



Honors Theses at the University of Iowa

Fall 2019

School of the Wild's Impact on Students' Attitudes Towards the Outdoors, Learning Science, and Sustainability

Rebekah Stelzle

Follow this and additional works at: https://ir.uiowa.edu/honors_theses

 Part of the [Outdoor Education Commons](#)

This honors thesis is available at Iowa Research Online: https://ir.uiowa.edu/honors_theses/312

SCHOOL OF THE WILD'S IMPACT ON STUDENTS' ATTITUDES TOWARDS THE OUTDOORS,
LEARNING SCIENCE, AND SUSTAINABILITY

by

Rebekah Stelzle

A thesis submitted in partial fulfillment of the requirements
for graduation with Honors in the Education

Conrad, Terry
Thesis Mentor

Fall 2019

All requirements for graduation with Honors in the
Education have been completed.

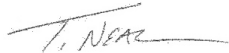
Croft, Laurie
Education Honors Advisor

SCHOOL OF THE WILD'S IMPACT ON STUDENTS' ATTITUDES TOWARDS THE
OUTDOORS, LEARNING SCIENCE, AND SUSTAINABILITY

by

Rebekah Stelzle

A thesis project submitted in partial fulfillment of the requirements
for graduations with Honors in the College of Education



Ted Neal
Honors Thesis Supervisor

Fall 2019

All requirements for graduation with Honors in the
College of Education have been completed.



Laurie Croft
College of Education Honors Advisor

Abstract

Current educational priorities are forcing students to stay inside to the detriment of students' well-being. Research proves that outdoor education provides many positive benefits for students' learning, health, and relationships. With this in mind, we set out to answer the question of how an outdoor education program in the Midwest affects student's attitudes towards science, the outdoors, and sustainability. The School of the Wild is a week-long outdoor education program provided to every sixth-grade student in the Midwest school district. We created an instrument to discover participants' changes in attitudes towards the outdoors, learning science, and sustainability. Students were given the pre-survey in January before they participated in the program, and the post-survey was administered anywhere from one to three weeks after their time at the School of the Wild. We then compared the pre- and post-survey results in terms of all students surveyed and in terms of their self-identified gender. Overall, the School of the Wild experience seemed to benefit boys more than girls. Boys had a more positive shift in attitudes. While girls began with more positive attitudes towards science and the outdoors, the School of the Wild experience did not seem to greatly impact their attitudes. Some limitations for this study include the fact that the results are not generalizable, we were not able to track individual responses, and that post-surveys should be sent to schools with the same amount of time after participation for the best comparison. Future research might explore the impact of the entire program, or subsections of the program, on different races, socioeconomic statuses, or ages. Given the benefits of outdoor education discovered in this study as well as others, it is imperative that we adjust our educational priorities to include outdoor education.

Introduction

Current educational priorities are forcing students to stay inside to the detriment of students' well-being. Education's focus on standardized test scores and meeting mandates are forcing students to stay inside to prepare for tests by cutting Physical Education, recess, and field trips. For example, according to the CDC's quote from Kann et al. (2016), "In 2015, 51.6% of high school students attended physical education classes in an average week." This is even less than the results of the Shape of the Nation report in 2006 which stated that "Nationwide, the percentage of high school students enrolled in physical education classes was 56 percent in 2003" (p. 1). Next, the National Parent Teacher Association press release mentions that "nearly 40 percent of American elementary schools either eliminated or were considering eliminating recess" (2006, p. 99). Additionally, the emphasis on technology literacy in schools is important in becoming a productive member of the twenty-first century. However, it causes students to spend more time in front of screens and less time in other areas where they can learn equally important lessons that are not possible to learn through a computer. Like Louv (2008) mentions, "The problem with computers isn't computers – they're just the tools; the problem is that overdependence on them displaces other sources of education, from arts to nature" (p. 137).

With more time in front of screens or workbooks, and less time outdoors, students' well-being suffers. Richard Louv (2009) calls the distance from nature and the negative effects that result, "nature-deficit disorder." He defines it as the "Description of the growing gap between human beings and nature, with implications for health and well-being" (Louv, 2009, p. 2). Research shows that being in the outdoors or just viewing the outdoors positively affects human health. Howard Frumkin (2001) cites many studies when he suggests that the positive effect of being outdoors "may extend beyond aesthetics, to restoration or stress recovery" (p. 237). By

keeping students inside, we are keeping students from many of the health benefits of the outdoors, such as reducing stress. In addition, the obesity epidemic in the United States has been prevalent for many years. Howard Frumkin and Richard Louv, backed by many studies, suggest that "Play in natural settings seems to offer special benefits. For one, children are more physically active when they are outside" (2007, p. 2). Next, Huh and Gordon (2008) state that lack of direct sunlight could be a risk factor for Vitamin D deficiency (p. 162). Finally, outdoor education has been shown to potentially help those with ADD to focus better. Faber Taylor, Kue, and Sullivan (2001) completed a study from which they report that "Several analyses suggest that contact with nature is systematically related to lessened attention deficit symptoms" (p.70-71). The current educational system is under-utilizing the many free benefits that nature has to offer students.

For many years, scientists warned about the state of our environment and the rapid speed of climate change. We need our Earth to sustain and nurture us for many years to come. Schools need to make outdoor education a priority which will result in increased care and respect for our environment. Now is the time to research the benefits of nature. We need to remind ourselves, the educational system, and our leaders of the proven facts once again that children need time outside. Not only is this time for enjoyment, but being outside impacts our health and wellbeing, and time spent outdoors is needed to protect nature and the invaluable benefits that result from being outside. With this in mind, we set out to answer the question of how an outdoor education program in the Midwest affects student's attitudes towards science, the outdoors, and sustainability.

Literature Review

Historical Context

It could be argued that outdoor education began as soon as people evolved on Earth. People explored their surroundings, learned what was safe to eat, and how to interact with their environment to survive. Indigenous populations migrated and learned how to live off the land in new locations. Since the beginning of their time, Native American tribes used their knowledge of the environment to perfect the ways of migrating with animals and seasons. In contrast, European settlers in the United States used outdoor education to learn about the new environments in which they were invading. Similarly, Stothart (2012) mentions that children of European pioneers in New Zealand could be found playing and exploring in nature. He writes then when children had free time, "they tended to use it, especially the boys, in exploring the wild life and in adventures offered by the natural environment, rather than playing traditional games" (p.7). Early outdoor education stemmed from curiosity about the natural environments in which people were living. People were exploring new species, landscapes, and how to best live in them.

As people became more settled in their environments, artists, writers, musicians, and poets began to incorporate the outdoors into their works. The outdoors was written about and celebrated by authors such as British poet William Wordsworth "whose poetry was suffused almost throughout by the content and lessons of nature" (Marsden, 1997, p. 11). American influences include Thoreau and Emerson (p. 18). These artists helped to inspire a love for nature and the environment. In the United States, a concern for the protection of the environment grew. As people settled the frontier, "the attack on the forests, soils, and mineral veins of the frontier

wilderness was rapid, predatory, and momentous” (p. 19). Presidents Theodore and Franklin D. Roosevelt passed legislation to protect the environment. The effects of both their presidencies included the creation of many national parks, the United States Forest Service, and the Civilian Conservation Corps. In addition to creating the CCC, FDR was president while many camps were being created throughout the country (p. 23). Further, schools began to incorporate camps into their educational programs. For example, in New Zealand in 1942, the Superintendent of Physical Education “organised [sic] a camp at Tiritia Dam for about 100 intermediate school children and 13 adults” (Stothart, 2012, p. 8). This increase in awareness for environmental conservation and increase in opportunities for the public to explore the natural wonders of the country inspired people to explore the outdoors.

Eventually, Lloyd Burgess Sharp decided to combine the ideas of educators like John Dewey with the camping programs. Progressive philosophies like Dewey's, with their emphasis on experiential and practical learning, worked well with the learning that was done by those involved in camping programs. Sharp later coined the term “outdoor education” (Carlson, 2005, p. 326). Outdoor education was influenced by other philosophies such as that of Nikolaj Frederik Severin Grundtvig. Grundtvig encouraged the idea of learning in the natural environment to stimulate more ‘learning by doing’ (Rotaru, 2014, p. 532). Grundtvig suggested that “The natural environment... offers the framework for a harmonious development of body and mind” (p. 532). These ideas of experiential learning and learning about oneself and the environment through experiences has continued to be included in outdoor education today.

Currently, outdoor education programs are available internationally. Students across the United States, as well as in other countries participate in some form of outdoor education whether it is required by the school district or sought out by individual families. National parks

provide educational opportunities, and camping experiences are still popular among many people. Additionally, some pre-service teachers receive training in incorporating outdoor education into their future curriculums. This can be seen in the preparation elementary education preservice teachers receive at the University of Iowa as well as teacher preparation programs in New Zealand (Stothart, 2012, p. 9). Further, universities across the United States provide programs of study focused on outdoor education such as Black Hills State University in South Dakota and the University of Alaska in Anchorage. However, with the current educational priority of passing standardized tests, there is still a long way to go in ensuring that all students have access to outdoor educational experiences.

Benefits and Importance of Outdoor Education Programs

Outdoor education has numerous positive outcomes which makes it imperative to incorporate outdoor education into our schools. To begin, researchers determined that students who camp together feel more confident in themselves and their abilities. They also form better relationships with their peers and others. Beker (1960) found after participating in a school camping program, sixth-grade students from the United States demonstrated positive shifts in their self-concept and social relationships (p. 356). This connects with Palmberg and Kuru's (2000) study in Finland. These researchers found that the outdoor education program they experienced "developed pupils' self-confidence and feelings of safety, in particular, which in turn increased their willingness to participate in future outdoor activities" (p. 34)

Next, Eaton (1998) found that outdoor education experiences "are effective for promoting cognitive changes in students" (p. iii). His research compared the learning of Canadian upper-elementary students who learned about beaver ecology at a half-day outdoor education program

with those who learned about beaver ecology for a half day in a traditional classroom setting. He found that the outdoor education program “made a greater contribution to cognitive learning compared to the classroom program” (p. iii). Similarly, Lisowski and Disinger (1991) studied the outcomes of a seven-day school-sponsored, marine science field program in either the Bahamas, Andros Island, or the Grand Cayman Islands. The program’s emphasis was on the teaching of ecological concepts which students learned through field instruction and exploratory activities. The researchers’ results found that participants “showed statistically significant gains in posttest scores” and maintained retention even after four weeks (p. 22). These studies begin to show the power behind experientially learning in an outdoor environment.

Additionally, Smith-Sebasto and Semrau (2004) found that students participating in an outdoor education program in New Jersey increased in their environmentally responsible behaviors (p. 16). However, this study also found that students’ overall attitudes towards the environment were not affected (p. 16). This seems to be a common trend among other research. Shepard and Speelman (1986) found that after participating in an Ohio 4-H outdoor education program, students demonstrated that a “positive learning experience took place” during their camping experience (p. 20). However, “as a whole, the experimental treatment had little effect upon environmental attitudes” (p. 22). These authors suggest this lack of change in attitudes might be connected to a variety of variables. The first is the length of the program with five-day resident programs showing the most positive effect (p. 22). The next variable would be the age of the camper as well as their previous camping experience. For example, “Ten- to fourteen- year-old campers and repeat campers appear to have already established conservation attitudes” (p. 22). Finally, the amount of time given to acclimate to the new surrounding may also have an impact on attitude (p. 22). Environmentally responsible attitudes and behaviors are incredibly

important if we want students to continue to learn, grow, and develop in the outdoors. We want to instill in students a sense of responsibility and commitment towards keeping the Earth healthy, vibrant, and full of life. These practices are essential to heal and then maintain a planet that can sustain future generations.

Some programs have reported increases in both conceptual understanding and positive attitudes towards the environment. Bogner (1998) found that students who participated in either one-day or five-day outdoor education programs gained knowledge about the environment and natural processes (p. 26). Additionally, students' attitudes of sensitivity toward and understanding of human-altered nature positively shifted (p. 26). The author writes that "environmental behavior can be fostered in programs like the 5-day instruction" as well as "a more positive environmental attitude" (Bogner, 1998, p. 27). In comparison, Kidd Jr., Burrus-Bammel, and Bammel (1978) created a study to measure the changes in campers' philosophy and understanding after learning about "the Eastern Hardwood Forest ecosystem and the knowledge that it can be used to produce the goods and services required by people without destroying or degrading its status in the environment" (p. 15). The goal was to shift campers' attitudes to see "the environment as a total system that has as its major component a natural ecological system upon which are imposed, the social, political, and economic systems" (p. 12). The researchers discovered that "there were significant changes in attitude in the direction of the goal statement, in conceptual and factual knowledge" for campers, ages 16-20, who participated in the environmental education camping experience (p. 15). These studies show that it is possible to have both increases in content knowledge as well as environmentally beneficial shifts in attitudes. These findings add to the curiosity of discovering the most effective way to set up programs to attain the goal of learning more and positively shifting attitudes.

Ways to Improve

While there has been much research on the importance of outdoor education and its positive benefits, there are still areas in which to improve. Nicol (2014) critiques outdoor education and advocates for programs to be less about having fun outdoors or merely focusing on practicing social relations. Rather, programs should place more emphasis on “wider environmental considerations,” specifically sustainability (p. 453). Neill and Richards (1998) created a meta-analysis of the findings of various research on outdoor education. They discovered factors that impact the effectiveness of outdoor education programs. To begin, the authors found “that one of the most critical factors influencing the outcomes is the operating organization’s program design and facilitation” (p. 7). Next, the authors consider the length of the program another factor when they cite Hans (1997) explaining that “residential and semi-residential programs were more effective than ‘sessional’ programs” (p.6). Additionally, the authors cite Hans (1997) finding that programs focused on therapeutic goals rather than recreational goals were more effective (p.6). Further, the age of the participants also plays a role in the effectiveness of outdoor education programs. Specifically, adult programs tend to achieve better results than adolescent programs (p. 7). However, Neill and Richards warn “many adolescent programs are compulsory whilst adult programs tend to be voluntary” which may affect outcomes as well (p. 7). In addition, the authors mention research from Cason and Gills (1994) that found that “stronger outcomes were found for younger rather than older adolescents” (p.6). As Neill and Richards conclude, they suggest that “‘educational auditing’” is incredibly important and needs to be implemented more (1998, p. 8). This leads into the School of the Wild study. The following study evaluates the effectiveness of an outdoor education program in the Midwest.

School of the Wild

The School of the Wild is a week-long outdoor education program located in a state park in the Midwest. Every sixth-grade student in the local school district participates in the program annually, totaling around 1,100 students. 20 schools participated during the 2018-2019 school year. This includes students from diverse backgrounds, high-achieving students, students with special needs, and students from several Title 1 schools. The School of the Wild's mission "is to awaken an awareness of the wildlife and natural ecosystems in our area, develop an appreciation of the natural world, and encourage a balanced environmental ethic and caretaker attitude with respect for the earth." ("School of the Wild," n.d.). Students attend every day for five days. They stay the length of the school day and participate in lessons regarding prairies, wetlands, ornithology, and sustainability among many other topics. For example, sixth-grade students tag and release birds, study the woodlands and wetlands through building natural shelters, and learn about gardening and prairie sustainability by going on nature hikes in native prairies. The experience serves to help students become more aware of and gain a greater appreciation for wildlife and the world's ecosystem.

Methods

By gathering questions from Eaton's 1998 study, Svein Sjoberg's ROSE questionnaire (n.d.), and the School of the Wild's own evaluation assessment, we created a survey tool to give to the sixth-grade participants of the School of the Wild. The survey questions are included in Appendix A. Students answered 25 Likert questions pertaining to their attitudes towards the outdoors, science, and sustainability. After the instrument was validated by faculty at another Big Ten institution, we sent out the pre-survey at the beginning of the semester in January. All

students participating in the School of the Wild were given the online survey via their teachers to complete within one week. By giving all students the survey at the beginning of the semester we believed students' attitudes would not be affected by any excitement about the upcoming week at the School of the Wild. Additionally, the curriculum taught in preparation for the School of the Wild would not affect any attitudes. Post-surveys were administered to students to measure the change in their attitudes towards the outdoors, learning science, and sustainability after participating in the program. After students completed the program, they were given a follow-up survey anywhere from one to three weeks after their time at the School of the Wild. We then compared the pre- and post-survey results in terms of all students surveyed and in terms of their self-identified gender.

Results

Overall, when comparing straight pretest and posttest data, there was a marginally significant increase in the belief among all surveyed that school science is important. Almost all individual items increased when examining the measure of student belief that school science is important:

- The belief that school science is interesting increased significantly.
- The belief that school science has increased student appreciation of nature increased significantly.
- The belief that school science has shown students the importance of science for students' way of living increased significantly.
- The belief that everybody should learn science in school increased marginally.
- However, students' optimism for the future decreased significantly.

Additionally, the overall data also showed there was a marginally significant decrease in students' belief that preserving the environment is important. More specifically, there was a significant decrease in the belief that woodlands are valuable assets to neighborhoods and communities and a marginally significant decrease in the belief that students' themselves can personally influence what happens with the environment. Finally, there was a significant decrease in student belief from pretest to posttest that learning about the environment is boring after experiencing School of the Wild and a marginal decrease in the belief that nature walks are a waste of time.

When looking at the data by gender we found that, in general, boys showed the more positive shifts in attitudes. They found greater value in preserving the environment and in learning science in school. They also demonstrated reductions in negative attitudes. Although girls tended to start with more positive attitudes, their attitudes after the School of the Wild were more mixed. They reported more optimism for the future but were less impressed with learning science in school. Additionally, although girls still disagreed in thinking that learning about the environment was boring and taking nature walks were not worth it, there were some upward increases.

Next, by measuring the same group of females to males from the pretest to the posttest, females significantly declined in their belief that preserving the environment is important. However, males' belief of caring little for the environment decreased with marginal significance. Males' belief that school science is important increased significantly.

When we focused on students' attitudes towards preserving the environment by gender, we found that girls' belief that they can personally influence what happens with the environment

and that woodlands are valuable assets to neighborhoods and communities significantly increased. While girls' belief that everyone can make a significant contribution to environmental protection, and their commitment to living in a way that leaves little negative impact on the land increased with marginal significance. However, girls' belief that recycling paper is important decreased with marginal significance. Boys' belief that preserving prairies and healthy soil is important to themselves increased significantly. However, their belief that woodlands are valuable assets to neighborhoods and communities decreased significantly.

Next, we focused on students' attitudes about caring little for the environment. We discovered that boys' belief that learning about the environment is boring significantly decreased, while boys' belief that threats to the environment are not the student's business decreased with marginal significance. Girls' belief that learning about the environment is boring increased with significance, as did their belief that nature walks are a waste of time. Girls' belief that environmental problems are exaggerated decreased with marginal significance.

Finally, we compared boys' and girls' belief that school science is important. We found that boys' attitudes toward school science significantly improved for finding school science interesting, finding that school science increases their appreciation of nature, and finding that school science shows the student the importance of science for the today's way of living. Girls' optimism for the future significantly increased. However, their belief that school science increased the student's appreciation of nature significantly decreased. In addition, the girls' belief that school science is interesting and belief that everyone should learn science in school decreased with marginal significance.

Discussion

Overall, the School of the Wild experience seemed to benefit boys more than girls. Boys had a more positive shift in attitudes. They found greater value in preserving the environment and in learning science in school. The results also demonstrated a reduction in boys' negative attitudes. A passion and interest in science and the environment is needed to continue to care for and learn about our planet. We need to instill this passion in our future students. It would appear that outdoor learning is one strategy to reach boys. With more investment and care about the environment, we can develop leaders and everyday citizens who do their part in sustaining our planet and slowing climate change. We also can grow citizens who reap the many health benefits that nature has to offer.

While girls began with more positive attitudes towards science and the outdoors, the School of the Wild experience did not seem to greatly impact their attitudes. There were some upward increases in negative attitudes such as thinking that learning about the environment was boring and that nature walks are not worth the time or energy. In addition, girls seemed to be less impressed with learning science in school. However, their time in the outdoors did improve girls' optimism for the future. Increasing girls' impact and interest in STEM fields and especially the outdoors is essential in furthering our understanding. There is hope in the fact that the girls began with a more positive attitude towards the environment and science. However, we need to find ways to nurture and grow their positive attitudes to continue to benefit the environment and our future.

Limitations and Moving Forward

Some limitations for this study include the fact that the results are not generalizable. Results can only be used to describe the effects of the School of the Wild program. Additionally, post-surveys should be sent to schools with the same amount of time after participation for the best comparison. Finally, we were not able to track individual responses which made it difficult to monitor changes in individual students. To make the findings stronger, pre- and post- survey results should be tracked for individual students. This way, we can follow students' individual shifts in attitude. Future research might explore the impact of the entire program, or subsections of the program, on different races, socioeconomic statuses, or ages. Further questions to ask include:

- What resources and supports are necessary to improve the reach and impact of programs like the School of the Wild?
- What interventions can we implement to better reach all students?

Given the benefits of outdoor education discovered in other programs, the impact of the School of the Wild on boys and girls, and the numerous health benefits nature offers, it is imperative that we utilize what we have learned from others and experienced for ourselves. We need to protect and preserve our environment. We need to teach our future generations how to care for, appreciate, and sustain the Earth. To do so, we need to adjust our educational priorities to include outdoor education.

Appendix A

To which gender do you most identify?

I think that recycling paper is important.

I think that learning about the environment is boring.

I think that nature walks are a waste of time. I'd rather stay home and watch TV.

I don't worry very much about the environment.

I think ponds are full of bad things.

Threats to the environment are not my business.

Environmental problems are exaggerated.

I can personally influence what happens with the environment.

I think each of us can make a significant contribution to environmental protection.

I am optimistic about the future.

School science is interesting.

I think everybody should learn science at school.

School science has made me more critical and skeptical.

School science has increased my appreciation of nature.

School science has shown me the importance of science for our way of living.

Preserving prairies and healthy soils is important to me.

Woodlands are valuable assets to our neighborhoods and communities.

Conserving wetlands for migratory birds is important to me.

I am committed to living in a way that leaves little negative impact on the land.

I enjoy playing and learning outside.

References

- Beker, J. (1960). The influence of school camping on the self-concepts and social relationships of sixth grade school children. *Journal of Educational Psychology, 51*(6), 352-356.
- Bogner, F. X., (1998). The influence of short-term outdoor ecology education on long-term variables of environmental perspective. *The Journal of Environmental Education, 29*(4), 17-29.
- Carlson, J.A. (2005). The legacy of Lloyd Burgess Sharp (1895-1963): A career history of a pioneer in outdoor education. *Journal of Experiential Education, 27*(3), 326-327.
- Eaton, D. (1998). Cognitive and affective learning in outdoor education (Doctoral Dissertation). Retrieved from ProQuest. 9780612415874.
- Faber Taylor, A., Kue, F. E., & Sullivan, W.C. (2001). Coping with ADD: The surprising connection to green play settings. *Environment and Behavior, 33*(1), 54-77.
- Frumkin, H. (2001). Beyond toxicity: Human health and the natural environment. *American Journal of Preventive Medicine, 20*(3), 234-240.
- Frumkin, H., & Louv, R. (2007). The powerful link between conserving land and preserving health. *Land Trust Alliance Special Anniversary Report 2007*, 1-8.
- Huh, S. Y., & Gordon, C.M. (2008). Vitamin D deficiency in children and adolescents: Epidemiology, impact, and treatment. *Reviews in Endocrine and Metabolic Disorders, 9*(2), 161-170.
- Kann, L., McManus, T., Harris, W.A., Shanklin, S.L., Flint, K.H., Hawkins, J., ... Zaza, S. (2016). Youth Risk Behavior Surveillance—United States, 2015. *MMWR, 65*(6), 1–174.

Kidd Jr., W.E., Burrus-Bammel, L.L., & Bammel, G.C. (1978). Evaluation of one environmental education program. *The Journal of Environmental Education* 10(1). 12-15.

<https://doi.org/10.1080/00958964.1978.9941889>

Lisowski, M., & Disinger, J.F. (1991) The effect of field-based instruction on student understandings of ecological concepts. *The Journal of Environmental Education* (23)1,

19-23. <https://doi.org/10.1080/00958964.1991.9943065>

Louv, R. (2008). *Last child in the woods: Saving our children from nature-deficit disorder*.

Chapel Hill, NC: Algonquin Books of Chapel Hill.

Louv, R. (2009). Do our kids have nature-deficit disorder? *Educational Leadership*, 67(4), 24-30.

Marsden, W. E. (1997). Environmental education: Historical roots, comparative perspectives, and current issues in Britain and the United States. *Journal of Curriculum and Supervision*, 13(1), 6-29.

National Association for Sport and Physical Education & American Heart Association. (2006). *2006 Shape of the nation report: Status of physical education in the USA*. Reston, VA: National Association for Sport and Physical Education.

National Parent Teacher Association. (2006). *Recess is at risk: New campaign comes to the rescue*. Washington, DC.

Neill, J.T., & Richards, G.E. (1998). Does outdoor education *really* work? A summary of recent meta-analyses. *Australian Journal of Outdoor Education*, 3(1), 1-9.

Nicol, R. (2014). Entering the fray: The role of outdoor education in providing nature-based experiences that matter. *Educational philosophy and theory* 46(5), 449-461.

Palmberg, I.E., & Kuru, J. (2000). Outdoor activities as a basis for environmental responsibility.

The Journal of Environmental Education, 31(4), 32-36.

<https://doi.org/10.1080/00958960009598649>

Sjoberg, Svein. (n.d.). ROSE: The relevance of science education. University of Oslo.

Rotaru, C. (2014). The triad: Grundtvig, Haret, Gusti outdoor education in the history of the international pedagogy. *Procedia-Social and Behavioral Sciences*, 142, 531-535.

School of the Wild. (n.d.). Retrieved from <https://recserv.uiowa.edu/SOW>

Shepard, C.L., & Speelman, L. R. (1986). Affecting environmental attitudes through outdoor education. *The Journal of Environmental Education*, 17(2), 20-23.

<https://doi.org/10.1080/00958964.1986.9941405>

Smith-Sebasto, N.J., & Semrau, H.J. (2004). Evaluation of the environmental education program at the New Jersey School of Conservation. *The Journal of Environmental Education*, 36(1), 3-18.

Stothart, B. (2012). A chronology of outdoor education in New Zealand 1840 to 2011. *New Zealand Physical Educator*, 45(1), 7-12.