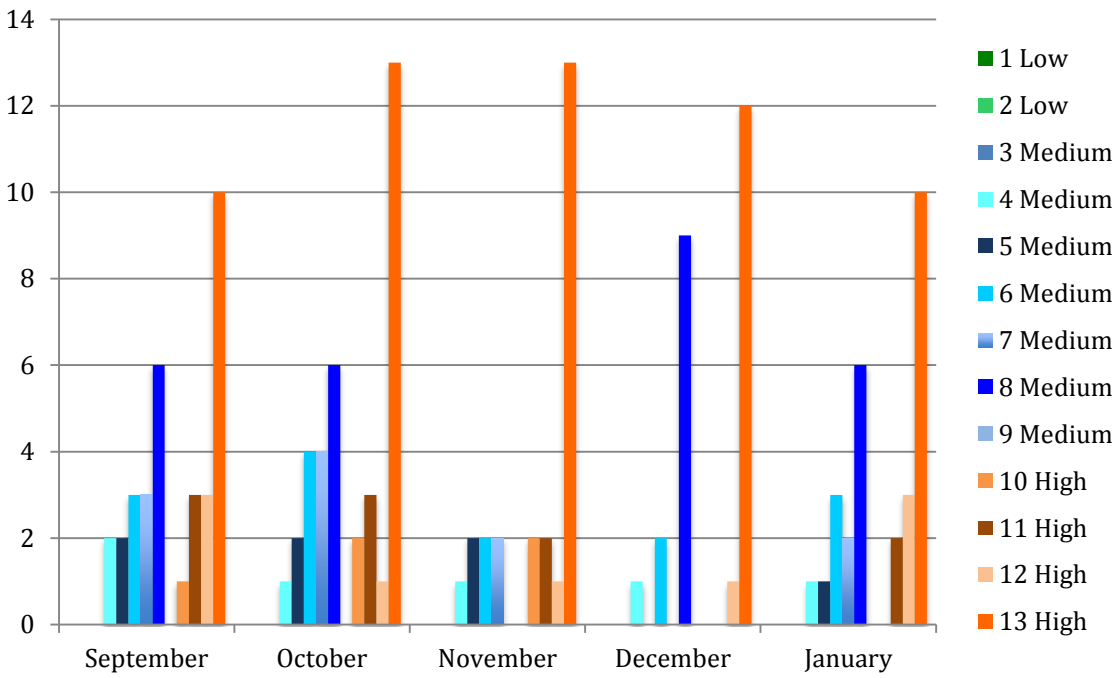


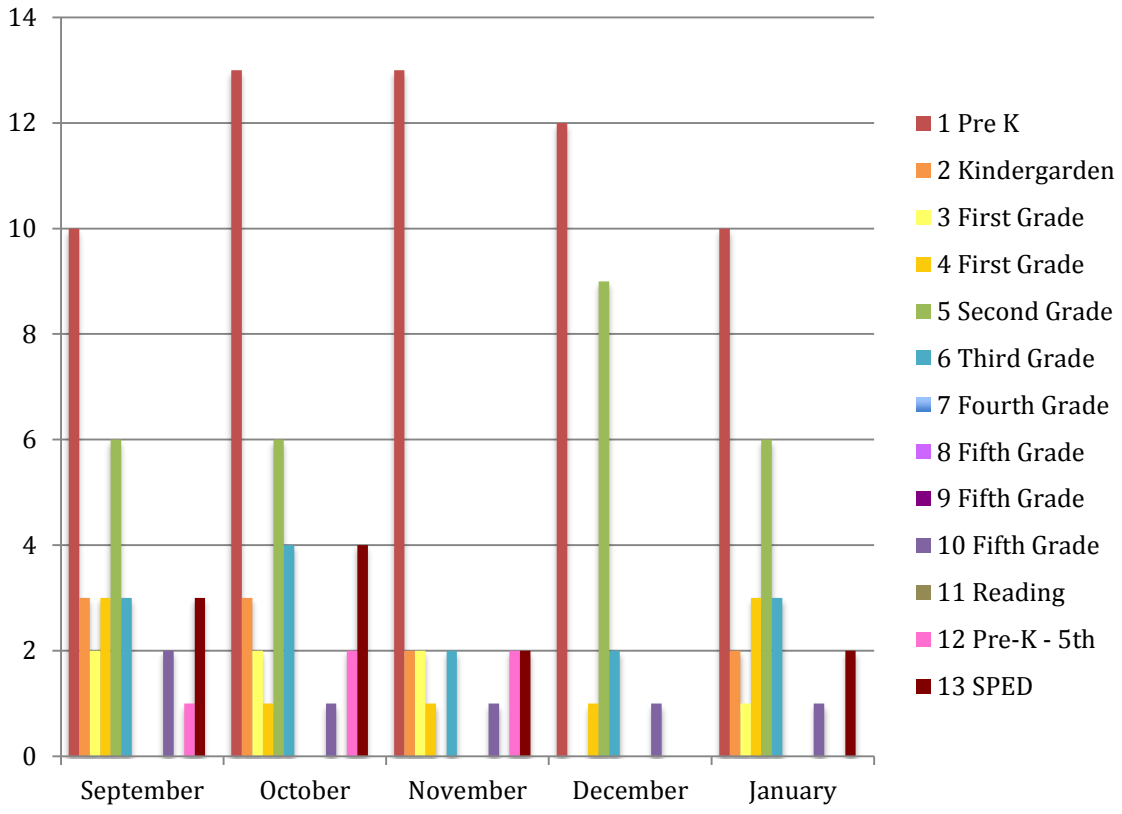
Figure 4.16 Individual Responses of Use Per Month by Personal Experience Level



A final perspective to view the use of the outdoor classroom is by grade level. Through conversations with the teachers before data collection began, there was an indication that upper level teachers were less likely to use the outdoor classroom. They

indicated that the pressure from their curriculum and focus on standardized testing made it difficult for them to find time to move their class outside. This grade level discrepancy was evident in the data. Early childhood teachers and special education teachers reported using the outdoor classroom more than the upper level teachers (Figure 4.17).

Figure 4.17 Individual Responses of Use Per Month by Grade Level



Teachers also responded to a Likert style questionnaire to indicate how much they agreed with the statements about the outdoor classroom (Strongly Disagree = 1; Disagree = 2; Neutral = 3; Agree = 4; Strongly Agree = 5). Table 4.13 shows the statements along with descriptive data about their responses. The most positive responses are related to the accessibility of the outdoor classroom (M = 4.15) and their intent for continuing to use the outdoor classroom (M = 4.15). The lowest responses were related to using the outdoor classroom separately from their indoor classroom curriculum. This indicates that

teachers are using the outdoor classroom in connection with their indoor classroom. A low to moderate number of responses indicated that teachers would still like more information or resources for the outdoor classroom.

Table 4.13

Assessment Questions About Outdoor Classroom Usage

1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly Agree

	SD	D	N	A	SA		
Question	1	2	3	4	5	Total Responses	Mean
1. The Outdoor Classroom was accessible to my students and me.	1	0	2	3	7	13	4.15
2. The Outdoor Classroom was useful to my students and me.	1	0	2	4	5	12	4
3. I used the Outdoor Classroom to supplement the lessons I taught in the indoor classroom.	2	0	3	5	3	13	3.54
4. The students seemed to be more attentive in the Outdoor Classroom.	1	0	6	4	2	13	3.46
5. I need more information or resources to better use the Outdoor Classroom.	0	2	4	6	1	13	3.46
6. I used the Outdoor Classroom separately from lessons taught in the indoor classroom.	2	4	6	1	0	13	2.46
7. The Outdoor Classroom stimulated more hands on activity for the students than the indoor classroom.	1	0	8	1	3	13	3.38
8. I plan to continue using the Outdoor Classroom in the future.	1	0	2	3	7	13	4.15

In a section for comments, teachers also indicated that they would like more chairs available in the house and for some of the vegetation to be labeled (Table 4.14). The teachers also provided comments to describe the way they were using the outdoor classroom or the way they plan to use to outdoor classroom (Table 4.15). In addition to using the outdoor classroom to supplement their class material, teachers are using the outdoor classroom to change the pace and work out excess energy in their students.

Table 4.14

Additional Teacher Comments About Wants/Needs

"Getting more resources in th [sic] rooms to use in lessons."
"Need a class set of chairs available in the house"
"Labeling of vegetation would be helpful."
"I'm excited to see the new trail that goes through an area with fewer evergreens and more hardwood trees. I think that will provide even more opportunities for us to learn and explore."

Table 4.15

Teacher Comments on Outdoor Classroom Usage

"I have used the outdoor area to provide hands on activities to reinforce the themes and lessons used within the classroom. Future plans are to include activities involving gardening, animal/plant life cycles, pond and other nature related themes."
"I would like to use the Outdoor Classroom for my Land and Water Science Unit and my Organism Unit."
"Change of environment and opportunity to explore and move their bodies is extra benefits for my students."
"I try to figure out ways to supplement what I do in the classroom with the trips to the outdoor classroom. We recently set up a classroom store using items we collected from the outdoor classroom. We were learning about money so each child made an advertisement for their item, a price tag, and how to figure out which coins were necessary to buy an item from another student. It was much more engaging than how I would have done the same task in the past."

Summary of Findings

The results of the hypothesis testing showed that there were no significant differences in classroom environment scales of competitiveness, difficulty, peer relations, or satisfaction between the treatment and comparison groups. However, the changes in mean rank scores between the pre-test and the post-test illustrated some interesting trends. Descriptive statistics also provided some interesting information and insight into how the outdoor classroom is being used at the treatment school. These findings and trends, along with their connections to previous studies, will be discussed further in the following chapter.

CHAPTER FIVE

DISCUSSION

Summary of Study

The purpose of this study was to investigate the impact of an outdoor classroom on indoor classroom environment, specifically elements of competitiveness, difficulty, peer relations, and satisfaction. The literature shows a positive relationship between access to the out-of-doors and education benefits through increased attentiveness and restoration (Berto, 2005; Dutt, 2012; Tennessen & Cimprich, 1995). There are also indications that access to nature and natural areas is beneficial to overall health and development (American Academy of Pediatrics, 2007; Fatai, Faqih, & Bustan, 2014; Fjørtoft, 2001). Research has shown that an integrated approach that uses hands-on, student based learning through environmental or outdoor education can have benefits for diverse populations of students (Desmond, Grieshop & Subramaniam, 2002; Eick, 2012; Glen, 2000; Lieberman & Hoody, 1998; Volk & Cheak, 2003). These outcomes are exciting as they provide an avenue for use by teachers to decrease the education gap between their students (Glen, 2000; Lieberman & Hoody, 1998). Even more promising than the positive academic achievements associated with these programs is the increase in engagement and motivation among students who were not motivated and decreases in

behavior problems (Desmond, Grieshop & Subramaniam, 2002; Lieberman & Hoody, 1998; Volk & Cheak, 2003). The teachers are also more motivated by these approaches and the potential benefits for their classrooms and their students (Eick, 2012; Glen, 2000; Lieberman & Hoody, 1998). The overall indoor classroom environment has similarly been shown to impact academic achievement (Alexander, Entwisle, & Dauber, 1993; Hoge and Luce, 1979). The scope of this study was to add to the body of knowledge about the outcomes of outdoor classrooms and outdoor education on the indoor classroom environment.

Participants who met the criteria for this study voluntarily completed the Teacher Version of the My Classroom Inventory Short Form (Sink & Spencer, 2007) in September and again in February. Teachers at the treatment school (with access to an outdoor classroom) were asked additional questions to assess how they were using the outdoor classroom and how often. Because the comparison school was not a true control, pre-test scores were analyzed using a Mann Whitney U to test for differences between the groups. The post-test results of the TMCI-SF were analyzed with a Mann Whitney U and the follow-up questions were analyzed as descriptive statistics. The data analysis was conducted using the IBM Statistical Package for the Social Sciences 20 (IBM SPSS 20). Figures and graphs were created through SPSS 20, the Qualtrics database, and Microsoft Excel.

Discussion of Classroom Environment Findings

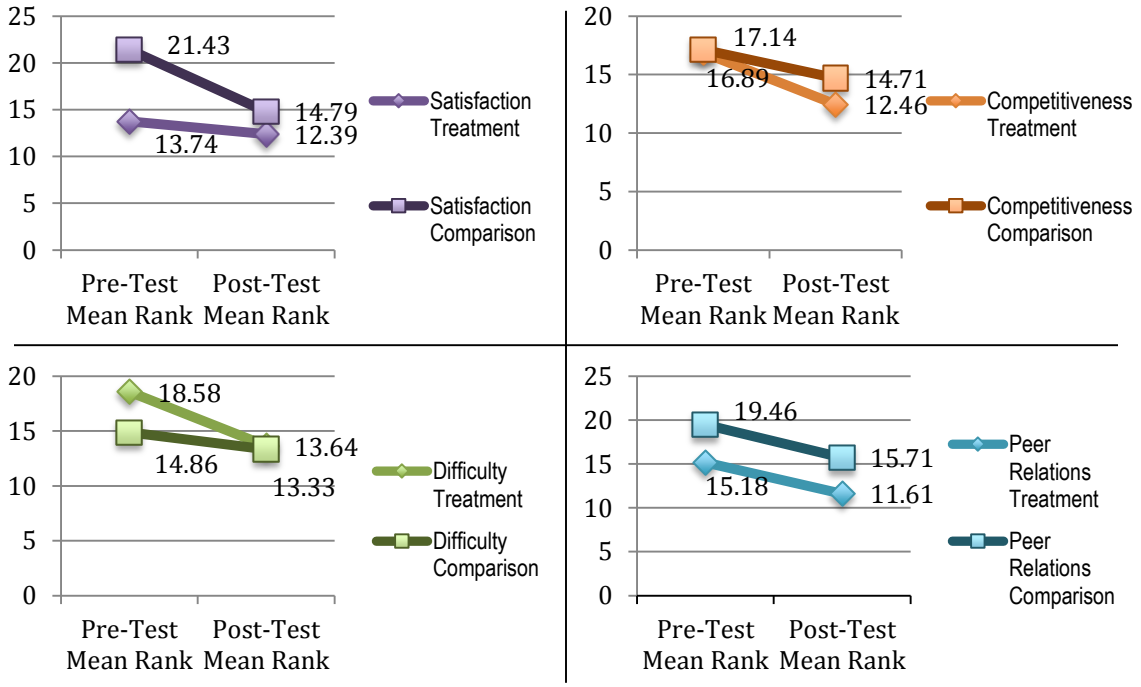
Fraser, Anderson and Walberg (1982) described the various uses of classroom environment measures and specifically the MCI. One application they suggest is the evaluation of curricula, teaching approaches, or educational innovations. The literature

they review in their manuscript and the literature included earlier in this document show the relationship between classroom environment and various measures of academic achievement (Alexander, Entwisle, & Dauber, 1993; Fraser, Anderson, & Walberg, 1982; Hoge & Luce, 1979). Furthermore, Fraser, Anderson, and Walberg (1982) suggest that the research shows that the MCI is a capable evaluation of curricular effectiveness because previous research supports that the MCI is a more sensitive criterion than more traditional cognitive achievement measures. That is to say, the health and quality of the classroom environment may be a better indicator of student academic achievement than traditional measures such as standardized tests scores and GPAs.

This study used teacher perceptions of classroom environment as an indicator of possible outcomes related to access to an outdoor classroom. There were no significant differences in teacher perceptions of competitiveness, difficulty, peer relations, or satisfaction in post-test comparisons. However, there was a significant difference in pre-test scores of satisfaction ($U = 71$; $Z = -2.302$; $p = .024$). Based on previous literature that shows positive academic outcomes related to access to the out-of-doors (Berto, 2005; Dutt, 2012; Tennessen and Cimprich, 1995), and increased academic achievement and a more favorable classroom environment associated with outdoor education (Desmond, Grieshop & Subramaniam, 2002; Lieberman & Hoody, 1998; Glen, 2000; Volk & Cheak, 2003), it is reasonable to conclude that the pre-test differences diminished as teachers with access to an outdoor classroom perceived their students to be more satisfied in their classroom over time due to positive changes in academic achievement and classroom environment.

Figure 5.1 shows the changes in mean ranks for each dependent variable on the satisfaction, competitiveness, difficulty, and peer relations scales. The significant difference in satisfaction pre-test scores is visible, along with the closeness of post-test scores.

Figure 5.1 Changes in Mean Ranks by Group



The competitiveness and difficulty scores for the treatment group decreased more than the same scale scores for the comparison group. This decrease was desirable for competitiveness and difficulty, which also supports previous literature that indicates positive changes in academic achievement and classroom culture when students are exposed to outdoor education opportunities (Desmond, Grieshop & Subramaniam, 2002; Lieberman & Hoody, 1998; Glen, 2000; Volk & Cheak, 2003). However, peer relations and satisfaction mean ranks also decreased (Figure 5.1). Classroom environments are expected to change over time, but this collective decrease, along with attrition of

participants, may indicate that February is a particularly difficult time of the school year or that the research design did not allow enough time for any measureable change to occur. The invitation to participate in the post-test was sent to teachers around Valentine's Day and a three-day weekend. Anecdotal data indicates that this amounts to a doubly difficult time for students and teachers. Diamantes (2002) administered the MCI in October and April (a similar timeline) and did not report any limitations associated with the timeline. Comparably, Koch (2008) administered the student and teacher versions of the MCI-SF first in October and November and then again in the spring (the month is not specified) and did not report timeline limitations specifically. However, in her discussion, Koch (2008) explained that one principal reported that the results did not provide a complete picture of the change in students and thus, Koch (2008) suggested that future research consider data over a "longer period of time" (p. 119).

Koch (2008) conducted a study using pre-test-post-test administrations of the student and teacher versions of the MCI-SF to investigate the impact of a school-counseling program, which is a similar application to the current design. The findings related to a decrease in competitiveness scores support findings by Koch (2008) of a significant decrease in competitiveness and friction scores. However, Koch (2008) also found a significant increase in cohesion and satisfaction among the second and third graders included in the study. While the current study did not use the cohesion or friction scales, the peer relations scale included a collapsed version of these scales that favored an increase and subsequently did not a find an increase in peer relations. However, the current study was from the perspective of teachers, rather than students. Koch (2008) did not find any significant differences in pre-test and post-test scores for teachers and

suggested that teachers might have a generally more consistent perspective of their classroom environment. Further investigation shows that the teacher data from Koch (2008) is even more similar to the current study's findings. Koch (2008) reports small decreases between the means of teacher pre-test and post-test scores for satisfaction, competitiveness, difficulty and cohesion while friction increased slightly (p. 84). Again, none of these differences were statistically significant, but their direction of change is similar to the data from the current study and could support timeline and administration issues. Further research should be done in this area to better understand these trends.

Discussion of Outdoor Classroom Assessment Findings

The results of the follow-up assessment of the treatment school's use of the outdoor classroom showed that there was some variation in how the outdoor classroom was being used. Primarily, the lower grade levels and specials teachers are using the outdoor classroom more often than upper grade levels. This result supports the suggestion that upper grade level teachers have a harder time integrating the outdoor classroom into their curriculum and/or finding time within their standardized testing schedule. Future research should examine this trend to find ways that upper grade level teachers could utilize better the outdoor classroom.

Additionally, there was a small trend that teachers who identified with higher outdoor experience levels used the classroom more often. However, it is not a substantial enough tendency that medium or low outdoor experience must be considered a barrier at this point. Future research could be directed toward understanding better the relationship between personal outdoor experience and a teacher's use of the outdoor classroom.

Finally, teacher responses about how they are using the outdoor classroom were promising. When given the opportunity to describe how they use the outdoor classroom and the benefits they see, a teacher wrote "Change of environment and opportunity to explore and move their bodies is extra benefits for my students." In addition to using the outdoor classroom to supplement their class material, teachers are using the outdoor classroom to create dissonance and work out energy, which is supported in the literature and echoes the "cathartic" theory from Aristotle (Erikson & Erikson, 1998; Luckner & Nadler, 1997).

By and large, teachers report that the outdoor classroom was accessible and useful as a supplement to their overall curriculum. Undeniably, this data may exclude teachers who do not find the outdoor classroom accessible because they may have elected not to participate in the research. Further discussion of this limitation along with recommendations will be included in the following sections.

Conclusions

Within the context of this study, access to an outdoor classroom does not have a statistically significant impact on the indoor classroom environment. However, through the consideration of descriptive data, there are some positive indicators that could be used for future studies. Access to an outdoor classroom is a possible mediator for some of the inevitable "slump" that occurs in the middle of the school year. Satisfaction scores from the school that had access to the outdoor classroom decreased less than scores from the school that did not have access to an outdoor classroom. Additionally, in the environment scales that favored lower numbers (competitiveness and difficulty), the treatment school's rank means indicated that the teachers perceived less of the undesirable elements

than the teachers at the comparison school at the time of the post-test. Without more information, it is difficult to say whether these changes can absolutely be attributed to the outdoor classroom, but follow-up responses from teachers at the treatment schools support the idea that the outdoor classroom provides meaningful, positive benefits to their students and their classroom.

Limitations

Even with the best intentions, research on humans is a difficult task. One of the reasons the Mann Whitney U is so popular in social sciences is due to the difficulty of recruiting subjects and the resulting small sample sizes (Nachar, 2008). The present study suffered from the same challenge. Of the total census of teachers invited to participate, around 35% self-selected to complete the pre-test and the post-test. The general sense from many teachers and administrators is that teachers are consistently pressed for time. Although this survey was short, it is possible that teachers were simply deterred by the idea of taking their time. Additionally, in order to maintain as much confidentiality and anonymity as possible, very few unique characteristics were collected from the participants. As a result, this study relied on the participants to answer three questions in the exact same way on the pre-test and the post-test in order to create a unique code. The three questions were the grade level they taught, their birth month, and the last four digits of their phone number. Although there were 14 and 12 participants in the post-test, only seven from each of those groups could be matched with pre-test scores. In a few cases, the grade level and birth month matched, but the four digits of the phone number did not. In a time where individuals often have more than one phone, participants may have inadvertently used two different phone numbers. For the scope of this study, the matched

pre-post-test scores were not imperative, but this instance speaks to the overall limitation of a small sample. Evaluations by grade level or outdoor experience level that may have relied on pre-post-test scores were not possible with such a small sample. Ultimately, the sample size was not debilitating. The biggest impact was on the statistical analysis as an ANCOVA was not appropriate for this sample. However, the Mann Whitney U test provided meaningful analysis and was robust to the influence of non-normality and small sample size.

In addition to teachers not being required to participate in this study, as the monthly use of the outdoor classroom indicates, teachers were also not required to use the outdoor classroom. Some of the teachers who indicated that they used the outdoor classroom were not grade level teachers. As such, students may have been exposed to the outdoor classroom during physical education or reading even though their primary teacher was not using the outdoor classroom. It is possible that a greater difference in classroom environment between the two schools could have been observed if the teachers at the treatment school were using the outdoor classroom more consistently.

Another limitation of this study was the differences between the two school groups. Stillwater Public Schools was quite helpful in allowing this research to take place within their district. However, they were also, understandably, most interested in protecting the time and space of their teachers and students. While these goals were not immediately mutually exclusive, they did conflict when it came to selecting a control school. With gratitude for their willingness to participate in this research at all, this limitation was accepted and statistically controlled for as much as possible (by testing for pre-test differences).

Finally, a considerable limitation to this study was the timeline. A pre-test in August and a post-test in May would be most desirable. However, August is a busy time for teachers. Students are arriving and leaving and the classroom environment is still being established. Likewise, May is a busy time for teachers. Students are experiencing the "Adjourning" stage of Tuckman's Group Development Model and are likely acting much like they did in August (Tuckman & Jensen, 1977). Additionally, as this project is part of a dissertation, university timelines for submission of research restricted the post-test date as well. Although mid-February met the needs of the research timeline, it was problematic timing for teachers. The limited timeline may have truncated the data in such a way that measurable change could not be captured. Additionally, the timing of the post-test may not have accurately captured the big picture, but instead some sort of mid-February slump. At least, in this case, both the treatment and comparison schools shared the short timeline and poor timing limitations.

Recommendations for Future Research

The results of this study, while not statistically significant, reasonably support previous research related to the outcomes of outdoor classrooms. However, there is still ample room for inquiry. Future studies should try to capture more longitudinal data to allow for measureable change to occur. One additional measurement (pre-test, mid-year, and post-test) could be considered to track the possibility of data being influenced by collection occurring at difficult times for the teacher or students. Between winter holidays and spring break, data collection could be difficult. Teachers should be contacted for recommendations on data collection timing.

Ideally, future research should also include larger samples and better-matched control groups. In a larger school district, if multiple schools with outdoor classrooms could be included, the possibility for analysis across grade levels is much higher. This design would work only if the focus was on evaluating access to an outdoor classroom and not how the outdoor classroom is being used, as it is likely to vary from location to location based on differences in resources, teachers, and school climate. If at all possible, a more specific intervention that ensures consistent use of the outdoor classroom, possibly even consistent use of particular materials or curricula, would be a desirable way to better understand the impact of outdoor education and outdoor classrooms on the indoor classroom environment.

Future research using the TMCI-SF should further investigate the changes made to the peer relations items and reverse coding. Additional reliability measures and factor analysis should be conducted to determine the instrument's usefulness for varying populations and applications.

Finally, another recommendation for future research is that students should be included in the measurement of outdoor classroom outcomes. The scope of this study could not undertake the requirements for minors to participate in research, but in the context of more time and resources, students could add an instrumental voice to this body of knowledge. The TMCI is often used as a companion to the student version of the MCI in order to compare teacher and student perceptions of their classroom environment. It could be valuable to measure student and teacher perceptions of their indoor classroom environment and their outdoor classroom environment and use a between and within analysis to examine the differences at all levels. Previous research has shown that

teachers can use the results of the SMCI to improve their classroom environment (Diamantes, 2002). Teachers might be more invested in using the outdoor classroom if they were more aware of the impact it had on their students and their indoor classroom environment.

Implications and Concluding Comments

This study focused on the impact of access to an outdoor classroom on indoor classroom environment. Although there were no statistically significant results, the findings were promising. The additional comments provided by teachers from the treatment school indicate that the results of the TMCI-SF might not portray a complete picture of what is occurring at the treatment school or how those occurrences differ from the comparison school. There were positive implications from the teacher's statements that indicate they are enhancing their curriculum in a way that they did not before they had access to the outdoor classroom. As the outdoor classroom is still relatively new and certainly continuing to undergo development, the possibility exists for continued benefits. As the conditions for use become more favorable, more teachers have begun using the outdoor classroom and other schools within the district are beginning to use the outdoor classroom as well. For a small, rural community, it is encouraging to see the dedication for improvement of their schools and learning environment through outdoor education and it is hoped that further research will be done to understand better the impact and implications of access to an outdoor classroom and resources for outdoor education.

REFERENCES

Adkins, C., & Simmons, B. (2002). Outdoor, Experiential, and Environmental Education: Converging or Diverging Approaches? ERIC Digest Number ED467713.

Alexander, K.L., Entwisle, D.R., & Dauber, S.L. (1993). First-grade classroom behavior: Its short- and long-term consequences for school performance. *Child Development, 64*(3), 801-814.

American Academy of Pediatrics (2007). The Importance of Play in Promoting Healthy Child Development and Maintaining Strong Parent-Child Bonds. *PEDIATRICS, 119*(1), 182-191.

Berto, R. (2005). Exposure to restorative environments helps restore attentional capacity. *Journal of Environmental Psychology, 25*(3), 249-259.

Blose, R.J. & Fisher, D. (2003). Effects of teachers school-level environment perceptions on changing elementary mathematics classroom environments. Retrieved from http://files.eric.ed.gov/fulltext/ED476659.pdf

Caillois, R. (2001). *Man, play, and games*. University of Illinois Press. Retrieved from http://books.google.com/books (Original work published 1958)

Diamantes, T. (2002). Improving Instruction in Multicultural Classes by Using Classroom Learning Environment. *Journal Of Instructional Psychology*, *29*(4), 277.

Desmond, D., Grieshop, J., & Subramaniam, A. (2004). *Revisiting garden-based learning in basic education*. Food and Agriculture Organization of the United Nations.

Dutt, I. (2012). School Design and Students' Relationships with the Natural World. *Children, Youth, and Environments, 22*(1), 198-226.

Eccles, J. S., Barber, B. L., Stone, M. and Hunt, J. (2003), Extracurricular Activities and Adolescent Development. *Journal of Social Issues*, *59*, 865–889. doi: 10.1046/j.0022-4537.2003.00095.x

Eick, C.J. (2012). Use of the outdoor classroom and nature-study to support science and literacy learning: A narrative case study of a third grade classroom. *Journal of Science Teacher Education, 23,* 789-803. doi 10.1007/s10972-011-9236-1

Erikson, E. H., & Erikson, J. M. (1998). *The life cycle completed (extended version).* WW Norton & Company. Retrieved from http://books.google.com/books?id=SKidSuluprgC&lpg=PP2&ots=E51hDuHkJO&dq=Erikson%2C%20E.%20H.%2C%20%26%20Erikson%2C%20J.%20M.%20(1998).%20The%20life%20cycle%20completed%20(extended%20version).%20WW%20Norton%20%26%20Company&lr&pg=PP8#v=onepage&q&f=false

Ewert, A., Place, G., & Sibthorp, J. (2005). Early-life outdoor experiences and an individual's environmental attitudes. *Leisure Sciences*, *27*(3), 225-239.

Fatai, I. A. O., Faqih, A., & Bustan, W. K. (2014). Children's active learning through unstructured play in Malaysia. *Childhood Education, 90*(4), 259-264. Retrieved from http://search.proquest.com/docview/1550131505?accountid=4117

Fjørtoft, I. (2001). The natural environment as a playground for children: The impact of outdoor play activities in pre-primary school children. *Early Childhood Education Journal, 29*(2), 111-117.

Ford, P. (1986). Outdoor Education: Definition and Philosophy. Retrieved from http://files.eric.ed.gov/fulltext/ED267941.pdf

Fraser, B.J., Anderson, G.J. & Walberg, H.J. (1982). Assessment of learning environments: Manual for Learning Environment Inventory (LEI) and My Class Inventory (MCI) (3rd version). Retrieved from http://files.eric.ed.gov/fulltext/ED223649.pdf

Fraser, B. J. (1998). 5.1 Science Learning Environments: Assessment, Effects and Determinants. Retrieved from http://surveylearning.moodle.com/cles/papers/Handbook98.htm

Glenn, J. L. (2000). Environment-based education: Creating high performance schools and students. Washington, DC: National Environmental Education and Training Foundation.

Godbey, G. (2008). *Leisure in your life: New perspectives.* State College, PA: Venture Publishing, Inc.

Harun, M.T. & Salamuddin, N. (2014). Promoting social skills through outdoor education and assessing its effects. *Asian Social Science, 10*(5), 71-78.

Hoge, R.D. & Luce, S. (1979). Predicting academic achievement from classroom behavior. *Review of Educational Research, 49*(3), 479-496.

Huizinga, J. (1949). *Homo ludens: A study of the play element in culture.* Boston, MA: Routledge & Kegan Paul Ltd.

Hungerford, H. R., & Volk, T. L. (1990). Changing learner behavior through environmental education. *The Journal of Environmental Education*, *21*(3), 8-21.

Hungerford, H., & Volk, T. (2003). Notes from Harold Hungerford and Trudi Volk. *The Journal of Environmental Education, 34*(2), 4. Retrieved from http://search.proquest.com/docview/233058971?accountid=4117

Ibrahim, H., & Cordes, K. A. (2008). *Outdoor recreation: Enrichment for a lifetime* (3rd ed.). Champaign, IL: Sagamore Publishing, L.L.C.

Key, J.P. (1997). Research Design in Occupational Education. Retrieved from http://www.okstate.edu/ag/agedcm4h/academic/aged5980a/5980/newpage2.htm

Koch, J. M. (2008). *Effects of an early elementary school counseling intervention on academic achievement, behavior and school climate* (Doctoral dissertation). Retrieved from Proquest, UMI Dissertations Publishing. (0549809953, 9780549809951)

Kolb, D.A. (1984). *Experiential learning: experience as the source of learning and development.* Englewood Cliffs, NJ: Prentice Hall. Retrieved from: http://www.learningfromexperience .com/images/uploads/process-of-experiential-learning.pdf!

Lieberman, G. A., & Hoody, L. L. (1998). Closing the Achievement Gap: Using the Environment as an Integrating Context for Learning. Results of a Nationwide Study. *State Education and Environment Roundtable Report*, San Diego, CA. ED 428 943SE

Leitner, M.J., Leitner, S.F. & Associates (2012). *Leisure Enhancement* (4th ed.). Urbana, IL: Sagamore Publishing, L.L.C.

Lee, C., Ng, M., & Phang, R. (2002). Effects of cooperative learning on elementary school children in Singapore. *Asia Pacific Journal of Education, 22*(1), 3-15.

Louv, R. (2008). *Last child in the woods: Saving our children from nature-deficit disorder.* New York, NY: Workman Publishing Company, Inc.

Luckner, J.L., & Nadler, R.S. (1997). *Processing the experience: Strategies to enhance and generalize learning* (2nd ed.). Dubuque, Iowa: Kendall/Hunt Publishing Company.

Martin, B., Cashel, C., Wagstaff, M. & Breunig, M. (2006). *Outdoor leadership theory and practice.* Champaign, IL: Human Kinetics.

McLean, D.D., & Hurd, A.R. (2012). *Kraus' recreation and leisure in modern society* (9th ed.). Sudbury, MA: Jones & Bartlett Learning.

Meyers, L.S., Garnst, G.C., & Guarino, A.J. (2013). *Performing Data Analysis Using IBM SPSS (*1st ed.). Hoboken, NJ: John Wiley and Sons Inc.

Moore, R. C. (1997). The need for nature: A childhood right. *Social Justice, 24*(3), 203-220. Retrieved from http://search.proquest.com/docview /231942309?accountid=4117

Nachar, N. (2008). The Mann-Whitney U: a test for assessing whether two independent samples come from the same distribution. *Tutorials in Quantitative Methods for Psychology*, *4*(1), 13-20.

National PTA (n.d.). Resolution on school recess. Retrieved from http://www.pta.org /about/content.cfm?ItemNumber=3954

No Child Left Behind (NCLB) Act of 2001, 20 U.S.C.A. § 6301 *et seq.* (West 2003)

Ramey, H. L. & Rose-Krasnor, L. (2012). Contexts of Structured Youth Activities and Positive Youth Development. *Child Development Perspectives, 6*: 85–91. doi: 10.1111/j.1750-8606.2011.00219.x

Sink, C.A. & Spencer, L.R. (2007). Teacher version of the My Class Inventory-Short Form: An accountability tool for elementary school counselors. *Professional School Counseling, 11*(2), 129-139.

Taylor, A.F., Kuo, F.E., & Sullivan, W.C. (2001). Coping with ADD: The surprising connection to green play settings. *Environment and Behavior, 33*(1), 54-77.

Taylor, A.F., Kuo, F.E., & Sullivan, W.C. (2002). Views of nature and self-discipline: Evidence from inner city children. *Journal of Environmental Psychology, 22*, 49-63.

Tennessen, C.M. & Cimprich, B. (1995). Views to nature: Effects on attention. *Journal of Environmental Psychology, 15*, 77-85.

Torquati, J. & Ernst, J.A. (2013). Beyond the walls: Conceptualizing natural environments as "third educators". *Journal of Early Childhood Teacher Education, 34*(2), 191-208.

Tuckman, B. W. & Jensen, M.A. (1977). Stages of small-group development revisited. *Group & Organization Studies (pre-1986), 2(4)*, 419-427.

U.S. Census Bureau (2014). State &County Quick Facts: Stillwater (city), Oklahoma. Retrieved from http://quickfacts.census.gov/qfd/states /40/4070300.html

U.S. Census Bureau (2010). 2010 Demographic Profile Data. Retrieved from http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk

U.S. Census Bureau (n.d.). 2008-2012 American Community Survey 5-Year Estimates. Retrieved from http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk

Volk, T., L., & Cheak, M., J. (2003). The effects of an environmental education program on students, parents, and community. *The Journal of Environmental Education, 34(4),* 12-25.

Wilson, R. A. (1996). Starting Early: Environmental Education during the Early Childhood Years. ERIC Digest.

APPENDIX A

EMAIL CONTACT AND CONSENT

TO: email contact
SUBJECT: Changes in Classroom Environment

Oklahoma State University invites you to participate in a survey about the environment of your classroom. You are kindly requested to answer all of the questions about your classroom outside of your contract hours.

- This survey is available online and will take about 10 minutes of your time.
- There are no known risks associated with this project that are greater than those encountered in daily life.
- Your responses to the survey will be confidential.
- You may start the survey, stop, and resume the survey at a later time.
- This research has been approved by Stillwater Public Schools.

As a teacher for Stillwater Public Schools, your voice is important in understanding classroom environments. Please complete this survey by September 29, 2014. [February 16, 2015 for the post-test]

Project Title:

Outdoor Classroom Experiences and Changes in Indoor Classroom Environments: Teacher Perspectives

Investigators:

Emily McKenzie M.S. and Dr. Lowell Caneday

Purpose:

The purpose of this study is to investigate whether experiences in an outdoor classroom change the environment of an indoor classroom. You are being asked to participate in this study because you meet the requirements set forth by the researcher. The type of information this study wishes to collect is your perspective of the actual environment of your classroom. The Teacher Version of the My Class Inventory – Short Form will be used at the beginning of the school year and again in February to examine changes in classroom environment from your perspective. Changes in environment will be compared between two schools, one with an outdoor classroom and one without an outdoor classroom.

Procedures:

You will be asked via email to complete the Teacher Version of the My Class Inventory – Short Form once at the beginning of the school year and again in February. This inventory should take only 8-10 minutes and will be completed online. You are kindly requested to fill out all of the questions on the survey about the environment of your indoor classroom.

Risk of Participation:

There are no known risks associated with participating in the study that are greater than those encountered in daily life.

Benefit:

A potential benefit from this study may include identifying potential indoor classroom benefits associated with an outdoor classroom. Additionally, understanding perceived

changes in classroom environment over the course of a school year can be helpful for future improvement of strategies for schools and teachers.

Confidentially:

The investigators will attend to ensuring the confidentiality of the participants of this study. Any written results will discuss group findings and will not include information that will identify you. Consent forms including signatures will be kept in a locked office and kept separate from any data. Survey responses will not have any names associated with it but will use a coding system to match pre-tests with post-tests. Research records will be stored on a password-protected computer in a locked office and only researchers and individuals responsible for research oversight will have access to the records.

Contact:

You may contact any of the researchers at the following addresses and phone numbers, should you desire to discuss your participation in the study and/or request information about the results of the study:

Emily McKenzie, M.S.
181 Colvin Center
School of Applied Health and Educational Psychology
Oklahoma State University, Stillwater, OK 74078
918-809-6295

Lowell, Caneday, Ph.D.
184 Colvin Center
School of Applied Health and Educational Psychology
Oklahoma State University, Stillwater, OK 74078
405-744-5503

OR: If you have any questions about your rights as a research volunteer, contact:

OSU IRB Office
219 Cordell North, Stillwater, OK 47078,
405-744-3377 or irb@okstate.edu.

Participants Rights:

Participation is voluntary and you may discontinue the research activity at any time without reprisal or penalty. *By clicking on the link and completing the survey you are agreeing to participate.*

Click on the survey link or copy and paste the URL into your browser to access the survey.

http://to be determined

Investigators:
Emily McKenzie, M.S., emily.mckenzie@okstate.edu, Oklahoma State University
Lowell Caneday, Ph.D., lowell.caneday@okstate.edu, Oklahoma State University

APPENDIX B

REMINDER EMAIL CONTACT

TO: email contact
SUBJECT: REMINDER: Changes in Classroom Environment
This is a friendly reminder that Oklahoma State University invites you to participate in a survey about the environment of your classroom. If you have already completed the survey, thank you! If not, this survey is available online and will take about 10 minutes of your time. You are kindly requested to answer all of the questions about your classroom. There are no known risks associated with this project that are greater than those encountered in daily life. Your responses to the survey will be confidential. You may start the survey, stop, and resume the survey at a later time. As a teacher for Stillwater Public Schools, your voice is important in understanding classroom environments.

Please complete this survey by September 29, 2014. [February 16, 2015 for the post-test]

Click on the survey link or copy and paste the URL into your browser to access the survey.

http://to be determined

Investigators:
Emily McKenzie, M.S., emily.mckenzie@okstate.edu, Oklahoma State University
Lowell Caneday, Ph.D., lowell.caneday@okstate.edu, Oklahoma State University

APPENDIX C

PRE-TEST QUALTRICS SURVEY INSTRUMENT

In order to create a code that is unique to you, please indicate what grade level (or levels) you teach, the month you were born, and the last four digits of your phone number.
For example:
3rd grade, January, and 3045

Please respond to the following survey about the environment of your classroom. Indicate your response by clicking the box that best describes how much you agree or disagree with the statement.

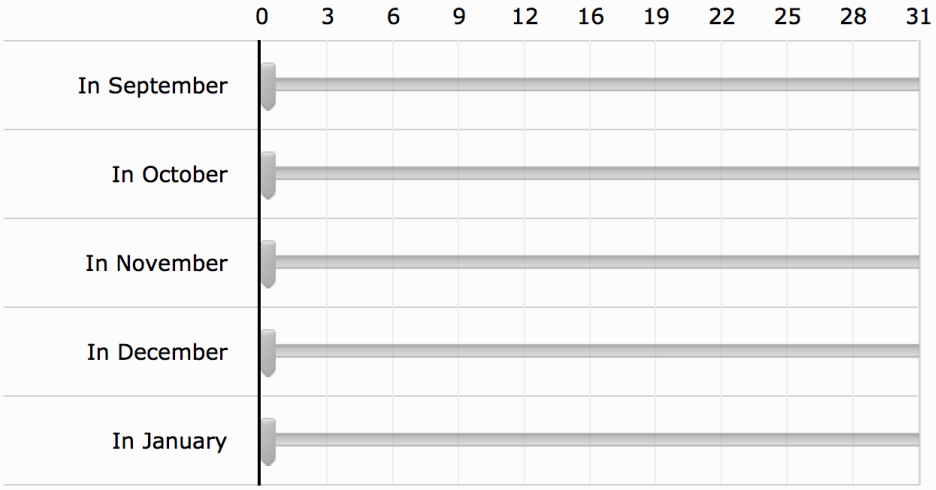
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. The students enjoy their schoolwork in the class.					
2. Students do not fight with each other.					
3. Students often race to see who can finish their work first.					
4. In the class the work is hard to complete.					
5. In the class everyone has friends.					
6. Students are happy with the class.					
7. Most students want their work to be better than their friend's work.					
8. Most students cannot complete their assignments without a lot of help.					
9. Students in the class have good buddies.					
10. Students seem to like the class.					
11. Only the brightest students can do all the work.					
12. All students in the class get along well with each other.					
13. Most students appreciate their learning experiences in the class.					
14. Some students always try to outperform their peers.					
15. The schoolwork is too complicated for the students.					
16. All students in the class are fond of one another.					
17. The students see the class as fun.					
18. Students in the class do not argue with each other.					
19. Most students in the class do not know how to do their work very well.					

APPENDIX D

ADDITIONAL POST-TEST QUALTRICS SURVEY INSTRUMENT

Outdoor Classroom Questions

On average, about how many days each month did you use the Outdoor Classroom with your students?



Please use this space for any additional comments about how you used the Outdoor Classroom or how it benefited your students.

Please describe any areas of improvement you would suggest for the Outdoor Classroom.

How would you describe your personal experience in the out of doors?

- Low Involvement: I don't spend very much time recreating outside.
- Medium Involvement: I spend some time recreating outside.
- High Involvement: I spend a lot of time recreating outside.

Please respond to the following survey about your impression of the Outdoor Classroom. Indicate your response by clicking the box that best describes how much you agree or disagree with the statement.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The Outdoor Classroom was accessible to my students and me.	○	○	○	○	○
The Outdoor Classroom was useful to my students and me.	○	○	○	○	○
I used the Outdoor Classroom to supplement the lessons I taught in the indoor classroom.	○	○	○	○	○
The students seemed to be more attentive in the Outdoor Classroom.	○	○	○	○	○
I need more information or resources to better use the Outdoor Classroom.	○	○	○	○	○
I used the Outdoor Classroom separately from lessons taught in the indoor classroom.	○	○	○	○	○
The Outdoor Classroom stimulated more hands on activity for the students than the indoor classroom.	○	○	○	○	○
I plan to continue using the Outdoor Classroom in the future.	○	○	○	○	○

APPENDIX E

PRINCIPAL CONSENT FORM

Project Title:

Outdoor Classroom Experiences and Changes in Indoor Classroom Environments: Teacher Perspectives

Investigators:

Emily McKenzie M.S. and Dr. Lowell Caneday

Purpose:

The purpose of this study is to investigate whether experiences in an outdoor classroom change the environment of an indoor classroom. You are being asked to participate in this study because you meet the requirements set forth by the researcher. The type of information this study wishes to collect is the teachers' perspective of the actual environment of their classroom. The Teacher Version of the My Class Inventory – Short Form will be used at the beginning of the school year and again in February to examine changes in classroom environment from their perspective. Changes in environment will be compared between two schools, one with an outdoor classroom and one without an outdoor classroom.

Procedures:

Your teachers will be asked via email to complete the Teacher Version of the My Class Inventory – Short Form once at the beginning of the school year and again in February. This inventory should take only 8-10 minutes and will be completed online. They are kindly requested to fill out all of the questions on the survey about the environment of their classroom.

Risk of Participation:

There are no known risks associated with participating in the study that are greater than those encountered in daily life.

Benefit:

A potential benefit from this study may include identifying potential indoor classroom benefits associated with an outdoor classroom. Additionally, understanding perceived changes in classroom environment over the course of a school year can be helpful for future improvement of strategies for schools and teachers.

Confidentially:

The investigators will attend to ensuring the confidentiality of the participants of this study. Any written results will discuss group findings and will not include information that will identify you. Consent forms including signatures will be kept in a locked office and kept separate from any data. Survey responses will not have any names associated with it but will use a coding system to match pre-tests with post-tests. Research records will be stored on a password-protected computer in a locked office and only researchers and individuals responsible for research oversight will have access to the records.

Contact:

You may contact any of the researchers at the following addresses and phone numbers, should you desire to discuss your participation in the study and/or request information about the results of the study:

Emily McKenzie, M.S.
181 Colvin Center
School of Applied Health and Educational Psychology
Oklahoma State University, Stillwater, OK 74078
918-809-6295

Lowell, Caneday, Ph.D.
184 Colvin Center
School of Applied Health and Educational Psychology
Oklahoma State University, Stillwater, OK 74078
405-744-5503

Or

If you have any questions about your rights as a research volunteer, contact:

OSU IRB Office
219 Cordell North, Stillwater, OK 47078,

405-744-3377 or irb@okstate.edu

Participants Rights:

Participation is voluntary and you may discontinue the research activity at any time without reprisal or penalty.

Signatures:

I have read and fully understand the approval to conduct research form. I sign freely and voluntarily. A copy of this form has been given to me.

_____ _____
Signature of Principal Date

I certify that I have personally explained this document before requesting that the participant sign it.

_____ _____
Signature of Researcher Date

APPENDIX F

INITIAL IRB APPROVAL

Oklahoma State University Institutional Review Board

Date:	Monday, August 25, 2014
IRB Application No	ED14105
Proposal Title:	Outdoor Classroom Experiences and Changes in Indoor Classroom Environments: Teacher Perspectives
Reviewed and Processed as:	Exempt

Status Recommended by Reviewer(s): Approved Protocol Expires: 8/24/2017

Principal Investigator(s):

Emily A. McKenzie
843 W. Moore Ave.
Stillwater, OK 74075

Lowell Caneday
180 Colvin Center
Stillwater, OK 74075

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

☒ The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1.Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval. Protocol modifications requiring approval may include changes to the title, PI advisor, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms
2.Submit a request for continuation if the study extends beyond the approval period. This continuation must receive IRB review and approval before the research can continue.
3.Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of the research; and
4.Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Dawnett Watkins 219 Cordell North (phone: 405-744-5700, dawnett.watkins@okstate.edu).

Sincerely,

Hugh Crethar, Chair
Institutional Review Board

APPENDIX G

STILLWATER PUBLIC SCHOOLS APPROVAL

STILLWATER BOARD OF EDUCATION GVA-E

RESEARCH STUDY REQUEST
STILLWATER PUBLIC SCHOOLS

I hereby request permission to conduct a research study in the Stillwater Public Schools district during the period Aug. 25th, 2014 to Feb. 15th, 2014.

The topic is: Outdoor Classroom Experiences and Changes in Indoor Classroom Environments: Teacher Perspectives

Date Submitted: July 10, 2014 Daytime Phone Number : 918-809-6295

Reason for Request:

_____ Class Requirement _____ Master's Thesis _X_ Doctoral Dissertation _____ Other

If this request is granted, I agree to abide by the Stillwater Board of Education policy and administrative procedures.

Emily McKenzie
Typed Name of Researcher(s)

Signature of Researcher(s)

Oklahoma State University
Institution of Higher Learning

Applied Health and Educational Psychology
Sponsoring College or Departmer

Dr. Lowell Caneday
Typed Name of Faculty Member

Signature of Faculty Member

Submit approval letter from the IRB
(Must have IRB approval to proceed.)

ENDORSEMENT:

This request was ✓ Approved ____ Disapproved July 14, 2014 (date)

Gay Washington, Ed.D.
Assistant Superintendent or Designee

APPENDIX H

IRB MODIFICATIONS APPROVAL

Oklahoma State University Institutional Review Board

Date:	Tuesday, February 03, 2015	**Protocol Expires:**	**8/24/2017**
IRB Application No:	ED14105		
Proposal Title:	Outdoor Classroom Experiences and Changes in Indoor Classroom Environments: Teacher Perspectives		
Reviewed and Processed as:	Exempt **Modification**		

Status Recommended by Reviewer(s) **Approved**

Principal Investigator(s):

Emily A. McKenzie
843 W. Moore Ave.
Stillwater, OK 74075

Lowell Caneday
180 Colvin Center
Stillwater, OK 74075

The requested modification to this IRB protocol has been approved. Please note that the original expiration date of the protocol has not changed. The IRB office MUST be notified in writing when a project is complete. All approved projects are subject to monitoring by the IRB.

☐ The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

The reviewer(s) had these comments:

Addition of questions to the post-test survey. No increased risks.

Signature :

Hugh Crethar, Chair, Institutional Review Board

Tuesday, February 03, 2015
Date

VITA

Emily Ayers McKenzie

Candidate for the Degree of

Doctor of Philosophy

Thesis: ACCESS TO AN OUTDOOR CLASSROOM AND CHANGES IN CLASSROOM ENVIRONMENT: ELEMENTARY SCHOOL TEACHERS' PERSPECTIVES

Major Field: Health, Leisure and Human Performance (Emphasis in Leisure Studies)

Biographical:

Education:

Completed the requirements for the Doctor of Philosophy in Health, Leisure, and Human Performance at Oklahoma State University, Stillwater, Oklahoma in May, 2015.

Completed the requirements for the Master of Science in Leisure Studies at Oklahoma State University, Stillwater, Oklahoma in July, 2011.

Completed the requirements for the Bachelor of Science in Human Development and Family Science at Oklahoma State University, Stillwater, Oklahoma in July, 2008.

Experience:

Graduate Teaching Associate in a teaching role for the Recreation Management and Therapeutic Recreation Program from August 2014 to May 2015.

Graduate Associate in a supervisory role over the challenge course and challenge course facilitators from August 2012 to July 2014. Co-led trainings, managed scheduling, and continuing education opportunities for facilitators.

Graduate Assistant in a supervisory role over the challenge course and challenge course facilitators from August 2009 until August 2010, and over local programming from August 2010 until May 2011 at Oklahoma State University Outdoor Adventure.

Challenge Course Facilitator from May 2007 until August 2011 at Oklahoma State University Outdoor Adventure.

Professional Memberships:

Member of the Wilderness Education Association from January 2009 to present.