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Abstract: Family-school partnerships play an integral role in supporting family engagement in children's learning and development. The shift from on-site learning to remote programming facilitated by the means of technology during the COVID-19 lockdown required that educators and families work collaboratively in new ways in order to support young children's growth and development in different spaces. This qualitative case study examines how educators from an early childhood nature program supported family engagement in nature-based learning activities during COVID-19 lockdown in Spring 2020. Data include program-wide communications and classroom documentation. Two major themes and six subthemes emerged from the analysis. Results show that during the period of remote programming, the educators facilitated family engagement by providing instructional support for the education process and supporting social-emotional well-being and a sense of community. A strong curriculum component was apparent with encouragement for play and inquiry, connections to place, STEAM curriculum, and environmental awareness. The findings offer an insight into innovative teaching practices and have implications for family engagement beyond remote programming.

Keywords: family engagement; early childhood education; nature-based education; nature preschool; COVID-19

Statements and Declarations

Competing Interests

The authors report there are no competing interests to declare.

Data availability statement

These data are not publicly available in order to protect the identity of study participants.

Maintaining Family Engagement During the Initial Months of COVID-19 in an Early Childhood Nature Program

Introduction

Engaging families in the educational process has been shown to predict child academic success and social development in early childhood education (ECE; Harvard Family Research Project, 2006). Family engagement can be conceptualized as meaningful, reciprocal, and effective partnerships between families and ECE programs (Halgunseth et al., 2009). Family engagement became especially important during the COVID-19 lockdown, when educators had to partner with families to facilitate child education and development via remote programming. This change required increased communication throughout the programming in order to maintain children's participation in the educational process. Evidence shows that family-school partnerships deepened in response to the new mode of education imposed by the lockdown (Bubb & Jones, 2020; Soltero-González & Gillanders, 2021). In their systematic review of literature on family-school partnerships during COVID-19 around the world, Carrion-Martinez et al. (2021) discuss multiple communication channels established by educators to provide support to families with the use of educational materials. At the same time, the authors note that family engagement and participation in remote learning was contingent upon the educational stage, with families and students in compulsory education being more likely to participate than preschool-aged children and their families.

While there are several studies examining how ECE programs adapted to remote learning during COVID-19, there is limited research on the ways ECE nature programs approached the situation, considering the additional challenge of incorporating a nature component in remote programming. To address the gap in the literature, the present study uses case study methodology

to explore family engagement practices that educators utilized during remote programming in the early months of COVID-19 in a University-based ECE nature program located in the mid-Atlantic region of the United States. Examining educators' response to the crisis illuminates the ways educators and families collaborated to achieve common goals despite the challenges presented by the new reality and provides ideas for family engagement in ECE nature programs beyond the times of lockdown.

ECE Nature Programs

Nature programs are gaining momentum in many parts of the world, including the United States. A recent North American Association for Environmental Education national survey report estimated 800 ECE nature programs across the U.S., a 300% increase since 2010 (NAAEE, 2023). The NAAEE *Early Childhood Environmental Education Programs: Guidelines for Excellence* set the standard for high-quality ECE nature programs in the U.S. and emphasize the development of the whole child in a safe and stimulating environment (NAAEE, 2016). The goal of environmental education in early childhood is seen in providing opportunities for “development of individual feelings, beliefs, and inner unity with nature” (NAAEE, 2016, p. 3) while also raising a generation of environmentally literate citizens. Environmental education is learner-centered and offers children direct, play-based, hands-on experiences with real-world nature contexts to construct their own understanding, meaning, empathy, and agency (Carr & Plevyak, 2020; Merrick & Braus, 2013; NAAEE, 2016).

Benefits of nature for child learning and development are well documented (Johnstone et al., 2022; Kuo et al., 2019; Prins et al., 2022). Open and dynamic nature spaces offer children environments rich with exploration opportunities and affordances for different types of play (Alme & Reime, 2021; Garcia-Gonzalez & Schenetti, 2022; Hamilton & Hile, 2023). In a

systematic review of the ECE nature programs' effects on child outcomes, Johnstone and colleagues (2022) identified 36 quantitative and qualitative studies. The reviewed literature suggested that ECE nature programs have a positive link with i) children's social-emotional outcomes, ii) nature relatedness and awareness of nature, and iii) play interaction, and a negative link with child behavior problems. Prins et al.'s (2022) review emphasized the effect of ECE nature environments on children's play. The review included 28 relevant qualitative studies published between the years 1995 and 2022. The analysis and synthesis of the literature findings showed that nature environments i) serve as a context for enhanced quality of children's play experiences, ii) provide loose natural materials that could contribute to children's play quality, and iii) affect educator perceptions and expectations of children's play behaviors. The reviewed papers demonstrated that nature play promotes children's cognitive (problem solving, language use), social-emotional (pre-social behavior, self-confidence), and motor development. Based on the findings, the authors argue that the value of nature play lies in the complex interactions of children with the nature-based environment, provided through availability and diversity of loose parts, reciprocity of the "living" nature in children's play, and elaborate contexts for play scripts that facilitate child involvement.

Family Engagement prior to COVID-19

According to the National Association for the Education of Young Children (NAEYC) Position statement (2020), developmentally appropriate practice (DAP) calls for educators to engage in reciprocal partnerships with children's families in order to work in collaboration and support each child through individualized approaches that will address their needs. Educators should seek ways to communicate with families in the most convenient way both in terms of media and preferred language, which will enable establishing a respectful and welcoming

atmosphere. Additionally, the overlapping spheres of influence theory (Epstein, 1995) proposes that when schools, families, and communities collaborate to enhance children's learning and development, children receive more common messages of support and motivation from different parties. Partnerships can occur at an institutional level, when all families participate to a similar extent, or at an individual level, when caregivers receive personalized communications. The engagement in collaborative practices together with placing the child at the center of such a partnership encourages children to succeed and provides them with several important sources of support.

Existing literature shows that prior to COVID-19, educators engaged families in on-site school events and sent materials home to support family-child interactions beyond the classroom. Le Roux (2021) demonstrated how through educator modeling a home literacy program can be implemented to promote interactive caregiver-child reading and extension games at home for preschool and elementary school-aged children. Educators also provide detailed instructions and supplies for caregivers to work with children on art, science, or literacy skills, which encourages caregivers to ask their children questions that foster inquiry and develop imagination (Mulcahey, 2002).

Nature programs also incorporate family engagement into their programming, although the research is limited. In their study of children's nature experiences in a farm-based ECE program, Rymanowicz and colleagues (2020) offered an example of family engagement through a Community Supported Agriculture program and a program blog that provided activities for families and children to do together. Tal (2004) described how an elementary community school in Israel invited families to participate in the development of an environmental education curriculum. Interviews with teachers and caregivers revealed that caregivers engaged in a variety

of collaborative activities such as the organization of field trips and mentoring students through an Industry-Environment project. Professional journals also provide examples of family engagement in environmental education activities. For example, programs distribute nature-oriented materials that encourage families to explore and document the outdoor settings (Satterlee & Cormons, 2008) and collaborate with caregivers to organize nature investigation field trips (Simms-Smith & Sterling, 2008).

Family Engagement during COVID-19

The rapid onset of COVID-19 in 2020 led to a shutdown of schools in many countries, with children's homes becoming their educational spaces. For young children, learning had to be facilitated by caregivers not only because of children's young age, but also due to the added technological component and new communication rules during online synchronous lessons (Steed et al., 2022). Besides, the home-based nature of education created a sense of optionality – 'as if school was over' (Soltero-González & Gillanders, 2021, p. 972), further underlining the role of caregivers as supervisors. Maintaining consistent partnerships between families and educators had never been so crucial as caregivers assumed the role of educators for their own children.

Several studies employed surveys to examine how educators conducted remote programming during the COVID-19 lockdown. Using a large sample (N=1,434) of ECE educators in the U.S., Ford and colleagues (2021) found that only 37% were teaching virtually. Thematic analysis of open-ended responses indicated that, despite the inevitable challenges related to curriculum, technology, and maintaining children's attention, educators responded to the new reality by i) preparing developmentally appropriate lessons suitable for remote delivery, ii) collaborating with peers, iii) providing resource information to caregivers, and iv) supplying

families with learning apps that contained home activities. Educators emphasized family engagement and relied on caregivers to assist with remote learning, although not all caregivers were able to participate. Despite educators finding adaptations such as establishing routines to ensure child participation (Barnett et al., 2021), the lack of family engagement and hands-on learning experience impeded the remote learning process. In a similar study on an ECE provision of remote learning, Steed et al. (2022) found that educators spent more time planning lessons and communicating with families than in online synchronous instruction. Educators conducted online lessons with children and provided families with links to resources, but it was noted that the activities did not resemble the on-site lessons that the programs used to have. Studies also show that ECE educators encouraged families to engage in play activities during the lockdown (Ethridge et al., 2022; O'Keeffe & McNally, 2021; Rogers, 2022) as well as the study of science (Nikolopoulou, 2022). However, research also indicates that families felt the lack of support with their children's learning during COVID-19 (Cahoon et al., 2021), while children experienced a lack of communication with peers (Linnavalli & Kalland 2021; Pascal & Bertram, 2021). Additionally, many families' wellbeing deteriorated due to experienced hardships during COVID-19 (Gassman-Pines et al., 2020).

Interviews with ECE educators also provide insight into their efforts to support young children and their families at the beginning of the COVID-19 lockdown. A multiple-case study of perspectives of two ECE educators from an International School Hong Kong preschool classroom (Negrette et al., 2022) showed how educators adapted their teaching approach to the new reality. In their interviews, the educators described their effort not to make activities that they sent home burdensome for families. In addition to using online platforms for communicating with families and providing resources and lesson plans, educators sent home

resource boxes with arts and crafts supplies for use during online lessons, conducted small-group learning activities, and recorded videos of themselves cooking so that families could follow along. Importantly, families were provided with coaching on developmentally appropriate practice, including explanation of stages of child development and teaching children Zoom etiquette.

ECE Nature Programs during COVID-19

While the shift to remote learning in itself presented a significant challenge to both families and educators, ECE nature programs also had to maintain their philosophy of nature-based learning. Nature program educators across the world had to adapt their practices to the new reality (Quay et al., 2020). Few studies have examined ECE nature programming during the lockdown. Assaaf and Gan (2021) conducted document analysis and interviewed a sample of mainly preschool and elementary school environmental educators in Israel to learn about remote programming pedagogies during the initial months of COVID-19. Results showed that children engaged in three types of learning experiences: 1) active and direct experiences of nature, which mainly occurred outdoors; 2) active and indirect experiences of nature, with activities conducted at home using available materials; and 3) passive and indirect experiences such as watching nature-related videos. Educators were able to incorporate technology into the educational process, while also providing children with nature experiences local to them. The educators reported sending resources such as a bird sounds app and receiving photos of nature phenomena from students. Families were engaged in the learning process by participating in teaching lessons and spending time outdoors with their children. Research also shows that during lockdown, caregivers used personal strategies to ensure young children's exposure to outdoor nature spaces (Martin et al., 2023). Reporting more frequent use of outdoor spaces than before the COVID-19

lockdown, caregivers' interviews indicated that families explored nearby parks, spent time in the gardens, and creatively approached organization of outdoor activities by incorporating new equipment and play ideas. Some caregivers also mentioned implementing outdoor activities similar to the ones children engaged in at their ECE programs.

Overall, while there are studies examining the response of ECE educators to the new reality during the initial months of the COVID-19 lockdown, there is little research regarding how ECE nature programming was conducted and how educators engaged families in the educational process. To address this gap in the literature, this paper reports on the results of a qualitative case study undertaken in an ECE nature program located in the Mid-Atlantic region of the United States. The study aims to answer the following question: How did the early childhood nature educators support family engagement in nature-based learning activities in March through May of the 2020 lockdown?

Method

Research Site

This research study focuses on a university-based laboratory school located in the Mid-Atlantic region of the United States. In the 2019-2020 academic year, the NAEYC-accredited, state-licensed ECE nature program served 175 children ages six months to six years. Typically, children aged six to 24 months and their caregivers meet one morning per week, morning toddler classes meet two to three times per week, and prekindergarten (preK) and prekindergarten/kindergarten (preK/K) classes meet five times a week. Enrollment is open to the community. Children reflect diverse backgrounds, with over fourteen home languages spoken in addition to English and 19% of children receiving special needs support in 2019-2020. The racial backgrounds included 62% Caucasian, 19% Asian, 11% Biracial, 5% African American, 2%

Latino, and 1% not reported. Families in the U.S. normally spend 13% of their family income on average ECE program tuition (U.S. Department of the Treasury, 2021); high-quality and university-based ECE programs have higher cost. While varying socioeconomically, typical families enrolled in this program are middle-class with 14% being children of University employees, 4% receiving state tuition subsidies, 2% receiving partial scholarships, and several receiving tuition support from grandparents and extended family members.

In addition to teaching young children, the four full-time and two part-time educators mentor preservice educators, and the school supports over 300 field placement experiences in a typical academic year. In 2019-2020, all full-time educators had over 13-40+ years of teaching experience, at least one Master's degree and Administrative Certification. The program models practices taught in university courses as well as cutting-edge practices in nature-based education and mindfulness education. The curriculum is grounded in child-centered, developmentally appropriate, play-based practices (Copple & Bredekamp, 2009). Historically, the program has had a strong commitment to working with families. Educators foster reciprocal partnerships through interacting with families during drop-off and pick-up times, maintaining consistent communication via phone and email, and organizing end-of-semester caregiver-educator meetings. The program holds family events throughout the year, including family picnics and family curriculum events, and invites caregivers to share family traditions in the classroom.

Programming during COVID-19

In the second week of March 2020, a case of COVID-19 was reported on the University campus. University courses were moved online, and the program continued on-site operation for two days before a decision was made to no longer hold on-site programming. Within a week the state was in lockdown. Initially, the state border was closed, and only essential personnel were

allowed to leave their homes. Over time, people were allowed to travel for groceries, medical care, and emergencies. When it became apparent that it was safe to be outside, people were encouraged to go outdoors for walks as long as social distance was maintained. K-12 schools pivoted to remote programming and remained online for the rest of the academic year. ECE programs that supported children of essential personnel were allowed to apply for special licensing to reopen on-site. However, most ECE programs remained closed for the rest of the academic year with some moving to remote programming.

When the on-site nature program abruptly closed due to the COVID-19 lockdown, the educators were concerned about maintaining consistency and support for children and families, which prompted the rapid modification of the program. Within days of closing, the program began offering online lessons via the Zoom platform. The educators did not have experience teaching online and strongly questioned its developmental appropriateness for young children. The remote program was therefore designed to address social-emotional well-being and make sure that children engaged in physical activity, play-based experiences, and exploration. One important goal set by the educators was to establish consistent classroom practices in order to provide some stability for the children at the time of uncertainty. All of the educators' decisions were underpinned by the DAP curriculum and intentionality as the overarching framework (Copple & Bredekamp, 2009). The program was delivered via synchronous Zoom classes, email, Google platform, and class social media forums in order to provide a menu of options that families could utilize in ways that best fit their circumstances. Engaging caregivers as essential partners aligned with the educators' existing beliefs about quality education and was grounded in the fact that an on-site adult was necessary to facilitate the children's participation in any activity.

The educators iteratively revised the program to meet the developmental needs of children and to accommodate family resources, technological access, and time. After negotiating the schedule, the educators set consistent times for class online synchronous lessons. As a result, during Spring 2020, the nature program maintained remote learning for 82 children and their families. Programming continued for five classes: two-year-olds, three-year-olds, Nature Preschool, Prekindergarten (PreK), and Prekindergarten/Kindergarten (PreK/K; see Table 1). The educators intentionally kept online synchronous lessons short in order to better support engagement and align with the developmental needs of the children and with the families' needs at home.

[Insert Table 1 near here]

The educators designed a wide variety of programming and resources with multiple methods of communication in order to connect with and support families. It was understood that in this time of crisis families needed support and engagement in the program in ways that worked best for their situation. Some families attended all online synchronous lessons, while others attended weekly and used online resources or attended parts of synchronous lessons. Yet other families intentionally limited their child's access to technology and strategically utilized educator-provided resources to engage with their children. The educators accommodated their lessons for different situations such as limited parental availability, stress in the home, limited availability of devices, and for children with special needs, emotional needs, and English Language Learners. Numerous modifications were provided including online small group activities, online playdates, one-on-one sessions with the educators, and extended support for families.

Data and Analysis

This study uses a qualitative case study design to examine the ways ECE nature educators supported family engagement during remote programming. Case study methodology has been widely applied in environmental education research, including pedagogical practices (Kuburtz-Graber, 2004). Utilization of the case study methodology allows researchers to thoroughly investigate contemporary phenomena as embedded in context (Yin, 2018).

A secondary dataset of ECE nature program educator classroom communications to families during the first three months of COVID-19 lockdown (early March 2020 through the end of the school year in mid-May 2020) and staff meeting communications in June 2020 were used for this study. Data comprised 236 pieces of textual communication that included educator emails to families, social media public and classroom interfaces, and program and staff meeting documents. The data were maintained by the school as documentation of their family communications and then shared with researchers as a secondary dataset after the semester was over.

This study is part of a larger project that used open coding to examine ways that educators supported children and families via remote programming from March through May 2020. For the present study, all data that referenced nature-based activities were coded. These data were then moved into a new subset and coded a second time to identify nature-based family engagement practices. The resulting sample included 115 pieces of communication (16 for two-year-olds; 7 for three-year-olds; 39 for Nature Preschool; 26 for PreK; 26 for PreK/K; and 1 for Staff Meeting). Grounded theory (Charmaz, 2014; Glaser & Strauss, 1967) was used to analyze the types of activities that were implemented as a part of remote programming. Open, axial, and selective coding were conducted to identify and further refine emerging categories. The data were double-coded when two or more codes were reflected. HyperRESEARCH software was

used for coding procedures. The researchers held weekly meetings to discuss the coding process and wrote analytic memos. After the coding and analytic memoing were completed, two main themes and six subthemes emerged. The subthemes reflected distinct types of support or curricular activities that the educators provided to families during the early months of COVID-19. The first theme reflects the ways educators helped facilitate family engagement in the educational process; the second theme identifies nature-based activities for children and families to engage in as part of remote nature programming (see Table 2). Findings were triangulated across data sources by type and across classrooms through member checking (Flick et al., 2004). For purposes of confidentiality, pseudonyms are used throughout the paper. The study was approved by the University Human Subjects Institutional Review Board.

[Insert Table 2 near here]

Results and Discussion

Two major themes and six subthemes emerged from the data analysis.

Theme 1: Facilitating Family Engagement

The first theme identifies strategies educators used to support children and families during the initial months of COVID-19 lockdown. While these approaches incorporate the tenets of DAP, they also highlight the educators' commitment to working with families as partners and supporting community-wide engagement.

Educational Process

The educators found the most productive ways to deliver remote programming and ensure family engagement through consistent contact with families. Most of educator-caregiver communication occurred via email and the Bloomz classroom communication app, but there were several instances of online caregiver-educator meetings being held. The two-way

communication allowed for pedagogical instructions, hands-on activities, and extension activity ideas to be delivered to families. The following excerpt from an educator email encourages caregivers to ask their children what they learned during the online lesson:

We learned how lemons grow and learned a lemon magic trick with cups - please ask your children to share (You can use any small fruit like oranges, limes, small apples).

Educators also supported families whose children were reacting to the challenges of the pandemic. For example, for many children, the prolonged time at home led to feelings of boredom. Caregivers expressed concerns about this during an online caregiver-educator meeting held after children's bedtimes. As a follow-up, the educator wrote about the benefits of boredom and the value of children learning to occupy themselves by engaging in self-initiated unstructured play.

During the Parents' Zoom on Thursday, we talked about how the children are saying how they are bored and this situation is an opportunity for children to learn how to be bored in a world that was once always so busy.... When children are bored, they have a chance to become more creative and use their imagination to problem-solve what they can do to stop feeling this way.

These are two of the many ways educators utilized online resources to support families and children. Other studies have reported that online platforms are consistently used by educators for communication with families. Ramos and colleagues (2021) describe the establishment of online platforms for families to connect with each other and share their at-home learning progress. In their study, one-on-one sessions between educators and caregivers and consistent check-ins with families provide the necessary support through phone calls, text messages, or emails are seen as best practices to facilitate remote programming.

Educators in this study emailed caregivers describing upcoming lessons and extension activities. One of the most frequent strategies that emerged in the data was asking caregivers to participate in the material gathering stage. Prior to each lesson, and typically at the beginning of the week, they sent a list of materials for families to gather. Suggested materials were generally common household items, and educators regularly provided a variety of options that families could use.

We showed the children what they will need for tomorrow's craft - please help them pick some flower petals today, locate a piece of paper and also a hard object to press flowers with - I use a rock.

Sometimes educators' emails resembled an excerpt from a pedagogy book, instructing caregivers on the educational process and incorporating them into the process as collaborators. These findings align with other research that found that educators provided educational guidance to caregivers during remote learning (Negrette et al., 2022). Resources, guiding questions, and activity ideas were shared to provide caregivers support for working with their children. These practices are reflected in the message below.

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. ... 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. 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.

The educators also praised families' efforts to maintain the learning process and acknowledged the value of their work.

As I reflect on the last three weeks and how very different they have been for me, for your children, for your family, I am still amazed and more grateful than ever for the tribe that we have created together. Your children have transitioned to seeing me on a screen each morning instead of in our woods. Their familiar voices and smiles each morning are reminders of what once was and challenges me to perfect this on-line nature school teaching.

Here, the educator states that caregivers' eagerness also empowers her to improve the program, which could inspire families to stay positive and show continued resilience despite the challenges.

Well-Being and Sense of Community

The educators expressed concern that the sudden isolation and disruption of routines might negatively impact families' well-being. They sought to cultivate resilience through activities to support social-emotional needs and sustain connections within the program community. One approach was to incorporate mindfulness activities into remote programming. Mindfulness activities regularly connected nature, exercise, and the outdoors. This example encourages physical activity while also prompting families to slow down and relax. Like many other activities in the curriculum, this exercise builds on a story and includes an extension activity.

Tuesday's Zoom will feature a story that I love, *Little Yoga*. Get ready to explore actual yoga poses that feature animals and are easy for toddlers to complete.

Educators' emails also contained mindfulness challenges that encouraged families to explore the feelings of peace, gratitude, and joy while going outdoors, taking a thank you walk, or pausing and watching the clouds. The educators also reminisced about joyful moments spent together in the outdoor space at the program site before lockdown. Valuing the memories and looking forward to returning to these outdoor spaces was a strategy they provided for coping with hardships.

On Friday, when I visited our most wonderful space, I took a few videos and plan to share them throughout the week. I expected to be sad when I returned, but I was filled with JOY! I was instantly reminded of the many glorious memories we had together. I can't wait to see their faces when they see their spaces in a new way.

Educators sharing their own feelings about the new reality also comprised a large part of the effort to foster well-being. In the following quote, the educator emphasized that the caregivers' resilience during stressful times determines the well-being of children. Even though the lockdown appeared as something unknown and daunting, the educator encouraged caregivers to get the best out of the time while staying at home together, reminding them that the hardships will pass and the memories will remain.

My hope and wish is that you are able to enjoy this green and all of nature in YOUR space. Are memories flooding back to you these days? It is almost as if the quiet, the slower pace has made memories become brighter and more present. As hard as this time is right now, there is no doubt in my mind that each of you are creating memories that will last a lifetime!

Research also shows that during the initial months of COVID-19, educators provided compassion to families and offered ways of talking with children about COVID-19, anticipating

that the lockdown could negatively affect both caregiver and child well-being (Gassman-Pines et al., 2020). Similar to our finding, educators in other studies supported families during the difficult times by establishing routines for the children to follow (Barnett et al., 2021).

Throughout the remote programming period, educators asked families to share photos of their activities to show how they had been engaging with nature during lockdown. This approach also fostered a sense of community as children were motivated not only to observe the nature around them, but also to take pictures and share their experiences with classmates, being able to see what others were seeing.

Let me know what you find outside! Send me pictures or put them in our classroom photo albums on Google!

Some studies of ECE educators' remote programming practices during COVID-19 report that, while educators were able to successfully maintain family-school partnerships, they still struggled with ensuring peer communication among the children (Shin & Puig, 2021). The educators in this study sought to help children and families maintain connections and relationships during the lockdown. One way they supported a sense of community was by organizing class projects for the children and their families. The following excerpt from an educator's email contains a metaphor - when each person contributes a little, it results in a big thing:

Good Evening - Nature Explorers! I wanted to upload our first take of One Seed song! We would love your recordings. We are thinking to make a montage of the families singing! ... We think this is a great way to share our Happy Earth Day message beyond the Nature school! After all, one seed can go pretty far!

In addition to whole-class engagement, educators asked families to work on their own projects, such as compiling a favorite nature books wishlist. Educators themselves were willing to describe to children what nature elements they witnessed in their surroundings and send out photos and videos. Additionally, they took screenshots of class interactions and emailed the highlights of the lessons to caregivers. Ford et al. (2021) also found that ECE educators used remote programming to foster a sense of community among children, families, and educators. In their study, educators reported that children were happy to reconnect with their peers and educators through technology.

Another goal that the educators pursued was encouraging families to safely go outdoors and explore the community beyond home. One of the activities invited families to walk around their neighborhoods and look for teddy bears placed on windows by the residents as part of a larger global activity developed and shared via social media and news networks that provided entertainment to children and families during lockdown (Fortin, 2020). The activity allowed children to interact with multiple communities: 1) their family and neighborhood when going for walks and ‘hunting’ for bears; 2) the classroom community when the educator read the book to the class and the children discussed the activity and shared their experiences; and 3) the program community when singing and acting out the song and learning how other classes were also going on bear hunts. Not only could families interact with their community to maintain the morale, but they were also suggested ways to impact the community by sharing art.

This Thursday I am asking all of ... children (and those young at heart) to step out of their houses with a handful of chalk. I want you to write inspiring messages or draw pretty pictures on your sidewalk or driveways! Then take a walk with your family to see

the messages that people have left you. Let's bring joy and hope to our neighbors while being responsible!

With research showing that children felt isolated and longed for companionship and peer communication (Linnavalli & Kalland 2021; Pascal & Bertram, 2021), activities like these helped connect educators, children, and families with each other.

Theme 2: Nature-Based Curricular Focus

Play and Inquiry

Multiple activities implemented during the remote programming were dedicated to play and exploration. Similarly, in the study by O'Keeffe and McNally (2021), most ECE educators provided play strategies to families during COVID-19 remote learning. Encouraging play was important as access to play opportunities was impeded during the COVID-19 crisis (Rogers, 2022).

In many of their communications, educators provided families with a range of activities dedicated to nature exploration that had been utilized during the on-site programming. Educators consistently encouraged families to go outside, and sometimes provided activities that could be completed indoors or outdoors depending on the family's preference. Some families moved activities such as painting outside; this was visible in photos they shared with educators.

Activities such as wind exploration explicitly called for families to bring play outdoors:

The wind is delightful! Get up and go fly a kite!

Treasure hunting and scavenger hunts supplemented observational walks that the families took. Encouragement to observe nature was often grounded in educators' own experiences and included a question to initiate a family discussion:

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?

Studies examining play in ECE during COVID-19 demonstrate that, despite barriers imposed by remote programming, educators managed to incorporate different types of play into their curriculum. Ethridge et al. (2022) found instances of functional, constructive, dramatic, games with rules, and guided play. Interestingly, in their study, while educators encouraged children to investigate outdoor spaces and go on scavenger hunts, the most popular type of play was games with rules - presumably, due to easier implementation during remote programming. In our study, the educators were more likely to encourage open-ended play experiences.

Occasionally, educators also suggested that the children engage in dramatic play., Educators were aware of the fact that not everyone had the same resources at home and therefore provided families with alternative ideas for acquiring learning materials. This was especially important as families were at home with limited ability to go to public places or order supplies.

If you have a printer at home - you can print out the finger puppets from Emily Arrow's book - ... and your children can tell the story with us. If you don't have a printer at home - I do not - you could have your child help you make their own ladybug, and rabbit puppets.

Historically, children in the program hatched chicks and studied birds each spring. The educators did not hesitate to modify the experience to incorporate it into remote programming. This introduction activity shows how families were encouraged to think about natural phenomena. The educator set the mood by using word puns and provided an educational question to provoke a family discussion.

We are getting prepared for a few egg-citing egg-speriments! I hope you are having an egg-traordinary Sunday! Before I go, I wanted to leave you with a question that I have

been wondering about. Why don't the eggs break when the Mama Bird sits on them?

Hmmm, I wonder? I can't wait to hear your theories tomorrow!

Another educator introduced the topic of nests and egg laying. Without an opportunity to watch the chicks hatch in the on-site incubator, educators developed alternative activities that would be feasible at home.

Another activity we would be doing at school would be hatching eggs in an incubator.

We will continue to focus our attention on birds, the nests they build and the eggs they lay. I have attached a photo of the shells I have cleaned and the materials I will bring on Friday to our meeting. If you would like your child to bring materials to our meeting too, that could be engaging for them! If not, they are welcome to watch our demo like they did today.

Finally, the children observed chicks hatching in the incubator through the University of Nebraska 4-H embryology program's live webcam. In their emails, educators explain to caregivers the process of candling so that they could discuss chick development with the children. Both children and caregivers were then invited to participate in the observational drawing activity.

Research shows that remote learning for nature-based programs is not a novelty of the COVID-19 lockdown period. In their systematic review of literature on online nature-based learning spanning the decade before the COVID-19 onset, Merritt and colleagues (2022) find multiple examples of remote learning implemented in K-12 programs. The authors conclude that while remote nature-based programming cannot substitute on-site hands-on learning, these modes can complement each other. Remote learning in nature-based programs can serve as an

extension to hands-on learning or, as in the case of the COVID-19 lockdown, help overcome various situational, distance, and socioeconomic barriers.

Connections to Place

A substantial amount of attention in the nature-based remote programming was given to the spaces children were in and the ways they could be integrated into the educational process. Educators encouraged families to explore outdoor spaces, which generally manifested in two ways: either exploring the proximal spaces or going beyond. In terms of spaces located near families' whereabouts, the idea of getting to know the place of residence more thoroughly was expressed in multiple educators' emails as well as during staff planning meetings:

You know, I encourage my families to go on nature space hunt, find, look and see in that grove of trees over there. What's happening over there? ...And so I think in terms of place-based education it helped them understand more about their yards and their space that they're living in, and that they spent a lot of time in.

Here, the educator reflects on her practice of engaging caregivers in the education process, asking them questions that she would normally ask the children, and prompting families to explore their surroundings. 'Beyond' spaces included neighborhoods, state parks, and nearby wilderness areas, and the educators often shared their own experiences in messages to support family engagement. In the following excerpt, one educator shared her own challenges of getting her family to go outside as well as the benefits of spending time in nature.

Rainy days just aren't the same out of the Forest! I told my family - get up - we are going out. After a few grumbles and 'It's cold!' complaints we headed out. We made it all the way around the biggest block in our neighborhood. The kids ended the walk with smiles and everyone got to hit reset. Nature is our greatest tool to get through this!

Being online did not stop educators from following the nature-based curriculum and finding other ways to explore different sites. For example, families were invited on a virtual field trip to a recycling plant. As shown in the literature, incorporating digital technology into play in outdoor spaces can foster experiences with nature and introduce new elements of inquiry such as capturing natural phenomena with cameras and sound recorders (McGlynn-Stewart et al., 2020).

Educators also attempted to move synchronous online lessons outdoors with the help of caregivers. Several educators organized online house and yard tours where children shared their outdoor spaces.

We loved our trail walk with Ms. Johnson and our animal sound game! We got to see Pablo playing in his backyard and Ms. Zhu's snake and raspberry plants. Nature provides so much excitement in our lives!

Although educators tried to incorporate nature into their programming, it did not always work out. Not all children had equal access opportunities to go outside. During a staff meeting, one educator expressed concerns that a child in her class was not able to go outside to gather worms for the project. As a result, the child could only watch others participate in the activity. One way the educator addressed these limitations was by occasionally bringing materials to families' homes.

I did drive around to everybody's house from a distance for Earth week and I gave them a little Earth week pack. And that was huge –I stayed in my car, and they stayed in their driveway or their yard - and for connecting to the kids that weren't accessing the computer [Zoom sessions] at all.

Despite the inability to conduct lessons in-person, the educator still found ways to connect with children other than online. She also noted that some children did not have access to

technology or were not comfortable using it, so for some families, distanced visits provided the first chance to see her since lockdown began. The educator talked about the impact it had - evidently, both on her and on the children. Ultimately, flexibility allowed families and educators to find ways to stay connected while in different spaces. Other studies also report instances of ‘being together while apart’. Pramling Samuelsson et al.’s (2020) study of preschool practices during the onset of COVID-19 describes how in the U.S., caregivers and children drove to the preschool parking lot and honked their horns to show appreciation of educator and staff work.

The confinement experienced during the pandemic also prompted both caregivers and educators to reconsider their routine understanding and use of space. Other research has also found that caregivers encouraged children to spend time outdoors engaging in sport activities and exploring nature (Martin et al., 2023; Soltero-González & Gillanders, 2021). Such a decision was warranted as COVID-19 lockdown restrictions diminished children’s access to outdoor spaces and negatively impacted motor skill development (Hobbs & Bernard, 2021). Thus, the educators felt the importance to communicate to families the need to engage in physical activity and nature-based play and provide them with multiple opportunities to interact with nature at different spaces.

Nature-Based STEAM Curriculum

The home-based curriculum dedicated a substantial amount of time to nature-based interdisciplinary science education. For example, for a wind exploration unit, the educator explained how to construct a pinwheel while providing flexibility for children to create their own using whatever materials they had available. These activities fostered exploration and critical thinking.

Here is the link to make paper pinwheels. I did put a small bead between the paper and

the eraser to help the spinning. You may use any paper cut into a square. I used copy paper, and mine worked just fine.

Families were also encouraged to engage in engineering practices with artistic elements, as shown in the musical instrument project example:

Share your homemade or environmental instrument. Johnny's mom sent us a link of how to make an outdoor xylophone - an oatmeal container can become a drum, two spoons together make a joyful sound.

This activity combines repurposing materials at home, crafting a musical instrument, and discovering the sound it produces. Science experiments usually included several alternatives for materials depending on what families could have access to at home.

Baking Soda and Colored Vinegar experiment - We would love for you to join us with this! What they will need - A tray/plate with a layer of baking soda, a few cups with vinegar colored with food coloring. If you do not have these materials, water can be used. The children can use the eye droppers I gave them in their Earth Week packages or can just use a spoon. We will observe together, and will discuss being scientists.

As seen in the study by Cahoon and colleagues (2021), approximately half of the surveyed caregivers who engaged in learning activities with their children during the COVID-19 lockdown reported needing more support with teaching math, science, literacy/reading, and art. Although no studies that explicitly described teaching science in preschool or kindergarten classrooms during COVID-19 were located, a study of elementary school educators' practices during the COVID-19 lockdown in Greece showed that caregivers and children were encouraged to engage in science experiments at home (Nikolopoulou, 2022).

Each classroom incorporated art into the curriculum. Projects included drawing and

painting, gathering natural materials for collages, providing caregivers with ideas for a discussion with children, and encouraging families to share the results with class.

One way to celebrate Earth Day is to make nature mandalas. Collect various nature treasures and arrange them into a circle formation. This can be a very peaceful, calming activity! I made this today...What nature materials can you find to make your own?

In addition, many of the usual art-related activities were designed to be done outdoors. Here, children are encouraged to draw or paint what they discover in nature and share their creations.

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 certain objects to draw/paint.

Environmental Awareness

During the remote programming, the educators emphasized Earth Day, which is celebrated annually on April 22, with many relevant activities during that week. Families were encouraged to celebrate Earth Day by going outdoors, creating nature-themed art, and building with recycled materials.

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!

The pandemic lockdown and decreased human activity led to increased wildlife mobility and improved air quality (Davenport, 2020; Tucker et al., 2023). One educator suggested families consider staying at home as a benefit for the Earth.

We hope that even for a brief time today you are able to listen to the call of Mother Nature and slow down, connect, listen! One thing has been made abundantly clear to me as I have been home. The Earth is healing! Being home, driving less, consuming less, and watching more, the Earth is responding to us with one GIANT hug!

Similar findings were displayed in the article by Lee and Wenham (2021). Caregivers in the study reported discussing with children how staying at home allows the planet to recover.

Educators also conducted activities to talk about recycling in an interactive way so that children and caregivers could receive useful information and exercise their creativity. Extension and preparation for class activities were provided. Numeracy learning was also embedded into the recycling theme.

On Monday, we will begin a discussion on the concepts of The 3 R's, reduce, reuse and recycle. We will learn about the recycling numbers that we can find on all plastic containers. These numbers begin at 1, going up to 7. ... This is where I need your help. In order for this activity to be interactive, I am asking that you provide your child with a clean, empty plastic container.

Even tiny steps can support the development of citizens who are cognizant of the need to consume smartly. Research shows that children are aware of the harm humanity does to the environment, as evidenced in the study by Rios and colleagues (2021) conducted during COVID-19, where children voiced their disappointment with adults throwing masks and gloves on the ground.

Conclusion and future directions

The unexpected onset of the COVID-19 lockdown required strengthening family-school partnerships in order to facilitate remote learning. The current study showed that the ECE nature

program educators had to transform their previously existing partnerships with families, bringing them to a new level. Caregivers had to take on new roles, and it was crucial for nature program educators to support the educational process at home by engaging families. Since educators were concerned about the families' well-being, they made sure to provide them with wellness and community-oriented activities that would foster connectivity and relationships during the time of lockdown. They supported family engagement during remote programming through offering activities and instructions, helping families foster their young children's learning by providing directions, questions to ask, and lists of materials to use for nature-based activities. Additionally, educators encouraged families to engage together in activities outdoors thus aligning with the nature program's philosophy. Lessons learned during the COVID-19 lockdown can therefore contribute to the development of nature-based education (Priest, 2022; Quay et al., 2020). At the same time, it is important to acknowledge that on-site programs are more developmentally appropriate for young children (Allvin, 2020). This study does not intend to promote remote ECE nature programming. As ECE nature programs move back to on-site learning, the practices of educators engaging families in the learning process and nature-based education can be implemented beyond remote programming, while also strengthening children and families' engagement with the outdoors. Consistent email and in-person communication with families will strengthen family-school partnerships, while sharing of activities and engaging families in place-based learning will enhance connectivity to nature and help foster alignment between educator and caregiver practices to better support children's outcomes (Epstein, 1995).

The COVID-19 lockdown provided a challenging, but unique opportunity for educators and caregivers to coordinate efforts in order to support children's development and learning throughout remote programming. The strength of the current study lies in the fact that the data

were captured in the midst of the COVID-19 crisis. Additionally, it presents actual educators' communications and practices rather than insights or opinions. The data from several classrooms allows us to see a comprehensive image of the nature program educators' practices. At the same time, the study has several limitations. Specifically, the case study design does not permit generalizability of findings, while the time-specific nature of the study does not allow for its replication. Studying similar practices in other ECE nature programs could provide increased generalizability and inform readers about other ways to support family engagement in ECE and in nature programs in particular. Since the program studied serves primarily middle-class families, studies that examine programs that cater to populations from other socioeconomic statuses could demonstrate different results. Factors such as caregiver loss of income, no access to technology or Internet connection, and persistent caregiver unavailability to facilitate remote programming would constitute increased challenges to participation. Future research could also examine how educators incorporate the newly obtained experiences of engaging families into their practices after the COVID-19 lockdown has been lifted.

Statements and Declarations

Competing Interests

On behalf of all authors, the corresponding author states that there is no conflict of interest.

Data availability statement

These data are not publicly available in order to protect the identity of study participants.

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Table 1***Early Childhood Nature Program Online Synchronous Class Schedule during COVID-19***

Classroom	Age	Number of children	Lesson Schedule
Two-year-olds	2	12	two times a week; 30-minute morning sessions
Three- year-olds	2-3	16	three times a week; 30-minute morning sessions
Nature Preschool	3-4	16	daily 45-minute morning sessions (excluding the weekend) with a session held in the afternoon once a week
PreK	3-4	18	45-minute morning sessions three times a week with a session held in the afternoon twice a week
PreK/K	4-5	20	daily one-hour morning sessions with two one-hour afternoon sessions a week

Table 2
Description of Themes

Theme	Subtheme	Description
Facilitating family engagement	Educational process	Ways educators explicitly instructed caregivers to facilitate education at home.
	Well-being and sense of community	Resilience and well-being cultivated through activities, projects, and idea sharing with peers and the broader community.
Nature-based curricular focus	Play and inquiry	Instructions incorporated in activities that families could follow in order to promote children's play and inquiry.
	Connections to place	Place-based activities tailored to the different environments of children and families.
	Nature-based science, technology, engineering, arts, and mathematics (STEAM) curriculum	Engagement in activities related to Science, Technology Engineering, Creative Arts, and Mathematics.
	Environmental awareness	Activities directed at fostering a sense of environmental stewardship in children.