

Pre-Service Teachers' Perspectives and Opinions on Outdoor Learning: Towards Tightening Research Protocols

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Abstract: Consistently promising results of research into preservice teachers' attitudes towards outdoor learning are mitigated by some methodological looseness in those studies. When researchers tend to use their own students for studies on the effects of ongoing instruction, bias is likely to creep into the data. Studying your own students also tends to turn your attention away from potentially important variables, especially demographic variables. Program evaluation, especially of unique programs, cannot support arguments for the general validity and usefulness of outdoor learning. I've designed and piloted a study that addresses these issues by moving research on outdoor learning from the parochial to the general and from the descriptive to the explanatory.

In 2020, during the height of the COVID-19 pandemic, two prominent grassroots organizations, Children & Nature Networks and Green Schoolyards America, advocated for students and teachers to return to schools set up for outdoor learning in all climates. For over three decades combined, these two organizations have worked to educate policymakers, administrators, teachers, students, and parents about the myriad benefits, including increased physical activity, better academic results, and emotional well-being, that students gain from outdoor learning year-round. These organizations promote the advancement of outdoor learning, nature-based education, and the reconstruction of concrete schoolyards into green spaces. Learning outdoors is not an anomaly during times of health crisis in the United States. In the early 20th century, during the flu pandemic and tuberculosis outbreak, many open-air and outdoor learning spaces were established in schools.

After hearing these ideas, I began to think about how more children from all backgrounds and experiences could benefit from having more exposure to nature. With technology and excessive screen time, concerns about childhood obesity, lack of focus in classrooms with the rise of social media, and the test-driven environment of schools, many students are struggling. I wondered if using the natural benefits of being outside for learning could make a difference and stem the negative consequences that cripple academic outcomes and students' (and teachers') excitement and wonder in the world of learning (and teaching).

As I formulated my research question on outdoor learning, I accepted a short-term job offer at a local community farm to be a Field Trip Farmer. I gave a 20-minute interactive outdoor presentation to over 30 different classes with a total of approximately 800 students who were preschoolers through 3rd-graders and homeschoolers on field trips to visit a farm and pick a pumpkin. This allowed me to teach in ways that tap into the benefits of presenting information in an outdoor educational environment, such as showing the students the pumpkin patch, parts of a pumpkin vine, apple orchards, and the surrounding environment that supports agricultural enterprises. This experience demonstrated to me the power that outdoor learning has to excite and energize students about nature, which indoor learning lacks. I began to imagine what it would be like to incorporate outdoor learning throughout all curricula, just as pre-service teachers learn to do with culturally responsive teaching and social-emotional learning.

These ideas and experiences led me to research the views, attitudes, and opinions of pre-service teachers in a community in upstate New York about outdoor learning. My definition of

outdoor learning is learning activities that are curriculum-based and conducted outside of the classroom (on-site or off-site, e.g., schoolyard, gardens, field trips to nature parks, farms, etc.) during regular school hours. Via surveys and interviews I generated quantitative and qualitative data to answer the question: "What are pre-service teachers' perspectives and opinions on outdoor learning?"

Promisingly Positive Pre-Service Perceptions of Outdoor Learning

My study is backgrounded by the fact that, in recent years, interest in integrating outdoor learning into the curriculum for students of all ages has increased worldwide. From research on benefits to students and educators garnered from different outdoor learning strategies, to ways to accomplish outdoor learning in a variety of settings for different disciplines, to perceived and documented obstacles to establishing outdoor learning in the curriculum, outdoor education is receiving research interest (Shume & Blatt, 2019). That literature gives clear indication of positive attitudes towards outdoor learning among students and teachers, both in-service and pre-service. But the research tends towards parochialism and description rather than generalizability and explanation. My study seeks to establish a model for research into pre-service teachers' perceptions of outdoor learning more likely to discover how to bring preservice teachers on board with outdoor learning.

Torquati and Ernst conducted a research study to ascertain the likelihood that pre-service early childhood education teachers would use various outdoor settings to teach their future students. The researchers focus on the concept that "nature teaches" as they explore the following hypothesis: "the ability of early childhood educators to capitalize on the opportunities afforded by natural environments is dependent upon their perceptions of those affordances" (Torquati & Ernst, 2013, p. 192). The authors believed that if pre-service teachers (PSTs) recognized the benefits and importance of children spending time in natural environments, even manmade outdoor environments, such as parks and playgrounds, then PSTs would plan to use these areas for outdoor learning activities. Torquati and Ernst (2013, p. 196) used surveys from 110 PSTs in a Minnesota university early childhood education program to find out "perceptions of natural settings, intention to use natural settings in teaching, knowledge of nature benefits for children, and nature relatedness."

The study participants preference-ranked photographs of 16 natural settings of the Spring season that could be found near the university, which teachers could use when teaching young children, including "water, woods, open field/grassy area, and park" (Torquati & Ernst, 2013, p. 196). These outdoor areas were either natural or built up/maintained by people. Participants answered open-ended survey questions about photograph selections. There was a rating scale to indicate how likely they were to use different types of outdoor settings for teaching activities. And questions on participants' opinions and knowledge about benefits of being in nature.

The PSTs' responses indicated that "their intention to use natural environments in their future teaching [was] quite high," and most of them did not believe it would be "difficult" (Torquati & Ernst, 2013, p. 204). Most responded that they would use natural environments maintained by humans (i.e., parks, playgrounds) for future outdoor learning activities over choosing non-maintained natural settings (i.e., forests, open fields). The researchers also discovered that respondents were more likely to use "unstructured play for physical, health, or social benefits in the park area" (Torquati & Ernst, 2013, p. 204). The responses indicated that participants were uncomfortable, concerned about safety hazards, and did not know how to use

the “more natural nonhuman-maintained settings” (i.e., forests, water, open fields) for structured or unstructured outdoor learning activities. These teachers were not trained to provide children with the tools for learning about nature, and they needed “professional development [to] scaffold knowledge about the rich affordance for... less-maintained environments” (Torquati & Ernst, 2013, p. 204). Most respondents said they would need more adults to help supervise students and more resources for students’ outdoor learning activities in any setting. Although the PSTs responded positively about planning to use outdoor learning, the authors believed that PSTs’ responses to the photographs demonstrated hesitancy and lack of commitment to outdoor learning activities in natural settings.

James and Williams (2017) used a qualitative, phenomenological research methodology and focused on participant observation, contextual note-taking, and individual interviews of middle school students and their pre-service and in-service teachers during and after an outdoor education experience. The participants were 56 middle school students, with eight PSTs and three in-service teachers at a Rocky Mountain West U.S. school that gives students from kindergarten through ninth-grade some opportunities to participate in increasingly “challenging” outdoor education activities.

James and Williams focused on discovering the perspectives of students, PSTs, and in-service teachers, first, using an in-class unit theme of studying water in the environment with videos, lectures, and text readings. After the in-class teaching, the students had experiential outdoor activities to contextualize the learning with real-life data collections of water, soil, and plant samples. They also did “team-building activities, archery, nature hikes, nighttime astronomy, campfire cooking, tent pitching, and camping” (James & Williams, 2017, p. 61). This outdoor learning experience was referred to as a “camp” because the students were together for two days and one night. The PSTs and in-service teachers were facilitators and mentors during the in-class preparatory learning activities and the outdoor learning camp.

After doing follow-up, clarifying questions, as well as sorting the responses into themes, James & Williams (2017, p. 64) discovered that most participants’ responses in all three categories (students, PSTs, and in-service teachers) “indicated that the outdoor education camp was worthwhile.” The researchers found that the students highly valued the hands-on learning experience and that being outdoors allowed various students, some with special needs or behaviorally challenged, opportunities to take on leadership and active roles in outdoor learning activities. This theme also was prominent in the pre-service teacher responses. James and Williams pointed out that one respondent said, “it is more hands-on, and the students can see and learn from real things. It is a different avenue for learning with more engagement...” The eight preservice teachers' responses highlighted the “benefits of connecting in-class concept learning to application in the field” (James & Williams, 2017, pp. 65 and 66, respectively).

Twenty-nine pre-service early childhood education teachers at a Bangkok, Thailand, university were given an open-ended questionnaire about their experiences with STEM outdoor learning and about their “perceptions on how to implement outdoor learning in STEM education.” The participants “had experienced teaching STEM in the real classroom” (Khwaengmek et al., 2021, p. 2). The researchers gave the participants a 10-item questionnaire individually and used interpretive methods to analyze the respondents’ answers by putting responses into categories, codes, and themes.

Khwaengmek et al. discovered that only 5 of the 29 participants had not had experience in setting up some outdoor learning STEM educational activities. Based on their experiences, PSTs indicated on the questionnaire that they used various strategies to incorporate STEM outdoor learning, such as “hands-on activities... as project-based learning, place-based learning, and science experiments” (Khwaengmek et al., 2021, p. 6). In addition, the PSTs’ responses to the questionnaire highlighted three themes in their reflections and views about implementing outdoor learning in STEM activities. First, the PSTs believed it was important to use “the local place” of nature in their communities, such as markets, farms, and gardens, to solve problems and learn. The second theme from the research was the importance of going outside the classroom and working with people in the community who have expertise in utilizing STEM topics outdoors, such as farmers. Finally, the third theme that emerged from the research was the importance of learning how to combine STEM classroom topics with what is related to nature in the students’ community to make the learning more applicable and fun, as well as giving students an opportunity “to explore their communities” and “solve problems in their communities” (Khwaengmek et al., 2021, p. 5).

Shume and Blatt (2019) did a study focused on how PSTs viewed their outdoor experiences in their youth, their plans to incorporate outside activities when teaching future students, and perceptions of the obstacles they would encounter with these plans. Participants were 95 pre-service elementary teachers in a public university in the Midwestern United States. These participants all took an elementary science methods course with an assignment that was used for the research. The participants had to read Louv’s (2006) seminal book, *Last Child in the Woods*, which focused on the scarcity of children spending time outdoors or, as the author coined the phrase, “nature-deficit disorder.” After reading the book, the participants responded to essay prompts on their outdoor experiences, their reflections on the book and their science education ideas, and the challenges they expected to encounter with implementing outdoor learning. The researchers used qualitative inquiry for data collection. They triangulated that data with interviews with some participants several months later while participants were doing their student teaching.

The researchers discovered that the majority of participants had “meaningful outdoor experiences in their youth” and had “positive intentions for taking their own students outdoors” (Shume & Blatt, 2019, p. 1354). As for obstacles to outdoor learning, the researchers discovered three themes from the participants’ responses. First, the participants were concerned about the “logistics of organizing outdoor experiences” related to school policy hurdles, safety issues, weather and availability of proper outerwear, monetary needs for resources, proximity to natural areas, and the time needed for organizational efforts to implement outdoor learning. The second theme found PSTs believed that stakeholders (i.e., administrators, other teachers, parents, and students) would not be receptive to students going outside for activities. The participants’ responses indicated that they were concerned about not receiving the necessary logistical support from colleagues in the school; that parents would not cooperate with paperwork and volunteering; and that their students, who are in a “digitalized world,” would also not be cooperative while doing the outdoor activities. Finally, the third theme that emerged from the research was that it would be challenging to incorporate outdoor learning activities into an already packed curriculum schedule that included the “pressures of test preparation... and a plethora of standards and content” (Shume & Blatt, 2019, p. 1359).

R. Richards et al. (2018) were interested in gaining insights into pre-service physical education teachers' views on outdoor education that focused not on traditional sports and skill development but also helped their students in “affective areas” of development in pursuit of life-long physical activity. Thus, Richards et al. collected data for a study that reported on the perceptions of 13 pre-service physical education (PE) teachers’ outdoor education participation in an assigned three-day and two-night field experience, teaching 40, fourth-grade students from a suburban elementary school nearby to the university the participants attended. Most primary students had never spent time in the woods before this Outdoor Education experience. All of the pre-service teacher participants in the study were enrolled in a required Outdoor Education Methods course at a U.S. Midwestern regional university. The PSTs were given a great deal of preparation and instruction before the field experience with the fourth graders, including in-class instruction and a weekend on-site, in which the pre-service PE teachers were instructed to do the activities they would be teaching the elementary students. These activities included “pioneering, orienteering, survival skills, birding, campfire, and forest ecology.” The researchers used qualitative research to collect data through several “focus group interviews, non-participatory observations and informal interviews, and guided reflections” (R. Richards et al., 2018, p. 376).

The study's results highlighted the pre-service PE teachers’ mixed negative and positive opinions about the field experience as they shared views on required preparation, execution, and relevance to their field of study. In addition, the non-participatory observations recorded similar information that aligned with the participants’ comments. The researchers reported the following data themes in the study: PSTs felt they did not have enough freedom to be creative in teaching the students during the outdoor education experience; they did not get the feedback they needed during the experience to understand their roles during the experience; they felt they sometimes had management responsibilities more like a camp counselor than a teacher; they gained valuable confidence in teaching in an outdoor field experience environment; they did not believe the field experience related enough to being PE educators, although they said the experience helped them to use class management techniques learned in other courses; and finally, they believed the outdoor field experience helped them to be more adaptable as teachers (R. Richards et al., 2018).

Methodological Examination of What’s Been Found

While offering a favorable prognosis for PSTs and outdoor education, the studies discussed above more resemble program evaluation than empirical research, lean towards the descriptive and away from the explanatory, and neglect an array of seemingly important variables. Variables consistently neglected include pedagogical costs and benefits of outdoor learning in man-made versus non-maintained outdoor environments, discussion of opportunities for outdoor learning in all four seasons, investigation into the usefulness of structured versus unstructured activities for outdoor learning, and demographic variables, especially participants’ experiences with school-based outdoor learning by frequency, type, intensity, and duration. These variables are crucial for understanding teacher readiness for outdoor education.

A reason for the neglect of these variables is that much of the research evaluates ongoing outdoor education programs. Using your own students for your research can carry a high cost. Participant responses may be biased with a positive spin because of the perceived power differential between researchers and participants. Also, a program evaluation approach to outdoor learning research tends to limit studies to a single grade level and to specific curriculum topics. Consideration of opportunities for outdoor learning across ages, disciplines, and school

settings is ruled out by program evaluation studies. Research into PSTs and outdoor learning could benefit greatly by going where outdoor learning is not the norm. Even when research concerns itself with the evaluation of ongoing outdoor learning efforts, that research tends to miss opportunities to examine important constructs. Few use pretest/posttest models to examine the effects of instruction. When in-class instruction is used in combination with outdoor learning activities there is a tendency to avoid looking at differences between indoor only instruction and combined indoor/outdoor learning. The result is a good description of what's going on with outdoor learning in a variety of specific contexts of instruction, but a lack of clarity about what works and does not work to bring PSTs in a variety of grades, subject matters, and settings on board with the aims, strategies, and techniques of outdoor learning.

My study attempts, in a preliminary way, to fill in some of these gaps in research on PSTs and outdoor learning. I make it a point to collect data on participants' school-based experiences with outdoor learning, both as students and as teachers, across settings, grades, and disciplines. In addition, while most studies rely almost exclusively on interview data, my study triangulates PST response to close-ended and open-ended survey questions with data collected via in-person, follow-up interviews.

Restructuring Research Protocols

For my research study on outdoor learning and PSTs, I wanted to gain a better understanding of PSTs with different educational specializations and their opinions about outdoor learning and how it could be a part of the kindergarten through 12th-grade curriculum. I first developed a survey which I emailed to PSTs who attended higher education institutions in an Upstate New York county with a population of over 700,000 people. Then, the PSTs who chose to participate in the survey emailed their responses back to me through Google Forms. This survey was conducted using the free online service Google Forms which allows users to create questionnaires, surveys, and other forms to collect information, responses, and different types of data to evaluate. Since the data was gathered via email, the responses were automatically collected in Google Forms and displayed through graphs, charts, and spreadsheets.

When the survey was emailed to potential participants with the Google Forms link, they were informed that the survey was confidential and voluntary and was being used for a graduate research project. Second, the questions in the survey were developed to be unbiased and non-offensive to gather quantitative data on the participants related to such demographic information as the name of their institution, major, and year in their program, as well as qualitative data on their specific comments on outdoor learning experiences as students and as school employees. Third, the survey asked the participants questions about their opinions on the benefits and concerns of outdoor learning, and finally, the respondents had the opportunity to express their opinions on whether outdoor learning should be integrated into the curriculum.

The survey participants were given 10 days to complete the survey after receiving the email. On about the 5th day, the participants were sent an email to remind them of the impending deadline to complete the survey. The PST emails were gathered from email lists of PSTs who were in my graduate classes and those who were also in my undergraduate/graduate workshop classes that prepared students for Student Teaching. Two of my professors also agreed to email out the survey to students in their other classes, and the survey was also emailed to colleagues that I knew in PST higher education programs in the community where I live. I would estimate that over 65 PSTs received the survey via email, and 16 PST teachers returned the completed

survey by the deadline they were given. Thus, the results of my research question "What are pre-service teachers' perspectives on outdoor learning?" are based on the quantitative and qualitative research information from the 16 PSTs who completed the survey. I also conducted 30-minute, separate, in-person interviews with two PSTs who were emailed the survey and took the opportunity to complete it.

Results

The first few questions in the survey gathered demographic information about participants. The majority of PST respondents were students at one college in Upstate NY, and over 80 percent were graduate students. Furthermore, the PSTs' majors varied from Inclusive Childhood & Adolescent Education, Art Education, and Teaching English as a Second Language (TESOL), with 60 percent specializing in Special Education and over 20 percent in Social Studies. Two of the survey participants were enrolled in Speech Pathology programs because these students take education classes to train to work with clients in school environments. When asked to give a brief description of their experiences working in kindergarten through 12th-grade classrooms (Question #5), an overwhelming majority of the respondents gave specific information which indicated that they had experience working in classrooms for students in kindergarten through 12th grade. Some of the participants said that they served in roles such as substitute teachers, teacher assistants, pull-out/push-in teachers, and teaching in nature camps.

As for responses to a prompt about the benefits of outdoor learning (Question #6), 100 percent of respondents believe that outdoor learning provides better mental and emotional health for students. Over 80 percent believe outdoor learning provides students with opportunities for collaboration, creativity and active learning. Moreover, 75 percent of respondents believe that outdoor learning engages students in authentic learning experiences and students are not on screen as much as inside the classroom.

The greatest concern that the participants of this study had about implementing outdoor learning into the kindergarten through 12th-grade curriculum (Question #11) was that the weather could be a barrier. In fact, 50 percent of respondents listed the weather as a concern. In contrast, about 38 percent of the participants had the following three concerns: not enough time to include outdoor learning in the curriculum with mandated testing considerations; educators are not trained to know how to incorporate outdoor learning into the curriculum; and students will not have appropriate clothing for the weather. Closely following these three concerns, approximately a third of respondents were concerned about safety and that schools did not have resources to set up outdoor learning in the schoolyard or offsite.

Asked about their experiences with outdoor learning when they were K-12 students (Question #7), 75 percent of respondents indicated that they engaged in outdoor learning as students from kindergarten through 12th grade. Those respondents who answered "Yes" to having outdoor learning experiences as a student listed a variety of outdoor learning which included the following; in English class going "outside as a change of scenery on a nice weather day," in high school going on "urban sketching adventures to draw outside all-day," in science classes going to a "wood area" when discussing environment systems," reading outside for various classes, or in elementary schools doing "regular lessons outside (math, writing, etc.) or learn about weather." Furthermore, a majority of respondents (81.3 percent or 13 participants) believe that it is important to integrate outdoor learning into the curriculum for kindergarten through 12th-grade students.

Analysis

One of the most striking results of this research on PSTs' perspectives on outdoor learning is that 100 percent of the respondents believe that outdoor learning provides better emotional and mental health for students. This may be an indication of PSTs' beliefs that outdoor learning can benefit today's emphasis in schools for students to have direct instruction in Social Emotional Learning (SEL). Because of the pandemic leading to many difficulties in education over the past two years, SEL has become a high priority in many schools. Also, the survey results are from PSTs who are being trained in a variety of educational disciplines and will be teaching students from kindergarten through high school. So, these PSTs are not just from one discipline or grade level, and they all indicated that outdoor learning has mental and emotional benefits for all students. Moreover, the majority of the respondents have had experiences working in classrooms with students of various ages and 75 percent even engaged in outdoor learning as students themselves from elementary through high school. Thus, the survey results are not focused on just using outdoor learning in one educational area or specialty, and also, PSTs' responses give a wide breadth of outdoor learning experiences from different perspectives. Even the speech pathologist respondents' insights on outdoor learning are valuable because they also have opportunities to engage students in therapy and beneficial activities outside of the classroom setting.

It is no surprise, perhaps, after reviewing the demographics, school and outdoor learning experiences of the PSTs, and opinions about the benefits of outdoor learning, that the majority of respondents, over 80 percent (Question #9), believe it is important to integrate outdoor learning into the curriculum for all ages. The PSTs' answers to the open-ended questions on the survey, Questions #5, #8, #10, and #12, are insightful and give a more detailed understanding of the reasons the PSTs overwhelmingly reported positive reflections on the benefits and importance of having outdoor learning as part of students' overall experiences in schools. For example, those respondents who believed that it is important to have outdoor learning as part of the curriculum further explained their opinions with the following information: "[outdoor] learning beyond testing outcomes would benefit children's spirit and overall wellness;" "outdoor learning gives students a chance to get fresh air"; "helps students to retain more information as they focus more"; and "gives students opportunities to learn hands-on and more in-depth with topics."

Despite the overall positive beliefs about outdoor learning, the PSTs still had some concerns about integrating outdoor learning into the curriculum. Since these PSTs live in Upstate New York, which is known to have a long winter season, it is understandable that the biggest concern, 50 percent of respondents, is that weather is a barrier and over 30 percent are concerned that the students will not have proper outerwear for all weather conditions. It is interesting that although an overwhelming majority of the PSTs believe that outdoor learning should be integrated into the curriculum, almost 40 percent of the respondents do not believe they have the training to do outdoor learning and there is not enough time in the curriculum to do it. These results reveal a tension between PSTs recognizing the value of outdoor learning to their students, but not knowing how to overcome the many obstacles they see to having it be a part of their teaching. For example, a couple of comments about obstacles included, "I am so concerned with the time limits that we have throughout our school day. District leaders just want us to prioritize state test prep... We need a full shift in what we view to be the purpose of education" and "I think outdoor learning is essential for students' all kinds of development."

Limitations

Small sample size is the foremost limitation of my study. I was only able to get responses from a limited number of PSTs and the majority of these respondents were graduate students at one higher education institution. Genuinely unbiased results would require data collection from a broader, more differentiated set of participants. Second, time constraints kept me from doing follow-up interviews with all respondents to the survey. This follow-up research would have added exactitude to triangulation between quantitative and qualitative data collected via the survey. Third, Questions #6 and #11, which asked respectively about perceived benefits and perceived concerns about outdoor education, provided lists of options to check. While the content of the lists of benefits and concerns was gleaned from research on the topic, it would have been beneficial, especially for discussion in follow-up interviews, to garner respondents' own ideas about the promises and problematics of outdoor education, via open-ended responses, and without prompted responses from which to choose. This would be a great way to ensure research was tapping into participants' real thoughts about the benefits and drawbacks of outdoor learning. Finally, expanding the email list of PSTs at a variety of institutions would extend the scope of the project and, potentially, turn this regional study into a national one.

Discussion

This research was prompted by my interest in ascertaining PSTs' knowledge and ideas about incorporating outdoor learning into classroom instruction for every student age and every subject matter from kindergarten to high school. I focused on PSTs because I wanted to discover how much they had reflected on the idea of outdoor learning as part of the curriculum as they prepare to become in-service teachers. I was encouraged by the results indicating that PST respondents did not view outdoor learning as another educational "gimmick" to incorporate during this difficult time in education in the U.S.; but instead, the majority of PSTs who responded appeared to believe (because of their own outdoor experiences as students and from work they had already done in schools) that outdoor learning is an important and vital instructional strategy for all students. Although all of the respondents recognized the SEL, creativity, collaboration, and less screen time benefits of outdoor learning, they also recognized obstacles to implementing outdoor learning, such as weather and students' access to proper outerwear, lack of teacher education in strategies of outdoor learning, and lack of time with test prep constraints. Overall, the respondents of this survey gave a thorough overview of their perspectives of outdoor learning.

There are other research studies that highlight the overall landscape of outdoor learning in schools worldwide and specifically, Canadian elementary schools (Oberle et al., 2021; Waite, 2020). Although there is more educational research, nationally and internationally, on outdoor learning and advocating the benefits to students (and sometimes teachers), there are still many obstacles, such as school funding, administrative support, training for educators and pre-service teachers, and time constraints because of testing requirements. More research is needed in the United States on outdoor learning in various settings that focus on student benefits, the training needs of educators, and best practices for implementation. Stakeholders in our educational system need to become more informed and aware of why outdoor learning needs to be considered a viable, powerful influence to support our students' learning. That's why research on outdoor learning must move beyond program evaluation studies and into empirical research about how to overcome perceived obstacles to widespread implementation of outdoor education.

Conclusion

Compared to the literature reviewed above, my study of PSTs and outdoor learning gives a broader view because my participants came from a variety of disciplines and grade levels they are preparing to teach. Also, the PSTs I surveyed and talked with were not involved in my evaluation of some field experience or any teacher training related to integrating outdoor teaching into the classroom curriculum. My study had no stake in the evaluation of ongoing programs like the literature reviewed above. I also collected data on participants' previous experience with outdoor learning both as students and as educators. More research needs to be conducted on what outdoor learning strategies are being taught in U.S. teacher training. Where outdoor education is part of teacher education programs, we need to study changes in the views of PSTs after experiencing these activities. In addition, stakeholder views on outdoor learning need to be researched, including the perspectives of higher education faculty, school administrators, in-service teachers and parents on integrating outdoor learning into the curriculum. PSTs see the benefits of outdoor learning and with further research we can ascertain best practices for preparing them for the use of this promising learning strategy. As well, we can do more research to improve the feasibility of incorporating outdoor learning into all school curriculum.

References

- James, J. K., & Williams, T. (2017). School-Based experiential outdoor education. *Journal of Experiential Education*, 40(1), 58–71. <https://doi.org/10.1177/1053825916676190>
- Khwaengmek, V., Pitiporntapin, S., Pimthong, P., & Bukatunyoo, O. (2021). Perceptions of pre-service teachers about outdoor learning for STEM education in early childhood education. *Journal of Physics: Conference Series*, 1957(1), 012018. <https://doi.org/10.1088/1742-6596/1957/1/012018>
- Louv, R. (2006). *Last child in the woods*. Algonquin Books of Chapel Hill.
- News, A. B. C. (n.d.). *MacArthur's 2022 "genius grant" winners picked to inspire*. ABC News. Retrieved November 16, 2022, from <https://abcnews.go.com/Business/wireStory/Macarthur-2022-genius-grant-winners-picked-inspire-91390493>
- Oberle, E., Zeni, M., Munday, F., & Brussoni, M. (2021). Support factors and barriers for outdoor learning in elementary schools: A systemic perspective. *American Journal of Health Education*, 52(5), 251–265. <https://doi.org/10.1080/19325037.2021.1955232>
- Richards, K. A., Jacobs, J. M., Wahl-Alexander, Z., & Ressler, J. D. (2018). Preservice physical education teacher socialization through an outdoor education field experience. *Journal of Adventure Education and Outdoor Learning*, 18(4), 367–381. <https://doi.org/10.1080/14729679.2018.1483252>
- Shume, T. J., & Blatt, E. (2019). A sociocultural investigation of pre-service teachers' outdoor experiences and perceived obstacles to outdoor learning. *Environmental Education Research*, 25(9), 1347–1367. <https://doi.org/10.1080/13504622.2019.1610862>
- Torquati, J., & Ernst, J. A. (2013). Beyond the walls: Conceptualizing natural environments as "third educators." *Journal of Early Childhood Teacher Education*, 34(2), 191–208. <https://doi.org/10.1080/10901027.2013.788106>
- Waite, S. (2020). Where are we going? International views on purposes, practices and barriers in school-based outdoor Learning. *Education Sciences*, 10 (11), 311. <https://doi.org/10.3390/educsci10110311>