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LITERATURE REVIEW ON THE MEANINGS OF SPACE IN EARLY CHILDHOOD EDUCATION AND CARE CENTRES

The meanings of spaces in ECEC centres: a literature review

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INTRODUCTION

THE IMPORTANCE OF SPACE IN ECEC CENTRES

The last few decades have seen a growing interest in the role of physical environment in early childhood education and care (ECEC). In addition to **who** implements the educational action and **what** the contents of education are, it has become increasingly important **where** education takes place. Alongside staff (who) and programs (what), the physical environment of a service (where) is in fact recognized as a critical aspect through which early childhood education and care (ECEC) quality could be implemented (European Commission, 2014; Melhuish, 2016; OECD: Organization for economic cooperation and development, 2012).

Attention to the role of space in educational settings began in the '60s: the first studies investigated specific physical features of space, such as crowding, color, openness, warmth or light, trying to define the optimal factors for good child development and learning (David & Weinstein, 1987; Weinstein, 1979). Since then, research has developed and the importance of educational settings has become more and more evident: **the quality of the physical environment has shown to be linked to wellbeing and proper development in the early years**, by influencing behavioral, cognitive and emotional aspects (Evans, 2006; Guo, Justice, Kaderavek, & McGinty, 2012).

Attention to ECEC spaces has increased even more since the Italian pedagogue and school psychologist Loris Malaguzzi, founder of the Reggio Emilia approach, defined **physical environment as the “third teacher”**: he assumed that, besides family and educators, features and organization of spaces could convey educational meanings and affect children's growth in the early years (Edwards & Gandini, 2018; Malaguzzi, 1987). Similarly, the Italian architect Mario Botta has defined **the construction of a school building as “the first pedagogical act”** (Botta, Crepet, & Zois, 2007, p.73), highlighting the need to consider the physical spaces in which education takes place, even before constructing them. In line with these visions, many authors have stressed the importance of the physical dimension of the educational environment, which seems to affect and be affected by the pedagogical approach: they assume that the physical environment either enables or hinders potential actions, orienting children's experience and conveying psychological meanings.

Of course, the educational environment also includes **psychological and social dimensions, in addition to the physical one**, and the three are intertwined and interdependent (Gifford, 2014).

The relationship between physical environment and developmental outcomes could be considered in the light of some classic **psychological and sociological theories** that have investigated the underlying mechanism in the relation between space, perception and behavior. **Piaget & Inhelder** (1948) distinguished between the perception of space and the representation of space: the former provides shapes while the latter creates meanings for these shapes. In this vision, space provides opportunities for action, and meanings are created from action. Similarly, **Tuan** (1977) argued that the physical features of space influence the perception and representation of reality: they define the context in which people can act and live, just as language gives structure to thought. **Soja** (1996) distinguished between quantitative spatial features (Firstspace), the psychological interpretation of space (Secondspace) and a third dimension in which the first two are connected through action (Thirdspace). All of these theories share the idea that **space has a role in the definition of reality**, supporting the presence of a relationship between the physical environment and psychological development.

The theoretical model underpinning the EDUCAS project has been developed within a **constructivist approach**, based on the idea that the understanding and knowledge of the environment in which people live is co-constructed through experiencing things and reflecting on those experiences. According to this vision, the perception of space is fundamental and it should be important to take into account how children, teachers and parents perceive the spaces in which they live and which are the meanings given to them. This approach is consistent with a specific idea of space that is conceived not as something that subsists independently of interactions and individual behaviors, but as **representative space, that is co-constructed and negotiated through the meanings and the behaviors of all these who inhabit it** (Strong-Wilson & Ellis, 2014; Vuorisalo, Rutanen, & Raittila, 2015).

But what do we know so far about the relationship between ECEC physical environment and educational

issues in early childhood? Many studies have been conducted in relation to the school environment (Choi, van Merriënboer, & Paas, 2014; Weinstein, 1979), investigating how the physical features of classrooms could enhance or interfere with learning processes. In contrast, **less attention has been given to similar issues regarding ECEC spaces designed for children from birth to school age and their families** (Amicone, Petruccelli, & Bonaiuto, 2017). This could be due to greater interest in the relationship between certain aspects of space and the academic outcomes or learning processes of children (Barrett, Davies, Zhang, & Barrett, 2017; Zandvliet & Broekhuizen, 2017).

Nevertheless, national and international policies demand more investment on the quality of physical spaces in early childhood to ensure the proper development of children (CDC: National Center for Chronic Disease Prevention and Health Promotion, 2016; OECD: Organization for economic cooperation and development, 2012).

The EDUCAS Project aims to create child and family friendly spaces in ECEC centres. To reach that goal, the first step is the production of a literature review to understand what has been said so far on the meanings of ECEC spaces for children from birth to school age.

AIM AND METHOD

Aim

The aim of the EDUCAS literature review is to **investigate the meanings of space in ECEC services for children from birth to school age**, by mapping, synthesizing and critically analysing the findings of studies carried out so far on this topic. Attention has been also put to the Educare approach and to the involvement of children and families in this discourse. The review was then conducted with three specific questions in mind:

- **how space can support children's development?**
- **how space can support an Educare approach?**
- **how space can support the inclusion of all children and families?**

The added value of EDUCAS literature review is the **inclusion of both scientific international peer-reviewed publications and local contributes published in national language of each country participating in EDUCAS project**: Italy, Belgium and Lithuania. The choice to include international peer-reviewed contributes has been done to have a wide look at contributions on the topic. Besides the exclusion of the local European literature could have led to an incomplete and unrepresentative framework of knowledge. Furthermore, the inclusion of peer-review papers guarantees the scientific look on the topic, while the inclusion of the local gray literature allows to deepen some specific experiences of the countries involved in EDUCAS and to take into account their perspective on space, often resulting from the concrete experience.

Based on these premises, the EDUCAS Literature Review analyses what has been said so far on the meanings of ECEC spaces for children from birth to school age. This effort is aimed to prompt **useful reflections and recommendations** for education professionals, researchers and policy makers, in order to create beautiful, functional and meaningful ECEC spaces to improve the wellbeing of all children and families, within an Educare approach. The main outcomes of the review will also help to orient the CPD paths in each country, according with the aims of EDUCAS project.

Methodology and Procedure

EDUCAS Literature Review includes two different types of contributes:

- international peer-reviewed publications
- local European publications from Italy, Belgium and Lithuania

A two-pronged approach was then used to search these contributes: the University of Parma (UniPR) searched the international literature¹, while contributing partners (VBJK, UIC, and ECEC centres involved in each country) searched local literature. The analyses of both these types of contributes were conducted with systematic procedures in order to select and screen relevant contributes to be included.

International publications

Search

To search international peer-reviewed publications, University of Parma has consulted the following databases: PsycINFO, Education Research Complete, and SCOPUS. PsycINFO and Education Research Complete were chosen as robust databases for psychological and educational research, in order to find publications in both fields. SCOPUS was included as the largest database of peer-reviewed literature in many fields (Elsevier, 2019), in order to reach the highest number of publications on the topic. Since attention to the role of physical space in educational settings first began in the '60s, the search included studies published from 1960 to 2018, in order to cover an extensive literature base.

The search terms were the following

About environment:

- Physical Environment

¹ An analysis conducted by UniPR on peer-reviewed publications has been recently published on *Educational and Psychology Review* (Berti, Cigala & Sharmahd, 2019)

- Architecture
- Design

About ECEC services:

- Early Childhood Education
- Child Care
- Day Care
- Preschool
- Kindergarten

Inclusion and exclusion criteria

The **inclusion criteria** were the following:

- only peer-reviewed publications were selected;
- studies had to be published in English, French, Spanish or Portuguese (main languages used in the world and known by the authors);
- studies had to refer to age-range from birth to school age;
- studies had to concern the physical environment of ECEC services, such as preschools, kindergartens, childcare centers;
- studies had to consider the physical environment as a variable.

In accordance with the aforementioned criteria, the **exclusion criteria** were the following:

- not peer-reviewed publications;
- studies published in languages other than English, French, Spanish, Italian or Portuguese;
- studies did not refer to age-range from birth to school age;
- studies did not concern the physical environment of ECEC services but other kinds of environments (e.g.: family, urban environment, biosphere environment...);
- studies did not consider physical environment as a variable

Furthermore, in line with the aims of the review, we excluded all the studies that:

- focused on the physical environment in relation to disabilities (e.g.: architectural barriers);
- limited their aim to the understanding of how the physical environment could increase physical activity in childhood with a view to preventing obesity;
- were aimed at assessing whether the services of a specific country complied with the quality standards defined by the Government of that country.

Data Extraction

Before the inclusion and exclusion criteria were applied, the initial search retrieved 246 articles from PsycINFO, 169 articles from Education Research Complete, and 406 from SCOPUS. After screening the abstracts of these papers against the inclusion and exclusion criteria, 92 studies were provided. After the elimination of duplicates, 64 studies remained. In addition, some other relevant studies were identified by going through the references of the selected documents and some of the main European studies which give the framework to EDUCAS project were included. Altogether, **91 international studies were selected**.

The main information of the studies were annotated in a systematic grid that allowed to extract information relevant for the analysis and to organize them on the basis of descriptive characteristics: authors, year of publication, country of data collection, type of publication (empirical studies, theoretical articles, etc.), type of ECEC service, range of children's age considered, aims, methods and main findings.

Local publications

Search

To search local publications, each participant country has consulted its local literature on the topic. All three research centers (UniPR, VBJK, UIC) and the ECEC centers involved in the EDUCAS Project were involved in the literature search. Each partner could find any kind of publications (academic papers, research reports, grey literature, and theoretical articles) by consulting any kind of sources (online databases, books, journals, internal documentation of ECEC centres).

The search terms were the following

About environment:

- Physical Environment

- Space
- Materials
- Outdoor
- Indoor

About ECEC services:

- Early Childhood Education
- Child Care
- Day Care
- Preschool
- Kindergarten

About EduCare:

- Education
- Care

Data Extraction

On the basis of the aforementioned criteria, Italy provided 26 publications, Belgium provided 24 publications and Lithuania provided 25 publications. **In total 75 publications were provided.** Each publication found was coded and the main information was summarized by each partner on a prepared grid that allowed to extract information relevant for the analysis and to organize them on the basis of descriptive characteristics: title, authors, year, type of publication, source, abstract or summary, aims of the document, age of children, focus on (which aspects), which aspects of space, which perspectives, which methods, main findings, images, notes.

Final procedures for both international and local publications

Mapping Results

The mapping results were derived from the analysis of the descriptive characteristics of each selected publication. They focus on: geographical distribution, temporal distribution and characteristics of the studies.

Narrative Findings

The narrative findings discuss the main contents emerged from an in-depth analysis of the studies.

Key recommendation

Starting from reflections derived by the findings of the literature review, implications for practice are discussed and some key recommendations are provided, to orient education professionals, researchers and policy makers on space issues in ECEC centers and its connection with an educare approach.

Template used for the mapping of the literature



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Document Code

<i>Title</i>	
<i>Authors</i>	
<i>Year</i>	
<i>Type of publication</i>	
<i>Source</i>	
<i>Abstract or Summary</i>	
<i>Aims of the document</i>	
<i>Age of children</i>	
<i>Focus on (which aspects)</i>	
<i>Which aspects of space</i>	
<i>Which perspectives</i>	
<i>Which methods</i>	
<i>Main findings</i>	
<i>Images</i>	
<i>Notes</i>	

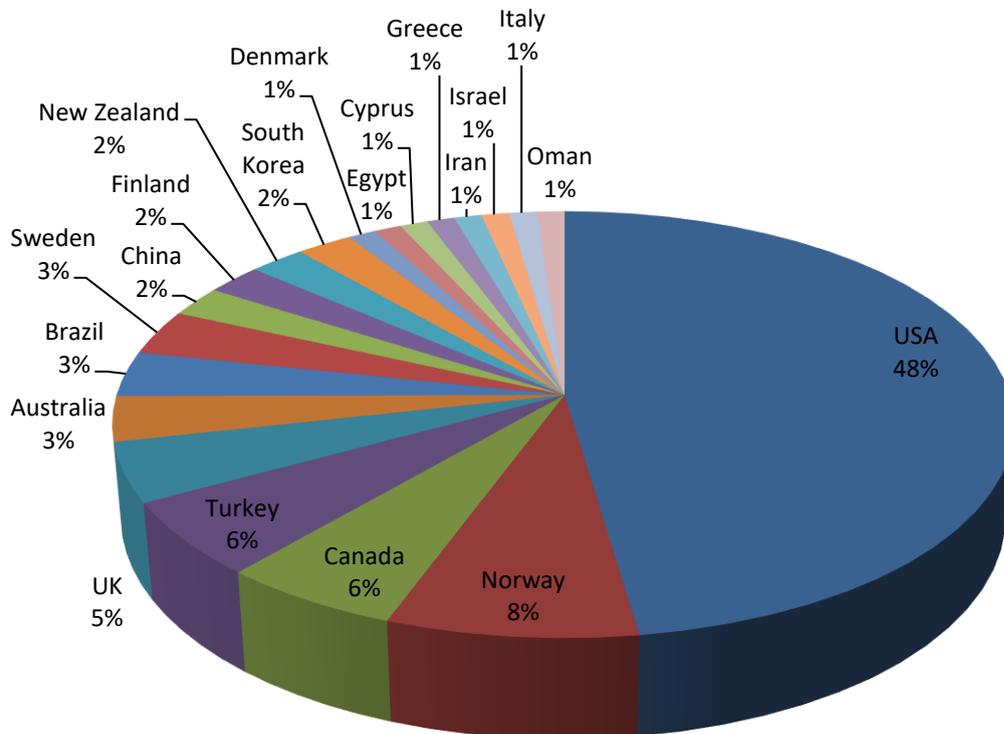
MAPPING RESULTS

Mapping results provide an overview of the general characteristics of the studies included, focusing on geographical distribution, temporal distribution and characteristics of the studies.

Geographical distribution

Most of the **international publications** examined are from the United States: 42 studies (47.7% of the papers included); 7 (7.9%) from Norway; 5 (5.7%) from Canada and Turkey; 4 (4.5%) from the United Kingdom; 3 (3.42%) from Australia, Brazil and Sweden, 2 (2.3%) from China, Finland, New Zealand and South Korea and one study (1.13%) from each of the following countries: Denmark, Egypt, Cyprus, Greece, Iran, Israel, Italy, Oman. Some of these studies involved other countries in their data collections: India, Indonesia and South Africa.

In relation to **local publications**, Italy, Belgium and Lithuania provided literature from their country. In addition to Flemish studies, Belgium included 9 studies from the Netherlands (37,5% of the documents provided), because of the same language.



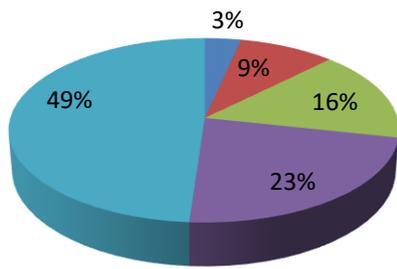
Geographical distribution of the international studies

Temporal distribution

The selected **international publications** were published from 1974 to 2018, showing a slow but constant increase over time: 3 studies were published from 1974 to 1980 (3.4% of the papers included); 8 studies from 1981 to 1990 (9.1%); 14 studies from 1991 to 2000 (15.9%); 20 studies from 2001 to 2010 (22.7%) and 43 studies from 2011 to 2018 (48.9%).

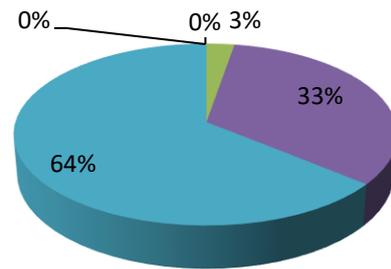
The selected **local publications** were published from 1997 to 2019, with only 2 studies published before 2000 (2,67%), 25 studies from 2001 to 2010 (33,3%) and a prevalence of studies of the last ten years, from 2011 to 2019 (64%), with similar distribution in the three countries.

■ 1974-1980 ■ 1981-1990 ■ 1991-2000
 ■ 2011-2010 ■ 2011-2018



Temporal distribution of the International Studies

■ 1974-1980 ■ 1981-1990 ■ 1991-2000
 ■ 2011-2010 ■ 2011-2018



Temporal distribution of the Local Studies

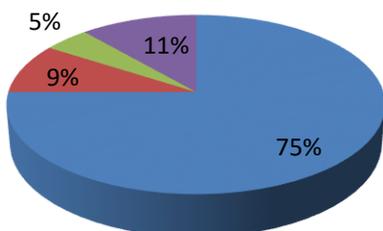
Types of publications

Most of the selected **international publications** are empirical studies (75%), 8 are reviews (9,1%), 4 theoretical articles (4,5%), and 10 case studies (11,4%): of the latter, four are action-researches and two are comparative analyses of three different case studies.

In relation to **local publications**, Italy provided 5 books, 5 internal documents from services, 1 conference report and 15 articles from reviews belonging to the Italian gray literature on infancy. Belgium provided 1 book, 2 research report, 3 thesis, 3 brochure, and 15 articles from reviews belonging to the Belgian gray literature on infancy. Lithuania provided 5 books, 1 article, 1 film, 2 internal documents from services, 4 thesis, 2 documents from international projects and 10 official policy documents of Lithuanian government (e.g.: ministerial documents, municipality legislation...).

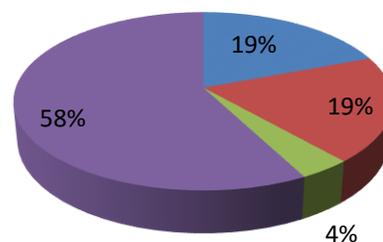
Characteristics of the international studies

■ Empirical studies
 ■ Reviews
 ■ Theoretical articles
 ■ Case studies

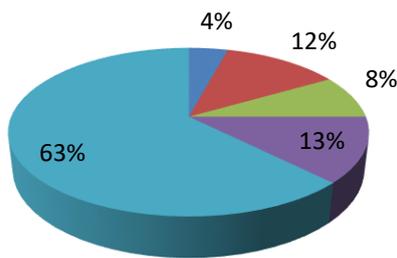


Characteristics of the Italian studies

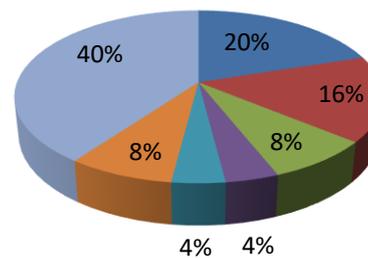
■ Books
 ■ Internal documentation
 ■ Conference report
 ■ Articles (gray literature)



Characteristics of the Belgian studies



Characteristics of the Lithuanian studies



Contents of the studies

Looking at the contents of the international studies from a temporal viewpoint, it should be noted that, **at the beginning, the focus was primarily on the direct effects of the physical environment on child development**: most of the studies from '70s to the '90s aimed at evaluating how **specific aspects** of the physical environment, such as crowding, open-space distribution, complexity and play materials, could affect children's behavior. From the '90s onwards, some studies began to investigate **children's perception** of space and emotion-related topics, such as their search for intimacy, sense of competence, emotional mood. After 2000, some studies also began to investigate **adults' perception**, trying to understand how educational spaces are used by educators, chosen by parents and designed by architects. During these years, a growing interest in the impact of the **outdoor environment and nature play** also emerged. The first action-researches related to the **co-participatory design** of ECEC spaces, which involved educators, children and sometimes parents, were conducted after 2010: they were interested in understanding the needs and expectations of participants, the dynamics of the design processes and the communication gap between different professional mentalities and between designers and users.

The brief time lapse of publication of the European studies doesn't allow to analyze the contents from a temporal viewpoint, but it is interesting to note which idea of space emerges from the local literature. Each country actually gives attention to specific aspects and reflections on the physical environment, letting emerge its vision about the meanings of space in ECEC centres: here below are briefly summarized some of the main concepts.

- Italy: Space should be considered a **relational space**: a dimension which should support affectivity, positive relationship and education. Space is **co-constructed through relations**: all the actors involved co-create meanings through materials and physical elements of the environment. Space should be **thought and adapted** in coherence the pedagogical vision of the centre and children should be educated to take care of it. Space should be child-centered and **support the development** of all children. Space should be **subject of reflection for educational** staff through concrete experiences. Space includes an important **communicative dimension** which allows to keep in touch the internal world of the services and the external world. Space should enhance the **participation of families and community**; co-design experiences can facilitate this process.
- Belgium: Space should support the development of a **“rich and competent child”**, by allowing autonomy and meeting the needs of all children. Space contributes to define the quality of a service and for this reason it should be **coherent with the pedagogical vision** of the ECEC centre. Space can enhance the **involvement of families** and the relationship staff-families, through devices as the

family wall (very used in Belgium) and the pedagogical documentation (still not much developed in the country). **Outdoor space should be a thought place** with different offers and the possibility of risks and adventures, to support motor development as well as children's autonomy and self-esteem. Space can support the **educare approach**: it should be organized and adapted in order to help children live "caring moments" in an autonomous and pleasant way, underlying the learning-socio-emotional experience of the "caring moments". Recent research shows a clear hierarchy between care and education in ECEC services in Belgium (FL), which is also emphasized by the presence of ECEC assistants that have mainly "caring tasks".

- Lithuania: Space should be **child-centered**, with opportunities for children to play actively, make choices and take responsibility. Space should be enriched with a variety of educational environments to **meet the changing needs and abilities of all children**. Special attention should be given to spatial aspects which can support the development of children with special needs. **The teaching team has a fundamental role** in creating the environment and transforming it into a kind of laboratory where children experiment many roles. Space needs **specific requirements** defined by the government to guarantee the proper establishment and maintenance of the preschool institutions. Space should be **welcoming, accessible and comfortable** and creates a sense of belonging, to enhance children's wellbeing and involvement of families.

Considerations about mapping results

Analyzing the geographical and temporal distribution of the international publications considered, it should be noted that there has been a **slow but constant increase over time and an ever-broader geographic distribution of studies on the issue**. The first research was conducted in the United States, where environmental psychology began (Mehrabian & Russell, 1974), then other countries started to show interest in the subject, particularly since the beginning of the 21st century. It should be noted that, dividing the years of publication into two equal parts, of the 19 studies published from 1974 to 1996 (first 22 years) 16 (84.2%) are from the United States (the other three are from Canada, New Zealand and the United Kingdom), while of the 69 studies from 1996 to 2018 (second 22 years), only 26 (37.7%) are from the United States.

In relation to local publications it should be noted that almost all the documents provided were published after 2000, 80% of them from 2009 to 2019. The thesis (bachelor's, master or PhD) were all drafted in the last five years, from 2014. This data suggest that **European local realities are recently paying attention to the spatial aspects of ECEC services**, considering them important for the proper development of children and putting a thought and a reflection on them.

Although all the three countries underline the importance of some issues, as a child-center approach, the thought of educators on space and the potential of outdoor environment, some differences emerged between the main stressed topics in the three countries. Concerning the specific spatial aspects considered:

- Italian studies underline the **relational aspect of space** and report many real experiences of transformation and co-construction of space in the services. It emerges the idea of a generative space that changes and evolves, adapting to always new needs of those who inhabit it. Italian literature also focuses on the importance of the involvement of educational staff and families in **co-design processes and reflective practice** on space issues: publications describe a lot of experiences of co-participatory design and staff reflection on ECEC environment.
- Belgian studies stress the overlap between education and care in many moments and spaces of the services, suggesting the need for an **Educare approach**, rather than a net division between the two, in terms of spaces, practices, and professional staff. Recent research shows that Belgian (FL) ECEC centers don't always work within an educare approach, and that actually education and care are perceived as split in a hierarchic way. This is mainly due to the meaning historically given to ECEC centers, and to the structural conditions of the ECEC system in Belgium (low staff qualifications, lack of involvement of assistants in CPD paths together with core practitioners, lack of childfree hours to reflect on practice, lack of pedagogical coordination etc.). Almost all the included studies from the Netherlands highlight the **potential of outdoor spaces**, underlining the importance of play in nature and possibilities for risks and adventures.
- Lithuanian studies show a significant **interest of the government** on spatial issues, with the production of many documents, recommendations, methodological tools and orders to provide

indications for education professional and designers. Lithuanian literature also pay attention to **space as a dimension to enhance inclusion**, in terms of promotion of equal opportunities for all children and participation of parents and communities.

Looking at the international studies, the trend of the contents provides a long-term view of how space research in educational contexts has been developed: **a progressive shift of attention was seen from a static vision of the relation between ECEC spaces and children's development to a processual understanding of the dynamics involved in designing ECEC spaces**. The concept of physical environment itself has been developed: initially considered a passive container for educational actions, it has been studied more and more as a complex dynamic reality, in which perceptions and relations are fundamental. During this process, children's perceptions were first recognized as an important factor to be taken into consideration, then the adults' point of view began to become relevant and finally the inclusion of all the subjects involved in space and educational issues was encouraged.

Reflections on the co-construction of physical and relational spaces in ECEC services are discussed in some of the most recent studies included in the review: in addition to the action-researches on co-participatory design, some theoretical studies have been published. In particular, these studies focus on relational **meanings of space co-constructed by educators and children (and sometimes parents) jointly**, emphasizing the idea that the conformation of the physical environment can allow or deny actions, can convey messages and educational contents, can maintain or change particular interactive formats.

These reflections suggest that environmental issues should not be limited to understanding the direct influence of the physical features of the environment on children's behavior, in terms of static dimensions which affect development, in a deterministic conception. Rather, **new conceptual frameworks should include the meanings given to space by both adults and children**, the joint actions to co-construct them and the interconnection between the physical and the psychological environment.

Since space is defined "**the third educator**", it should be considered as an entity with which to relate, rather than a mere container where education takes place. Since relational dynamics are involved, a perspective focused on the processes is more appropriate than a static one: it would be very interesting indeed to investigate how the space changes and develops over time, observing how the different subjects contribute to its development.

NARRATIVE FINDINGS

An in-depth analysis of the selected publications allowed to highlight some **main investigated thematic areas**, through which the contents of the studies were organized. These main areas are the following:

- Main factors of physical environment related to children's development
- Importance of a child-centered approach in design processes
- Importance of educators' awareness on environmental issues
- Importance of an Educare approach
- Educational potential of outdoor spaces
- Communication gap between educators and designers
- Participation of families and communities

Main factors of physical environment related to children's development

Taking into consideration the studies focusing on the specific characteristics of the physical space, some aspects were found to be transversally relevant to several studies. In particular, the analysis of these studies suggests that the ECEC physical environment, including both indoor and outdoor spaces, should be characterized by a child-scale design, variety and appropriateness of materials, spatial definition, cozy spaces, cleanliness and safety.

First of all, **health and safety** in physical environments are recognized as essential elements for appropriate child development (Aušrinė Preschool, 2019; Berris & Miller, 2011; Ministry of Health of the Republic of Lithuania, 2018) and seem to enhance positive caregiving behaviors. **Crowding** has been shown to affect behavioral as well as cognitive and emotional development: in crowded spaces, children seem to be engaged in more physical activity and more off-task behaviors during performance tasks, and seem to display more socio-emotional problems (Maxwell, 1996; Stern-Ellran, Zilcha-Mano, Sebba, & Binnun, 2016). **Variety and complexity** of spaces and play materials provide diverse opportunities for all children (Larson, Marks, & Land, 1990; Pro.Ges. Trento, 2016; Read, 1999; SERN coordination group, 2009; Vroom, 2016)] and have been found to be correlated with more exploratory behaviors, engagement and social interactions. At the same time, in order to be effective, complexity should be associated with a **clear spatial definition** (Acer, Gözen, Saadet Firat, Kefeli, & Aslan, 2016; Aušrinė Preschool, 2019; Gaviano, 2011; Penso, 2009): where unity and definition of thematic areas are consistent, children seem to show more continuity in play, more cooperation and to experience more positive emotions. In relation to the development of academic skills, the **presence and availability of adequate materials** (e.g.: the presence of books and writing materials for literacy skills) has been shown to positively improve the acquisition of these cognitive abilities. Concerning emotional development, the **presence of cozy spaces** seems to be important to meet children's need for privacy, withdrawal and intimacy (Friedmann & Thompson, 1995; Gaviano, 2011; Skånfors, Löfdahl, & Hägglund, 2009). The **communication between rooms and activity centres** stimulates children in experimenting, discovering and participating actively in their experiences, by letting them moving in the spaces in an autonomous way, choosing when to be out or inside, choosing when to change room, when to play in the symbolic corner, or when to paint (Hollander, 2007). Moreover, from the educators' point of view, an interesting aspect that emerged is that **communication between classes** (e.g.: with a door or a common toilet) let teachers experience less stress because they have the feeling they can help each other (van Liempd, 2005).

Outdoor spaces have been shown to be very important in children's experience of ECEC services: outside children seem to be engaged in more complex plays and more exploratory behavior, especially in natural environments (Cloward Drown, 2014; Shim, Herwig, & Shelley, 2001). In particular, starting from the analysis of the studies collected, optimal outdoor environments seem to be characterized by the presence of both natural and manufactured elements, the accessibility and definition of play areas and the provision of appropriate materials. In such places, free child-directed play seems to increase, enhancing choice-making, problem-solving, self-regulation and prosocial behavior (Brussoni, Ishikawa, Brunelle, & Herrington, 2017; Kochanowski & Carr, 2014; Zamani, 2016). Particularly in **natural environments**, the physical activity of children has been seen to increase and their motor skills improve (Chow & Louie, 2013; Fjortoft, 2001; True et al., 2017). Their knowledge of nature and their awareness of human-nature interdependence also seem to develop (Giusti, Stephan, & Lars, 2014). In addition, due to the amount of time spent outdoors during daycare, attentional processes seem to improve, while inattention and hyperactivity symptoms seem to decrease. The opportunity to take some risks in adventurous play outdoor is also seen as a positive factor for the development of motor skills, autonomy and self-esteem (Ciabotti, 2014; Wijffels & Veekamp, 2009).

Finally, a cross factor to the specific characteristic of the physical space it emerge to be the **coherence between provisions and pedagogical vision**: the quality of the environment seems to improve in spaces thought and organized coherently with the pedagogical aims of the ECEC centre (Børve & Børve, 2017; Cillani, 2015; Marazzi, 2015; Ministry of Education and Science of the Republic of Lithuania, 2005; van Liempd, 2005).

Importance of a child-centered approach in design processes

A child-centered environment is based on two core principles: children create their own knowledge from their experiences and interactions with the world around them; caregivers foster children's growth and development by building on the interests, needs, and strengths of the children (Szanton, 2001). Such environment meets the **needs and abilities of all children** (Center for Innovative Education, 2013) and promotes children's sense of community, children's exploration, learning and independence (Aušrinė Preschool, 2015, 2019; Hansen, Kaufmann, & Rothschild Stolberg, 1997). Some studies also underline how specific elements of the space, as pedagogical documentation or a multi-model design, can support the development of a "**rich and competent child**" (Hollander, 2007; Malavasi, Zoccatell, Boudry, Roelandt, & Gielen, 2013).

In relation to the perception of space, a relevant aspect that emerged from the literature review is that **children have personalized visions and preferences about places** (Durak, 2009; Marques & Sperb, 2013). In addition, it emerged that their vision and use of the physical environment is different from that of adults: **they seem to see spaces invisible to the adult eye**, perceiving imaginary places and reinterpreting the aims and uses of spaces designed for them (Kennedy, 1991; Rasmussen, 2004; Strong-Wilson & Ellis, 2014; Zamani, 2016). However, **when involved in design processes, children have shown a marked ability to detect the weaknesses and strengths of the physical environment**, being able to suggest coherent and creative solutions to improve the quality of the ECEC environment (Bers, Strawhacker, & Vizner, 2018; Botsoglou, Beazidou, Kouhioumtzidou, & Vlachou, 2017; Gaviano, 2011; Kind & Samenleving, 2017; Nah & Lee, 2016; van Liempd, 2005). In addition, it was noted that involving preschoolers in design processes could improve their ability to communicate and negotiate with adults, their initiative and active participation (Nah & Lee, 2016).

Since it has emerged that the physical environment contributes to children's wellbeing, and since children have demonstrated competence on environmental issues concerning their ECEC services, a child-centered approach is desirable during design processes. Results suggest that the **children's point of view should be taken into account** for several reasons: first, to meet the actual needs and preferences of children; second, to enhance their self-determination and autonomy; third, to give them a voice as competent players able to improve the environment in which they live. Furthermore, the involvement of children in design processes complies with the Child Centered Approach promoted by UNICEF (2018) which encourages the involvement and participation of children, in line with article 12 of the Convention on the Rights of the Child (The United Nations, 1989).

Importance of educators' awareness on environmental issues

In the process of the creation of a child-centered environment, **the role of the educational staff is fundamental**: the realization of educational spaces is influenced by educators' professional knowledge, their creativity and initiative (Børve & Børve, 2017; Burškaitiene & Vilkonis, 2010; Prochner, Cleghorn, & Green, 2008) The teaching team is responsible for creating the environment, inviting conversation, arousing curiosity, and observing the children so that activities can be adapted to meet their changing needs (Hansen et al., 1997). Teachers are responsible for transforming the environment into a kind of laboratory where children experiment with roles as explorers, artists, friends and scientists (Szanton, 2001).

In the perspective that identifies adults and children as co-constructors of the environmental context, it might be useful to improve adults' awareness regarding their use and perception of space. Some studies on this topic have suggested that sometimes educators could not be totally aware of their perceptions of space: sometimes their verbal declarations are in contrast with their effective practices, or sometimes they have been seen to experience a philosophy-reality conflict between intentions and possibilities in the use of space (Ihmeideh & Al-Qaryouti, 2016; Olivieri, 2016; Viliušienė, 2016). Studies on perceptions of outdoor play have also underlined how **educators' views and culture could affect the use of space**: for example, in some countries, the outdoor environment is used only in optimal weather conditions and normally only for free

play, where the role of adults is limited to supervising child-directed play (Ihmeideh & Al-Qaryouti, 2016; Kind & Samenleving, 2017; Maynard & Waters, 2007; Olivieri, 2016), while in other countries children spend a lot of time outdoors, and educators conduct specific educational activities in natural environments in all weather conditions (Kind & Samenleving, 2017; Parma Infanzia, Centro studi e ricerche per l'infanzia e l'adolescenza, & Pro.Ges., 2012). The **importance of educators' pedagogical views** on the use of space is in fact more evident comparing educational practices and physical environments in different parts of the world (Prochner et al., 2008).

In consideration of the above, educators' awareness might include various issues. First, the potential of educational spaces, both indoors and outdoors. Second, perceptions of space that can affect their educational actions. Third, the cultural context which can affect the vision and use of space. To attain these goals, the involvement of educators in **reflective practices on environmental issues** could be suggested, in order to prompt the emergence of implications and consequences relating to the use of space, enabling the educators to undertake a deep examination of their personal beliefs. Such practices involving **professionals from different pedagogical contexts**, employing different approaches would be of great benefit inasmuch as they would help broaden their vision and stimulate thought on new possibilities, and on the educational potential of the physical environment (Parma Infanzia et al., 2012; Pijl, 2009; Viliušienė, 2016).

The (missed) potential of outdoor spaces

Both local and international literature provide a lot of studies on the (often missed) opportunities given by outdoor spaces. Many articles show the **richness of playing outside and in nature** with young children (Ciabotti, 2014; Fjortoft, 2001; Hansen et al., 1997; Steffens, 2014a), also pointing out the importance of outdoor playing and 'risky'-adventurous playing for children to develop not only motor skills but also autonomy and self-esteem (Brussoni et al., 2017; Deman, Robberecht, & Stoffels, 2016; Leereveld, 2008; Steffens, 2014b). Learning environment outside the classroom also may teach children to be in harmony with the surrounding sociocultural and natural environment (Center for Innovative Education, 2013; Giusti et al., 2014; Pennisi, 2014). One Belgian publication (Kind & Samenleving, 2018) identifies **10 challenges of playing outside** which could be representative of the main findings of the other studies on the topic (some of them are similar also for the indoor playing): 1. Playing together, learning to deal with differences; 2. Looking for adventure and risk (children like to mix pleasure and fear); 3. Being creative, looking for alternatives, making mistakes and try again; 4. Finding own talents, passions, limits by supporting motivation; 5. Physical development, movement; 6. Creating a link with the community; 7. Creating a bond with nature; 8. Enriching positive experiences that influence self-esteem; 9. Developing freedom, having own rules; 10. Developing pleasure.

Outdoor spaces should give a diverse offer, concerning 'materials', playing possibilities. It seems that they do not need necessarily to be big, but **the space needs to be well thought out**. Outdoor educational environment should be an immersive environment for teaching and learning **from environment – through environment – in environment** on the basis of personal experiences (Burškaitienė, 2014). It also emerged the importance of the possibility of risks and adventurous play, to improve the development of motor skills, autonomy and self-esteem (Ciabotti, 2014; Wijffels & Veekamp, 2009). Parents should also be involved in this vision, so that they can better accept it if children come home dirty (Wijffels & Veekamp, 2009). Nevertheless, many countries still don't exploit all the potential of outdoor environment, don't feel that everything that can be learned and taught indoors can be done outdoors (Hansen et al., 1997). Educators seem to agree that educational activities are important for children education, but they often find adverse environmental conditions to carry on activities (Ihmeideh & Al-Qaryouti, 2016; Kind & Samenleving, 2017; McClintic & Petty, 2015; Olivieri, 2016; Viliušienė, 2016). ECEC centers seem to give more attention to activities carried on inside more than outside, sometimes not enhancing creativity and knowledge about what kind of activities can be done outdoors (Hansen et al., 1997; Jayasuriya, Williams, Edwards, & Tnadon, 2016; Maynard & Waters, 2007).

The meeting with other countries' realities can inspire new possibilities in the use of outdoor spaces (Parma Infanzia et al., 2012; Pijl, 2009). For example, in Flanders some ECEC centers are starting to adopt a very well used practice of Scandinavian countries: **sleeping outside**. Based on the fact that research shows that sleeping outside doesn't bring more risks of getting sick for children, and that it is actually healthier, this practice has been introduced and is realized by using special safe closed beds to place in the outdoor space (Pijl, 2009).

Importance of an Educare approach

Belgian literature highlights the need to **overcome the division between education and care** in the approach and management of ECEC centres.

Many research studies and reports underline how quality in ECEC should encompass a broad, holistic view on learning, caring, upbringing and social support for children, with specific attention to the fact that the concept of ‘care’ and ‘education’ are inter-twined: it is not possible to divide them or to see one as superior to the other (European Commission, 2018; Van Laere, Peeters, & Vandebroeck, 2012; Peeters, Sharmahd, & Budginaite, 2016; Vandebroeck, Urban, & Peeters, 2016). As pointed out also by the European Quality Framework (European Commission, 2014, 2018; UNESCO, 2010), the task of ECEC professionals, whatever their profile is, should be geared towards this holistic approach. In Belgium, as in many other EU countries, ECEC assistants are employed to work alongside the core teachers and are responsible for caring tasks and for looking after the children outside the classroom periods (during meals at midday, in the play-ground, during sleeping moments). Considering the debate about the ‘schoolification’ of the early years and the consequent priority that this perspective gives to the ‘cognitive’ aspects of education, different studies (Laere et al., 2012; Peeters et al., 2016) argue that the divided roles between assistants and core practitioners (in which assistants are seen as the ones that ‘take care’ and core practitioners as the ones that ‘educate’) might reinforce the division between care and education, which does not facilitate the holistic approach that we aim to embrace.

Belgian and international literature suggests to move towards a new integrated approach, namely “**Educare**”, which includes both educational and caring meanings during all practices in ECEC centres. In practice this should include a more thought collaboration between core teachers and practitioners, their involvement in common CPD paths to reflect on their practice together in order to work for the wellbeing of children and families. Considering more specifically ECEC spaces, all this means that (f.e.) the space where the children’s sleeping room is, the way and the location where it is built, as well as the location and organization of the toilet or the eating room, have the same importance than the way classes or playing rooms are organized. It means that high quality time and space should be given to all the spaces where children live their days in ECEC centers, which means giving importance to all the elements that contribute to their growth in a holistic way.

It is interesting that not many studies focus in an explicit way on the way ‘routines spaces’ (toilet, eating space, sleeping room...) should be organized. There are studies that emphasizes the importance of cozy familiar spaces and of the outdoor, underlying the importance of taking into account emotional and caring needs, but still even the studies that underline this, don’t always explicit where the toilet or the sleeping room should be, implicitly still showing the general less attention given to these moments (and thus to a real educare approach).

Communication gap between educators and designers

Starting from the analysis of the studies collected, it emerged that **comparisons and joint reflections between designers and educational practitioners** are required to improve the quality of the educational environment, since the literature review highlighted that these two professionals seem to have **different perceptions and expectations** regarding ECEC design (Beacham, 2006). In addition, their **different technical languages** widen the communication gap, so an improvement in communication skills and a jargon-free style have turned out to be necessary (Beacham, 2006; Wachs, 1989). Some studies have shown that when communication works, the best design solutions also emerge. In specific terms, ECEC centers whose design processes were conducted by both architects and educators have gained higher scores in environmental ratings, and transmit greater wellbeing to the professionals who work in the buildings designed (Iwan & Poon, 2018).

Moreover, it emerged that **when the pedagogical vision of an ECEC centre is coherent with the way the building is made**, both parents and teachers give a high score to the quality of the building, while when the match vision-building is not there, the score are much lower. This show how important it is to take into account the vision of the ECEC centre when building and organizing the space (van Liempd, 2005).

These findings **encourage education and design professionals to collaborate** more closely during design processes and to work together in order to provide suitable spaces for child development. To ensure the effectiveness of such collaboration, it may be useful to clarify the specific jargon of the various professionals; in this sense, the presence of facilitators would be also important to render communication clearer and more fluid, at least in the initial phases.

Participation of families and communities

As shown by the literature review, few international studies took parents' perceptions into account; local studies seem to pay more attention to the involvement of families and communities. Some studies found that the **main aspects affecting parents' preferences** regarding ECEC services seem to be a "homey" atmosphere, the presence of stimulating contents, and the safety and existence of natural outdoor spaces (Berris & Miller, 2011; Gur, 2014; Read, 2003). Also important, in the parents' view, is the presence of front porches, serving as filters between the inside and outside where they can stand and meet other parents and families, and of transparent façades, through which they can see even when they are outside (Gur, 2014). In addition, some of the parents interviewed would like the ECEC services to be a hub for community integration, where the philosophy is that of looking after the whole family (Gur, 2014; Havu-Nuutinen & Niikko, 2014).

Looking at these results, it seems that parents would like to perceive ECEC services as something that is not separate from the other contexts of life but in constant communication with them. According to this point of view, the role of ECEC centers would be not only to take care of children, but also to **facilitate positive interactions between parents and professionals, families and the community**, where resources from different professionals could be shared. This implies that ECEC services should have the physical space to enable such relationships to develop, i.e. both large spaces for groups and smaller private spaces for delicate conversations. Such a vision is in line with European international policies, which encourage parental participation and involvement in ECEC centers (OECD: Organization for economic cooperation and development, 2012; OECD Organization for economic cooperation and development, 2006) and the development of integrated early childhood education systems (Gordon, Peeters, & Vandekerckhove, 2016). **A new concept of ECEC services as a hub for community already seems to be in the parents' mind** and is supported by international policies. It would be important to develop this idea and find ways to make it concrete.

Local studies highlight how **space can enhance the involvement of families and the relationship staff-families**, through devices as a family room (Hansen et al., 1997) or a family wall (Doeleman, 2005), by giving the possibility to borrow materials from the centre and organizing workshop and meetings (Hansen et al., 1997; Province of Parma & Pedagogic coordination of Parma, 2010) or the exposure of pedagogical documentation (Malavasi et al., 2013). In particular, **pedagogical documentation** supports two movements: towards the external world of the ECEC centre (communication to community, policy makers) and toward the internal world of the ECEC centre (to share experiences with families, to accompany children's development, to co-reflect in the team about what are we doing and why). In relation to space, pedagogical documentation 'gives words to the walls' through panels, pictures and other materials, explicating the identity of the ECEC centre and helping to make the space readable (Malavasi et al., 2013).

CONCLUSION AND KEY RECOMMENDATIONS

The overall analysis of the state of the art reveals points of reflection from which future conceptual and methodological orientations can be derived in order to prompt useful reflections for education professionals, researchers and policymakers.

Key recommendations for education professionals, researchers and policymakers

Taking into account the main findings emerging from the literature review, we summarize here the main recommendations for education professionals, researchers and policymakers:

- In designing and arranging ECEC environments, **the perspectives of all stakeholders should be considered**: designers, educators, parents and the children themselves. A co-participated design process could contribute to creating spaces suitable for the real needs of those inhabiting them. To ensure the effectiveness of such a partnership, the presence of facilitators would be preferable in order to ensure jargon-free communication.
- ECEC environments should be characterized by **some general features that help promote the healthy development of children**. They should be salubrious and safe, not chaotic or crowded, characterized by variety and complexity (a variety of materials and arrangements that encourage and facilitate play...) but with a clear spatial definition (legibility of space, clarity of thematic areas...); they should be equipped with materials suitable for the children's age and the proposed teaching objectives; they should have cozy spaces where children can withdraw and find privacy and intimacy, communicating rooms and activity areas; outdoor spaces should be characterized by a variety of elements, both natural and manufactured, designed to broaden the children's opportunities for play. It is also important that the organization of space is thought and coherent with the pedagogical vision of the ECEC centre.
- A **child-centered environment** should be built on the interests, needs, and strengths of all children, allowing them to create their own knowledge from the experiences and interactions with the world around. Such environment promotes children's abilities, sense of community, exploration, learning and independence, supporting the development of a **"rich and competent child"**.
- Since educators realize educational spaces according to their own professional knowledge, creativity and initiative, their awareness on environmental issues is fundamental. To facilitate such awareness, the involvement of educators in **reflective practices** on this topic could be helpful. The involvement of **professionals from different pedagogical contexts**, employing different approaches could provide an opportunity to broaden personal visions and stimulate thoughts on the educational potential of the physical environment.
- The **potential of outdoor spaces** should be exploited more, by reflecting on possible activities to be done outside, allowing children to take some "risks" in adventurous playing, also setting up the outdoors with different "areas" where children can experiment and explore. Such spaces need to be well thought to maximize the opportunities given to the children.
- The division between education and care in the approach and management of ECEC centres should be overcome, **moving toward an Educare approach**: a holistic approach in which education and care are inter-twinned. This should be reflected in the organization of space, as well as in the daily practices and in the staff qualification.
- In line with parents' expectations, the role of ECEC centers should not only be to take care of children, but also to facilitate **positive interaction between parents and professionals, families and the community**. In this perspective, **ECEC services should have physical spaces to facilitate the development of such relationships**, i.e. large spaces for groups and smaller spaces for private conversations, dedicated spaces for families and pedagogical documentation that helps the communication and interaction between the worlds inside and outside the services.
- With regard to research issues, **action-research in this field has proven to be an appropriate**

strategy. In particular, co-design processes which involved designers, educators, families and children showed interesting results, facilitating the advancement of knowledge on the topic and at the same time providing concrete improvements in ECEC environments.

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