

Froebel Box: A Tool for Participatory and Creative Learning

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Abstract

Historically, Finnish early childhood education has been largely based on Friedrich Froebel's pedagogy. However, Froebelian pedagogy is no longer as well known in Finland as it once was. We at the Kindergarten Museum in Helsinki wanted to increase awareness of the Froebelian tradition. Together with artist Alexander Reichstein, we came up with the idea of enriching children's play by making use of the idea of Froebel gifts. To this end, we invented a set of equipment called the Froebel box. The aim of our research project is to discover how children learn and interact through Froebel box activities. We use educational design research, which refers to a process in which we develop our pedagogical tool together with the teachers and children from our collaboration Early Childhood Education and Care (ECEC) centers.

The data was collected from three Finnish ECEC centers and analyzed with qualitative content analysis of teacher's interviews. According to our findings, Froebelian applications increase participative play and children's interaction and learning in a holistic way. By playing with giant-sized blocks, children develop their social and motor skills and their mathematical and spatial understanding. Giant blocks are a way that children can express themselves with their bodies.

Based on the interviews conducted, in the future we will concentrate on developing the participation of adults in the children's play with the blocks, and on enriching the potential of the Froebel box as a pedagogical tool. There are lots of possibilities for how the Froebel box could be developed as a tool for spatial reasoning that would take into account bodily interaction, the role of teachers in supporting play, and different ways of using spatial concepts for play.

Key Words

Froebelian gifts, the Froebel box, holistic learning, participatory play, adult play skills, giant-sized blocks, museums

Introduction

The Kindergarten Museum in Helsinki provides a record of the history of the Finnish kindergarten for the public and is also responsible for documenting current Finnish early childhood education practices. Museum pedagogy also wishes to contribute to the future of principles of early childhood pedagogy. Since Finnish early childhood pedagogy has its roots in an educational program invented by the German educator Friedrich Froebel (1782-1852), we

wanted to bring Froebelian ideas to our museum's pedagogy in a new way by designing Froebel box material for museum visitors and for collaboration with Early Childhood Education and Care (ECEC) centers.

Froebel's (1887) pedagogy and humanistic values, which foster children's agency and autonomy, inspire Finnish early childhood education (Kumpulainen, 2018). The principles of Finnish Early Childhood Education and Care (ECEC) pedagogy (Finnish National

Agency for Education, 2018) promote the sociocultural nature of learning with children's active agency and interaction with their environment and fellow community members. Bruce (2021, pp. 4, 6) points out according to Froebel's philosophy, education needs to form part of a nurturing environment: enriching the environment and developing children's own thinking, and learning by doing, especially through play. According to Kumpulainen (2018), in Finnish early childhood education it is essential that children's trust in their abilities and strengths as learners is fostered through positive experiences, child-centered play, creative activities, inquiry, and imagination. In the Finnish ECEC curriculum, some Froebelian methods are still used, such as play, exploring nature, and singing (Kinos & al., 2021).

We created new innovations, Giant-sized blocks and a "You and Froebel" construction kit in collaboration with artist Alexander Reichstein on the basis of Friedrich Froebel's pedagogy. These innovations change the learning dynamic to one of group activities and promote dialogue in social situations, as Froebel's gifts and occupations concentrate more on individual work of a child or pair work between a child and an adult. We combined our two innovations and Froebel's first six gifts to make what we called the Froebel box. It is a rental construction and creative learning set aimed mainly at ECEC centers.

The aim of our research project is to discover how children learn and interact through Froebel box activities and to further develop this tool. The data was collected from three Finnish ECEC centers and analyzed using qualitative content analysis of teacher's interviews.

Finnish early childhood education and Froebelian roots

Finnish early childhood pedagogy has its roots in the ideas developed by Friedrich

Froebel. Hanna Rothman (1856–1920) founded the first folk kindergarten in Finland in September 1888. Together with her colleague Elisabeth Alander (1859–1940), Rothman initiated the education of kindergarten teachers in 1892. Rothman and Alander both studied in Pestalozzi-Froebel-Haus in Berlin, with Henriette Schrader-Breymann (1827–1899) as their teacher. They brought Froebelian pedagogy to Finland and developed it over the course of many decades. (Sillanpää and Ruokonen, 2014)

In 1882, Schrader-Breymann started an education institution for pre-school teachers in Berlin and developed some of Froebel's curriculum and didactics. Her curriculum focused on home and motherly care, and she used monthly themes as a project method, which included household work and the idea of spiritual motherhood. (Johansson, 2022, p. 74) Rothman and Alander adopted Schrader-Breymann's concept of spiritual motherhood, as well as monthly themes and household work, but they also highlighted Froebel's main works, *Mother Play and Nursery Songs (Mutter- und Kose-Lieder)* and *The Education of Man (Die Menschenerziehung)* and used elements of his play theory, including the Whole of Gifts and Occupations.

According to Froebel, play is the main activity of young children (Wasmuth, 2020, p. 75). Froebel developed his materials, The Whole of Gifts and Occupations, by observing children's play. Children prepare themselves into natural reality, when playing designing and building with the material (Wasmuth, 2020, p. 79). The gifts can be returned together to form an entity matching the original presentation, "the process of whole to parts to whole"; however, the Occupations are not completed this way (Bruce, 2021, pp. 102-103). With the Occupations something new is created permanently. The Occupations also include different activities such as drawing, pricking, sewing, paper cutting,

folding, and weaving. Froebel's first six gifts include woolen balls in six different colors, a combination of wooden sphere, cylinder, and cube, and wooden boxes with sliding lids containing blocks, which enable block play (Bruce, 2021; Brosterman 1997; Kinchin 2012, p. 33). The forms of the first six gifts are three-dimensional. Through gifts, children can explore and develop their ideas and thinking. According to Bruce (2021), block play gives children freedom to be thoughtful and make connections. Education is carried out holistically in terms of the children. The pedagogical aim of the gifts was to present universal aspects of the external world to children, while the Occupations developed children's skills at furnishing new material. (Bruce 2020, pp. 93-96, 106-123.) The interaction between entity, variation, and unity was Froebel's tool for helping children to develop awareness of the structure of the world (Johansson, 2022, p. 72; Wasmuth, 2020, pp. 80-81).

According to Froebel, the idea of holistic education exists in unity and wholeness. Today, the Finnish national core curriculum of ECEC promotes the holistic and socio-cultural conception of learning in which children grow, learn, and develop in interaction with those closest to them and their immediate learning environment. Children learn everywhere and in a very holistic way (Kumpulainen, 2018). They learn by playing, exploring, moving, and expressing themselves through activities based on the arts (Finnish National Agency for Education, 2018, 22). Today, the underlying values of Finnish ECEC include a belief in the intrinsic value of childhood, equity, equality and diversity and a healthy and sustainable way of living (Finnish National Agency for Education, 2018, pp. 20-22).

ECEC is the first part of the Finnish education system. It is based on the Act of Early Childhood Education and Care (540/2018) and

the National Core Curriculum of Early Childhood Education and Care (Finnish National Agency for Education, 2018). The National Core Curriculum of pre-primary education (Finnish National Agency for Education, 2016) is based on the Basic Education Act (628/1998) and forms part of early childhood education and care in Finland. Both National Core Curricula promote the United Nations (1989) Convention on the Rights of the Child so that Finnish local authorities are responsible for offering early childhood education and care to all children (10 months to six years) and families willing to participate in ECEC. Pre-primary education (for 6-7-year-old children) that precedes compulsory education is obligatory for all children in Finland.

Municipalities prepare their local ECEC curricula in accordance with the National Core Curriculum. Helsinki's curriculum for early childhood education and care (2019) emphasizes the importance of learning in richly varied ways and the right of children to gain a wide range of experiences. The areas of learning are divided into five subsections in the curriculum: the diverse world of languages; various forms of expression; our community and I; I explore and act in my environment; and I grow, move, and develop. All five areas contain different themes that can be combined and applied in practice, taking children's interests and abilities into account. Moreover, Helsinki's curriculum for early childhood education and care (2019) states that learning environments are designed together with children, and that these environments inspire children to play, to move using their whole body, and to actively study their surroundings using all their senses. Staff in ECEC centers should value pedagogically supported play by observing and reacting to forms of play initiated by children (Helsinki's curriculum for early childhood education and care 2019, p. 11).

Froebel's ideas in the Kindergarten Museum pedagogy

Although, historically, Finnish early childhood education has largely been based on Friedrich Froebel's pedagogy, it is no longer as well-known as it once was. Froebelian methods are still present in Finnish ECEC, but the origins of Froebel's pedagogical principles are not clear, and the fundamentals are missing. According to the Finnish Froebelian tradition as well as the values of Finnish ECEC, nature and outdoor environments play an important role in children's activity. Considering these values, we devised the idea of enriching the outdoor environment of our museum and aimed to raise awareness of the Froebelian tradition at the center. We wanted our museum pedagogy to be active and for the environment stimulating for not only the children, but also the adults.

Together with artist Alexander Reichstein, we began a project to update Froebel's ideas. Reichstein was born in Moscow, but has lived and worked in Helsinki since 1990, making art both for children and with children. We wanted to collaborate with Reichstein since he has created exhibitions where children and adults get the chance to be active both mentally and physically and to experience unusual artistic impressions in a playful manner, using all their senses. All of us who work at the Kindergarten Museum have a professional background as ECEC teachers and considered it important that the collaboration had a pedagogical starting point. We wanted to have something for the children to engage in their creativity, cooperation, and playful learning.

The giant-sized building blocks, made from lightweight plastic foam, were designed as large-scale toys for the yard of the Kindergarten Museum. These giant blocks were inspired by Froebel's wooden play gifts. However, Reichstein significantly increased the size of the blocks (Niemi, Reichstein & Sillanpää, 2019).

The shape of Froebel's wooden blocks are somewhat basic, and so the artist with whom we collaborated was inspired to create his own version of the cubes. The giant blocks designed by the artist contain all the shapes of Froebel's first six gifts: a sphere, a cube, a cylinder, a cuboid in three, and a triangular prism in two different variations. However, in addition to these shapes, Reichstein halved a sphere (hemisphere) and made two cylinders of different heights (aspect ratios 1:1 and 1:2), with the aim of diversifying play and construction with the giant blocks.

The giant blocks are packed in a cube-shaped box similar to the Froebel gifts: a huge wooden box containing 90 blocks in different shapes with an edge length of 40 centimeters. As with the original Froebel blocks, it is essential that children get experience of handling the blocks and are able to correctly put the giant blocks back in the large box by themselves. Even the smallest children can play with the giant blocks; since they are made from plastic foam, they are lightweight and safe. They are suitably pliant and can easily withstand being sat upon, even by adults. Furthermore, they are so large that children can build playhouses into which they can hide or play in other ways.

Image 1. Children playing with the giant blocks in the Kindergarten Museums yard in Helsinki. Photo: Kindergarten Museum, Helsinki



Image 2. The original Froebel blocks compared with one giant-sized cylinder block. Photo: Kindergarten Museum, Helsinki



The reason for making a giant version of the originally hand-held blocks was so that the blocks could be used in a different way. We assumed that because of the size of the giant blocks, cooperation between children would increase when the area of play expanded. The participatory way of learning is essential in Finnish ECEC. Teachers listen to children's interests, thoughts, and needs to provide them with engaging opportunities to learn in a playful way (Kangas, Ojala & Venninen, 2015). However, based on their research findings, Kangas et al. (2019) suggest more emphasis on participatory play-based pedagogy in Finnish ECEC than is currently being implemented. They also propose the construction of new approaches and solutions in pedagogical environments for supporting and enriching the pedagogical practice of play-as-learning. According to their conclusions, Finnish ECEC pedagogy should focus on developing physical structures as a key to supporting children's play and learning. They also promote peer-to-peer engagement as a foundational element of learning and children's well-being.

Hart (1992) points out that the experience of participation requires a common language in which a group can communicate.

According to him, children should also be provided with sufficient information about their situation and the environment so that they can have agency in their actions. When working with new equipment and even when working with equipment as old and familiar as the original Froebel blocks, adults should know the meaning of orientation. Without a common language, even the simplest equipment might not increase cooperation or creativity among children. This is one reason why we believed from the beginning that when working with the giant blocks, there should always first be guidance for how to use them in different ways. Froebel had an idea of freedom with guidance or an interactionist approach to play, in which both a child and an adult take the leading role in turns and engage actively in play (Bruce, 2021, p. 68). An adult takes the leading role first to introduce the equipment. With giant-sized blocks, we recommend different playful activities for introducing opportunities for how to use blocks and, importantly, how to encourage children to use them creatively. It is recommended that proper concepts of forms are used during activities. After that, children take center stage.

The second innovation we designed in cooperation with Reichstein was the "You and Froebel" construction kit. It is a playset that combines art and handicrafts that can be used for play. The construction kit contains basic wooden blocks from Froebel's second gift: a ball, a cube, and a cylinder, as well as bits of broken toys. The wooden blocks have magnets embedded in them, so children can fix broken bits with steel screws or plates. The construction kit can be gradually replenished with toy parts brought in by the children, a process which has the benefit of promoting awareness of recycling and ecology. (Niemi, Reichstein & Sillanpää, 2019). With the giant blocks, children get to know the blocks' possibilities together with an adult, whereas with the construction kit, the

possibilities are clear from the start since children recognize broken bits of the toys and easily understand the mechanism of magnets. We could say that the construction kit itself leads children to play and create an imaginary world. The kit can also be used as a group activity with the guidance of an adult, for example, as a part of an art session for creating an installation that has a story behind it. The kit is very versatile, and we are designing various inspired ways for how it can be used.

After designing the giant-sized blocks and “You and Froebel” construction kit, we got invitations to visit children’s festivals and events as a pop-up museum. We had giant blocks for working with on the floor and we also had Froebel blocks for construction on a table. For the original blocks, we had photos of blocks constructed from Froebel’s models to present life forms (repetitions of the real world). We made observations of how the giant blocks and the original Froebel blocks work side by side, and we were amazed by what we found. It was at this point that we decided to combine these two kinds of blocks and make something new; we decided that the “You and Froebel” construction kit could be evolved in interesting ways. We have since created a set of three different construction tools for creating and playful learning, which we call the Froebel box.

The Froebel box

According to Whitton (2018), there are three aspects of playful learning: playful tools, techniques, and tactics. First, it is important that tools like objects or artefacts as well as new technologies signify a playful environment. Second, it is essential that pedagogies and learning approaches facilitate playful learning. Third, there are many tactics for engendering playfulness, such as fairy-tale mystery, surprise, humor, and storytelling. These have all affected the design process of the Froebel box and can be

used during playful and participatory learning activities using the box material.

The idea of the Froebel box is that it can be rented out to ECEC centers seeking to encourage and develop creative building. It also enables comprehensive project work with a variety of open-ended materials. The playset can be used to create a joint project that is accessible to all children and adults. The box also enables families to participate. Meaningful activities together increase the interaction between children and adults.

The box can be rented for four weeks at a time or according to an agreement. The rental price for a four-week period is 300 euros, which includes an introduction to the use of the box through a demo workshop for one group of children. The intention is that children and adults in the demo workshop will later instruct other groups of children to use the Froebel box correctly.

Because we wanted the Froebel box to be easily and quickly moved in different locations, we needed to make a smaller package of the giant blocks. The first set, which is used at the Kindergarten museum yard was too big and it was impractical for it to be relocated from one ECEC center to another. For the Froebel box, we made a repetition from the base of the first set using only approximately half the number of the blocks. As a result, we got a cube that was 120 centimeters from one edge and contained 42 giant blocks.

The demo workshop begins with a presentation of the life of Friedrich Froebel and his first six gifts. Children can sample different structures from model images with blocks from the fourth gift. Finally, the whole group switches over to the box of giant blocks. Children are advised that the giant box has the same shape as the fourth gift box. Members of the group open the box and find its secret: the giant blocks. They examine the laws of forms, and at the end of the

construction, the blocks should be returned to the box correctly. Usually, this causes hilarity in children, as they are extremely excited about the size and large number of blocks. They have such comments as, “How can they ever fit there again? Is that possible? Wow!” We can only imagine the various ways in which children perceive the giant blocks!

Construction begins by first carrying all the blocks to the center of the space. Collective construction can only begin when all the blocks are out of the box. The workshop instructor allows the children to decide what to build together. This, in our view, increases the children’s realization that they themselves have the power to plan and implement. The demo workshop can take approximately an hour. The workshop ends when the giant blocks are placed back in their boxes. Finally, the children are reminded that they now know how to work properly with the blocks, and they have an important role in guiding all kindergarten children to use the blocks. In the demo workshop, there is no role for the “You and Froebel” construction kit. The kit’s possibilities are introduced to the adults of the group, but the demo workshop concentrates only on the original Froebel blocks and the giant blocks.

To maximize the use of the Froebel box during the rental period, we encourage staff in ECEC centers to plan how they will teach other children and adults to use the equipment in the box.

Study design

The methodological approach of this study is educational design research, which is a process that aims to change or develop pedagogical conventions and conduct research in interactive and iterative cycles where planning, execution, analysis, and new planning are done sequentially (Plomp, 2013). Educational design research uses existing

knowledge in problem solving to find results that promote sustained innovation (Scardamalia & Bereiter, 2014).

In this study, the existing knowledge is in Froebel-based early childhood pedagogy, which is a child-centered, holistic view of education in which play is valued. The aim is to further develop the tool based on Froebel’s ideas and to promote creative, collaborative, and constructive play, as well as holistic bodily and verbal expression. In this article, the first case study to evaluate new material is reported. The evaluation and pedagogical development of this design research will continue to develop the pedagogical knowledge and possibilities for using this tool in early childhood pedagogy.

The approach of this case study is qualitative. Our aim is to observe and develop children’s participatory play and learning with the Froebel box developed as part of Froebelian pedagogy in the Kindergarten Museum. The data of this study has been collected from three ECEC centers that each used the Froebel box in their pedagogy for a period of four weeks.

Research questions

The research questions were as follows:

1. How do teachers describe children’s learning and interaction through Froebel box activities in the context of the Finnish ECEC curriculum?
2. How do children use the Froebel box (the original Froebel blocks, the giant-sized blocks, and the construction kit) during their participatory activity?

Data gathering

The qualitative data were gathered by interviews with teachers about the teachers’ experiences of using the Froebel box with children. The interviews included a total of 24 questions, which were seen in advance by the teachers (see Appendix 1). As an introduction,

we wanted to know the teachers' knowledge of Froebel's pedagogy. We also wanted to know how the practical arrangements for the Froebel box had been made between the groups at the ECEC centers. We asked how the equipment had been used and how much the children had been allowed to influence its use. We wanted to know how the equipment was combined with pedagogical activities and the curriculum. We asked if the pedagogical goals set for the activities were reached. We also wanted to know about the children's free actions with the equipment, if any.

Data analysis

The data (interviews N=7) from three Finnish ECEC centers were analyzed using qualitative content analysis (Schreier, 2012). The qualitative data were reduced and grouped according to Braun and Clarke's (2006) model of qualitative thematic analysis, that is, from the material; the core messages were extracted into descriptive themes and then into the specific categories. Explanations or confirmation and interpretations of the analysis are reflected in the background theories of playful and participatory learning and ECEC local curriculum learning areas, requirements for playful spaces, and interaction through abductive reasoning. We divided the data using three aspects of playful learning, which are, according to Whitton (2018), techniques, tactics, and playful tools. First, we highlighted the techniques by using the ECEC local curriculum's holistic conception of learning. Second, we focused on play itself as a playful tactic in terms of play modelling, the role of the adults, and play as collaboration. Third, we concentrated on the environment and, in particular, tools concerning the Froebel box.

Results

The data were reduced and grouped into themes according to qualitative thematic analysis. The results obtained consist of three themes, which have been grouped from the raw data of the interviews. The themes are 1) the whole child, 2) adult and child's play skills, and 3) interaction with the environment. In the chapter the whole child the Froebel box is examined in different areas of learning according to Helsinki's curriculum for early childhood education and care (2019). Adult and child's play skills include play modelling, collaboration, and the role of adult participation both in play and as a supporter of the play. Interaction with the environment introduces different ways in which children operate with the Froebel box as a tool for active and collaborative play while simultaneously transforming their environment.

The whole child

According to the teachers (=T1–T7) interviewed, the goal of using the Froebel box as a tool for wide-ranging learning in different areas was successfully achieved. Here, the findings are divided into four categories that emerged from the data, which also adapt to the ECEC local curriculum learning areas.

Various forms of expression. According to all interviews (N=7), many forms of expression, both bodily and verbal, are important for children and could be developed through Froebel box activities. For older children, verbal expression is natural as language develops. Children's understanding of preposition concepts develops during construction. For young children, children having difficulties with language or children with special needs, bodily expression can be an important way to communicate and express ideas. Giant blocks are equipment that can be used for that process. One teacher noted, "The

use of the Froebel box also promotes children's language skills and abilities, such as naming directions and shapes" (T5).

Learning to play is a priority. All teachers emphasized the importance of construction in enriching imagination and bodily communication. Learning to play was a priority in many groups. When building with giant blocks, children develop their commitment to play, and their play skills improve. During play, children learn to take turns, share, and give space to friends. A teacher who was interviewed said, "Children also learn to follow instructions from adults and other children and to give instructions themselves and make compromises" (T4). Giant blocks were an inspiring tool for the children, and the enthusiasm they instilled increased the children's interaction and desire to learn. The large size of the blocks "drove" children to cooperate and to build, for example, a small house or a castle in which they could play further.

Exploring and thinking. The use of the Froebel box develops children's mathematical thinking and spatial perception. When building, children perceive the three-dimensional shapes and evaluate the shapes and their sizes. According to one teacher, "Playing with the giant blocks was very functional math" (T5). Construction also promotes the development of logical thinking. When a child acts, their action leads to another act. One important feature of the blocks is that the children must figure out how to make all the blocks fit into one large box. The teachers said that putting both the original Froebel blocks and the giant blocks back in their boxes was an interesting and thought-provoking task for the children. One mentioned, "Maybe it's just that the blocks go into those boxes in a certain way. That kind of action creates satisfaction for the children when they succeed in putting the blocks back in the box" (T6).

Moving and developing. Even the smallest children, of 1-2 years old, can use the giant blocks to study shapes and their features. One teacher reported how children's play with a large ball excited the kids: "Children pushed the ball down along a foam pad that was placed against the wall, watched the ball slide down, how it bounced to the floor, and what kind of sounds it made during the process. The operation was then repeated several times" (T3). With younger children, motor development, movement, and learning to control their bodies are all important areas of learning. The children learned to push, pull, and lift the blocks as well as to spin the ball and climb on top of the blocks.

In summary, the teachers believe that the construction supports the holistic development of children, especially when using giant-sized blocks in accordance with the principles of the Finnish early childhood education curriculum. The whole child is also strongly present in the Finnish early childhood education debate. Kumpulainen (2018) describes the unique features of Finnish ECEC as its "whole child"-centered approach, including the value of play and trust it places on teachers and institutions instead of externally controlled testing systems.

Adult and children's play skills

The research material revealed that the Froebel box equipment supports the play skills of both adults and children. The play skills that emerged from the data can be further divided into three themes: play modelling, the role of the adult as a supporter of children's play, and play as collaboration. The study highlighted the importance of giant-sized blocks as enablers of development of play skills. They were seen as developing interaction and negotiation skills, teaching rotation, and enabling peer learning.

Play modeling. Most of the interviewees mentioned that the process of acquainting

children with the tools of the Froebel box was begun in an adult-led way. The teachers introduced the equipment to the children through guided activity sessions and play. The teachers told the children the names of the different shapes of blocks, which helped the children learn the right concepts as well as the potential of those shapes. According to the interviewees, after the guidance, children were more willing to act and experiment independently. Based on the interviews, the teachers devised activities from the perspective of participation.

Although the activity may initially have been adult-led, interviewees pointed out that it was still child-initiated. The adult observed the direction of the children's interests, and the activity always proceeded on the children's terms. For example, one teacher in a group of children under three years of age pointed out that the mere fact that the gym was an unfamiliar place to visit was very exciting for children, and adults needed to understand how the child perceived the situation as being very exciting (T3).

The children first did the same as the teacher had presented the previous time, but then began to vary the play and come up with their own uses so that some shape might even be a computer screen. "Hey! This could be a rocket! Now, we drive a rocket!" They always changed what the device was. There were benches and screens, as if in a nerve center, where three children were side by side (T6).

In this example, the play was initiated by the adult, but was varied and honed by children into an inspiring adventure track.

The Froebel blocks were built not only according to the model, but also by modifying

the design. The ones made according to the model were compared with the modified structures, and the fact that construction problems can be solved in many ways was taken into account. Sometimes children didn't even need to build anything figurative to be able to enjoy working with blocks. In particular, one teacher suggested, "Placing the third and fourth gift blocks back in their boxes was interesting to the younger children, and they periodically repeated the routine several times" (T6).

An adult as a supporter of play. From the research data, it emerged that common challenges in current early childhood education are committing children to long-term play, developing the interaction skills required for joint play, and encouraging the use of imagination. One teacher took advantage of working with giant-sized blocks to reach the goal. About half of the activities were tentatively planned by adults and half by the children themselves. This teacher summarized:

It required around 4-5 times working with giant blocks before the children internalized their opportunities and the activities deepened. After this, the motivation to play was clearly visible, even before the activity began. The kids didn't want to wait for the giant box to open before they got to work (T2).

The adult's most active role as a supporter of play occurs when working for the first time with the Froebel box equipment. As the equipment became more familiar, the role of the adult receded to the background, but if necessary, he or she could give new play suggestions. By learning to work with the equipment and understanding the limitless possibilities, children learn to plan and direct activities themselves. The adult's role as a

supporter of the play continues as an observer (T2; T5).

Recently, there has been much discussion in Finland about adult play and adults' play skills. This study also highlights the importance of adult play skills for children's play. In the interview (T1), concerns were expressed about the role of professionals in early childhood education as being just supervisors of play, instead of participating and having their own role in the play. The giant blocks presented a useful opportunity for adults to develop their own play skills. Although the interviewees were not more familiar with Froebel's philosophy, they saw construction as an easy way for adults to participate in play.

The importance of educator participation in children's play has also been observed in studies, and adult participation has been found to enrich and develop children's play (van Oers, 2013). The role of an adult in play is usually themed either as an organizer of play facilitations (so-called stage manager) or as a player (Singer et al., 2014). In addition to the role of stage manager and player, the role of the educator as an enricher of the play, a mediator in various problem situations, and as a play planner have also been highlighted (Jones & Reynolds, 2011).

Play as a collaboration. Most of the interviewees said that they had worked with giant-sized blocks with only half of a group of children at a time. Two of the interviewees stated that the best joint play was successful when there were no more than 4-6 children (T1; T2). According to the interviewees, in challenging play, the challenge was generated by skills in interaction, compromise, and alternation. When building a common entity, negotiation skills were also required.

Two of the interviewees thought that even though the giant blocks invite collaborative play because of their size, encouragement from

the adult is still required and children should be encouraged to play collaboratively from the beginning. There are a lot of blocks, but still, there is only a limited number and so if children want a larger structure, everyone needs to work together. Adult support was required to remind the children of the benefits of achieving a common goal (T1; T7). The set goal of learning play skills also includes many other life-relevant skills for the child's development (Wyness, 2015). According to Leonard (2016), the experience of inclusion and one's own opportunities to be equal in the group are the child's first experiences of belonging to the community. She continues that through participation, the child is taught the skills, independence, and actions necessary to participate in social communities.

In some groups, the children also learned to modify the structures they made separately so that, when they were completed, the children themselves created a narrative between the structures, eventually forming a whole in which they could play together. One of the interviewees stated that "the idea of building a shared object and a collective play space was self-feeding so that after being reminded, the children were happy to work in that direction" (T6).

During the participatory play, one group of children managed to vary the activities with giant blocks toward a game with rules:

The gym floor was lava, and the children moved by stepping on the blocks without being allowed to touch the floor. Whoever touched the floor three times lost their lives. A child could earn five more lives by going to a corner of the gym to dance where there was music. The dancing was initiated by the children and invented to get back into the game (T2).

The collective construction play at first turned into a gymnastics moment, as the blocks formed a track where the children walked. The stunt track eventually became a game platform as the floor turned into lava. The adult's role as a presenter of possibilities and variations and as a supporter of play is highlighted in this example.

Interaction with the Environment

When the environment is viewed as a relational process, it is built in everyday practices and shaped by children and staff (Raittila & Vuorisalo, 2021). According to Fuller & Löw (2017, p. 470) researchers using the concept of relational space are interested in how space affects people, how it shapes people and human activities, and how people build space for their own needs. Working together with the giant blocks, children build, reproduce, and transform their environment in a new, active way. The giant blocks in particular support the children's imagination and always enable a new kind of experimentation and construction. According to one teacher, the mere form allows children to use their imagination in ways that ready-made play equipment cannot provide: "The giant blocks represent a tool that allows children to engage in the exchange of thoughts, ideas, feelings, and interactions" (T5).

The different affordances of the original and the giant versions. The giant blocks encouraged collaboration and interaction between the children and the supported activity. One teacher noticed that "Two-year-old children carried heavier blocks together on their own initiative and began to build spontaneously" (T3). In some groups, the use of the Froebel box was more versatile; the original Froebel blocks were also actively used. According to one interviewee, children played with Froebel blocks on their own or with a friend: "When playing with the small blocks, children brought animals,

princesses, pet shop characters along. Working with the small blocks was an individual activity, while playing with the giant blocks was done in a larger group" (T5). After the children had practiced cooperation with the giant blocks, they wanted to work together and mix the original Froebel blocks with each other. However, some of the teachers clung to individual work and feared that as the blocks shuffled, they would no longer know how to return them to the boxes. It seems that the children were more eager and courageous than the adults when it came to changing the patterns:

But that is exactly when the teacher was directing the participatory play; children learned to work and build together so there could be a castle or whatever children wanted. Participatory play succeeded very well with this group. With the small blocks, I just noticed that the kids wanted to combine those pieces with pleasure, so I thought that 'Oh my god now children are mixing them. How do we manage to get them back in those boxes? (laughs). The children also wanted to cooperate with the small blocks, so the participatory play shifted from playing with the giant blocks to playing with the small ones (T8).

One teacher found the idea of studying the relationship between small and giant blocks with children interesting. They pondered using small blocks as miniatures when designing the construction with the giant blocks: "I think that children's learning begins bodily when working with the giant blocks. Then, it is easier to move to smaller blocks. It would also be possible to first plan with the small blocks what to build with the giant ones. In my opinion, there are good opportunities to develop that" (T7).

Bodily interaction. In groups with special needs, cooperation with peer children was both linguistic and physical. For children with special needs, the activity was above all bodily. Altogether, teachers thought that construction with the giant blocks was very functional and required less discussion. The children followed and imitated each other. According to one teacher, a child's learning starts with bodily actions. The children supporting the integrated group were competent with words, language, and interaction. They were able to develop a story that served as a scheme for imaginative play: "In the case of children with special needs, progress was made through their bodies and touching different shapes" (T5). According to one teacher, in an integrated group, participatory play is fundamentally different. In this group, for example, two autistic children got involved in the activities by balancing and rolling on cylinders and a sphere or stepping on triangles. While other children were focused on constructing, the autistic children explored various shapes through their senses (T2). Work with giant blocks can be carried out without any use of spoken language. The most important thing is an enthusiastic atmosphere (T5).

Horizontal and vertical stacking. Play with the giant blocks was divided into two different levels: horizontal and vertical. According to Whinnet (2012), children typically begin their block play by stacking vertically or horizontally. For example, building a long garage shows horizontal stacking and mathematical forms of knowledge in the one-to-one correspondence of vehicles. A castle shows vertical stacking, where blocks are carefully balanced both physically and visually (Whinnet, 2012, pp.117–118). In Finnish ECEC centers, construction on the horizontal level is characterized by extensive surfaces, such as trick tracks, along which children can rotate and

progress block by block. As the teacher described:

One common form of play was building a large track along which the children went around together. Children innovated so that they could ride a moped through slots of the blocks. Children wondered how big a gap there should be for the moped to ride through. The track was formed when all the children began to transport blocks around the space (T4).

Another way for children to build was three-dimensional. Children built castles, towers, campers, police, and fire trucks. According to the teachers, building different vehicles was inspired by the round shapes in some of the blocks (divided cylinders). In one group, the children built a working center with computers, various ships, and traditional princess castles. The children visited each other's castles, and play developed through these visits. In some groups, children were proactive in finding additional tools for play. The children asked for fabrics or foam pads when making roofs for the houses. While building campers, the children were looking for steering wheels, seats, and other supplies for the trip. Some teachers mentioned that "Teddy bears, for example, were also brought into the camper as passengers" (T6; T7).

The opportunity to influence their own environments motivated children to work with giant blocks. One teacher pointed out that spaces for children's groups are often relatively stable, and children's ability to modify the spaces may be limited to moving a pair of foam pads or beds. A teacher explained:

By constructing the giant blocks freely, the children were allowed to influence

the design and implementation of their physical play environment. The children could use their imaginations to implement something concrete, which served as a starting point for enthusiastic participation in the group's activities (T2).

Conclusion and discussion

The research results support our presumption of holistic learning using the Froebel box. The box invites children to participate, collaborate, and play, and is based on the Froebelian principles of children actively playing and exploring in a relational environment. We were glad to discover that the teachers also saw the possibilities of the Froebel box, even though the relatively short rental period posed its own challenges to the implementation of all ideas. Our presumption of the usability of the giant blocks in group activities was also reflected in the results. It was inspiring to hear how adults had also understood the potential of the giant blocks in group activities and encouraged children to collaborate. Working with the blocks allowed for the emergence of a dialogue between children, which sometimes even turned into a common imaginative journey from one play activity to another.

Learning through play was a common narrative thread throughout all the interviews. Another interesting result was the idea of the opportunity provided by the giant blocks for giving children an experience of modifying the play environment. This was an aspect that we had been aware of, but we did not realize to recommend this approach to the ECEC centers to further benefit from the giant blocks. Construction and play with the original Froebel blocks remained minor with the groups. Reasons why it remained minor included the adults not having the courage or their own, first-hand

experience of how versatile the original Froebel blocks can be. Furthermore, we understood that there were difficulties in timetabling the use of original blocks inside the ECEC center when normally the giant-sized blocks were placed in the gym room for everyone to access. The giant blocks were new and exciting to the children, and due to their large size, they were also an exceptional tool for indoor play and allowed for physical, sporty play to be carried out inside.

We are going to further develop ways to encourage and guide teachers in the use of the Froebel box as a whole. There could also be more interaction between the original Froebel blocks and the giant blocks. In this study, the blocks also adhered to a very model-oriented construction instead of a free construction. The reason for this could be the example learned in the demo workshop. Although the intention is to provide the basics, which can then be set to try and create new ways, the demo workshop can also present a challenge if seen as a model for the only way in which the equipment can be used.

As generally defined in educational design research, we will continue collaboration with two of the ECEC centers that participated in this study. In 2022–2023 we will develop our equipment further. Here, our existing knowledge from the teachers will play an essential role. Based on the interviews conducted, we will concentrate on developing and enriching participation of adults and roles for them in play, and expand the possibilities of the Froebel box as a pedagogical tool. Froebel used the concept *Spielpflege* [freely translated as “nurture of play”], which emphasizes the importance of an acting and supportive adult (Wasmuth, 2020 p. 66).

To get adults more involved in play, we will hold demo workshops specifically for the adults of the ECEC center. According to our study, adults can have difficulties supporting

children's play or participating themselves in play. Also, considering the results of original Froebel blocks not being used as much as we wished, we have started to plan how we can get adults to be more committed and see more possibilities in their use. We will extend the content of the workshop so that when playing with the giant blocks, we will use different methods for action. We will try to make adults more aware of tactile and bodily expression, essential for children's knowledge. We want to encourage them to examine their roles as players, organizers, enrichers, planners, and mediators by letting them play by themselves (Singer et al., 2014; Jones & Reynolds, 2011). This could also lead to another case study in which teachers are seen as co-researchers.

The teachers also pointed out the necessity of written instructions and examples or videos to show the possibilities of the boxes. Together with the teachers, we will develop more goal-directed methods of using the Froebel box as a tool for both bodily and verbal expression, cooperation and play skills, mathematical thinking and spatial perception, architectural education, and motor development. It would also be interesting to study further the dialogue between the giant blocks and the original Froebel blocks. We are also curious about how children perceive the connections between the original wooden blocks and the giant blocks, the resemblances in terms of form, partition, and wholeness, and the differences between weight, size, and material.

According to Newcombe and Shipley (2015), early childhood pedagogy needs to develop new ways for children to practice and learn spatial thinking, because the future world will require new tools that require higher spatial thinking to be designed. There is interesting new scientific research about spatial skills. According to Boriello and Liben (2018), better spatial skills are correlated with more spatial play and more

parental attention to spatial concepts. Jakonen, Szabo, and Fenyvesi (2021) argue that body, cognition, and cooperation are deeply correlated with spatial understanding. There are lots of possibilities to develop the Froebel box as a tool for spatial reasoning, taking into account bodily interaction, teachers' role as a supporter of play, and different ways of using spatial concepts in a playful manner.

Froebel had a holistic philosophy about humanity and education, in which people, nature, the world, and the universe were interconnected; he believed that when children become aware of this interconnectedness, they will develop deeper knowledge about themselves and the world. According to Froebel, every child has the right to a holistic education, which includes the development of the self in the world (Wasmuth, 2021, p.27; Heiland, 2002). Froebel said that play has the potential to teach children mathematics, language, beauty and artistic endeavors, scientific construction, stories, and other representations of everyday life, as well as enable them to be physically competent and skilled. The wholeness of learning means that each aspect of experience is interconnected. (Bruce 2012.) Our results concerning the use of the Froebel box confirm these Froebelian concepts of holistic learning. According to our findings, the Froebel box tools have the potential to widen learning through play, especially for children from diverse groups. Furthermore, with the Froebel box activities, there are many possibilities for encouraging children to collaborate and to deepen a dialogue between children and the environment.

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Appendix 1: Fröbel box - interview frame

1. Our introduction
2. Can I record the interview?
3. Introduction of interviewees (name, group, age range of children)
4. How familiar are the tools and pedagogy created by Froebel?
5. How is the use of the Froebel box organized between groups in the ECEC centre?
6. Has the activity with the Froebel box been recorded (photos, recordings, children's stories, drawings, portfolios, social media, others?)
7. How was the demo workshop and introduction to using the box?
8. Looking back, what kinds of additional tips would you have needed for working with the Froebel box?
9. How were the giant blocks, Froebel's blocks, and construction kit introduced?
10. Did the initiative to use the equipment come from children/adults?
11. Did the children have free access to work with the equipment?
12. What kind of activity was created (for example, play): Froebel's blocks, construction kit, giant blocks?
13. Was the Froebel box equipment combined with other materials of the ECEC centre (toys, music, props, etc.)? If this happened, by whom (children spontaneously, adults spontaneously/planned)? Did it deepen the play, or did the different materials otherwise work well? If the materials were not combined with the equipment of the box, do you remember afterwards what could have been combined?
14. Was the box's equipment used as part of separate guided action? How?
15. What are your thoughts on the Froebel box as a whole? What thoughts from a child's point of view?
16. What observations did you make about working with equipment with children of different ages or with linguistic challenges? Linguistic or bodily interactions when working with the Froebel box?
17. What kind of observations did you make about the children's (joint) activities? For example, did working with giant blocks affect the dynamics of the group? What was the children's mutual interaction like during the construction?
18. Did the equipment of the Froebel box correlate with the ECEC curriculum, or was it used in particular for an area of learning presented in the Helsinki curriculum (2019) (see figure below)?
19. What kind of learning experience do you think Froebel's blocks, construction kit, and giant blocks as their own entities offered to the children? What about adults? Any concrete examples?
20. Were some of the learning outcomes achieved with the help of the box's equipment, with the goals being pursued perhaps without being known in advance but being achieved nevertheless?
21. Did your ECEC centre have any operating practices, ideas, or new thoughts after the Froebel box time was over?
22. To what other material/equipment already in the kindergarten could the contents of the Froebel box be compared indoors and/or outdoors?
23. What other material/equipment is there in the kindergarten that the whole group can work with at the same time?
24. What else would you like to say?