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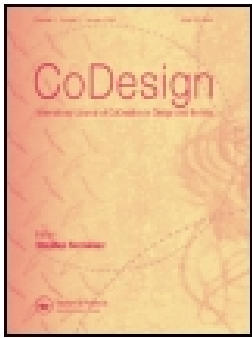
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Zones of participation – a framework to analyse design roles in early childhood education and care (ECEC)

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ABSTRACT

Current research has addressed children's involvement in codesign from several different perspectives such as empowerment, design thinking, participation, and learning. The literature presents many roles that children can have in participatory design (PD) e.g. as testers, informants, users, co-designers, and co-researchers. Both critical views and solutions to support children's genuine participation exist. The investigation was motivated by examining whether and how children's participation can be enhanced through PD practices. The study conducted a participatory design (PD) process in a kindergarten in Finland together with adults and children.

The Grounded Theory analysis elicited different roles of the participants as prominent indicators of the interaction in and quality of participatory process. These roles were further elaborated as Zones of participation (ZoP) that constituted of the Zone of audience, Zone of whisperer, Zone of actor and Zone of director. The analysis shows that there are significant co-occurrences between participant groups accessing different zones.

We suggest that the quality of participation in the design process can be investigated by identifying participants' access to different ZoP. Movement between the zones indicates that there is no one-sided control over actions and dialogue between the participants is prominent.

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1. Introduction

In recent years, researchers have shown a growing interest in design in the context of teaching and learning in the twenty-first century. A number of scholars have presented design as an approach in educational research (Collins, Joseph, and Bielaczyc 2004; Cobb et al. 2003; Edelson 2002). Accordingly, design has been introduced as a method to implement and develop teaching and learning practices (e.g. <http://www.designlearning.us>; Vartiainen and Enkenberg 2013; Kangas 2014; Seitamaa-Hakkarainen, Viilo, and Hakkarainen 2010; Heikkilä, Vuopala, and Leinonen 2017; Hjorth et al. 2015). Nevertheless, there are few studies on design methods in developing pedagogical practices in Early Childhood Education and Care (ECEC).

The study conducted a participatory design (PD) process in a kindergarten in Finland together with adults and children, focusing especially on children's design roles. The

investigation was motivated by examining whether and how children's participation can be enhanced through PD practices. Ten adults and 20 children (4–6 years old) participated in 15 workshops over 9 months. The study concentrated on exploring the empirical data thoroughly. Our previous experiences in working with small children provided us with a background, directed practices in the design process, and guided the codesign practices with the children. Participatory design enabled us to engage in collaboration with research participants, and the solutions evolved as the collaborative design and research advanced. Openness enabled us to learn from the process and directed the research activities, data-gathering, and sampling according to our experiences (Figure 1).

During the process, the discussions and reflections highlighted the roles of the participants especially meaningfully when aiming to enhance the level of children's participation in the process. This understanding, gained during the process, brought three research questions into focus in our Grounded Theory analysis: (1) What are these roles and how can they be described? (2) Are the roles fixed or is there movement between the roles? (3) Are there co-occurrences between adults and children accessing certain roles? At the final stages of the analysis, the core categories were further elaborated as Zones of participation.

The topic is timely and relevant – supporting children's participation has recently been one of the main focuses of early years pedagogy (Shier 2001; Sommer, Pramling Samuelsson, and Hundeide 2010). Further, the new Finnish National Core Curriculum for Early Childhood Education and Care (2016) challenges kindergartens' existing operational cultures to rethink their pedagogical practices to take children's interests and perspective more into account. *The Future of Education and Skills: Education 2030* (OECD 2018) argues for broader education goals and learner agency in a complex and uncertain world. A sense of responsibility for participating in the world requires acknowledging the interactive, mutually supportive relationships that help learners to progress towards their goals.

The paper begins by introducing the theoretical framework: PD with children and the ECEC in Finland. Thereafter, we present our empirical work and the method of analysis. Finally, we present the results of our work and conclude with a discussion of the relevance of the study and the conclusions.

2. Theoretical framework

2.1. Participatory design with children

Many participatory processes with children have been linked to developing technology for children and learning how children use different technologies. Current research on PD with children has a strong link to Interaction Design and Children (IDC) (Simonsen and Robertsen 2013). Maker culture, makerspaces, and digital fabrication in education have evoked interest from researchers in recent years (e.g. Smith, Iversen, and Hjorth 2015; Martin 2015).

Researchers have addressed children's involvement in PD from several different perspectives, such as empowerment (Kinnula et al. 2017), design thinking (Iversen et al. 2015), participation (Iivari, Kinnula, and Kuure 2015) and learning (Barendregt et al. 2016a; Lee 2019). The studies address both critical views and solutions to support

children's genuine participation in PD (Iivari and Kinnula 2016; Barendregt et al. 2016b; Simonsen and Robertson 2013).

The literature shows an interest in defining different roles for children and adults during codesign processes (Druin 2002; Iversen, Smith, and Dindler 2017; Landoni, Rubegni, and Nicol 2018; van Doorn 2016; Walsh et al. 2010). In Druin's (1999) seminal work (see also Guha, Druin, and Fails 2013), children were identified as adopting various roles in participatory design, e.g. testers, informants, users, co-designers and co-researchers. Iversen, Smith, and Dindler (2017) introduce an approach in which the child takes a protagonist role. The child as protagonist 'bridges the divide between a design approach and a learning approach', as their case study emphasises the skills children acquire through participation. In Druin's (1999) cooperative inquiry with children, adults adopted different roles to enable fluent interaction with small children. One of the researchers acted as an interactor, who did not take notes but initiated discussion and asked questions concerning the activity. This role was important for the flow of the activities and more equal interaction. It directed the enquiry and enabled the activities to be discussed and guided while other researchers were observing and taking notes. In their case study, which involved 6- to 10-year-old children in a PD process, Schepers, Dreessen, and Zaman (2018) suggest a play perspective to PD. They conclude that genuine forms of participation can be accomplished by engaging children as process designers, e.g. co-defining the methods used. Instead of adopting a limited role as a user, children were seen as process designers together with adults.

To engage teachers, children, and other stakeholders in a participatory design (PD) process, this study adopted the Edukata design model (Toikkanen, Keune, and Leinonen 2015; www.edukata.fi). The Edukata model includes several workshops with stakeholders that iteratively progress with reflection sessions. The activity aims to reach clearly set goals and outputs. The participatory design (PD) sessions in Edukata increase participants' understanding of the design context, challenges, and opportunities and guide participants to reach concrete results. Edukata and PD were employed to engage teachers and children in collaboratively developing everyday learning activities. According to our knowledge, the use of the Edukata design model in this study was the first time it had been applied to the early childhood education context.

In this study, the aim of the workshops was to recognise the significance and relevance of children's ideas and experiences as resources valuable to the collaborative development of pedagogical practices. In the PD tradition, the participation of children is seen as a way to carry out learning innovations (DiSalvo et al. 2017). In practice, the PD approach, when applied to planning early childhood education, explicitly requires children's participation in the process.

2.2. Participation in early childhood education and care

The Finnish National Core Curriculum for Early Childhood Education and Care (2016) highlights children's agency and participation. Children are supported to develop their understanding of their community and of their rights, to develop responsibility and become responsible for the consequences of choices through participation. 'Children have the right to express themselves, their opinions, and thoughts. They also have the

right to be understood in the different ways they are able to communicate' (Finnish National Core Curriculum for Early Childhood Education and Care 2016).

This study shares a view of a child as an active actor who constructs their own life in interaction with their sociocultural environment (Hilppö et al. 2016; Karila and Lipponen 2013; Corsaro 2015). The child influences society on many levels, including political and cultural levels (Alanen 2009). Nevertheless, professional and social change is needed to enable children's possibilities and rights to participate, contribute, and be heard (Alanen 2009; Sinclair 2004).

Emphasising the importance of children's participation and agency in education is not a new idea. These ideas were already well presented in seminal texts by John Dewey (1966) and Paulo Freire (Freire 2018). Giving and taking ownership of one's own learning is also a crucial attitude of contemporary education. From educators' perspective, this requires allowing space for the child to become an active agent of their own learning. As Gert Biesta (2013) emphasises, the core idea of education 'is not about filling a bucket but about lighting a fire' (p.1). In the Finnish ECEC curriculum, there are also signs of a sociocultural approach that gives an important role to the community and peers of a learner in a learning process (e.g. Vygotsky 1978). The participation can be used to build high-level skills, such as group enquiry, interpretation, negotiation of shared meaning, finding solutions together, and building capabilities in a group (Sinclair 2004). As Leinonen and Venninen (2012) demonstrate, children have only few opportunities to design learning activities. However, when educators use a participatory approach, the children evolve in making choices and are encouraged in self-expression. The design process can be considered as an important activity where educators and children share experiences in interaction.

Participation is a skill to be learned. It is important to develop a learning culture which supports the learning skills essential in the twenty-first century (Griffin, McGraw, and Care 2012). In ECEC, this requires adults to rethink their positions as enablers and supporters of learning processes and designers of everyday activities. Adults are key for the children to be heard. Designing together can be a challenge when working with very young children, as it requires a particular listening attitude from the adults and pushes educators to rethink their power positions in singular situations, perhaps more than in other educational situations. This challenge is taken as an essential starting point in this study.

3. Research design

3.1. Current study

In this study we conducted 15 workshops in a kindergarten involving teachers (N = 2), day-care assistants (N = 3), a pre-service kindergarten teacher (N = 1), children (N = 20), and pedagogical specialists (N = 4). During the workshops, we (author and participants) identified design opportunities, design challenges, and design resources in order to design and implement learning activities. One of the design goals was to find novel practices for child-initiated pedagogy and to map innovative ways to engage children in co-designing the day-care activities.

In the first phase of the study (design workshops 1–4, [Table 1](#)), four design workshops were conducted in the kindergarten. There were three full-time adult participants, four part-time adult participants, and five children (4 years old). The children participated in two design workshops. This phase abided by the Edukata model, as we first created a scenario for a future kindergarten. The scenario highlighted children’s participation and agency in day-care. Thereafter, we identified design challenges, design opportunities, and useful resources according to the Edukata method. Prototypes of the learning activities were elaborated from the workshop material. The design process elaborated two main themes for the activities: visual, digital documentation as a tool for sharing and reflection; and extended learning environments.

In the second phase of the study (design workshops 5–11, [Table 1](#)), we continued with the design process by implementing and evaluating designed prototypes of the learning activities in extended learning environments. The first activity constituted a parkour trip to a nearby beach and its visual and digital documentation and collaborative reflection. The kindergarten teachers originally introduced the Parkour activity to the group as an example of good practice. They had identified that the children would benefit from challenging physical exercise to develop their gross motor skills. In our design workshop, we developed the activity further on how to enhance children’s participation in this parkour exercise. The children took turns as leaders and we documented the trip by taking photographs. At the end of the workshop, we collaboratively reflected on the documentation. The discussion was recorded on video. Later on, we continued working with the photographs with the children and filmed a small animation inspired by the trip. During the collaborative reflection session, the children were able to express their thoughts and also give practical feedback. The second learning activity enfolded two field trips to Aalto Fablab, visual digital documentation and reflections. Aalto Fablab was selected for a field trip because it was recognised as a useful resource during our design workshops. We planned the trip together with the children and took photo-portraits in advance to be printed onto pile wood in Aalto Fablab with a laser cutter. This produced the wooden game (see [Section 4.4](#)). We collaboratively documented the trip by taking photographs and videotaping, as well as compiling a visual travelogue collage. Later on, we reflected on the trip by organising a Torikävely (market walk) exhibition for parents. The aim was to share our experience with the families, as well as other children and staff in the kindergarten. The children took an active role and introduced the exhibition to their families. Twelve (4–5-year-old) children took part in implementing and reflecting on the activities, accompanied by six adult participants.

Table 1. Phases of the process.

PHASE 0: orientation	Before the actual design process, the designer spent time in the kindergarten to familiarise herself with its everyday practices and conducted an art education project with four-year old children.
PHASE 1: design workshops 1-4:	A scenario, design challenges, design opportunities and useful resources according to the Edukata method. Prototypes of learning activities.
PHASE 2: design workshops 5-11:	Designing, implementing and evaluating learning activities: ‘Taking new paths’ parkour trip and Aalto Fablab visits.
PHASE 3: design workshops 12-15:	Designing a prototype of a design tool: Design Puzzle, for the participatory designing of learning activities in ECEC.

In the final, third phase of the study (design workshops 12–15, [Table 1](#)), we summarised in two design workshops the experiences gathered during the design process and brainstormed a method: a Design Puzzle for the participatory design of everyday activities in kindergarten. In the third, final phase, the participants constituted seven adult participants and eight children (6 years old). The children participated in two design workshops.¹

3.2. Data collection

In the workshops, the participants (children and adults) produced several types of data: written text, photographs, audio, and video ([Table 2](#)). In addition, after each workshop, the key events were summarised in a research diary which reflected on the interaction, practicalities, topics, and ideas that had been raised in the discussions. This helped in remembering and categorising the research data at an early stage.

Each workshop had a different agenda, impacting on data collection. The children participated in 10 workshops and implementations of the designed activities. These were documented with photography, videotaping and audio recordings. Discussions and reflections with the children were mainly video-recorded, to capture the multiple forms of messages that the children produced. Collaborative brainstorming, summarisation, and reflection of the workshops amongst adults were mainly recorded in audio.

After the first phase of the process, designing the learning activities (Edukata design workshops 1–4, [Table 1](#)), we directed our workshops towards implementing and evaluating the prototypes of the learning activities (design workshops 5–11, [Table 1](#)). The practical try-outs of the activities and the feedback discussions that followed gave us a deeper understanding of the children's and adults' actions and participation in various situations during the workshops. During the final phase, we designed a method, Design Puzzle, for the participatory design of everyday activities in kindergarten (design workshops 12–15, [Table 1](#)). This constituted the end product of our design process.

During the whole design process, the literature was reviewed (qualitative research, Grounded Theory, participatory design, ECEC) to reflect our actions and initial coding and to provide insights in light of the theory.

Table 2. Participants and data.

Research Activity	Participants	Data
PHASE 1: WS 1-4 Edukata workshops: Scenario, Design challenges, Design opportunities, Useful resources	Children (N = 5, girls 3, boys 2, 4 years), Kindergarten teacher (N = 1), Childcare assistant (N = 2), Pedagogical specialists (N = 3)	Photographs: 33, Video: 54 min, Audio: 02 h 20 min, Reflections by email: 6
PHASE 2: WS 5-11 Implementing the activities Parkour and Aalto Fablab	Children (N=12, girls 5, boys 7, 4–5 years), Kindergarten teacher (N=1), Pre-service teacher (N=1), Pedagogical specialists (N=1), Childcare assistant (N=2)	Photographs: 391, Video: 1 h, Audio: 50 min, Reflections by email:1, Audio: 1 h 25 min, Video: 20 min (by children)
PHASE 3: WS 12-15 Designing the tool: Design Puzzle	Children (N=8, girls 6, boys 2, 6 years), Kindergarten teacher (N=1), Pre-service teacher (N=1), Pedagogical specialists (N=4)	Photographs: 2, Video: 1 h 50 min, Audio: 2 h 05 min, Reflections by email:1

3.3. Data analysis and coding

The study applied Grounded Theory analysis (Glaser and Strauss 1999; Corbin and Strauss 2015; Bryant and Charmaz 2007; Flick 2014) to study the participatory design process in pedagogy development in the ECEC context.

The coding categories were not predefined, but emerged through a close reading of the data. The entire design process constituted the unit of analysis. The first author of this article conducted the data analysis. The Atlas.ti software was used for its capability to manage different types of data sources.

Table 3. Examples of coding: concepts, categories and core categories.

Constant comparative method	Open coding: concepts	Adult's perception on children's learning Adult's perception on how to enable children to succeed Critical reflection on one's own role as an educator Interaction between a child and an adult Roles of adults and children in designing activities Educator as a learner Pedagogical flexibility How to listen and understand small children's initiative? Documentation, its purpose and meaningfulness Listening and being present to a child Be open to children's initiative Let children have an opportunity to make choices and learn through that Child-centred approach Recognition of agency Learning activity Extended learning environments Children's interests and child-initiated activity Excepting speed and loudness Ways to implement children's ideas Getting to know the world through enquiry Freedom to act and follow impulses Learning activities that are initiated by children's play Contradiction in planning and implementation Critical view of existing operational structures Community that supports new approaches and experimentation Routines and structures in day-care: <i>'Things are usually done this way'</i> restricts Togetherness
	Axial coding: categories	Design process Educator Child Play Learning Learning environment Participation Families Operational culture
	Selective coding: core categories	Adult Adult: audience Adult: whisperer Adult: actor Adult: director Child Child: audience Child: whisperer Child: actor Child: director

The aim in the design and the research process was to enable open-ended processes, and actively collaborate with participants and learn from the interaction and collaboration. Although the first phase of the design process (workshops 1–4) was organised according to the Edukata model, it was an essential principle for the project that the process was not fixed beforehand. This flexibility enabled learning from the process and directed the research activities, data-gathering, and sampling according to our experiences.

The analysis started with the process of open coding and advanced to axial and selective coding (see Table 3). During the open coding, the empirical data were conceptualised through interpretation. Axial coding compared these concepts and grouped and merged them into categories. Selective coding recognised emerging core categories which were significant in the process of forming the theory. The analysis was an iterative, nonlinear process. It included constant comparison of phenomena, concepts and categories and going back-and-forth, negotiating with the raw data. (Corbin and Strauss 2015; Flick 2014).

3.4. Phases of the analysis

From the very first design workshop, the data were investigated and initial coding was produced and categorised. The objective of the early stage coding was to gain insight into each workshop discussion and to adjust the following design activities and data-gathering accordingly. Integrating the initial data analysis into the data collection enabled the researchers to direct the design process according to insights gained in participation with the research subjects (Corbin and Strauss 2015). Figure 1 illustrates the phases of the design process and analysis.

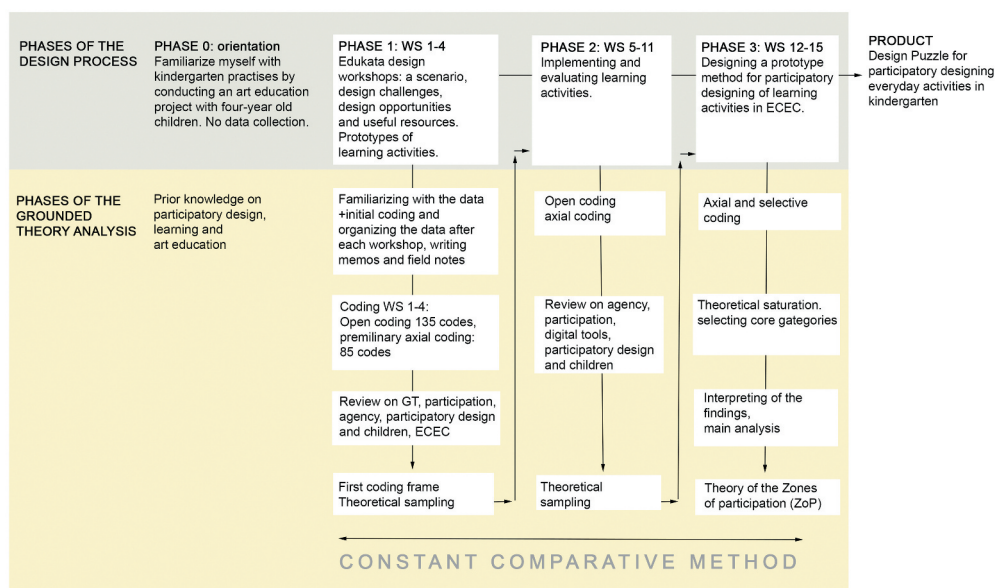


Figure 1. Phases of the design process and analysis.

4. Results: Zones of participation

In our discussions between adults, we constantly addressed the issue of the roles that adults and children perform in everyday pedagogy. Our discussions highlighted the fact that to enhance the participation of small children, the adults need to reflect on and regulate their own roles as leaders and rethink their authority position. This gives space for the children to communicate and express themselves in the ways which are most natural for them (e.g. creative practices and play).

We considered different approaches for activating children in the participatory workshops and ‘going beyond’ merely interviewing and observing children. This required us to rethink our positions as adults and as educators and to reflect on our preconceptions of children as participants in the design process. In the following excerpts, we give examples of the discussions.

Teacher: I think that, at this moment, our design goals and our discussions are focusing on the ‘child as a learner.’ What is special in early childhood education is that the ‘adult is a learner’ as well. So, if we wish to change something, the change needs to happen in the adult and in their thinking. In this way children get opportunities to move beyond what has previously defined by the adults. Could this [design] process lead to a method for adults to learn new [participatory] ways for designing activities and instruction?

Childcare assistant: Do we give opportunities to children to learn from each other in different ways? Do we act as educators or just ‘one of those adults’ who define how the group [of children] is formed and what the activity is and what they do?

Teacher: In the group activity, does it really matter who are the adults and who are the children, if there is a common goal to work for? What if we don’t position ourselves as adults and children ... [but as a group of designers].

These excerpts illustrate the educators’ reflections on their role as acting pedagogues. They recognise the need to assess the authority position of the adult as the ultimate decision-maker and the leader. They also acknowledge the design process as an opportunity to rethink this power relation and to give space for children’s initiative and exploring new forms of participation.

The analysis elicited the different roles of the participants as prominent indicators of the quality and level of participation in the process. The roles participants manifested and had access to during the design process were significant considering the level of interaction and the power relations between adults and children. For example, if children in participatory workshops were merely under strict adult supervision and following directions, their own creative input was inevitably limited, and there was no deep interaction between participants.

The findings elicited an interesting hypothesis: Quality in participatory processes can be promoted if both children and adults have access to various roles. From the hypotheses, three questions emerged: (1) What are these roles and how can they be described? (2) Are the roles fixed or is there movement between the roles? (3) Are there co-occurrences between adults and children accessing certain roles?

The roles were identified from the data. They were conceptualised as Audience, Whisperer, Actor, and Director according to the participant’s presence and actions

Table 4. Descriptive framework for assaying the roles in the data.

Role and Verb that Describes the Presence and Actions	Type of Presence and Actions in the Situations
AUDIENCE, Receives	Audience as a manifested role was defined as passive participation with no contribution.
WHISPERER, Supports and guides	The whisperer was guiding activities within the commonly negotiated goals and supporting others to act. The whisperer did not manifest a major individual contribution but engaged with a supporting role and guided in a subtle manner.
ACTOR, Owns	Actor as a manifested role was actuating the course of the activity. The actor was taking the initiative and contributing to the common goal.
DIRECTOR, Leads and controls	Director as a role meant that the participant led the group and had control over actions.

during the workshops (Table 4). These conceptualisations expressed the dimensions of people's presence and activity during the participatory workshop (Table 5).

The core categories were:

Adult: (Adult: audience, Adult: whisperer, Adult: actor and Adult: director)

Child: (Child: audience, Child: whisperer, Child: actor and Child: director).

Analysis of the roles reflected on the participant's (Adult or Child) position, means and opportunities to act, to take initiative and to contribute.

At the final stages of the analysis, the core categories were further elaborated as Zones of participation (ZoP) which constituted Zone of audience, Zone of whisperer, Zone of actor and Zone of director. Theorising the roles of the participants as zones enabled us to adduce:

- (1) In which zones were the participant groups, adults and children, mainly operating?
- (2) Did both adults and children have access to all the zones?
- (3) Were the participants able to move between roles during the activities?
- (4) Were there significant co-occurrences between adults and children accessing the different zones?

These questions are addressed in the following paragraphs. Figures 2 and 3 give graphic examples of how the roles were interpreted from the visual data.

4.1. Identification of different roles during the activities

The first learning activity was a parkour trip to a nearby beach. The second learning activity was two field trips to Aalto Fablab. By implementing these activities, we were able to interact, play, listen, and observe the children's responses and initiative. In reflective workshops, we discussed with the children their thoughts and feelings concerning their experiences. Visual documentation supported recollection and guided discussions.

All of these activities allowed the children and adults to move between different roles and participate at various levels. Children did not need to be constantly under adults' control, and adults did not need to make all the decisions. The children had their own creative input in the development of the activities when they took a more active role, e.g.



Figure 2. A situation in which children act in the role of audience while adults are actors and directors.



Figure 3. The child's role in this image reflects the role of director, and the adult as a whisperer. The featured situation is from the children-led parkour trip that was one of the learning activities implemented during the design process.

explored the surroundings by photographing and documented the activities by videotaping. Collaborative reflections allowed all the participants to share their ideas and listen.

The designed activities brought value to participatory pedagogy development and early childhood learning because taking different roles enables the breaking down of existing power relations between adults and children, and thus enhances constructive interaction.

As our aim was to enhance children's participation during the process, we highlight here the identification of the roles by explaining children's positioning with the following guidelines.

1) For a child, in the role of audience, there was an opportunity to become familiar with new situations (e.g. introducing the machines at Aalto Fablab) and observe, get instructions, wait, and rest. In these cases, most commonly an adult was in the roles of actor and director, giving instructions and controlling the situation and the group.

2) In the role of whisperer, the child was able to take part in collective activity in a constructive way, to make suggestions and comments, give encouragement to a peer, and ask questions (e.g. during the discussions, gaming, or play). By taking the role of a whisperer, the child was able to support and give space to others to take a more initiative role. To act in this kind of supporting role requires developed interaction skills and the ability to step aside from the spotlight, yet remain active.

3) In the role of actor, the child was able to take the initiative and follow it up. During the design process, this was particularly prominent during the creative activities that included playful elements, such as storytelling, photographing, and videotaping. The adult supported this by taking a more subtle role as a whisperer.

4) As a director, the child was able to lead the group, make decisions, and set the pace (e.g. during the parkour trip). During the activity, the peers honoured the authority of the director and followed their lead. Most commonly in these situations, an adult acted as a whisperer, aiming to support the child's leadership during the activity.

4.2. Distribution of Zones of participation

The analysis confirmed that both adults and children were able to take all of the roles (audience, whisperer, actor, director) during the design process and thus had access to all of the Zones of participation. The entire design process constituted the unit of analysis.

In the analysis, it was acknowledged that each role had its own value in supporting performing the activities in participatory workshops. We state that it is important in a participatory process, particularly in ECEC, that no specific participant group is determined as a one-sided role (e.g. adult as leader and child as follower). In the ECEC context, whether the children have access to the Zone of director at all or what kind of activity or circumstances enables children to reach the Zone of actor is significant. In some situations, taking the role of audience is important and beneficial for children (e.g. listening to instructions, for safety reasons). Adults also need to have the ability and skills to step aside, listen and give the stage to the children. Nevertheless, if a participant is not enabled to shift from an audience role to any other role during the whole workshop, it is an indication of one-sided control over actions. In order to support genuine participation, the activities need to be designed in such a way that they enable all the participants to manifest different roles.



Figure 4. Children and adults accessing the Zones of participation during the entire design process.

Figure 4 represents how the adults and children manifested different roles and were positioned in the different Zones of participation during the design process.

The analysis shows that in the workshops, in most cases, children performed in the Zone of actor. Only on some occasions did children perform in the Zone of director. In the workshops, adults in most cases took the role of whisperer in order to support children's initiative and enable their active contribution to the activities.

4.3. Participant positioning in the Zones of participation

Children's participation and agency were constantly highlighted in our design process. Many of the activities were especially designed to support the children's active role and participation. As adults, we pondered how to best support children's participation, how to act, and which roles to take as educators, to support children's active contribution. As experienced early childhood educators, our actions in the situations were partly designed and partly intuitive and related to group control as much as designing together.

To highlight the roles that the adults and children had in certain situations, I (the first author) investigated the co-occurrence of the manifested roles between adults and children. Table 5 shows the distribution of the codes.

The analysis shows that there are significant co-occurrences between participant groups accessing different zones. The most remarkable finding is that while children influenced in the Zone of actor, the adults in most cases acted in the Zone of whisperer. Thus, adults taking the role of whisperer supported children's participation in the situations.

Table 5. Distribution of the codes in the analysis.

	Child: Whisperer	Child: Director	Child: Actor	Child: Audience
Adult: Whisperer	6	5	108	4
Adult: Director	2	0	3	17
Adult: Actor	10	0	18	26
Adult: Audience	0	0	8	5

4.4. Children as actors and adults as whisperers: a descriptive example

The following example (Figure 5) demonstrates the co-occurrence of children taking roles as actors and adults taking roles as whisperers. The children were playing with a wooden game of which they are co-designers. The previous week, the group had been on a field trip to Aalto Fablab. There they had witnessed their wooden game being fabricated by a laser cutter. Now they were playing with the game at the kindergarten for the first time.

The scene constituted of a group of six children (5 year olds) and two adults as they were exploring the possibilities of engaging with playing with the wooden pieces. The children were showing interest in exploring the game on their own, without any rules for the game defined by the adults. The adults understood this initiative and they took roles as whisperers, which meant that they let the children plan how to play with the game and invent their own play. After a few experiments and try-outs, the children started to assemble the pieces in a line on the floor. The adults supported the activities from a distance and guided the children towards a collaborative approach to establish a construction that needed many pieces to succeed. The children were measuring each other with the pieces, by lying on the floor and assembling the pieces by their side, then counting the pieces to measure themselves.



Figure 5. Children playing with the wooden pieces they created in the previous design workshops. In the illustrated situation, the children take the roles of actors, deciding how to play with the pieces. Adults are whisperers and supporting the actions, but allowing the children to act on their initiative.

Excerpt: [WS9 0:29:20]

[WS 9; 7:11]

Child 1: Hi, check out how long [line of the wooden pieces], let's make it as long as me!

Adult 1: What a great idea!

Adult 1: Let's try now, how many pieces more should we put to make it as long as Martti?

Child 1: Two!

Adult 2: Lisa, you can put them there, then.

Child 2: [Puts the pieces on the floor]

Child 3: I have the least [amount of the pieces]

Adult 1: Oh listen, here are plenty of pieces. We can work together, there is no need to make it on your own.

Adult 2: This piece is at the right place at the head of Martti, what about the feet?

You can measure from here. You can count how many pieces Martti is long.

Adult 1: How many pieces are there?

Child 3: I will count! One, two, three, four ... twelve.

Adult 1: Twelve pieces! What about Anna, then?

The group ended up measuring everyone's length by counting the pieces on the floor, including the length of the adults. The adults guided the play in a subtle way and directed children to learn maths while playing. And the children had an opportunity to explore and invent what to do with the wooden game they had created at Aalto Fablab the previous week.

5. Discussion

An initial objective of the study was to explore whether and how children's participation can be enhanced through PD practices. The new Finnish National Core Curriculum for Early Childhood Education and Care (2016) determined the pedagogical framework. The implementation of the new curriculum created the need to explore and assess practices in ECEC from a novel perspective. In the final phase of the project, as an outcome, we developed a Design Puzzle method for participatory designing in ECEC. This method should be tested and validated in further studies.

The major finding of the study, Zones of participation (ZoP), focused on the roles that participants took during the design process. In addition to the identification of the ZoP, movement between the zones was significant and indicated the quality of the participation. The roles of the two participant groups, adults and children, were analysed during the design process. The study showed that both adults and children were able to act in all the ZoP. Movement between the zones is considered to be important. For example, the role of audience is natural and beneficial in certain situations during the PD process, but if the participant cannot take the lead or be an active agent of the process at any stage of

the process, the creative flow of the process is lost. The adult, leading designer or teacher needs to have the capability to reflect on their authority and status of power, and to step back and let the participant initiate actions and show the next steps of the process. In that way, advancement of the process is collaboratively innovated and defined, and truly novel approaches can be found.

The findings support the work of other researchers raising the roles of the participants as an important study framework in PD to evaluate the level of participation and interaction. Prior studies (Druin 1999; Iversen, Smith, and Dindler 2017; Landoni, Rubegni, and Nicol 2018) note the importance of the roles of the participants, e.g. children and adults, as a significant feature in participatory design. The main contribution of the ZoP framework is that it focuses on the fluid adoption of various roles, rather than one role, during the process. Simonsen and Robertson (2013) emphasise ‘genuine participation’ as a fundamental question in PD. This is established when participants are able to take an active role and to express their initiative fully in a respectful and safe environment. (p. 5). ZoP brings a novel lens into this discussion by emphasising the movement between the roles, which enables the identification and rethinking of power structures in the design process. This perspective is even more essential when the aim is to establish equal grounds of interaction with small children or any other fragile groups.

Compared to Arnstein’s (1969) well-known model of levels of participation focusing on citizen participation and the particular types of participation, the ZoP operates on a more personal level. As Arnstein’s typology specifically addresses citizen participation and power structures in societal development projects, ZoP is a framework to study any group’s dynamics and any individual’s opportunities to take different roles during the PD process. The ZoP is a suggested framework to identify and assess how participation and interaction within a PD process are actuated.

In this study, the theory of Zones of participation was generated through a Grounded Theory approach. The theory was developed in a particular design process in the ECEC context. As the entire design process constituted the unit of analysis, further research is needed to observe and analyse activity-specific results of the distribution of the Zones. The contribution of this work is the identification of the ZoP from the data and the generalisability of the results requires further studies in different settings. In spite of its limitations, the study adds to our understanding of the frameworks for designing pedagogy and learning activities and how to assess participation and quality in PD with small children.

Further research should be undertaken to explore how the Zones of participation can be identified, theorised, and substantiated in different PD processes, and also applied outside of an educational context with varied age-groups and situations.

5.1. Conclusions

The aim of this study was to explore whether and how children’s participation can be enhanced through PD practices. In the investigation, a data-driven approach enabled an open-ended enquiry to learn from the process and about its qualities as the study advanced.

Firstly, the Grounded Theory analysis identified different roles of participants (audience, whisperer, actor, and director) as the guiding characteristics of the design process in ECEC. Secondly, these roles were further elaborated as Zones of participation (ZoP).

Thirdly, the analysis confirmed that the participants were able to move between the zones during the design process. Finally, the analysis showed that there were significant co-occurrences between participants accessing different zones.

The most remarkable finding was that while children had influence in the Zone of actor, the adults in most cases acted in the Zone of whisperer. So, adults taking the role of whisperer supported children's agency in the situations.

5.2. Research ethics

City of Helsinki officials approved the research plan and informed consent was addressed to the adult participants and the children's parents. In addition, the children themselves were consulted about conducting the study. The study applied the recommendations of the Finnish National advisory board on research ethics.

Notes

1. The Design Puzzle is an end product of the process and thus emerged during the final phase of the process. The Design Puzzle is published online in Finnish. (http://jaanabrinck.com/wp-content/uploads/2020/03/SuunnitteluPalat_nettiin_.pdf)

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