Take it outside: Administrators perspectives on the role of nature in outdoor schools

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ABSTRACT

JESSIE HARGRAVE Take it outside: Administrators perspectives on the role of nature in outdoor schools.
(Under the direction of Dr. Rune Simeonsson)

The perspectives of 24 Administrators of nature-based, early education settings were examined in the context of children's degree of contact with nature. Differences in perceived educational experience were examined as a function of whether schools identified as Forest Schools or not. Administrators reported children's time and contact with nature were higher than schools that identified as Forest schools. However, not all schools that identified as Forest Schools had high levels of direct contact with nature and wildlife. Conversations with Administrators revealed a split between schools with large amounts of time outdoors focused on "primal skills" for students and those which were nature-based, with more of an education focused. These findings suggest the need for further examination of outdoor-based early education and more research into the difference between "outdoor education" and "nature-based" education settings.

Keywords: nature, early education, forest schools, outdoor learning

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Come forth into the light of things,
Let Nature be your teacher.

She has a world of ready wealth,
Our minds and hearts to bless--
Spontaneous wisdom breathed by health,
Truth breathed by cheerfulness.

(William Wordsworth, 1888)

Introduction

Over the last decade there has been a growing interest in the United States in outdoor early childhood educational settings, specifically nature-based schools. With the decline in children's time spent outdoors (Hofferth & Sandberg, 2001; Wen, Kite, Merom & Rissel, 2009) and a reduction of time allocated for playing outdoors in early educational settings (Dale, Corbin & Dale, 2000), a resurgence in the interest of nature's role in child development and early education has occurred. Researchers and educators are questioning what role, if any, does contact with nature fill in the children's development: physically, cognitively and emotionally (Kellert, 2002; Nabhan, 1994; Warden & Buchan, 2007; Wilson, 2008).

Limited research suggests that the amount of contact with the natural world, especially during early childhood years, plays a role in a child's emotional responsiveness and cognitive receptivity (Derr, 2002; Kellert, 1985, 1996, 2002; Pyle, 1993). Research by Rickenson, Dillon, Teamey, Morris, Choi & Sanders (2004) found a small number of studies that focused on how young learners perceive nature and how

they use their early contact with nature to build a relationship with their surrounding environment. Several studies have highlighted students' perceptions of nature and environment, as well as the many varied influences that may shape these perceptions of the natural world (Bonnett, 1994; Bonnett &Williams, 1998; Kahn, 1999 Payne, 1998; Wals, 1994). Research suggests that direct contact with natural surroundings provide children with opportunities for critical thinking, creativity, problem solving skills, and cognitive development (Berg & Medich, 1980; Hart, 1979; Kahn, 1999, 1997; Kaplan & Kaplan, 1989; Kellert, 1997; Moore, 1986; Moore & Young, 1978; Searles, 1959; Sobel, 1993; Thomashaw, 1995). The challenges found in nature, such as identifying different creatures, observing the life cycles of survival, reproduction and dying, as well as identifying flora and fauna, all offer a rich environment for the child's cognitive development (Chawla, 1988; Nabhan & Trimble, 1994; Pyle, 1993).

Nature is commonly thought of as a place to commune with living things, to relax, and be at peace with the world. However, ideas about nature are changing as the planet changes and the effects of human presence are felt. While nature arguably includes urbanized natural areas and parks, typically the conceptualization of nature is that of a pristine wilderness, or forest, largely untouched by civilization (Wilson, 1996). However, as the editors of Nature (2008) point out, "If nature is defined as a landscape uninfluenced by humankind, then there is no nature on the planet at all" (p. 263). For the purposes of this research "nature" will be defined as a landscape or environment available to children that has been minimally affected or altered by humankind.

Much of the small body of research has centered on children's experiences of play and regular contact with nature as it relates to the development of environmental

awareness, an affinity for nature, and cultivation of early childhood biophilia, or a love of living things (Chawla, 1998; Moore & Cosco, 2000; Rivkin, 1998; Sobel, 1996, 2002, 2004; Wilson, 1997, 2000). Biophilia was introduced as a theory by Wilson (1984) and is defined as "the urge to affiliate with other forms of life" (Wilson & Kellert, 1995, p. 416). Biophilia is believed to increase the "possibility of achieving individual meaning and personal fulfillment" while furthering a "human ethic of care and conservation for nature, most especially the diversity of life". While the biophilia hypothesis has been examined from a scientific, cultural, as well as a humanistic perspective, little has been done on the role of biophilia in the educational environment. Little research has focused on the specific amount or degree of contact with nature in an early childhood setting with regards to its effect on the child's learning experience (Kellert, 2002; Warden, & Buchan, 2007).

In considering the potential benefits of contact with nature in children's development, this research will distinguish among the degrees of contact children have with nature and their immediate outdoor environment. Kellert (1996) broadly categorized children's experience with nature into three categories: direct, indirect, and "vicarious" or "symbolic" experience. This is the basic classification of contact with nature that will be employed in this research, which will address whether children's degree of contact with nature differs based on the pedagogy of the schools surveyed. Specifically, whether U.S nature-based, early education settings are affording the direct contact with nature that is paramount in the development of a respect and love for life and nature (Kellert, 2002). Work by Kellert (2002) represented the first attempt to systematically assess how people, particularly children, value nature via their experiential

knowledge and contact with their natural environment. The present research has attempted to extend Kellert's work by examining the degree to which children in nature-based, early education settings experience contact with nature and how that might relate to the school's philosophy or ethos.

This research surveyed administrators of early education, outdoor-based schools in the United States about their perspectives on the amount and type of time their students spend in nature. Their views on the role of nature in their school's pedagogy, environmental education and sustainability, were examined. Of additional interest was whether schools that identify as Forest Schools differ with regard to the amount of time students spend in nature settings or the type of contact students have with nature.

History of Nature in Early Childhood Education

Early philosophers such as Locke and Rousseau advocated for educators to embrace a more holistic, child-centered, and naturalistic attitude towards the education of the child. They were the first to romanticize the notion of childhood as a period of life to be preserved, cherished, protected, and experienced largely out of doors (Beatty, 1995). Following in the romantic philosophers' footsteps, Johann Pestalozzi supported the notion of children being educated in nature. This natural approach progressed over Pestalozzi's educational career from the great outdoors, initially the same as Rousseau, to the cozy indoors. While all the aforementioned education scholars advocated the notion of "children as children" and rebuked the forcing of knowledge on young children in strict, "academic" ways, none of them would popularize outdoor pedagogy in the way of Froebel.

Building on the Pestalozzian education model, which emphasized learning by discovery in the natural environment and the role of play in education, Froebel implemented his educational model of “kindergarten” (literally child garden) which saw his romanticized notions of childhood brought to life. He considered unity of the inner with the outer, or inner-connectedness, among the most salient of all human characteristics, and one which was most able to be experienced through contact with nature. Froebel saw the connecting of the inner with the outer as a process facilitated through nature and the garden environment (Beatty, 1995). In Froebel’s view, this contact with outdoors and freedom to play and experience, served to give the child “joy, freedom, contentment, inner and outer rest, peace with the world.” (Beatty, 1995, p.45)

More than a hundred years later, psychiatrist Harold Searles (1959, p. 27) suggested views similar to Froebel’s on the importance of the natural environment: "The non-human environment, far from being of little or no account to human personality development, constitutes one of the most basically important ingredients of human psychological existence." Research by Burgess and Mayer-Smith (2011) on the experiences of children attending a Mountain school documented the range of emotions children associated with their time spent in nature. They noted that children seemed to be particularly “tuned in” to nature. At times children were so engulfed in nature that they were unaware of time passing. These findings by Burgess and Mayer-Smith (2011) suggest that such moments in nature displayed similarities to what Csikszentmihalyi (1990) termed “flow”. While involved in demanding and intrinsically rewarding activities, “flow” requires total concentration of the participant, a merging of action and attention, loss of awareness, and a temporal distortion (Nakamura & Csikszentmihalyi

2002). Mulder ten Kate (2011) has suggested that flow is a fundamental characteristic of direct experiences in natural settings. Her work and that of Burgess and Mayer-Smith (2011) suggest that direct immersion in nature encourages children's deep engagement in their surroundings. While the connection to biophilia is implied, their research also aids to further the education research on the role of nature for developing children's attention, self-regulation and cognitive development.

The Outdoor Environment as a Learning Environment

According to the literature, one of the main advantages of the outdoor environment is that it provides children with the space to move freely (Rivkin, 1995). Movement, along with play, has been described as one of the most natural and powerful modes of learning for young children (Bilton, 2002). As numerous researchers have noted (e.g. Bilton, 2002; Ouvry, 2003; Rivkin, 1995), when children are outdoors they can explore the world first hand and experience natural phenomena such as varying weather, the changing seasons, and wild animals. Ouvry (2003) maintained that in the outside environment children also have the space to engage in and develop more believable fantasy play. In their relationships with peers, children can more easily move away from confrontation when outside and so are less likely to show signs of frustration and lack of cooperation (Faber Taylor, Kuo, & Sullivan, 2001; Ouvry, 2003). Research by Rivkin (1998) suggests that, while inside, children may be expected to sit still and be quiet. However, when outside they are allowed to run around and be loud. The outdoors allows children to push the boundaries of activities without a fear of being reprimanded for being too boisterous, too loud or too messy (Bilton, 2002; Ouvry, 2003).

Stephenson (2003) linked young children's physical risk-taking in the outdoor environment with the potential for children to develop confidence in themselves as well as a disposition to manage risk effectively. Similarly, risk-taking in natural environments has been linked to children's development of learning paths and dispositions (Waller, 2005). Scandinavian research by Fjortoft (2001, 2004) reports that children who play in flexible, natural landscapes appear healthier and have improved motor coordination, fitness, and balance. Fjortoft and Sageie (2000) pointed out that the natural landscape has qualities necessary for children's diverse and stimulating play environments. Additionally, they found that children who played in the forest tended to demonstrate better motor skills than children who played in a traditional playground. Their research emphasizes that it is the natural environment that is beneficial. Recalling Kellert's assertion that direct contact with nature, or wild landscapes, is imperative for children's development, one can begin to see the alignment between biological and educational research and the need for further investigation into the type of interactions children are experiencing with nature.

Experiences within wild spaces are also vital for an effective environmental education. The increasing interest in environmental issues has raised the profile of children's use of the outdoor space in terms of the potential for them to develop positive and caring attitudes for the environment (Rivkin, 2000; Wilson, 1996). However, it has been suggested, that access to outdoor space alone is not enough to foster such attitudes (Kellert, 2002; Malone & Tranter, 2003). The care and management of the outdoor space by adults lends to children an example which is as important as access itself, in developing in children a sense of environmental respect and love. Finally, the rich

sensory, natural environment supports children's own investigations (Fjortoft, 2004; Waite et al., 2006) and provides an ideal context for children's group activities. The development of knowledge and skills sets are enhanced by participation in authentic, purposeful and often real life tasks, for example building forts, creating a garden area, clearing brush in the forest, and growing crops (Sobel, 2002).

Nature as Pedagogy

In the field of education, the term "pedagogy" has largely been defined and understood as encompassing "the science of teaching and learning" (Watkins & Mortimore, 1999, p. 2). However, with more education research focusing on child development beyond that of academic learning, the notion of pedagogy has been conceptualized with a broader interpretation. For the purposes of this research, pedagogy shall be defined as "learning [as] an ongoing process, encompassing learning about self in relation to others, about one's talents and power, about creativity and about the physical world" (Moss & Petrie, 2002, p. 144).

The process of learning about one's self in relation to others is central in children's early education. Relating to others in a school setting presents the child with a variety of challenge and growth opportunities. However, in the classical pre-school or kindergarten model, the typical play environment afforded children is often one with limited access to nature. This "pre-fab" play environment may fail to challenge children to explore their talents and abilities (Dale, Corbin, & Dale, 2000). Additionally, environments which limit children's interaction with outdoor spaces do little to enhance learning opportunities about the physical world and nature outside the classroom.

Values Associated with Nature

Kellert's value categories provide a starting place in the process of understanding and identifying "dispositions associated with the human inclination to affiliate with the natural world" (Kellert 1996, p. 26). Values characterized by Kellert as the convergence of human emotion and cognition resulted in his creating a typology that "reflect a range of physiological, emotional, and intellectual expressions of the biophilic tendency to associate with nature" (Kellert 2002, p. 26). Nine nature values were identified and a functional definition was established for the following: Scientific-Ecological, Naturalistic, Symbolic, Aesthetic, Humanistic, Negativistic, Moralistic, Utilitarian, and Dominionistic.

Scientific values emphasize the systematic study and understanding of nature. Advantages of this value are seen as functional and would include the early development of skills such as: critical thinking, problem-solving skills, enhanced analytical ability, and a respect for and appreciation of nature. The naturalistic value expresses the desire for close contact and interaction with nature. Functional benefits of this value include the development of children's curiosity, inquisitiveness, and imagination. Self-confidence and self-esteem are also established by children's opportunity to experience competence and adaptability in nature. Symbolic value indicates nature's role in shaping and facilitating children's communication skills and development of perspective taking. Adaptive benefits of this value would include classifying and labeling abilities, related to language and counting. Additionally, symbolic value encourages story-telling and fantasy characters, as well as the use of imagery and symbols to enhance children's ability to understand social situations and interactions. The aesthetic value reflects the physical attraction and appeal of nature. Its development is viewed as instrumental in

children's emerging capacity for recognizing order and organization, for their developing ideas of harmony, balance, and symmetry, and for stimulating curiosity, imagination, and discovery.

A humanistic value emphasizes the development of a strong affection for, and emotional attachment to, nature. Most closely related to the theory of biophilia itself (Wilson, 1997), bonding with the natural world is viewed as instrumental in developing children's capacities for social relationships and trust. The humanistic view also enhances children's self-confidence and self-esteem through opportunities to give, receive, and share affection. A negativistic value reflects avoidance, a fear, or outright rejection of nature. This has been termed "biophobia" (Kellert & Wilson, 1993) and is seen as a result of children having minimal or no contact with nature. While this value is less desirable, on a small-scale it does have a functional aspect for children. They learn to avoid harm and injury, assess and minimize risky situations, and develop a respect and awe of nature as its power to humble and destroy is recognized. The moralistic value reflects an ethical view and affinity of nature. Again, as an expression of biophilia (Wilson, 1997), the formation of the moralistic value has adaptive qualities for children. These include a sense of underlying meaning, order, and purpose in their world, and especially the inclination to protect and treat nature with kindness and respect. Utilitarian values reflect the material attraction of the natural world. Physical and material security is seen as a benefit of this value as self-confidence and self-esteem are developed through the opportunity to demonstrate craft and skill in nature. Finally, the dominionistic value is seen in the urge to master or control nature. Adaptive developmental benefits of this value are: safety and protection, independence, autonomy, bravery to explore and

confront the unknown, and the child's confidence to assess and take risks, be resourceful, and develop courage.

Limited research (Eagles & Muffitt, 1990; Kellert, 1985, 1996; Kellert & Westervelt, 1983) suggests these nine values emerge at varying ages or developmental stages. Nonetheless, several researchers have questioned the degree and importance of children's learning and development associated with their vicarious experiences of nature, especially when these experiences occur in a context of diminished and declined direct contact with nature (Kellert, 1997; Mander, 1991; Nabhan & Trimble, 1994; Pyle, 1993). Notably, Pyle (1993) has raised concern regarding children's lack of accessible, spontaneous, and challenging encounters with the outdoor environment.

Children's Experiences with Nature

A logical starting point in considering the potential impact of early contact with nature in children's development is to distinguish among the kinds of experience children have with natural systems and processes which may affect their values of nature. Young people's experience of nature, broadly speaking, can be classified in three ways: direct, indirect, and what may be called "vicarious" or "symbolic" experience (Kellert, 1996). Direct experience involves actual physical contact with natural settings and nonhuman species. However, the perspective adopted by Kellert (2002) restricts these direct encounters to creatures and environments occurring largely outside and independent of the human built environment: plants, animals, and habitats that sustain and live apart from continuous human attention. The child's direct experience of nature is viewed as largely unplanned rather than organized into structured programs or outings. Direct contact involves children's spontaneous play or activity in a backyard, in a nearby forest,

park, or as it pertains to this research, in a nature-based school. In each situation, the natural setting, though influenced by human manipulation and activity, includes creatures and habitats that function largely independent of human intervention and control.

A child's indirect experience of nature involves actual physical contact, however in a more restricted or managed context. Indirect contact with natural habitats and animals is commonly the result of regulated and organized human effort. Examples of indirect contact with nature would include children encountering plants and animals in zoos, aquariums, botanical gardens, arboretums, museums, or nature centers. Similar displays of children's indirect experience with nature would involve contact with domesticated animals or plants, most commonly those considered part of a child's home or family life. Domesticated forms would include animals like cats and dogs, horses, and birds. Indirect experience would further include contact with flower or vegetable gardens, crops, fruit orchards, or farm animals. All environments and animals associated with indirect contact have in common their dependence on human management or intervention for survival.

Finally, vicarious or symbolic experience occurs in the absence of actual physical contact with nature. Instead, what the child encounters are simply representations or scenes of nature. These vicarious images or symbolic depictions most often are found via relatively innovative technology, such as phones, television or computers (the internet). However, more traditional media such as books and magazines would also be considered symbolic contact with nature.

Forest Schools

One nature-based model that is gaining in popularity is Forest Schools. Originating in Scandinavia, Forest Schools are the creation of Sten Gösta Frohm. However, they are heavily inspired by many of the ideas of Froebel. Nursery schools and early child-care centers in Scandinavia have traditionally favored “free” play, outdoor activity, and time spent in the fresh air over traditional “sit-down” indoor activities (Stigsgaard, 1978, in Williams-Siegfredson, 2005). A child’s sense of connection with nature and with their environment has also been connected to the Scandinavian notion of what constitutes an ‘ideal’ childhood (Organisation for Economic Cooperation and Development [OECD], 2001). The development of young children’s understanding about the natural environment is seen as being an important aim of all Scandinavian child-care facilities (OECD, 2000). Most nurseries and early childhood education settings in Scandinavia incorporate some form of nature education for their students (Williams- Siegfredson, 2005). Although there is great variation in how this is achieved, the belief is that children should experience nature and be educated about the environment that is such a part of their culture and heritage.

Sten Gösta Frohm (1908 -1999) was a Swedish outdoorsman, best known as the creator of Skogsmulle, for which he received the epithet "Old Mulle". In 1946 Frohm developed several ideas regarding the future of education in a contemporary style, which would utilize nature, as a way to circumvent the constant battle for school funding. The first ”mullet school” or Forest School started in 1957, and since then more than half a million children have attended the Forest Schools. Also called ”I Ur Och Skur” which translated means ”rain or shine” schools, the schools slogan sums their outdoor attitude up, stating there is ”no bad weather, only bad clothes”.

Created by Frohm, the character of Skogsmulle is that of the children's friend. According to stories, Skogsmulle will play, sing, and talk about nature for children. A symbol of light in nature, the woodsland creature Skogsmulle was created by Frohm to aid children's learning in "mullet school" about nature and to learn about the forest's most common plants and animals in a playful way. Remeniscent of Kellert's (2002) symbolic or vicarious experience of nature, these stories, both oral and written, convey messages and experiences about nature in a way that can supplement children's direct contact with nature. In a similar vein to Froebel's early notions, Forest Schools seek to satisfy children's curiosity and joy of discovery, whilest developing a responsibility for living in the wild.

Valuing Nature in Education Settings

Forest schools are conceptualized on active learning in the natural environment. This philosophy of nature as both classroom and teacher can be connected to the research of Wilson (1984) who suggested that biophilia, or an innate attachment to nature, might offer an explanation for why nature settings are attractive to humans and offer a holistic approach to learning. Research connecting nature not only to learning environments, but to learned values as well, such as Kellert's (2002) organization of values, can add to the explanation of how a nature educational setting might appeal to learners. Recalling that Kellert outlines nine values: Scientific-Ecological, Naturalistic, Symbolic, Aesthetic, Humanistic, Negativistic, Moralistic, Utilitarian, and Dominionistic, these will briefly be discussed as they might relate to the Forest School ethos.

A naturalistic approach is central to the Forest School philosophy. Children experience hands-on natural phenomena such as fire, earth, wood and creatures. There

are typically no concrete lesson plans. Instead, leaders rely on observation and awareness of different learning styles, as they adopt an intuitive approach, encouraging children to use all their senses to appreciate nature. Play, in particular, offers a means for children to engage in their environment holistically. This echoes Burls and Caan's (2005) assertion that we are natural creatures and that being in nature is therefore our preferred context.

Interpersonal skills, communication, self-esteem, and emotional and behavioral change are supported in Forest School through the encouragement of the expression of feelings, group work, trust games, and social interactions. It has been suggested that negotiated boundaries within the natural setting contribute to support for students who may find the confines of classrooms difficult (Gardner, 1991). This relates to Kellert's (2002) humanistic value in that attachment and emotional interactions are incorporated into the children's experience both with each other and with the natural surroundings.

The wildness of a Forest School setting is significant for the moralistic dimension. It contributes to the awe and wonder felt, perhaps because of unfamiliarity initially but also because the rich and changing environment (Pyle, 2002) maintains high levels of interest and engagement (Kuo & Taylor, 2004). The importance of respect and making minimal impact on the natural environment is also emphasized.

In line with Kellert's (2002) symbolic value of nature, the Forest School experience contributes to language development with most discourse occurring during periods of free play (Waite, 2007). The focus on other than self (e.g., the fire or other outdoor features) affords opportunities for stimulating talk, sharing, and recording experience through writing, drawing, and videos. Improved communication may also contribute to the development of children's' social behavior.

Utilitarian and dominionistic values are also present through an emphasis on dividing tasks into small achievable steps in order to guarantee a successful outcome. Tools are imported to create things from material naturally occurring in the wild. By making things from natural objects, rather than playing with manufactured objects outside, children can learn to value their own achievements. This is paramount for the development of self-esteem. It may also have an impact on negativistic values. That is, as the children learn to assess risks and manage nature, fear of the unknown diminishes (Bundy, 2009; Nichols, 2000; O'Brien & Murray, 2006). The 'danger' inherent in wild spaces is seen as fundamental to this process.

Cognitive aspects of learning about nature described as scientific values by Kellert (2002) are less emphasized in the Forest Schools. Learning process over content is stressed, and the focus is learning from rather than about nature. Nevertheless, many Forest Schools teachers are in fact knowledgeable about nature, which enables them to respond accordingly to children's interests (Warden, 2002).

In summary, the values Kellert (2002) proposed help support principles which guide the Forest Schools. Learning to be and live together (Delors, 1996) seem to be the dominant modes of learning as aesthetic, naturalistic, humanistic, moralistic, and symbolic values prevail. Active participation in a natural setting and the interpersonal interaction it implies also seem fundamental to the appeal of the outdoors for Forest School, though they are not directly addressed in Kellert's (2002) conceptualization.

Research Foci

There are two questions central to this research. First, what is the experience and duration of the time students spend in outdoor- focused education? Second, do schools

that identify as Forest Schools differ with regard to the students' contact with nature from schools that do not identify as Forest Schools? The research attempted to answer these questions relating them to Kellert's (2002) nine values of nature, as well as Kellert's (2002) three degrees of contact with nature, in the context of nature-based schools.

Methods

To examine the amount and type of contact with nature children experienced in U.S. outdoor schools, administrators of 30 nature-based schools in the United States were contacted and invited to participate in a telephone questionnaire.

Schools were initially identified based on an Internet (Google) search with the following key words: "Forest Schools", "U.S based nature schools" "Nature Schools", "Nature Pre-schools", "Nature Kindergarten", "Outdoor Pre-Schools", "Outdoor Kindergarten", "Forest Kindergarten" and "Forest Preschools". Schools were considered eligible for participation in this research if they indicated their program was primarily based in nature, either on their websites or in their school's Mission Statements.

Participants

Administrators from 30 outdoor schools in the United States were included in this research. Schools were located across the United States, with all but two schools being located on the coastal areas: 18 (60%) schools were located on the West coast (Washington, Oregon and Northern California), 10 (33.33%) schools on the East coast (North Carolina), and 2 (6.6%) schools centrally located (Minnesota and Colorado). Schools were all currently open and had been in operation from one to 35 years ($M = 9.79$, $SD = 7.95$)

In June of 2013, 30 administrators of nature-based schools were contacted by the researcher using the phone number listed on their websites as the school contact information and invited to participate in a telephone survey. They were invited to participate in survey research to help gain information about the type of contact with nature students experienced in their schools. The telephone script which was used to contact participants can be seen in Appendix A. Of the 30 schools contacted, 26 (86%) responded; however only 24 (80%) were included in the analysis. One administrator declined to participate, one was excluded when it became clear during the phone interview that the school was directed towards older students and adults, and four (13.33%) were unreachable by phone and voice messages left for them were not returned.

Materials

The survey contained 26 questions which addressed the school's pedagogy, students served, time spent outdoors, parent involvement, views on the child's relationships with nature, contact with and exposure to nature and wildlife settings, and environmental education practices. Seven questions asked about how the children spent the hours of the school day. One question asked whether the administrator considered the school to be a Forest School, while the next 12 questions addressed the degree of contact children had with nature. One question asked about the parents' role, if any, in the school. Five questions asked about the school demographics including teachers, students, length of school year and how long the school had been in operation. The survey questionnaire can be seen in Appendix B.

Prior to distribution, the survey was piloted to a small group of six local educators, all of whom had experience with outdoor education. The group evaluated the

questions for clarity and to check question validity, reliability and fidelity. Twenty-five of the 26 questions (96%) were reported to be straight forward and easily understood and educators' answers correctly addressed the question. One question regarding whether the school was a Forest School or not was found to be confusing in the way the question was worded. All the pilot survey respondents interpreted the question as being two separate questions, but only a single response option. The question was subsequently refined and solidified as one question which explicitly asked whether the school was a Forest School (Yes/No) or not to eliminate confusion.

Procedure

The researcher spoke personally to each school administrator, following a telephone recruitment protocol script with a semi-structured interview. Administrators were informed that the researcher was a Master's student at the University of North Carolina at Chapel Hill and this survey was to collect data for her Master's thesis. They were told the research was being carried out by the researcher, under the direction of her faculty advisor in the School of Education. Administrators were informed of the research's IRB approval and also assured that they were free to end the conversation at any time. The researcher explained that the answers administrators provided would be anonymous, following the end of the conversation. That is, the responses would be number-coded and not traceable back to the school associated with the administrator. At the end of the initial recruitment conversation, administrators were asked if they wished to participate in the research and their affirmative response was considered to be consent to participate in the survey.

During the telephone conversation, questions were often answered by administrators in the midst of answering other questions, or in the process of explaining their school's philosophy or policies. If there were questions which were answered during a discussion of another question, the unasked question was not then repeated. Additional telephone time was allotted for respondents to expand on questions or provide additional information about their schools. They were also welcomed to include anything else they felt was pertinent for the researcher to know about the specifics of their educational setting.

Conversations were structured to take only ten minutes. However, of the 26 administrators spoken to, only two (7.69%) took ten minutes. The other 24 (92.31%) conversations were much longer, at the administrators choosing. The conversation durations ranged from 10 minutes to one hour and 15 minutes (M = 40.00). During the conversation, Administrators were reminded that the researcher would only need 10 minutes of their time. However, if administrators chose to extend the conversation, it was allowed, provided their nature-based education program was the topic of conversation.

Results

Analyses

The 24 Administrators' responses to the telephone survey questions were analyzed for completion, normality, homogeneity of variance, and outliers. All statistical analyses were performed using the statistical program R 2.15.1. Since the survey specifically asked whether outdoor schools self-identified as Forest Schools or not, data were further analyzed based on which category they fell into. Despite having similar group sizes of 11 and 13 (Forest and non-forest schools, respectively), Levene's Test and

the Shapiro-Wilk test were used to assess variance and normality. No concerns were found with any variables with the Levene's Test, however both the free play and exploring in nature variables highlighted concerns that they might not be from a normally distributed population. Frequency distributions were used to observe patterns in the data for hours of the school day and also for the student, teacher, and schools demographics. Histograms of the data can be seen in Table 1.

Administrators who identified their schools as Forest Schools were compared to schools that did not identify as Forest Schools on several variables. Means and standard deviations were calculated for variables in both the Forest Schools and non- Forest Schools groups and compared (see Table 2). There were differences in time spent in school between the Forest schools (M = 4.77, SD = 1.57) and the non-Forest schools (M =6.08. SD = 1.89) but similar time spent outdoors, Forest (M = 4.41, SD = 1.59) and non-Forest (M = 4.31, SD= 2.46). Forest schools had slightly more time to explore nature, Forest (M = 2.05, 0.96) and non-Forest (M= 1.31, SD = 1.44). Also there were differences in the numbers of students between the Forest schools (M = 12.00, SD = 7.03) and non-Forest Schools (M = 17.00, SD= 10.88) but similar numbers of teachers at the Forest (M = 3.36, SD = 1.69) and non-Forest schools (M = 3.85, SD = 1.86).

Correlations and *t*-tests were calculated for several variables to examine possible relationships and differences between the Forest School group and the non-Forest School groups. While the assumption for normality is necessary for *t*-tests and there were some earlier concerns regarding normality with free play and exploring nature, this was noted and the decision to perform the *t*-tests was made. Differences between school dimensions

were all significant, with the exception of hours spent in school and instruction inside (See Table 3).

Correlations were calculated for several different school variables, with strong positive correlations found between the hours per day students spent in school and time spent outdoors (.79) and time for free play (.63). Also the amount of free play and time to explore nature (.78) and hours spent outdoors (.71). A strong positive correlation was also found between time spent on instruction inside and hours of class per day (.95). There was a moderate negative correlation between whether the school was a forest school and the amount of inside instruction (-.55) and the hours of class per day (-.56) (See Table 4).

Chi-square tests of independence were performed to examine the relation between school and several variables. The relationship between the school and parents, χ^2 (1, N = 24) = 0.73, p >.05 and the relationship between school and the presence of animals χ^2 (1, N = 24) = 0.91, p >.05 were not significant. That is, there does not appear to be any relationship between whether the school was a forest school or not and the level or parent involvement or the presence of animals at the school. The relationship between school and wildlife χ^2 (1, N = 24) = 6.77, p <.05 and the relationship between school and time exploring nature χ^2 (1, N = 24) = 5.34, p <.05 were both significant. So, there does appear to be a relationship between what school it was (Forest or not) and whether the children were exposed to wildlife and how much time they had in nature. The contingency tables can be seen in Table 5.

Several schools provided additional qualitative information about their school during the phone interviews and their answers were transcribed and examined for themes

of valuing nature and time spent in nature, and referenced in terms of contact with nature. These answers were not included in any statistical analyses. However, excerpts from telephone conversations were included to further understand the Administrators view of their schools and to convey their perspectives. A sample of excerpts from these telephone conversations can be seen in Appendix C. Conversational responses during or after the questionnaire were considered as they related to Kellert's (2002) nine values of nature (Scientific-Ecological, Naturalistic, Symbolic, Aesthetic, Humanistic, Negativistic, Moralistic, Utilitarian, and Dominionistic).

Discussion

In examining the relationships between schools which identified as Forest schools and those which did not, several themes emerged. As described earlier, there were differences in the amount of time that students spent outdoors, based on whether the school identified as a Forest School or not. However, all the schools were nature-based. So, while the differences in time for free play and time spent exploring nature were significant based on whether the school was a Forest school or not, this association assumes that the school identified with the Forest school ethos purposefully. It is possible that schools were operating under pedagogy identical to the Forest schools, however were not aware. While all the schools expressed a desire that students spent time in nature, the focus was ultimately on students learning how to communicate and to be present with others in nature. Echoing the earlier definition of pedagogy in which "learning as an ongoing process, encompassing learning about self in relation to others, about one's talents and power, about creativity and about the physical world" (Moss & Petrie, 2002), all the Administrators seemed to embrace this notion. They had a focus on

the “physical world” as being nature specific and encouraged children to play and spend time out in their natural environment. This was seen across schools and related directly to the first research question of how the experience and duration of the time students spend in outdoor- focused education might differ based on school.

With regards to the second research question of whether schools that identify as Forest Schools differ with regard to the students’ contact with nature from schools that do not identify as Forest Schools, it would seem that several differences do exist. When the data were analyzed by question, there were clear differences on the degree of contact with nature, particularly direct contact with nature. The questions of contact with wildlife and time to explore in nature alone were related to the area of direct contact with nature. While many administrators reported that their schools had animals and gardens, these were indicators of indirect contact with nature, as the environments were being manipulated by the students or school. Despite the low levels of interactions with wildlife, and “unaltered” nature, many schools did in fact provide indirect contact with nature to their students in varied ways. The opportunity for multifaceted interactions with nature, even on an indirect contact level, helps to foster the familiarity with nature that Kellert has noted as a precursor for developing a love and appreciation for nature, the beginnings of biophilia (Kellert, 2002).

Conversations with Administrators

When considering the excerpts from the telephone conversations, several themes emerged. In agreement with the literature (Kellert, 2002; Kuo & Taylor, 2004; Waite, 2007) , those schools which identified as Forest Schools were described as having naturalistic values (hands on contact with fire, wood, creatures, etc.) and moralistic

values (respect for and making minimal impact on, environment). Administrators emphasized the importance of teaching children "love and respect" for nature as well as creating an environment and community of teachers, parents and children who embodied those same values. Two administrators indicated the core goal of their nature-based school was to teach a "love of nature" more so than "learning" or developmental skills. While both skills were global goals of their program, they specifically geared activities towards instilling a respect and deep admiration for nature in their students, often in lieu of more traditional school work. Early exposure and familiarity with nature and the encouragement by supervising adults provides the support children need to develop an appreciation for the nature, and is one of the main elements of biophilia (Kahn, 2002; Kellert, 2002; Wilson, 1993)

A small group of four schools (30.77%) which administrators did not identify as Forest Schools were very strongly aligned with the naturalistic/utilitarian/dominionistic value in the sense of teaching children how to be self-sufficient in the woods, how to survive in nature. These schools could perhaps be gently described as "survivalist" in their mentality that primal skills such as building a shelter (utilitarian) or making fire and finding food to eat (dominionistic) values were the focus of their early education, given priority over more "academic" or scientific values of nature which the majority of the other schools had as an equal element of the educational experience they attempted to provide for students.

Several administrators reported that the symbolic value of nature (as distinct from symbolic contact with nature) was the ultimate outcome for their students, as seen by the development of language skills and language development through interactions with

nature, naming plants, animals, and telling stories involving daily activities students experienced in nature. One administrator in particular explained he scheduled activities for students (aged 4-6) around situations which would elicit the need for discussion and naming, so a trip to the forest was scheduled with the express goal of finding and naming as many different types of leaves as possible. In this way, language development was supported, but in the environment which comprised on novelty and ever-changing dimensions of nature.

One interesting conversation with an administrator revolved around the complexity and sophistication of what students at her school were learning. Giving the example of 5 and 6 year olds learning about volume, she recalled a situation where after a particularly heavy rain, students were walking across a flooded area. The water was above their rain boots, and as they crossed, water filled their boots. Rather than become alarmed at the students getting wet, the administrator (who was also a teacher at this school) waited and allowed the children to realize that their boots were full of water and subsequently take them off. In the taking off and pouring out of the water-filled boots, students began to compare the amount of water in boots of differing sizes and height. As this continued, the administrator was consulted by the students who wanted to know how and why different boots held differing amount of water. In this situation she was able to have a very advanced and sophisticated discussion of volume with young children which was most salient to them because they were directly involved in the creation and solution of the unknown. This was a specific example of the scientific, naturalistic, and utilitarian values of nature (Kellert, 2002) coming together to allow a child-directed learning moment. The administrator felt this situation very strongly embodied the work she was

trying to do at her nature-based school. A sample of these telephone conversations can be seen in Appendix C.

Limitations and Future Directions

This research is not without limitations. Most notably the sample was not a random one, and the sample size was quite small. Additionally, with responding administrators being from schools located predominantly on the coasts of the United States, it would be hard to say that those administrators from nature-based schools in the middle regions of the United States would have the same responses. However, the education goals of the schools sampled and the responses from administrators suggest that they were in alignment with previous research done on nature education. Given the small sample size, it is worth noting that although only 30 administrators were contacted, there was an 86% response rate. So, while the responses were limited in number, the response rate suggests that this population is very eager to be involved in research. Since this pilot study of administrators views on the role of nature in their schools is the only one known to date, this seems to be an area which warrants more research and with a population that seems agreeable and supportive of research on their pedagogy and ethos.

With less and less time available for children to spend time in nature, more research into the benefits of a nature-based education is needed. The research fascination with education and schooling in the United States begs the question, how is a nature-based school different? With private schools, charter schools, and alternative schools increasing in popularity, it seems the market for a different type of school is certainly available. However, the Forest school or nature-based education would appear to be less of a “different school” and more a “different perspective” on schooling. With a child-

centric focus and emphasis on discovering oneself in relationship with nature, there is less pressure on academic performance and more focus on how the child can develop in a rich and grounding environment, and learn to love and appreciate nature and their surroundings. A criticism of the idea of nature-based education has been that it is specific only to those children who have access to nature. The question of how could it be addressed in an area without large-scale access to nature such as a larger city with limited green spaces has been a consistent concern when discussing this research. While this is a valid concern, perhaps it serves to highlight the need for further research into how areas largely inhabited by children with a need for schooling, could access more green spaces and find a way to bring nature to them. Research is needed to discover how the ethos of child-directed learning and respect for nature and animals in the context of a nature-based school, could be implemented on a smaller scale to provide children the contact with nature that Kellert (2002) asserted was so important for their development, both cognitively and physically, but socio-emotionally as well.

While this study was a pilot for exploring some of the basic themes among nature-based education, there is certainly more to be done to fully understand both the administrators perceptions of nature-based education, and to gain more of a perspective from both the parents and the students. Questionnaires addressing the elements of contact with nature, as well as observations, interviews, and cognitive measures, could all serve to further inform the role of nature in children's learning environments. With a greater understanding of not only the administrators' perspectives, but that of the children and parents involved with these schools, the opportunity to involve nature more fully in

schools seems an attainable and necessary goal for the future of early childhood education.

Appendix A: Telephone Protocol

Hello, my name is Jessie Hargrave and I am calling from the University of North Carolina at Chapel Hill.

How are you today?

I am calling to ask whether you would be willing to answer a few questions about nature-based schools as part of my Master's Thesis.

Are you an Administrator for _____ outdoor- based school?

My Master's Thesis is being supervised by Dr. Rune Simeonsson in the School of Education at UNC-Chapel Hill. The research is interested in how Administrators, such as you, view the role of nature and the outdoors in early childhood learning environments.

The questions should take less than 15 minutes to answer and any answers given will not be traceable back to you. They will be number coded to ensure your anonymity.

Would you be willing to answer a few questions at this time about your school? Your answers are completely voluntary, and you may opt to not answer any individual questions you do not feel comfortable answering.

(Yes) Thank you for agreeing to answer a few questions…. (proceed to survey)

OR

(NO) Thank you for your time, have a wonderful afternoon.

Appendix B: Telephone Survey

This survey has been designed to gain information and to better understand the role of nature in outdoor- focused early childhood education settings in the United States.

Please answer all the questions to the best of your ability. If you wish to comment on any questions or qualify your answers, please feel free each section of questions. Your comments will be read and taken into account.

Record answers in hours

How many hours make up the school day?	Time
On average, how many hours per day do children spend outdoors?	
On average, how many hours per day do children spend inside in the classroom setting?	
On average, how much of your daily instruction takes places outdoors?	
On average, how much of your daily instruction takes place inside?	
On average, how many hours per day are allocated for free play?	
On average, how many hours per day do children have time to explore nature alone?	

Record answers yes/no

	Y	N
Do you consider your school to be nature-based? A Forest School?		
Is sustainability part of your education program?		
Are parents involved in daily activities at your school?		
Do children engage in unguided exploration in nature?		
Do children collaborate with each other on outdoor projects?		

	Y	N
Do children have access to building materials for outdoor projects?		
Do children in your school encounter wildlife in the outdoor program?		
Does your school have animals? What kind?		
Are children involved in the care of animals at your school?		
Does your school have a garden (vegetable or flower)?		
Are the students involved in the creating and/or maintenance of the garden?		
Does your school recycle?		
Does your school compost?		
Is environmental education part of your program?		

Finally, we would like to ask a few questions about you and your school for statistical purposes.

How many students does your school serve? Ages?	
How many teachers work with your school?	
How many days per week is your school open?	
Is your school a year round school?	
How long has your school been in operation?	

Thank you so much for your participation in this telephone survey. Your answers will help to further our knowledge about nature-based early education.

If you wish to contact me at any time after our phone conversation please feel free to contact me via email at martinjh@email.unc.edu or by phone at 843.743.9880.

Appendix C: Excerpts of conversations with school administrators:

Administrator from School 02:

"…there was such a wonderful, uninterrupted learning opportunity happening in that moment. The children were walking down past the creek where it tends to flood after a heavy rain. As they were crossing a flooded area, it was too deep for them and their little legs and their rain boots filled up with water. It is probably not a good example to use, but for me it was such a fascinating and magical moment. The children realized that the water was filling their boots and they took them off to dump out the water, but then they went back to walk around and their boots filled up again. And again they came and dumped the water out. But after a few more times they recognized that different size boots had more water and began to wonder about this. So, I went over to them and gently aided the conversation to ask about whose boots had more water and why they thought it might be and so on. It was amazing that these four and five year olds began to understand and have a conversation about volume, all from getting their boots wet! If we, the teachers, had run over and asked them to stop what they were doing or have intervened or scolded them, that teaching moment, that learning moment would never have occurred. And that, to me, is the beauty of teaching in nature…"

Administrator from School 07:

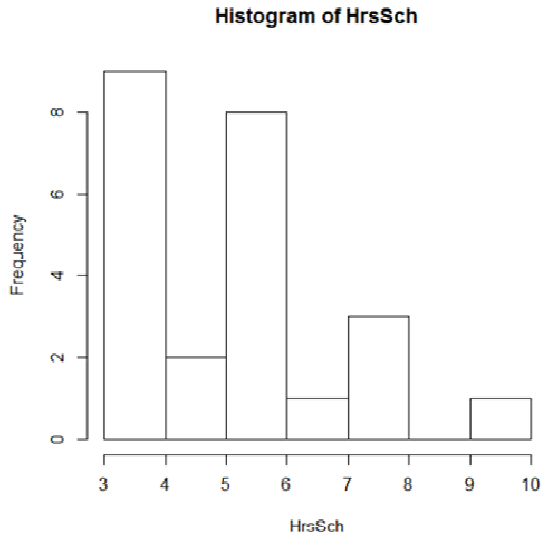
"…people do not know how to survive anymore. If we continue to be dependent on others, on the government for everything, how can we sustain? So, one of the goals is to teach our young students how to life in the woods. How to make a fire, how to collect berries, how they can find fruit or leaves or things that can be eaten, that are not harmful to them……. And this is such a valuable lesson, such a valuable life skill, because they can then truly learn and be responsible citizens because they know how to care for themselves….. so, yes, education is important, we want them to learn to read and they need to write and think, but before all that, they must learn to live. And so we instill that knowledge that is missing in the young generation, how to life with nature…."

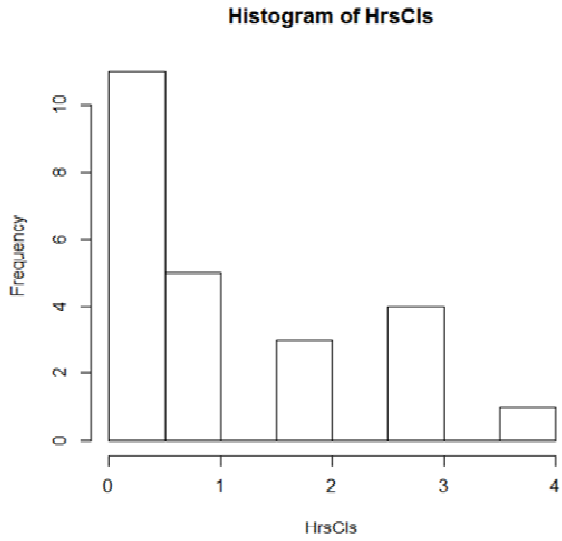
Administrator from School 19:

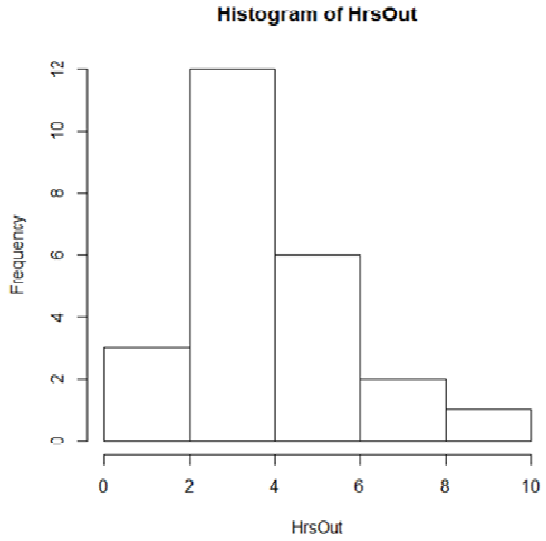
"…kids love to be out in the woods, it's something they don't get much of at home, so when they come to school a few days a week it's a chance for them to connect with what is missing. It's also a chance for the teachers to create situation where children who are really into being in nature are motivated to do things together, to make things, and find things, in the woods. A fort, or a castle,

mud pies, find leaves to bring back to the house to show their parents when they go home. It's an easy way to teach kids to work together, find leaves. How many? What colors? Shapes? And it's like all this makes them talk, use language. They are encouraged to find the time to do this and the teachers make time for it so they can encourage the kids' language and help the kids learn to 'use their words' and really do stuff together. It's so great for them, to just talk about their projects or their leaves, or whatever it is that they see all around them, because it's always changing you know? And it's always challenging them to express what is going on…"

Table 1. Histograms of time spent during school day (in hours).







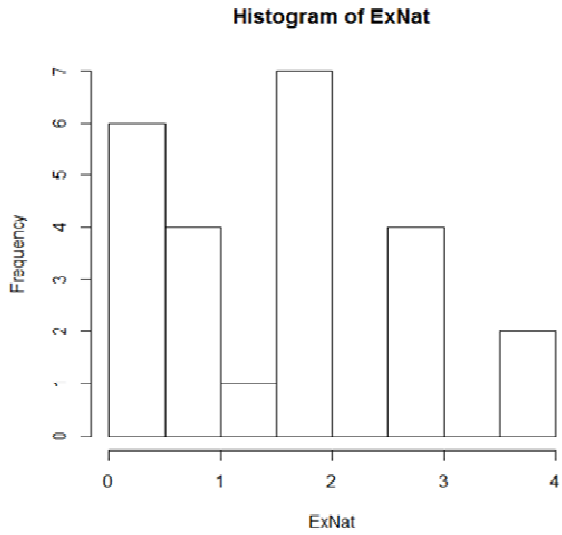


Table 2. Time spent in school (time in hours)

	Forest School		Non-Forest School	
School day	Mean	4.77	Mean	6.08
	SD	1.57	SD	1.89
Time Outdoors	Mean	4.41	Mean	4.31
	SD	1.59	SD	2.46
Time Indoors	Mean	0.36	Mean	1.77
	SD	0.67	SD	1.36
Inside Instruction	Mean	0.18	Mean	1.54
	SD	0.40	SD	1.39
Outside Instruction	Mean	4.36	Mean	3.69
	SD	1.69	SD	2.98
Free Play	Mean	2.91	Mean	2.62
	SD	0.83	SD	1.20
Explore Nature	Mean	2.05	Mean	1.31
	SD	0.96	SD	1.44
Number of Students	Mean	12.00	Mean	17.00
	SD	7.03	SD	10.88
Number of Teachers	Mean	3.36	Mean	3.85
	SD	1.69	SD	1.86
Days open per week	Mean	4.18	Mean	4.46
	SD	0.87	SD	0.88
Years of operation	Mean	6.63	Mean	12.46
	SD	3.81	SD	9.61

Table 3. *t*- tests for outdoor variables

		t-value	df	p-value
Hours of school				
	ExNat	8.40	46	0.001*
	HrsCls	9.48	46	0.001*
Free play				
	HrsSch	6.34	46	0.001*
	ExNat	-3.30	46	0.001*
	HrsCls	-4.81	46	0.001*
Instruction outside				
	InstIn	-5.50	46	0.001*
	HrsCls	-5.08	46	0.001*
Hours of class				
	InstIn	0.57	46	0.573

Table 4. Correlations between variables

	HrsSch	HrsCls	FreePl	ExNat	HrsOut	NumTch	Op	InstIn	InstOut
For	-.36	-.55	.14	.30	.02		-.37	-.55	.14
HrsSch				.63					
FreePl	.63				.48	.71			
ExNat	.26								
NumTch					.07	.12			
NumStu	-.15			-.44	-.37	-.36	.44		
Op				-.40					
InstIn		.95							-.60
InstOut									
HrsOut	.79								

Table 5. χ^2 Contingency tables

	Forest	Non	Total
Parents	4	7	11
None	7	6	13

	Forest	Non	Total
Animals	8	7	15
None	3	6	9

	Forest	Non	Total
Wildlife	11	7	18
None	0	6	6

	Forest	Non	Total
Exploring Nature	11	8	19
None	0	5	5

References

Bilton, H. (2002). *Outdoor play in the early years*. London: David Fulton.

Bonnett, M. (1994). *Children's thinking: Promoting understanding in the primary school*. London: Cassell.

Bonnett, M., & Williams, J. (1998). Environmental education and primary children's attitudes towards nature and the environment. *Cambridge Journal of Education, 28*, 159- 174.

Burls, A., & Caan, W. (2005). Human health and nature conservation. *British Medical Journal*, *331*, 1221-1222.

Chawla, L. (1988). Children's concern for the natural environment. *Children's Environments Quarterly*, *5*(3), 13-20.

Csikszentmihalyi, M. (1990). Flow: *The psychology of optimal experience*. London: Harper and Row.

Dale, D., Corbin, C., & Dale, K. (2000). Restricting opportunities to be active during school time: Do children compensate by increasing physical activity levels after school? *Research Quarterly for Exercise and Sport*, *71*(3).

Davis, B & Waite, S. (2005). *Forest Schools: an evaluation of the opportunities and challenges in Early Years* (Final Report, January 2005). Plymouth: University of Plymouth.

Delors, J. (1996). Learning: The treasure within. UNESCO report for Education for the 21st Century. London: UNESCO Publications, HMSO.

Derr, V. (2002). Children's sense of place in Northern New Mexico. *Journal of Environmental Psychology*, *22*, 125-137.

Eagles, P. J., & Muffitt, S. (1990). An analysis of children's attitudes toward animals. *Journal of Environmental Education*, 21, 41-44.

Fjortoft, 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.

Fjortoft, I. (2004). Landscape as playscape: the effects of natural environments on children's play and motor development. *Children, Youth and Environments, 14(*2), 21–44.

Fjortoft, I. & Sageie, J. (2000). The natural environment as a playground for children.

Landscape and Urban Planning, 48, 83–97.

Hart, R. A. (1979). Children's experience of place. New York: Knopf.

Hofferth, S. & Sandberg, J. (2001). How American children spend their time. *Journal of Marriage and Family, 63*(2), 295–308.

Kahn, P. H., Jr. (1997). Developmental psychology and the biophilia hypothesis: Children's affiliation with nature. *Developmental Review, 17*, 1-6.

Kahn, P.H. (1999). The Human Relationship with Nature: Development and Culture. Cambridge: MIT Press.

Kahn, P.H. (2002). Children's affiliations with nature: Structure, development, and the problem of environmental generational amnesia. In P. Kahn and S. Kellert, (Eds.) Children and Nature: Psychological, Sociocultural and Evolutionary Investigations (pp. 116-123). Massachusetts: MIT Press.

Kahn, P.H., & Kellert, S.R., (2002). *Children and Nature: Psychological, Sociocultural and Evolutionary Investigations*. Cambridge: MIT Press.

Kaplan, S., & Kaplan, R. (1989). *The experience of nature*. New York: Cambridge University Press.

Kaplan, S., & Talbot, J. (1983). Psychological benefits of a wilderness experience. In Altman & J. Wohlwill (Eds.), Behavior and the natural environment. New York: Plenum Press.

Kellert, S.R. (1985). Attitudes toward animals: Age-related development among children. *Journal of Environmental Education, 16*(3), 29-39.

Kellert, S.R., (1996). *The Value of Life: Biological Diversity and Human Society*. Island Press.

Kellert, S., (1997). *Kinship to Mastery: Biophilia in Human Evolution and Development.* Washington, DC: Island Press.

Kellert, S.R., (2002). Values, ethics and spiritual and scientific relations to nature. In S. Kellert and T. Farnham, (Eds.). The Good in Nature and Humanity: Connecting Science, Religion, and Spirituality with the Natural World (pp. 49-63). Washington, DC: Island Press.

Kellert, S.R., (2005). Nature and Childhood Development. In Building for Life: Designing and Understanding the Human-Nature Connection. Washington, D.C.: Island Press.

Kellett, S. R., & Westervelt (1983). *Children's attitudes, knowledge and behaviors toward animals*. Washington, DC: U.S. Fish & Wildlife Service.

Kellert, S.R., & Wilson, E.O., (1993). *The Biophilia Hypothesis*. Washington, DC: Island Press.

Knight, S. (2009). Forest Schools and Outdoor Learning in the Early Years. *Children, Youth and Environments, 21*(1).

Kuo, F. E., & Taylor, A. F. (2004). A potential natural treatment for attention-deficit/hyperactivity disorder: Evidence from a national study. *American Journal of Public Health, 94*(9), 1580-1586.

Kuo, F. E. & Taylor, A.F. (2009). Children with attention deficits concentrate better after A walk in the park. *Journal of Attention Disorders, 12*(5), 402-409.

Louv, R. (2005). *Last Child in the Woods: Saving our Children from Nature Deficit Disorder*. Algonquin Books.

Malone, K. & Tranter, P. (2003). School grounds as sites for learning: making the most of environmental opportunities, *Environmental Education Research, 9*(3), 283–303.

Mander, J. (199 1). *In the absence of the sacred*. San Francisco: Sierra Club Books.

Maynard, T. (2007). Encounters with Forest School and Foucault: a risky business? *Education 3-13: International Journal of Primary, Elementary and Early Years Education, 35*(4) Special Issue: Outdoor play and learning.

Maynard, T. & Waters, J. (2007). Learning in the outdoor environment: a missed opportunity? *Early Years: An International Research Journal Volume*, 27(3).

Moore, R. C. (1986). *Childhoods domain: Play and space in child development*. London: Helm.

Moore, R., & Young, I. (1978). Childhood outdoors: toward a social ecology of the landscape. In I. Altman & J. F. Wohlwill (Eds.), Children and the Environment (pp. 83-130). New York: Plenum Press.

Moss, P., & Petrie, P. (2002). *From children's services to children's spaces: Public policy, children and childhood*. London: Routledge Falmer.

Mulder ten Kate, Q. (2011). *Direct experiences in nature* (Unpublished doctoral dissertation). Simon Fraser University, Burnaby.

Nabhan, G. P. (1994). Proximate and ultimate threats to en-dangered species.

Conservation Biology, 8, 928-929.

Nabhan, G. P. (1997). *Cultures of habitat. On nature, culture, and story*. Washington, DC: Counterpoint Press.

Nabhan, G.P., & S. Trimble. (1994). *The Geography of Childhood*. Boston: Beacon Press.

Nakamura, J., & M. Csikszentmihalyi. (2002). The concept of flow. In C. Snyder and S. Lopez (Eds.), Handbook of Positive Psychology, (pp. 89-105). London: Oxford University Press.

Nature. (2008). Handle with care. *Nature, 455*, 263-264.

O'Brien, L. (2009*).* Learning outdoors: the Forest School approach. *Education 3-13: International Journal of Primary, Elementary and Early Years Education, 37*(1), Special Issue: International Perspectives on Outdoor and Experiential Learning.

Organisation for Economic Cooperation and Development (OECD). (2000). *Early Childhood Education and Care Policy in Denmark – Background Report*. Copenhagen: The Ministry of Social Affairs in consultation with the Ministry of Education.

Organisation for Economic Cooperation and Development (OECD). (2001). *OECD Country Note: early childhood education and care policy in Denmark*. http://www.oecd.org/dataoecd/31/56/33685537.pdf.

Ouvry, M. (2003). *Exercising muscles and minds: outdoor play and the early years curriculum*. London: The National Early Years Network.

Payne, P. (1998). Children's conceptions of nature. *Australian Journal of Environmental Education 14*, 19-26.

Pyle, R. (1993). *The thunder tree: Lessons from an urban wildland*. New York:Houghton Mifflin.

Pyle, R. (2002). Eden in the vacant lot: Special places, species and kids in the neighborhood of life. In P.H. Kahn and S.R. Kellert (Eds.), Children and Nature: Psychological, Sociocultural and Evolutionary Investigations, (pp. 305-327). Boston: MIT Press.

Rickinson, M., J. Dillon, K. Teamey, M. Morris, M.Y. Choi, & D. Sanders.(2004). *A Review of Research on Outdoor Learning*. National Foundation for Educational Research and King's College London.

Rivkin, M. (1995). *The great outdoors: restoring children's right to play outside*.

(Washington, DC, NAEYC conference).

Rivkin, M. (1998). Happy play in grassy places: the importance of the outdoor environment in Dewey's educational ideal, *Early Childhood Education Journal, 25*(3), 199–202.

Rivkin, M. (2000). Outdoor experiences for young children. Educational Resources Information Center. (ERIC digest ED448013 2000-12-00). Available online at http://www.eric.ed.gov10, (accessed January 13, 2013).

Searles, H. F. (1959). *The nonhuman environment*. New York: International Universities Press.

Sobel, D. (1993). *Children's special places: Exploring the role of forts, dens, and bush houses in middle childhood*. Illinois:Wayne State University Press.

Sobel, D. (1996). *Beyond Ecophobia: Reclaiming the Heart of Nature Education*. Massachusetts:Orion Society.

Sobel, D. (2004). *Place-based Education*. Massachusetts: Orion Society.

Sobel, D. (2008). *Childhood and Nature: Design Principles for Educators*. Portland: Stenhouse Publishers.

Stephenson, A. (2003). Physical risk-taking: dangerous or endangered*?, Early Years, 23* (1), 35–43.

Taylor, A.F. & F.E. Kuo (2006). Is contact with nature important for healthy child development? State of the evidence. In Spencer, C. and M. Blades, (Eds.), Children and Their Environments: Learning, Using and Designing Spaces. Cambridge: Cambridge University Press.

Taylor, A. F., Kuo, F. E., & Sullivan, W. E. (2001). Views of nature and self-discipline: Evidence from inner city children. *Journal of Environmental Psychology, 21*, 1-15.

Thomashow, M. (1995). *Ecological identity*. Cambridge: MIT Press.

Waite, S. (2007). 'Memories are made of this': some reflections on outdoor learning and recall. *Education 3-13: International Journal of Primary, Elementary and Early Years Education, 35*(4), 2007 Special Issue: Outdoor play and learning.

Waite, S. (2011). Teaching and learning outside the classroom: personal values, alternative pedagogies and standards. *Education 3-13: International Journal of Primary, Elementary and Early Years Education, 39*(1).

Waite, S., Davies, B. & Brown, K. (2006). *Five stories of outdoor learning from settings for 2–11 year olds in Devon.* (Plymouth, University of Plymouth).

Wals, A.E.J. (1994). Nobody planted it, it just grew: young adolescents' perceptions and experiences of nature in the context of urban environmental education. *Children's Environments, 11*(3), 177-193.

Wen, L., Kite, J., Merom, D., & Rissel, C. (2009). Time spent playing outdoors after school and its relationship with independent mobility: a cross-sectional survey of children aged 10–12 years in Sydney, Australia. *International Journal of Behavioral Nutrition and Physical Activity, 6*(15).

Williams-Siegfredson, J. (2005). The Competent Child: developing children's skills and confidence using the outdoor environment: a Danish perspective. Paper presented at BERA 2005, 15-17 September 2005, University of Glamorgan, Wales.

Wilson, E.O. (1984). *Biophilia: The Human Bond with Other Species.* Cambridge: Harvard Univ. Press.

Wilson, E.O., (1994). *Naturalis*t. Washington, DC: Island Press.

Wilson, E.O., (1996). *In Search of Nature*. Washington,DC:Island Press.

Wilson, E. O., (1992). *The diversity of life*. Cambridge: Harvard University Press.

Wilson, E. O., (1993). Biophilia and the conservation ethic. In S. Kellett & E. 0. Wilson (Eds.), The hiophiha hypothesis. Washington, DC: Island Press.

Wilson, E.O., (2006). *The Creation*. New York: W. W. Norton and Company, Inc.