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Exploring children's participation in the framework of early childhood environmental education

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ABSTRACT

The paper explores the participation experiences that a nursery school gained through its involvement in an environmental education program that focused on the transformation of the school ground. The research took place in a nursery school in Greece, in which 15 preschool children aged 4 years old and their teacher were engaged in participatory action research. The research emphasizes the rights and abilities of young children as equal participants, solution seekers, problem solvers and initiators of action on authentic issues of their everyday environment. The research was based on a combination of action research and participatory planning methods. The findings of the research highlight the ability of young children to express their ideas and practice critical thinking, problem-solving and collaboration skills. When the teachers decided to withdraw their authority, the whole nursery school practiced democratic dialogue and action skills. New participation experiences took place for both children and adults.

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Introduction

The current paper focuses on children's participation in the framework of early childhood environmental education. Environmental education/education for sustainability in the early years is underpractised, under-resourced and under-explored, even though young children will experience the consequences of ecological crisis within their lifetime (Davis 2008, 2009; Pramling Samuelsson and Kaga 2008). Only recently is there an interest in the specialization of environmental education/education for sustainability with a focus on young children's needs, based on the work of pioneer early childhood pedagogues and researchers. The message from the international workshop 'The Role of Early Childhood Education for a Sustainable Society', held by UNESCO in 2007, was that education for sustainability should begin in early childhood. In that period, children develop their possibly long-lasting basic values, attitudes, skills, behaviors and habits (Pramling Samuelsson and Kaga 2008).

There are synergies between environmental education and early childhood education that share similar philosophical orientations and endorse similar educational practices. These synergies include the building of equitable, democratic and inclusive ways of bringing about intrapersonal relationships and interaction based on negotiation rather than domination and the value of creating a connection with nature. A creative and promising interdisciplinary space emerges through the combination of principles and methodologies from traditions of early childhood pedagogies with the pedagogical philosophy of environmental education and practice. Through these synergies, the goals of social justice and ecological responsibility could be achieved (Davis 1998).

The focus on empowerment and participation in environmental learning and experience is reflected in recent early childhood environmental education/education for sustainability research. According to Davis (2010, 31), early childhood education for sustainability is

transformative education that values, encourages and supports children to be problem seekers, problem solvers and takers of action in their own environment. It is explicitly about creating social change, and central to the changes is the redistribution of power and authority. Empowerment can describe any transfer of power.

Young children are capable learners and explorers of their surroundings and they should be encouraged to discuss and form their own opinions, to seek and find solutions, to make responsible decisions and to act upon them. This approach can help children become active citizens (Norddahl 2008).

Even though there is great interest in research on children's participation in environmental learning and action, there is still a lack of quantity and scope in empirical research data on children's participation in the early childhood stage. This paper's aspiration is to contribute to the scientific dialogue regarding early childhood environmental education by shedding light on the framework of young children's participation. The aim of this paper is to contribute to this relatively new field of research, by exploring preschool children's (aged 4 years old) participation experiences and by promoting the possibility of further discussion and exploration of young children's right to participate in decision-making procedures and initiate action.

The growing interest in young children's participation in their environment

One of the problems of environmental education is that educators usually assign children work on environmental projects instead of involving them in research and action on actual issues of their environment. This is a restricted notion of the significance of children's action and participation in environmental learning (Jensen 2002). The reality is that the ability of children to participate in decision-making procedures regarding their environment is underestimated and children remain overcontrolled by adults (Alderson 2005).

Children's right to participate in decision-making procedures is documented in the United Nations Convention on the Rights of the Child (CRC). The CRC includes articles that focus on children's participation. These include Article 12, which underlines the right that children have to express their ideas, Article 13 which focuses on their right to investigate, find and transfer information and ideas regarding issues that interest them through various ways and Article 29 which mentions the need to encourage children to respect human rights and the environment.

The right of all citizens to participate in decision-making procedures is vital for social change (Mogensen and Schnack 2010). Children, even the young ones, should be included through educational programs in this democratic procedure, since they have the right to participate in environmental experience and learning (Hacking, Barratt, and Scott 2007).

There is no more a need for environmental education that transfers, through the traditional teacher-centered didactical model, sterilized scientific knowledge on the ecological crisis to the 'ignorant' pupils (Tsevreni 2011), nor one that forces children to confront increasingly complex and pessimistic environmental problems that are beyond their understanding and control and will only make them anxious, despondent and, later in life, inactive adults (Jensen and Schnack 2006; Sobel 2013). Environmental education that focuses on action includes the critical process of inquiry and reflection and an optimistic vision of potential (Varela-Losada et al. 2016).

In the field of early childhood environmental education that focuses on children's participation, Johansson (2009) introduced the idea of the preschool child as the world citizen who takes care of himself/herself, others and the world, thus throwing the spotlight on issues of children's rights and democracy. Mackey (2012) highlighted the potential for introducing participation in environmental issues of children's immediate environment in early childhood education. Her research focused on young children's involvement in environmental experiences and learning in the framework of education for sustainability and children's rights. The research revealed the importance of honoring a

young child's right to know, to be part of conversations and possible solutions with others in order to be able to take meaningful action on genuine issues of their everyday immediate environment. Boileau (2013) outlined the need to include young children in investigations about their environment and to focus on a research methodology that can be appropriate for environmental education research in early childhood.

Previous studies have indicated that young children have the capacity to form and express views freely and the right to participate in decision-making, communicating their experiences and opinions and taking action. They have the right to enjoy the same human rights that adults do – to be informed, to participate, and to make decisions regarding their environment (Alderson 2008, 2010). Children's participation is a multidisciplinary field that grows, producing constantly theory and methodology for involving children with informed, empowering and creative ways in decision-making for their lives and environments (Cahill 2019; Ergler 2015; Holt, Evans, and Skelton 2017; Hart 1997). Children's self-determination is now scrutinized in the framework of early childhood education, approaching children's right to participate from a diverse, international, multidisciplinary perspective, revealing an emerging field of research, pedagogy and institutional changes (Farini and Scollan 2019).

Problematizing children's participation

Even if literature on children's participation has been growing, there are researchers who question the process and the results of this research field. The problematization of child participatory research focuses on issues such as the 'depth' of children's participation, the role of adults and power inequalities between adults and children.

Although children's participation has been recognized as a positive part for democracy and social equity, the extent to which the child is recognized as a social actor is limited and its competences as useful to planning and decision-making are often underestimated (Cele and van der Burgt 2015; Poretti 2019). Children's participation's projects have been criticized for their ineffectiveness to include children's voices to decision-making processes. The initiatives for engaging children remain 'top-down' and controlled by adults (Matthews 2003; Percy-Smith 2010; Thomas 2007). Furthermore, they often fail to ensure the representation of children's voices or to succeed a 'deeper' degree of participation (Horgan 2016).

There is also an urgent need for researchers who constantly reflect critically on their work, asking questions about their role and the role of adults in children's participation research, aiming at power distribution and children's empowerment (James 2007; Spyrou 2011). Child-adult relations and the role of adults are key factors that determine the quality characteristics and success of children's participation (Mannion 2007). Mannion (2010, 339) suggests that children's participation projects are about 'the creation of new dialogical intergenerational spaces of and for participation, through which new kinds of relationships, identifications and spaces for adults and children emerge and find expression.'

Finally, there is a need to redefine the role of adults in children's participation research and practice. For example, rather than reproducing stereotypes regarding adults and children in participatory work with children, Blaisdell (2018) proposed the approach of participation as 'lived' experience through relationships and interconnections between adults and children. This concept considers children's participation as a troublesome area of theory, research and practice, which includes uncertainty. Kina (2012) added a philosophical touch on the view of the role of adults in participation with children, revealing the need for acknowledging the factors of emotion and power in the participatory process.

The present study

Hultgren and Johansson (2019) propose a new model of participation that includes even the youngest children and regards participation, not as decision-making, but as an ongoing process which is

not dependent on age, maturity or competence and is constantly redefined during the process of every specific activity or situation to counterbalance subjection and inequality that take place from the age of infancy and is based on power relations (Holt 2013; Duhn 2019). Furthermore, Hart (1997, 108) claimed that:

children of all ages, from the third or fourth year of their lives on, can be involved in planning and design ... the child will develop at an early age the sense that the environment is, in part, created by people, including themselves.

Children, even from the earliest age, can form and express views and participate to issues relating to their immediate family, school, local community and natural environment (Lansdown 2011). In line with Hultgren and Johansson (2019) and Hart (1997), the current research focuses on the young age of children in an attempt to support the claim that, despite their age, they are capable of participating as equal partners and problem-solvers by taking decisions on issues that concern them, such as the management of their immediate school environment.

The current study reinforces this claim. In line with Mackey (2012), who stressed the importance of the right and the ability of young children to know about social and environmental issues of their everyday environment, to be involved in dialogue and possible solutions and to take part in action for the environment, the current research explores the ability of young children to design, manage and care for their own environment. The research focuses on the exploration of the participation experiences that young children and adults gained through their engagement in designing and caring for their immediate environment. This exploration is based on an action research that engaged young children in the improvement of their school ground in a Greek nursery school.

Research methodology

The aim of the research

The present study explores the framework of young children's participation, emphasizing the experiences of the children and the entire school during an environmental education program in a nursery school of Volos, Greece. The school lacked any previous experience of action research, participatory planning and decision-making procedures. We were interested in investing on the chance to work with very young children in a creative and experimental manner, offering them the opportunity to express and participate as equal partners in action research regarding their school ground. We attempted to give the young children the ability to express their needs, to become empowered and to participate in the decision-making procedures regarding the transformation of their own environment (Christidou et al. 2013; Kellett 2011; Parnell and Patsarika 2011).

The research examines the children's experiences as they take action in the management and improvement of their school ground, according to the following research questions:

1. *Which are the participation experiences that children and the whole nursery school had through their engagement in their school ground improvement?*
2. *Which were the benefits that emerged when children and adults engaged in participating and caring for their school environment?*
3. *Which were the challenges that were revealed from the implementation of the participatory action research in the nursery school?*

The action research group

The action research took place with the participation of 15 preschool children (7 girls and 8 boys), aged 4, and their teacher. The children who attended the environmental education program had no previous experience of participation or environmental education. The class teacher was part of the

research team. The headmistress of the school acted as the critical friend of the action research process. The environmental education program also progressively engaged the 15 older children of the school, aged 5 years old, the other teachers of the school and the assisting school staff (the janitor and the cleaning lady), especially during the third cycle of the action research.

The action research cycles

The research process lasted three months (May 2016–July 2016). The research was initiated by the teacher's observation that the school ground was empty and 'sterilized' and, moreover, was not being used as an educational resource. The children remained indoors throughout the day and could not approach or use the outdoor space. Furthermore, inspired by the theory and practice of children's participation, in the course of the present study young children were considered as equal partners in environmental learning, decision-making and action regarding their immediate environment.

Action research was selected as it connects education with emancipatory ideals (Kemmis 2006). Action research is an ideal methodology for the implementation of an educational program that aims at children's participation and empowerment regarding issues of their everyday life and environment (Tsevreneri 2011, 2018; Bywater 2014; Garnett et al. 2019; Hart 1993). There is also a need for implementing action research to reflect and change teachers' practices and encourage children to actively participate (Davis 2009; Vipond 2019). Participatory action research encourages children to construct their own knowledge, interacting with their environment (Malone 2018).

Action research was combined with participatory planning methods, especially suited for young children, which captured children's ideas and vision and enabled the children's communication, collaboration and empowerment. They included child-friendly methods like walking in the schoolyard, brainstorming, taking photographs, drawing, children's handicrafts and dialogue between children and adults. These methods were also selected because of their creative and interactive potential (Cele 2006).

The research process consisted of planning, action, monitoring and reflection cycles according to the principles of action research (Kemmis and McTaggart 1988). The first action research cycle consisted in the identification and listing to children's ideas about their school ground. The children were encouraged to express and communicate their ideas and vision for the school ground. They walked in the school yard, participated in brainstorming, took photographs and made collective drawings and playdough models (Figure 1). The children expressed many ideas about the improvement of their school ground such as planting flowers, attracting animals, inclusion of colors in the school ground (a colorful rainbow painted on the wall and colorful railings at the school ground), the implementation of motor activities, the inclusion of water in the form of a pool and the creation of an outdoor library.

In the framework of the second action research cycle, the children created a scale model that presented their collective vision for the school ground. The scale model included all children's

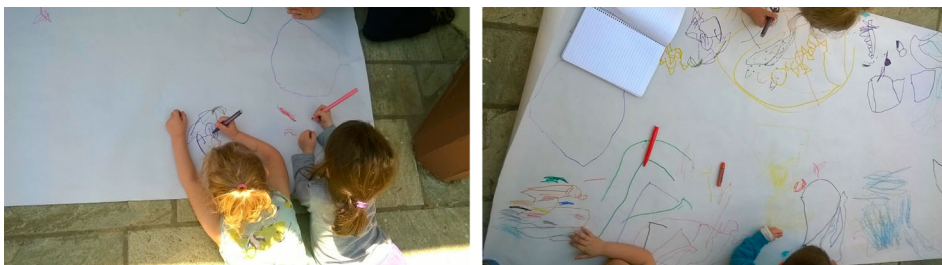


Figure 1. The collective drawing of children's vision for the school ground.

ideas and visions for their school ground and was constructed with the assistance of their teacher. The scale model was placed at the entrance of the school where the children had the opportunity to communicate their ideas to the whole school community (Figure 2). The scale model was also the means through which the children discussed the implementation of their ideas with the headmistress during a special meeting, which many older children were also invited to attend. This meeting evolved into a negotiation between the headmistress and the children. In that meeting, collective choices and decisions were made by children and adults.

The school community was not trained on children's participation methods. However, the critical paradigm of pedagogical research and praxis includes processes of taking decisions and acting collectively towards change. Action research offered the field for collective discussions and self-reflection between the research team and the teachers that facilitated teachers' receptiveness of children's ideas. At first, the teachers were reluctant about the kind of ideas that the children would propose and if their ideas could be realistic and could be implemented. The children surprised their teachers by presenting ideas that were reasonable and adjustable to the everyday school environment.

In the third action research cycle, the children in cooperation with adults (teachers and the assisting school staff) took action and made changes in their school ground. The teachers and the children of other classes began to observe closely and participate actively in the changes that took place. The final ideas that were decided in the negotiation between children and adults and implemented included: planting flowers, attracting birds, installing a water table and creating an outdoor library.

Ethical considerations

Involving young children as co-researchers in pedagogical research and practice raises several ethical issues and dilemmas regarding children's free will and role in the participatory process (Brosström 2012; Holt 2004). In the current research, there was close attention to ethical issues such as confidentiality, respect for children's opinion, needs and participation throughout the whole educational program. The participants' anonymity was ensured.

The children were informed of the scope and the process of the research. They were also informed about their rights to withdraw from the research or not to participate in specific activities throughout the program. The parents were also informed by the teacher and a letter from the research group regarding the framework, the purpose and the need of the research. They provided their written permission for their children's participation in the research.

The researchers discussed their considerations regarding ethical issues in several stages of the research. They took decisions regarding directions that, while empowering young children's voices, would minimize enforcement of adults' ideas and opinions, away from manipulation and tokenism (Hart 1997). The children were involved in every possible stage of the research (including the selection of the environmental education program's theme, methods and activities) (Lundy, McEvoy,



Figure 2. The scale model represented children's collective vision for their school ground.

and Byrne 2011). The researchers attempted to achieve a balance between participation and children's protection in every stage of the research (Lansdown 2010).

Data collection and analysis

For data collection, multiple methods were used, including children's drawings and creations, brainstorming, recorded dialogues between children and teachers, semi-structured interviews with children and teachers, recorded discussion with the critical friend and the research diary that was kept by the teacher of the class, consisting of research notes, photographs and recordings from the research field in digital form.

Data analysis was based on thematic analysis, which is a qualitative analytic method that is characterized by theoretical freedom and flexibility (Boyatzis 1998; Braun and Clarke 2006). We identified themes within data, which were strongly linked to the data, in an inductive (bottom-up) way. Initial codes and coding frames were compared and discussed within the research team and a set of suitable coding strategies was agreed. Subsequently, one of the researchers coded all data, while two others coded a percentage of it (approximately 20%). This procedure yielded an intercoder agreement of 88%, ensuring the code validation. All codes were subsequently sorted into potential themes, which were reviewed and refined by the research team and the final themes were defined by consensus (Braun and Clarke 2006).

From the data analysis procedure, three themes emerged that encapsulate the children's and the school's experiences: (a) the children's expression of their ideas and the practice of critical thinking, problem-solving and collaboration skills, (b) the practice of democratic dialogue and the emergence of challenges, and (c) participation and action.

Results

In the following paragraphs, the above-mentioned themes are presented in detail, along with examples of children's and teachers' dialogues and reflection on participation experiences.

The children express their ideas and practice critical thinking, problem-solving and collaboration skills

The use of multiple methods facilitated the expression of children's ideas, as can be seen, for example, in the following part of a dialogue between the teacher and the children during brainstorming in the school ground:

- Teacher: What would you like to have here?
- Child 1: A rainbow.
- Child 2: A pool.
- Teacher: And what will the pool have inside?
- Child 2: Water, like the sea.
- Child 3: A playhouse.
- Teacher: And what are we going to play?
- Child 3: Dolls and animals.
- Child 4: A buried treasure [...] deeply buried.
- Teacher: How will we find it?
- Child 4: There has to be soil to dig.

The children shared their needs and suggestions creating a common pool of ideas that formed their collective vision for the school ground. In their collective drawing, the children demonstrated various ideas, whereas the elements that were represented in the scale model emerged after they discussed and shared their ideas. The children had a variety of ideas regarding the design of their school ground, as they were recorded through the participatory planning methods. They imagined

their school ground with natural elements and creatures (water, soil, animals and plants), with colors (a colorful rainbow painted on the wall and colorful railings at the school ground) and with an outdoor library.

During the second cycle of action research, the scale model created by the children became a means through which they were able to communicate their ideas and needs. During the construction process, the children began asking each other questions and embraced the inquiry-based approach of their teacher: 'How did you think of that?' or 'What do you mean by that?'. In so doing, they practiced an inquiry-based way of thinking and communication:

The children seemed to remember everything that we had discussed or done regarding the design of the school yard, saying 'I made this myself' or 'that child made this' and they asked each other questions trying to imitate me. (teacher's research diary)

Furthermore, since the scale model was placed at the entrance of the school, the children had the opportunity to communicate and explain their ideas to the broader school community.

The children found solutions for problems that arose during the implementation of their ideas in the third cycle of action research. For example, when the children attempted to plant flowers, they discovered that the soil was very hard and so they had to find ways to soften it, as well as to find ways to protect their planted garden and to attract birds. They had also to fix the water table. Below, is a dialogue between the teacher and the children regarding the painting of a rainbow on the school-yard wall in which the children practice problem-solving and critical thinking skills:

Teacher: Did we construct the rainbow?
 Child 1: No.
 Teacher: Why? What do we need to paint it on the wall?
 Child 2: We need paint.
 Teacher: And what do we need to buy paint?
 Child 1: Money.
 Teacher: Who has money?
 Child 2: Nobody.
 Teacher: So, in order to paint the rainbow on the wall we need money. And who could help us paint the rainbow in our yard?
 Child: Mr L. (the janitor).
 Teacher: So, we need money and Mr L. when he will be available. –

The children were familiarized with the process of implementing their ideas and practiced finding solutions to the obstacles that existed in the process of the improvement of the school environment.

Children and adults engage in a democratic dialogue and challenges emerge

The negotiation of their ideas with the headmistress was a unique experience for the children and the whole school. The children had the opportunity to experience an authentic, democratic dialogue with the school authorities regarding the implementation of their own ideas for their immediate environment. This process had many benefits for the children who began to understand their rights as well as school administrative structures and restrictions. At the same time, the children learned to discuss their ideas collaboratively and in a context in which adults took their opinions and needs seriously. This participatory educational process, which was based on democratic dialogue and collaboration, emerged through children-adult conversations. For example:

Teacher: What does Mr. L do well?
 Child 1: He paints.
 Teacher: So, he could paint ...
 Child 1: The wall with beautiful colors.
 Child 2: No, black and white
 Child 3: A colorful wall
 Headmistress: He could also make the bird feeders.

- Teacher: We can make them from milk bottles, we will make a small door and we will put them high ... Thank you very much Ms K. (the headmistress)
- Children: Thank you.
- Headmistress: I would like to thank you too ... and we will come back with new suggestions ... In order to replace those that cannot be implemented, ok?

The children learned to discuss and negotiate their ideas with adults as a necessary step for their implementation. In the following extract from the dialogue of negotiation between the children and the headmistress, the latter summarizes the ideas that could be implemented in the school ground, based on criteria such as children's safety, space availability, cost, etc.:

- Teacher: Let's hear if you have any ideas for our yard, that we can make happen.
- Child 1: A swing.
- Child 2: A seesaw.
- Child 3: A high bar.
- Teacher: Tell us Ms. K., what could we make happen from all these?
- Headmistress: We could make the seesaw and the swing that you said, the book library and the books outside where we could read, the birdhouse where we said that we could place food and water ... Now, I would like you to think a bit more about the pool. Because it would be difficult, I would like you to recommend to me something that we could put water inside, that would not be so big, and what I see difficult to realize is the trampoline ... we can do the flowers, the trees, and if you like we can add something else, but these we can do.

The children approached an authentic issue of their immediate environment and practiced listening and accepting different opinions, comprehending the educational structures and hierarchy, expressing and negotiating their opinions and exploring and implementing solutions and change.

However, in several occasions, school teachers and staff felt anxiety and unease due to the emancipatory character of action research and the unknown results of children's engagement in decision-making. According to the research data, the main difficulty for the teachers was the feelings of awkwardness and anxiety at the beginning of the program. The dialogue below, between teachers, reveals their concerns towards the unexpected results and the difficulty of the participatory methods:

- In the beginning, what were your thoughts when I told you that I was going to ask children's opinions for the school ground?
- In the beginning I was reluctant because I was not sure about children's ability to express opinions that could be implemented, but finally the outcome was very good.
- So, in the beginning you thought that the process would be difficult. That is what I was thinking, too.
- Yes ...

In the following extract, the teacher of the class reflects in the research diary regarding the difficulties she experienced, being involved for the first time in a child-centered pedagogical process that questioned her authority and encouraged sharing her power with her pupils.

I felt anxiety and unease regarding children's response, since I used to guide and protect my pupils. I had many discussions with the critical friend, but we had no prepared answers. My central thought was that children would not have the ability to think critically to form their ideas ... However, finally it came out that children's ideas were fascinating and negotiable.

Sharing power and release from teacher-centred teaching and learning methodology was not an easy task, as it was expected, since the Greek educational system does not provide opportunities for real and essential participation and action:

In the beginning of the research, attempting to 'protect' the program from children's unbridled imagination, I made several mistakes trying to moderate their enthusiasm. I was afraid that the ideas they would propose could not be implemented. Fortunately, this stance did not affect children's will and joy of participating.

However, the climate of trust, cooperation and openness towards progressive pedagogical methods that developed in the school and the implementation of action research with support from the research group contributed to the gradual transformation of teaching and learning and sharing of power:

Gradually, I distanced myself from my protective and leading role. Supported by the critical friend and the research group I realized that the program's goal was the empowerment of children's participation (and not the creation of the ideal school ground).

Finally, the teachers evaluated positively the environmental education program, and said that 'It was very interesting' or that 'I liked it so much that I'm thinking of implementing this program next year' or that 'It was something innovative'. The teachers' experience allowed them to understand the value and need of children's participation. One of them said:

It was a very good idea, and I, as a teacher, I am going to listen more to the children.

Another teacher underlines the need to broaden their perspective on children's participation:

It is very important for children to take their own decisions, because school is an important part of their lives and they could express their opinions on other issues, too.

This change regarding the teachers' way of thinking about children's participation was also observed by the headmistress:

All the teachers and the school staff began thinking that there are other ways to do some things, such as the design of the outdoor space, with the children's participation.

Experiences of action and change

The children were willing to participate in the whole program, and the teachers who observed the educational program said that 'the children exhibited joy, interest, curiosity.' The children were very pleased and sometimes quite enthusiastic. They were pleased from the beginning of the process because they 'were able to propose and present what they would like for the specific space, but they were also very enthusiastic while they put into practice all the ideas they had proposed [...]' (headmistress).

The children expressed their interest, joy and enthusiasm, and were proud of their achievements.

After the planting of the flowers, another young girl shouted: 'We have flowers, we have flowers!'. A young boy expressed his joy for the construction of the bird feeder: 'I like birds! This would be a perfect house for the birds!' (teacher's research diary)

Here is the dialogue between the teacher and the children at the final stage of the evaluation of the educational program:

Teacher:	Did you like all the things we did?
Child 1:	I liked ... all the things.
Teacher:	How did you find ... all this?
Child 2:	I found it beautiful!
Child 3:	And nice!
A girl chose the emoticon that represented 'interest':	
Teacher:	How does this face feel? Did it like the things that we made?
Child 4:	Yes!
Teacher:	Did we have a nice time?
Child 4:	Yes!
Child 5:	It said 'wow' (the emoticon).

'Why did you like all these things that we did?', the educator asked the children. 'Because we thought all of these', answered a child. The children seemed dedicated to their collective effort to

express their ideas and needs and to improve their schoolyard. They participated spontaneously, they took initiatives and the actions that took place flowed naturally from the previous activities. For example, at the construction phase of the scale model, the children were confident in remembering and adding all the ideas that had been discussed. They photographed their model scale, highlighting the fact that it was something extremely important for them:

While I was taking photos, the children asked to take their own photos [...] feeling that this was something important (teacher's research diary).

When the scale model was placed at the school entrance, the children were able to spontaneously communicate to the adults their ideas and their vision for the school grounds, represented in their collective creation: 'Here are the pillows, our books ...', 'This is the pool'.

In the third cycle of action research, the children's participation was transformed into the will and the ability to take action. The children were encouraged to think critically and to take decisions and initiatives in order to implement the changes in their school ground. They took the responsibility to bring flowers which they planted with enthusiasm. They were absorbed in the planting; they cooperated with the adults of the school and expressed the will to take care of the plants that were already planted in their school ground. They also chose the trees where they placed the bird feeders and they explored and indicated the spots where they placed water vessels for the birds. The children took care of the plants and flowers every day, taking new initiatives in the school ground:

After we planted the flowers we noticed that the soil was hard and we decided to water it [...] Then, the children thought that they should also water the rosebush that was nearby, something that we had never done before (teacher's research diary).

They consistently added water and food for the birds and they worked every day on the outdoor library, asking for more books to read.

The teachers realized the value of children's participation. For example, addressing children's participation, the headmistress said:

In schools, the design of the space is defined mainly by adults and the opinion of young children is not being asked, though it is of direct concern to them because they are the ones that live and are active in the specific space.

Discussion

Through participatory research, the children and the teachers of the nursery school were involved in experiential environmental learning and action by having to deal with a genuine issue of their everyday environment – the improvement of their school ground. This was a brand new experience for the young children who familiarized themselves with their outdoor school space, expressed and communicated their ideas, practiced critical thinking and problem-solving. This was also a brand new experience for teachers, who had to question their own authority and share their power, transforming their traditional didactical methodology towards a new emancipatory direction that emphasizes intergenerational cooperation and peer teaching and learning (Mannion, Adey, and Lynch 2010). Children's participation theory and methodology alters the balance of adult-child power relations and provides the ability for transformative educational, environmental and social action and change (Hart 1997; Malone 2018).

We observed the evolution of children's participation through the educational program. When the children familiarized themselves with the concept and practice of participation, they were able to combine participation and action skills. As Jensen and Schnack (2006) claim, it is crucial for students in environmental education to deal with authentic problems and to participate in selecting the issues to be addressed and the development of visions, forming a sense of ownership that will determine any actions and changes.

In these authentic issues, the goal is to avoid the authority of the 'experts', but to create a framework of support that enables children to become critical thinkers, resolve problems and make changes (Percy-Smith 2010). The environmental knowledge that children gained through the educational program included the ability to care for and manage their own environment by cooperating with adults, visioning and implementing environmental and educational changes in their own school ground.

The research findings underline the value of the concept and practice of empowerment in the framework of early childhood environmental education. Davis (2010, 32) stressed the importance of young children's ability to be

problem solvers and solution seekers around social and environmental issues and topics of meaning in their local context ... As they engage in such thinking and actions, young children also learn the social and political skills of working together, resolving differences, making a case, of quiet activism and the persistence required to harness the necessary resources to create changes and to implement planned actions.

Through the educational program, the young children practiced participation and action skills, which they can potentially use as adults and citizens.

The anxiety that teachers experienced in front of new emancipatory methods that challenged their authority and encouraged sharing of power, reflected the need for pedagogical praxis using action research, as well as for institutional changes in the curriculum that will provide more opportunities for children's participation and action from the early childhood stage. This lack of participation experiences in the nursery school reveals a great need and opportunity for teachers' training in children's participation theory and methodology using action research in the framework of environmental education. Further research on a wider scale is needed for revealing the challenges and obstacles that teachers experience using action research and participation methods towards environmental and educational change in their immediate environment.

The educational program became a stimulus for the creation of a democratic educational process in the school and a reconsideration of the relationship between adults and children. As the headmistress said: 'It was the first time that I discussed with the children and we tried to find out altogether how the space could be shaped.' This sense of participation contributed to the creation of a vision for the school's democratization and emphasized the need for support from the official educational structures: 'We could propose to the superiors, those who are in charge of spatial design, that this could be achieved with children's participation, as something innovative', the headmistress mentioned.

In the framework of the specific educational program, it was very important that the headmistress, the teachers and the parents agreed and were open to being engaged in participatory action research as well as to action and change for the improvement of the school ground. The distribution of power in the research and educational process is an issue that is significant in action research and the critical research paradigm. Emancipatory action research is an empowering process, since it includes qualities of the struggle for more just and democratic educational and social processes, self-critical reflection, action and change (Carr and Kemmis 1986). The school community's approval and willingness to participate in educational and environmental change and the commitment to collaborative work and democratic dialogue seems to be crucial for the successful implementation of action research.

Many children's visions for the improvement of their school ground included their need for connecting and interacting with space, nonhuman creatures and elements. Nonhuman nature in the school ground was one of the children's main ideas. Playing, engaging, interacting and co-evolving with nonhuman creatures and elements such as water, soil, animals and plants emerges as a priority for children in the urban environment (Duhn, Malone, and Tesar 2020). The potential and challenges for claiming nature in the school grounds and emerging children-nature interconnections need to be further researched in the framework of the critical paradigm (Tsevreni and Tigka 2018). The critical educational paradigm could be enriched by reimagining sustainability and

education for sustainability under the lens of posthumanism and encounters with the more-than-human others in early childhood environmental education (Malone 2016; Malone, Truong, and Gray 2017).

In the current paper, we approached children's participation as a reflective process of change and 'becoming' between children, adults and space. The reformation of the school ground was observed as a process of co-evolving and was approached as an experience of critical transformation between children-adults-space relationships (Mannion 2010; Blaisdell 2018). This point of view simulates the cultivation of Freire's (1970) notion of critical consciousness, which in the framework of environmental education could be defined as the critical reflection on the world in a dialogical encounter with others (Percy-Smith 2010; Clover 2002).

Sustainability and environmental change would not be achieved through promoting more institutionalized environmental education, but through alternative paths that focus on experiential learning, transdisciplinarity, collaboration and action research (Grunewald 2004). Children's participation in designing and caring for their own environment is a dynamic process, where children, by transforming their environment, transform their ideas and actions, making important steps towards empowerment. It also includes the emergence of adults' reluctance and fear for freer educational planning that sometimes questions their authority and power in order to facilitate co-evolving of dialectical children-adults-space relationships. This distribution of power and transmission to a more participative teaching and learning methodology based on peer education and intergenerational cooperation has the potential to create a democratic experience of critical spatial and educational transformation.

Conclusion

Despite the growing research interest in children's participation and the recognition of the importance of children's empowerment in the framework of environmental education, there is still a lack of research data and findings regarding the early childhood stage. The current study contributes to this dialogue, exploring participation experiences that a nursery school gained by engaging in designing and caring for its own school environment. Davis (2009) stresses the need for focusing and supporting both morally and practically early childhood sustainability education research as beneficial not only to young children and to teachers, but also as an investment for the creation of a sustainable future.

There is a strong need for an approach to environmental education that focuses on the involvement of children in authentic environmental problems of their immediate surroundings, empowering their participation and action competence. The current study reveals the potential of introducing young children to the notion and practice of participation and action in collaboration with adults under the lens of early childhood environmental education. We have in mind an environmental education that educates children to participate in decision-making procedures and mastery of the environment, moving in more democratic levels of social life (Ward and Fyson 1973). According to Pramling Samuelsson and Kaga (2008), learning about democratic values and practices, as a presupposition for a just and sustainable society, can and should start in early childhood. The current research suggests that there are great benefits when teachers decide to carry out action research with young children, cooperating as equal partners for the improvement of their common environment.

If we are engaged to 'deepen' research on children's participation (Horgan 2016), we should approach it as a space of cultivation of our critical consciousness through a dialectical, intergenerational framework for relating with others and the environment. We should create more opportunities for participation experiences, skills and knowledge for both children and adults (Lundy, McEvoy, and Byrne 2011). Action research seems to be an ideal methodology supporting children's participation as well as teachers' reflection on withdrawing their authority and moving towards more emancipating directions.

In the current study, teaching and learning transformation towards more empowering and emancipating directions seems to be achieved through the environmental education program. Action research through its transformative dimension creates a pedagogical environment where teachers have the opportunity to reflect on their mainstream didactical methodology and to feel able to share their power and authority with young children. Applying action research in an environmental education program revealed the potential of making the first steps for children's participation in decision-making processes regarding their immediate environment.

Our paper reveals the need for teachers' training on participatory instructive philosophy and methodology in the framework of early childhood environmental education towards empowerment and emancipatory directions. It also stresses the need for further research on young children's participation, filling this gap with promising results for a democratic and sustainable future that involves engaging with and co-evolving with space, human and nonhuman others in the framework of early childhood environmental education.

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