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Addressing Policy, Practice, and Research That Matters

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EDITORIAL NOTE

Writing Research-to-Practice Briefs: Opportunities for Published Authors and Graduate Students in Advancing Research-Based Practices in Nature-Based Early Learning

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Why This Moment Matters

People of all ages have always learned in, with, and from the natural world. Yet that relationship has been strained in our modern, largely urban and technology-focused society. Holistic development of children supported by effective teaching in natural outdoor environments is risked as children's connections with the places where they live and the natural and communities they belong to are severed. There is currently clear global recognition of the early years as foundation for lifelong learning, well-being, and environmental responsibility. A parallel rise in early childhood environmental education, nature-based learning (NBL), and outdoor and place-based early learning programs manifest as further evidence that nature-based early learning (NBEL) constitutes an important approach in our collective work.

In the past, environmental educators and early childhood teachers were seen as two separate camps with different approaches. In recent years, with increased awareness of the need to share in each other's wisdom, a compelling and creative synergy has emerged. Educators with expertise in natural science and dependable access to natural and wild spaces have increasingly created programs and resources for children's positive learning engagements with nature and in fostering children's journeys in environmental literacy development. Philosophically speaking, the hope is to foster future stewardship. Meanwhile, teachers working with young children bring pedagogical training and experience with play-based learning and are more aware of the benefits of time in nature for children's healthy development and the need to re-introduce nature in their outdoor spaces. Here, the philosophical orientation is focused on joyful childhoods, internal motivations that foster sense of belonging and place, as well as preparation for success in future school environments.

National professional organizations' efforts to enhance young children's learning and well-being align with connecting or reconnecting children and nature. The North American Association of Environmental Education describes early childhood environmental education as a holistic concept that encompasses knowledge of the natural world, as well as emotions, dispositions, and skills (NAAEE, 2016). This statement confirms what many educators, policymakers, and parents now recognize, that time in nature can positively impact young children's development. National Association for the Education of Young

Children's (NAEYC, 2020) Developmentally Appropriate Practice position statement emphasizes that nature-based experiences are essential for fostering joyful, engaged learning and emotional regulation in children. It highlights the need for access to nature for all children, supporting their well-being and development across cognitive, language social, and physical domains.

In recent years, early childhood environmental education has emerged as a complex construct that is vibrant and rapidly expanding and promoting areas of research and practice. This growth reflects a broader recognition that the early years are foundational - not only for learning and well-being, but also for shaping children's relationships with the natural world. As direct service programs, educational materials, online information, literature and video resources, and research studies multiply and surge, so too does the need for meaningful connections between research and practice. This editorial briefly frames current trends in early childhood environmental education and introduces a shared vision between Exchange Press and the International Journal of Early Childhood Environmental Education (IJECEE) to strengthen pathways for translating research into practice - and practice into research.

Rise in Trends in Early Childhood Environmental Education

- Significant increase has been evident in:
    - Research activity (applied, conceptual, literature review, empirical, and more)
    - Direct service programs
    - Innovative practices in ECEE/NBEL
    - Journals and publications focused on the intersections of two or more of the following: early childhood, environmental education, science education, outdoor education, sustainability education, and related disciplines
- Evidence of more focused alignment among and between:
    - Educational goals (learning, well-being, access, etc.)
    - Nature connection and outdoor learning
    - Nature connection and school curriculum and outcomes
- NAAEE's (2016) definition of ECEE as a holistic concept encompassing:
    - Knowledge
    - Emotions and dispositions
    - Skills and relationships with the natural world

What Research Tells Us

Research consistently emphasizes the benefits of nature-rich environments that encourage play and movement and skilled adult guidance. Research also documents the benefits of ECEE for high-quality early childhood education overall, with specific benefits in areas such as academic performance, cognitive development, social and emotional learning, physical development, creative and divergent thinking, and executive functioning and self-regulation. Broader impacts include support for children's development of positive environmental attitudes and motivations, knowledge, and skills as well as laying the foundation for lifelong environmental responsibility.

An example of the significant interest and research activity intersecting early childhood education and nature-based learning is a literature review conducted at Standford University (Ardoin & Bowers, 2020) which synthesized evidence from more than 60 recent studies. The studies were diverse in their design and implementation, but all emphasized the importance of nature-rich settings, play and movement, and effective guidance by mentors and teachers. The Stanford study found overwhelming evidence supporting that early childhood environmental education (ECEE) can provide wide-ranging benefits for children that overlap with high quality early education overall. Benefits were described as increased learning in a range of domains such as mathematics, science, language and literacy, enhanced social and emotional skills**,** and improved physical development**.** Additionally, ECEE programs also contributed to children and family's environmental awareness in areas such as environmental attitudes, knowledge, and skills that lay the foundation for more environmental responsibility and engagement**.**

A recent Exchange Bridging Research and Practice article (Ward, et.al, 2025) also illustrated environmental and early childhood researchers, educators and policy makers joining together to learn from each other. The article described a conference session where early childhood educators, researchers, and managers came together to hear presentations and shared their perspectives in the discussions that followed. Participating authors and presenters also conducted IRB-approved 'in conference' research by engaging in an additional 90-minute workshop with the early childhood professionals who attended their session.

And, published in this issue of IJECEE are compelling study approaches, conceptualizations, and findings that go deeper in breaking down variables, research designs, and contributing to new connections and understanding. Claire Underwoods' literature review and empirical studies by Holyoke & Fletcher; Dean, Gladys, & Werner; Muscat; Ernst & Johnson; Hachey-Bell, Dietze, Craig, & O'Donoghue; and Gallo-Fox, Pic, & Novikova all engage in shaping, defining, and refining the construction of, and research-based evidence for, early childhood environmental education or NBEL in new ways. The wider ecological perspective that emerges, and that will continue to emerge, lays out the intricacies and variables that are in involved in, as well as suggest, effective teaching practices, important research and scholarship activities, and meaningful and impactful policies. Also, in this same issue, the children's activity and picture books related to sensory-based exploration summarized by our book editor, Carla Gull, exemplify possible additional reading resources that complement studies by Holyoke & Fletcher about *picturebooks* that support early climate justice education, as well as by Dean, Gladys, & Werner about supporting children's deeper connections with nature through slow learning and authentic caregiving. The selection and use of appropriate children's books are just one extension of research implications that may be drawn for curriculum improvement and practice - and in the writing of research-to-practice briefs.

Gaps and Ongoing Challenges

Despite growing research, findings are not always accessible to practitioners. Also, practice-based knowledge continues to be underrepresented in peer-reviewed literature. This creates a persistent need for translation of research into classroom, program, and community settings with research questions emerging directly from educator experience.

We are collectively putting the call out for a **two-way bridge**: Research informing practice and practice informing research.

Research to Practice Opportunities

Both organizations have existing initiatives in support of research to practice discussions. The Natural Start Alliance, for example, has created opportunities through their Graduate Student Network and virtual mentoring symposiums. Exchange, on the other hand, has a tradition of promoting teacher-research and action research articles in their printed magazine and now online in Exchange Community Voices.

With the goal of sparking new dialogue that leads to new research questions grounded in lived practice, we are collaborating to bring you research to practice briefs that summarize current research and provide practical applications for classrooms, programs, and families.

Exchange Press and IJECEE: A Shared Vision

There are synergies between Exchange Press, publisher of *Exchange Community Voices* and *International Journal of Early Childhood Environmental Education* (IJECEE), published by Natural Start Alliance (a network and program of North American Association for Environmental Education). We share a vision for expanding authors' reach and translating practical applications of research findings. *Exchange* and *IJECEE* are also both committed to sharing research from a greater diversity of authors with readers.

At a time of increasing clarity about the importance of healthy development during the early years, research plays a vital role in shaping even-handed, effective, and responsive practice. As two leading publications serving early childhood professionals, Exchange and IJECEE are committed to creating spaces where research and practice inform one another and where diverse voices are welcomed into the conversation. We invite readers - educators, researchers, students, and advocates alike - to share how research shapes your work and to join us in building a field that values curiosity, collaboration, and children's deep connections with the natural world.

Publication Pathways and Collaborative Opportunities

IJECEE invites practitioners, graduate students, and researchers to author practice briefs and other practitioner-oriented articles. Similarly, Exchange invites teacher researchers to write about the action research projects they conduct in their classrooms. Both publications hope to spark discussion between researchers and practitioners that will lead to opportunities to investigate issues that arise from teachers' experience as well.

In this time of increasing clarity on the importance of the early years, research is fundamental. As two leading publications for professionals in the field, *Exchange* and *IJECEE* seek to scaffold and strengthen bridges linking research and practice and to bring these to professionals at all levels. IJECEE can publish special issues incorporating research completed in classrooms, programs, and homes, for example. Exchange Community Voices hosts a regular Bridging Research and Practice feature and is organizing a special issue focused on nature in 2026 with an accompanying online conference featuring the authors.

Call to Action: Invitation to Readers

We have a vision for our field where research is accessible, practice is valued as knowledge-generating, and children's relationships with nature are central to early learning. Please join us in shedding light on the critical importance of the early years as we demonstrate that young children are citizens now with

rights to quality care, education, and a healthy world to grow into. The role of research in advancing access, quality, and sustainability is essential to this vision.

Interested in writing research briefs? Please reach out to us about writing briefs based on your own published research or writing briefs of existing published studies. This latter approach is a particularly helpful way for graduate students to start building a publication record.

With appreciation for your dedication to children and nature-based learning. Please reach out to learn more about this opportunity or to submit a research brief to either one or both of us at:

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Story as Seed: A Conceptual Framework for Using Picturebooks to Teach Climate Justice with Young Children

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ABSTRACT

In a time of ecological crisis and educational constraint, this conceptual article reimagines early childhood climate education as a site of relational, justice-centered learning, led through story, grounded in place, and co-constructed with children. Drawing on critical literacy, justice-oriented place-based education, this article explores how picturebooks serve as anchors to support early climate justice learning grounded in ecological belonging, civic responsibility, and relational care. We present four thematic lenses - *reciprocity and kinship*, *ecological identity and observation*, s*ystems thinking and collective action*, and *environmental grief and repair* - as invitations and practical tools for educators. We share text selections and text analyses of eight picturebooks, classroom strategies, and inquiry prompts that position stories as a literacy practice and an ecological engagement. Applying frameworks to include land, place, and more-than-human relationships, we argue that justice in children's literature must include relational responsibility. This article offers readers an approach to climate justice education that begins with wonder, centers relationships, and affirms young children as participants in imagining and enacting more just and sustainable worlds.

Keywords: children's literature, environmental education, early childhood, conceptual framework, environmental justice

In a time of ecological crisis, cultural division, and escalating pressure to make classrooms apolitical, early childhood educators are asking urgent and hopeful questions: How can we follow children's questions about the world? How can we nurture their sense of wonder, justice, and responsibility? And how do we create learning spaces where all children see themselves as valued members of a shared and sustainable world? This article explores questions such as these through stories. We explore the notion of stories as inquiry, as pedagogy, and as acts of justice, arguing that engaging young learners with stories, particularly those in picturebooks[1], can nurture curiosity, empathy, and a sense of agency in ways that honor children's questions and affirm their place in our shared world.

Children's picture books, when explored and shared with intention, become invitations to wonder, grief, reciprocity, and participation. Through story, young children encounter more-than-human worlds, complex relationships, and possibilities for collective care. Stories help children notice their surroundings, name their questions, and imagine futures shaped by justice (Bishop, 1990). Stories also offer opportunities to be entry points for children's lived stories

[1] We use the compound form *picturebook* (following Sipe, 2002) to underscore the interdependent relationship between words and images as a unified art form, rather than *picture book*, which suggest simply a book that contains pictures.

in and with the environment and more-than-human world and in building understanding of how the world works (Freire, 1970). Increasingly, early childhood educators anchor their teaching in literature to support conversations about climate change and environmental care that are rooted in hope, belonging, and relationship (Tagg & Jafry, 2018; Warden, 2022; Fletcher & Holyoke, 2025a).

This article examines how picturebooks support early climate justice learning in developmentally appropriate, culturally responsive, and emotionally resonant ways. When storytelling is paired with observation, inquiry, and action, children see themselves as participants rather than passive observers in shared worlds, capable of noticing, caring, and acting with others (Freire, 1970; Lysaker, 2018). Children's literature becomes a site of civic learning and ecological attunement, where children engage ethically and imaginatively with people, place, and planet.

In this conceptual paper, we situate our work through a relational and justice-oriented perspective. Theories that inform our work include justice-focused place-based education (Tuck & McKenzie, 2014) and frameworks of diverse children's literature, including an expanded application of books as windows, mirrors, and sliding glass doors (Bishop, 1992). We consider how climate storytelling helps young children locate themselves within a story and in place. We extend frameworks of picturebooks focused on diverse representation (i.e., Bishop, 1990) to include representations of land, more-than-human life, and relational belonging, arguing that justice in children's literature must account not only for who is seen but for what relationships are made visible and valued. Further, we approach this through a lens of critical literacy in recognizing how children engage print and explore and read the world around them (Freire, 1970).

This conceptual, practice-based article presents four thematic lenses, *reciprocity and kinship*, *ecological identity and observation*, s*ystems thinking and collective action*, and *environmental grief and repair*, through which educators approach climate justice learning with young children. Across each theme, we share examples from picturebooks, paired with classroom strategies and inquiry questions. Our aim is to offer a framework for integrating story, care, and justice into everyday teaching. In doing so, we invite early childhood educators to see children as future stewards and as present participants in imagining and enacting more just and sustainable worlds.

Literacy and Story as Foundations for Climate Justice Learning

Literacy learning and storytelling are powerful foundations for interdisciplinary, justice-oriented climate education in early childhood (Fletcher & Holyoke, 2025b). Storytelling as a vehicle for interdisciplinary learning is grounded in how young children make sense of their worlds and the world at large, as well as in how they play, wonder, and form relationships. Picturebooks about animals, weather, seasons, and communities often echo the questions children are asking, offering purposeful entry points into complex and abstract ideas. When educators connect stories to nature and empathy, they invite children into real and imagined worlds to make sense of concepts like shared responsibility.

Picturebooks play a pivotal role in bridging children's lived experiences with environmental learning. As one nature-based preschool teacher shared, "picturebooks are chosen to support what students are noticing and discovering in the outdoors…when children can relate to the characters in the story, they are more likely to engage in conversations about their own experiences." Educators foster agency and empowerment by anchoring literacy learning in what children are already observing. Picturebooks become sources of knowledge and invitations to take action, bridging children's understanding of the natural world with civic and ecological responsibility.

Multicultural and culturally responsive stories further deepen this work by affirming children's identities and expanding their views of environmental appreciation, gratitude, and reciprocity. When young learners see environmental stewards and activists in stories who look, sound, and live like them, they are offered mirrors (Bishop, 1992). These mirrors foster self-affirmation and ensure children see themselves as part of communal stories and solutions (Holyoke & Fletcher, 2024). Stories reflecting cultural relationships with land, plants, water, and climate broaden children's imaginations around care, repair, and sustainability. Diverse picturebooks around environmentalism amplify a local-global approach to environmental understanding.

When children read and hear stories featuring characters from diverse racial, cultural, and geographic backgrounds who navigate climate challenges, they develop empathy and a critical awareness that climate change is both a local and global concern. These stories surface multiple solutions and ways of knowing, nurturing critique, possibility, and action. Culturally relevant books also challenge the dominance of white protagonists and colonial perspectives in traditional environmental literature, opening up space for more inclusive, relational, and justice-centered environmental engagement (Johnson, 2020). Our previous work (Holyoke & Fletcher, 2024) presents a framework using Bishop's model to help educators select a wide range of multicultural picturebooks that center on environmental justice, community care, and sustainable futures. Building on that foundation, the current paper expands to present a framework that encompasses both ecological and civic dimensions of representation, highlighting not only who is represented in environmental stories but also how land, place, and more-than-human relationships are made visible, valued, and taught in early childhood classrooms.

Conceptual Framework: Story, Place, and Justice-With Children Story as Relational and Civic Practice

In early childhood classrooms, stories serve as literacy tools and invitations into meaning-making and identity. Storytelling offers young learners an emotionally resonant way to engage with complex ideas, including environmental change, systems of power, and collective care. Story supports comprehension and language development, while also fostering perspective-taking and civic awareness (Miller & Pennycuff, 2008; Vascellaro & Genishi, 1994). Freire (1970) reminds us that literacy is a form of power in that reading the word and the world are central to justice.

When climate education is grounded in stories, children are invited to notice, feel, and respond. Stories foster ecological thinking in that texts simultaneously present facts about weather or pollution, and nurture wonder, emotional literacy, and relational responsibility (Walan & Enochsson, 2019; Lysaker, 2018). In our work with educators, we have seen how picturebooks become sites of observation, connection, and inquiry, where readers of all ages ask critical questions about care, fairness, and belonging in the natural world (Fletcher & Holyoke, 2025; Holyoke & Fletcher, in press). Literature becomes a practice of civic participation and ecological attunement, preparing children not only to understand systems but also to live well within them.

Rethinking Representation: Extending Toward Relational Justice

When considering the teaching and introduction of climate justice in early childhood education, we require frameworks that support diverse perspectives, experiences, and understandings. One way to approach this is to build upon and expand the tremendous and critically important frameworks of diverse representation in children's literature that reflect diverse racial and cultural identities in affirming and inclusive narratives, to also include a more relational and ecological understanding of justice. While previous models, such as Bishop's (1992) exploration of multicultural children's literature as mirrors, windows, and sliding glass doors, have offered powerful tools for affirming identity and inclusion in children's literature, they are not designed to explore the specific entanglements of people, place, and more-than-human life central to climate justice. This manuscript builds upon frameworks such as these to develop a framework for children's literature grounded in interdisciplinary theory, centered on ecological interdependence, culturally and community-rooted care, and civic responsibility.

This approach draws from several intersecting frameworks. Critical place-based education (Tuck et al., 2014) understands place not only as a locale and setting, but as politically and relationally charged, calling educators to consider histories of land, power, and belonging. Common worlding (Taylor & Giugni, 2012) invites young children into inquiry alongside animals, plants, weather, and materials as entangled participants. Culturally sustaining pedagogies (Paris & Alim, 2017) remind us to honor the home languages, stories, and knowledges children carry with them. Finally, critical literacy provides an understanding of how readers explore texts through lenses of power and positioning (Jones, 2012). Together, these perspectives position early childhood learners as both shaped by and shaping the ecologies they inhabit.

Drawing on a larger content analysis of over 200 environmental picturebooks (Fletcher & Holyoke, 2024), including a focused study of 76 texts addressing water (Holyoke et al., in progress), we present a conceptual framework for

justice-oriented climate storytelling in early childhood. This framework is organized around four overlapping themes: *reciprocity and relational belonging*, *systems thinking and collective action*, *ecological identity and observation*, and *environmental grief and repair.* Each theme provides an invitation for practice grounded in justice and care.

We present this framework in Table 1 as a tool to support text selection, inquiry design, and reflection on the deeper values embedded in environmental education. The guiding questions are intended to support educators in adapting stories to their community contexts while staying grounded in the possibilities of joy, responsibility, and relational learning. In the following sections, we apply the framework to two focal picturebooks in each category, sharing strategies for interdisciplinary teaching and inquiry that nurture young children's ecological identities and civic imagination.

Table 1.
Justice-Oriented Climate Storytelling in Early Childhood: Four Conceptual Invitations for Practice

Theme	Conceptual Invitation	Pedagogical Practice	Guiding Question
Reciprocity & Kinship	Frame care for the environment as a relational, cultural, and community-rooted act.	Invite family to share food stories, go on nature gratitude walks, and explore cultural plant mapping.	What do we give to the land, and what does it give to us?
Ecological Identity & Observation	Nurture children's sense of self as part of the more-than-human world through noticing and naming.	Use nature journals, metaphor walks, or sound mapping of schoolyards.	What do we notice when we slow down? What is our place asking us to see?
Systems Thinking & Collective Action	Support children in noticing interconnectedness and working together to address shared problems.	Create classroom "cause and effect" webs or community care projects.	How are we connected, and what can we do together?
Environmental Grief & Repair	Make space for emotional responses to change and support children in imagining shared acts of renewal.	Use storytelling circles, hope jars, or collaborative dream gardens.	What do we miss or mourn—and what can we care for next?

Reciprocity and Kinship

> *"Grandma tells me, 'we take care of the land'... 'as the land takes care of us. Gunalchéesh,' I say giving thanks." (Goade, 2022, pp. 16-17)*

We, along with other scholars, argue that the concept of reciprocity and kinship with the land is a key facet in integrating climate justice across the curriculum (e.g., Meissner, 2022; Whyte, 2020; Widrig, 2025). The opening quote from the beautifully illustrated picturebook *Berry Song,* written and illustrated by Indigenous author and illustrator Michaela Goade, gets at the heart of this theme. To be in a relationship with all living beings, we must recognize that kinship extends beyond Western understandings often limited to human connections, but also

includes plants, animals, and all of the natural world. We draw on Indigenous scholars and writers and authors identified with texts as Own Stories, Own Voices, as we explore this theme, whose culture and way of being constantly invite us to embrace our interconnectedness with the earth.

Kimmerer (from Kimmerer and Smith, 2022), an Indigenous writer and scholar, defines reciprocity as "a mutual exchange of dependence that benefits both, each, and all but also includes mutual responsibility" (p. 10). She encourages us and children alike to position the natural world as the "real teacher" and to engage in mindfulness as we interact with the living world around us. While stories cannot replace direct interactions with the land, they can serve as prompts, models, and invitations. They encourage children to see the land not merely as a setting or a resource to extract, but as a living presence in their lives; a friend who deserves attention, gratitude, and shared responsibility. These books prepare children to engage with the world and invite inquiry about how we live well with others, both humans and more-than-humans, and how the land can teach us through listening, noticing, and co-caring.

In what follows, we describe two books that foster reciprocity and a sense of kinship with the earth. These books demonstrate our interconnectedness with the natural world while also inviting children to understand their unique abilities and consider how to share them so as to contribute to the well-being of our world, from berry picking, noticing the earth as a friend, to growing a garden.

***Berry Song* (Goade, 2022)**

Michaela Goade, an Indigenous author and illustrator, tells the story of a Tlingit girl and her grandmother harvesting berries on ancestral land. In the author's note, Goade explains that her own upbringing inspires the narrative and reflects on her deep kinship with the earth. She shares that berry picking was more than just gathering food; it was a practice rooted in gratitude, a way to stay connected to the land, and a means of passing ancestral knowledge to future generations. The story begins with the girl berry picking with her grandmother, in which they name the berries, sing with the berries and the forest, and explore their relationship with the earth, from speaking to, taking care of, and being a part of the land and vice versa. Goade's illustrations blend the human world with the natural world, in which the girl's arms become branches and her hair a berry bush. The story concludes with the girl, now grown, continuing the tradition with her younger sister.

This book supports sensory engagement, relational storytelling, and identity affirmation for early childhood learners and stewards. It situates environmental care within everyday acts of noticing and thanking, which are concepts highly accessible to young children. Additionally, through poetic imagery and cultural specificity, the book makes reciprocity tangible, framing nature as a living relative rather than a resource. Such stories open space for children to recognize their cultural traditions of gratitude and food, while learning that caring for the land is not separate from caring for each other. The text supports justice not through solutions, but through modeling relational stewardship that affirms children's place within a web of reciprocity.

Wild Greens, Beautiful Girl (Schlaikjer, 2024)

This vibrant multilingual story follows a young girl and her mother, members of the Amis community in Taiwan, as they gather wild greens and recall ancestral knowledge. Told in English and Chinese with Amis cultural references, the text offers a sensory-rich exploration of reciprocity, where ecological care is enacted through cooking, walking, touching, and storytelling. It is particularly resonant in early childhood because it centers embodied learning and familial memory, which are two ways young children naturally come to understand themselves in place.

The story affirms that children are not only observers of nature but participants in inherited and evolving ecological practices. Teachers who have shared this book describe how it opens space for joyful conversations about food, family, language, and migration. It also disrupts dominant narratives of environmentalism by centering a narrative of Indigenous and Asian cultural traditions of foraging and food sovereignty. For early learners, it offers a model of belonging that is sensory and intergenerational.

Summary

These example texts affirm that reciprocity is accessible to young children through culture, family, and sensory experience. Rather than framing climate education as an external issue or individual task, they position care as something shared, enacted through gratitude, memory, and ongoing relationships. Both stories highlight different pathways into environmental justice: one through seasonal harvesting and ancestral song, and the other through bilingual storytelling and foraging as a cultural practice. Together, they offer young children models of what it means to belong, to be with land, with others, and within more-than-human world.

In line with critical literacy, the theme of reciprocity invites readers to question dominant narratives of how we interact with the world (Starr, 2019). Many stories on climate justice position humans as taking from or saving the land rather than living in harmony with it. However, this theme and these texts also diverge from critical literacy in decentering humans and focusing on an integrated and critical view of place, humans, and world (Tuck et al., 2014; Taylor & Giugni, 2012).

Ecological Identity and Observation

"I have a lot to learn from bees." (Larkin, 2019, p. 29).

This simple reflection from Larkin (2019) in *The Thing About Bees: A Love Letter* captures a central truth of climate justice education: we are students of the world around us. In this picturebook, author Shabazz Larkin moves through his fear of bees to admiration, seeing them not as pests but as teachers, models of care, persistence, and cooperation. In doing so, he invites children to view themselves as part of the intricate web of life, not separate from it.

Where the theme of reciprocity and kinship emphasizes mutual care and ethical relationships with the more-than-human world, the theme of ecological identity and observation centers on how children come to understand themselves *within* nature. Developing an ecological identity means seeing oneself as a participant in living systems, a process shaped by sensory experiences, stories, memories, and an attention to place.

Ecological identity is cultivated through repeated observation, storytelling, and sensory engagement with the natural world. These themes are deeply intertwined. Reciprocal relationships with nature shape one's ecological identity, just as a well-formed ecological identity deepens care and responsibility for sustaining those relationships.

Observation and looking slowly play a crucial role here. Often seen as a scientific method, in early childhood, it is also a relational practice, a way of coming to know the world through listening, wondering, and noticing with care. When children are invited to slow down and engage with the natural world through storytelling and sensory experiences, they begin to develop a sense of ecological belonging. Picturebooks support this process by modeling ways of seeing, feeling, and responding to the more-than-human world.

In the following, we highlight two texts that nurture ecological identity through observation and emotional attunement: *Can You Hear the Plants Speak?* by Nicholas Hummingbird, and *The Thing About Bees: A Love Letter* by Shabazz Larkin. These stories encourage young readers to ask questions, listen closely, and form meaningful connections with the world around them, practices essential to cultivating ecological care and responsibility.

Can You Hear the Plants Speak? (Hummingbird, 2024)

Can You Hear the Plants Speak? (2024) by Indigenous plantsman Nicholas Hummingbird is a powerful narrative that fosters ecological identity through observation, intergenerational knowledge, and relational listening. Blending memoir, Indigenous knowledge, and science, the story follows Nicholas from childhood to parenthood, illustrating how he learns to hear and respond to the voices of plants. Taught by his grandparents to observe what plants give and need, Nicholas later finds himself in an urban environment where the natural world feels distant. Yet he discovers that nature persists, in sidewalk cracks, apartment balconies, and city parks, and learns to reconnect

through mindful observation and acts of care, like planting milkweed for butterflies or sowing wildflowers in empty spaces. By illustrating these everyday practices, the book demonstrates how ecological identity is cultivated through reciprocal relationships with place. Hummingbird's invitation, "Can you hear it?" encourages children to listen deeply to their surroundings, affirming that observation is not a passive act but a participatory one. Especially relevant in urban and culturally diverse early childhood contexts, this story reframes nature as ever-present and knowable, urging children to develop a sense of self that includes, and is shaped by, their relationship with the more-than-human world.

The Thing About Bees: A Love Letter (Larkin, 2019)

With lyrical metaphor and vibrant visuals, this book explores the interdependence between humans and bees through the lens of parental love. Larkin compares his two sons to bees, loud, wiggly, and essential, blending science with emotion to help children move from fear to care. It teaches about pollination and biodiversity not just through facts, but through relational thinking.

This text offers a meaningful entry point for discussing fear, connection, and biodiversity with young children. Its warm tone and figurative language support exploration of ecological relationships that are both scientific and emotional. In classrooms, it has sparked metaphor writing, pollinator observations, and conversations about what it means to be brave or to love something we once feared. The book affirms that ecological identity is rooted in feeling as much as knowing, and that through story, young children can see themselves as already entangled with the more-than-human world.

Summary

The two example picturebooks in this theme offer children a way of being in the world that is curious, connected, and caring. The narratives also support intergenerational knowledge and building of ancestral and cultural knowledge in shared practices and experiences. Affirming that an ecological identity begins not with urgency or advocacy, but with noticing, with a question, with a quiet moment, these stories model observation as a relationship over time. They amplify the perspective that children are integrated with nature and part of it. Children's and adults' identities are shaped by where they are, what they love, and how they choose to care for others and the world. Through story, children come to know themselves in relation to land, language, and life.

Again, this theme invites critical literacy through encouraging readers to disrupt the commonplace and examine multiple viewpoints (Lewison et al., 2002). As readers slow down to consider the stories of the living world, they are invited to adopt its, plants, bees, etc., point of view and, in doing so, gain new perspectives. We argue this encourages readers not to take for granted their initial reaction to nature and the more-than-human world, but to closely observe, notice, and name.

Systems Thinking and Collective Action

> *"This is the landfill, growing each day, that spills the plastic thrown away, that traps the turtle green and gray… that swim in the mess that we made." (Lord, 2020, p. 14)*

In this refrain from "*The Mess That We Made*," author Michelle Lord employs cumulative verse to illustrate how everyday choices ripple outward, entangling marine life in a growing web of pollution. The text functions as a mirror and a call to action, revealing the consequences of human behavior while urging readers to see themselves as part of a larger system, capable of both harm and healing.

Building on the themes of reciprocity and ecological identity, which emphasize relational care and a deep sense of belonging within the natural world, this third theme extends that awareness into an understanding of interconnected systems and collective responsibility. Young people deserve rich opportunities to engage in learning that supports climate justice. This includes nurturing care for the world, encouraging curiosity about how it works,

and helping children understand how people, places, and species are interconnected. It also involves recognizing how actions ripple through ecological systems, shaping the health of our communities and the planet.

At the heart of this approach is systems thinking, which involves noticing patterns, relationships, and interdependencies within and across systems, and understanding how changes in one part of a system can affect the whole. In the context of environmental justice, systems thinking helps children understand that environmental issues are deeply interconnected with social systems, including housing, health, labor, and education. It lays the groundwork for understanding that addressing these challenges requires collective, interconnected solutions.

Although systems thinking is sometimes considered too complex for young learners (Sobel, 1996), early childhood is already rich with relational noticing. Children naturally explore cause and effect, observe changes over time, and engage in collaborative problem-solving. When these innate capacities are nurtured through storytelling, they become powerful foundations for ecological literacy and civic imagination.

This theme highlights how picturebooks invite young children into systems thinking as both an intellectual and ethical practice. Rather than presenting isolated problems and individual heroes, these stories frame children as part of dynamic systems: social, ecological, and civic. Through narrative structure, visual patterning, and communal language, they affirm that children's questions and decisions matter in a shared world. We highlight two picturebooks that exemplify this theme: *The Mess We Made* by Michelle Lord, and *A Place for Rain* by Michelle Schaub.

The Mess We Made (Lord, 2020)

This cumulative, lyrical narrative traces the path of plastic waste from everyday use to its devastating impact on marine life, gradually building a web of consequences that affect fish, oceans, and food chains. In communicating possibility and hope, the story shifts toward collective response, emphasizing that "we" can change what happens next. Through vivid illustrations and a cumulative story with rhyme structure, children are introduced to ecological systems in ways that are both accessible and emotionally resonant. The cumulative story component also indicates to readers the compounding efforts, both of destruction and repair in ecosystems and the world.

This text can foster opportunities for learners to visualize cause-and-effect and to explore human impact. Importantly, the text offers space for imagination and shared responsibility. The text encourages ownership and engagement, centering on the plural pronoun "we" and asking, "What part do we play?" and "What can we do together?" The text's repetition and rhythm reinforce systems thinking through both form and content, making complexity feel knowable and action feel possible.

A Place for Rain (Schaub, 2023)

Rooted in a conceptualized classroom project, this story follows a group of young children who respond to flooding and pollution caused by runoff. Together, they design and create a rain garden. The text centers on the process of collaborative inquiry, which involves observing water patterns, identifying needs, proposing solutions, and working with community partners to bring them to life. Through clear, child-friendly language, the book demonstrates how environmental issues are local, material, and within children's spheres of influence.

This picturebook offers an authentic model of systems thinking by highlighting how weather, soil, plants, and built environments interact, and how young learners can intervene in those systems with care and creativity. It affirms the importance of noticing patterns, testing ideas, and designing with place in mind. Within early childhood contexts, the story validates that young children can engage in design-based stewardship when supported through place-responsive learning.

Summary

These texts illustrate that systems thinking in early childhood is not abstract theory; it is grounded in how children notice, respond, and imagine together. Through metaphor, real-world action, and collective language, the books make visible the complexity of our ecological and social worlds while affirming children's place within them. Justice, in this context, becomes a practice of recognizing connection, tracing impact, and creating space for children to act with others in building something better. Drawing on Grace Lee Boggs' notion of 'solutionaries, ' the young people in these texts are positioned as envisioning more sustainable futures in response to the ecological destruction and despair observed. Rather than instilling a feeling of doom, by positioning children as changemakers, the stories promote hope and possibility.

These stories remind us that systems are not static and that they are shaped by those who care enough to notice, question, and act together. Applying a critical literacy lens, these narratives invite readers to focus on the sociopolitical issues associated with environmentalism and to take action to promote a more just and sustainable world (Lewison et al., 2002).

Environmental Grief and Repair

> *"Look at it. Wounded, worn, twisted, torn. One day this tree will fall and this story will end."* (Booth, 2024, p. 5)

In *One Day This Tree Will Fall*, Barnard Booth offers young readers a quiet and powerful meditation on environmental loss. Her words, paired with powerful illustrations, draw our attention to a tree that has carried the weight of time and human impact. The image of a single tree, weathered and fallen on the forest floor, becomes a metaphor for broader ecological grief: a sense of sadness, disorientation, or even mourning in the face of environmental harm.

As young children build relationships with place, they inevitably notice when something changes; when a tree falls, insects disappear, or weather patterns shift. These early experiences of ecological loss often surface in quiet moments of confusion, silence, or sorrow. While children may not always name these feelings as grief, they are attuned to the absence of what they love.

This theme explores how picturebooks support children in recognizing and moving through environmental grief, while modeling possibilities for resilience, renewal, and shared care. In early childhood education, environmental grief need not be avoided. Instead, it can be gently named and transformed through story and relationship. When books introduce loss or harm while also maintaining attention to agency and imagination, they offer children a pathway toward hope and healing. These texts affirm that grief and hope are often entwined. Through story, children are invited not only to mourn what has been lost, but also to imagine what can be restored. We highlight two books that exemplify this theme: *A Flicker of Hope* by Cynthia Harmony and *One Day This Tree Will Fall* by Leslie Barnard Booth.

A Flicker of Hope (Harmony, 2024)

A Flicker of Hope follows a young girl waiting for her father's return from migratory labor. The story is told in parallel with monarch butterflies' journey across North America. Set in and around the Monarch Butterfly Biosphere Reserve in México, the story grounds children in ecological observation, seasonal rhythms, and an awareness of longing and cyclical returns. Through cultural references, the book invites children to consider environmental and familial migration as relational processes. The author's note and glossary further contextualize the ecological and economic realities of the region, reinforcing the story's connection to land and livelihood.

This narrative is a thoughtful resource for exploring environmental grief and repair. The girl's experience of waiting mirrors the vulnerability of human and more-than-human lives, asking children to reflect on what it means to care for something that cannot always be seen or immediately returned. The story affirms children's capacity to engage with emotional complexity in family life and their observation and interaction with the natural world and migration patterns. In the classroom, educators might use the text to map monarch and family journeys side-by-side, explore

sustainable practices through art, or co-create stories of return and care. In doing so, children are invited to see their lives, and the lives of butterflies, families, and ecosystems, as connected by migration, memory, and hope.

One Day This Tree Will Fall (Barnard Booth, 2024)

This informational text traces the life of a single tree, from its strength and fortitude in the forest to its decay, revealing how, as the tree falls, it sustains a web of new life. Through poetic prose and engaging illustrations, the story invites children to witness ecological cycles of decomposition and regeneration. It suggests that endings are not final, but generative, offering insight into the interconnectedness of living things.

For young children, *One Day This Tree Will Fall* introduces transformation not as something to fear, but as a natural and necessary part of life. The story blends poetic language with ecological insight, offering an entry point into cycles of change, decay, and renewal. It invites children to reflect on what it means for something to end—and what forms of life or possibility might grow in its place. The book supports both emotional literacy and scientific exploration, encouraging close observation, memory-making, and relational thinking about the more-than-human world. It affirms that noticing and naming change is itself a form of care.

Summary

These texts help children recognize and hold space for environmental grief while offering pathways toward hope and repair. They validate children's emotional responses to loss without overwhelming them, and model that restoration begins with attention, imagination, and shared effort. In doing so, these stories affirm that justice is about naming harm and co-creating healing.

For early childhood educators, these books offer accessible ways to support children in navigating the complexities of change, stewardship, and resilience. The texts in this theme reinforce that small gestures and natural cycles can be seeds of transformation. In a world facing ecological uncertainty, helping children walk through grief with creativity and relationship is an act of justice. Related to critical place-based studies and critical literacy, this theme invites children to notice how loss and renewal are connected to land, community, and story. They show that repair is not about erasing pain, but about tending to it collectively, whether through planting seeds, telling stories, or caring for one another. In this way, grief becomes an opening for hope, and repair becomes a practice of belonging, reminding children that even the smallest hands can help weave resilience into the fabric of our shared world.

Suggestions for Interdisciplinary Learning with Texts as Anchor

To support educators in applying the themes and texts discussed above, Table 2 provides an at-a-glance synthesis of the eight picturebooks highlighted in this article, presented in order as they are mentioned in the text above. Each row aligns the featured book with developmentally appropriate, interdisciplinary practices across literacy, science, math, and social studies. These invitations are not exhaustive but illustrate how picturebooks can become powerful anchors for place-responsive, justice-oriented learning in early childhood settings.

These interdisciplinary invitations illustrate how picturebooks can function as catalysts for ecological inquiry, civic imagination, and relational learning across early childhood domains. Rather than isolating environmental education into discrete units, the examples in this table illustrate how climate justice can be integrated into daily classroom life through observation walks, collective storytelling, family interviews, and small acts of place-based care. By pairing literacy with science, social studies, and mathematics in meaningful ways, educators can support children in developing critical understandings of systems, relationships, and responsibilities, rooted in their lived experiences and local environments.

Table 2.
8 Picturebooks and Interdisciplinary Invitations for Early Childhood Climate Justice Learning

Picturebook (Citation)	Literacy Invitations	Science / Math Explorations	Social Studies Connections
Berry Song (Goade, 2022)	Write gratitude poems, co-create a class Berry Book in multiple languages	Observe and sort berries, measure plant growth over time	Map family foods, discuss intergenerational knowledge and Indigenous stewardship
Wild Greens, Beautiful Girl (Schlaikjer, 2024)	Describe sensory memories, write or draw plant stories	Identify plants in the neighborhood, compare uses	Discuss urban foraging and community foodways
Can You Hear the Plants Speak? (Hummingbird, 2024)	Interview plants, create field guide entries	Chart plant changes over time, compare water needs	Explore family stories about plants and nature
The Thing About Bees (Larkin, 2019)	Write a metaphor "love letters" to animals or insects	Diagram pollination cycles, track local bee sightings	Connect fear and care through personal stories
The Mess We Made (Lord, 2020)	Write "solution webs" or eco-poems	Sort classroom trash, graph waste types	Discuss pollution impact and shared responsibility
A Place for Rain (Schaub 2023)	Create class storybooks about water or flooding	Design model rain gardens, map schoolyard runoff	Explore civic design and shared outdoor spaces
A Flicker of Hope (Harmony, 2024)	Create "hope jars" or emotion drawings	Design a pollinator habitat, track seasonal changes	Discuss climate change feelings and community care
One Day This Tree Will Fall (Barnard Booth, 2024)	Create memory maps or lifecycle murals	Observe trees and decomposition, compare over time	Reflect on change, legacy, and ecological renewal

From Story to Justice: Conclusion and Implications

This framework responds to the broad wondering of what it means to teach climate justice through story in early childhood. By bringing together the four strands of the framework, we offer a conceptual and practical approach that offers a layered, interdisciplinary framework positioning children as relational, capable participants in their communities and ecosystems. We have argued that climate education in early learning is not only developmentally appropriate, but it is essential. To make this work meaningful, we must move beyond thematic booklists or content alignment and toward a pedagogical vision that reimagines the very aims of early childhood education.

The framework we propose invites educators to view environmental literacy as a civic and relational practice. Through the four conceptual invitations, reciprocity and kinship, ecological identity and observation, systems

thinking and collective action, and environmental grief and repair, we outline an intentional justice-oriented approach to climate storytelling that is rooted in story, place, and relationships. These themes challenge individualistic or performative approaches to environmentalism and instead foreground connection, interdependence, and cultural ways of knowing. By doing so, they reframe climate justice as a lens that reshapes how we engage in literacy, science, and social studies.

Educators already use stories across diverse classrooms and contexts to help young children notice, wonder, critique, and act. The strategies shared in this article, from cultivating observation and data storytelling to using books as mentor texts and planning responsively within constrained settings, expand on everyday practices of early childhood educators in purposeful ways that center climate and environmental justice. In many ways, early childhood educators are doing this work in spite of systems that attempt to depoliticize curricula or constrain teacher agency, and yet, working collaboratively, we have the opportunity to imagine possibilities in interdisciplinary early childhood learning that fosters children's inquiries, realities and imagine a more just and sustainable future together.

This framework and approach we offer carries important implications. For teacher preparation, it calls for programs that equip future educators to extend from implementing climate-themed lessons to facilitating justice-centered, culturally sustaining, and place-based inquiry. Environmental learning in early childhood must go beyond facts and awareness to include critical reflection, storytelling, and sustained engagement with students' lived experiences. For curriculum and policy, this work demonstrates how interdisciplinary, justice-focused teaching can meet academic standards while also responding to urgent planetary challenges. In contrast to narrow, skills-driven mandates, climate storytelling offers a generative, joyful, and pedagogically sound pathway to integrated learning.

We need research that follows children over time to understand how they make meaning from environmental stories and how they carry these understandings into their relationships with place and community. We need studies that explore the transformative potential of collective inquiry, especially in multilingual and culturally diverse classrooms. We also need to better understand how educators navigate the practical and political realities of doing this work, particularly as state-level mandates, book bans, and reductive discourses attempt to limit what can be taught and read.

At the heart of this manuscript is a belief that young children are already attuned to fairness, beauty, and care. They notice what is changing, what is broken, and what deserves protection. They ask profound questions and tell powerful stories. And when educators take those questions seriously, when they read and reimagine stories together, they nurture a kind of hope that is rooted not in denial, but in relational possibility. In a world marked by ecological loss and uncertainty, that hope is not naïve. Early childhood is not too early to begin. It is, in fact, the most powerful place to start.

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Honoring Children's Agency: A Systematic Review of Research *With* and *By* Children in Environmental Contexts

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ABSTRACT

As climate impacts increase, research that meaningfully engages young children as agents of change could contribute to children's confidence, sense of belonging, and agency. Further, research *with* and *by* young children has been identified as an emerging trend in the field of Environmental Education Research (Green, 2015). This systematic literature review explores the theoretical and methodological approaches utilized in research conducted with and by young children in environmental contexts and seeks to contribute to a broader conversation that will equip researchers and early childhood educators to engage in effective and impactful participatory action research with young children. It appears that it is not the specific theoretical or methodological approach that ensures research *by* children, but the child's active involvement in the project before and beyond the data collection phase which requires the researcher's active reflexivity and willingness to release control and power over the research process.

***Keywords*:** early childhood, environmental education, education for sustainability, participatory research, child-led research

Young children will not only inherit the climate crisis, they are experiencing its impacts now (Helldén et al., 2021). The impacts of the climate crisis, including physical and psychological effects on young children, are well documented (Burke et al., 2018; Sheffield & Landrigan, 2011). While children are often positioned as most vulnerable in the context of the climate crisis, the Early Childhood Education for Sustainability (ECEfS) literature positions children as *current* agents of change "possessing the ability to make their own choices and affect change" (Dean & Elliot, 2022, p. 63), rather than *future* environmental stewards. This systematic literature review simultaneously acknowledges the impacts of the climate crisis on children while affirming their right to speak and act for themselves, in society, and in research.

Further, conducting research *with* and *by*, rather than on, children has been proposed as a promising paradigm in Environmental Education Research by Barratt Hacking et al. (2013) in their seminal chapter *Children as Active Researchers* and documented as an emerging trend in Environmental Education (EE) by Green (2015). Green (2015) argues that "the way in which EE researchers approach research with young children is key... in promoting children's active participation as agents of change" (Green, 2015, p. 208). Therefore, I assert that as a field, there ought to be a direct connection between our affirmation of children's agency and engaging children in the research and knowledge co-creation processes.

The purpose of this systematic literature review is to explore the theoretical and methodological approaches utilized in research conducted with and by young children in environmental contexts, in particular, the role of both child and researcher, in the hopes of informing ongoing professional research practices that affirms children's agency and positions children as agents of change. As climate impacts increase, research that meaningfully engages young

children as agents of change could contribute to children's confidence, sense of belonging, and agency. This systematic literature review seeks to contribute to a broader conversation that will equip researchers and early childhood educators to engage in effective and impactful participatory action research *with* and *by* young children. Therefore, the research questions guiding this literature review are as follows:

1. What theoretical and methodological approaches are being used in environmental contexts to conduct research *with* and *by*, rather than *on*, young children?
    a. What role(s) do the children and researchers play in the research process?
2. What challenges have been identified by researchers working in environmental contexts to conducting research *with* and *by* young children?

Method

This systematic literature review was guided by the Galvan and Galvan (2017) method for conducting literature reviews. This review is comprised of an 8-year period, from 2015-2023, building on a literature review conducted by Green (2015) that explored literature from 2004-2014, the United Nation's Decade of Education for Sustainable Development. Inclusion was limited to empirical articles that had undergone double-blind peer review to ensure the articles met professional and ethical standards. Further, research conducted with young children aged birth to ten was included to focus on early childhood. Finally, the Environmental Education (EE) field is broad and evolving; therefore, research from EE, Early Childhood Education for Sustainability (ECEfS), and other research conducted in environmental contexts concerning climate change impacts or involving nature-based learning will be included. These inclusion criteria are expressed in the form of questions in Table 1.

Table 1

Inclusion Criteria Identification Questions

Inclusion Criteria Questions:
Was this study published between 2015 – 2023?
Did this study undergo a double-blind peer review?
Is the content or context of this study relevant to EE, ECEfS, climate change education, or nature-based learning?
Does the study involve children in the research process? That is, is this research conducted *by* or *with* children (as opposed to *on* children)?
Are the children involved in the study ages birth to 10 years old?

Data Collection

An initial search was conducted using Education Research Complete, which was chosen as it is an educational database focusing on a range of ages and educational topics, in the hopes of generating the broadest range of possible results to apply the inclusion criteria. Searches in Education Research Complete were conducted using keywords to address the major topic of the review: children as researchers in environmental contexts. These keywords included: "participatory action research or community-based participatory research," "young children or early childhood or preschool or kindergarten or early years," "environment or sustainability or climate change or natural resources or environmental protection," "children as researchers," "children as active researchers," "child-led research," "environmental education or outdoor education or conservation education." Additionally, filters limited the search to include only peer-reviewed articles published between 2015 and 2023. These searches resulted in 121 articles, of which nine met the inclusion criteria. Additionally, reference lists were reviewed to identify other relevant articles for inclusion, resulting in an additional two sources for inclusion.

Data Analysis

Analysis began by creating a data extraction matrix that included categories that record basic information about each article and categories that correspond to the research questions, as recommended by Galvan and Galvan (2017). A summary of the data extraction matrix can be found in Appendix A. The relevance of these categories to the inclusion criteria and research questions is outlined in Table 2.

Table 2
Matrix Category Relevance to Inclusion Criteria and Research Questions

Category	Inclusion Criteria Relevance	Relevance to RQ
Field	Environmental contexts including EE, ECEfS, climate change, and nature-based learning.	R1
Age of children	Ages birth to 10 years old.	R1
Theoretical Foundation	Participatory research with or by children	R1
Methodology	Participatory research with or by children	R2 / R3
Data Collection & Analysis	Participatory research with or by children	
Ethical & Other Considerations Working with Children	Participatory research with or by children	R2 / R3
Role of Child	Participatory research with or by children	R2 / R3
Role of Researcher	Participatory research with or by children	R2
Challenges	Participatory research with or by children	R3
Recommendations	Participatory research with or by children	

After confirming articles met the inclusion criteria, each article was reviewed in its entirety and data related to the categories (see Table 2) was extracted. A comparative approach was used to analyze the data across each category of the extraction matrix to identify key themes, similarities, and differences across the included articles. Findings are organized to answer the research questions addressing theoretical foundations, methodological approaches, role of the child, role of the researcher, and challenges. Considering these findings, recommendations are made in the hopes of furthering effective and impactful participatory action research with and by young children.

Results

Eleven articles were included in the final analysis. Articles were equally split between publication in journals specific to Environmental Education (such as the *International Journal of Early Childhood Environmental Education*, *Environmental Education Research*, and the *Australian Journal of Environmental Education*) and publications specific to Early Childhood (such as the *International Journal of Early Childhood*, *Early Child Development and Care*, and the *Journal of Early Childhood Literacy*). One outlier (Nah & Lee, 2016) was published in *Action Research*. The articles included here represent six countries: Australia, Canada, South Korea, Sweden, the United Kingdom, and the United States (see Figure 1).

Preliminary analysis utilized Barratt Hacking et al.'s (2013) continuum of methodological approaches regarding research with children, ranging from research *on* children to research *with* children and, finally, research *by* children. For the purposes of this systematic review, research *on* children was not included as it did not meet the inclusion criteria of children's active involvement in the research process. Building upon the work of Green's (2015) systematic review, the articles included for review were organized along Barratt Hacking et al.'s continuum, see Table 3.

Figure 1

Articles by Location, per Country

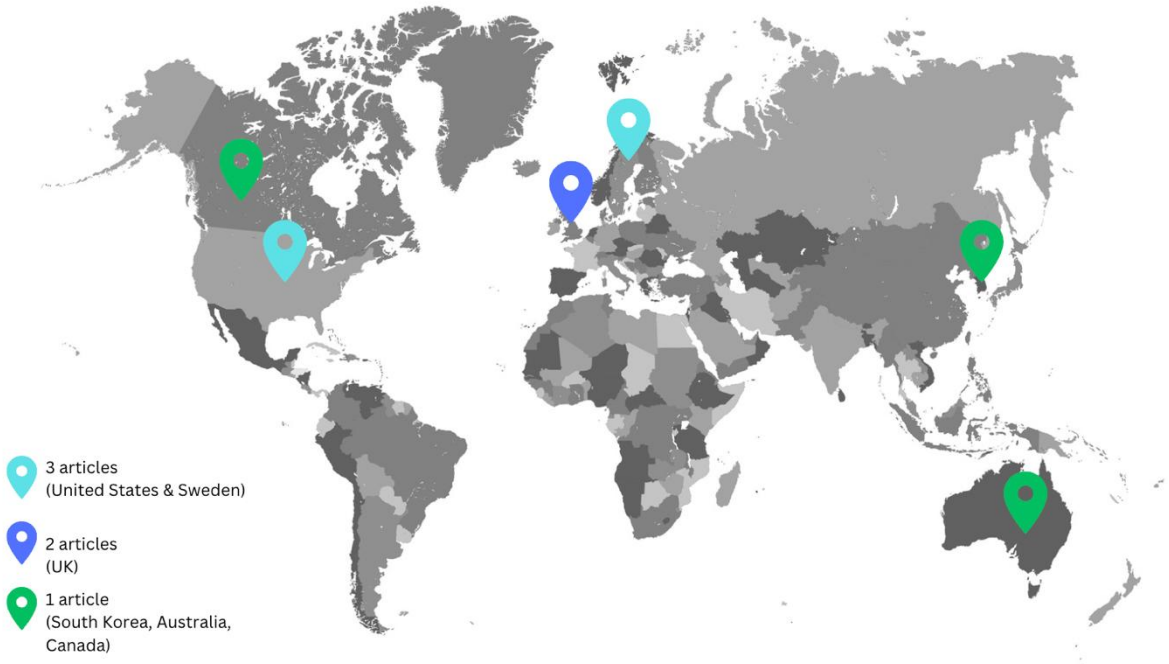

Table 3

Included Articles Along the Continuum of Barratt Hacking et al.'s Childhood Research Approaches (Adapted from Barratt Hacking et al., 2013 and Green, 2015)

Research with Children		**Research By Children**	
Research is primarily led and interpreted by adults. Methods are designed to understand children's perspectives.	Research is participatory and collaborative and includes children's perspectives. Children participate in data collection but are not involved in other phases of the research project.	Children are engaged as co-researchers, throughout the project (i.e. beyond data collection). Methods and project design honors children's agency and active participation.	Children conduct and lead all stages of the research process "independent of adult intervention" (Barratt Hacking et al., 2013, p 439).
Williams et al., (2017) Haywood-Bird, (2017) Williams & McEwen, (2021)	Harwood & Collier, (2017) Nordén & Avery, (2020) Moore et al., (2021)	Nah & Lee, (2016) Green, (2016) Green, (2017) Postila, (2019) Postila, (2022)	

It is notable that none of the included articles meet the definition of Barratt Hacking et al.'s (2013) conceptualization of research authentically conducted by children. This may be because of the age of studies included focusing on early childhood, with all but two studies including children younger than six. However, this is not to suggest very young children are not capable of conducting their own research, merely that, as of this review, that work as not been reported.

Theoretical Foundations

A wide range of theoretical foundations underpinned the included articles. They have been grouped into categories (see Table 4). Articles that engaged children in the research project were grounded in theoretical foundations that take seriously the role of children as active agents and warn against the potential of tokenization of children's involvement in the research process. Three articles were strongly grounded in a theoretical paradigm (such as post-humanism), and seven utilized childhood theories to describe and position children as competent social actors (such as the New Sociology of Childhood). Four articles referenced the UN Convention on the Rights of the Child (1989, 2005), which asserts children's rights to participation in decisions that affect their lives. Finally, five articles cited learning theories such as experiential learning (Kolb, 1985) and place-based education (Sobel, 2020) to frame how children learn and engage with their world.

Table 4

Theoretical Foundations of Included Articles

Theory	Key Authors	Article
Theoretical Paradigms		
Post Humanist	Stengers (2010); Tsing (2015) Taylor (2013)	Postila (2022) Harwood & Collier (2017)
New Materialist	Haraway (2016) Taguchi (2014)	Postila (2022) Harwood & Collier (2017)
Situated Knowledge	Haraway (1988)	Postila (2022) Postila (2019)
Common Worlds	Taylor et al. (2013); Haraway (2004); Haraway (2008); Taylor & Giugni (2012); Pacini-Ketchabaw & Taylor (2015)	Harwood & Collier (2017)
Slow Science	Stengers (2018)	Postila (2022)
Relational Ontology	Stengers (2015); Stengers, (2018)	Postila (2022) Postila (2019)
Post-Marxist Critical Theory	None cited	Haywood-Bird (2017)
Childhood Theories		
Huizinga's theory of play and place	Huizinga (1949)	Moore et al. (2021)
Children's Social Capital	Wong (2017); Wood et al. (2013)	Williams & McEwen (2021)

New Sociology of Childhood	James (2009); James & Prout (1990)	Green (2017); Green (2016)
	James & Prout (1997)	Nordén & Avery (2020); Nah & Lee (2016)
	James, Jenks, & Prout (1998)	Moore et al. (2021)
	Barratt Hacking et al. (2013); Green (2015)	Williams et al. (2017); Green, (2016)
	Holloway & Valentine (2000)	Nah & Lee (2016)
Policy		
UN Convention on the Rights of the Child	United Nations (2005); United Nations (1989)	Moore et al. (2021); Green (2017); Green (2016); Nah & Lee (2016)
Learning Theories		
Constructivist	None cited	Haywood-Bird (2017)
Social constructivist	Rogoff (2003)	Nah & Lee (2016)
Experiential Learning	Kolb (2014); Kolb (1985)	Williams et al. (2017)
Active Learning Theory	Hart (2013)	Williams et al. (2017)
Transformative Learning Theory	Mezirow (1997)	Williams et al. (2017)
Social Cognitive Theory	Bandura (1986), Paton (2003)	Williams et al. (2017)
Place-Based Education	Smith, (2002); Sobel (2020); Woodhouse & Knapp (2000)	Nordén & Avery (2020)
Framework for Significant Learning	Fink (2013)	Williams et al. (2017)
Explorative Pedagogy	Vecchi (2010)	Postila (2022)

Notably, the majority of studies foreground the agency of children through the use of childhood theories. In doing so, the authors clearly established respect for the child as an active agent not only in the context of the research study but in society. Appropriately, the theoretical foundation often informed the role of the child in the research project (explored in detail below.) For example, Postila (2022) used Stengers' 'slow science' to position children as "the connoisseurs, the producers of local knowledge in their expertise of their preschools and their surroundings" (p. 279). Even articles that did not cite one of the childhood theories included in Table 3 (Harwood & Collier, 2017; Postila, 2019, 2022) explicitly named the participatory aims of the research study. However, these aims were not always fully actualized, as I will show below.

Methodological Approach

The included articles utilized a range of methodological approaches, though all involving qualitative data. Moore et al. (2021) used a comparative case study to compare children's perspectives on their outdoor play spaces at two childcare centers. Haywood-Bird (2017) used a critical approach to ethnography in her study of children's enaction and understanding of power in their outdoor play. Haywood and Collier (2017) reported on an ethnographic study exploring children's relationship with humans and nonhumans. Green (2016, 2017) used a phenomenological approach to understand children's experiences of their environment as a means of evaluating child-friendly data collection methods. Participatory action research was utilized in Williams et al. (2017), and Williams and McEwen's (2021) work to engage elementary school students in flood prevention education. Both Nordén and Avery (2021) and Nah and Lee (2016) utilized action research approaches to redesign outdoor play areas in their respective settings (a childcare center in Sweden and a childcare center in South Korea). Postila (2019, 2022) used a multidisciplinary approach and pedagogical working methods that were familiar to the children to explore water and water-related environmental issues. Additionally, Haywood and Collier (2017) and Moore et al. (2021) utilized the Clark and Moss (2021) mosaic approach, which identifies participatory tools to elicit children's perspectives.

Methods

A variety of child-friendly data collection methods were used to engage children in the research process. Three categories of data collection were identified: documentation, interviews, and observation. Documentation methods included those that involved the children documenting their own experiences and perspectives through the use of: GoPro Cameras (Green, 2016, 2017; Harwood & Collier, 2017); photography (Nah & Lee, 2016; Nordén & Avery, 2020; Postila, 2019); personal diaries or informal writing (Harwood & Collier, 2017; Nah & Lee, 2016; Postila, 2022), drawing, making models or making art (Green 2017; Moore et al., 2021; Postila, 2019, 2022), role play (Green, 2017), map making (Moore et al, 2021), site tours (Moore et al., 2021), sensory tours (Green, 2016, 2017) and field trips (Nah & Lee, 2016).

Interviews were another common method employed, though in a variety of ways with varying degrees of structure including informal conversations with children (Harwood & Collier, 2017; Nordén & Avery, 2020;) child-led interviews (Nah & Lee, 2016); Researcher-led interviews (Williams et al., 2017); group discussions (Nah & Lee, 2016; Williams et al., 2017; Nordén & Avery, 2020; Williams & McEwen, 2021); video-stimulated recall discussions (Green, 2016, 2017), storytelling (Postila, 2022), interviews with teachers (Nah & Lee, 2016; Nordén & Avery, 2020); and interviews with families (Haywood-Bird, 2017; Williams et al., 2017).

Finally, Nordén and Avery (2020) and Haywood-Bird (2017) used participant observation. Notably, all articles used multiple methods to both authentically engage children and draw on several data sources to support triangulation and verification. While the studies included utilized a range of approaches and often cited the participatory nature of these approaches, it appears that it is not the specific methodological approach or method used that indicates "research by" children, but the child's active involvement in the project before and beyond the data collection phase.

Role of the Child

Researchers utilized a range of strategies to engage children authentically in the research process (see Table 3). At a minimum, all studies sought children's assent to participation and utilized child-friendly data collection methods. However, this should be considered a baseline when the aim is research conducted *by* children. The studies included here provide promising examples of children's authentic involvement in the research process including selecting the issue of investigation, selecting data collection methods, directing the researcher's documentation (what they could or could not document), participating in data analysis, and sharing findings.

Table 3

Children's Involvement in the Research Process

Activity	Description	Article
Assent to participation	Opportunity to opt out of activities at any time.	All

Participation in child-friendly data collection methods	Children participate in data collection methods (described in detail below).	All
Issue selection	Children decide what issue or topic to focus on.	Green (2017)
Method Selection	Children choose which data collection methods to use for the study (from a set of methods presented by the researcher).	Nah & Lee, (2016); Green (2017)
Direct the researcher in documentation	Children decide what not to include in (or delete from) documentation for analysis and/or direct the researcher's documentation.	Harwood & Collier (2017); Postila (2019); Postila (2022)
Interpret the data	Researchers bring back data to children (sometimes in the form of video or photos) and have a discussion with the children to understand their perspectives on the experience.	Nah & Lee, (2016); Green, (2016); Green, (2017)
Share Findings	Children presented findings to families at the end of the project gathering.	Green (2017)

To ensure children's authentic and active participation, the researcher often had to release some amount of control over the research project. Doing so created meaningful opportunities for not only the children's involvement in, but also influence on, the research process, as demonstrated above in Table 3.

Role of Researcher

Most articles also explicitly detailed the role of the researcher in the study. This act of reflexivity appears to have been essential to successfully engage children in the research process because researchers had reflected on their positional power in the project as adults, and often as outsiders. Green (2017) aptly notes, "the way research is guided and facilitated by adults will greatly influence what children share or don't share in the process" (p. 7). Many of the other studies included also reflected on this reality (described in more detail below). Beyond mere acknowledgment, researchers intentionally crafted a role for themselves in the research project that made space for the children's enacted agency.

As these conceptualizations of the role of the researcher were analyzed, three categories emerged, participant observer, facilitator, and co-researcher, which were mapped onto Barratt Hacking et al.'s (2013) Childhood Research Approaches (see Table 4).

Several researchers acted as participant observers and did not involve children in the research process beyond data collection. They utilized primarily observation methods, though some included children's documentation (Harwood & Collier, 2017; Moore et al., 2021), and one included interviews with families (Haywood-Bird, 2017). In this role, methods were designed to elicit and understand children's perspectives, but the research process was primarily led and interpreted by adults.

Some researchers acted as facilitators and actively involved children in the data collection, often facilitating group conversations and processes with the children. In their work on flood prevention, Williams and McEwen (2021) and Williams et al. (2017) facilitated a flood education intervention and conducted researcher-led interviews with

children as well as interviews with families. In this role, children participated in the data collection, but again, the research process was primarily led and interpreted by adults.

Table 4

Continuum of the Role of the Researcher mapped onto Barratt Hacking et al.'s Childhood Research Approaches (Barratt Hacking et al., 2013)

Methodological Approach	**Research with Children**		**Research by Children**
Role of Researcher	**Participant Observer** Harwood & Collier (2017) Haywood-Bird (2017) Moore et al. (2021)	**Facilitator** Williams et al. (2017) Nordén & Avery (2020) Williams & McEwen (2021)	**Co-Researcher** Nah & Lee (2016) Green (2016) Green (2017) Postila (2019) Postila (2022)

Finally, some researchers acted as co-researchers with the children. In this approach, researchers made space for children's active involvement in the research process beyond data collection. Nah and Lee (2016) provide a robust description of their role as researchers,

> we acted as ''committed facilitators, participants, and learners'' rather than as neutral observers (Arieli, Friedman, & Agbaria, 2009). We not only observed but also participated in the activities involved in the development of the outdoor play area; accordingly, child participation was actualized. Specifically, we participated in the project by helping and offering assistance with the activities…We encouraged the parties involved in the project by providing ideas, searching for relevant resources when they approached us with problems, and cooperating in efforts to maintain a fundamentally democratic relationship, *in which all parties could exercise power and share control of the decision-making process* [emphasis added] (p. 340).

In this approach, the researchers constructed their role as specifically ensuring the children's active participation in not only data collection but the research process more broadly. Green (2017) similarly noted her role as making space for the children's discussion, input, and decision-making. Finally, Postila (2022) described her role as one of eliciting questions, creating the conditions for children's stories to emerge and be seen as valuable, and synthesizing the stories shared by the children while acknowledging who and how they were created (i.e., with the children). In this role, researchers intentionally engaged children throughout the research process by making space for their active participation. In addition to participating in data collection, children also contributed to issue selection, data analysis, and dissemination.

Challenges

The included studies identified several challenges to conducting research with and by children, including following the children's lead, social influence of the researcher, adult receptivity and buy-in, and coordination time and investment, each of which is described in detail below.

Following the Children's Lead

Though the theoretical foundations provided a strong grounding for the methodological choices regarding the role of the child as well as the role of the researcher, the reality of enacting those roles proved challenging. Postila (2019, 2022) found that staying with the children, their interests, and concerns was not easy but was worthwhile. She reflects, "as a researcher, at times I had to let go and lose control both of the research process as well as the data production" (2019, p. 224). This entailed allowing the children to continue their play or experimentation at times when the questions or inquires framed by the researcher were not taken up by the children, rather than forcing their engagement.

Further, engaging seriously with children in the research process, particularly around environmental issues, sometimes surfaced challenging ethical issues or questions. Postila (2022) notes this in her work exploring water with preschool children. The children posed challenging questions about who has access to clean water and the impacts when dirty water is ingested. As adults, it is important to recognize our own discomfort or limiting beliefs around children's capabilities to deal with difficult topics and instead follow their lead, supporting their inquiry in developmentally appropriate ways. As Williams and McEwen (2021) note, a lack of engagement with children around potentially challenging or emotional topics can, in fact, "convey hopelessness and instability to children who are searching for guidance and answers" (p. 1643). Following the children's lead requires taking seriously their questions and concerns and finding developmentally appropriate ways to engage with them in those concerns.

Finally, following the children's lead required flexibility. Green (2017) found that using an assigned schedule and grouping for the children to rotate through methodological activity centers "did not necessarily support children's autonomy in the project." (p. 10) This led her to allow the children to engage with the stations however they liked, which posed challenges of its own: overcrowding and completing work in the time allotted. However, it did allow for the children's freedom of choice and movement. Ultimately, Green (2017) recommends that "when opportunities arise, researchers should embrace children's innovations - doing so provides deeper insight into the life world of a child and honors children's agency in the process" (p. 18). While certainly more time-consuming, and requiring of a great deal of reflexivity, this flexible approach appears very important in supporting children's agency in the research process.

Social Influence of the Researcher

Many researchers reflected on the influence of their presence in the research project, given the unequal power dynamic between adult and child which may result in children responding to researchers in the way they believe is socially desirable or required. While in some ways unavoidable, it appears very important that researchers both acknowledge and do their best to ward against traditional power dynamics. Researchers utilized several strategies, including ongoing assent throughout the research project, reading children's body language to gauge assent in addition to verbal assent processes (Haywood-Bird, 2017), giving children agency over what is documented and how, and utilizing multiple methods to document a variety of perspectives and experiences (Green, 2017). Ultimately, Haywood-Bird (2017) noted that despite these efforts "not all dynamics of power and privilege between me and the children could not be erased" (p. 1018), making researcher practices of reflexivity, particularly regarding their power and role in the research process, even more essential.

Adult Receptivity and Buy-In

Notably, every article included in this review was conducted in the context of a school or early childhood care center. As such, all studies included, to some degree, teachers and families. While adult participation is not necessarily an inherent challenge, if all adults involved are not bought into the theoretical framing, particularly regarding children's agency and active role in the research process, it appears challenging to fully actualize the aims of the research project to be collaboratively conducted with or by children.

This can be due to a variety of factors. Nordén and Avery (2020) suggested that preschool teachers' lack of prior experience in Environmental Education led to an inability to engage with children's questions and interests, which posed challenges to the research process and recognized a tension between their children's curiosities and desire to enact their agency in the context of the project and the teacher's expectations for the children's participation. Further, they observed the adults involved with the project's "limited interest and curiosity to listen to what the children might be thinking during the activities" (Nordén & Avery, 2020. p. 328). This posed significant challenges and ultimately led to missed opportunities to involve the children and authentically understand their perspectives.

Nah and Lee (2016) recognized the larger cultural context also greatly influences how adults interact with the research process: "it is difficult to implement child participation initiatives in an authoritarian culture, where the notion of childhood as subordinate to adulthood has prevailed" (p. 348). Green (2017) also notes adults' and educators' misplaced instincts toward maternalism, thereby viewing children as vulnerable, innocent, and in need of protection. Challenges to adult buy-in include both individual and cultural factors that researchers should consider and address when aiming to implement research with and by children.

Coordination and Time Investment

Further, this approach that foregrounds children's agency takes time. Nordén and Avery (2020) found that educators' aim "was getting the work done quickly, rather than adding extra time and space for communication and engagement with the children" (p. 328). It seems evident that this work cannot be rushed, particularly if the aim is to authentically follow the interests and curiosities of the children. Nordén and Avery (2020) also recognized the need for significant coordination and planning time, which proved difficult to build into staff schedules. Nah and Lee (2016) similarly noted that the process of engaging adult participants takes time and investment beyond any one research project. This finding is also supported by Barratt Hacking et al.'s (2013) finding that time is needed to support the success of the research project to foster trust and relationships between children and adults and children and the research process.

Discussion

The purpose of this systematic literature review was to explore the theoretical and methodological approaches utilized in research conducted with and by young children in environmental contexts in the hopes of informing ongoing professional research practices that affirm children's agency and position children as agents of change. While the studies included utilized a range of theoretical and methodological approaches, it appears that it is not the specific methodological approach or method used that indicates research with or by children but the child's active involvement in the project before and beyond the data collection phase, which requires active reflexivity on behalf of the researcher to create space within the research process for the children's active involvement. Based on the analysis, several findings emerged regarding the role of the child and the role of the researcher.

Role of the Child

Researchers interested in conducting research with and by children ought to include children in the research process beyond data collection. As several articles included here show, children can be involved throughout the entirety of the research process, from topic selection, method selection, data collection, data analysis, and dissemination. The articles included in this review offer several exciting examples of ways to do so, with Nah and Lee (2016) and Green (2017) among the strongest approaches. Green (2017) includes a very thorough table detailing both the researcher and children's roles throughout every phase of the research process.

Role of the Researcher

Clearly articulating the role of the researcher, in addition to the role of the child, appears to be important in authentically conducting research with children. In explicitly naming the role of the researcher, unspoken power dynamics that may be assumed in the research process -- the researcher selects the topic of investigation, leads data collection, and has the ultimate say over what data is included in analysis -- are surfaced and more collaborative

processes and roles can be utilized. As noted above, a variety of researcher roles can be utilized in approaches seeking to conduct research with or by children.

Detailing the role of the researcher in the project, in particular the ways the researcher facilitates or potentially disrupts children's agency, provides important examples to other researchers seeking to work in this paradigm and mirrors Barratt Hacking et al.'s (2013) recommendation for active dialogue amongst children and adults involved in the research project around their respective roles. It appears a great deal of both reflexivity and flexibility on behalf of the researcher is needed to truly allow children's thoughts, curiosities, and interests to drive the investigation. For Postila (2022), "this involved challenges such as letting the child(ren)'s concerns matter, rather than starting in a predetermined matter of facts" (p. 296). If we are to truly engage children as co-researchers, we must make space for them in the research process – it is the responsibility of the researcher to create the conditions for children's stories, experiences, and opinions to emerge and to be valued.

Seeking Assent

Beyond seeking parental consent and children's assent at the beginning of the project, researchers should seek children's assent throughout the research project. As Green (2017) notes, "in this way, children were invited to choose what, if, and how long they wanted to engage in each particular research activity" (p. 8). Further, researchers ought to consider the use of child-friendly assent practices beyond verbal confirmation. For example, in Nah and Lee's (2016) study, children created their own post-it note consent forms that indicated if they were participating in the day's research activities. Moore et al. (2021) used a smiling or sad face form that the children ticked each time research was conducted. These examples offer age-appropriate ways to authentically gain children's assent to the research process. In the case of Nah and Lee (2016), the means for gaining children's assent (the post-it note) was created by the children themselves. This presents another opportunity for the children to be authentically involved in the research process by determining how they will give their assent to participate in the research process, as well as when and how they will participate in research activities.

Working with Teachers and Families: Creating a Culture of Co-Research

Research with children does not occur in a vacuum. In each of the studies included in this review, teachers and/or families were actively involved in the research process. As noted above, this can pose challenges as the dominant culture does not typically support young children's agency. Nah and Lee (2016) noted that researchers must both acknowledge this dynamic and actively work to "establish an inclusive participatory climate…creating a new way of viewing the relationship among researchers, educators, children, and staff members" (p. 348). While this work of culture building may seem tangential to the research process, it appears essential to ensure adults involved are equipped to support and respect children's active engagement in the research process.

Conclusion

This systematic literature review explored theoretical and methodological approaches, the role of the child and researcher, as well as challenges regarding conducting research with and by children. Researchers endeavoring to conduct research with and by children ought to deeply consider their role in the research project, examine and account for their positional power, and work with the other adults involved in the project to ensure children's agency can be enacted. Eight years after Green's (2015) review, examples of research *by* children are few, particularly in early childhood. While some promising examples exist (Nah & Lee, 2016; Green, 2017), the field of Environmental Education has not realized the potential identified by Barratt Hacking et al. (2013) for engaging children as active researchers. Much more work and research are needed that authentically includes children in every phase of the research process.

If we take seriously children's agency and internationally affirmed rights, we must move beyond research *on* children to authentic research with and by children that prioritizes children's participation and perspectives in every phase of the research process. Merely naming children's right to participation is not enough. Theoretical presuppositions must be embodied throughout the entirety of the research process for children's perspectives to come forward and their capabilities as co-researchers and change agents realized and respected.

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Appendix A: Summary Table

Authors & Year	Age Group	Country	Theoretical Foundation(s)	Methodological Approach	Method	Role of Child	Role of Researcher
Postila (2022)	3-5	Sweden	Post Humanist New Materialist Situated Knowledges Slow Science Relational Ontology Explorative Pedagogy	Multidisciplinary	Storytelling Children's Diaries Photography	Participated in issue selection and documentation.	Creating the conditions for children's active participation. Posing questions, documentation, synthesizing learning.
Williams & McEwen (2021)	7-9	United Kingdom	Children's Social Capital	Participatory Child Led Approach. Guided by Greig, Taylor, and MacKay (2012) and Davis (2015)	Group Discussion	Participated in the child-led, researcher facilitated discussions	Building rapport with the children, facilitating discussions. Project design, data collection & analysis.
Nordén & Avery (2020)	3-5	Sweden	New Sociology of Childhood	Participatory Action Research (Kemmis 2009; Kemmis et al. 2014).)	Photography Informal Conversations with children Group Discussions Interviews with Teachers Participant Observation	Participation in children's council (group discussions) and project implementations.	Navigated tension between positioning as expert, facilitator, and equal participant in the project.
Moore et al. (2019)	4-5	Australia	Huzinga theory of play and place New Sociology of Childhood UN Convention on the Rights of the Child	Comparative Case Study Mosaic Approach	Conversational Storytelling Drawing Site Tours Photography Artefact collection Map Making Wishing Stones	Participated in data collection	Led project design and analysis.
Postila (2019)	3-5	Sweden	Relational Ontology Situated Knowledge	"Pedagogical Working Methods"	Photography Drawing Field Notes	Participate in data collection, make decisions regarding	Decide with children what data sources to save or delete.

						what data sources to delete or save and which data to include in dissemination.	Facilitate research process, make space to follow children's interests and inquiries. Led analysis.
Green (2017)	3-6	United States	New Sociology of Childhood UN Convention on the Rights of the Child	Participatory Phenomenology	GoPro Cameras Creating Art Role Play Making Models Sensory Tours	Selected topic for investigation, selected data collection methods, participated in data collection, participated in data analysis through group discussion, shared findings with family members	Supported research process that made space for children's active engagement, prepared relevant materials given the children's decisions.
Harwood & Collier (2017)	Preschool	Canada	New Materialist Post Humanist Common Worlds	Mosaic approach (Clark & Moss, 2001)	Go Pro Cameras Photos Educator Journals Researcher notes Surveys Conversational Interviews	Documented their experiences with Go Pros and iPad. Directed researchers in what they could or could not document.	Led research design and implementation.
Haywood-Bird (2017)	2.5-5	United States	Post Marxist Critical Theory Constructivist	Ethnography with a critical lens	Participant Observation Field Notes Interviews with Families	Directed researcher away from their play when they did not want to engage.	Utilized noninvasive fieldwork to respect children's agency. Led research design and implementation.
Williams et al. (2019)	7-9	United Kingdom	New Sociology of Childhood Experiential Learning Active Learning Theory Transformative Learning Theory Social Cognitive Theory Framework for Significant Learning	Participatory Methodological Approach using Shier's (2001) 5 Stage Method	Intervention activity (making a flood box), interviews with children, interviews with families.	Participated in intervention and interview	Designed and led research project.

Green (2016)	3-6	United States	UN Convention on the Rights of the Child New Sociology of Childhood	Phenomenology	GoPro Camera, Sensory Tours, Video-stimulated recall discussions	Decide how, if and when to participate in data collection. Interpreted their experiences through group discussions.	Identified felt were relevant video clips to bring to the children for discussion. Facilitated discussion amongst the children.
Nah & Lee (2016)	5-6	South Korea	New Sociology of Childhood Social constructivist	Action Research with flexible, open-ended design	Photography, Field Trips, Drawing, Informal Writing, Child-led interviews, Educator-led interviews, Circle Time Discussions.	Children involved in issue selection (outdoor play space) and project management; children led theme development, investigation, and application phases of project	Committed facilitator and co-participant. Secured resources, supported children's agency and ensured a democratic process.

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Slowing down, caring deeply, trusting children: An ethnographic study of Forest School practice

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ABSTRACT

Forest School is an experiential, nature-based educational approach that often evolves as it takes root in new cultural and ecological settings. This ethnographic study explores how one Forest School in the Southeast United States interprets and enacts the Forest School model within its local context. Drawing on participant observations, interviews, field notes, and photography, we examine the lived experiences of the Forest School community to understand how cultural practices shape daily life at the school. Three central themes emerged: (1) slowing down to deepen learning and connections, (2) supporting the whole child through individualized care, and (3) trusting students with independence and responsibility. These findings reflect a nuanced and place-responsive interpretation of Forest School, foregrounding practices such as slow learning and authentic care that are often implicit but underexplored in the literature. This study contributes to the global conversation on Forest School by highlighting the importance of contextually grounded adaptations and offering insights for educators and policymakers seeking to preserve its transformative potential.

***Keywords*:** Forest School, ethnography, early childhood education, slow learning, holistic development, place-based education

Forest School, a nature-based early childhood educational approach rooted in experiential learning in outdoor settings, has witnessed a surge in global popularity in recent years (Harris, 2022). As it expands into diverse cultural and ecological contexts, however, Forest School faces critical tensions that challenge its core values (Knight et al., 2023). Among these is the risk of its transformation into a standardized, commercialized product, which could compromise its integrity as a context-responsive pedagogy (England et al., 2024; Christiansen et al., 2018). These concerns are particularly pertinent as government agencies and formal education systems increasingly seek to regulate or formalize Forest School programming.

To preserve Forest School's transformative potential, it is essential to recognize that its philosophy cannot remain static as it takes root in new settings. Instead, localized adaptations shaped by cultural values, ecological features, and community needs are not only inevitable but necessary for its meaningful implementation (Leather, 2018; O'Brien, 2022). This ethnographic study specifically examined a Forest School in the Southeast United States that served children aged 3 to 12, providing repeated opportunities for child-led, nature-based learning experiences.

Ethnography was an appropriate approach because it allows for in-depth exploration of how participants experience, interpret, and enact Forest School within their local cultural and ecological context, providing a nuanced understanding of its place-based implementation.

Literature Review

Our study is framed by the literature related to the contextual nature of Forest School, its historical and theoretical foundations, and why it is seen as a beneficial schooling model. This literature is explored below.

Forest School in Context

There is not one clear definition of Forest School as it has shifted and developed within different geographical and cultural contexts, underscoring its responsiveness to *place* (Dabaja, 2022b; Elliot & Krusekopf, 2017). In essence, Forest School is an outdoor educational experience for children conducted in woodlands or other natural environments with trees, emphasizing exploration, play, and learning in a forested setting (Tiplady & Menter, 2020). The literature further indicates that Forest School involves regular visits to a natural space, child-led explorations, and opportunities for emerging inquiry (Dabaja, 2022b; Mackinder, 2024; O'Brien, 2022). Morgan (2018) suggests that "forest" is one of the key defining features of Forest School, meaning it should be in a woodland or wild setting rather than a contrived location.

The term *Forest School* varies geographically, commonly referred to as "Bush Kinder" in Australia and "Forest Kindergarten" in certain European countries (England et al., 2024). In the United States, the location of this ethnographic study, there are a variety of terms and definitions related to early years outdoor programs, including "Nature Preschool," "Nature Kindergarten," and "Nature-Based Kindergarten" (Dean, 2019; Larimore, 2016). And while there are similarities between these programs, Forest School remains distinct due to both the underlying philosophy and the lack of an indoor facility or established curricula (Sobel, 2014). In the U.S., individual state requirements regarding health and safety for preschool programs also delineate a nature preschool from a "grittier, wilder" Forest School (Sobel, 2014, p. 232). Yet some scholars have argued that Forest School within the United States has taken on distinct components of the culture, including hyper-individualism and overt litigation concerns (O'Brien, 2022). Compared to its U.K. and Canadian counterparts, there is limited research within the United States on Forest Schools (Dean, 2019). This is likely due, in part, to Forest Schools not yet being widespread in the United States, although their numbers have steadily increased in recent years (NAAEE, 2023).

In some comparative studies, scholars have found that the underlying cultural context can influence the implementation of a Forest School program (e.g., Mackinder, 2024). This highlights the importance of understanding Forest Schools as a phenomenon that is shaped by country-specific cultural and educational contexts. Because Forest School practices must be contextually adapted to local cultures and environments (Lloyd et al., 2018; Wahab et al., 2020), exploring the nuances of a Forest School situated in the southeast region of the United States can contribute to the literature. Even Forest Schools within the same country but different regions can have a variety of approaches, highlighting how programs can fluctuate given the unique context (Speldewinde et al., 2021). Thus, this ethnographic study is timely and important given that Forest School is not simply a "drag-and-drop" approach that can be directly translated into a new country or region while negating the unique cultural context (Lloyd et al., 2018).

Historical and Theoretical Foundations

Examining the theoretical underpinnings that guide Forest School's ethos can shed light on understanding its historical foundations. Forest School's detailed history is complex, and entire scholarly works have been dedicated to exploring its development in different parts of the world (e.g. Cree & McCree, 2012; Dean et al., 2019). For this ethnographic study, we offer a brief overview of Forest School's history, highlighting its development as a pedagogical practice *and* an ethos towards learning (Power et al., 2015).

Forest School has its roots in Scandinavia, emerging during the middle part of the 20th century as firmly rooted within the culture of the region (Dean, 2019; Williams-Siegfredsen, 2012). The Scandinavian term *friluftsliv* literally

translates to “free air life,” and describes a lifestyle characterized by the freedom *of* nature as well as the freedom *in* nature (Gurholt, 2014; Knight, 2023). *Friluftsliv* as a cultural construct is at the heart of Forest School, including ideas about recurring time outside, connection to place, and a respect towards nature (Knight, 2023). Thus, in Scandinavia, there is a sense of cultural continuity between Forest School as a practice and *friluftsliv*, the underlying philosophy. Some scholars also posit that the ethos of Forest School has its roots in Froebel’s Kindergarten and Soerensen’s play-based preparatory schools, both which emphasize holistic, child-led learning (Dabaja, 2022b; Knight et al., 2023). After being established in Scandinavia, Forest School spread to other parts of the world and has recently grown exponentially in popularity (Cudworth & Lumber, 2021; North American Association for Environmental Education, 2023).

Benefits of Forest School

Forest School has a wide range of benefits that are holistic in nature, contributing towards the *whole* child’s development as they play and learn outdoors (Sella et al., 2023). Many of these benefits align with similar research related to time spent outdoors or nature-based learning in more formal settings (e. g. Kuo et al., 2019; Mann et al., 2022; Marchant et al., 2019). Forest School supports the social and emotional development of children, having a positive effect on their mood, self-esteem, and even behavior (Dabaja, 2022a; Hepworth et al., 2024). There are also positive cognitive outcomes such as improved concentration and an increase in creativity (Boileau & Dabaja, 2020; Sella et al., 2023). Another important benefit of Forest School is the impact on a child’s connection to nature and, subsequently, pro-environmental attitudes and behavior (Harris, 2021; Smith et al., 2018). A great deal of the literature reflects the significance of sense of place and belonging as it relates to a child’s connection to the natural world (Cumming & Nash, 2015; Dabaja, 2022a). It is important to note that the holistic nature of Forest School’s benefits apply to diverse settings and to diverse groups of students. For example, some studies have examined the Forest School experiences of students with autism, highlighting the importance of outdoor play in contributing towards social and practical skills (Bradley & Male, 2017; Friedman et al., 2024). Another study looked more broadly at students with special education needs and determined that Forest School had a positive effect on their self-regulation and social development (McCree et al., 2018).

Another clear benefit of Forest School is the way in which it supports a child’s physical development, such as physical endurance, gross and fine motor skills, (Dabaja, 2022b), and immunity (Michek et al., 2015). Coinciding with the physical benefits of Forest School is the construct of risky play. Some scholars argue that risky play is integral to Forest School as it is a critical component of play pedagogy (Knight et al., 2023). Others suggest that Forest School can be an effective place to explore concepts of risk (Harper, 2017) since it can support the development of a child’s risk management skills (Dabaja, 2022a). There are tensions, however, between healthy risk taking in Forest School and cultural risk aversion that is common with educational settings (Connolly & Haughton, 2017).

Despite the extensive literature on Forest School’s history, philosophy, and benefits, less is known about how these principles are enacted and experienced within specific, localized communities. Exploring these lived experiences can provide insight into the cultural practices that shape teaching and learning in a Forest School context. The research question that guided our inquiry was: *What are the lived experiences of the Ridgeline Forest School community and how are these reflective of their cultural practices?*

Methodology

Acting as the foundation to our ethnographic study, an interpretivist theoretical framework emphasizes human experience occurs through a socially constructed nature of reality that research can seek to understand (Willis, 2007). As interpretivists, we recognize the subjective nature of the social world and seek to contextualize knowledge by understanding human actions (Johnson & Parry, 2022). Forest School is inherently a social world of people with shared meanings (see Goldkuhl, 2012), so our goal was to understand *one* Forest School as cultural phenomena, exploring the processes and patterned realities of the community (Rose, 2022). There has been a call to develop theoretical frameworks for Forest School (Leather, 2018), and some scholars have developed context-specific ones for distinct geographical and cultural settings (e.g. Barrable & Arvantis, 2018; Knight et al., 2023; Sharma-Brymer et al., 2018). We recognize that an interpretivist theoretical framework is very general in nature, but Forest Schools

within the United States are underexplored, and thus, require a broad paradigm through which to engage in inquiry. We turn now to the specifics of our research design, outlining our ethnographic approach, the participants and site, data sources, analysis steps, and then the ways in which we attended to ethics throughout the work.

Ethnographic Approach

"If education is always risky, always unsettling, then ethnography is the perfect method to capture its dynamism and power." (Mills & Morton, 2013, p. 1).

Many definitions and conceptualization of ethnography have emerged in recent years that overlap with other qualitative inquiry approaches, resulting in ambiguity and controversy surrounding the term (Gobo, 2011; Pole & Morrison, 2003). Some scholars argue that the multiple conceptualizations of *ethnography* are problematic given the discrepancies between underlying philosophical ideas, such as the desire for generalizable findings which is rampant in education settings (Hammersley, 2018). For the purpose of this inquiry, we adopt Brewer's (2003) definition, each feature of which is described in more detail below when we elaborate on our method specifics:

> Ethnography can be defined as the study of people in naturally occurring settings or 'fields' by means of methods which capture their social meanings and ordinary activities, involving the researcher participating directly in the setting (if not always the activities) in order to collect data in a systematic manner, but without meaning being imposed on them externally. (p. 312)

In early childhood education, ethnographic research offers a unique lens through which to understand the mechanisms of sociocultural events, enabling the collection of detailed, in-depth descriptions of everyday interactions since the research is *in context* (Flewitt & Ang, 2020). Within nature-based learning settings, such as Forest School, ethnography can create opportunities for the researcher to situate themselves within the inquiry and deeply explore phenomena as an individual and community process (Speldewinde et al., 2021). Furthermore, for the majority of the public, particularly in the United States, Forest School remains an unknown and "hidden" construct; ethnographic inquiry can generate meaningful and rich insights so as to inform the broader educational community (see Reeves et al., 2008). Because ethnography is focused on learning *about* people by describing and explaining a culture through holistic insights (Hammersley, 2018; Jones & Smith, 2018), it aligns well with our interpretivist framework which acknowledges and celebrates the complexity of social realities of a community.

As researchers, we bring our own experiences, values, and familiarity with outdoor learning and early childhood education to this ethnographic study, which informs our observations, interpretations, and interactions with participants. Authors 1 and 3 are university professors who partnered with a local Forest School to explore its cultural practices. Author 2, a PhD student and full-time public-school teacher, joined the study to investigate this phenomenon from a practitioner's perspective. We recognize that our positionality shapes the questions we ask, the aspects of the setting we attend to, and the interpretations we draw from the data.

Participants and Site

Due to the contextual nature of Forest School (Lloyd et al., 2018; Wahab et al., 2020), it is important that the setting and background be described in detail so as to shed light on the geographic and cultural nuances. Furthermore "place and space matter" within educational ethnography reflects the cultural and social components of learning, including processes and community perspectives (Hopson, 2017).

Ridgeline Forest School (pseudonym) is an independent program situated in the Southeast United States. It is located a little over ten miles from a small suburban community outside of a mid-sized city. Ridgeline leases the land from a private owner to use for Forest School, and the teachers and students have access to a diverse selection of areas on the campus. These outdoor spaces include: an open grassy area, meadow, ravines, lakes, creeks, and several acres of woodland with trails. The forested regions are home to a variety of mature trees and species of flora and fauna endemic to the region. Ridgeline's program takes place entirely outdoors, with one composting toilet and a simple open-sided structure to use only in case of severe weather.

The program itself runs Monday through Friday, with some weekend options for older students throughout the year. Ridgeline is open to children ages three to 12, with intermittent programming offered to adolescents. There are three different "classes," each with two teachers and grouped within age bands: ages 3–4 (10–12 students per group), ages 5–7 (12–20 students per group), and ages 8–12 (12 students per group). Most children attend twice a week, but families can choose the schedule and frequency that works best for them. In total, 182 individual students participate in the program across the year. School-aged children are typically homeschooled, as Ridgeline is not part of the local formal school system. All instructors have a background in education or outdoor education, and nine instructors currently make up the staff at this location. Like many independent programs in the United States, Ridgeline is not publicly funded, so families pay a fee for attendance, with subsidized options available to those in need.

The students and teachers who attend Ridgeline Forest School are referred to by their *forest name,* a self-chosen title that relates to something nature-based or whimsical. Thus, the pseudonyms used in our study reflect this vital component of Ridgeline's culture. Students can change their forest name when they wish and new students or teachers join each year, so any overlap between the pseudonyms and real-world forest names is coincidental. Table 1 illustrates Ridgeline Forest School's staff who were a key part of this ethnography.

Table 1
Ridgeline Forest School's Staff

Name (Pseudonym)	Role
Ms. Sage	Founder and leader
Mr. Coppice	On-site leader and head teacher
Ms. Stratus	Teacher and parent
Ms. Gneiss	Teacher and parent
Ms. Mushroom	Teacher and parent

We also observed and talked to many students and families during this study, so these voices will be included as part of the greater narrative in the findings.

Data Sources

Since ethnography is a holistic approach to studying holistic cultural systems (Whitehead, 2005), it was important for us to dive deeply into truly knowing Ridgeline and its community by becoming intimate with its people, its practices, and its culture. For this reason, we collected a variety of data in hopes of painting a rich picture of Ridgeline and what it is like for parents, teachers, and students to be part of this Forest School.

Participant Observation

Because a key component of ethnographic inquiry is the researcher's direct involvement in the people and place which they are studying (Reeves et al., 2008), our Ridgeline observations were a foundational data source. These observations included using multiple senses to observe both the physical environment itself, the outdoor space, as well as the interactions of the people within that space (Whitehead, 2005). To be clear, we did not look for any pedagogical strategies or particular actions; rather, we sought to better understand the daily cultural practices of Ridgeline. We took on the role as participant-as-observer, meaning that we intentionally integrated into the setting, but our presence and role were openly recognized (Jones & Smith, 2018). For example, we sought to not interrupt the regular rhythms of Ridgeline, but the teachers would frequently interact with us during transitions *or* the

students would invite us to participate in their play or learning. Author 1 was even invited to choose a forest name, an honor that highlighted the positive relationship she had developed with the community.

There were six visits total, with each visit lasting between two and four hours. The first site visit to Ridgeline took place in October of 2023, and the final visit for this formal inquiry was in May 2025. This adheres to suggestions that ethnography emerges from spending a significant amount of time with people to gain an insider – *emic* – perspective (Merriam & Tisdell, 2016).

Semi-structured Interviews

In ethnographic research, semi-structured interviews are open-ended and seek to elicit descriptive responses from an *emic* perspective (Whitehead, 2005). We interviewed a total of 14 participants, including nine parents and five Ridgeline teachers or leaders (some of whom were also parents of children at Ridgeline). Two parent participants chose to be interviewed together.

Semi-structured interviews are guides for interviewers in terms of focusing on a set of common topics for multiple participants while allowing for the interviewer to follow up or asking probing questions (Roulston, 2010). While interviewing teachers, the questions focused on the day-to-day activities of Ridgeline, their personal experiences and feelings as a teacher at Ridgeline, and the work of teaching at Ridgeline. Parents' interview questions were focused on their child's/children's experiences at Ridgeline and their thoughts and feelings about their family being a part of the Ridgeline community. Interviews lasted from 23-61 minutes each, with the majority lasting 30-40 minutes. All interviews were conducted online via Zoom and after allowing Zoom to take a first pass to transcribe the interview, the third author then reviewed the interview and transcript to make any corrections.

Photography

There is a long history – over 200 years – of photography supporting ethnographic studies in anthropology and sociology (Ball & Smith, 2012). As Liebenberg (2009) noted, "...images can serve as signifiers of culture, highlighting values and expectations of individuals as well as groups. Research incorporating images can therefore provide important information regarding the cultural reality of the community studied" (p. 444). Taking this to heart, each time we visited Ridgeline, we took pictures of students, surroundings, and artifacts in an attempt to better understand the culture of the school. In total, we took 316 pictures while at Ridgeline.

Field Notes

In ethnographic research, field notes go beyond the observations recorded as a key data source and include the thoughts, feelings, and experiences of the researcher (Rose, 2022). They serve as both a data source as well as a component of the data analysis since they highlight the iterative nature of the inquiry and our own interpretations that shifted and evolved (see Whitehead, 2005). During our long-term engagement with Ridgeline's community and the aforementioned data sources, it was important for us to engage in reflexivity by recording our reactions as scholars in a way that was both descriptive and systematic (see Reeves et al., 2008). After each visit to Ridgeline or interview with a community member, the research team would record field notes, using rich descriptions to accompany the other types of data. These field notes were an invaluable component, contributing to "the depth and insight of [our] ethnographic research project" (Rose, 2022, p. 132).

Analysis Steps

Pole and Morrison's (2003) text entitled *Ethnography for Education* acted as the foundation for the various components of our analysis, yet each step was also informed by other ethnographers and qualitative scholars. The data analysis process was iterative, as is common in ethnographic inquiry; data collection and analysis occurred simultaneously, with each informing the other (Rose, 2022).

"Bringing Order"

The first analysis step involved "bringing order" to the data, meaning we organized it into broad categories, finding general patterns after a few interviews and participant observations had been conducted (Pole & Morrison, 2003, p. 78). Because ethnography is an emergent form of inquiry, there are often newly discovered phenomena that appear during the initial analysis process (Whitehead, 2005). We found it helpful to use Spradley's (1980) descriptive framework to organize our participant observations and field notes. Spradley's framework suggests that ethnographers consider nine categories when examining phenomena in the field: actors, acts, activities, events, space, objects, time, goals, and emotions. These nine categories provided a way to bring order to our raw data, serving as a framework for organizing field notes and observations after each on-site visit was complete. For example, we recorded activities such as stick collecting or rolling down a hill and later entered these notes into the table, categorizing them within Spradley's framework.

"Moving Backwards and Forwards"

After bringing order to the data, we began to categorize the data in a more nuanced way by further sorting the entire dataset systematically. This required "moving backwards and forwards through the data" as we grouped broad ideas into more nuanced categories that would later be interpreted (Pole & Morrison, 2003, p. 82). We looked at all that we had learned about the Ridgeline community and culture as sorted into Spradley's categories and then established subcategories through which to sort our observations, transcriptions, and photos (Whitehead, 2005). For instance, within Spradley's category of "time," we recorded the observation: *teacher gives students an extra five minutes for snack since they were distracted by bug watching*. This observation was later grouped under the subcategory of "slow learning," an early pattern that emerged as we worked with the dataset and refined our categories.

"Establish Connections"

This analysis step was conducted near the end of our data collection at Ridgeline and involved "establish[ing] connections" between and across the categories we developed in the previous step (Pole & Morrison, 2003, p. 93). Maxwell & Chmiel (2014) detail the ways that qualitative researchers can look at relationships between categories, noting their similarities-differences, cause-and-effect, or sequential nature. Our approach, however, was not guided by existing literature but was instead emergent, grounded in the data itself. The research team considered various ways to connect ideas, using a simple paper-pencil approach to visually document these connections. Specifically, we looked for overlap among subcategories across all data sources collected throughout the year. We met together to discuss these overlapping ideas, and revisited the data multiple times as we developed the themes. The end result was a typology unique to Ridgeline yet most likely transferable to other Forest School contexts within the United States and beyond.

"Describe and Explain"

Part of our final step involved including vignettes as a literary genre within ethnography, bringing to life our own interpretation of the Ridgeline community through descriptive retellings of what we observed (see Mills & Morton, 2013). We "describe[d] and explain[ed]" our observations using a narrative style while also highlighting key connections established as we developed connections in the previous analysis step (Pole & Morrison, 2003, p. 89). Writing up ethnographic findings involves both a description and interpretation, and the overall configuration of the writing contributes to effectively communicating to the reader (Merriam & Tisdell, 2016).

Attending to Ethics

Ethnographers must continually ask themselves "Is this ethical" as they engage relationally with participants and repeatedly manage ethics while in the field (Russell et al., 2022, p. 1). The unpredictability of working with and within a community led us towards regular reflexivity regarding our roles as researchers as well as the ways in which we could accurately and honorably represent Ridgeline. Our field notes were an opportunity to bring our own emotions,

interpretations, and thoughts to the data collection and analysis process as an act of reflexivity. For example, Author 1 wrote:

> I can't remember the last time I actually saw students competing in these kinds of games wherein there are clear winners and losers. The kids seem ok with losing! I am remembering my own experiences from childhood during which it was perfectly acceptable to lose at a track and field event or at a school-sanctioned game.

In writing this manuscript, we wrestled with the challenge of meaningfully representing our participants' narratives in a way that honored them and their community (see Rose, 2022). It is our hope that we were (and still are) relational and respectful in past, present, and future acts by attending to ethics throughout the entire ethnographic process.

Findings

Throughout the data analysis process, there were many patterns that emerged, yet three themes were salient throughout, effectively responding to our ethnographic research question: *What are the lived experiences of the Ridgeline Forest School community and how are these reflective of their cultural practices?* We introduce each theme with a descriptive vignette based on our observations at Ridgeline and then expand on each theme by offering sample quotes from participants as well as a general synthesis across all the data.

Theme 1: Slowing Down to Deepen Learning and Connections

A group of students approaches a steep hill that slopes down towards the small shelter overlooking the lake. The hill is riddled with tree roots, slick mud, and a myriad of other obstacles that could prove daunting for 3- to 5-year-olds. Slowly, the students begin to descend, with the teachers dispersing along the hill to observe. There is no handholding or carrying, however, as the students are expected to figure out on their own how to safely navigate down this obstacle. Some students let muscle memory take over, and steadily shimmy down, moving feet-first. Others are more

> *cautious, grabbing onto knobby roots as they let their body slide one hurdle over the other. A three-year-old boy is last to go, and Ms. Gneiss gently encourages him, "Do you see what your friends are doing? Look at how they are getting down." Slowly and carefully, the boy turns around, copying his slightly older peers. Minutes pass, and, although he is making headway, it is at a very leisurely pace. Ms. Gneiss watches, and makes her way down beside the boy, gifting him with the time to figure out this challenge on his own, only interfering with encouraging words rather than physical support. At last, the whole group reaches the bottom of the steep hill which intersects with a gently sloping paved trail. There was an easier way to the bottom that would have been quicker for the group of young students, but time was afforded for this more complex journey and the self-confidence it instilled.*

Taking the more difficult, challenging route with a group of children may seem like a lesson in patience for teachers, but this is a common occurrence at Ridgeline. Time is valued by the community as a tool for deeper, more meaningful engagement with nature rather than something to race against. At Ridgeline, there is an intentional slower pace that creates opportunities for students to be present in their learning and their relationships.

> *Ridgeline gives Acorn the amount of freedom that he needs and space he needs to just adjust himself internally.* (Liora, parent)

Many parents commented on how Ridgeline teachers give students the freedom to develop at a pace that is just-right for them, recognizing that all children are different and don't typically benefit from a fast-paced learning environment. At Ridgeline, the value and practice of slowing down is woven into daily activities across all age levels - whether it's allowing students the time to struggle and succeed in building a fire, pausing a hike to explore a spontaneous natural phenomenon, or creating ample opportunities for unstructured play in the woods. There is also time for meaningful rituals; meditation and reflection can happen when time isn't crammed or overly structured. Mr. Coppice, Ridgeline's lead teacher, describes how he intentionally seeks to create opportunities for students to slow down and learn about nature in a meaningful way.

> *Okay, let's sit down first, and let's all be silent for like a minute. Let's be silent for a few moments and listen to the water. And everybody's completely silent, completely focused, 12 kids, you know, completely silent, completely focused, completely concentrated listening to it.* (Mr. Coppice, teacher)

Mr. Coppice's narrative highlights that, while there are weekly themes and goals for learning at Ridgeline, there is not a frenetic pace towards that objective but a meandering approach that fosters a love of nature through slow learning. This might be the daily ritual of starting together in a circle to consider the day ahead or it may be more significant, such as when students do their "solo time" in the woods at the end of the year. Oftentimes, meaningful thought occurs when there is simply a slower pace to activities that fosters students' ability to connect with nature and reflect on that process.

> *I think [Ridgeline] has impacted them to be more self aware in nature. It's opened their eyes to what nature has to offer on a different level. It impacts them, just in terms of overall confidence in nature, but also joy in nature. And I think it has increased their excitement of learning.* (Connor, parent)

The lived experiences of students at Ridgeline is one of deep, meaningful learning that is slower paced and deliberate. As a cultural practice, slow learning is intentional and often manifested through reflective routines or joyful leisurely explorations of the natural world. Lexi, a parent, describes what it's like at the end of the day when she sometimes has to wait for her child to return from the woods to the meet-up area.

> *And then they'll come up the hill, and we're like, "Oh, there they are." Man, I just love that. Like focus on enjoying and like observing nature and being in nature, where they kind of lose track of time sometimes. I think that that's just unique in our society to allow kids to do that.* (Elle, parent)

Theme 2: Supporting the Whole Child Through Individualized Care

> *Without thinking, the young boy hurled the rock at his best friend, flinging it through the air in an impulsive act. He is the only one who sees the rock hit Orion in the side of the head. It looks like it actually hurt a lot, but Orion keeps on playing in the rain, most likely irked that the rock had interrupted his play. Moments later, the young boy sees blood flowing down Orion's temple, and the teacher also notices, taking action to inspect the wound. The injury isn't severe and will heal quickly, but it is clear that someone acted unsafely by throwing a rock in the first place. Safety at Ridgeline is important, and the boy is uncertain how he will be punished. Will they allow this transgression to slide? Will he be kicked out of Forest School forever?*

The above vignette summarizes a story from Shay's interview, the parent of the boy who was hit in the head with a rock. She used the phrase "a beautiful experience" to describe the incident, particularly in how it was handled by Ridgeline teachers in a way that honored both students' emotions and provided individualized attention to remedy the situation. Shay outlines how the teachers handled the student who threw the rock in a way that was kind, just, and restorative.

> *Mr. Coppice was like, "You know what, I think you need to take a break from Forest School. You can't come back for two weeks. And I'd really like you to either make him some art or write him a letter and tell him that you're sorry, or express your feelings." He didn't say that he had to say he was sorry. And this little boy genuinely experienced remorse. He ended up painting, like two pictures for Orion, one of them was them playing together. And he articulated, he wrote a letter, - his mom wrote it for him - saying that he was sorry, and that he couldn't wait to come back and play with him. And to this day, they're still like best friends.* (Shay, parent)

A core value of Ridgeline Forest School is supporting students holistically, and this is seen in the cultural practice of teaching children by attending to who they are emotionally, socially, and developmentally. As in Shay's story with her son Orion, the community of teachers recognizes that emotions are complex and that creating space for emotional expression is a valuable part of the Forest school experience. Other parents within the community acknowledge how Ridgeline teachers support the whole child, particularly when it comes to relationships and social-emotional growth.

> *I think that the way the teachers facilitate that and lead the group and manage those group dynamics is really important. Like, it's really formative for [Name] and how he's learning how to be social, both with his peers and with the younger kids and with his teachers. So it's really important to me that he has healthy relationships going on there because it is, like, one of the only consistent social things that he does.* (Luma, parent)

Each Forest School student is different, and educating the whole child involves responding to each individual in a way that fosters mutual respect. Holistic education is a cultural practice at Ridgeline and one that is manifest through the lived experiences of students as they receive personalized care.

> …*Self-exploration, learning things about themselves, learning things about their community, about others around them, it is such a holistic experience of just goodness and joy. Yeah, it's just so positive.* (Nenna, parent)

Parents, like Nenna, recognize this cultural practice of the Ridgeline community and the ways in which teachers attend to a child's wellbeing in many ways. Students are simply *happy* at Forest School, and this is largely due to the ways in which Ridgeline teachers support the whole child by curating opportunities for social-emotional health and celebrating student interests.

One of the ways in which students receive individualized care and support at Forest School is through recognizing their achievements and growth in a holistic way. The community uses journey sticks to mark growth in twelve different areas. Ms. Sage, the founder of Ridgeline, explains the system:

> *The children get bands of different colors based on their growth. And everybody's growing at different rates, and so the growth is not like linear where everybody gets the same checks to get a band. No, each child individually is showing where they're growing in a specific area, and it can be something really simple, or it can be something really big. It's shown like, "Oh, that was an aha moment today. Here's a green band, because you identified plantain for the first time on our nature walk, and you were really excited about that so you're going to get a band today for that."* (Ms. Sage, founder)

Whether it's facilitating restoration when a child makes a poor decision or giving students the option of walking barefoot in the forest, Ridgeline values the individual child and his/her experiences. Teachers articulate and exemplify the importance of individualized care, and parents report improved moods and well-being in their children. At Ridgeline, students aren't just "managed", they are respected, taught, and celebrated as unique individuals.

Theme 3: Trusting Students with Independence and Responsibility

Goldenwing, a six-year-old, sits crisscross a few feet away from the smoldering fire, elbows on his knees. In his left hand, he holds a stick that's about 10 inches long and relatively "green". In Goldenwing's right hand, he holds a very *sharp whittling knife. Slowly but confidently, the young child begins creating small strips or curls from the stick, holding the knife at a precise angle and firmly pushing away from his body. He is focused and intent on practicing his whittling skills, an optional activity during this chilly winter day. A Forest School friend approaches to ask a question, and Goldenwing immediately (but conscientiously) puts his sharp knife back in its sheath. An*

> *important whittling rule for these children is to always put the knife away when shifting attention so that distractions don't lead to fatalities. There is also a safety zone that children honor when someone has the whittling knife out, known as the "Blood Circle." The teacher, Ms. Stratus, is nearby, helping a handful of interested students find appropriate wood to whittle and hone their skills. Once everyone is settled, Ms. Stratus sits crisscross herself and gets out her whittling knife, ready for the rhythmic task of creating strips of wood from her chosen stick.*

Ridgeline Forest School seeks to build confident children by letting young people do hard, real, meaningful things. A key part of the culture is the idea that children are capable of many things which oftentimes manifests when teachers curate opportunities for student-led activities and step back to let young learners run the show. In the case of whittling, an adult is always nearby, but young children are trusted with very sharp knives because they are capable of being responsible with such instruments.

Ridgeline teachers explained the importance of supporting student autonomy by encouraging children to consistently be self-starters and to work towards completing tasks independently. This could be as simple as putting on their own socks, asking a peer for help in moving a log, or by remembering to collect their own tinder. Parents contribute to the cultural practice of empowering students as competent individuals, as described by Ms. Mushroom, a Ridgeline teacher.

> *That's kind of how the parents participate, by helping toward independence. Like the more you can support your kid to be independent and okay with stuff, the better.* (Ms. Mushroom, teacher/parent)

A key part of this push for independence involves trusting that students can adapt to changing environments. Ridgeline is geographically located in a place that has a wide range of temperature, rainfall, and, during the years of field site visits, high winds. As researchers, we watched students have a solo meditation moment in pouring rain sitting completely still without complaining. We also observed very young children spend all morning outside in 28 degrees Fahrenheit, using a myriad of strategies to keep their hands and bodies warm. Simply being outside all day at Ridgeline Forest School exposes children to challenging conditions as they adapt to the ever-changing outdoors, giving them practice in successfully adjusting to other variable environments.

> *Kids are being out there and getting to know their bodies and their limits. I just think it's invaluable.* (Elowen, parent)

Other parents echoed Elowen's narrative regarding the benefits of Ridgeline, stating that exposing children to the outdoors as much as possible contributes to their health and wellbeing. Yet this appears to be mediated by a child's own sense of independence and the opportunities they leverage to be responsible for themselves or others.

> *It's impacted my kids' ability to adapt to different environmental changes. And it's encouraged them, it's helped them see that they can do more maybe than they thought they could do. And I think it's also given me a lot of comfort knowing that they feel comfortable in different outdoor environments.* (Liora, parent)

This idea of independence is also woven into the cultural practice at Ridgeline of moving from novice to expert. The curriculum leans heavily on survival skills, and students are trusted to develop their skills through activities like fire building, foraging, whittling, shelter-building, water purification, and others. Ridgeline teachers are the responsible adults, yes, but they also share this responsibility with the students in a way that fosters community and independence. Ms. Sage, the founder and leader, stated that primitive skill-building is a core part of Ridgeline's culture and that she hopes it trickles over to parents as well:

> *So the kids aren't only coming to Forest School to get this information, but maybe parents can also be educated as well. Maybe these are things like a family can feel they'll have the tools that they need to be able to go on a camping trip together with one another.* (Ms. Sage, founder)

Trusting students with independence and responsibility is a cultural practice of Ridgeline and embodies the lived experiences of this Forest School. This means that teachers allow students to fail, to learn from setbacks, and then succeed on their own efforts. Student-led learning geared towards practical skill development has produced a community of competent children who can do hard things.

> *Both my children gain confidence, just with the skills they learn. You know, they come home and are so proud of themselves.* (Raye, parent)

Discussion

This study sought to learn more about a particular Forest School – Ridgeline Forest School in the Southeast United States – using the guiding question, *What are the lived experiences of the Ridgeline Forest School community and how are these reflective of their cultural practices?* Here, we discuss our findings in light of the literature on Forest Schools more broadly.

Slowing Down to Deepen Learning and Connections

Ridgeline's culture was marked by a slowing down to allow students to focus on tasks and move at their own pace. 'Slow education' is a concept "used to describe an emerging philosophical movement and approach to teaching and learning which allows students to pursue their own interests, become absorbed in their work, care about it and reflect on it—all without the pressure of exams and targets" (Smith, 2017, p. 19). This idea arose in the U.K. in the 1980s, inspired by the slow food movement, and coined by Maurice Holt (2009). Several studies have shown the benefits of slow education or slow school, such as encouraging student self-reflection (Smith, 2017), increased

physical and social wellbeing, increased confidence for learning (McCree et al., 2018), and supports young children's individual developmental trajectories (Nault & Barette, 2020).

Consequently, the idea of slow education and 'slow schools' is not new; however, it is not an idea that has been readily taken up by schools in the U.S. The freedom for students to slow down and dig into their learning is therefore something rather particular to Ridgeline. As seen in the data, teachers at Ridgeline allow students to try things and learn at their own pace and take moments to enjoy the silence or task before them. While the concept of slow education and Forest Schools seemingly go hand in hand, what is surprising is that rarely is this mentioned in studies on Forest Schools. For example, the Forest School Association (FSA) in the U.K. shares six principles that are key to Forest Schools, but none mention a deliberate slowing down for learning. Rather, the principles refer vaguely to 'learner-centred processes' and the aim of supporting 'holistic development' for all learners (FSA, n.d.). Similarly, in McCree et al.'s (2018) study of a Forest School, they note that there is ample time for 'free social play' but do not mention a purposeful slowing down to connect nature and learning. We see this disconnect as an interesting tension, as slowing down is often implicit in Forest School philosophies and activities and yet it is not explicitly discussed. Parents and teachers at Ridgeline seemed to recognize the importance of moving at one's own pace and losing track of time; we would urge more studies related to Forest School to consider pacing and time as concepts of interest.

Supporting the Whole Child Through Individualized Care

The literature on Forest Schools widely recognizes holistic development as a key goal (e.g., Dabaja, 2022b; FSA, n.d.; Knight et al., 2023). Cudworth and Lumber (2021) note that Forest Schools offers a learning environment that supports, "a holistic development of the child, one where their personal growth, cognitive, social and emotional development can be nurtured through a connection with their wider environment and other people and other animals" (p. 81). Consequently, it is not surprising that supporting the whole child was a core piece of Ridgeline's culture.

What is noteworthy, however, is that Ridgeline also emphasized individualized attention and care. And while this is part and parcel of holistic education, again, it is not something explicitly mentioned in the literature on Forest Schools. For example, McCree et al. (2018) discuss a finding they call 'nurture' in which the teachers were meeting students' basic needs (warm clothes, warm drinks during the cold) and building trust through those actions, but they do not talk about care. In Noddings' (2012) discussion of care, she notes that carers (in this case, Ridgeline's teachers) are attentive to what the cared-for (a student) is experiencing and expresses as a need – not what the carer assumes is best for the cared-for. For this relationship to work in education, the teacher must establish a safe environment in which students can express their needs, must also be an intent listener, and possess a depth of knowledge and understanding about the topics at hand. Surely to be a competent Forest School teacher, one must care. However, the field would benefit from more focused and nuanced studies of care in the Forest School context.

Trusting Students with Independence and Responsibility

A final significant theme in Ridgeline's culture was that of allowing students to be independent and responsible for themselves. This is also a common theme in Forest School literature, accompanying or subsumed within the concept of holistic development of children. In a review of Forest School practices in Canada, Boileau and Dabaja's (2020) participants noted that benefits for students include independence, persistence, self-regulation, resiliency, self-reliance, and risk taking, all due to the structures inherent in Forest School. Cerino (2023) argues that for children to learn, they need freedom and independence to forge their own path at their own pace, but in a way that is supported by adults or teachers; this is certainly seen in the culture at Ridgeline. Further, as noted earlier, the notion of risky play and the ability to explore risk management is often integral to Forest Schools (Knight et al., 2023; Harper, 2017; Taylor, 2020).

In the vignette about the young boy whittling, the teacher had set up safety parameters (others staying out of the 'blood circle,' putting away the knife when talking with others, etc.), but did not micromanage the student. Rather, the boy was trusted to explore his abilities, manage risks, and move at his own pace. In the U.S. (and Canada), the notion of allowing for this level of independence and risk during schooling is often frowned upon due to the risk-

averse and highly litigious natures of these societies (Boileau & Dabaja, 2020; Connolly & Haughton, 2017; O'Brien, 2022). Consequently, the level of autonomy and responsibility seen at Ridgeline can be considered quite novel in terms of the typical education in these countries.

Summary of Themes

It is clear that these three themes (slowing down to deepen learning and connections, supporting the whole child through individualized care, and trusting students with independence and responsibility) are tightly intertwined. These themes emerged because teachers truly know their students, understand both their capabilities and what is developmentally appropriate, and consistently provide guidance for safety. Teachers are also comfortable with allowing students to fail and/or struggle so they could work through difficult things, often only providing support or helpful information when students asked for assistance. Slowing down the pace of learning allows teachers to more holistically care for their students. By knowing their students more deeply, teachers can support students' needs for independence and risky play in safe ways. We argue that without any of these components, Ridgeline would not function as it does or have the culture that is so appreciated by its teachers, students, and parents. Just as Forest Schools focus on holistic development in students, we would urge researchers exploring Forest Schools to not only look for components vital to the culture, but also investigate how these components impact each other and work together to create the particular culture at that site.

Context and Place Matter

We would be remiss not to acknowledge the importance of place in the culture of Ridgeline. As noted earlier, a key characteristic of Forest School is a strong connection to and responsiveness with place (Dabaja, 2022b; Elliot & Krusekopf, 2017). While the teachers played a significant role in the practices reflected in the themes, the natural environment at Ridgeline served as a second teacher and the backdrop for meaningful experiences. With its varied areas – meadow, woods, streams, hills, and more – Ridgeline lent itself to a wide range of activities and learning. Teachers took advantage of this, spending extended periods in different spaces and giving students time to engage with what the place had to offer. A consistent notion woven throughout the themes was the comfort and familiarity students felt at Ridgeline. As they interacted with nature and each other, there was a sense that this was *their* space to explore, play in, and learn from. Further, there appeared to be a place for everyone; if a student preferred the woods over the stream, for example, teachers could notice this and build on that preference. In sum, the place supported students in slow learning, whole-child development, and independence nearly as much as the teachers did. And although each Forest School is unique, we would venture that place may play a similar role in many Forest Schools.

In terms of situating this study in the literature, as previously stated, Forest Schools can vary by context and location. The fact that we observed similarities to the Forest School literature (autonomy, attention to holistic development) as well as some differences (explicit attention to care, explicit attention to slow learning) exemplifies this point. Additionally, while O'Brien (2022) made the argument that Forest Schools in the U.S. may be hyper-individualistic and risk averse, we did not see evidence of this at Ridgeline, further demonstrating that differences in Forest School cultures can occur within countries. This study of Ridgeline therefore contributes to the literature in terms of providing yet another detailed description of a Forest School culture and illustrating the variety of these nature-based educational settings that exist.

Implications and Conclusions

This ethnographic inquiry contributes to the literature on Forest Schools within the United States, which is very limited compared to other English-speaking countries (Dean, 2019). The rich dataset of observations, photos, and participant interviews paints a clear picture of the lived experiences of one Forest School community in the United States–Ridgeline–and their cultural practices. Furthermore, the themes that developed shed light on the nuanced characteristics of Forest School within context. Yet this work also informs the global literature on Forest School and nature-based learning in an early childhood setting. It fills gaps concerning the explicit exploration of slow learning and individualized care while also broadening the understanding of student independence and responsibility. In the

Discussion we suggest specific directions for future scholarly work on Forest Schools and contend that more research is needed in a variety of international contexts.

For practitioners, this study provides examples of one Forest School's community and their cultural practices. We believe that the vignettes, participant quotes, and photos can serve as both an inspiration and a pathway for those seeking to develop or improve their own programs. The ethnographic approach of this inquiry provides helpful details from which other Forest School teachers and leaders can benefit. Although situated in a single context, these findings highlight how cultural practices shape teaching and learning within Forest School. Educators can draw from these examples to inform their own instructional decisions, adapt strategies to their local context, and advocate for the value of place-based, experiential learning. In this way, the study not only documents a specific program but also offers guidance for enhancing student engagement, fostering holistic development, and supporting reflective practice in diverse educational settings. It also serves as a reminder of what children are capable of when trusted with independence, and how granting them greater agency can enrich their learning in meaningful ways.

As Forest School continues to grow and thrive across the globe, it is imperative that educators, policymakers, and practitioners recognize the importance of avoiding commercialization that risks diluting its core values. At the same time, thoughtful, place-based adaptation must be embraced to ensure that Forest School remains responsive to the diverse cultural, ecological, and social contexts in which it is practiced (Wahab et al., 2020). At Ridgeline, the absence of commercial pressures allowed the program to develop organically from its local context, which in turn shaped the three themes identified in this study. These themes emerged precisely because the school was not bound by standardized models or market-driven expectations, but instead could evolve in response to the needs of its community and landscape. While the Ridgeline Forest School community is contextually specific, its distinctive culture offers valuable insights into how Forest School can be authentically implemented. By examining such localized expressions, we can deepen international conversations about what it means to preserve the integrity of Forest School while allowing it to evolve meaningfully across settings.

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Entangled Gardens, Entangled Lives: Refiguring Presences Toward an Ethics of Care and Vulnerability in Preschoolers' Multispecies Encounters

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ABSTRACT

This praxis-oriented paper draws from a yearlong multispecies ethnography of preschoolers' encounters in an urban garden through child-led documentation. Thinking-with common worlds pedagogies, I attend to young children's everyday multispecies encounters with worms, bees, and flowers and describe their embodied, affective, and relational learning-with the more-than-human that was messy and situated. Important as we navigate the environmental destruction of the Anthropocene, I share moments of children's learnings where their developing ethics of relational care and environmental vulnerability surface as hope. Seeking to unsettle disconnected, humancentric, nature-as-resource scientific learning, I mobilized a pedagogy of refiguring more-than-human presences to center human/more-than-human entanglement, interconnectedness, and interdependency. Findings narrate learning encounters and pedagogical moves through vignettes and children's documentation of photographs, drawings, and writings.

Keywords: early childhood education, environmental education, common worlds pedagogies, decolonizing pedagogies, teacher-researcher

This article discusses preschoolers' developing ethics of relational care (Haraway, 2008; Puig de la Bellacasa, 2012) and environmental vulnerability (Hird, 2013) in their multispecies encounters through a pedagogy of refiguring more-than-human presences (Nxumalo, 2019) within the context of the Anthropocene. The Anthropocene is defined as unfixable environmental damage directly consequent to human activity, including ocean acidification, depletion of the ozone layer, global climate change, and rapid loss of biodiversity (Steffen, Crutzen, & McNeill, 2007). In responding to environmental crisis, the geological epoch of the Anthropocene has spurred drastic calls for educational research to cultivate, theorize, and deploy pedagogies to equip future generations to combat and solve colossal environmental problems (Malone et al., 2017; Sjörgen, 2020). However, responding to environmental change through human-centered approaches can reaffirm blinding human exceptionalism (Tsing, 2012) while positioning youth as child-saviors who will rescue humankind, as Taylor (2017) articulates: "grandiose geo-engineering fixes, simply rehears[ing] the same kinds of triumphalist anthropogenic interventions that disrupted the earth's system in the first place" (p. 1449). Responsivity to climate change as a means to preserving anthropocentric ways of life through human technological innovation without accounting for more-than-human experiences and interactions in environmental education pedagogies is deeply entangled with taken-for-granted early learning pedagogies imposing hierarchical humanisms of settler colonialism (Nxumalo, 2019). Such stewardship pedagogies implicitly reinforcing human mastery over the more-than-human wherein children are inheritors of more-than-humans as resources (Taylor, 2013; Tsing, 2012). Taking a common worlds approach inspired by critical early childhood multispecies and place-based educational scholarship of Taylor and Pacini-Ketchabaw (2019) and Nxumalo (2019), this paper adds to the living archive of praxis-oriented research (Lather, 1986) addressing the ethical response-ability (Haraway, 2008) of early learning to unsettle humancentric practices (Pacini-Ketchabaw,

2013; Pacini-Ketchabaw & Taylor, 2015) toward multispecies flourishing (Haraway, 2008) as co-inheritors, co-witnessers, and co-agents of the Anthropocene.

Entangled Common Worlds of the Anthropocene

From post-humanist and Indigenous perspectives that decenters humans as sole protagonists, human life is entangled with the more-than-human (Barad, 2007; Haraway, 2008; Nxumalo, 2019; Orman, 2025; Tammi et al., 2023). We ongoingly co-exist in agentic relations with worldly matter from before our first breath to long after our last; however, we humans have centered ourselves as matter that "matters" because we embrace and reinforce human/nature divisions of Enlightenment (Hohti & Tammi, 2019; Taylor, 2013). Therefore, human importance with mattering is deeply entangled and entrenched in human-centric settler colonialism discourses (Rose, 2015; Taylor, 2013) positioning more-than-humans as passive resources for human advancement (Tsing, 2012). These settler colonial discourses surface in early childhood education (Pacini-Ketchabaw & Taylor, 2015) in many ways, such as: (1) envisioning nature as someplace exotic and "out there" where "innocent" (white) children "explore" and "discover" nature's bounty (Taylor, 2013); (2) romanticizing and anthropomorphizing species that are "big" and "cute" while erasing and eradicating less idealized species that don't have faces, fur, and deemed pests (Taylor & Pacini-Ketchabaw, 2019); and (3) positioning the more-than-human as a resource for solely scientific learning disembodied from relationality, co-dependency, and ethical response-ability (Haraway, 2008). These beliefs and practices can actively uphold dominant colonial ideologies by solidifying the human/non-human divide, encouraging human exceptionalism, and perpetuating Indigenous erasure (Blaise et al., 2017; Nxumalo, 2019; Pacini-Ketchabaw, 2013).

Grappling with the dangers of anthropocentric gaze – a worldview that humans are the most important entities (Hultman & Lenz Taguchi, 2010) – in humanist stewardship pedagogies (Pacini-Ketchabaw, 2013; Taylor, 2013; 2017), common worlds pedagogies (Taylor & Pacini-Ketchabaw, 2019) identify the "ethical possibilities inherent in the messy and fraught child-animal encounters, interactions, and relations that are already taking place in local common worlds in the face of the precarious global ecological futures that we all inherit and face together" (p. 21). Borrowing from Latour (2004), the term "common worlds" recognizes the simple, yet profound, reality of how place is mutually constituted through the agentic entanglement of human and non-human communities (Taylor & Pacini-Ketchabaw, 2019). To date, common worlds pedagogies (Common Worlds Research Collective, 2020; also see www.commonworlds.net) have ushered in robust, empowering, and hopeful educational scholarship situating children and more-than-human multispecies learning-living as entangled co-witnessers and co-responders of the Anthropocene. As a pedagogical method of responding to the Anthropocene in early childhood education, common worlds pedagogies (Taylor & Pacini-Ketchabaw, 2019) seek to: (a) resituate humans within ecological systems by shifting attention toward the integral interdependency, co-habitation, and entanglement of life on earth – toward a "common good for all its constituents" (p. 1); (b) recognize the "micro-effects of these everyday child-animal encounters are part of the macro-politics of mortal ecological entanglements" (p. 5); and (c) engage in an ethics of "ongoing relational practices involving human and more-than-human actors and situated within the ordinary interactions and exchanges of everyday life." (p. 6). Common worlds pedagogies are mobilized on the micro-scale of child-animal interaction and within the mundane, seemingly banal everydayness of child-nature encounters to nurture children's ethical care and responsivity to the more-than-human toward the common good for all life on Earth (Haraway, 2008; Latour, 2004; Orman, 2025).

Central to common worlds pedagogies is ethical engagement. These ethics are expansive, situated, and attuned to "geo-historical tracings of the trajectories and convergences of animals, settlers, and indigenous people within settler-colonized lands" (Taylor & Pacini-Ketchabaw, 2019, p. 7). In cultivating a common worlds ethics, Taylor and Pacini-Ketchabaw think-with feminist science studies, more-than-human geographies, multispecies environmental humanities, Indigenous epistemologies, and post-humanist theories to channel theory into practice. Working with their expansive conceptual framing, this article attends to two notions of common worlds ethics: relational care and environmental vulnerability. Relational care (Haraway, 2008) is a situated, embodied, and affective-ethical way of interdependent relating (Puig de la Bellacasa, 2012), whereas environmental vulnerability recognizes "human and non-human asymmetrical vulnerability to an unknowable future" (Hird, 2012, p. 105).

Multispecies Bag Pedagogies and Refiguring More-Than-Human Presences

Drawing from Haraway (2024), "bag lady methods" are mobilized in common worlds pedagogies (Hohti & Tammi, 2023; Orman, 2025; Taylor & Pacini-Ketchabaw, 2019), including multispecies ethnography, geo-historical tracings of human and more-than-human convergencies within settler-colonized lands, and reconceptualizing child-animal relations through affect-attuned post-humanist, feminist, and indigenous theories. Methodologically, multispecies ethnographies "center on how a multitude of organisms' livelihoods shape and shaped by political, economic, and cultural forces" (Kirksey & Helmreich, 2010, p. 545), addressing the non-innocent ecological realities of the Anthropocene on entangled human and more-than-human life, culture, and future (Ogden et al., 2013). Analytically, multispecies ethnographies de-center human individuals as the unit of analysis by foregrounding and attending to the relational interdependencies of beings.

Within my own methodological and pedagogical teacher-researcher bag, I draw upon a collection of children's visual data, artifacts, and ethnographic classroom stories to amplify interspecies relational learning-with and children's growing affect and ethical attunements to more-than-humans on the grounds of an urban Church school garden. Seeking to expand and critically engage my own pedagogical orientations toward young children's environmental education, I trace the garden's geo-histories to both consider and trouble what colonial teachings children may inherit when human-centric ways of control over the more-than-human is normalized by garden design. It is within this scope of attending to everyday multispecies encounters that a pedagogy of refiguring presences can surface how "colonial legacies continue to have impacts on everyday life in multiple, often taken-for-granted ways in the banalities of everyday early childhood pedagogies" (Nxumalo, 2019, p. 41). As the head teacher of a preschool classroom of 4- and 5-year-olds, I attend to children's everyday multispecies encounters with worms, bees, and flowers in our urban Church school's garden common worlds by storying multispecies voices. In doing so, I unfold moments of preschoolers' developing ethics of relational care (Haraway, 2008; Puig de la Bellacasa, 2012) and environmental vulnerability (Hird, 2012) as hope for engaging in the ethical complexity of the Anthropocene.

Through vignettes and child-led documentation (Clark & Moss, 2011), I narrate children's entangled, embodied, and affective multispecies living-learning and a pedagogy of refiguring more-than-human presences (Nxumalo, 2019) to decenter children as sole protagonists in multispecies encounters. A pedagogy of refiguring more-than-human presences also worked interrupt "everyday material-discursive colonial place relations" (p. 43) inherited in our multispecies encounters with the Enlightened Church garden. By restorying "material-discursive stories of place, where both the stories and the 'storytellers' are more-than-human" (p. 43), children's ethical awareness of more-than-human entanglements surfaced in our decolonial interruptions with the garden that were not always innocent.

Garden Inheritances

It is important to consider what children might inherit in their encounters with the Church garden. The world-making of multispecies entanglements are situated within place-specificities, co-emerging as unique contact zones (Haraway, 2008) where species meet and co-author entwined futures. Although contact zones are in an ongoing state of becoming-with as they inherit and build upon place histories to give and support new life, children (and teachers) are not separate from these multispecies knots of ethical time (Rose, 2012). Therefore, to attend to children's multispecies encounters in this specific contact zone, the garden's vitality, agency, and settler-colonial history must be critically examined to situate the learning to come.

As a garden of Enlightenment, this garden is a network of landscaped pathways that cut between and divides nature from the human (Tammi et al., 2020). Publicly described as "an oasis" amidst a fast-moving city, the garden is the connective tissue between street, Church, school, and playground. Everyone must engage with the garden in their everyday comings and goings across the campus. Cement pathways trace through edged soil, mulch, woodchips, and a variety of plant life: trees, grasses, bushes, flowers. Most flowers are annuals and are planted in ceramic pots seasonally uprooted and replanted by garden staff, juxtaposing the trees and bushes that host animal life. Ecologically, it is important to note the negative impacts of planting unrooted annuals as opposed to native perennials on pollinator activity and soil health (Smitley et al., 2024). Each bend in the garden offers different places for humans to convene. For example, the intermediate spaces between street, school, and Church have several

roundabout paths shaded by large magnolia, crabapple, and holly trees and various flowering bushes and annual planters. Benches line these pathways, some with their backs to the towering Church stone walls and stained-glass windows, others facing the school's entrance and playground where children's vibrant voices echo from. Trailing behind and between the Church and school buildings, the garden's midsection is private to the school community. Small tables sit amongst trees, bushes, seasonal flowerpots, and a small amphitheater. Staff and families often have lunch at these tables, whereas students and teachers use sidewalks and the amphitheater as learning spaces. Early childhood classrooms lookout and open into this intersecting midpoint of garden pathways and are where some of the stories in this article take place. Other stories take place in the Church's small public flower garden, it's most far-reaching section. This flower garden lays amongst the wreckage of a past Church fire, where green life sprawls and blooms amongst charred brick. Inside the public garden, hedges, trellises, benches, and geometrically symmetrical paths create a feeling of tamed Earthly density, a "caged jungle" as a child described it.

Unlike urban gardens that grow vegetables or native plants to foster sustainably robust ecosystems, this garden is ornamental and aesthetic in its intention – it seeks to orient pedestrians toward beauty and calmness while pleasantly strolling from Point A to Point B. Established in the early 1820s in the image of The Enlightenment period, the garden is manicured and maintained toward symmetrical harmony, reflecting man's mastery, triumph, and control over nature (Plumwood, 2005). In its quest for beauty and order, I call into question the garden's humancentric spatial design and how fauna and flora are arranged to aesthetically enhance human movements, rather than create ecologically sustainable habitats for more-than-human residents to flourish or fostering interspecies relationships between humans and more-than-humans. When attending to place-specificities, it is important to question how settler-colonial way of being and doing is normalized through everyday acts that silence the vibrant agency of the more-than-human (Nxumalo, 2019). Kimmerer (2013) describes how Indigenous languages speak to the "grammar of animacy" of worldly matter as active, lively agencies to be listened to and embraced as elder kin. Kimmerer contrasts the grammar of animacy with how colonial languages impose categorical and hieratical thinking and doing: "The arrogance of English is that the only way to be animate, to be worthy of respect and moral concern, is to be human" (p. 59). This colonial grammar is normalized in the everyday asymmetrical relationship between human and more-than-human in the Church garden, evoking dominant child-centered pedagogies that hold a boundary between humans and non-humans. From this perspective, Tammi et al. (2018) considers how research with children can illuminate the ways "something is continually in the process of being normalized, sedimented, or 'striated' (Deleuze & Guattari, 1987) within the historical-social-cultural-material contexts of the child-animal relations" (p. 3).

Multispecies research with children must therefore attend to how relationships and habits of being are normalized geo-historically through place (Taylor & Pacini-Ketchabaw, 2019). Hence, I wonder how the garden's settler-colonial legacies are inherited by children (and adults) when they walk and encounter its pathways. Do children envision this garden space as aesthetically cultivated for their enjoyment? Like innocent explorers of the natural world typical of dominant child-centered theories (Taylor, 2013), do children view this garden as an extension of their playground, with flowers, seedlings, leaves, and branches for their easy picking? Perhaps validating these dominant narratives and images of Enlightened childhood, I have observed children trample young seedlings, rip leaves off trees, and unearth flowers only to discard these earthly bodies when something else piques their interest. I've seen children chase squirrels and gleefully squash bugs with little restraint. Most often, and perhaps the most divided from nature, humans rush through these gardens, late for class or eager to engage with peers, with little regard for the more-than-human life that co-creates this urban oasis. I, too, am guilty of running through the garden, similarly late or trying to complete several teacher tasks in my short prep period, with minute intention for acknowledging and engaging with the more-than-human. We all play a part in how place is assembled and geo-historical inheritances are invoked.

Garden Stories

Data draws from a yearlong multispecies ethnography (Kirksey & Helmreich, 2010) in my class of eighteen 4- and 5-year-olds. Located on an urban neighborhood Church school garden in the northeastern United States, children transversed garden pathways daily in their comings and goings and outdoor playtime but paid little attention to more-than-human presences until heavy autumn rainfall brought children into contact with worms. This initial,

emergent child-worm encounter sparked our multispecies ethnography until late spring, finishing with refiguring more-than-human presences in child-bee-flower encounters. Although children encountered other critters and plants in the garden throughout the year, the scope of this paper focuses on child-worm-flower-plant encounters. Using the Mosaic Approach (Clark, 2011) to amplify children's perspectives and lived experiences while mitigating teacher-student power imbalances, children documented their multispecies encounters with a GoPro camera, bringing "place, materials, and more-than-human worlds into sharp focus" (Templeton a& Vellanki, 2022, p. 230). Children's photographs and learning artifacts (drawings, writings, creations) as pedagogical documentation (Edwards et al., 2012) and narrations (Pacini-Ketchabaw et al., 2015) facilitated reflective dialogues and provoked further wonderings. Thinking- and acting-with Nxumalo's (2019) pedagogy of refiguring more-than-human presences, I worked to de-colonially interrupt place by centering multispecies relationships through restorying practices that "bring attention to both the limiting effects and ethical potentialities of everyday pedagogical encounters, particularly in relation to possibilities for new ethical accountabilities in multispecies relations… grounded in children's everyday uncertain, embodied, affective, and thoughtful responses" (p. 104). Throughout this research, my guiding questions were:

(1) How did engaging in multispecies ethnography and a pedagogy of refiguring more-than-human presences change children's relationship to the garden?
(2) How were settler-colonial discourses in early childhood garden pedagogies both interrupted and normalized in children's multispecies encounters and ethical negotiations?

To illustrate children's surfacing ethics of relational care and vulnerability in their multispecies encounters, I share a series of stories alongside children's photographs and artifacts (Figures 1 to 8 and 10 to 11). Beginning with autumn child-worms encounters and concluding with spring child-bee-flower encounters, these stories are anchored conceptually. Stories overlap temporally because children's ethical negotiations with more-than-humans and decolonial interruptions of place surfaced in multiple ways. Whereas child-worms encounters were emergent, child-bee-flower encounters grew from refiguring more-than-human presences to unsettle and decolonize a predetermined preschool bee curriculum.

Touch

"Touch, regard, looking back, becoming with – all these make us responsible in unpredictable ways for which worlds take shape." (Haraway, 2008, p. 36)

This learning starts with touch. Thinking-with Haraway (2008), touch is the affective, embodied, relational genesis that "peppers its partners with attachment sites for worldmaking" (p. 36). Through touch, children engaged in worldmaking with the more-than-human, unpredictable worlds that stirred children's ethics of relational care and vulnerability in entangled learning-living. I narrate how touch surfaced ethics of relational care and vulnerability across two vignettes:

"They touch; therefore, they are"

> *Preschoolers' earliest moments of ethical care and vulnerability emerged on the watery, muddy grounds of the urban Church school garden, where children noticed worm movements amidst squelching dirt and dark puddles (Figure 1). Captivated and excited by worm movements, children gathered around to get a closer look – "It's dancing!" cheers a child. Giddy laughter and shrieks are cut short – "they're drowning!" shouts another child. Children hesitate, pondering the information. Was the worm dancing or suffering? The child's message was heard, and children begin scooping up worms from puddles. Although at first hesitant to touch worms, preferring to use a plastic spoons or containers (Figure 2), children begin gingerly pinching their fingers to pick-up worms. Child skin meets worm skin, giggles erupt, a relation is formed, a world emerges: "they touch; therefore, they are" (Haraway, 2008, p. 263). Cradling worms (Figure 3), children slow their bodies and bring their faces closer, as if bringing nose to "nose." Greetings ensue and children gently place worms in their recycled yogurt containers, determined to save as many as they can. Splashing along, children call out "worm alert!" to each other, signaling a worm has been found and for everyone to come (Figure 4).*

Children gather and rescue worms until their outside time has ended. Someday later, children quickly move amongst the garden, "worm alert!" fills the air, and begin "rescuing" worms. This time, children take time to prepare for their encounters. Some children use leaves to hold worms (Figure 5), others construct worm "homes" in their containers. Filled with wet soil, fallen leaves, and dried berries, children fashion beds for rescued worms (Figure 6). Many children adopt higher pitched, sing-song voices when greeting worms, some give names, "Hi, Wormy," and offer farewells when playtime ends. Over time, children contemplated where to put worms after housing them in their containers. Whereas some transferred their premade homes back to the Earth, other children placed worms on drier ground, under bushes, or in planting pots.

Figure 1: Noticing worms

Figure 2: Using plastic spoons to rescue worms from puddles

Figure 3: Touching worms

Figure 4: *"Worm Alert!"*

Figure 5: Holding worms on leaves

Figure 6: Worm beds and homes

Touch was an affective and embodied opening for child-worm attachment, worldmaking, and becoming-with. Through touch, children opened themselves to caring and being affected that became accountability and response-ability. Haraway (2008) believes "touch ramifies and shapes accountability. Accountability, caring for, being affected, and entering into responsibility are not ethical abstraction" (p. 36). Over time, children's ethics of relational care and vulnerability materialized as embodied more-than-human caring practices, "where caring involves affecting and becoming affective" (Nxumalo, 2019, p. 112). From gingerly handling worms, slowing down their movements, and adopting nurturing voices to purposefully building beds, homes, and locating safe places for worms to reside, children negotiated relational care and worms' uneven vulnerabilities to intense rain and pooling water. Rose (2015) reminds us that the act of responding requires us to be open, to listen with attentiveness, and be called into connection. Touching worms elicited response-ability, affective-understanding, theory building, and meaning-making, a thinking through the skin that "reflects, not on the body as the lost object of thought, but on inter-embodiment, on the mode of being-with and being-for, where one touches and is touched by others" (Ahmed & Stacey, 2001, p. 1). Learning was ethically entangled with life, situated and relational, following Taylor and Pacini-Ketchabaw's (2019) observation that "those who carefully seek intimacy with [more-than-humans] might learn about the precarity of life through (literally) holding the responsibility another life" (p. 59). Learning-with worms, children mobilized embodied-knowledges and affective-attunements, negotiating ethical care and vulnerability to

respond to their common worlds. However, touch can be non-innocent, and critically attending to multispecies encounters requires troubling human-centric tendencies for care as human-imposed. When our time outside ended, children abruptly and one-sidedly ended their interactions with worms. Returning inside, where there was no soil, worms, leaves, or mud, children's intentions switched to the next part of their school day. I wonder what possibilities could have unfolded if children weren't governed by institutional clocks (Clark, 2020), where their multispecies interactions didn't exist solely on human timetables. What would children experience if worms were the ones who decided to end an interaction?

"Touch and regard have consequences"

> *Mid-spring blooms and preschoolers pool their prior bee knowledge to answer my question: "How do you know it's a bee?" This question was intentional to refiguring bees as solely a site for scientific investigation (Nxumalo, 2019). Rather than asking children* what *they know about bees, soliciting factual knowledge, asking* how *children know it's a bee elicits more personal, affective knowledge grounded in embodied real-life experiences. Here my intention was for scientific information, like bee color, shape, size, features, and behaviors, to be mobilized as relational knowledge to better get to "know" bees and living-with bees in our common world. The topic becomes pollination and children discuss bees, flowers, pollen, and honey. Working toward unsettling human control over more-than-human (Tsing, 2012) and restorying bee-human-plant relations as commodified pollination networks, children were reminded of the crabapple tree's entangled interdependencies (see Figure 9 and following section for more details). Specific wonderings about pollen led children to flowers. Robust in the urban garden, children pretend to be bees and "fly" around looking pollen and nectar (Figure 7). Lightly bringing their noses into flowers, like a proboscis, children inhale deeply, smelling sweet aromas and releasing blissful sighs "ahhhh, sweet nectar!" Getting closer to flowers, touching flowers, children encounter unexpected flower agencies – "touch and regard have consequences" (Haraway, 2008, p. 36). Transferring golden yellow pollen from stamen to stigma (Figure 8), children apply too much pressure and the stamin or stigma breaks. Children gasp and freeze, noticing and feeling their touch's consequences. Instead, children try to move fast and pollen flies into the air, scattering in their faces causing itchy eyes, sneezing, and coughing, particularly for those with allergies. Responding to flower agencies, children slow their movements and proceed thoughtfully to transfer pollen, adjusting their movements to neither hurt the flower nor themselves.*

Figure 7: Looking at and smelling flowers from bee perspectives

Figure 8: "Touching" pollen (*picture taken by teacher)

Grappling with their preconceived notions of human mastery over the "passive" more-than-human, children negotiated ethical care and vulnerability in their embodied, affective, relational meaning-making encounters with bees and flowers. To learn-with bees, children and teachers consulted science as an advisor for getting closer to bees and understanding the interconnection of bee lifeworlds (Nxumalo, 2019), particularly bee-flower entanglements. Pretending to be bees, children metamorphosized, "a visible infolding that melts the boundaries that have been constructed between human and animal ... a moment of intersubjectivity to be celebrated" (Bone, 2010, p. 411). Becoming bees, children attuned relationally and affectively to flowers in "the dance of world-making encounters" (Haraway, 2009, p. 249) where both human and more-than-human agencies entangle (Taylor & Pacini-Ketchabaw, 2019). Touching and encountering flower agencies, children's embodied sensemaking of pollination was intertwined with flower bodies and learning-with flowers.

Touch, however, has consequences and unexpected ethics of vulnerability emerged in these co-created encounters, in which children were surprised by flower-pollen agencies. An ethics of vulnerability draws "attention to the extended others – human and non-human – affected by our actions" (Hird, 2012, p. 115). Perhaps, in their touch, children encountered the environmental vulnerability entangled with the physiological impacts of urban living and pollen activity and sensitivity. Urban inhabitants are 20% more likely to suffer from airborne pollen allergies than rural inhabitants (Carinanos & Casares-Porcel, 2011). Some contributing factors include lack of access to green spaces, uniformity amongst green spaces, pollen allergens interacting with air pollutants, and earlier intense pollen activity due to longer pollen seasons as a result of climate change (D'amoto et al., 2016; D'amato, 2000). Furthermore, pollen's vertical distribution is unequal. Pollen abundance increases at higher levels, disproportionately effecting the pollen sensitives of urban dwellers' who live in multistory apartment buildings (Armentia et al., 2004). When pollen counts are high, parents and teachers may restrict children's time outside to avoid allergic reaction. Encouraging children to remain indoors because of pollen imposes on children's thinking of pollen as a nuisance, rather than a life-giving ecological process, while simultaneously preserving pollen sensitivities. These physiological experiences are reciprocally consequential to Enlightened urban design that separates human from nature and produces pollution from human overconsumption of nature (Tsing, 2005). In this vignette, children touch flowers and engage with pollen despite their environmental vulnerability. Children slowed down and made precise movements to mitigate both hurting the flower and themselves as affective, embodied responses to mutual vulnerabilities. Becoming bees, touching flowers, and encountering pollen refigured more-than-human presences, transforming humancentric learning about bees and flowers as scientific subjects toward situated, messy, and relational interspecies learning-with.

Refiguring More-Than-Human Presences

"*Storytelling is an act of witness – of paying attention, and the recounting, of bearing witness – to lives and deaths in a way that grapples with what they mean and why they matter."* (Rose, 2016, n.p.)

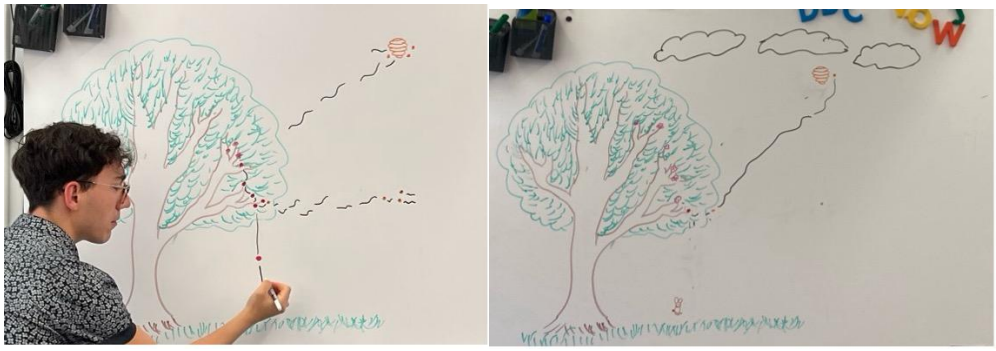
Refiguring presences was "a form of decolonial interruption," (Nxumalo, 2019, p. 42) engaged through restorying bee-garden-child relations to bring "attention to both the limiting effects and ethical potentialities of everyday

pedagogical encounters, particularly in relation to possibilities for new ethical accountabilities in multispecies relations… grounded in children's everyday uncertain, embodied, affective, and thoughtful responses" (p. 104). This refiguring began in the transition from winter to spring, when snow melts, ice thaws, and green shoots crack through hard soil. Earth Day neared and topics of environmental conversations about recycling, global warming, clean energy, and air pollution were afoot and children had a special ear for *The Lorax* by Dr. Seuss's (Geisel, 1971). Unlike most children's stories that fantasize and romanticize child-nature relations as mutually harmonious and innocent (Moxnes & Aslanian, 2024; Taylor & Pacini-Ketchabaw, 2019), *The Lorax* differs somewhat because it attunes to more-than-human agencies by voicing matters of entanglement in ecological systems (Barad, 2007; Haraway, 2008). *"I speak for the trees!"* warns the Lorax to the Onceler, whose capitalist and extractive greed causes environmental destruction, resembling a dystopian Anthropocene (Metinoğlu, 2020). *"Whack!"* – the final Truffula tree is cut down, children gawk, concerned brows furrow at the environmental destruction and suffering of all constituents. The final page, however, offers hope. The Onceler gives the child the last Truffula tree seed, and the last page is blank. This blankness stares back at young faces, a suggestion, a storied call to environmental action, as if asking: "How does this touch make us more worldly, in alliance with all the beings who work and play for an alter-globalization that can endure more than one season?" (Haraway, 2008, p. 5). Children mull over the story, enact it in their play, and ask to hear it again and again. Although *The Lorax*'s warning speaks to a human-centered, morality-based sense of care (Hird, 2012), it pulled at the children and nudged their attention toward relationality and interdependency. Their response encouraged me to try restorying our entangled garden's place story (Nxumalo, 2019)

Storying Entangled Gardens

> *Contemplating how to restory the garden, I was sitting in the public section of the garden and encountered a local tour guide. In conversation, they identified a crabapple tree and explained that the tree was baring less fruit than past years because an absence of pollinators. I decided to center this crabapple tree and its interrelations to restory the garden as an entangled place of co-habitation, creating "an opening for grappling with the ethical potentialities of plural more-than-human worldings where both the human and more-than-human 'shape and are shaped by political, economic, and cultural forces'" (Kirksey & Helmreich, 2010, p. 545, cited in Nxumalo, 2019, p. 43). While orally storytelling the crabapple-pollinator-garden, I illustrated interconnections of trees, bees, apple blossoms, more-than-humans, and humans on the whiteboard (Figure 9), emphasizing interdependency between pollinator activity, apples, and others, while leaving space for children's theory making about the crabapple tree*.

Figure 9: Teacher restorying crabapple-tree-bee-garden worlds (*picture taken by teacher)



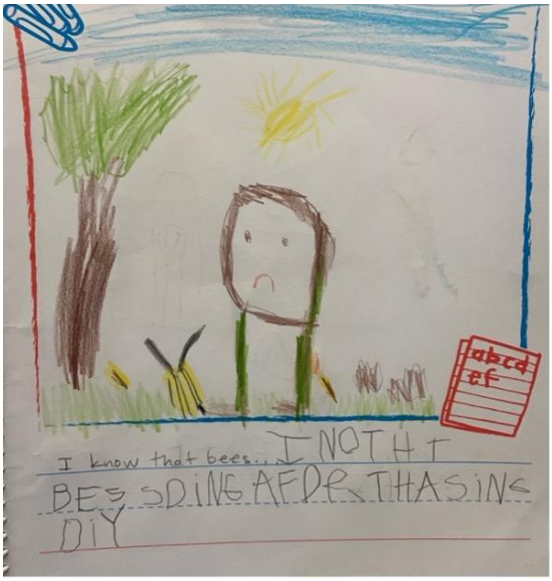
Drawing from *The Lorax* and our investigations into environmental conservation, children's theories spoke to human/more-than-human entanglements, wherein human pollution hurt and killed bees, therefore impacting the crabapple tree and animals/humans that depend on its fruit for sustenance. During my storytelling, a child exclaimed: "animals will be hungry and die!" Their situated and relational knowledge of ecological interdependencies resurfaced again in their drawings and writings (Figure 10) of the entangled garden, showing bee pollination of the crabapple tree and flowers, with some bees dawning smiling faces. This attention to interconnectedness matters within "the context of extinctions, this attentiveness to the relationality and interdependence of lies is particularly important because the death, and subsequent absence of a whole species,

unmakes these relationships on which life depends, often applying suffering and death for a whole host of others" (van Dooren, 2010, p. 273).

Figure 10: Children's entangled garden drawings/writings

Children visited the public garden in small groups, excited to meet the crabapple tree. Over time, children grew aware of the lack of bees. Fleeting bee comings-and-goings were quick. Pausing near flowers, children listened to locate bees, get closer, and observe bee movements between and amongst blossoms. Being proximal to bees, children voiced their knowledge of bee stings, primarily its pain but also how bees die after stinging others (Figure 11). Despite their bee sting worries, children continued to seek closeness to bees. Whereas before children would yell, swat their hands, or shrink away when bees darted about, children began practicing slowing and stilling in bee presences. Noticing these movements, I voiced my observation of child's movements: "I noticed you froze your body when the bee was near" to which the child replied, "because I am wise."

Figure 11: Uneven bee-child vulnerabilities



In restorying the garden's entanglement, I wondered how children's thinking- and learning-with bees-flowers-trees surfaced an ethics of asymmetrical, uneven vulnerabilities. Salient occurrences were in children's embodied attunements – listening for, slowing down, and stilling their bodies in the presence of bees, recognizing that a bee sting was more costly to bees than to humans. However, children's vocalizations and drawings of garden interdependency (Figures 10 and 11), where both humans and more-than-humans were impacted a by bee death, pointed toward a deeper ethical negotiation of environmental vulnerability in which "humans are vulnerable to living and nonliving earth processes" (Hird, 2012, p. 107). No doubt these wonderings of human vulnerability were ushered and introduced in their reading of *The Lorax*, but perhaps it was the situated, messy, and relational experiences of child-bee-flower-tree encounters as decolonial interruptions to an ecologically damaged place that brought awareness to their understanding of human and more-than-human precarity and interconnectedness.

Decolonial Interruptions and Resonances in the Garden

In the time of the Anthropocene, Haraway (2008) calls for action toward multispecies flourishing, requiring "a robust nonanthropomorphic sensibility that is accountable to irreducible differences" (p. 90). Following and amplifying the prolific scholarship of Taylor and Pacini-Ketchabaw (2019) and Nxumalo (2019), these garden stories illustrate children's ongoing ethical negotiations of relational care and environmental vulnerability in their multispecies encounters and my pedagogical moves toward refiguring more-than-human presences. Through touch, affect, embodiment, response-ability, metamorphizing, and restorying entangled child-garden interconnectedness, children's ethics of relational care and vulnerability emerged in their everyday multispecies encounters, photographs, drawings, and writings (Figures 1 to 8 and 10 to 11). These stories illuminate how seemingly mundane, banal, and unimportant child-more-than-human interactions can be sites for ethical relations and unsettling the

colonial legacies of erasures in early childhood pedagogies (Nxumalo, 2019). However, it is also important to critically examine and trouble the ways these garden stories also normalized settler colonial ideas in early learning.

Caring and Non-innocent Touch

Touch surfaced in children's multispecies encounters. With worms, their hands engaged in the "dance of world-making encounters" (Haraway, 2008, p. 249). While care emerges in relation, its obligations also create new and surprising relations (Puig de la Bellacasa, 2017). Like Nxumalo (2019) shares, in restorying garden relations,"even the playfulness of children's encounters with gardens and garden worms is a site from which to consider how touching worms holds consequential possibilities for children to learn how to get along with and care for more-than-human others in these messy inherited histories" (p. 85-86). This was illustrated in the ways that children's touch led to caring for worms during heavy rainfall, such as the emergence of *"Worm Alert!"* and the constructing of worm beds and homes. Their touch opened unexpected affective relations, embodied thinking-with, and responsibilities. Albeit not considering future worm lives past their outdoor adventures, children's caring processes reflected Puig de la Bellacasa's (2012) three dimensions of relational care: embodied-material labor, affective relations, and ethical political contextuality. As showcased in Tammi et al.'s (2020), multispecies ethnography of Finnish greenhouse school, caring touch became worlding as the inter-species dance of encounters emerged in children's caring hands, the mutual positive affect of stroking, and navigating precarious touch. Similarly, Taylor and Pacini-Ketchabaw (2015) found that relational care (Puig de la Bellacasa, 2012) surfaced in child-worm encounters, in the forms of tickling touch, caretaking, and mourning earthworm deaths. Taking-seriously children's interspecies relating with earthworms, the authors asked, what happens when children learn "to take these sophisticated animals seriously? What possibilities reside in different forms of relating and intersection with earthworms?" (p. 517). In this article, touching worms was indeed a dance of encounters: worm-child intertwined futures co-creating movements storie together, a thinking-with for both child and worm.

Taylor and Pacini-Ketchabaw (2015) also ask, "How might these sticky beings, who are indispensable in our world, also become indispensable in our pedagogies?" (p. 517). Touch, however well-intended, can also be non-innocent. The children and I did not consider the worms beyond our caretaking and migrating of them in the garden; we did not consider the worms' lives outside of our garden encounters and human-centered gaze. In a study of kindergarteners relations to their school's composting yard, Tammi et al. (2018) theoretical concept of withlings (human and non-human becoming-with as an ongoing assemblage of relational doings) illuminated the non-innocent emergence of joy in the suffering of earthworms in the normalization of humancentric nature-as-subject scientific learning. This was, perhaps not-so-coincidentally, described in kindergarteners use of the phrase "worm alert, worm alert!" (p. 5.) to initiate a "worm rally," in which children playfully gathered earthworms from a compost bin, transported them to a table for study, and then left them in plastic containers for subsequent weeks, eventually drying out and dying. In this study, our engagement with worms was ended by the transitional school bell of changing periods, the institutional realities of hurried children (Clark, 2020). If children's encounters with worms were not abruptly stopped, what possibilities for relational care may have unfolded? Would children have thought of worms beyond the signal of well-rehearsed halting of learning activity? These questions illuminate the frictions of human and more-than-human encounters (Pacini-Ketchabaw, 2013). Friction "reminds us that heterogeneous and unequal encounters can lead to new arrangements of culture and power" (Tsing, 2005, p. 5). The institutionalized organization of neoliberal agendas focuses on measuring the performativity of child outcomes as an investment for future capital (Clark, 2020). For Tammi et al. (2018), the human/nature divide was reinforced in the scientific subjectification of earthworms as composting resources, who were left to dry-out and die after children's observations. My study also reinforced this discarding of more-than-human life as resources in the non-innocent ways children displaced worms at their teacher's transitional signal.

These non-innocent touch relations also emerged in children's developing ethics of vulnerability with flowers and bees. Their touching of plants was asymmetrical – displacing flowers and their pollen, interrupting pollen circulation in a garden of overwhelmed with annuals rather than native perennials during a global declining pollinator activity (Smitley et al., 2024). Children's encounters with flowers were also embodied investigation and humancentric intention to see a whole being as collection and naming of functional parts (Kimmerer, 2013). Hence, friction emerged in children's non-innocent encounters and mutual environmental vulnerabilities, where both humans and

non-humans were vulnerable to each other's agencies. Some species, like the few bees sighted, were beyond children's physical touch. Children touched bees with fingeryeyes (Hayward, 2010), "making a new preposition of observation: seeing with tact; touching by eye; feeling from vision" (p. 582). Children's haptic touch grew into an embodied sensemaking, in which their bodily movements slowed, stilled, and augmented to the flight patterns and agencies of bees, in turn responding to the asymmetrical vulnerability of bees and humans as well showcasing children's awareness of the precarity of physically touching bees. Hayward (2010) describes the haptic-touch of fingeryeyes occurring through an apparatus, such as a microscope. I wonder how the GoPro camera acted as an amplifying apparatus of children's fingeryeyes, enabling haptic-touch with beings out of reach, like elevated flowers and bees, or when a child's own sensitive touch was too much for direct contact. Children's encounters further troubled touch that cannot be seen nor felt through hands. The microbial level of touch (Hayward, 2010; Ogden et al., 2013; Yong, 2016) is also entangled in multispecies encounters, like pollen particles connecting with eyes, nose, and mouth or the microbial connection between hand and worm. I likewise wonder about the dimensions of sonic-touch, the movement of hair cells in children's cochlea that sensed and heard the buzzing vibration of bee wings. As Haraway (2008) describes it, "caring means becoming subject to the unsettling obligation of curiosity, which requires knowing more at the end of the day than at the beginnings" (p. 38). Despite pollen allergies and fears of bee stings, children's drawings of bee-flower-tree life illustrated their affective attunement to the precarity of bee deaths. In refiguring more-than-human presences through storytelling, children's drawings expressed their sadness about bee death whereas our discussions of *The Lorax* placed children within the interconnected web of relations that reflect human vulnerability to bee extinction.

(Re)storying Garden Inheritances

The garden anchored these stories. Nxumalo (2019) asks, "How might critical attunements to place become central to early childhood [garden] pedagogies?" As a place, the garden is a "gathering of things, human and nonhuman bodies, and stories that require attention beyond the individual child's experiences… and is also enacted through colonial and neocolonial assemblages" (p. 43). In my research questions, I wondered how engaging in a multispecies ethnography and pedagogy of refiguring more-than-human presences would influence children's relationship to the garden. To refigure more-than-human presences in this garden and actively work toward resisting and disrupting its settler colonial inheritances, we restoryed the garden as entangled, interconnected, and situated. Bringing to life place stories of plants and animals, both human and nonhuman, that co-produce the garden against settler colonial histories and inheritances spurred children's ongoing ethical negotiations of relational care and environmental vulnerability. Through touch and fingeryeyes, responding with care, and experiencing the mutual vulnerability to worms, flowers, and bees, children (and myself) reoriented our relationship to the garden as a lively place.

Taking serious Tsing's (2012) notion that "human nature is in interspecies relations" (p. 144), Kirksey and Helmreich (2010) review of multispecies ethnography affirms that "plants must be key players, too" (p. 533). Their call encouraged multispecies ethnographers not to solely focus on human's interspecies relations with animal, but also with flora and fauna. Similar to the frictions in forest pedagogies between children and non-native blackberry bushes, whose delicious barriers required the pricking pain of thorns, that Pacini-Ketchabaw (2013) noted, children in this study experienced the dually sweet aroma of flowers and the itchy, sneezy irritation of their pollen. Pacini-Ketchabaw (2013) articulates how we not only shape forests, but forests shape us as "assemblages of human and more-than-human entangled in multiple relations, co-shaping each other" (p. 361). The children in this study have likely been shaped by their sensitives to pollen as urban dwellers (Carinanos & Casares-Porcel, 2011; D'amoto et al., 2016; D'amato, 2000) and numbness to more-than-human presences amongst rushed city living, pausing with little regard for more-than-human co-inhabitants. This garden, on the Indigenous lands of the Lenape people, was colonized in the image of Enlightenment, where human mastery over the more-than-human is evident in its symmetrical design and maintenance for human enjoyment. Some of the ways children's relationships changed to the garden were in their playful metamorphosizing (Bone, 2010) into bees; to "be a bee." Perhaps children's embodied taking-on of bee perspectives led to newfound relationality to flowers and plants, a step closer to reclaiming Kimmerer's (2013) grammar of animacy – a beyond-human way of listening and speaking "that lets us speak of what wells up all around us" (p. 55) and "remembering our kinship with all of the animate world" (p. 56).

Children's changed relationship with the garden was also seen in their regard for the consequences of touch (Haraway, 2008). Touch attuned children to other beings that co-create the garden-school-Church assemblage, opening possibilities for decolonial interruptions of place. In this shared garden, children attended to more-than-human lives of worms, bees, and flowers; attuned to more-than-human agencies of wiggling worms, fragile yet powerful flowers, and the fleeting energies of buzzing bees; and listened with a grammar of animacy by becoming bees. Whereas before the garden was an extension of their playground and a highway for human traffic in getting from Point A to Point B, these young children grew to engage with the garden as a lively being full of entanglement. However, I am unable to speak about the longevity of children's more-than-human encounters in our shared garden home. Each year children move up consecutive grades, from preschool and beyond, where normative humancentric learning can be implicitly taught through child-centered pedagogies positioning humans above nature. This unlearning of settler colonial teachings is an ongoing decolonial practice. While I cannot say that I know what future views and relationships these children will have with the more-than-human, I hope that this multispecies ethnography and pedagogy of refiguring more-than-human presences initiated "important cracks in the increasingly normalized techniques of framing early childhood education as a preparatory site for already pre-determined desired subjects of neoliberal economies" (Nxumalo et al., 2018, p. 434). I hope these cracks encourage children's ethical relations with more-than-humans as our planet continues to urbanize and change in the time of the Anthropocene.

Concluding Thoughts

My research-practice mobilized common worlds concepts through a pedagogy of refiguring more-than-human presences to decenter children as sole-protagonists in multispecies encounters in an urban Church school garden by centering entangled, agentic living-learning of children, worms, bees, and flowers. Through this experience, I have come to better understand and experience Nxumalo's (2019) pedagogical call: "these modes of caring are the kinds of attunements needed in the current time of the Anthropocene, grounded as they are in responding to the situated real-life messiness and uneven inheritances of the places children co-inhabit… rather than in universalized or precalculated understandings of what counts as care or of who or what is deserving of care" (p. 112). To reconfigure the natures of early childhood (Taylor, 2013), this work was made possible because my community embraced critical and complex thinking, opening themselves to other ways of knowing, learning, and being beyond dominant discourses of Euro-Western, developmentally based notions of "quality" (Dahlberg et al., 2012) in early childhood education (Pacini-Ketchabaw et al, 2015) and toward a collective orientation of unsettling "innocent child-in-nature discourses and trouble[ing] human/nonhuman, meaning/matter, and nature/culture divisions" (Nxumalo, 2019, p. 109). As I continue in this journey alongside children, families, teachers, administrators, and researchers, my concluding thoughts on these garden stories lie with Deborah Bird Rose (2011), who offers a profound potentiality: "Perhaps the most that can be said is that we encounter a wild and crazy ethic: we respond because we are here, because this opening occurred in our presence, because the zone [of death] is so thin, the lives so precious" (p. 145).

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How Cold is Too Cold? A Descriptive Study of Cold-Weather Play in Minnesota's Nature-Based Early Learning Programs

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ABSTRACT

While young children generally enjoy outside playtime regardless of the weather (Bilton, 2010), inclement weather often surfaces as a barrier to outdoor play among early childhood educators (McClintic & Petty, 2015). Considering declining outdoor playtime in childcare centers (Copeland et al., 2016) and significant declines in childcare-related outdoor playtime in northern latitudes across seasonal changes (Merrill et al., 2005; Schuna et al., 2016), a descriptive study of cold-weather outdoor play was conducted of 39 Minnesotan (United States) nature-based early learning programs. Since perceptions regarding the difficulty and safety of outdoor play provision are predictive of the implementation of outdoor play (Chakravarthi, Hatfield, & Hestenes, 2009), this study documented weekly outdoor playtime in winter months, strategies used to keep children safe in sub-zero temperatures, and perceived benefits of cold-weather play. This study can inform efforts to help reduce cold-weather safety concerns among other decision-makers, such as administrators and lawmakers, particularly in the context of advocating for early childhood regulatory and licensure language that supports outdoor learning for all children.

***Keywords*:** cold weather, winter, outdoor play, nature play

Early learning and care programs are an integral part of childhood, a place where children are introduced to societal norms and values and have foundational experiences, with lasting impacts on their short- and long-term development (Erdem, 2018; Sando, 2019). Most children in the United States (U.S.) ages three to five spend 30 or more hours per week at preschool (Tandon et al., 2013). In Minnesota, about 76% of children receive some form of non-parental care, and about 48% of children attend preschool (Chmielewski, 2025). Since children spend much of their waking hours in a childcare or preschool setting, these programs are consequently where children have the largest opportunity to play outside.

The importance of outdoor free play in early childhood is well-established in the research literature, with benefits across developmental domains (McCurdy et al., 2010). Not only do outdoor spaces further learning and development in different ways than inside (American Academy of Pediatrics et al., 2019), outdoor play spaces have also been associated with increased moderate-to-vigorous physical activity (MVPA), with MVPA levels doubling when children play outdoors versus indoors (Martin et al., 2022). According to the Minnesota Department of Health (2022), young children should have at least 60 minutes of structured physical activity, 60 minutes of unstructured physical activity per day, and not be sedentary for more than 60 minutes at a time, except when sleeping. The World Health Organization also supports the recommendation of more than 60 minutes daily of moderate-to-vigorous physical activity (Danielsen et al., 2021). Facilitating physical activity in early childhood is especially important, as it helps build a mindset of enjoying movement with lasting health impacts far beyond the preschool years (Hesketh et al., 2017; Ylvisåker et al., 2022).

Outdoor play in nature-based settings appears to be particularly beneficial, as natural settings afford improvements in the amount and quality of young children's play, offering opportunities for more self-directed, complex play and play that involves risk-taking (Jost et al., 2024). Research also suggests that outdoor play in nature furthers more imaginative and cooperative play, increasing play quality overall (Jost et al., 2024; Smedsrud et al., 2024). The systematic review of nature play benefits by Dankiw et al. (2023) suggests not only wide-ranging health benefits, such as immune health, physical activity, gross and fine motor development, sleep quality, and mental health and well-being but also a range of social-emotional and cognitive impacts. Additionally, Vitamin D is produced through sun exposure while playing outside, which is especially important in the cold weather months with fewer daylight hours (American Academy of Pediatrics et al., 2019).

In addition to the benefits of outdoor play in general, Rooney (2018) suggests there are unique benefits associated with seasonal outdoor play. Utilizing the term "weather worlding," Rooney (2018) states how outdoor experiences cannot be separated from the weather:

> We know what it is like to be in the open on a windy day… We also know how the rain feels as it trickles down our face and the smell in the air as a storm approaches. The heat of the midday sun can warm the skin and if we trudge too long through the winter snow our toes may go numb or ache with pain. These, and many such other experiences, are familiar weather encounters..., children often experiment with their own part in the weather world. On cold days the simple act of breathing out can become visible through condensation forming in the air that is exhaled, and it is not uncommon to witness an excited exclamation from children keen to share the connection between their own breathing, the elemental conditions and their own 'becoming weather.' Understood in this way, there is no clear boundary between the human body and the elements" (p. 5-6).

Consequently, children are constructing meaning of the world around them – as active participants – just by being outside. Therefore, play experiences outdoors are never "weather-neutral," as how we remember and experience a specific time or place is impacted by the weather (Rooney, 2018, p. 7). The weather-human relationship is built upon sensory and affective interactions experienced outdoors. Although the weather is "not always easy or comfortable," it helps us understand the "co-mingling of human/weather relations" (Rooney, 2018, p. 9). If given space and time, children can utilize their sense of wonder to explore their understanding of the interconnection between the world, its living creatures, and the weather.

Despite the benefits, children in early learning and care environments generally spend little time in outdoor play (Trost et al., 2010). Further, many children do not get the recommended amount of daily physical activity, living more sedentary daily lives (Copeland et al., 2011; Hesketh et al., 2017; Ylvisåker et al., 2022). One study suggests children in childcare spend almost half of their time in sedentary indoor activities (Ellis et al., 2017). Additionally, research indicates that in many childcare centers, outdoor playtime is occurring less frequently than scheduled, with over 80% of centers studied scheduling an hour or more of outdoor time, but only about a quarter of them actually providing it to children (Copeland et al., 2016). In that same study, about a third of young children experienced no outdoor playtime whatsoever (Copeland et al., 2016).

While young children generally like to play outside regardless of the weather (Bilton, 2002), inclement weather often surfaces as a barrier to outdoor play among early childhood educators (Ernst, 2012; Ernst, 2014; McClintic & Petty, 2015). In northern latitudes, a decline often occurs in childcare-related outdoor playtime across seasonal changes, with seasonal playtime variation attributed to temperature, precipitation, and daylight hours (Merrill et al., 2005; Berkey et al., 2003; Schuna et al., 2016). In Turkey, for example, preschool teachers reported that they used the outdoors most often in the spring and only seldom or never in the winter (Erdem, 2018). Kandemir & Sevimli-Celik (2023) similarly reported a decline in outdoor play in early childhood programs during the colder months, with both teacher and parent restrictions due to cold and/or rain.

Barriers to cold-weather outdoor play include teachers' preferences to stay inside in inclement weather (Elliot, 2021; Hughes et al., 2017), lack of outdoor clothing/gear (Copeland et al., 2009), and time involved in cold-weather dressing routines (Hatcher & Squibb, 2010). Haakenstad et al. (2023) concluded through focus group interviews and surveys that outdoor gear barriers could be summarized as a financial and time burden on parents, with barrier strength inversely associated with socio-economic status. Quality outdoor gear can be expensive, gear needs to be cleaned and dried often, and young children quickly outgrow clothing. Additionally, parents can be rushed in the morning and may not have enough time to collect the appropriate gear (Jayasuriya et al., 2016). However, classes can be limited to going outside if even just one child is not appropriately dressed. In addition to gear and its time and monetary associations, the physical play materials and the outdoor play spaces can be a barrier to cold-weather outdoor play. Having a range of durable materials – such as skis, snow shovels, toboggans, plastic bins, snowshoes, and other loose parts – helps facilitate engagement with the outdoors, in addition to building upon children's interests (Jacobs et al., 2019; Kracht et al., 2024; Scheffel et al., 2021). However, similar to outdoor clothing, equipment needed for winter sports is often expensive and associated with racial and/or socio-economic privilege (Haakenstad et al., 2023). Outdoor play spaces themselves may need modifications, such as wind buffers, which also require monetary and time investments (Dankiw et al., 2023). Furthermore, outdoor play spaces in colder weather may result in indoor messes, such as dirty snow melting on the floor in the entryway, requiring more time for cleaning after outdoor play.

Another barrier to cold-weather play is safety concerns. In early learning and care settings, fear of injuries and litigation can lead to a tension between valuing outdoor play and the practice of cold-weather outdoor play, as some educators perceive cold-weather play as risky (Jayasuriya et al., 2016). Parental safety concerns also impact outdoor play (Erdem, 2018; Kandemir & Sevimli-Celik, 2023) and cold-weather outdoor play in childcare and elementary school settings (Jacobs et al., 2019). Even if only one or a few of the parents oppose having their children play outdoors in cold weather, challenges result for childcare staff, and outdoor play opportunities are diminished for the class as a whole (Jayasuriya et al., 2016). Furthermore, how children are perceived can also be a barrier to cold-weather play, as children are often viewed as an object that needs protection. For example, Hesketh et al. (2017) found that extreme weather was frequently mentioned in the context of child safety, with "a general preoccupation with ensuring children were protected, usually at the expense of being physically active" (p. 1012).

As misleading cold-weather preconceptions (such as children will catch a cold if they go out in the cold) can limit cold-weather outdoor play opportunities, children's vulnerability to extreme temperatures is important to acknowledge. For example, exposure to cold temperatures can exacerbate childhood asthma symptoms and produce shortness of breath (Rasi et al., 2017), as well as place children at risk for frostbite to their extremities, such as noses, ears, fingers, and toes (Cappaert et al., 2008). Additionally, as pointed out by Rasi et al. (2017), children who are more susceptible to frostbite, more prone to lower temperatures in extremities, with neurological disorders, and immigrant children whose families are not accustomed to cold weather are particularly vulnerable. Despite these concerns, the researchers suggested that cold weather should not be an obstacle to children's unstructured outdoor play, given its wide range of positive effects on children's mental and physical well-being. Instead, Rasi et al. (2017) advocate for supporting children's outdoor activities in winter, while being mindful of the cold-related risks and taking prevention strategies, such as shortened duration of cold exposure.

While day-to-day activities vary due to individual program characteristics and goals, outdoor play is considered among best practices in early childhood learning and care programs (Bjørgen, 2015). Yet, policy research on state-funded preschool programs indicates that only 42% of states require outdoor play, with an additional 17% of states providing guidance, but not requirements, for outdoor time (Jost et al., 2024). For states that did have regulations or guidance on outdoor playtime, over half (52%) did not specify the amount of outdoor time required. States specifying the amount of time ranged from suggesting or requiring up to 60 minutes daily, with 17% suggesting or requiring multiple daily opportunities for outdoor play (Jost et al., 2024). Regarding weather conditions, about half (48%) had regulations or guidance on weather-related restrictions for outdoor play. State-level policies and guidance, as well as licensing regulations and quality rating and improvement systems for center-based and family childcare programs, have the

> potential to increase or limit young children's outdoor and nature-based experiences… State policies may set minimums for outdoor time or impose weather-based restrictions on outdoor time, set requirements for outdoor spaces, including nature-based experiences and environmental education, and set expectations, standards, or requirements for outdoor play. These rules could facilitate outdoor time for young children, but could also unintentionally obstruct access (Jost et al., 2024, p. 6).

Minnesota is located in the northern U.S., and its climate is characterized by four seasons, including cold winter weather. Currently, licensed childcare centers in Minnesota have no guidelines restricting cold-weather outdoor play, so the inclusion and duration of outdoor play across seasons are decided upon by individual programs. However, state legislation has proposed to restrict outdoor play at "real feel" temperatures of -15°F or colder (Minnesota Department of Human Services, 2025). Since cold winter weather in Minnesota may occur for up to half of the academic school year, this legislation has the potential to severely inhibit how often children can play outdoors and access natural outdoor learning environments. As such, a descriptive study was conducted among nature-based early learning programs in Minnesota to document weekly outdoor playtime in winter months, alongside strategies being used to keep children safe in sub-zero temperatures and the perceived benefits of cold-weather play. This study can inform efforts to help reduce cold-weather safety concerns among decision-makers, such as program administrators and lawmakers, particularly in the context of advocating for regulatory and licensure language that supports outdoor learning for all children.

METHODOLOGY

An invitation to participate in the study was sent to the approximately 100 programs in the Minnesota Early Childhood Outdoors (MNECO) network. MNECO is a grassroots network of Minnesota providers that share the aim of providing nature-based experiences for young children. This network includes family childcare providers, childcare centers, and public and private preschools. While these programs are all referred to as nature-based programs in this study, due to their affiliation with MNECO, they implement nature-based early learning to varying degrees. In light of the study context, the focus was on unstructured outdoor play, as opposed to specifically nature play or nature-based learning, with the reasoning that if outdoor play is restricted by low-temperature thresholds, nature-based outdoor learning will be restricted as well.

Thirty-nine practitioners responded to the invitation. Of these 39 practitioners, 22 self-identified their programs as nature preschools (many of which were licensed as family or center-based childcare centers); the remaining were center-based childcare providers (6), family childcare providers (5), preschool or kindergarten programs affiliated with a public school (5), and a private preschool (1). Additional demographic data on the practitioners or programs were not collected. The University's Institutional Review Board reviewed the study and determined that it did not meet the definition of research with human subjects. As such, there was no formal informed consent process; however, participants received an explanation of the study and its voluntary nature. Participants received $75 in appreciation for their time and effort.

Over nine weeks in December 2024 - February 2025, participating practitioners received an electronic reporting log (Google Form) each Friday. Programs did not receive the reporting log over the two weeks of winter break. The reporting log was modified with permission from an instrument used by the Colorado Collective for Nature-Based Early Education to document cold-weather play in support of outdoor preschool licensing efforts. In the study at hand, the reporting form asked practitioners to report the lowest temperature of the past week during hours of program operation, as well as the total number of minutes children went outside on the day of the reported lowest temperature and what strategies, if applicable, were used to support cold-weather play on that day of the reported low. Additionally, practitioners were asked to report any cold-weather-related injuries or safety incidents that were brought to the attention of the parent/guardian, and whether there were parent concerns or complaints related to the cold-weather play that week.

The final reporting log contained additional questions, including whether they have a "too cold" temperature threshold for cold-weather play, as well as other considerations beyond temperature that factor into their decision-

making around cold-weather play. This final reporting log also asked what shaped their receptivity and ability to manage cold-weather play and their perceptions of the benefits of cold-weather play. Practitioners also had an opportunity to respond to a prompt regarding what they would like policymakers to know regarding cold-weather outdoor play.

After the nine-week data collection period had concluded, data analysis was conducted. Descriptive statistics were used to analyze the quantitative data. Data from the open-ended items were summarized inductively (Braun & Clarke, 2006), looking for common strands, patterns, themes, and categories in the participants' responses. Because of the exploratory, descriptive nature of this study, the reporting log/questionnaire items served as general guides for categorizing and reporting the data.

RESULTS

Provision of Cold Weather Play

Throughout the nine weeks of data collection, participating programs were asked to report the lowest temperature of the past week during hours of program operation, as well as the total number of minutes children went outside on the day of the reported lowest temperature. In the table below, the first column represents the weekly low temperature during program operation. The next three columns represent the amount of outdoor playtime for programs that experienced this temperature during the week. Because practitioners were given the option to report actual or "real feel" temperatures, the data is broken down accordingly into the two subsections of the table. Additionally, since Minnesota has a breadth of latitude, not all programs throughout the state experienced the same low temperature at the same time. This data suggests that programs are providing outdoor playtime at temperatures well below the proposed "too-cold" threshold of -15°F ("real feel"). Even on days with reported "real feel" temperatures as cold as -39°F, most programs are providing time outdoors.

Table 1
Provision of Outdoor Play by Lowest Weekly Temperature Experienced

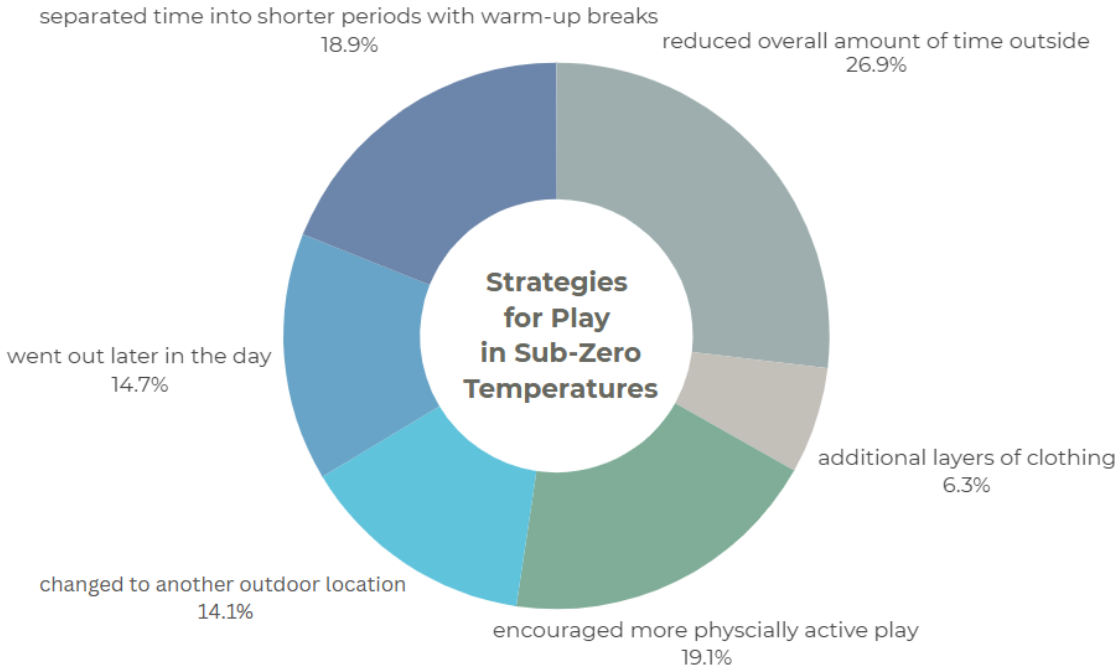
Temperature (°F)	% of Programs Experiencing this Temperature as Their Weekly Low that Provided Outdoor Play on that Day	Most Frequently Reported Amount of Outdoor Playtime on Day of Reported Low	Highest Reported Amount of Playtime Outdoors on Day of Reported Low
Real Feel			
≥ 31	100%	2-4 hrs	> 4 hrs
21 to 30	100%	2-4 hrs	> 4 hrs
11 to 20	100%	2-4 hrs	2-4 hrs
1 to 10	100%	2-4 hrs	> 4 hrs
-9 to 0	100%	2-4 hrs	2-4 hrs
-19 to -10	85%	30 min	2-4 hrs
-29 to -20	89%	30 min	2-4 hrs
-39 to -30	93%	30 min	2-4 hrs
≤ -40	25%	0 min	2-4 hrs
Actual			
≥ 31	00%	2-4 hrs	2-4 hrs
21 to 30	00%	2-4 hrs	> 4 hrs
11 to 20	00%	2-4 hrs	> 4 hrs
1 to 10	3%	30 min	> 4 hrs

-9 to 0	8%	60 min	> 4 hrs
-19 to -10	3%	30 min	> 4 hrs
-29 to -20	3%	0 min	90 min
-39 to -30	%	0 min	0 min

Practitioners reported using a variety of strategies to support cold-weather play on the day of the reported weekly low temperature. The most common strategies used included reducing the total amount of time outside, encouraging more physically active play, and breaking up the typical amount of outside time into shorter time periods with warm-up breaks in between. Additional strategies included bringing children out later in the day when the sun was higher in the sky, playing in a location sheltered from the wind, and using additional layers of clothing, protective equipment, or supplemental heat sources (such as neck gaiters, ski goggles, hand and toe warmers, etc.). Figure 1 illustrates the relative frequencies of these strategies.

Figure 1

Relative Frequencies of Strategies Used by Practitioners to Support Cold-Weather Play on Days of Reported Weekly Low Temperatures.



Cold-Weather Play Safety and Parental Satisfaction

Across the nine weeks (45 days) of data collection and the approximately 895 children collectively in the care of the participating providers, six minor injuries from cold weather were brought to parents' attention. Of those, five were frostnip, and one was a child who had their lip stuck to a metal surface. No cold-weather play injuries during this period needed medical attention. During this same period, practitioners collectively had six indications of parental dissatisfaction toward cold-weather outdoor playtime. Of these six indications, three were minor parent complaints, two were parents sending their children for only the indoor portion of the day, and one was a parent not wanting to have their child go out due to an illness.

"Too-Cold" Temperature Thresholds

Minnesota currently does not have a temperature threshold where cold-weather play is restricted, so the inclusion and duration of outdoor play across seasons are decided upon by individual programs. Eleven of the 39 practitioners indicated using "too cold" temperatures to guide decision-making relating to cold-weather play, with real-feel temperature thresholds ranging from 0°F to -20°F, often guided by local school district policies. Two practitioners indicated using a threshold of whatever temperature and wind chill combination would result in frostbite in under 10 minutes, signaled by NOAA's Wind Chill Chart. For practitioners not using "too-cold" temperature thresholds, many suggested that temperatures were more useful for guiding how to dress and where to play, as opposed to determining whether to go outside to play.

Beyond temperature, practitioners indicated taking other factors into account in their decision-making regarding outdoor play in sub-zero temperatures, such as the following:

- The specific children in their care (ages, presence and quality of gear; ability to keep gear on and skin covered; general health and wellness; acclimation based on newness to program and/or winter; energy and activity level; coordination levels and gross motor skills; sensory needs and sensitivities; and the needs of children on that particular day);
- Teachers and supporting staff (regular staff vs. substitute teachers; ability to assess risk and monitor children for signs of cold-weather injuries; the staff's own health and/or needs; and the overall child-staff ratio);
- Wind (direction, speed, and gusts; availability of places to play out of the wind or find shelter; and the presence of standing dead trees or potential for falling branches);
- Sun (cloud cover and how high the sun is in the sky);
- Presence of ice or snow at a depth that would limit physical activity levels;
- Humidity (presence or absence of high humidity levels that would trap moisture and make children feel colder); and
- Environmental conditions that increase the possibility of becoming wet and cold.

Influences on Providers' Abilities to Support Cold-Weather Play

Practitioners' abilities to safely support cold-weather play appear to be primarily supported and strengthened through community networks. In particular, practitioners indicated listening to, observing, and learning from experienced colleagues and programs. Additionally, many indicated drawing from local, state-level, or national outdoor and environmental education networks, as well as social media, for knowledge-sharing and problem-solving. Some practitioners also indicated furthering their learning through online resources, books, and research, as well as wilderness first aid classes or self-study to prevent cold-weather-related injuries. Further avenues included student-teaching at programs or in countries where cold-weather play is the norm and drawing upon their childhood experiences of playing outside in all seasons and weather. Additionally, some practitioners suggested the shift to outdoor learning prompted by COVID-19 provided an opportunity to grow their abilities and confidence, while helping them recognize high capability levels in both themselves and their children. Many suggested a process of gradual learning, starting with "small steps" and progressively building to cold-weather play of longer periods and in colder temperatures.

Benefits

Practitioners articulated many perceived benefits from cold-weather outdoor play. A common theme among practitioners was that cold-weather play also affords unique opportunities for learning and development and that these skills would not develop as prominently if play were confined indoors during the winter months. As one practitioner stated, "Winter is when we see the most growth. Adversity, physical challenges (walking in snow, sliding, sledding, skiing), and confidence lead to development. We see huge leaps in capabilities!" The following are cold-weather play benefits identified by practitioners:

- *Physical health and development:* general robustness and hardiness; fewer illnesses; increased physical activity through big body play; improved motor skills, coordination, and balance; increased strength and stamina; improved proprioceptive senses; activation of brown adipose tissue ("brown fat"); and improved cold tolerance;
- *Mental well-being:* boosts mood; reinvigorates; and exhilarates;
- *Emotional and behavioral regulation:* movement in snow provides natural "heavy work" that helps children calm their bodies; less challenging and unwanted behaviors; and increased positive interactions among children with sensory needs;
- *Curiosity and creativity:* inquisitiveness and wonderment are prompted by winter's gifts of snow, ice, and cold temperatures; and creative thinking naturally emerges from the "loose parts" of ice and snow;
- *Attentiveness:* noticing and attending to the different aspects of the winter environment, such as different sounds and textures of snow, changes in comfort level based on weather conditions and amount of activity, tradeoffs between finger dexterity and warmth, and ease of pulling sleds on ice compared to deep snow;
- *Persistence and resilience:* building grit from physically demanding play and movement; and fostering resilience through planning for and regularly being out in challenging environmental conditions;
- *Self-Confidence:* feelings of pride and joy from not being limited by the weather; mastery, competency, and independence regarding outdoor dressing routines; confidence from accomplishing challenging tasks (climbing mountains of snow, learning how to snowshoe, and being outside and staying warm in very cold temperatures);
- *Social Understandings:* a sense of community as children verbalize their needs and rely on those around them; cooperation to ensure all stay warm; consideration of the group as a whole; respectfulness of one another's needs; opportunities to feel seen and protected as peers watch out for exposed skin; and opportunities for gratitude and appreciation (for the sun's warmth, cozy fires, and peers who help);
- *Connection to Nature:* feeling more intertwined with nature when out in the winter with only wildlife and trees around; a greater appreciation for how wildlife survives in the winter; a deepened sense of place from experiencing all seasons; hearing the quiet of falling snow; and seeing the "moods of nature;"
- *Self-Management and Risk-Management:* listening to body signals to stay safe in the cold; noticing what helps to feel warm; learning what happens when gear gets wet; education about tree and ice safety; and assessing traction on slippery surfaces;
- *Early Academics:* learning science concepts (wildlife adaptations, population dynamics, the water cycle, phases of matter, weather, and friction); science process skills (predictions, hypotheses, experiments, and problem-solving); reading thermometers; positive and negative numbers; and geometric designs; and
- *Rippling influences outward to families:* as children experience cold-weather play in a safe, enjoyable, and ongoing way, their enjoyment and capabilities often extend outward to their families, consequently increasing their families' interest in going outside during the winter months.

Insights for Policy- and Decision-Makers

In response to the open-ended question on the final reporting log that allowed practitioners to convey what they would like policymakers and other decision-makers to know about cold-weather play with young children, practitioners had many useful insights. The following themes emerged from the responses, illustrated by verbatim quotations from the practitioners to capture the richness of their insights:

- Practitioners' motivations for and implementation of cold-weather play have children's best interests in mind.

Outdoor play is beneficial for motor development and academic development; the temperature doesn't dictate how imperative being outside is to children. I feel very comfortable with cold-weather play because I feel confident I can keep children safe while also creating meaningful learning opportunities that would not happen if we stayed inside.

People who know how to teach outdoors offer children one of the richest learning environments possible. Also, after a few years of minimal winter, I think we are experiencing something precious and fleeting. Let children have memories of snow and ice as climate change warms our winters.

We can do this safely and have been for years! We love these children and would never put them at risk. It is GOOD for children and GOOD for staff.

- Children become acclimated to cold weather and respond favorably to outdoor play in sub-zero temperatures.

  On the coldest day of the winter, children were heard telling one another at the end of the day that it was 'the funnest day ever!'

- Cold-weather play is good for teachers, as well as children.

  It's good for grown-ups to go outside every day. I sleep better than most of my friends, and I feel it's because I'm out every day. It breaks the day up, too. I sometimes feel secluded working alone, and when I'm out of the house, it just seems like I'm getting some away time from my home/work.

  Living in Minnesota, we deal with cold weather a lot. I personally find that I am happier if I prioritize time outside, even in cold weather, and feel like that is true for children as well. It keeps up my physical and mental energy.

- Motivation for cold-weather play is grounded in seeing the unique benefits and recognizing the meaningful learning opportunities that would not happen indoors. Practitioners appreciate the seasonality of Minnesota and a desire for the children in their care to grow their capabilities for outdoor activity in all seasons, not just in "nice weather."

  Cold-weather play is a part of being in Minnesota! The research on the benefits is abundant and makes it clear that we can't NOT provide children with these opportunities.

  Children have been playing outside in the cold long before now. Helping children embrace the cold at a young age teaches them how to be safe in different weather conditions and helps them build self-awareness. They can feel more deeply connected to the environment and their community as they brave the cold with one another.

  We live in Minnesota. We can't fear the cold. It's not going to help these kids become reasonable and capable adults. If too much emphasis is placed on protecting children from the potential risks of cold-weather play, this "protection" comes at a detriment, hindering the lifelong cold-weather education and experiential knowledge that will actually protect children.

  Minnesota is a wonderful, beautiful place. We are not victims of its temperature extremes, and it's our responsibility to learn how to manage our clothing choices and our bodies in the elements so we can enjoy its beauty year-round.

- A "too cold" temperature guidepost may falsely imply safe conditions to providers less experienced with cold-weather play, as the combination of environmental conditions and child-

related factors may lead to unsafe conditions even in less extreme cold temperatures. Flexibility in licensing requirements regarding cold-weather play is necessary.

Every program is different from what they/families can afford to dress the children in, the location of the program (not just that it's colder up north, but some have sunnier locations and others have locations that can break the wind), and some programs have multiple adults to help, and others have one adult doing it on their own. Each program has its own set of children with various skills and abilities. We shouldn't make laws on something with so many variables. Instead of a new regulation, education to support safe cold-weather play would be more helpful.

A set number on the thermometer does not factor in the type of environment a school has, children's gear, and the physical and mental benefits of being outdoors. Providers should be able to set their own parameters, as there are strategies we can use to adjust to the elements and enjoy Minnesota. We need to teach children to dress warmly and move outside. We can't keep raising kids to fear the cold and stay inside and be inactive for months on end.

DISCUSSION AND IMPLICATIONS

Before discussing these findings, it is helpful to situate them within the limitations of our methods. First, the study utilized a self-report method and intentionally had a relatively small, purposefully homogeneous sample of 39 respondents (practitioners who valued and provided opportunities for nature-based outdoor play in cold weather). Thus, this sample is not representative of the landscape of early learning and care programs and practitioners in Minnesota. Additionally, the benefits of cold-weather play indicated here are perceived benefits, not empirically collected outcomes or impacts. While these participants are closest to the work at hand and thus a credible and ecologically valid source of information, a potential remains for social desirability bias and less of a likelihood to bring forward "negative" information. In spite of these limitations, and without making claims of generalizability, what is presented here are data and insights from practitioners that may be helpful to decision-makers, such as administrators and lawmakers, particularly in the context of regulatory and licensure language regarding outdoor learning and weather conditions.

Unstructured outdoor play across seasons and weather conditions has many benefits for young children, evidenced in the research literature, and recognized and valued by practitioners, which help offset the time and effort involved in taking young children outdoors in cold weather. When considering the feasibility of cold-weather play, safety concerns are a prime driver of decision-making. While there are risks to cold-weather play, such as decreased core temperature (hypothermia) and freezing injuries (frostnip and frostbite), risks are also associated with limiting physical activity during the winter months, which can be a significant proportion of the year. Additionally, with early childhood education and care facilities often lacking sufficient room inside for big-body play and movement, outdoor physical activity in winter is particularly important. As one practitioner aptly summarized, "There is lots of good research on risky play and the benefits, such as fewer injuries, not to mention the mental health benefits of children and adults who are not fearful of being outdoors in all weather, but instead embrace it and the many wonderful things Minnesota winters have to offer!"

This study suggests that Minnesota nature-based early learning and care practitioners are self-imposing a high level of attention to decision-making and practices, and that decisions about cold-weather play are more nuanced than a single "too cold" temperature. Through the use of strategies such as reducing the total amount of time outside, encouraging more physically active play, and breaking up the typical amount of outside time into shorter periods with warm-up breaks in between, practitioners are bringing young children outdoors despite very cold temperatures that occur during program hours. Even on days with reported "real feel" temperatures as cold as -39°F, most programs are providing time outdoors.

Results of this study further suggest that this approach of practitioners' nuanced decision-making, versus reliance solely on a "too-cold" temperature threshold, and drawing on a variety of strategies to keep children safe in cold-

weather play is working well: parent satisfaction is very high, and rates of safety incidents are low. Across the 39 practitioners and nine weeks of data collection, six minor injuries from cold weather were brought to parents' attention, and no cold-weather play injuries needed medical attention. For context, in a traditional program setting with a similar time frame and number of children, it would be anticipated that 16–27 injuries would be brought to parental attention. Of those 16-27 injuries, 1–1.25 of them would be anticipated to need medical attention (per injury rates reported by Hashikawa et al., 2015).

In terms of implications from this study, the findings suggest that as policymakers and other decision-makers develop or revise regulations or guidance regarding cold-weather play, the ramifications of using a single temperature threshold should be considered. A "too-cold" temperature guidepost may unnecessarily restrict the type of play that affords the physical movement needed for children's physical health, particularly since it can be challenging during winter months for children to get the recommended moderate-to-vigorous physical activity indoors. The many other benefits to learning and development that unfold from outdoor play in cold weather may also be unnecessarily restricted. Additionally, a "too-cold" temperature guidepost may also communicate "safe" conditions, that, if unaccompanied by practitioners' knowledge, experience, and use of strategies to keep children safe, or in the absence of children's readiness (i.e., proper gear, gross motor skills to allow sufficient physical movement to stay warm, etc.), may actually be quite unsafe.

Echoing the advice of practitioners, flexibility is needed to account for the range of factors that go into the nuanced decision-making necessitated by cold-weather conditions. As illustrated in this study's findings, the practitioners had children's best interests in mind and were very attentive to practices that keep children safe during outdoor play in sub-zero temperatures. Their self-imposed attentiveness was developed and supported through personal experience and professional learning, often in the form of networked learning that facilitated the creation and sharing of knowledge, as well as collaborative inquiry and problem-solving. Thus, flexibility in the context of cold-weather play needs to be coupled with ensuring that practitioners are developing and drawing upon "know-how" knowledge and experience to manage the associated risks. In addition to supporting practitioners' procedural knowledge, outdoor and environmental education organizations and providers of early childhood professional development may want to incorporate opportunities for practitioners to experience the unique benefits and developing a personal appreciation for the seasonality of the places where they live and work, as this appears to be motivating factors that help practitioners overcome the barriers of time and effort.

In conclusion, the weekly reporting logs and questionnaire data from this study suggest that practitioners value the unique benefits of cold-weather play and are very attentive to practices that keep children safe during outdoor play in sub-zero temperatures. Through the use of a variety of strategies, providers are safely bringing children outdoors despite very cold temperatures that occur during program hours. Even on days with reported "real feel" temperatures as cold as -39 degrees F, most are providing time outdoors. A better understanding of what nature preschool providers are currently doing to support outdoor learning in winter environments can help counter cold-weather safety concerns among decision-makers, such as administrators and lawmakers, toward furthering the movement for outdoor learning in public and private preschool settings.

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AUTHORS' NOTE

While beyond the scope of this article, this project also entailed a qualitative study of observations and interviews of nature-based early learning programs, to gather and share in-depth practitioner knowledge regarding how to support cold-weather play opportunities for young children. This procedural knowledge is compiled in the guidebook, *Flourishing in Winter: Guidance for Cold-Weather Play By and For Early Childhood Practitioners*.

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The value and role of outdoor play: Analyzing early learning and childcare websites

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ABSTRACT

In an era characterized by rapidly advancing technology and an increasingly urbanized lifestyle, the role of outdoor play for and with children, families, and early learning and childcare programs has gained substantial attention. This research is a preliminary investigation into if and how early learning and childcare programs identify outdoor play on their websites. This information provides insight into determining how outdoor play is positioned within early learning and childcare centers (ELCs). Data were collected from 125 Early Learning and Childcare websites across five Canadian provinces. Following Bernard Berelson's (1952) content analysis process, the researchers identified and categorized if and how outdoor play was communicated on ELCs websites. The results suggest three types of communication categories used on websites related to outdoor play: explicit mention of outdoor play, no mention of outdoor play, and general mention of outdoor play. The website reviews suggest that early ELC programs should better highlight the benefits of outdoor play and how they incorporate it into daily activities. Despite the growing evidence on the importance of outdoor play for children's wholistic development, the early learning field needs to communicate and make visible the critical need for children, families, and communities to engage in increased outdoor pedagogy.

***Keywords*:** Outdoor play, public policy, outdoor pedagogy, early childhood education

In an era characterized by rapidly advancing technology and an increasingly urban lifestyle, the role of outdoor play for and with children in early learning and childcare programs has gained substantial attention (Golubovic-Ilic & Mikaric, 2023; Nazir, 2019). Currently, ELCs are lacking sufficient and engaging outdoor play opportunities (Dietze & Cutler,2020; Sanseter et al. 2021; Yilmaz, 2016). As families and educators navigate a world in which children spend more time indoors and engage with screens, it is crucial to examine how often early learning and childcare program websites highlight outdoor play as a key feature of their programs.

The outdoor environment provides a multifaceted and wholistic setting for children's development, fostering physical, cognitive, spiritual, social, and emotional growth. Lee et al. (2021, 2022) highlights how outdoor settings

foster physical activity, cognitive engagement, emotional resilience, social interaction and spiritual connection with nature. Research demonstrates that outdoor play is the ideal environment in which children can grow and develop to their fullest potential (Dietze & Cutler, 2020; Kiviranta et al., 2023; Sandseter, et al. 2021;). Dietze & Kashin (2019) cited Chawla (2015), who indicated, "When children's play takes place outdoors, it becomes the ultimate environment for learning, play, building relationships and contributing to health and wellness" (p. 13). This study is a preliminary investigation into if and how early learning and childcare programs address outdoor play on their websites, a crucial step in determining how outdoor play is positioned in the centers.

The Importance of Outdoor Play

Imagine what it would be like for children in early learning and childcare programs not to have opportunities to spend time outdoors daily and in various weather conditions (Lee et al., 2021; Dietze & Kashin, 2019). Research identifies that the absence of outdoor play negatively impacts children's development, from physical activity to language, creativity, and mental wellness (Smirnova & Riabkova, 2016). Children are hard-wired to need nature and to have opportunities to engage in exploration and experimentation in all kinds of weather and outdoor spaces and places (Dietze & Culter, 2020; Smirnova & Riabkova, 2016). It is vital for families and early learning professionals – inclusive of a variety of settings such as large centers, home centers, policy makers, and other professionals working in the field, to understand and explicitly communicate and make visible the importance of outdoor play. To advance outdoor play communication with children, families, communities, and government agencies it is necessary to make clear how outdoor play contributes to children's wellness and healthy development. Ideally, the early learning field makes their positions visible on outdoor play by various means, such as in their marketing and program descriptions on websites, employee and family handbooks, and during orientations.

The importance of positive outdoor play experiences is not new in literature. As cited by Okur-Berberoglu (2021), more than fifty years ago, Carson (1956) noted that when children engage in outdoor play experiences in nature, they engage all their senses and increase their sense of curiosity and wonderment. Outdoor play experiences contribute to children's self-confidence and the development of values, attitudes, skills, and behaviors involving themselves, others, and the environment (Carson et al., 2017). Beaulieu and Beno (2024) and Dietze and Kashin (2019) identified a significant difference between indoor and outdoor environments. They suggested that the outdoors provides more affordances for gross motor play, physical activity, mental health, exploring and experiencing risky play. According to Tunceli and Senoz (2022), early childhood is foundational in setting the stage for lifelong learning, behavior, and health. As Carson et al. (2017) stated, early childhood is a critical developmental stage marked by rapid neurological growth and the formation of fundamental skills. During this critical period, outdoor play serves as a dynamic catalyst for all aspects of a child's growth (Ayaga & Okaya, 2020; Physiother et al., 2022;).

Outdoor play is considered the ideal environment for children's play experiences, learning, and development. (Dietze & Cutler, 2020; Lee et al., 2022; Yilmaz, 2016). Outdoor play provides the ultimate opportunity to contribute to their sense of inquiry, curiosity, and developmental domains. Children who regularly play outdoors develop stronger self-regulatory behaviours, better communication skills, enhanced creativity, and improved attention spans (Beaulieu & Beno, 2024; Nazir, 2019; Yilmaz, 2016;). Outdoor play, such as playing in puddles or experiencing ice and snow melting, further contributes to children's understanding of early foundational concepts in math and science, which improves academic learning of these concepts later (Dewar, 2016). Their play provides fundamental opportunities to develop relationship skills such as building friendships, collaboration, and leadership skills.

Defining Outdoor Play

There is currently a lack of clarity in how outdoor play is defined within early childhood education. To contextualize this issue, it is helpful to explore broader definitions of play. Danniels and Pyle (2018) offered valuable insight into the diverse understandings of play and learning in early childhood education, emphasizing that play-based learning is not a singular concept but a multifaceted pedagogical approach. Their research identified two dominant perspectives: the developmental perspective, which prioritizes free play led by children with educators adopting a passive or observant role; and the academic perspective, which supports teacher-directed learning where educators

actively guide learning toward specific academic outcomes. To reconcile these differing views, Danniels and Pyle (2018) proposed a continuum model of play-based learning that spans from child-led free play to teacher-directed activities. This continuum provides a flexible framework for educators to balance developmental and academic goals, adapting their level of involvement to suit the learning context and needs of the children.

Gray (2008) argued that child-led play is nature's way of educating children's holistic development and characterizes child-led or self-directed play to be inclusive of: self-chosen and self-direction, intrinsically motivated from within the child, structured by children's rules, imaginative and creative and engaging and pleasurable.

In further studies by Kelly et al. (2025), outdoor play and learning is described as experiential, emphasizing embodied, sensory, and hands-on engagement with natural environments. It fosters learning agency through child-led, inquiry-based, and risk-taking play that promote autonomy and creativity. This pedagogy also views teacher-student relationships as creating more equitable dynamics and shared learning experiences. This relational dimension extends beyond human interactions, encouraging learners to build meaningful connections with nature as a co-teacher and to develop environmental awareness.

Together, these perspectives and pedagogical approaches underscore the need for a clearer, more integrated understanding of outdoor play—one that recognizes its developmental, academic, and ecological dimensions, as a vital, child-led learning experience within early childhood education.

Intentional Outdoor Play Experiences

As required by provincial jurisdictions, intentional, child-led outdoor play experiences are critical in the role of the early learning field. As the data demonstrates, if intentional outdoor play experiences are occurring, it is not being explicitly communicated within the websites. All involved in early learning must recognize the places and spaces of outdoor learning within the curriculum and plan accordingly to ensure that all children, families, and communities receive these opportunities to grow and develop to their fullest potential (Learning and Teaching Scotland, 2010, p. 26). Dietze and Kashin (2019) recommended that we need to rethink our outdoor practices. Outdoor play is no longer a time of "free play" but an opportunity to increase intentional outdoor programming and environments with children and families (p.102). Visible communication on outdoor play can guide and influence the collaboration of all ideas, actions, and visions in facilitate quality outdoor play opportunities and programming

The importance of outdoor play for children is well-researched and valued by the early learning professionals (Ardoin & Bowers, 2020). Play is an essential element of children's daily lives and learning. In most Canadian jurisdictions, licensing agencies require early learning to offer indoor and outdoor learning opportunities. Based on a review of early childhood education curricula in Canadian provinces and territories, McCuaig and Bertrand (2019) observed that outdoor play is well established as the medium in which children gain lifelong skills, knowledge, and growth in all areas of development.

Although its value is well recognized, outdoor play is often only associated with physical health and well-being rather than positively affecting wholistic development. However, Lee et al. (2022) demonstrated that outdoor environments contribute far beyond physical benefits. Their research shows that outdoor play, learning, and teaching foster interconnected domains of development—including cognitive, emotional, social, and even spiritual growth—by engaging children outdoor play experiences. According to Golubovic-Ilic and Mikaric (2023), playing outdoors lays the foundation for creating wholistic learning opportunities for our future lifelong learners. Outdoor play must be understood, valued, and intentionally planned for by early learning professionals to provide children, families, communities, and society with ideal opportunities to develop to their fullest potential.

Despite the fact that the early learning and childcare field generally values the importance of outdoor play and learning, Dietze and Cutler's (2020) and Lee et al.(2021) research suggested that children in early learning programs spend less time engaged in outdoor play now than even a decade ago. Often, when children play outdoors in early learning and childcare programs, they experience limited play possibilities and interactions with nature. They may be limited in time to explore, investigate and discover, experiencing intentionally planned play experiences only in

indoor environments. Golubovic-Ilic and Mikaric (2023) identified the need for future teachers, authors of curricula, policymakers, and early learning professionals to change their perceptions to recognize the importance and facilitate outdoor nature-based, child-led, inquiry-based learning.

Family Choices

Families use many tools to determine their children's early learning programs. According to Statistics Canada (2019), families frequently choose early learning programs based on space availability, hours of operation, service provider characteristics, location, cost, and references from others such as family, friends, neighbors, and coworkers, while formal sources of information may include childcare resources, referral agencies, and local human service agencies. Advertisements in community locations, newspapers, social media, and websites are also possible sources.

Families are children's first caregivers. They impart values, beliefs, perceptions, and learnings throughout the generations. A study by Tunceli and Senoz (2022) affirmed that many families perceive outdoor play positively and believe it is beneficial and necessary. As one parent stated,

> I think that the outdoors provides much of the contribution that the child needs in all areas of development, in accordance with the natural developmental speed of the child. Thus, outdoor play, especially in nature, will contribute to children's motor, cognitive, language, and social-emotional development (p. 126).

Some research demonstrates parents' positive perspective in valuing outdoor play in learning, while other research demonstrates that parents view outdoor play as being separate from learning that happens indoors. A study conducted by Parsons and Traunter (2019) argued that there is a disconnect between parents' perceptions of outdoor play as learning. This perception could arise from their own experiences and history, impacting on an understanding of the value of outdoor pedagogy. Parson and Traunter (2019) recommended increased communication "related to the objectives of learning outdoors, the amount of time children should and do spend outdoors and the school policies which guide practice" (pp.708-709), which can contribute to a common understanding of the value and importance of outdoor play.

Communicating the Importance of Outdoor Play

To better understand the importance of the role of the outdoor environment and play, we seek to understand how current research can inform systematic changes in communicating the importance of outdoor play will help in advancement of outdoor play. The National Association for the Education of Young Children (NAEYC) is a professional association that informs early childhood education providers about program standards and best practices in the field. NAEYC states the importance of communicating a philosophy or position statements visible in early learning programs, to families and communities, as it creates and communicates a shared language and evidence-based frame of reference for early childhood educators, and decision-makers to have a shared understanding of the key issue of the importance of outdoor play in early childhood education and how centers or provincial policies and programming could be acted upon.

Outdoor play statements can help communicate and create a shared learning environment. According to Grimwood, Gordon, and Stevens (2018), sharing a common vision and philosophy of outdoor play allows a cultural shift of being with and in nature, building relationships to support a deep level of engagement, support, shaping practices and programming, and knowledge in nature's play. By communicating and making visible outdoor play visions/philosophies, a common expectation and experiences can be created.

Lee et al. (2022) presented the outcome that outdoor environments offer multifaceted and holistic settings for human development. Through the scope of this review, it has been identified that standardized terminology and conceptual clarity are essential for advancing outdoor play research, policy and practices in outdoor education and play. "For many early learning programs across Canada, having a philosophy statement is required as part of the provincial or territorial licensing requirement" (Dietze & Kashin, 2019, p.39). Dietze and Kim (2021) suggested that

an outdoor pedagogy philosophy guides how outdoor spaces and places are prepared for and with children and how the freedom to experiment, experience and play in the space is extended to children. Communicating about outdoor play must be made visible to help inform and guide educators, directors and families in their role in shaping our generations of tomorrow.

To understand the extent to which early learning and childcare programs prioritize these developmental benefits through outdoor play, 125 Canadian Early Learning and Childcare Center (ELC) websites from five Canadian provinces were examined to determine what was communicated about outdoor play on the site.

The background review highlights the importance of outdoor play for children and, therefore, needs to be part of the information offered to families choosing childcare. To assess how much early learning and childcare programs prioritize outdoor play, examining if and how they communicate this on their public websites became essential.

Methodology

This research project is part of a larger applied research project. The research informing this article was conducted over a six-month period in 2023, during which time five researchers in five Canadian provinces examined 125 early learning centers' websites (n=25 centers per province) to identify if and how outdoor play was communicated on early learning and childcare websites.

There are many perspectives and definitions of content analysis. For this article, the researchers were drawn to content analysis as "a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use" (Krippendorff, 2004, p. 18). Essentially, it is a structured method for condensing large amounts of text into fewer content categories, guided by clear coding rules (Krippendorff, 1980). In this instance, using a content analysis methodology is well suited for this study, particularly because of the relatively small-scale study and because it is commonly used with text-based data, such as the text written on early learning centres' websites, which have been written for non-research purposes.

This method enabled the researchers to systematically examine how outdoor play and pedagogy are represented—or omitted—on the websites of early learning programs. By identifying key themes, language, and the frequency of references to outdoor play, the analysis provides insight into how programs publicly communicate their values and practices around outdoor learning. Content analysis is particularly effective for this type of inquiry because it allows for the objective interpretation of textual data that is not originally intended for research purposes, making it possible to uncover implicit messages, priorities, and potential gaps in how outdoor pedagogy is shared with families and the broader public.

Moreover, content analysis supports the study's aim of exploring patterns across programs in a consistent and replicable way, enabling the identification of commonalities or variations in how outdoor experiences are described, prioritized, or linked to programs. It is a valuable method for making sense of naturally occurring text in a way that bridges qualitative insight with quantitative analysis, offering a nuanced understanding of how outdoor play is positioned within early learning environments.

Prior to the website review, the researchers participated in discussions to determine the process for identifying early learning programs and examining and collecting data from the websites. The researchers identified that they would collect the data via provincial portals and health authorities, from their respective provinces, thus sampling would be collected from five provinces. The researchers determined that they would seek the names of twenty-five randomized centers discovered through provincial portals and then conduct an internet search to identify if a center website existed. The researchers identified keywords or phrases (e.g., outdoors, outdoor play, outdoor programming, outdoor spaces for play, nature play, outdoor learning) that would be searched to seek information on outdoor play.

The results were compiled according to three categories:

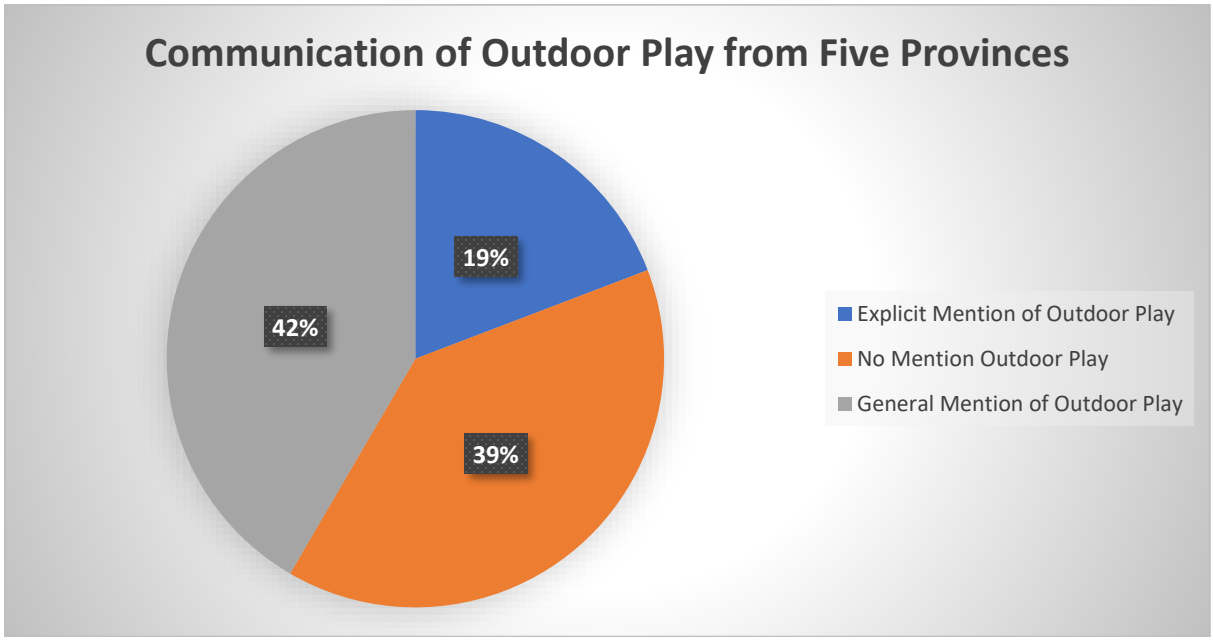
1. An explicit mention of outdoor play would fall under "yes." For our research, "explicit outdoor play" was deemed to include communication that guides perceptions, attitudes, and actions for intentional outdoor play experiences.
2. If the website did not include any information about outdoor experiences, it would fall under the "no" category.
3. The last category accounted for general information about outdoor play listed on the website, such as daily routines, play spaces, general activities, weather permitting statements, or safety equipment checks. While "outdoor play" was mentioned in the general sense, these websites did not provide explicit information on outdoor play in relation to the terms of perceptions, attitudes, or actions involving "outdoor play."

Analysis

Overview

At the time of the data collection (spring 2023), 19.2% (n=24 centers) had explicit communications involving outdoor play visible on their websites, 39.2% (n=49 centers) had no mention of outdoor play, and 41.6 % (n=52 centers) had general mentions of outdoor play on their websites. Table 1 illustrates the breakdown via the three categories. Table 2 illustrates the results by province.

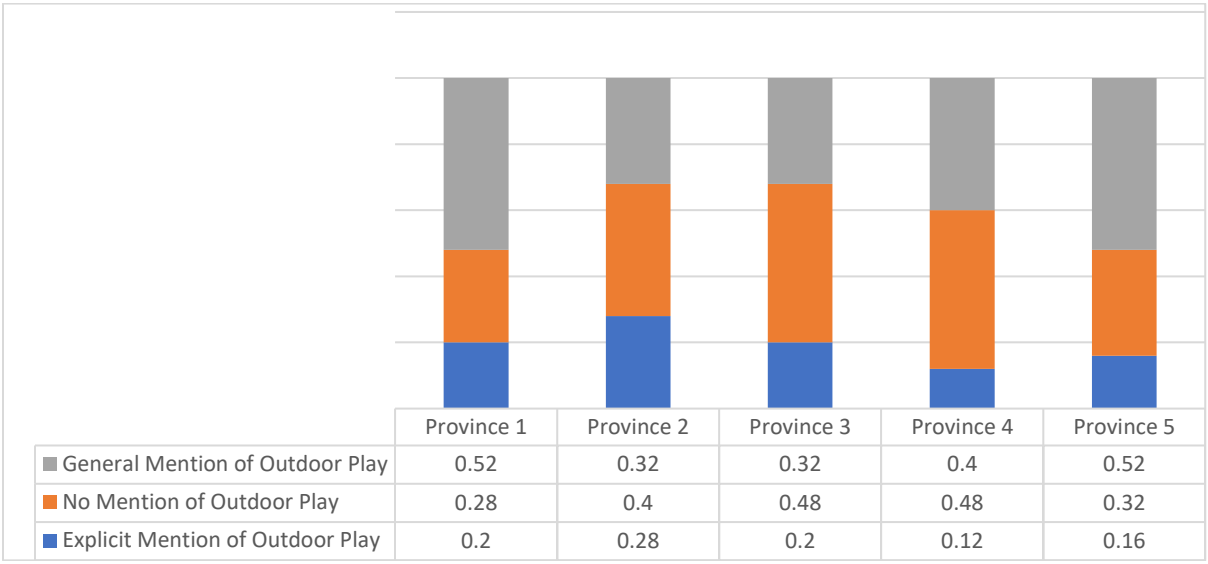
Table 1 –Early Learning and Childcare Programs with Explicit Outdoor Play Communications



Consistent with Table 1: Explicit mention of outdoor play remains the lowest when analyzing the data in the individual provinces.

The data collected in spring 2023 reveals a significant variation in how early learning and childcare programs communicate the importance of outdoor play on their websites. Only 19.2% of centers explicitly emphasized outdoor play, while 39.2% made no mention of it at all. The remaining 41.6% provided only general references to outdoor play. This suggests a need for clearer communication regarding outdoor play across many programs.

Table 2 – Explicit Outdoor Play Communications per Provincial Jurisdiction



	Province 1	Province 2	Province 3	Province 4	Province 5
General Mention of Outdoor Play	0.52	0.32	0.32	0.4	0.52
No Mention of Outdoor Play	0.28	0.4	0.48	0.48	0.32
Explicit Mention of Outdoor Play	0.2	0.28	0.2	0.12	0.16

Findings

Valuing the Importance of Outdoor Play

This study examined the visibility of communicating information about outdoor play on the websites of 125 Canadian early learning centers. Nineteen percent (n= 24 centers) of the early learning and childcare websites explicitly identified outdoor play as a core program component. Per provincial jurisdictions, Province 2 has the highest percentage (28%) of centers identifying information about outdoor play on their websites (n= 7 centers), while Province 4 has the lowest percentage (12%) of centers highlighting outdoor play on their websites (n=3 centers).

The literature review clearly describes the importance of outdoor play for children's healthy and wholistic learning and development. According to Blanchet-Cohen & Elliot (2011), Lee et al. (2021), and Kelly et al. (2025), despite evidence of the benefits of play outdoors, most early childhood educational training focuses on the indoor environment. (p.758-759) Despite the growing evidence and emphasis on this importance, the early learning field, policymakers, and provincial jurisdictions need to take action to communicate and make visible the critical need for increased outdoor play with children, families, and communities. Canada has a ways to go.

Despite the growing evidence of the importance of outdoor play (Beaulieu & Beno, 2024; Kiviranta et al., 2023), this research suggests that if outdoor play is part of early learning programs, it is not clearly articulated. This aligns with Dietze and Kashin's (2019), Kelly et al. (2025), and Grimwood et al.'s (2018) studies, which highlighted several factors influencing the advancement of quality outdoor play, including the importance of communicating and visibly presenting outdoor play statements or policies to guide practices and programming.

Intentional outdoor play experiences are critical in early learning and childcare centers. Dietze and Kashin (2019) recommended that early learning field need to rethink our outdoor practices. Outdoor play is no longer a time of "free play" but an opportunity to increase intentional outdoor programming and learning with children and families. Why is outdoor play not being communicated as an essential program component? According to Kelly et al. (2025), a systematic policy shift is required to clearly articulate outdoor play, enabling the effective enactment of a curriculum vision that embraces outdoor learning. Taken together, these perspectives highlight the importance of developing clear communication on outdoor play—one that integrates child-led principles, supports diverse learning needs, and aligns with broader curriculum and policy goals on outdoor play and learning in early childhood education.

Summary

This study may be the first in Canada to explore how often outdoor play is communicated as part of the information on early learning and childcare center websites. Our preliminary study suggests that early learning and childcare centers would benefit from examining content on their site to determine if there is information on outdoor play that they wish to make visible, and if so, why this would be important for current and potential families. As families, the child's first caregivers, and educators navigate a world where children spend increasing amounts of time indoors and on screens, it becomes essential to consider how frequently early learning and childcare program websites emphasize outdoor play as a central component of their programs.

While this study is a preliminary review of how early learning and childcare centers communicate about outdoor play on their websites, it does not provide insight into the complex issue of why early learning field does not specifically mention outdoor play as part of their programming and learning. Results from the data collection can only be generalized from the core question, "How do early learning and childcare programs communicate outdoor play as a programming component on their websites?" Nevertheless, this study highlights how outdoor play and learning is represented on early learning and childcare websites.

Limitations

There are limitations to this study. First, the sample of early learning centers was small (n=125). This study was designed to identify if and how early learning and childcare programs communicated information on outdoor play on their websites rather than serve as a comprehensive examination of all early learning and childcare programs' websites.

Second, the study depended on the content available on websites. Researchers used their provincial early-learning tools to identify early learning and childcare centers within the provinces. Based on the results generated by the tools, the researchers randomly selected early learning and childcare centers on the Internet to identify if the early learning and childcare center had a website. The search for early learning and childcare programs concluded only when a researcher was able to reach a total of 25 centers in the designated province.

Third, the timing of the data collection (February 2023 to July 2023) cannot reflect later changes to websites or the creation of new websites for existing early learning and childcare centers. The percentage of licensed childcare centers using websites to communicate their services is also undetermined, and, as seen in the literature review, websites are only one of many modes of communication.

Recommendations

Detailing the importance of outdoor play helps build a shared understanding of the expectations and actions needed to promote outdoor play with children, families, and the community. This research demonstrates a lack of explicit communication involving outdoor play. Researchers Legget and Newman (2017) and Kelly et al. (2025) identified the need for a systematic and sociocultural shift to advance outdoor play. Provincial jurisdictions must go above and beyond minimal standards in licensing. Collaboratively with administrators, educators, and outdoor play organizations, it is recommended to increase licensing recommendations of outdoor play and learning to be visible and explicitly communication for curricular expectations. Our children, families, and communities deserve more than the minimum standard.

The early learning field and outdoor play organizations need to work together to continue to support, educate and increase awareness of the importance of outdoor play for all children, families and communities. Through leadership support, and outdoor experiential professional development, the early learning field can gain confidence and feel supported to evolve outdoor play practices and change perceptions when working with children outdoors. (Dietze & Kashin, 2019; Kelly et al.,2025; Golubovic-llic & Mikaric, 2023), thus providing opportunities to communicate the

importance of outdoor play for children, families, educators, policymakers, administrators. to all current and future early learning professionals.

Creating provincial, municipal, and early learning outdoor play communications will impact attitudes and perceptions for high-quality outdoor play today and tomorrow. Outdoor play must be visible in marketing tools, parent handbooks, and employee handbooks to guide outdoor curricula expectations, continuously improve outdoor practices, and provide the opportunity to take actions that increase outdoor play.

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One Preschool's Adaptations and Modifications to Maintain Nature-based Programming During COVID-19

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ABSTRACT

The COVID-19 pandemic required many early childhood programs to adapt to remote learning. While there is research on early childhood teachers' responses to this new mode of learning, few studies examined how teachers in nature-based programs modified their practices. This qualitative case study examines early childhood educator practices in a nature-based university laboratory school program in the United States. We focus on how teachers maintained their commitment to nature-based, child-centered, and developmentally appropriate practices while supporting children and their families during remote programming. The data include classroom and school-wide documentation from the first three months of the COVID-19 pandemic when the teachers shifted to online remote programming. The findings illuminate how teachers adapted their nature-based curriculum and programming while maintaining alignment with the *North American Association for Environmental Education Guidelines for Excellence in Early Childhood Environmental Education* despite providing remote instruction.

Keywords**:** nature-based education; early childhood education; remote learning; developmentally appropriate practice; SDG 4 - Quality Education

The COVID-19 pandemic created unprecedented conditions for early childhood education (ECE) around the world. In the United States, mid-March 2020 began the time of disruption, forcing programs to quickly adapt teaching practices, expectations, and modes of communication to meet children's needs while coping with the evolving pandemic and personal challenges (Pic et al., 2023; Weiland et al., 2021). Many ECE programs remained closed during this period, whereas others shifted their programming to remote platforms (Ali et al., 2021; Grimm, 2020). Research exists on how ECE teachers adapted to the new reality, yet few studies examine educator practices in ECE nature programs.

ECE nature-based programs in the U.S. are informed by the *Early Childhood Environmental Education Programs: Guidelines for Excellence* developed by the North American Association for Environmental Education (North American Association for Environmental Education (NAAEE), 2016). Nature-based education is place-based education (Schools, 2019) and not pedagogically designed for remote learning; therefore, it leaves the adaptation of its practices at the discretion of teachers. Beginning in mid-March 2020, ECE nature-based program teachers faced a twofold challenge: 1) maintaining child-led, developmentally appropriate practice, and 2) preserving the nature-based component while all class members were home and interacting online. To elucidate teachers' responses to the new reality, this study examines how one university laboratory school, serving children ages 2-6 years, worked to sustain its commitment to providing high-quality and developmentally appropriate nature-based programming for 82 children and their families. This study explores the research question:

- Was a university nature-based laboratory school able to address the *Early Childhood Environmental Education Program Guidelines for Excellence* via remote programming during the initial months of the COVID-19 pandemic, and if so, how were they able to achieve this?

Theoretical Framework

NAAEE Guidelines for Excellence: Early Childhood Environmental Education Programs

The North American Association for Environmental Education *Early Childhood Environmental Education Programs: Guidelines for Excellence* (North American Association for Environmental Education (NAAEE), 2016) (hereafter, *Guidelines for Excellence*) were designed as recommendations for programs serving children birth–8 years to reflect best practices in nature-based programming while also prioritizing the development of the whole child. These guidelines depict a philosophical approach for teaching young children in nature-based contexts and provide structures for developing, improving, and evaluating programs. In addition, the guidelines describe the anticipated nature of the curriculum, instruction, stakeholder relationships, and programmatic structures.

The *Guidelines for Excellence* are organized around six Key Characteristics: (i) program structures, (ii) developmentally appropriate practice, (iii) play and exploration, (iv) curriculum, (v) place, and (vi) educator preparation. Each Key Characteristic consists of two to eight Guidelines that provide additional context about high-quality practices in nature-based programs and encourage the inclusion of local culture and climate. Key Characteristic 1 identifies core programmatic-level components of a high-quality early childhood environmental education program with an overarching emphasis on components essential to the mission and philosophy of high-quality programs. Key Characteristic 2 calls for developmentally appropriate practices that address the needs of the whole child through child-centered authentic learning experiences. Learning experiences that are culturally relevant, grounded in play and exploration, developed with the child in mind, and aligned with children's individual needs are emphasized. Key Characteristic 3 calls for programs to provide children with time to play and explore the world around them to support the development of the whole child and foster creativity and understanding of the world. Key Characteristic 4 provides a comprehensive vision for a developmentally appropriate, nature-based curriculum. This characteristic identifies the need to address children's developmental and learning needs and foster cognitive development through building a sense of curiosity and thinking skills through inquiry and exploration. Key Characteristic 5 acknowledges the importance of place and supports the use of a wide variety of safe, enticing, and comfortable indoor and outdoor spaces to encourage exploration and learning. Key Characteristic 6 identifies and highlights the knowledge that the professionals in high-quality environmental education programs must possess and demonstrate. The Key Characteristics are intertwined and overlap, with a consistent focus on the holistic development of young children in nature-based programs. The Appendix of this paper outlines the six Key Characteristics and their Guidelines.

Literature Review

Nature-Based Programs

In the United States, the popularity of nature-based programs has grown in response to the increased focus on curriculum standards as well as with concerns about increased screen time for young children and circumstances that have reduced opportunities for child-initiated play and outdoor play. There are approximately 800 nature-based preschools in the U.S. (North American Association for Environmental Education (NAAEE), 2023). A curriculum rich in child-led learning, free play, and natural outdoor play spaces are fundamental components of nature-based programs (Finch & Bailie, 2015). Nature-based programs generally share three common elements: 1) nature themes and daily nature exploration are central to programming; 2) programs are equally committed to high standards and developmentally appropriate practices in ECE; and 3) best practices of environmental education are adopted (Finch & Bailie, 2015). While nature-based learning occurs indoors and outdoors, outdoor classrooms support unique exploration opportunities (Bohling et al., 2010; Finch & Bailie, 2015), diverse educational experiences (Finch & Bailie, 2015; North American Association for Environmental Education (NAAEE), 2020), child-initiated, and full-body

learning. Through nature-based education, children receive opportunities to interact directly with nature, which promotes environmental stewardship (Kuo et al., 2019) and independent problem-solving (Fjørtoft, 2004).

Developmentally Appropriate Practice

Developmentally appropriate practice (DAP) is a framework for high-quality early childhood programs grounded in child development and the social, cultural, historical, and linguistic contexts of children's and families' lives (Iruka, 2022; LaForett et al., 2023; National Association for the Education of Young Children (NAEYC), 2022). Teachers create a classroom environment that fosters whole-child development through the use of child-centered teaching practices that address children's developmental needs (cognitive, physical, social-emotional, and linguistic) and content-learning needs (literacy, mathematics, science, social studies, and creative arts). To support the healthy development of all children, teachers work collaboratively with families to foster partnerships that enable them to understand and support the child's needs and background (Mancilla & Blanco, 2022; Author & Author, 2024). Teachers strive to establish strong relationships with children and families and create a warm and welcoming environment that supports engagement and learning (Wright, 2022).

As a part of DAP, planning is an intentional process in which teachers focus on the developmental domains for growth and content learning areas while supporting play-based learning and exploration. Such intentionality is grounded in an understanding of each child's strengths and needs that arise from ongoing observation, documentation, assessment, and conversations with families (Masterson, 2022; Scott-Little & Reschke, 2016). Play-based learning incorporates a spectrum of experiences from free play to teacher-guided play and provides children with the opportunity to explore, make mistakes, and learn through trial and error (Pyle & DeLuca, 2017; Zosh et al., 2022). Play allows children to initiate learning experiences. The inquiry process is supported by the educator posing strategic open-ended questions to encourage extended and expanded learning and to connect children's prior knowledge to new learning experiences (Becker & Mastrangelo, 2017; Ontario Ministry of Education, 2017; Weisberg et al., 2013).

Remote Programming in Early Care and Education Settings during COVID-19

The COVID-19 pandemic forced teachers to reinvent their classroom practices. In-person programming was relocated online, creating new challenges for children, teachers, and families. Several barriers emerged during the transition to remote programming, such as differences in educational support structures for ECE compared to K-12, and inequity of technological resources among families (Aslam et al., 2023; Shukia & Marobo, 2024). Unequal access to technology impeded the educational process for children whose families did not have an Internet connection or mobile device in their household (Timmons et al., 2021). Additionally, families and teachers had to familiarize themselves with how to engage in remote instruction, as not everyone had the same level of technological literacy (Aslan et al., 2022; Nikolopoulou, 2022). Furthermore, children had to acquire new ways of communicating, a challenge for younger learners. As such, teachers noted the need for clear guidelines that would enable them to successfully facilitate remote instruction (Ford et al., 2021). Teachers also perceived that online education suffered from the paucity of differentiated instruction, such as providing feedback, task modeling, and one-on-one guided interaction (Aslan et al., 2022). Meeting the individual needs of children while maintaining everyone's attention during synchronous classes was difficult because of the lack of in-person interactions between children and their teachers (Steed et al., 2022).

Despite these barriers, many early childhood teachers adapted their instructional practices to accommodate remote programming for young learners. Although it was not an ideal option, remote learning provided a safe way to continue the educational process. Programs varied according to how they provided remote delivery with some teachers providing web-based resources or educational programs for families to utilize, and others providing synchronized online whole-group learning experiences or asynchronous recordings for children and families to view programming at convenient times (Lee et al., 2021; Timmons et al., 2021). The lack of meaningful, in-person social interaction between children was a primary concern reported by both educators and families (Timmons et al., 2021). To address concerns of social isolation, teachers providing online synchronous experiences occasionally divided children into small groups during class time and held one-on-one sessions to provide more individualized support

and maintain a sense of community (Steed et al., 2022). Online instruction also led teachers to develop new curricula and innovate ways to present content across various online platforms, such as interactive tasks, videos, online games, art, and music (Aslan et al., 2022; Lee et al., 2021).

Studies of ECE teacher practices during the first three months of the COVID-19 pandemic often utilized interview or survey methods (Aslan et al., 2022; Atiles et al., 2021; Steed et al., 2022; Timmons et al., 2021). However, few studies utilized classroom-based materials. Additionally, there is limited scholarship on nature-based teacher practices during the COVID-19 lockdowns, particularly in ECE settings. One nature-based program study by Assaf and Gan (2021) examined Israeli environmental education teachers' practices across preschool- and school-age groups during March-April 2020 remote learning. The authors analyzed classroom materials and teacher interviews and found that teachers encouraged both direct and indirect experiences with nature and provided active and passive learning opportunities for their students. Teachers also strove to foster nature connectedness, connected environmental education to the pre-COVID period, incorporated technology into instruction, and encouraged students and families to share their experiences with nature.

During the COVID-19 pandemic, educators throughout the globe sought information about how to continue to support children's growth and development and address the needs of children and families while teaching remotely. Studies examining teachers' practices in nature-based ECE programs during the initial months of the COVID-19 pandemic are limited Additional research is warranted to support educators should new crises emerge. This study seeks to understand nature-based early childhood educators' practices and how they navigated remote learning challenges to support children through place-based teaching approaches. This study contributes to the literature through an examination of how early childhood educators in a university-affiliated laboratory school adapted their instruction for remote learning while adhering to the NAAEE Guidelines for Excellence. It also provides insight into how these educators navigated the challenges of supporting children through place-based, nature-based teaching approaches. Further, findings add to the early childhood education literature about the COVID-19 pandemic and remote teaching practices through documenting how teachers maintained high-quality nature-based early childhood education and engaged families. Findings can be used to inform teaching practices and procedures for supporting learning and development during a crisis or situation that necessitates educators need to work via remote approaches, such as addressing the needs of a family in transition or an ill child.

Materials and Methods

This study used a qualitative case study design (Yin, 2018). The main characteristics of a case study are the selection of a single unit of inquiry and the definition of its boundaries (Flyvbjerg, 2011). Case studies allow for a deeper understanding of contemporary real-life phenomena, permit the use of multiple data sources, and are applicable to situations in which the researcher does not have control over the event, particularly when it occurred in the past (Yin, 2018). An in-depth examination of a phenomenon through a case study provides concrete knowledge that is embedded in the context.

Research Site

This study was conducted at a university-based early childhood laboratory school located in the mid-Atlantic region of the United States. The program is licensed by the state and accredited at the highest level by the National Association for the Education of Young Children (NAEYC) and the state. At the time of the study, there were four full-time and two part-time teachers. All full-time teachers had 13-40+ years of teaching experience, held one or more master's degrees, and several had additional degrees including in nature-based education. In a typical year, this laboratory school supports over 175 children ages 6 months-6 years. Additionally, teachers serve as mentors, coaches, and instructors for about 300 university students annually. The emergency situation in the early months of the pandemic required in-person programs to abruptly move to remote programming, impacting instruction and practice for five classes (ages 2-6 years; 82 children and their families), 95 undergraduate students, and two visiting scholars. The five classes included a two-year-old class (2s); a three-year-old class (3s); a three- and four-year-old prekindergarten class (PreK); a nature preschool class (Nature) for ages three to four years; and a prekindergarten/kindergarten class (PreK/K) for ages four to six years.

The laboratory school program is grounded in its commitment to child-centered, developmentally appropriate practice (NAEYC, 2022). The curriculum emphasizes nature-based education, social-emotional development, and mindfulness. Individualized instruction is used to address learners' needs and position relationships as central to instruction. Teachers are committed to families and weave culturally responsive practices throughout their programming and daily interactions. These commitments are highlighted in the mission and guiding principles of the program and are evident in the mentoring and instruction provided for young children and university students. Additionally, teachers, staff, and undergraduate students participated in critical self-reflection and evaluation of learning to inform curriculum planning and decision-making.

As remote programming was established, teachers worked to support the children and their families to maintain the relationships they had built throughout the year. Teachers also worked to ensure that children continued to be engaged in early childhood programming and sought to provide a sense of consistency and routine in light of unprecedented events. Teachers facilitated communication with families through email, Zoom, FaceTime, phone calls, Bloomz (a communication app for supporting classroom-level adult communication), Google docs, and the school's Facebook page.

Data Sources and Analysis

Data for this study were program- and classroom-level sources from mid-March through early June 2020. Classroom-level data were teacher communications to families about class curriculum and resources, including classroom emails and newsletters (n =209), social media public posts and class group interfaces (n =295), Mindfulness Challenge emails (n=7), a class resource Google folder, and photo albums (n=4). Program-level data were program documents (n=3), media coverage (n=5), program-level staff communications and shared resources, and staff meeting notes and transcripts (n=2). The researchers were provided access to all program- and classroom-level data by the school administrator and teachers. This study is part of a larger study approved by the University Institutional Review Board. As a part of the larger project, additional insight into classroom practices was provided via recorded classroom Zoom sessions that were viewed and summarized by the research team, and one of the researchers attended staff meetings and periodically attended zoom classes throughout the lockdown.

Qualitative analysis was conducted using the multi-cycle approach described by Saldana (2016) which engages researchers in coding and reorganizing the data multiple times to develop a deeper understanding of the phenomena being studied. Each researcher was very familiar with the data from previous work with the data set. Throughout the analytic process, the researchers met regularly and utilized a collaborative qualitative analysis (CQA) approach to discuss the data and develop a mutual understanding of the data and analysis (Richards & Hemphill, 2018). This coding approach has been noted to support trustworthiness and rigor throughout the analytical process (Richards & Hemphill, 2018). In the first coding cycle, the data were read multiple times to identify nature-related curricular topics that spanned the five classrooms (Richards & Hemphill, 2018). Second, using a holistic coding approach, data were coded for each curricular topic and thematic reports were produced based on the nature-based curricular topics. Next, the NAAEE Guidelines for Excellence (2016) were used as *a priori* codes and an interpretive lens for examining the data. Each thematic report was then hand-coded during a third coding cycle. Coded reports were discussed as a team, and all questions or differences in opinion were reconciled by consensus process. To confirm that each of the NAAEE Guidelines were addressed in the data, a central matrix was compiled as part of a fourth cycle of analysis (Saldana, 2016); a streamlined version of the matrix is included in the Appendix.

To ensure credibility and validity, the data were analyzed using an inductive approach and member-checking with teachers (Gibbs, 2018). Methods triangulation (Patton, 1999) was employed to verify the consistency of findings across multiple data sources. Additionally, the data were examined line-by-line and searched for negative cases that did not fit the pattern trends (Gibbs, 2018).

Ethical Considerations

This research study was approved as an exempt study by the [Blinded] Human Subjects Research Institutional Review Board. Exempt status was determined following the United States Department of Health and Human Services Common Rule 45 CFR § 46.102. Additionally, the study conforms to the ethical principles of the Declaration of Helsinki and the Belmont Report. The data set is an archived collection of teacher communications to families about the curriculum. The data set was provided by the school. We have written permission and consent to use the data set from the school administrator and the teachers who worked provided us with access to the data set.

Results

This programmatic case study of a university laboratory school that operated remotely during the initial months of the COVID-19 pandemic examined how the nature-based program met the NAAEE guidelines. Findings illustrate how teachers incorporated the NAAEE's key characteristics and guidelines into their remote practices. Teachers leaned into place-based teaching, shifting from the singular location of the school to a broader landscape, including teachers and family homes, and the natural phenomena present in the local environments of teachers and families. Using the three most comprehensive curricular themes with clear nature-foci (*Connecting to Nature, Studying Birds, Earth Day and Caring for the Earth*), we describe emergent program-wide curricula and how the NAAEE guidelines were addressed. Space limitations prohibit our ability to address each NAAEE Guideline. Therefore, we focus on selected Guidelines from each Key Characteristic via a discussion of the three program-wide nature-based themes.

Connecting to Nature

The NAAEE Guidelines for Excellence (2016) state that "environmental education often begins close to home, encouraging learners to understand and forge connections with their immediate surroundings" (p. 6). Prior to COVID-19, school-based nature curricula were extended when teachers shared the curriculum with families and suggested additional at-home family activities. The COVID-19 lockdown required teachers to rethink their nature-based programming and reposition their instruction in children's homes, yards, balconies, and neighborhoods. At the onset of lockdown, initial challenges to remote places included learning to use Zoom technology, maintaining relationships between the school, families, undergraduate students, and teachers, and developing approaches for everyone to learn together. Despite these initial challenges, as the Nature teacher noted in a staff meeting, "We persevered through it because we wanted to make sure that the kids were reminded that this still is a nature program, and we still wanted our focus to be on nature. Our themes had to do with the different natural [phenomena] that we saw were happening at our houses."

To adapt to remote place-based learning, teachers created ways to incorporate nature in indoor Zoom-based activities and foster outdoor connections. When it was deemed safe to go outdoors, teachers began supporting home-based place-based remote learning by encouraging families to explore outdoors in their immediate backyards and neighborhoods. Teachers also identified safe outdoor areas where families could explore (Guidelines 5.1, 5.5).

> Send me (via e-mail) a photo of your child in a WILD space either in their yard or beyond. These "beyond" spaces might be outside your fence or a state park. Our State Park system has remained open and is waiving entrance fees. If you do visit a park, don't forget - social distancing! (Bloomz post, Nature teacher)

Teachers encouraged families to go outdoors to observe and notice the spring changes. Families were prompted to document and share findings with the classroom community by bringing materials and artwork to the Zoom class or posting photographs on class social media or Google photo albums. In one class newsletter, a student teacher wrote,

> As the weather gets nicer, go on a nature walk and bring some paper and crayons. Try to draw what you see. Send us any pictures of what they draw! Tip: Call them art detectives and have them find… objects to draw/paint. (Newsletter, PreK student teacher)

Teachers needed to be sensitive to the varying needs and comfort levels of families and children (Guideline 5.3). Teachers' weekly emails contained nature-based activities and resources for families who were not able or comfortable to participate in Zoom sessions, for those who were searching for additional activities to do with their children, and also for those who could not go outside. One teacher tried to accommodate differing needs by providing activities that could be done indoors or outdoors including, through windows, on balconies, and in yards.

> Tuesday we will focus on Our Backyards/Balconies & Beyond - What does it mean to be a Nature Explorer/Earth Guard? We will draw maps so your children will need paper and a writing utensil. (Bloomz post, Nature teacher)

The teachers also brought the outdoors inside by incorporating nature into class Zoom sessions. Many different approaches were used, including having children or teachers create videos or leading Zoom sessions from outdoors.

> Tomorrow at 1 is going to be exciting as we will be learning about honeybees! I will be taking videos today of the inside of one of my hives and hopefully will get a bee to sip honey from my hand. (Email, PreK/K teacher 1)

Children were invited to share nature finds during class Zoom sessions. Additionally, children in the Nature class and the PreK/K class shared their outdoor spaces through yard tours facilitated on Zoom,

> We loved being able to check out Sam's Park! She was such a great tour guide as she shared where she likes to make "witches brew." Your children were so kind as they complimented her on her space. If you haven't signed up to share your WILD space (yard or beyond) with us please do so. You may need to use Zoom on your phone in order to be able to move freely around the space. (Email, Nature teacher)

Teachers created nature-based experiences in which children could participate synchronously while on Zoom. Many of the activities were designed to support children using natural materials. Some children participated in class activities while on their balconies, porches, or doorsteps, others ventured into their yards.

> Thursday - Nature Portraits - We would love for you to join us outside for our Zoom together. We encourage the children to collect various nature items before this meeting, but if they are outside, they can always add items as we create. We will make nature portraits together. (Email, Nature student teacher)

Teachers also encouraged children to observe clouds, the moon, and the weather. As evident in one class's study of the wind, they even worked to make the invisible visible in order to help demonstrate concepts.

> Windy Day - Have your child bring something to show the wind - This could be a pinwheel, a ribbon wand, a scarf, butterfly wings - anything that would help the children to see the wind. (Email, Nature teacher)

Teachers were concerned about the well-being of families during these uncertain and stressful times. In their emails, they made connections between outdoor experiences and positive emotions and promoted mindfulness as a means of self-care and support.

> One of my favorite activities is to lie down on my back and watch the clouds roll by. I enjoy looking up at the canopy of trees overhead, or just looking for birds and listening to their songs. (Email, 3s teacher)

> I am also working on uploading a video reading of A Thank You Walk that I did a few days ago. Taking a thank you walk is a wonderful way to get outside and practice gratitude at the same time-

> - two scientifically proven strategies for improving physical and mental health. (Mindfulness Challenge #2, PreK teacher 1)

Collectively these examples illustrate how teachers adapted nature-based instruction to remote, home-based places by connecting children to nature in their surroundings through hands-on experiences. The excerpts also depict teachers' attention to DAP and the whole child, with their focus on children's social-emotional development, wellness, and physical health and children and families' mental health (Guidelines 4.1, 4.6). Teachers' environmental literacy and child-centered pedagogical approaches supported hands-on learning through the five senses and authentic experiences (Guidelines 2.3, 2.2). Additionally, they emphasized children's development of skills needed to learn about and connect to the local environment through emphasis on working with natural materials in order to observe, notice, document, and communicate findings (Guideline 4.4). Throughout these times, the teachers were cognizant of different family circumstances and worked hard to provide nature-based activities for families who stayed inside and/or could not or did not want to engage through Zoom (Guidelines 1.3, 5.3). All families were provided with a wide variety of learning activities as well as modifications that addressed children's different needs and families' health and safety concerns (Guidelines 2.4, 6.1, 5.5).

Studying Birds

Prior to the pandemic, teachers had engaged the children in the study of birds at school (Pollock et al., 2020). In the remote setting, teachers were committed to maintaining program routines and traditions as one way to evoke coherence and consistency for themselves, the children, and families. Bird study was adapted to remote programming through activities specifically designed to engage children and families, such as building bird nests and observing birds in their local environment. Nest building, eggs, and hatching activities addressed by each teacher demonstrates how they utilized their nature-based knowledge, environmental literacy (Guideline 6.3), and teaching practices to modify activities for remote learning. The teachers actively engaged children in hands-on, authentic experiences with natural and recycled materials available in the children's homes and yards (Guidelines 2.2, 3.1, 5.2). Suggesting the use of common, easily accessible materials and local, nature-based materials available in children's home environments was one way in which teachers were able to engage children in authentic and nature-based hands-on activities (Guideline 5.1).

> I have attached a few articles that describe how to make a bird nest, some using recycled or repurposed materials, such as bags or even boxes, and some using natural materials. Some use glue, some do not. The paper bag nest is a great way to start a conversation about nest building. One article has great questions such as, "Will the nest hold up in the wind?' or "What happens if it gets wet?" These are questions for your child to wonder about as they are building….
>
> Maybe going on a walk to look for real bird nests in your community can provide a relaxed time for discussion of how and where birds build their nests. Those "I wonder...." statements can be a window into your child's imagination and the building of the nests can be a demonstration of their creativity and their learning. Maybe it can be a family activity….
>
> I have also attached a few close-up photos of the real bird nest I used [in class] this morning. Your children can see up close the many different materials that a bird used in building this nest. (I did put the nest into my freezer for a while to ensure that it was safe for me to touch.) I encourage you to be creative as you complete this building together as a family. We are really excited to see what you and your child have to share with us at our Thursday Zoom. (Email, 2s teacher)

Consistent with the NAAEE Guidelines (2016), the program demonstrated a strong commitment to family partnerships (Guideline 2.1). These relationships gained a heightened level of importance as it became apparent that parents needed to facilitate school-based interactions with their children. As evidenced in the above quote, the teachers provided information to support children's development and engagement in activities that could provoke thinking and conversation (Guidelines 3.2, 4.2, 6.4, 6.5) while also supporting family engagement and enabling parents to take on new roles as teaching partners (Guidelines 1.4, 6.3, 6.2, 6.4, 6.5).

Another example of extending classroom practices to the remote setting was evidenced by the 2's and 3's teachers. Prior to the pandemic, both toddler classes studied birds that visited their classroom window feeders. This activity was adapted to the remote setting by encouraging families to observe birds near their homes.

> Hi friends, See the beautiful Northern Cardinal at my feeder here at home? What birds are you seeing and hearing while you are at home? (Email, 3s teacher)

All the teachers worked to foster real-life connections with birds, nests, and baby birds in nature. In the PreK/K class, a teacher created a video of herself walking around her yard locating bird nests in shrubs and on her porch, which was then shared during a synchronous Zoom session. In one email to families, a PreK teacher shared moments from her daily walk and explained that these nature-based experiences evoked a sense of joy and beauty.

> I went for a walk in the neighborhood today as usual. There are usually two geese by the pond. This afternoon when I took a moment to look closer, I saw two goslings and a cracked egg near the two geese. The goslings might have just hatched! I was so excited to share the pictures (see attachments)….This moment reminds me of a quote by Stephanie Mills in one of Mindfulness Challenge emails from Miss W. "There is always beauty to see if you have an eye for it. Looking is a practice. Seeing is a gift that comes with practice." I experienced a moment of joy as I took time to notice. What are your moments of joy today? (Email, PreK teacher 2)

The study of hatching is an annual tradition at the laboratory school; two classes continued this practice. One class connected families to a chick hatching webcam through a State University 4-H program providing families the opportunity to view chicken eggs in an incubator and live candling experience.

> Our Egg Exploration Zoom session starts at 1:45 p.m. tomorrow. We are going to listen to the story, *Where do chicks come from?*, by Amy Sklansky then watch, "Live Candling" on the Egg Cam. I wonder how the eggs have changed over the past 7 days? We will be nature scientists and observe closely what's happening inside the eggs. We will also practice our observational drawing skills to document the growth of the eggs. Observational drawing is drawing what you see as realistically and as true to life as possible. It is a great exercise in seeing and exploring how all of the details interact. If your child (or you) would like to join us in doing an observational drawing, bring a piece of paper, a pencil or black marker with you. If you would like to include color in your drawing, bring crayons, colored pencils or markers. Find out more about the eggs - the third week of incubation, days 14-19." (Email, PreK teacher 1)

A different teacher brought chicks into her home and shared updates with the families via email, videos and synchronous Zoom classes.

> We rescued some chickens, a chick, and some eggs from the middle school. Out of the 4 eggs that made it to hatch day, 2 have hatched so far. Egg #1 needed some help, but I took this great video of egg #2 hatching. Enjoy Friends! (Email, Nature teacher)

Earth Day and Caring for the Earth

Teachers created school-wide events to support a sense of community and belonging (Guideline 1.8). They made a programmatic decision to encourage families to go outside, engage in the environment, and celebrate Earth Day. On Earth Day, teachers did not hold Zoom classes; instead, they encouraged families to spend the day off technology and go outdoors. These decisions reflected the teachers' ongoing concerns about young children learning through technology, their desire to limit screen time, and their commitment to young children's engagement in physical activity and active learning (Guideline 4.6).

To encourage families to go outdoors on Earth Day, the teaching team developed an Earth Day activities resource list that was distributed throughout the school. The resource list provided activities that families could complete

either indoors or outdoors. Many ideas (crafts, nature walks, scavenger hunts, Earth Day books, recycling activities, sound hunts, and songs to sing) were open-ended and flexible regarding choices and materials. Collectively, the activities addressed a wide range of developmental and learning areas. Some families shared pictures or short messages, one parent wrote, "We didn't take a lot of pictures but played in the yard, tried to fly a kite (no luck), and hung out. [We] also picked flowers from our yard and made ornaments" (Email, PreK parent).

The student teachers' Earth Day newsletter included descriptions of artists who grounded their work in nature with related activities for families, such as nature walks and crafts for them to do together (Guidelines 6.1, 6.2, 6.3, 6.4, 6.5).

> Attached is this week's newsletter, there are lots of fun activities your family can do to celebrate Earth Day on Wednesday! From creating art like Monet who was inspired by nature, to building forts, to going on a nature walk, there are many resources to look at. If you're able to do any of these activities, please share it with us!

Additionally, teaching teams created a weeklong Earth Day curriculum with activities about sustainability and recycling that helped children think about ways they could take care of the Earth (Guideline 5.6). Several teachers taught about the types of plastics and recycling, while incorporating number recognition,

> Please find 5 plastic containers that can be recycled. We will be looking at recycling numbers on the containers. They can be found on the side or bottom of the containers in a triangle made of arrows and range from 1-7. (Email, 3s teacher)

Children also repurposed household materials for construction activities,

> Find materials in your house that you are not using anymore and repurpose them to build something new! Questions you might ask your child to help them think… How do you know or decide if something can be repurposed (used again in a new way)?... Are we still using this material? Is it still needed? How do we know this material is ready to be repurposed? Is it safe to repurpose this material? How are we helping the Earth by repurposing this material? (Email, PreK teachers)

Teachers read books about ways to care for the Earth, discussed sustainability, and worked to help children understand the impact that they could make on the Earth. As one teacher wrote to parents,

> I have attached a list of activities and resources that the teachers have compiled that focus on recycling, and how we can positively impact the environment. Children become Earth Guards as they feel the power in their ability to help the Earth, even if it is simply picking up trash when out for a walk or reminding a grownup to recycle. (Email, 2s teacher)

Another teacher wrote,

> Be prepared! Your little Earth Guards can become quite passionate about this and how they can help to save our planet! Here are a few wonderful books that can further their interests… (Email, 3s teacher)

It was evident that teachers sought to foster children's engagement in caring for the earth. Earlier, during the pandemic, when a strong storm knocked down trees and limbs in the school's outdoor learning area, one teacher involved the children in writing a letter to University Arborists. Before the class activity, she wrote to parents,

> I have a video to show them of some of the wind damage by our creek. My hope is that we can have the children help write a letter together to [University] Arborists for help in the cleanup process. After all, we are Earth Guards! (Email, Nature teacher)

Additionally, teachers encouraged families to continue these efforts even after Earth Week. As one teacher wrote, "Although Earth Week is over, these are great conversations to have every day of the year because we are all protectors of the Earth" (Email, PreK teacher 1).

Discussion

Remote instruction was a form of practice that these teachers never envisioned for their work, nor prepared for, and in many ways contradicted their beliefs about high-quality ECE practices. In fact, during the early weeks of the new reality of remote place programming, the Nature teacher declared, "I am not an online preschool teacher" (Staff meeting, April 2020). Not only did the experience of remote programming contradict this teacher's philosophy and beliefs about teaching, but it also contradicted the program's historically in-person place-based curriculum and relationship-based teaching approaches. Despite constraints that resulted from the COVID-19 lockdown, the teachers showed alignment with each of the NAAEE Key Characteristics from mid-March through May 2020. As evident in the findings, the teachers demonstrated strong knowledge of early childhood foundations throughout the pandemic, as well as each of the six NAAEE (2016) Guidelines for Excellence. Alignment was visible in their practice, commitment to children and families, and in the way they developed, supported, and communicated about environmental education during the early months of the COVID-19 pandemic. This discussion details how the NAAEE (2016) Guidelines for Excellence Key Characteristics were addressed by these teachers and how this study connects to research on other ECE programs during the initial months of the COVID-19 lockdown.

Program Philosophy, Purpose, and Development

Despite being forced to shift to remote, home-based programming, teachers maintained their commitment to quality nature-based early childhood education (Guideline 1.2). Supporting and sustaining relationships and a strong sense of community were central to teachers' practices (Guidelines 1.1, 1.8). Teachers could not support children or classroom-level programming without strong family engagement; family members assumed new roles as teaching partners. Howard's study (2024) of K-5 virtual programs also described the critical importance of this parental role. The critical importance of families was also noted by Steed et al. (2022) and Aslan et al. (2022) who found that ECE teachers used multiple methods to interact with families. Throughout the teachers' communications in this dataset, parents and family members were positioned as essential partners in facilitating school-home communications and in the process of educating and supporting their children (Guideline 1.7).

It has been noted that while varying according to socio-cultural-historical, economic, and geographic contexts, many parents, children, and early childhood educators around the world experienced high levels of stress, anxiety, and depression during this challenging time (Berger et al., 2022; Markowitz & Bassok, 2022; Martin et al., 2022; Rodriguez et al., 2022; Singletary et al., 2022; Souto-Manning & Melvin, 2022). The teachers in this study were deeply concerned about the health and well-being of all program community members and actively worked to support them through curricular programming (Guideline 1.5). One approach was to connect families to nature to support mental health and wellness (Wells & Evans, 2003). Emails regularly contained reminders for families to practice self-care through mindfulness challenges and outdoor explorations with their children. Teachers included yoga in class Zoom meetings in which children and families participated, and they shared the health benefits of going outdoors. They also tried to help the children understand the pandemic and why they were home and away from their extended family and friends. The teachers encouraged families who felt comfortable to go outdoors in their home environments for fresh air, exercise, and mental well-being.

Teachers worked with families to determine the support and approaches that worked best for them and their circumstances (Guideline 1.3). They evaluated their practices, reflected on their experiences with colleagues, and incorporated feedback into their work. Through a daily process of iterative self-reflection and assessment, teaching teams examined class proceedings, emerging pandemic related information, and their teaching practices in light of children's developmental and learning needs and current contexts (Guideline 1.6). Collectively, these supports helped the teachers navigate the challenges of remote teaching.

Developmentally Appropriate Practice

The teachers had a strong commitment to teaching the whole child and worked to actively engage the children with their world through hands-on, authentic interactions. The foundation for teachers' curriculum and interactions with children and families (Guideline 2.1) was rooted in DAP (NAEYC, 2022). This philosophical foundation created tensions for teachers who struggled with the structure of online programming, which was conducive to teacher-directed approaches and positioned children as passive learners. Teachers worked to reconcile these tensions through play-based, hands-on, and interactive child-centered experiences that sought to promote movement and nature-based holistic learning (Guideline 2.3). Teachers regularly engaged children in authentic, real-life activities using common household and nature-based materials that families and teachers could find in their environment (Guideline 2.2). They sought to continue addressing social-emotional and interpersonal needs as well as the physical, language, and cognitive development of each child, while also providing literacy, mathematics, STEM, and social studies instruction (Guideline 2.4). Additionally, teachers worked to accommodate the different developmental and learning needs of the children, their families, and their contexts (Guidelines 2.4 and 1.3). Activities were differentiated by embedding individual choices and flexibility, as families could use a wide range of materials and modify activities to fit their circumstances.

Play and Exploration

During the lockdown, teachers encouraged parents to provide unstructured time for children to play and explore both indoors and outdoors in safe environments (Guideline 3.2). Activities that teachers provided encouraged children and families to explore local parks, their yards, and neighborhoods together while looking for specific items, observing the world around them, and experiencing the weather (Guideline 3.1). Children and families were encouraged to play with natural materials from their environment and gather leaves and flower petals to create art, such as nature mandalas and collages. Additionally, teachers communicated information through email, apps, and newsletters with families including, activities, guiding questions, and ways to support children's exploration, inquiry, and play.

Curriculum Framework for Environmental Learning

Despite being in lockdown with social distancing and time at home, teachers worked to foster nature-based connectivity, environmental literacy, and a personal sense of responsibility and care for the Earth. Children and families were encouraged to go outside to observe, experience, and document their natural environment, including animals and fauna (Guidelines 4.2, 4.3, 4.4). Nature and the environmental topics wound through regular discussions and activities, as evident after a storm when one class wrote an arborist about a tree at the school that needed care (Guideline 4.5). Working to strengthen nature connectivity is an ongoing part of environmental education that was also visible in the work of nature-based teachers studied by Assaf and Gan (2021).

The interdisciplinary activities of the teachers in this study incorporated all the developmental domains and learning areas while supporting curiosity, environmental learning, and a personal sense of caring and connectivity to the Earth and the outdoors. Social-emotional support was provided across the program, with the inclusion of mindfulness and nature-based yoga in each class (Guideline 4.1). Additionally, the teachers worked to keep children active and engaged in physical activities to support gross and fine motor development, while also fostering children's cognitive development and natural curiosity and questioning through the use of exploration, inquiry, and play (Guideline 4.6).

Spaces and Places

Prior to the pandemic, interactions with the environment occurred outdoors on school grounds and in classrooms where teachers brought nature indoors and incorporated it into classroom life (Guideline 5.1). These typical classroom structures no longer existed during the initial months of the pandemic. The nature of home-based isolation and lockdown forced teachers and families to connect through online venues where the distance between home and school was brought closer together. Programming was now situated in family homes, yards, and

neighborhoods, with school-based interactions mediated through online means. The result was a significant transformation in both instructional delivery and interaction style, from a singular location to a multiplicity of locations where the teachers, children, and families were physically separated and communicating through technology.

The mandated lockdown required teachers and families to isolate at home, yet teachers continued to connect children to nature by encouraging them to get outside and by bringing the outdoors inside. By interfacing through technology and windows teachers were able to connect classroom members across space and also connect the indoors with the outdoors (Guidelines 5.2, 5.3). These practices are similar to those used by environmental educators in Israel (Assaf & Gan, 2021). Additionally, teachers worked to connect children and families across their multiple locations through yard and home tours shared via Zoom and by coordinating online teacher-child and child-child playdates. Teachers also used nature to support mental and physical health, play, and exploration for both children and families (Guideline 5.1). These sentiments and the outdoor experiences are reflected in research on British preschool parents' approaches and perspectives on getting children outdoors during lockdown (Martin et al., 2023). Most importantly, throughout the process, teachers worked to meet families where they were, supporting their comfort levels regarding their ability to go outside or desire to stay indoors (Guideline 1.3).

The NAAEE Guidelines point to the importance of health and safety in the learning space and risk management (Guideline 5.5). Throughout the data, teachers' attention to the health and safety of learning community members was a clear reflection of the times and realities of life during the pandemic. The teachers provided instructions on keeping everyone safe through proper handwashing, social distancing, and wearing masks. Their attention to the health and safety of the children and families was reflected in their concern for families' physical and mental well-being as they shared mindfulness activities. The teachers consistently incorporated animal yoga into Zoom sessions and encouraged families and children to get outside, go for walks, connect with nature. Additionally, they worked to foster a sense of community. The teachers' concerns about the mental and physical health of children and families, is also reflected in other international research about teacher concerns during the initial months of lockdown (Atiles et al., 2021; Dayal & Tiko, 2020; Timmons et al., 2021).

Educator Preparation

The teachers' preparation as nature-based teachers, their environmental literacy, and knowledge of the foundations of early childhood environmental education are evidenced in the curriculum that they implemented (Guidelines 6.1, 6.3, 6.4). Throughout the lockdown period, the university laboratory school teachers continued to educate, support, and mentor 95 undergraduate students (early field placements, science buddies, human service interns, and student teachers) by engaging them in classroom teaching and team meetings. During these meetings, the teaching team examined their practice, evaluated outcomes, and worked to reinvent their instruction to meet the needs of children, families, and teachers (Guideline 6.2). This was necessary because remote teaching practices were new, uncomfortable, and antithetical to the teachers' beliefs and philosophies of DAP. Because they were working to reconcile tensions between remote programming and their commitment to high-quality, child-centered, and nature-based programming, discussions around the professional responsibilities of teachers were elevated (Guidelines 6.2, 6.5, 6.6).

Conclusion and Future Directions

Despite being separated by place and needing to communicate through remote approaches during the initial months of the pandemic, teachers addressed the NAAEE Guidelines (2016). The teachers retooled their practices and implemented remote programming through their strong commitment to DAP, relationships with families, environmental literacy, and connections to place and the local environment. Each teacher connected their curriculum across multiple locations through their strong use of nature, the environment, and natural materials and shared commonalities across the children's home environments. These practices illustrate teachers' use of environmental literacy as well as their ability to ground instruction in the shared contexts and lived experiences of the children. These efforts display teachers' commitment to nature-based teaching and their openness to explore and examine their practice and ground their work in the philosophical foundations of DAP and their local funds of

knowledge (Moll et al., 1992; Román et al., 2021). Clear practices emerged including a commitment to social and emotional learning, mental health, and physical activity. Teachers drew on existing classroom routines, structures and curriculum to buttress their efforts, provide a sense of consistency and coherence, and support children's participation. Additionally, by using the local environment as a curricular anchor, the teachers utilized each family's local context to engage children in a wide range of activities that connected them to nature and natural materials in active ways both inside and outside the home, or through windows or from the borders on porches or balconies.

As noted elsewhere, at the onset of the pandemic, early childhood teachers generally had the least technological teaching experience and the fewest support structures to aid them in facilitating the shift to remote programming (Aslan et al., 2022; Atiles et al., 2021; Barnett et al., 2020). Guidelines and professional development are needed should this situation arise again (Howard, 2024; Steed et al., 2022; Timmons et al., 2021). Although remote instruction is not viewed as DAP for young children, it would be prudent to provide teachers with tools to support children in future lockdown/crisis situations arise (Allvin, 2020; Atiles et al., 2021). This study could provide a framework to help educators more effectively and efficiently pivot to their teaching across multiple locations in developmentally appropriate nature-based ways or expand current programs to meet the needs of children unable to attend in-person nature-based preschools.

The strengths of this study include the robust and comprehensive nature of daily classroom data spanning five classrooms across three months of remote instruction in Spring 2020. Collectively, these data illustrate how teachers shaped their programming to incorporate nature within remote teaching contexts and the multiple localities of families' homes and neighborhoods. This study illustrates how teachers were able to implement nature-based practices within a context that differed from prior teaching experiences using approaches that were recreated for a specific situation. The limitations of this case study include its inability to generalize beyond the local context. Teacher communications for families are written for a specific audience; the data from this secondary dataset were not designed to document all curricular plans, and they provide only partial insight into the comprehensive activities of the classroom or teachers' rationales for their practice. Furthermore, the perspectives of the families were not reflected in this dataset.

Nothing can replace in-place nature-based education; however, this study offers insight into how one set of teachers created programming for families during lockdowns. These findings could illuminate possibilities for other teachers working with children who may not be able to access in-person nature-based programming (e.g., critically ill children, displaced families, crisis situations requiring isolation). It is possible that the place-based curricular approaches shared here could also help foster ideas that others can adapt to their local contexts.

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Appendix

Table 1: Key Characteristics and Supporting Evidence

NAAEE Guidelines (2016)	**Evidence**
Key Characteristic 1: Program Philosophy, Purpose, and Development	
Guideline 1.1—Focus on nature and the environment	"We persevered through it because we wanted to make sure that the kids were reminded that this still is a nature program, and we still wanted our focus to be on nature." (Staff meeting, Nature teacher)
Guideline 1.2—Focus on education of young children	Program studied was an early childhood program. The entire curriculum and focus of the school was on the support and education of young children. (Program documentation, staff meetings, emails)
Guideline 1.3—Culturally appropriate goals, objectives, and practices	Teachers were sensitive to family structures, time, resources and comfort with both technology and being outdoors. Zoom schedules were designed based on family availability and interests and menu of resources and activities were developed so that families could engage in whichever way they felt best. (Staff meetings)
Guideline 1.4—Environmental literacy: board, staff, and providers	"Your children have enjoyed hearing the songs of each of the birds that would frequent our window feeder, using the Wild Republic Audubon soft birds that we had in our classroom. I shared the American robin with your children last week as I read the story, "My Spring Robin" by Anne Rockwell. I have attached a website featuring more than 600 actual bird sounds. I hope your family enjoys hearing them!" (Email, 2s teacher)
Guideline 1.5—Health and safety	"I did put the nest into my freezer for a while to ensure that it was safe for me to touch." (Email, 2s teacher)
Guideline 1.6—Ongoing evaluation and assessment	Program is state-licensed and nationally accredited and conducts programmatic self-studies at least annually. (Program documentation)
Guideline 1.7—Partnerships	In effort to remain connected to larger global and national events and communities, the school participated in Earth Day events, the Week of the Young Child (NAEYC), and All Children Exercise Simultaneously (ACES) Day. Staff also used resources from professional organizations to support their practice. (Program documentation, staff meetings)
Guideline 1.8—Interpersonal and intergenerational relationships	"Maybe going on a walk to look for real bird nests in your community can provide a relaxed time for discussion of how and where birds build their nests…. Maybe it can be a family activity." (Email, 2s teacher)

Key Characteristic 2: Developmentally Appropriate Practice	
Guideline 2.1—Based on research and theory	"Windy Day - Have your child bring something to show the wind - This could be a pinwheel, a ribbon wand, a scarf, butterfly wings - anything that would help the children to see the wind." (Email, Nature teacher)
Guideline 2.2—Authentic experiences	"Attached is this week's newsletter, there are lots of fun activities your family can do to celebrate Earth Day on Wednesday! From creating art like Monet who was inspired by nature, to building forts, to going on a nature walk, there are many resources to look at." (Email, PreK teachers)
Guideline 2.3—Child-directed and inquiry-based	"We loved being able to check out Sam's Park! She was such a great tour guide as she shared where she likes to make "witches brew." (Email, Nature teacher)
Guideline 2.4—The whole child	"As the weather gets nicer, go on a nature walk and bring some paper and crayons. Try to draw what you see. Send us any pictures of what they draw!" (Newsletter, PreK Student teacher)
Key Characteristic 3: Play and Exploration	
Guideline 3.1—Use of the natural world and natural materials	"See the beautiful Northern Cardinal at my feeder here at home? What birds are you seeing and hearing while you are at home?" (Email, 3s teacher)
Guideline 3.2—Play and the role of adults	"We didn't take a lot of pictures but played in the yard, tried to fly a kite (no luck), and hung out. [We] also picked flowers from our yard and made ornaments." (Email, PreK parent)
Key Characteristic 4: Curriculum Framework for Environmental Learning	
Guideline 4.1—Social and emotional growth	See quote in Guideline 2.3 Child-directed and inquiry-based
Guideline 4.2—Curiosity and questioning	"The Spring trees are blooming and waiting to be explored. Do you have any flowering trees in your yard? Do you know what types of trees are in your yard? Do an investigation with your child." (Bloomz post, Nature teacher)
Guideline 4.3—Development of environmental understandings	"Can you find these signs of Spring outside? I did! 1.Buds on trees, shrubs, etc.... 2. Forsythia 3. Daffodils 4. A bird's nest...this is an old one 5. A robin" (Email, 3s teacher)

Guideline 4.4—Skills for understanding the environment	"We will be natural scientists to observe closely what's happening inside the eggs. We will also practice our observational drawing skills to document the growth of the eggs. Observational drawing is drawing what you see as realistically and as true to life as possible. It is a great exercise in seeing and exploring how all of the details interact. If your child (or you) would like to join us in doing an observational drawing, bring a piece of paper, a pencil or black marker with you. If you would like to include color in your drawing, bring crayons, colored pencils or markers." (Email, PreK teacher 1)
Guideline 4.5—A personal sense of responsibility and caring	"Be prepared! Your little Earth Guards can become quite passionate about this and how they can help to save our planet! Here are a few wonderful books that can further their interests…" (Email, 3s teacher)
Guideline 4.6—Physical health and development	"Happy Friday-- I am excited that this weekend's forecast calls for warmer temperatures and sunshine. I hope that you are able to spend some time outside moving, laughing and soaking in the sun." (Mindfulness Challenge #3, PreK teacher 1)
Key Characteristic 5: Places and Spaces	
Guideline 5.1—Spaces and places to enhance development	"Send me (via e-mail) a photo of your child in a WILD space either in their yard or beyond. These "beyond" spaces might be outside your fence or a state park." (Bloomz post, Nature teacher)
Guideline 5.2—Natural components	"One of my favorite activities is to lie down on my back and watch the clouds roll by. I enjoy looking up at the canopy of trees overhead, or just looking for birds and listening to their songs." (Mindfulness Challenge #3, PreK teacher 1)
Guideline 5.3—Comfortable for both children and adults	"Tuesday we will focus on Our Backyards, Balconies & Beyond - What does it mean to be a Nature Explorer, Earth Guard? We will draw maps so your children will need paper and a writing utensil." (Email, Nature teacher)
Guideline 5.4—Maintenance and usability	"I have a video to show them of some of the wind damage by our creek. My hope is that we can have the children help write a letter together to [University] Arborists for help in the cleanup process. Afterall, we are Earth Guards!" (Email, Nature teacher)
Guideline 5.5—Health, safety, and risk	"Our State Park system has remained open and is waiving entrance fees. If you do visit a park, don't forget - social distancing!" (Bloomz post, Nature teacher)

Guideline 5.6—Environmental sustainability	"Find materials in your house that you are not using anymore and repurpose them to build something new! Questions you might ask your child to help them think about…How do you know or decide if something can be repurposed (used again in a new way)?... Are we still using this material? Is it still needed? How do we know this material is ready to be repurposed? Is it safe to repurpose this material? How are we helping the Earth by repurposing this material?" (Email, PreK teachers)
Key Characteristic 6: Educator Preparation	
Guideline 6.1—Foundations of early childhood environmental education	"Our themes had to do with the different natural [phenomena] that we saw were happening at our houses." (Staff meeting)
Guideline 6.2—Professional responsibilities of the educator	As noted by the varying schedules and differentiated activities, teachers designed curriculum and instruction to align with the developmental and learning/social-emotional needs of the children and families in their class. Even when activities were shared across classrooms, they were adapted for the specific needs of class members."(Staff meetings)
Guideline 6.3—Environmental literacy	See quote in Guideline 4.3—Development of environmental understandings
Guideline 6.4—Planning and implementing environmental education	"Thursday - Nature Portraits…We encourage the children to collect various nature items before this meeting, but if they are outside, they can always add items as we create. We will make nature portraits together." (Email, Nature student teacher)
Guideline 6.5—Fostering learning	See quote in Guideline 5.6—Environmental sustainability
Guideline 6.6—Assessment and evaluation	After teaching each day, the teaching team (teachers, student teachers, and early field placement students) reflected on their interactions with children, the lessons, if/how children's needs were met and what changes needed to be made. (Staff meetings)

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CHILDREN'S BOOKS AND RESOURCES REVIEW

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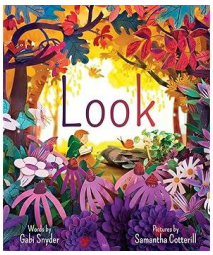
Using our Senses: Book and Resource List

The outdoors are sensory rich! Additionally, our senses are our primary tools for gathering information about the world around us. Consider the following books and resources to support sensory exploration in your spaces.

Sight



***Look* by Gabi Snyder**
Look encourages us to pause and use our sense of sight to understand the world around us. Color, size, patterns, and more. The text encourages us to recognize alternating and other patterns in the illustrations. Backmatter includes additional activities centered on looking for patterns.

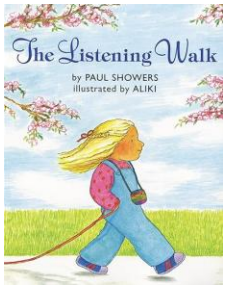
Smell

***The Smell of Summer* by Mary Ann Hake**
A blind girl encounters typical summer smells, from flowers, the pool, animals at the fair, a cookout, the beach, hay, a campfire, and more. The author has a full line up of seasonal smell books with the same character–fall, winter, and spring.

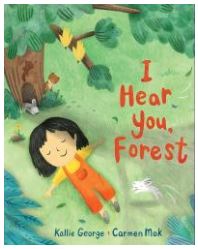
***What's that Smell? Nature: Follow the Trails, Lift the Flaps, Learn the Smells* by Igloo Books**
In this lift the flap board book with flaps, follow the scent trail to learn about the world around us. Children can lift the flaps, follow the finger trails, and explore the

smells in the natural world, including scratch and sniff scents. The book follows scents through a garden, the forest, and fields.

Hearing



The Listening Walk **by Paul Showers**
This classic book describes a girl's walk with her dog and dad, listening to the many sounds as she quietly walks. She hears sprinklers, lawnmower, cars, bicycle bell, pigeons, ducks, and so much more!

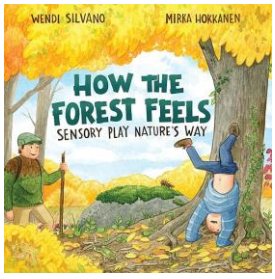


I Hear You Forest **by Kallie George**
A child hears the many sounds in the forest, from the trees and the robin, to the frog and stream. The author has additional books on hearing the mountain and the ocean for different geographical regions. There are many onomatopoeia sounds as well! This invitation helps us to pause and consider the small sounds around us that make the music of the forest.

Taste

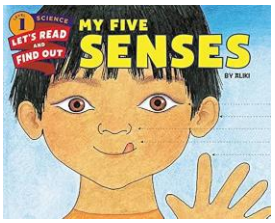
The Spice Box by Meera Sriram
A little family story and a lot of sensory exploration through spices and culinary explorations. Unfortunately, he drops and breaks the box; however, his father helps and the boy is able to refill his box with the delicious smells of home. Pair it with some spices in outdoor play.

Touch



How the Forest Feels: Sensory Play Nature's Way **by Wendi J. Silvano**
A child and grandfather go on a walk to explore the forest. Along the way, their senses become a tool to experience the world around them. Touch in particular comes to the forefront through texture descriptions such as the polished and wet stone, the jagged and hard pinecone, and the crumbling and cracked fallen log. The backmatter includes an author's note and scavenger hunt.

General

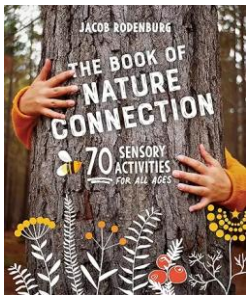


***My 5 Senses* by Aliki**
A simple read aloud exploring the senses and how they interact. Our senses are always ready to help us connect to the world around us.

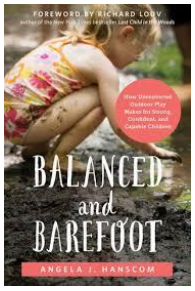
***All of Me is Nature: Exploring My Five Senses Outdoors* by Ashlee Renee Jefferson**
In this photographic outdoor sensory exploration, poetic verse encourages us to touch, smell, hear, taste, and see the world around us. I appreciate that the book has more diverse representations of children and that we are nature. A wide variety of settings are included.

Additional Resources

Get the Kids Outside: Sensory Activities
This article outlines the need for sensory play, as well as easy activities to connect with nature through our senses. It also includes vestibular and proprioceptive senses!
https://getthekidsoutside.com/outdoor-sensory-activities/



***The Book of Nature Connection: 70 Sensory Activities for All Ages* by Jacob Rodenburg**
Sorted by sense, these timeless approaches to interact with nature hone our connection through each of the senses. I actually chose to use this with preservice educators as part of a field-based nature-study course as it has the many tricks and tips of being a naturalist in one short, easy to digest book. Some activities are for older children/adults, but most can be adapted for our early childhood spaces.



***Balanced and Barefoot* by Angela Hanscom**
An all-purpose book advocating for more time outside, including sensory play. The outdoors is sensory rich, making it a perfect place to play and use our bodies in a variety of ways. As an occupational therapist, Hanscom has a unique perspective. Read it, though I suspect you already have! Good for a book club with parents as well.

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INTERNATIONAL JOURNAL OF EARLY CHILDHOOD ENVIRONMENTAL EDUCATION (IJECEE)
Addressing Issues, Policies, Practices, and Research That Matter

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The journal has two broad visions:

(a) To encourage thoughtful sharing of information about important ideas, conceptualizations, and frameworks, as well as effective practices and policies in early childhood environmental education; and

(b) To reach an extensive global readership in order to maximize the impact of the thoughtful information.

Thoughtful information may manifest through book reviews, description of educational approaches and programs, research investigations, and development or interpretation of theoretical perspectives. Associations among and between the following will be emphasized:

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- Community opportunities
- Policy mandates or recommendations
- Environmental activities, education, or experiences
- Mechanisms or processes related to knowledge acquisition
- Attachment or maintenance of affective dispositions
- Abilities, behaviors, or skills development related to good decision making in a range of environmental contexts; and
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