

Investigating the Role of Materiality in Pre-Primary Children's Land Art

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ABSTRACT

Natural materials provide children opportunities for artistic engagement, which encourages a dialogue between children and material and provides a platform for children to discuss their perspectives on significant issues like sustainable futures. This article examines the land art characters created by pre-primary education children in the garden of the University of Turku's Rauma campus. The study is part of a STEAM-themed learning process that was conducted in a pre-primary group (children aged six to seven years) during the spring of 2022, based on Freinet's pedagogy. The study uses multimodal content analysis to analyze the children's land art pieces and their character-based storytelling. The results indicate that the children were able to effectively use natural materials to create unique characters by selecting appropriate materials, colors, and shapes to highlight their features. The shapes of natural materials served either as building blocks for the characters or helped them realize the characters they imagined. Further, the garden was found to be a significant location for outdoor learning, as it provided a space for children to engage in activities such as creating land art and exploring nature.

Keywords: land art, pre-primary education, learning environment, nature materials

Early childhood education (ECEC) in Finland has a rich history of incorporating diverse aspects of sustainability, such as promoting contact with nature and safeguarding the environment. However, promoting social equity and diversity using sustainability education as a conceptual framework is recent, and there is a lack of common understanding and practice in teaching settings as to how sustainability can be approached in ECEC (Furu & Heilala, 2021). In addition, studies indicate that children and youth frequently feel that their opinions regarding environmental matters and sustainability are disregarded or overlooked (Kumpulainen et al., 2020; Manni et al., 2013).

This present study discusses arts-based making and the role of materiality in the land art process of a group of pre-primary children's that took place in a garden environment near the school and aiming to promote the preschoolers' contact with nature. The art technique chosen was land art, which according to Solberg (2016) incorporates natural materials such as leaves, cones, branches, pebbles, rocks, sand, and seashells and encompasses diverse interpretations that are open to everyone. Land art is linked to physical interaction and the use of materials with the immediate environment (Solberg, 2016). Land art was chosen for the study because it is often considered a fusion of artistic expression and ecological awareness (Stathopoulou, 1997).

In addition, ECEC research has scrutinized land art as a pedagogical approach for young children; its value has increasingly been acknowledged. According to previous studies (Amus, 2013; Chawla et al., 2014; Kuo et al., 2019), land art develops children's creativity, curiosity, and sense of connection with nature. Furthermore, incorporating green spaces into the educational practice enhances children's well-being and learning (Amus, 2013; Chawla, 2015). This means that the integration of art into environmental education can offer enjoyable, engaging, and experiential

learning opportunities for children to discover and understand nature (Foster, 2017). Solberg (2016) reports that site-specific activities that use natural resources heightens the environmental consciousness of preschool children and their teachers.

By exploring ways of encountering the environment through a materialistic lens, we can begin to reimagine the role of materials in our lives and move toward more sustainable and environmentally conscious practices. Developing pedagogical practices that encourage that effort is crucial because education may sometimes restrict young children's opportunities for engaging with nature, thus compounding their disconnection from the natural world (Ward, 2013). The following research questions are addressed: (1) What kinds of characters do children create during land art activity? (2) What choices do they make regarding materials during land art activity? Within these questions, we consider the possibilities of promoting preschoolers' contact with nature through land art.

Role of outdoor learning environments

Connecting with nature has several benefits, including increased cooperative play (Bell & Dymont, 2006), enhanced focus and attentional abilities (Wells, 2000), and the development of creativity and cognitive skills (Kellert, 2005). In addition, previous research (Aerila & Rönkkö 2023; Aerila et al., 2016; Bürgener & Barth, 2018; Lindfors et al., 2021) emphasizes the benefits of outdoor learning environments as they enhance experiential learning, develop more personal connections to learning, and increase engagement with nature. In Finnish ECE, outdoor learning spaces are already used quite widely and regularly; for many groups, visits to forests or urban parks are part of the weekly routine (Furu & Valkonen, 2021). However, these visits are rarely pedagogically planned (Furu & Valkonen, 2021), and their perspective is predominantly anthropocentric, which regards the world in terms of human focused values and experiences (Furu & Heilala, 2021). Playful, explorative, or dialogically framed learning experiences are sparse, and there is a lack of professional language regarding sustainability (Furu & Valkonen, 2021).

According to Needles (2020), learning environments should not only facilitate hands-on activities but also inspire creativity and encompass various forms of art such as writing and designing. Furthermore, the environment should contribute to the establishment of an inclusive and effective learning space (Brooks, 2010). Working or being in a garden enhances the senses, can both calm and stimulate, and activates creativity (Keckam, 2019). Improving the well-being of the environment necessitates treating people and the rest of the living world as integrated with one another and not merely in harmony with their surroundings (Berleant, 2002). Even in their early years, children possess an awareness and understanding of their environment (Spiteri et al. 2022), and creating art in an outdoor environment provides a platform for them to reflect on their experiences of beauty and awe of nature and the opportunity to interact with and incorporate aspects of nature into artwork (Green, 2017). In general, different inquiry-based learning activities link educational content to children's surroundings and effectively enhance their knowledge of nature's value and sustainability objectives (Spiteri et al., 2022).

Nature materials in arts-based education

From the perspective of ECE on the environment, a connection with nature and natural materials is considered essential. Natural materials not only satisfy basic human needs but also shape societal and cultural practices, and nature is known to play a significant role in the intellectual, emotional, social, spiritual, and physical growth of children (Kellert, 2005). In arts-based education, materials have the potential to inspire and cultivate a creative mindset (Needles, 2020), with young children in particular more actively engaged and invested in arts-based learning when they are encouraged to explore the possibilities of different materials (Lim, 2005). It is worth investigating how these factors manifest themselves in the work of pre-primary children, as they likely lack experience and preconceived notions and thus can freely experiment and create with materials.

In ECE, using natural materials for art is a common approach to environmental dimensions, alongside observing nature and using specific vocabulary for plants, birds, and animals (Furu & Valkonen, 2021) and promoting an attitude of being mindful of and careful with resources and learning to respect plants and animals (Furu & Heila, 2021). Natural materials provide opportunities for the kind of artistic engagement found in land art, which encourages a dialogue between artist and material. Working with both familiar and new materials can facilitate

children's understanding of the properties and potential of different materials, fostering creativity and critical thinking. (Bennett, 2007) The tangibility of materials can be engrossing and stimulating, and abundant material resources can inspire imagination (Alesina & Lupton, 2010; Clapp et al., 2016). Sometimes, encountering the environment can take on a new materialistic form (Bennett, 2007) that illustrates one's experiences of the environment and resembles a traditional verbal narrative but takes a more visual, tactile, or kinesthetic form (Aerila et al., 2019).

Art-based activities give children opportunities to create stories in modalities other than verbal expression and make individuals' environmental images, including unconscious ones, visible (Aerila et al., 2019). Relationships with nature can be promoted through artistic activity (Foster, 2017), and various visual, kinesthetic, and narrative methods have been shown to be effective in breaking away from plant blindness and promoting sensitivity to nature (Jose et al., 2019). Environmental sensitivity is defined as the ability to observe and care for the environment, and it is closely related to environmental aesthetics and education (Sepänmaa, 2017).

Much of human experience and knowing is expressed through sensory and emotional forms of knowing (de Bruin et al., 2018), and the arts make it possible to experience and make visible experiences that are not conveyed through rational knowledge (Foster, 2017). Art is a meaning-making process; through the creation of art, children represent and interpret their own experiences. Therefore, it is important to consider what type of art activities are appropriate for children (Green, 2017) and to find a balance between scaffolding children's learning and leaving ample room for individualized discovery (Wright, 2018).

Context of Study

The land art process investigated in this study was part of an intervention (Aerila & Rönkkö, 2023) carried out in an urban area of western Finland from the end of April to the end of May 2022. The intervention (Aerila & Rönkkö, 2023) was planned by two researchers in collaboration with the pre-primary teacher and implemented with the assistance of three student teachers (one specializing in early childhood education and two in craft, design, and technology education). An assistant who worked daily with the group was responsible for facilitating the use of tools and ensuring that all activities in the garden were conducted safely. The data collection was carried out over a period of three weeks in total, during which the children participated in the intervention for a total of eight days.

The context of the land art process was a garden near the school; it was established in 1897 and is situated in the city center. The garden is part of the University of Turku's Department of Teacher Education and is heavily used by individuals throughout the region (Ruokonen & Lepistö 2021). The garden area comprises a diverse collection of over 500 plant species. It is a busy part of the Rauma campus, accommodating teacher trainees and pupils from a number of schools (University of Turku). It is popular for both studying and relaxation. In previous generations, gardening was viewed as an essential skill for everyday life and nutrition, and the garden was considered an ideal location for learning these skills (Kokkonen & Kortelahti, 2018). The recommendations for implementing the study entail the utilization of outdoor spaces, encompassing natural environments such as forests, lakes, parks, or playgrounds, as highlighted by Chawla (2015). Additionally, the scope of these spaces extends to encompass specialized outdoor learning centers (Fuller et al., 2017), educational field trips (Henriksson, 2018), and rural locations (Kaasinen, 2019). Researchers are able to manage the public dimension of these spaces by selecting tranquil areas for instructional purposes. Both researchers and educators, along with the participating children, are encouraged to document the land art creations through photography. Depending on the study context, the art installations can either be left for public admiration or removed responsibly.

The intervention in this study was targeted at a pre-primary group from a Freinet school; it consisted of 19 children aged six or seven-years old (12 boys, nine girls). Freinet's pedagogy developed from the ideas and practices of Celestin Freinet (1859–1952). It is highly open and provides the implementing teacher with a wide range of choices and opportunities to further develop their pedagogical principles and practices (Aerila et al., 2010). In line with Freinet's pedagogy, methods of learning that prioritize the child and enable self-directed approaches necessitate learning environments that are adequate and adaptable. Moreover, the design of such learning environments must take into account outdoor spaces that are conducive to a variety of activities (Freinet, 1987). In accordance with the

principles of Freinet’s pedagogy, the children who were involved in the intervention had regularly visited the garden and had prior experience with activities such as planting seeds and harvesting crops. Nevertheless, it was observed that the children primarily used the garden for outdoor recreational pursuits and play.

The overall objective of the intervention was to explore the use of arts-based activities within a STEAM-based learning approach. Throughout the intervention, the children were introduced to the idea of nature and plants and participated in activities like borrowing books, planting seeds and monitoring their growth, building a robot, and reflecting on their learning experiences through storytelling. In addition, the intervention used a range of art-based activities, such as word art, drama, music, visual art, and crafts. Activities were held in both the classroom and the garden; each lasted between 60 and 120 minutes. The activities were structured into four phases: motivation, orientation, core assignment or activity, and reflection (see Figure 1; see Aerila & Rönkkö, [2023] for the structure of activities).

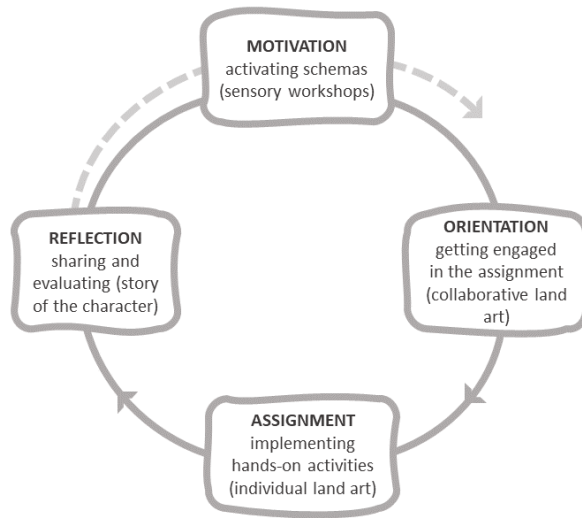


Figure 1: Implementation of the land art activity during the learning process.

One of the STEAM-learning process activities was the land art activity, which lasted for two hours. The motivation phase of the activity consisted of three sensory workshops: a scent-kinesthetic workshop provided opportunities to observe and identify a variety of scents and materials; in the visual workshop, children identified shapes and colors found in nature; finally, in the auditory workshop, they created a sound landscape for a story (Figure 2).



Figure 2: The intensive study of forms and colors in the garden.

The purpose of the workshop assignments in the orientation phase was to strengthen the children's multisensory observations. They were scaffolded on producing land art and created free-themed land art in small groups. These land art pieces were accompanied by storying, in which the children were asked to collaboratively related what they had created and imagine the meaning of the land art (see Figure 3).



Figure 3: Land art with leaves, flowers and spruces.

The core assignment was to individually create land art character. In the core assignment, the only limitations were that they were supposed to use only materials from nature, such as branches, cones, and leaves that had fallen to the ground, and material that was brought to them for the activity, such as flowers. All materials had to fit into a tray reserved for the land art piece. The reflection phase of this assignment was a shared reflection on the next

activity, which was designing a robot in the classroom based on a land art piece. This activity contained a drawing an outline of scanned images of land art pieces. Subsequently, the outlines were engraved on plywood using a laser machine and cut around the edges. A motor was attached to the plywood board by soldering. The children were given the opportunity to decorate plywood panels by painting or by adding natural materials collected from the garden. The robots were launched for the first time on the lawn of the garden. The reflection involved dictating a story about the character. Further, the children were not allowed to use any tools like scissors, glue, or coloring materials when creating the character, but they were allowed to work with natural materials in the way they wanted, such as tearing and cutting them.

Data and Data Analysis

The data consisted of photographs that documented the collaborative ($n = 3$) and individual ($n = 16$) land art projects undertaken by the children, as well as video recordings of the garden sessions, memos written by the two researchers, and stories dictated by the children in reflection phase. Video recordings, memos, and stories acted as supplementary data, with the photographs forming the main data. For the study, the characters' names are presented as the children named them in Finnish. When a name refers to something tangible, it has been translated, with both the Finnish name and its translation presented in Table 1. In the results section, these names are in their English form.

Table 1: The land art characters.

Child	Character's name	English version
C1	Keijumaija	Fairy Maija
C2	Goem	Goem
C3	Suomi Kukka	Finland Flower
C4	Lehtikettu	Leaf fox
C5	Kotka	Eagle
C6	Karvakamu	Hair pal
C7	Kauhu-ukko	Horror dude
C8	Pupu	Bunny
C9	Keijuapina	Fairy monkey
C10	Joulupukki	Santa
C11	Outo possu	Weird piggy
C12	Keijukisu	Fairy kitty
C13	Aava	Aava (Open like see)
C14	Luonnonsuojelija härkä	Nature Protector Bull
C15	Lintu	Bird
C16	Pupu	Bunny

Two researchers were present during the land art activity; they documented their observations by taking photographs and memos throughout the intervention. In the initial phase of analysis, the photographs were printed for both researchers to preserve the land art pieces and to facilitate the children's creation of stories about those characters.

A qualitative case study approach is employed (Yin, 2018) and involves a multimodal application of content analysis (Cohen et al., 2008) of the research data. Multimodal content analysis is based on semiotics, which argues that our actions are not arbitrary and reflect our understanding and learning. Since children may have trouble expressing their comprehension clearly and directly, using their creative productions and their actions can aid in understanding their learning and thinking (Bezemer et al., 2012).

First, the land art characters generated by the children underwent categorization based on idea behind the theme and execution. At this stage, the basis for character design was categorized (e.g., nature, imagination, combination). In the second phase of analysis, the land art pieces were scrutinized with an emphasis on their textures and the expression of diverse senses. Simultaneously, categorization was conducted on the materials used and how the character's details (facial features, limbs, and other distinctive attributes) were realized. Alongside this categorization process, the children's storytelling was also analyzed, and descriptions of the characters were made. Researchers' memos served as support for writing the descriptions. The first phase of analysis was conducted jointly by all researchers, while the second phase was carried out by the researchers individually. Those individual results were then integrated by the first author to form a shared understanding.

The study was conducted in accordance with the European Union's General Data Protection Regulation. Prior to collecting data, informed consent was obtained from the children and the guardians of all 19 participants. This included obtaining written consent for the use of the children's data for research purposes and ensuring that the participants and their guardians were fully informed about the study, the data being collected, and how those data would be used. In the context of data collection, participation in the study was voluntary, and children had the option to terminate their involvement at any point during the activity. The land art assignments constituted an integral component of the school's regular learning endeavors, so all children participated in these activities, regardless of their involvement in the study.

Findings

Diversity of characters created by children in land art activities

All the children created their own pieces of land art and assigned names to their land art characters (Table 1). The land art activity produced a diverse range of characters, with inspiration coming from different sources: nature itself, children's imaginations, and a fusion of nature and imagination. A few children's land art pieces ($n = 3$) were inspired by natural elements like animals or plants. For example, one child wanted to create an eagle, and the resulting piece of land art was brought to fruition through the use of a wide range of natural elements such as leaves, plant stems, and lichen (see Figure 4).



Figure 4: "Eagle," implemented by C5.

Some of the children's land art pieces ($n = 5$) were clearly conceived in their imaginations without explicit inspiration from the natural world. These pieces were characterized by the depiction of fictional creatures from popular culture or shapes that were original to each child's individual vision. "Horror Man" featured conifer cones as the character's eyes and a stone as its nose. In the creation of this artwork, the child incorporated leaves to enhance the details of the character's features, including the depiction of its hair and mouth (see Figure 5).



Figure 5: "Horror Man" by C7.

Most of the children's land art characters ($n = 8$) were a fusion of imagination and inspiration from nature. They used elements from the natural environment but added their own creative twists to create something unique. "Nature Protector Bull" comprised a bark-covered body, a single-leaf head, and various details crafted from branches (see Figure 6). One child wanted to emphasize the role of bulls as protectors of nature and bestowed on one such creature the title of "Nature Protector." It seems that land art evoked the children's passion for protecting the environment. According to the child's story, when Nature Protector is provoked, it can deploy countermeasures and even cause the world to explode if angered. It can climb and serves as a champion of environmentalism. Child (C14) describes Nature Protector like this:

"The character is powerful and has super armor. It rams with its horns. It can make antidotes if it gets irritated. If it gets angry, it starts to lash out and then the world explodes. It can climb and is a conservationist."



Figure 6: "Nature Protector Bull" by C14.

Children's choices of materials in land art activities

The analysis revealed that the children created cephalopod-like characters with heads, bodies, and arms (e.g., Figures 4 and 6). They used natural materials like leaves, sticks, branches, and flowers to create unique designs while experimenting with various shapes, sizes, colors, and textures. The resulting characters demonstrated the children's creativity and ability to bring their imaginations to life using only natural materials.

In the realm of land art, the creative process involved a form of communication with natural materials that provided inspiration and ideas for the children, while the characters imposed certain demands on the materials chosen. In this way, creating land art can be viewed as a dialogue between children, materials, and characters brought to life through the art form. The use of natural materials such as leaves, twigs, stems of plants, and grass to create unique characters encouraged the children to explore and appreciate the beauty of nature. In this study, the observation that certain natural materials were particularly well suited for specific character features is noteworthy.



Figure 7: Bird (C15).

Figure 7 shows "Bird." This child's use of natural materials to create a bird with anatomically correct legs demonstrates a sophisticated understanding of both the physical attributes of birds and the properties of the materials used. The body of the bird is composed of pine cone, which add a distinctive texture to the piece. The head of the bird, meanwhile, is made of bark, which fits in seamlessly with the rest of the design. To add to the realism of the artwork, the child has used moss to create the bird's feathers, lending it an earthy, organic feel. The eyes are made of cowberry leaves. The careful arrangement of the materials reflects an attention to detail and a commitment to producing a realistic representation of the bird. However, the child's description departs from the naturalism of the land art: "It is a bird that is attending a party and drinking juice. It is playful, watches TV, specifically a Mickey Mouse movie, and eats potato chips while drinking Coca-Cola" (C15). Based on these details, it appears that the character is living a human-like life that includes entertainment. The story continues:

"Bird goes to buy a cupcake and a hamburger. Then, it spins a wheel of fortune and gets the best number, which is one. It also puts on a gooseberry cap. Bird goes to play with the birds because it is a bird party. Dogs and cats also come to the party. The child likes them and plays with everyone. Then, Bird buys cupcakes for everyone and they all eat them." (C15)

The use of natural materials in character design allowed the children to create characters with recognizable animal features, such as limbs, faces, and expressions, despite the unconventional medium. By carefully selecting and

arranging natural materials, the children were able to craft intricate details, bringing their characters to life in a way that was both unique and memorable. For instance, leaves with fine, stringy fibers or fringed edges proved to be ideal for crafting hair or tufts of hair for the characters, as the fibers could be arranged to create a realistic, textured effect. Waxy leaves served as the skin or hide of the characters and were also used to shape the body or shield. Small leaves, dry berries, and pebbles were the primary choices for eyes. Similarly, grass with fluffy textures were used to design ears, giving the characters a distinctive and quite charming appearance.



Figure 8: "Bunny" (C16).

The child's artistic creation, as depicted in Figure 8, is a character named "Bunny":

"The character is Ella. Ella lives in a house, a golden house. Mashed potatoes are a favorite food. The golden house is in the forest. Fox, bear, snake, squirrel, mouse, owl, frog, and dog are Ella's friends. Ella is adventuring in the forest with her friends. Found seven new friends in the forest. Friends play together in the forest. Then they eat and go swimming and go home, and then sleep. Ella was born in Germany and knows German. Ella was born in the forest. Ella became a veterinarian when she grew up."

Ella's body was crafted using the wax-like leaves of the bergenia plant, while the head was formed from an oval leaf; even her feet were made using leaves, complementing the rest of the design. To add an extra touch of realism, the ears were carefully crafted from a plant stem with accompanying leaves, adding to the character's overall appearance. The tail - a crucial aspect of any bunny - was meticulously designed using lichen to create a fluffy and tactile texture that adds to the sensory experience.

Discussion

The results showed that children created imaginative characters, each of which was unique. They were able to use natural materials for their needs, selecting colors and shapes to highlight each character's particular features. The garden served as a significant location for outdoor learning by providing a space for children to create land art and explore nature. The shapes of natural materials served either as building blocks for the characters or helped them realize the characters they imagined. In this study, most children had an imaginary character in mind and chose materials accordingly. Multiple sensory experiences were meaningful in choosing materials: their visual form (length, shape, colors); their feel to the fingers (softness, hardness, roughness); and the kinesthetic experience of moving the materials. The land art assignment helped children enrich their understanding of the environment and the human relationship with it through active creation.

The learning process presented in this study serves as an example of how children engage in using natural materials if they are given the opportunity to exercise their creativity (for creativity and nature, see Almers et al., 2021). The results also emphasize that the availability of natural materials facilitates a direct interaction with the natural world that can be enhanced with diverse hands-on activities like land art. The results of this study accord with previous research (e.g., Tuuling et al., 2019) in suggesting that the use of natural materials can stimulate creative capacity in children.

Experiential and multisensory knowledge can provide children with opportunities for personal interpretation, thereby fostering their relationship with matter (Wilson, 2012). By engaging with materials through various sensory channels, children can gain a deeper understanding of their properties and potential uses and enhance their creativity. As such, providing children with opportunities for experiential and multisensory learning can have a significant impact on their relationship with the environment and the natural world, fostering a sense of stewardship toward natural resources.

In general, children who attend childcare centers with outdoor spaces can interact with nature and explore green spaces in a safe and convenient way (Chawla et al., 2014). The dynamic interaction between children and nature materials illustrated in this study facilitates a space for learning and exploration, enabling children to experiment with diverse materials and explore the unique properties of each of the many materials at hand. In the present study, children were engaged in garden activities, and their environmental investigations provided a platform for the expression of individual voices, and creativity. Through land art, a child may be expressing a desire to promote environmental conservation and sustainability and a belief in the transformative power of individual action. In the future, it is crucial to place a greater emphasis on making nature experiences meaningful for children and structuring them pedagogically.

Facilitating arts-based education provides a platform for children to interact socially and discuss their perspectives on significant issues like sustainable futures (Green, 2017). In general, art-making activities are considered useful and creative approaches for exploring and expressing understandings of the natural world and for assisting engagement with the local natural environment. Arts-based exploration provides learners with additional ways of knowing - cognitive, affective and kinesthetic - and understanding the environment (Ward, 2013). The importance of play in a child's growth and its potential for educational objectives in promoting well-being and supporting the learning process are acknowledged. The techniques utilized and the educational settings offered should encourage children's inquisitiveness and enthusiasm to investigate, test, and participate in practical, hands-on activities (Yliverronen et al., 2023). This study revealed that playful activities were intriguing to children and nourished their creativity. We demonstrated how natural materials provide a tangible link between children, the environment, artistic creation, and stories. Land art is also a way to engage with one's immediate surroundings and life, as children can strengthen their relationship with familiar habitats by creating their own characters. Creating land art is a concrete material exploration, and it is worth further investigating the relationship between children and materials as part of arts-based environmental and sustainable education in ECEC.

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