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Four Methods for Engaging Young Children as Environmental Education Researchers

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ABSTRACT

This article contributes to the ongoing dialogue regarding what it means to engage young children as active researchers in Early Childhood Environmental Education (ECEE) and Early Childhood Education for Sustainability (ECEfS). Drawing from a participatory and phenomenological framework, this paper considers the advantages, challenges, and opportunities of four interactive data collection and analysis methods (Art Making, Role Playing, Building a Model, and Book Making) used to explore the nature of children's experiences in a northern boreal forest. Specifically, facilitating art and model building in the forest provides a backdrop for children to reflect on the beauty and awe of nature; it also provides an opportunity for children to interact with and incorporate aspects of nature into their artistic creations. Children's engagement in role-play in/with nature encourages children to construct stories and scripts to depict their interests and understandings of their local ecology. Children incorporate real and imagined elements into their schematic representations, drawing from past and present experiences within a socio-cultural context. Additionally, bookmaking can be used as a tool to encourage children to create a narrative of their experiences. As a data analysis instrument, children are invited to reflect on photographs and artwork previously collected in order to interpret, reconstruct, present, and document their environmental experiences.

Keywords: children as active researchers; early childhood environmental education; role-playing; building a Model; bookmaking; art making

Around the globe, childhood researchers advocate for children to take a more active role in research (Alderson, 2001; Einarsdóttir, Dockett, & Perry, 2009; James, 2009; Punch, 2002). Scholars within the fields of Early Childhood Environmental Education (ECEE) and Early Childhood Education for Sustainability (ECEfS) have also argued for the promotion of children's agency in research and practice (Barratt Hacking, Cutter-MacKenzie, & Barratt, 2013; Davis & Elliot; 2014; Green, 2015). Indeed, in a recent review, Green (2015) identified a strong trend in ECEE and ECEfS scholarship moving towards participatory approaches *with* children that honor children's voices and perspectives. However, among the studies reviewed the degree in which researchers included child-centered data collection approaches varied. In other words, issues of control, which have long been debated among qualitative researchers (Lincoln, Lynham, & Guba 2011), remain even more contentious in studies involving young children. Specifically, children are subordinately positioned in an adult world. While children are recognized as active agents of culture and change, their ability to create change is heavily influenced by adults and the world around them (Corsaro, 2005). Undeniably, in research involving young children the power-imbalance between the adult researcher and child participants can greatly impact *what* data is collected and *how* it is interpreted. Therefore, researchers must be aware of their own role and how their presence, or lack of presence, influences children's actions and behaviors. Research is also influenced by a number of relational and contextual factors. Thus, methodological approaches of research involving young children fall under great scrutiny; adult researchers must continue to critically engage in discussion on what it means to engage children as active participants in research. As Punch (2002) argued ''reflexivity should be a central part of the research process with children, whereas, researchers critically reflect not only on their role and their assumptions, but also on the choice of methods and their application'' (p. 323). Thus, this paper is aimed at advancing the conversation about what it means to engage children as active agents of research in ECEE

and ECEfS. The aim of this article is to present and critically examine four participatory data collection methods in a study exploring young children's experiences in a forest.

Research Approaches Involving Children

To begin, it is necessary to provide a background on participatory methods of research *with* children. Specifically, Barratt Hacking et al. (2013) described a continuum of methodological approaches for research involving children from traditional, research *on* children approaches, to alternative, research *with* or *by* children designs. This continuum can be used to interpret the ontologies, epistemologies, and methodologies that inform early childhood research.

Specifically, research *on* children approaches derive from positivist and objective paradigms, and in many cases experimental designs or traditional measures employed in fields such as developmental psychology (James, 2009). Such studies view children as objects of research, perceiving children as "human becomings" not yet developed into fully competent and functioning adults (Lee, 2001, p. 7). Adults are positioned as the primary interpreters of children's experiences and behaviors with little to no input from children. In perceiving children as incapable of understanding, researchers often elect not to disclose to children that a study is underway. Furthermore, researchers embracing this type of methodology might consider children vulnerable and in need of protection from complex problems or issues (Duhn, 2012). In other words, they are likely to avoid the risks and uncertainty associated with critical frameworks and action-oriented methods of research.

As researchers move along the continuum towards research *with* children approaches, children are more likely to be listened to and acknowledged. Informed by contemporary sociological understandings, children are considered "people worthy of study" and whose actions can contribute and make a difference in society (James, 2009, p. 34). Under this approach, research recognizes the United Nations Convention on the Rights of the Child (UNCRC), which set precedence for children's citizenship and rights of participation (United Nations 1989, 2005). Specifically, Article 12 under the UNCRC established respect for the views of the child, asserting that children have the rights to "participate in all matters of relevance to them," including research (Barratt Hacking et al., 2013, p. 438). Child-friendly data collection methods are used to encourage active participation, such as artwork, photography, and other interactive activities. However, in utilizing research *with* children approaches, researchers should be careful not to facilitate tokenistic forms of participation (Hart, 1997); whereas, children's participation may be manipulated or enacted at a superficial level. In other words, although children's voices are recognized as significant and important, adults may still be heavily leading and directing the process. That is, the way research is guided and facilitated by adults will greatly influence what children share or don't share in the process.

Whereby, research *by* children approaches aim to engage children as the researchers or co-researchers of a project. Under this approach, children are viewed as competent social actors, "active in the construction of their own lives and the lives of those around them and of the societies in which they live'' (James & Prout, 1990, p. 8). Ideally, children would lead all steps of the research process including posing a research question, determining data collection methods, collecting and analyzing data, and interpreting and presenting findings. Rather than leading the inquiry, the researcher would take on a supportive role, stepping away from their own notions of how the study should be done in order to allow children's questions and ideas to emerge and guide the inquiry. In other words, children's agency should be at the forefront of the research process.

Engaging children as active researchers in the research process is challenging, particularly with young children. As Duhn (2012) explained early childhood educators (and researchers) tend to be led by maternal notions, whereby, children are positioned as innocent and vulnerable and in need of protection. Duhn (2012) warned that this can lead to the over-protection of young children, characterized by a closely monitored environment and restrictive pedagogy and practices. This maternalistic discourse, in turn, can be is contradictory to invoking children's agency with their environment and in ECEE and ECEfS research. Restrictive frameworks and procedures may limit children's voices from being heard and promulgate the positioning of children at the subordinate (powerless) end of the child participant/adult researcher relationship. For example, this might lead an adult to restrict children's engagement with their environment by stating: "don't play over there it is too dangerous" or "there are too many mosquitos to

explore outside." An adult researcher may also be tempted to place restrictions on children's creative activities: "you may only use these colors," "the photograph must be glued on the page like this." While I am not arguing against the importance of ensuring children are safe and cared for, I am suggesting that ECEE and ECEfS researchers continue to consider large and small day-to-day decisions that encourage and discourage children's engagement in the research process.

In my mind, the fine line of providing guidance and promoting agency must be considered and reconsidered continually throughout the research process. Furthermore, if we want to grow as a research community and encourage our children to take an active role in addressing ever prominent environmental and sustainability issues, we must continue to engage in dialogue about the ethics of engaging in research *with* and *by* young children. This paper is aimed at advancing the conversation by attempting to discuss the advantages, challenges, and opportunities of four methods for engaging children as agents in research. Specifically, the following question will guide this inquiry: What methods can be used to promote children's agency in ECEE and ECEfS research?

METHODOLOGY

This study was informed by a participatory and phenomenological framework, focusing on the "careful description of ordinary conscious experience[s] of everyday life" (Schwandt, 2015, p. 234). Phenomenological meanings are derived from "perception (hearing, seeing, etc.), believing, remembering, deciding, feeling, judging, evaluating, and all experiences of bodily action" (Schwandt, 2015, p. 234). Rejecting scientific realism, reality is subjective to each individual. As such meaning is socially constructed and is based on an individual's past and present experiences. Phenomenology is person-centered; it is concerned with "Daesin," that is human existence, or one's experience of "Being-in-the-World" (Heidegger, 1967). As such data collection methods are aimed at eliciting participant's understandings, feelings, and perspectives and rich descriptions of their experiences of "being" in a particular environment.

Study Context

The study included thirty-one 3-to-6 year old children enrolled in a University early childhood education program. However, on any given day, only around 20 children were involved in the research, as some children attended the preschool part-time. Set in a northern boreal forest, the children, with their teachers and researchers, visited the same patch of forest near their school eleven times for approximately an hour each time over a ten-week summer period. Time spent in the forest primarily consisted of open-ended play and exploration.

The research team, consisting of the author and three undergraduate research assistants, provided a supportive role in ensuring that children's ideas and perspectives directed the project. As such, the study took on a deductive and naturalistic, and exploratory approach, meaning that while there was some general structure to the overall project, the process evolved and emerged based on children's interests (Bogdan & Biklin, 2007). As well the children's teachers supported children's agency in the process, encouraging child-led initiatives and risk-taking behaviors during their open-ended forest play and exploration. The Institutional Review Board of the University in which the researcher is affiliated approved the research. Permissions were obtained from the early childhood education center director and teachers as well as from parents of the children who participated in the project. Child assent was sought at the beginning of the project and during all research activities. In this way, children were invited to choose what, if, and how long they wanted to engage in each particular research activity.

Overview of Research Methods and Strategies

The overarching goal of the larger research project was to explore methods for engaging children as active researchers in all aspects of the research process including topic selection, question formulation, methods selection, and data collection, analysis, and interpretation. Table 1 provides an overview of the methods and strategies used in the larger research project. While several strategies were used throughout the research process, for the purposes of this article only four strategies and methods will be presented: Art making, Role-Playing, Building a Model, and Bookmaking. Other methods used, including Sensory Tours and Video-Stimulated Recall Discussions, are presented

elsewhere in another publication (Green, 2016). With that said, in presenting these four methods it is essential to provide the reader with the overarching picture of the entire research process to examine *how* and *what* data was collected by the children.

Table 1
Methods and strategies used to engage young children as active researchers

Steps of Research	**Strategies and Methods**
1) Posing Research Questions/ Selecting Topics	• Small wearable cameras were used to collect video footage of children's exploration and play in the forest. • Adult researchers reviewed video recordings to identify footage that might interest children. • Video footage was presented to small groups of children for discussion. • Children expressed an interest in learning about their experiences of four phenomenon in the forest: rosebushes, forts/castles/houses, bugs, and sticks/"X-marks-the-spot." • Topics formulated the research questions: How do children experience (rosebushes, forts/castles/houses, bugs, and "X-marks-the-spot") in the forest?
2) Selecting Data Collection Methods	• Children choose the phenomenon that most interested them and were grouped accordingly. • "X-marks-the-spot" was the most popular. • Groups were then presented a book of interactive, developmentally appropriate data collection methods and invited to choose methods that most interested them (see Figure 1).
3) Collecting Data	• Children expressed interest in creating art, role-play, building models, and sensory (GoPro) tours. • These data collection centers were constructed in the forest. • Children rotated through centers creating data to further explore their experiences in the forest.
4) Analyzing and Interpreting Data	• Using video-stimulated group discussions, children were invited to view video footage and interpret their own experiences. • Bookmaking was also used as a data analysis and interpretation method. Children were presented with photographs and pictures of their art, models, and role-play and invited to talk about their experiences. Each child created a book page with photographs, drawings, and direct quotes to illustrate their unique experience in the forest.
5) Presenting Findings	• Children presented their research to family and community members in the forest. They shared their experiences of the forest and research process and the book pages they had created. • After the presentation, children led adults on a tour of their data collection centers and their special places in the forest.

Figure 1. Pages in the book, *Our Data Collection Methods*, were used as a prompt to invite children to choose data collection activities.

Four Data Collection and Analysis Methods

The children in this study expressed interest in four main topics, or phenomenon, surrounding their experiences in the forest, including: rosebushes, forts/castles/houses, bugs, and "X-marks-the-spot." The children invented the X-marks-the-spot game during their play and exploration in the forest. They engaged in the game by seeking and finding sticks that crossed in the shape of an X. Several variations of this game emerged during the project, including V-marks-the-spot and T-marks-the-spot. These topics became the focus of their data collection activities. Four centers were developed in the forest based on children's preferences: an Art Center, Building a Model, Role-Playing, and Sensory Tours. Initially, a rotation schedule was devised to enable the groups of children to circulate through the forest centers over the course of four days. However, after the first two days of using the rotation schedule, it became apparent that assigned centers and assigned groups did not necessarily support children's autonomy in the project. Children in the Art Center wanted to explore Role-Playing or Building a Model and children participating in Sensory Tours wanted to do art (or vice versa). Additionally, children's interests in forest phenomenon often overlapped; thus, it did not seem appropriate, for instance, to ask children to create art about bugs when they wanted to focus on "X-marks-the-spot," or vice versa. Thus, by the third day, children were invited to freely explore whichever phenomenon and data collection centers most interested them at any given time. This, in turn, aligns with the nature of engaging children as active agents in their own research. A drawback, however, in offering free-flowing center exploration was that sometimes centers became overly populated or children were unable to complete their projects before it was time to leave the forest. Table 2 highlights advantages, challenges, and opportunities of the four data collection centers used in this project. These will be further discussed in the sections that follow.

Art Making

"Like language, art is a symbol system that can be used to generate meaning" (Isenberg & Jalongo, 2001, p. 106). While art as a method has grown in popularity in childhood environmental education research with children (Green, 2015), it is important to consider what type of art activities are appropriate for the skill level of children involved in research. For young children who are still developing their fine motor skills, painting may be more inviting than drawing. In our study, we provided materials for both painting and drawing). An Art Center was constructed in the forest by placing a large board on four tree stumps for a table and stringing a line between two trees to hang finished

artwork. Children were invited to draw or paint about their forest experiences using the medium they preferred; some did both.

Art is a meaning making process; through the creation of art, children represent and interpret their own experiences. We invited children to describe their creation in order to ‘‘record[s] the journey of their constructions of meaning’’ (Einarsdóttir, Dockett, & Perry, 2009, p. 219). In this way, focus was placed on the process of meaning making rather than children’s artistic abilities or their finished products. Completed artworks were then hung to dry on a clothesline to dry and shared and admired with others.

Figure 2. Children’s paintings hanging to dry in the Art Center.

Creating art in the forest allowed for unique interactions with forest flora and fauna that could not be had indoors. During one art center session, a group of children interacted with a caterpillar that happened across Heidi’s paper:

> **Derek**: *Hey there’s a caterpillar on your…*
> Heidi drops her marker in the bucket and looks up at Ms. Bethany, pointing to the caterpillar.
> **Heidi**: *Ms. Bethany, there’s a caterpillar on my page.*
> **Ms. Bethany**: *Oh wow.*
> **Ms. Taylor**: *Did you draw a cater … oh is that…*
> **Heidi**: *No, it’s a real one*.
> **Ms. Taylor**: *Oh, it’s a real caterpillar right there.*
> **Ms. Bethany**: *He wants to see your art there, Heidi.*
> Heidi touches her paper near the caterpillar and laughs.
> **Heidi**: *I think he wants…I think…I think he thinks it’s a real tree.*

During the interaction with the caterpillar, Heidi along with her teachers personified the caterpillar, assuming its intentions and behavior. As an individual’s environmental identity is formed through interactions and experiences, Heidi’s empathetic response towards the caterpillar is indicative of her growing relationship with the natural world (Green, Kalvaitis, & Worster, 2015).

Setting up opportunities for socializing through group art making encourages children to engage in discussions about what is meaningful to them, communicate shared experiences, and bounce ideas off one another. In this way, the art table creates a common ground for children to express their particular interests in topics.

On the other hand, social influence might also pose limitations. That is, children can be easily influenced by the activities of others around them and might strive to create similar artwork (Einarsdóttir et al., 2009). Furthermore, a child might try to construct what they perceive the researcher wants, rather than authentically express his ideas and perceptions. One way to mitigate social influence is to include multiple methods for children to share their perspectives of their environment. This allows for triangulation of the various data sources. In other words, salient aspects of children's experiences will emerge multiple times through multiple methods. For instance, if a child draws a picture of himself looking for ladybugs on a tree and then creates a model with a similar description this likely demonstrates something that is important to him.

In considering possible limitations of art making as a method, some children might create artwork that seems unrelated to the environmental context. It is important, however, not to dismiss a child's creation as irrelevant, rather a researcher might invite a child to explain the connection that she is making to a particular setting. Furthermore, there are logistical considerations when facilitating art activities with children especially in nature as art making can be messy. Spill proof paint containers and non-toxic products support the common goal of consideration for and preservation of the environment.

Building a Model

Building and molding is a common feature of childhood play, whether indoors or outdoors, in formal (classrooms) or informal (forest) settings, children love to explore how 'stuff' fits together and what that 'stuff' might become. Indeed, "children learn best through manipulation of materials in which they can see the effects they have on the world around them" (Swartz, 2005, p.100). In other word, through building and molding, children are interpreting and constructing their own sense of place in their environments. Childhood place research has also revealed children's inclination to manipulate "loose parts" or objects in nature (Hart, 1979; Kjørholt, 2003; Kylin, 2003; Sobel, 2002). Cobb (1977) described this as "a sort of fingering over the environment in sensory terms, a questioning of the power of materials as a preliminary to the creation of a higher organization of meaning" (p. 48). In other words, by manipulating objects and settings through their play, children are personally making meaning of the world around them and developing environmental competencies (Green et al., 2015).

Figure 3. A child's model: The mushrooms are "houses;" the green moss is "the grass;" and the sticks are the "bushes, prickles and things."

In our research, we invited children to use natural materials to build models to represent their environmental experiences. First, children were provided with buckets to gather materials from their environment, including sticks, leaves, spruce pine, bark, moss, mushrooms and other interesting objects. Next, children shaped and glued their objects onto cardboard surfaces, creating miniature worlds to represent both real and imaginary elements of their experiences. After children were done constructing their models they were invited to describe them. Bug homes, mini villages, tiger huts, tiny lakes, and rivers were among the features depicted in children's models. Some accurately represented the local flora and fauna of their environment, while others extended their depictions to include features that were not native to their environment (e.g. tigers).

The primary advantage of the Building a Model method is that models constructed by children represent their particular interests in their environment. For instance, Sergo built his home in the forest. This, in turn, validated his interest in claiming a place in the forest, which he demonstrated during other data collection activities. Katherine built a ladybug on a tree, demonstrating her environmental competency of the creatures that she had interacted with in the forest. Others incorporated native flora and fauna of the local habitat that they had not come into direct contact with during their forest explorations (i.e. bears, salmon, and berries). Nevertheless, such depictions provide insight to their personal interactions with the local outdoor environment, both past and present.

Additionally, children's descriptions of their models provide insight into the social, cultural, geographical and familial influences of their nature experiences. Several children created their houses and described features of their yard (i.e. kid pool). They also talked about going on hikes with a family member, or engaging in hunting and gathering activities (i.e. berry picking). These all make up the local ethos of their place (Kjørholt, 2007).

As well a third advantage and disadvantage of the Building a Model method is that children incorporated both real and imaginary elements in their models in order to interpret their surroundings. While this can be viewed as an advantage, especially in considering fantasy play as an important feature of children's environmental identity development (Green et al., 2015), it might also be perceived as a disadvantage in that their representations may not fully reveal the truth of their lived experiences. Facilitating multiple methods to explore children's experiences, as discussed earlier, provides one way to overcome this. If children repeatedly represent and tell about an experience or particular phenomenon then likely it represents a salient aspect of their environmental identity.

A possible disadvantage, or challenge, associated with the Building a Model method is that it may not be suitable for especially young children who are still developing their fine motor skills. It is important to keep in mind the age and skill level of children when considering this method. It may be challenging for younger children to use liquid glue or to cut or shape materials into distinct environmental features. Thus, when facilitating this method with young children, researchers may want to employ an ample number of adult or peer assistants. It is also wise to arrange for enough assistance for video or audio recording children's descriptions of their models. Because models may be very abstract and indistinguishable, children's explanation of what they created is of upmost importance. Finally, allow plenty of time for children to create and construct their models. Rushing the process may lead to gaps or a disjointed understanding of children's environmental experiences.

Role-Playing

Childhood is full of fantasy play and creativity. Why not harness children's imagination by employing role-play as a data collection method? Role-play requires children to consider ideas from various perspectives and draw upon their own beliefs, values, and experiences. As O' Sullivan (2011) explains:

> Role-play is concerned with representing and exploring different people's points of view, and different points of view forge different types of knowledge. It places participants at the centre of the learning experience, and allows them to build their own bridge of understanding. As a result of this informed consideration, they are better able to resolve problems and issues. (p. 513)

Figure 3. Children pretending to be bugs in the Role Playing center.

Thus, role-play is a useful data collection method for studying children's environmental experiences. By assuming the role of human and other entities of the more-than-human-world (i.e. plants, animals, or other environmental features), children begin to explore their personal relationship with nature. Additionally, through role-playing children engage in empathetic reasoning, that is, they think about how it might feel to be someone or something else - like a bug, sunflower, or another creature (Donohoe & O'Sullivan, 2015). Additionally, children's environmental competencies are harnessed through perspective taking and emotional understanding. This encourages children to think about how they feel about and relate with various entities in nature. Furthermore, role-playing promotes children's social engagement with peers and when orchestrated outdoors, children are more likely to relate their stories to their environment. In other words, they are more likely to incorporate elements of the natural world into their role-play. They may assume a stick as a sword or build a nest out of pinecones.

In our research, we created a stage like area for children to role-play in the forest. A sheet was strung between two trees, a tarp was laid across the forest floor, and puppets (flower, tree, sun), costumes (ladybug, butterfly), and other prompts (a talking stick) were made available for children to act out their forest experiences. First, children were invited to choose their desired role by selecting among various costumes or puppets. This, in turn, supported their autonomy in engaging as active researchers. Next, children were reminded of the phenomenon in which they had previously expressed an interest (i.e. bugs, X-marks-the-spot, sticks, forts, houses, castles). They were then encouraged to construct a narrative based on their role selection and their expressed interests in certain topics. Question prompts were used to encourage children to think about and facilitate their participation in the role-play: *"Let's think about what we like to do in the forest. How can we make a story about what we like to do? Can we use things around us to make that story? What might you say? What might you do?*

Children responded by assuming different aspects of their environment and reenacting key interactions of living flora and fauna through their perspective. In this way, they demonstrated their understanding of environmental relationships and how humans interact with particular features of their environment. Additionally, the researcher participated by assuming a role, often a role that was assigned by children. In this way, the researcher engaged as a facilitator as well as an active participant of the experience. For instance, in one scenario the children asked the researcher to play the role of the 'Forest,' in another situation the researcher was invited to be 'Mr. Stickerbush.' Puppets or costumes were used to act the appropriate role. By taking on the role of an environmental feature, the researcher was able to evoke the children's experiences and gain deeper insight into how they perceived their own experiences within the forest. As the 'Forest' the researcher was able to ask the children how they interacted with it, what they liked best about it, and what the forest meant to them. As 'Mr. Stickerbush' the researcher asked similar

questions and the children actively responded by lightly stroking the 'Mr. Stickerbush' puppet; the children responded appropriately as if poked by a wild rosebush in real life.

Studies have shown that discourse between children and an adult researcher is enriched when researchers assume a role compared to discussions generated by a traditional teacher/researcher role (Aiken, 2014). In turn, children may feel more comfortable with researchers engaged in playing a role; this can "open up possibilities for new storylines and admissible actions" (Aiken, 2014, p. 255). Similarly, research has also shown that children are more likely to view puppets as peers rather than authority figures (Belohlawek, Keogh, & Naylor, 2010; Simon, Naylor, Keogh, Maloney, & Downing, 2008). We found this to be the case; even shy children were more inclined to engage in conversations with puppets worn by adults (Luckenbill, 2011; Keogh & Naylor, 2009). Thus, by taking on an imaginary role researchers are venturing towards new avenues for engaging children in expressing aspects of their environmental identities.

Another benefit of role-playing as a data collection method is that children perceive it as fun and engaging. In our research, children were drawn to the Role-Playing center, curious and eager to join in the excitement. Many revisited the center on multiple occasions, enacting and reenacting similar stories. This served to validate children's experiences and interests in particular topics. Additionally, role-play, as a research method, offers flexibility to cater storylines to fit both the shared ideas of groups as well as individual ideas on any given topic. For instance, while a group might decide to create a story about bugs in an environment, individual children can express how they think and feel about a particular bug.

While social dramatic play is a common activity among young children, role-playing as a research method is a bit more structured and focused. In planning to use this method, researchers should purposively think about which types of roles are appropriate for a given environment. To the extent possible, costumes and prompts should reflect the flora and fauna of that setting. It is also important for researchers to have materials on hand for children to design additional costumes to fit with the story lines that they conjure up. We found that storylines were often limited to the props available to children. However, by creating a stage in nature, children can be encouraged to incorporate their environment into their role-play schemes.

Bookmaking

Bookmaking can be used in various forms throughout a research project in order to document what took place and to create a visual that children can revisit time and time again. In our research project, we engaged children in bookmaking collectively as a group and individually. First, a Research Big Book was used to document children's engagement in the project from beginning to end. Second, each child was invited to create a book page to show and tell about his or her forest experiences.

Bookmaking engages children in the making of the research. Children's ideas can be built upon from the inception of a project, including documenting their experiences with each aspect of the research process and capturing their ideas about the topics they wish to explore. In this way, books were used to keep record of the research as well as to engage children in data analysis and interpretation.

A Research Big Book

In our project, a Research Big Book (large flipchart) was used to introduce children to the research, capture their ideas, and to document what they did together: *"Over the next several weeks, we will be making make a story together. Even today we will be making this story, I would like to write in the story the things that you say. You can add pictures or whatever you want in the story – this will be our story about research. What do you think? Would you like to make this story together?"*

From the onset of the project, the children were invited to collaboratively make a story about them and for them. Each time we met in the classroom to reflect on their forest experiences, we added new pages to their book, including photographs, quotes from their discussions, and drawings that they created to represent their experiences.

Discussions were framed around video-stimulated recall; specifically, children were invited to view videos of their forest exploration and talk about their experiences. Teachers helped facilitate the discussions and wrote down children's comments on sticky notes. Children were then invited to stick "their words" on the Research Big Book page; these notes were later transcribed into the story of their experiences. Overall, children expressed excitement in revisiting pages previously created; they built upon and extended previous understandings.

Individual Book Pages

While children's environmental experiences are to some extent socially informed, each child constructs personalized meaning of their experiences. For this reason, we also worked one-on-one with children, inviting them to make their own page and share what they remembered and liked best about their forest experiences. Children were presented with an 11 X 17 sheet of paper, pictures and photographs, and a variety of craft supplies (markers, stickers, glue sticks, stickers, and glitter paper). The bookmaking activity was introduced by stating: "*Today you are going to make a book page about your experience in the environment. I have some pictures of you and artwork that you made. You can decorate your book page however you wish*."

As a child creates his or her book page, they can be invited to describe what they were doing in a photograph. They can also be invited to draw pictures to illustrate their experiences. Below are some probes that can be used to engage children in data analysis and interpretation:

1) *Tell me about your experience in the [name of environment]. What do you remember? What did you like best? What was your favorite thing to do?*
2) *I am going to show you a photograph. What do you find interesting in this photo? What were you doing?*
3) *Tell me about what you notice (qualitative description).*
4) *Is there anything that you can count (quantify)?*
5) *Would you like to draw a picture of your experience the [name of environment]? Is there anything else that you want to share about your experience?*

Bookmaking as a data analysis activity provides an opportunity for children to reflect on and validate their interests in selected topics. For instance, in our research, Peter drew and talked about bugs during his bookmaking activity:

Researcher: *Do you remember what you did when you were in the forest?*
Peter: *Yes.*
Researcher: *What did you do?*
Peter: *I was trying to look for beetles.*
Researcher: *Beetles…oh wow!*
Researcher: *Do you want to draw anything about your experience in the forest?*
Peter: *Uh-huh.*
Peter takes the lid off a marker and begins to draw.
Peter: *How about I draw a bug. This one is a bug. It has two legs.*
Researcher: *I like that bug.*
Peter: *And that one's a ladybug.*
He draws a second bug on the other side of his paper.
Researcher: *That's a ladybug?*
Peter: *Uh-huh.*
Researcher: *And what did you do with a ladybug?*
Peter: *I don't know. I went and found one.*
Researcher: *Did you find lots of ladybugs in the forest?*
Peter: *Yes.*

Figure 4. Peter's book page with photographs, drawings, and quotes illustrating his forest experience.

During the bookmaking process, Peter had the opportunity to interpret data (in this case a photograph) that was captured during his forest play and exploration. He interpreted the photograph of himself looking for bugs in the forest. He also drew a picture of bugs, demonstrating that he had internalized the search for bugs as an important part of his forest experience. The bookmaking activity also demonstrated Peter's growing understanding about bugs: some bugs have two legs and ladybugs live in the forest. Peter also reflected on his experience with sticks; he tried to get around the sticks, fought with sticks, and was trying to break the sticks (see Figure 4). In this way, Peter analyzed the photographs of his experiences in the forest and the book page depicts his interpretation of his experience.

Additionally, children were invited to wear a small camera (i.e. a GoPro) on their forehead while creating their book page. This revealed a child's viewpoint, depicting their interests and what drew their attention. The wearable camera revealed Peter's attentiveness to a photograph. For example, Peter continuously exclaimed, "*Hey that's me*," while bringing a photograph close to his face for further examination. The camera also showed when Peter looked towards the door, or when he became distracted by a peer or another object in the classroom. In this way, a researcher becomes aware of what excites a child, revealing more about their individual experiences. As well there are also logistical benefits to using wearable cameras to film the bookmaking process. This frees the researcher's hands from holding a camera, allowing for a more authentic interaction between a child and adult researcher without the awkwardness of a camera in between.

CONCLUSION

In this paper, four interactive methods were presented for engaging children as active researchers. Data collection centers were facilitated in the forest; this provided an authentic context for children to construct and interpret meaning of their environmental experiences. Creating art in the forest provides a backdrop for children to reflect on the beauty and awe of nature; it also provides an opportunity for children to interact with and incorporate aspects of nature into their paintings or drawings. While artistic representations have been used quite extensively in early childhood research, inviting children to use materials from nature to build models and to engage in role-play encourages children to create and recreate representations and scripts of their experiences. As well book making as a data analysis and interpretation tool, provides children with the opportunity to reflect on and further share salient aspects of their experiences. Bookmaking can be used as a tool for children to collectively and individually construct understanding; photographs, drawings, and quotes can be incorporated into book pages and presented. In our

project, children used the book pages as a prompt to share the story of their experience with their families and other community members.

When selecting among the methods presented in this paper, researchers should consider children's interests and skills. Materials and activities should align with children's fine motor abilities and their cognitive and socio-emotional development. For instance, while role-play can be fostered across the early childhood spectrum, social perspective taking is still emerging during the early years and this need be considered when interpreting the roles that young children assume (McDevitt & Ormrod, 2013). Additionally, skills that require fine motor precision such as cutting and pasting may be challenging for the very young. Furthermore, while painting and model building provides a means for children to creatively represent their perspectives, it is important to invite children to talk about what they create. Representations may be abstract and difficult to decipher, children's verbal descriptions can shed light on past and present environmental experiences as well as socio-cultural and familial influences. Along this line, it is important to enlist sufficient adult help to assist with art-making (i.e. cutting or gluing) and video recording children's descriptions. As well researchers should also consider incorporating multiple methods to validate children's expressive understandings. Understandings that emerge multiple times through several activities are more likely representative of salient aspects of their experiences.

Finally, promoting children's agency in ECEE and ECEfS research is not a simple matter. It is one that should be treaded upon delicately and lightly. It requires a deep level of reflexivity and a willingness to modify, adjust, or even terminate an approach should it be found ineffective or disengaging. In other words, children more often than not have alternative ways of knowing and doing. 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.

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