Multidisciplinary Approach to Designing Space of Early Childhood Education Institutions as a Condition for High-Quality Education Process

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Abstract
The quality of education process in an early childhood education institution can be defined by several factors, including the creation of spatial environment. It has a significant impact on the children's learning and education perspectives, as well as on the possibilities of children engaging in various social interactions. The affirmation of the multidisciplinary approach in the process of designing spatial environment of an early childhood education institution requires networking and cooperation among experts in the fields of pedagogy and architecture. Teachers, educators, architects, designers, landscape architects and other profiles of experts invest a joint effort in the process of developing, shaping, and designing the facility of an early childhood education institution and its spatial features. Including the educational ideas into the architectural design of an early childhood education institution enables prevention and/or overcoming of the barriers that have a negative effect on the quality of the process of education. Sensitizing the architects to a better understanding of the child's perspective and the complex process of children's education has a particularly important role in this process. It enables us to design spatial conditions that reflect the contemporary understanding of the child and the time spent in early childhood education institutions in which free choice, activities, exploration, discovery, movement and initiative of the children, and self-organization of their activities take the central position. This paper discusses various options of networking and cooperation among the experts in the fields of pedagogy and architecture in the process of designing space.
of an early childhood education facility and the possibility of including the children themselves in this process.

**Key words:** architect; early childhood education; educator; multidisciplinary approach; spatial environment.

**Introduction**

Numerous authors (Curtis & Carter, 2003; Exley & Exley, 2007; Hertzberger, 2008; Miljak, 2009; and other authors) have described various possibilities of how a space in which children spend time may have impact on them, listing its diverse features. In an early childhood education institution, special importance is attached to the requirement that the space should be stimulating in order to enable children to perform various activities and to encourage the development of various aspects of the child’s holistic development. The majority of authors describe the stimulating environment as the one which appeals to the children, encourages them and gives them an incentive to engage in activities, at the same time making room for the affirmation of their intellectual, social and creative potential. At the same time, the authors emphasize the fact that spatial environment which is restrictive, deficient and which has not been designed while having pedagogical standards in mind, may inhibit the development of the child’s potential and the learning process in general. Olds (2000) offered an interesting contribution to the interpretation of this issue. He listed several so-called children's spatial needs, which include: a need for an environment which enables movement, a need for an environment which is pleasant, a need for an environment which promotes the acquisition of skills, as well as a need for an environment which enables certain gaining of control by children (regarding the freedom of choice, independence and object manipulation).

**Spatial Environment as a Factor Which Has an Impact on the Quality of the Early Childhood Education Institution**

The quality of the learning and education process of young children in an early childhood education institution depends to a great extent on the quality of its environment (Miljak, 2009). Many authors have pointed out the correlation between the learning environment and the depth and quality of the children's learning process (Brown, 2001; Desforges, 2001; Hewitt, 2006; etc). They have also pointed out that “The learning process is especially sensitive to the environment” (Desforges, 2001, p. 10); that “The learning process is a complex unit of many processes, and is under a strong influence of environment in which it takes place” (Brown, 2001, p. 34), and so on. Some of them have also stated that spatial organization of an education institution can also significantly determine the quality of social interactions among the children, but also the interactions between the children and the adults (Gandini, 1998; Malaguzzi, 1998;
Mathieson, 2005; and other authors). The spatial structure and organization should be designed in such a way that it promotes encounters, communication and interaction among the entities engaged in the learning process. It can be said that one of the most important criteria of the quality of space in an educational institution is the extent to which it provides opportunities for communication, that is, for social interactions among students (children) and teachers (preschool teachers). If the educational institution is in fact an early childhood education institution, Malaguzzi (1998) claims it should meet three basic requirements, which are: movement, independence and interaction. Movement is immanent to children in their early and preschool age and their activities, including those which facilitate the learning process. Independence presupposes the constant availability of and access to the materials which encourage development, promote learners’ autonomy and the emancipation of children, which are prominent educational objectives in contemporary early childhood education institutions. The space which promotes diverse forms of communication and interaction, as well as various forms of social grouping of children makes a direct contribution to the holistic development of children and their learning process, as a primarily social phenomenon.

It is evident from everything that has been mentioned above that the requirements for organizing a stimulating and encouraging spatial environment in an early childhood education facility are rooted in Piaget’s constructivist theory, according to which knowledge is self-constructed by the child (Piaget, as cited in Buggle, 2002), in the theory of social constructivism of Lev Vygotsky who claimed that knowledge is constructed in the process of social interaction (Vygotsky, as cited in Berk & Winsler, 1995), and in Gardner’s multiple intelligence theory (Gardner, 2005) which emphasizes the importance of accepting children’s various interests, abilities and learning styles.

“The space around us conditions how we feel, think and behave, and it dramatically affects the quality of our lives. Everything we do may be facilitated or aggravated by our spatial environment” (Greenman, as cited in Gandini, 1998, p. 169). That is why it is not surprising that the development of the contemporary early childhood education curriculum, which is a dynamic concept constantly being questioned and changed in the educational practice in order to enable the efficient support to the high quality of children’s, educators’ and parents’ living and learning conditions (Miljak, 2009; Rinaldi, 2006; Slunjski, 2011), begins with the studying and changing of spatial and social environment in an early childhood education institution.

**Different Perspectives in the Process of Understanding Space in an Early Childhood Education Institution**

Design, organisation and functionality of the early childhood education facility itself, and later its subsequent “pedagogical revival”, always presents the material version of the image that the adults have of the child (Malaguzzi, 1988), whatever that image
might be. The spatial structure of an early childhood education facility may reflect a deep understanding and appreciation of the child, but at the same time it may reflect a complete lack of understanding of the child and the basic conditions which should be met in order to enable him/her a quality life within this type of educational institution. In the latter, the children, during their most sensitive period of growing up, will have to face, on a daily basis, numerous problems arising from the adult-centric practice of a kindergarten they attend. This adult-centric practice encompasses the spatial environment organization as well.

The indicators of the quality of spatial and material environment in the contemporary early childhood education institution include: multiple functionality (environment which encourages children's engagement in various activities); stimulation and multisensory perception (environment abounding in a variety of materials, which provides an incentive to children to explore the world around them by employing various senses and which evokes fascination); flexibility (environment which is organised in such a way that it can be continuously reorganized in order to keep pace with the current needs and interests of children and adults, as well as the development of their activities); openness (environment which supports meetings, interaction and relationships); sustainability (environment in the construction of which environmentally-friendly and sustainable procedures and materials were applied and used). The environment which encompasses all the above mentioned features is responsive to various learning styles, as well to the needs and interests of children. In that way it creates a basis for the conducting of a quality educational process. As it is widely known, the quality of experience and the perspective of children's learning increase in proportion to the quality of environment in an early childhood education institution (Miljak, 2009).

However, understanding the way in which spatial environment of an early childhood education institution influences its (specific) user is difficult to achieve by using universal, generally applicable indicators, without determining or understanding the perspective of the user himself/herself. That is why it is necessary to understand the child and his/her perception of space in order to perform an effective organization and spatial and pedagogical design of the spatial environment in an early childhood education institution. It is even more relevant when we take into account the fact that the child’s perception of space differs to a great extent from that of an adult. For instance, adult perception is frequently directed towards discovering and/or achieving the practical function of space, while for children it is more relevant how that space “speaks” to them and how they can interact with it (Day, 2007). The actions of adults are often aimed at arriving at a final product, while children find the purpose of their activities (games and many other activities) in the process of engaging in them, enjoying them and taking part in them in their own, specific way. In that sense, as Day (2007) points out, the main distinction between the ways in which children and adults perceive space lies in the fact that for adults it has a predetermined function, while for children it is an abundant source of opportunities for action.
Child as a Co-constructor of Space in an Early Childhood Education Institution

In the process of designing and creating spatial environment in an early childhood education institution it is extremely important to gain insight into the perspective, that is, perception and experience of space by children as the key users of that space. The involvement of children in the decision-making process can be justified by the Convention on the Rights of the Child (2001) which guarantees to the child the right to freedom of expression of their own attitudes towards the issues which may affect them, according to their age and maturity. With respect to the limited capabilities of children to present verbally to the adults their perspective and ways of understanding, it is necessary to provide them with other modes of expression which will help them visualize their ideas and present them to others. This is the reason why it is not sufficient to ask children about their wishes only formally (sometimes only to make an impression that they are involved in the process) when an early childhood education facility is being built or reconstructed. Children are able to help adults understand a space in the facility and make it more functional. Even more, children are the only ones who can actually do that. They know from the “inside” all the advantages and flaws of the environment in which they spend their time on a daily basis, even when they are not able to describe them verbally. Bearing that in mind, Clark and Moss (2005a; 2005b) developed the so-called mosaic approach, which is based on listening to children actively and which includes a range of methods and techniques which enable children to express themselves better and more deeply. This again provides the adults with a better understanding of various problems which affect the quality of their lives. For example, the methods and techniques such as observation, guided tours, usage of cameras, creation of maps, construction of 3D models, etc. may help adults gain insight into the children’s way of perceiving the space around them. Some research that was conducted (Clark, 2005) and in which photographs, recordings and conversations were used, as well as 2D and 3D images of the existing space, explicitly showed that children can provide adults with useful feedback on how they perceive space (spatial atmosphere, its appeal), how they use it and to what extent it is available to them (the way in which this space is used, to what extent it is used, how obvious the hierarchy between its parts is, separate part of space for children and separate part of space for adults), what the meaning of objects in it is (toys, furniture, stimuli), which activities are performed in it (diverse opportunities for activities), which routines there are (establishing and maintaining specific spatial rituals of a certain child or a group of children), what the importance of private space is (sections of the whole space which children have turned into “their” space and in which they spend most of their time during the day), and in which parts of space they feel uncomfortable (certain negative feelings which children associate with certain parts of space caused by previous unpleasant experience). In addition to everything already mentioned, in this kind of appreciating and supportive
approach children are given feedback which shows them that they are being listened to and understood, and that their ideas and perspectives are appreciated and taken into consideration, which is pedagogically justified and desirable.

**A Symbiotic Relationship Between Pedagogical Vision and Architecture**

Lately, there has been a more and more obvious need for realising a multidisciplinary approach to creating spatial environment of an early childhood education institution, as well as for understanding the child’s perspective and the way in which the child perceives space. Regardless of whether the facility is being newly built or reconstructed, various stages of the process require active engagement of experts in different fields, such as pedagogues, teachers, educators, architects, designers, landscape architects and others. Each of the above mentioned experts could (should) make their contribution to the joint project with the knowledge of their field of expertise, investing effort in successful cooperation with experts in other fields, with the aim of successful accomplishment of the common aim. A need for cooperation between pedagogues and architects has arisen from the increasing awareness of the interrelationship of pedagogy and architecture (Nicholson, 2005). A connection between pedagogy and architecture, as Hertzberger pointed out (2008), enables the balance between the form and function, that is, the creation of the quality architectural structure which has been inspired and informed by education.

Therefore, it is not an exaggeration to say that the quality structure of an educational institution (including kindergartens) arises from the symbiotic relationship between pedagogical vision and architecture (Dudek, 2007). The practice of the construction of kindergartens in Zagreb and in some other cities in Croatia explicitly testifies to this: in some cases it illustrates the advantages of the cooperation between the experts in these two fields, while in some cases it illustrates an extremely difficult compensation for the consequences resulting from the lack of cooperation between them.

We conducted action research in the period from 2003 to 2010 in seven Croatian early childhood education institutions, and its results were published in scientific studies (Slunjski, 2006; 2011). They described in detail the impact that spatial organization and structure of an early childhood education institution may have on the quality of educational process that is taking place in it. Here we cannot provide the complete presentation of the above mentioned research, so we will highlight some conclusions we have reached, which are relevant to the topic of this paper. They are related to the disadvantages of spatial arrangement in early childhood education institutions which are a result of their unsuitable architectural design:

- Spatial structure and organization encourages a *culture of isolation and individualism* – that is, the architectural idea or the ground plan of an institution resembles an “egg carton” (Kinsler & Gamble, 2001). In spatial environment designed in this way the teachers are placed “behind the closed door”, together with “their” group of children, so children have no opportunity to get in contact with other members
of the institution with whom they could, were the circumstances different, plan their activities, solve mutual problems, and create conditions for professional reflection (Hargreaves, 1999; Hopkins, 2002). In addition to that, this kind of spatial arrangement provides children with minimum possibilities to interact and communicate with children from other groups, especially with children of different chronological age. Therefore, this kind of spatial environment aggravates the quality of educational process, depriving children of opportunities for gaining relevant social skills and experience.

- Space in an early childhood education institution is not properly used, that is, it is not sufficiently functional. The total area is to a small extent adapted to children and their activities; rather, it is to a large extent suitable for other purposes (insectarium, terrarium, large corridors with flowers, etc.) Due to this reason, a great number of children in educational institutions spend their time in limited space, which has a negative impact on the quality of the educational process itself.

- Spatial environment of an early childhood education institution does not invite parents and other social factors to cooperation – there is not enough suitably equipped space in which parents could cooperate with kindergarten teachers, which decreases the quality of work performed in the institution, since parents are a crucial factor for the quality educational process (Ljubetić, 2011; 2014).

- Inadequate size of early childhood education institutions – too large facilities aggravate the quality of the child’s education, since they inhibit the possibility for the child to develop his/her identity. For example, one of the more important features of the well-known and world renowned Reggio-kindergartens (Edwards et al., 1998; Rinaldi, 2006) is their modesty in size, which at first sight reflects the development of the child’s identity as the basic educational value. Too many groups in a kindergarten makes it difficult, or even impossible, for children to socialize and communicate with other children from various groups, and is also an obstacle to free movement of children throughout the facility.

- Unsuitable usage of glass surfaces in a facility – transparency of space in a facility may enable children to make contact with other children and groups of children in the same institution, which can be facilitated by using glass surfaces. However, mounting glass surfaces to inappropriate places (between corridors and toilets, using glass as the exterior wall of an institution, etc.) may breach the privacy of children and in that way reduce the quality of the educational process.

Cooperation with the experts in the field of pedagogy may help the architect to understand the nature of childhood spent in an early childhood education institution better, as well as the features of the contemporary kindergartens. Some of the examples which illustrate the possibilities of this kind of cooperation include the International Symposium “Hura-arhitektura”1 (Slunjski, 2009) and a seminar “Prostor koji odgaja”2
(“Space which educates”) (Slunjski, 2009), where experts in various fields had an opportunity to present their opinions and discuss various aspects of space and its implications for educational process.

At the level of a specific kindergarten this cooperation may be performed through multiple consultations in the form of workshops (3D models which educators create together with children and the architect), discussions (in which photographs of innovative kindergartens are used and serve as a basis for making sketches of ideas and design), etc. In that case, architect uses the agreed guidelines to make a 3D plan of the spatial arrangement, 2D design and a model of the future kindergarten, all of which are subject to changes after another round of consultations with pedagogues. This kind of cooperation between architects and pedagogues is the basis for the design and construction of an early childhood education institution which would justifiably be called “the third teacher” (Edwards et al., 1998). To illustrate this, below are presented several examples of cooperation between pedagogues and architects which has led to high quality spatial designs of kindergartens based on the thorough understanding of the child and appreciation of the contemporary educational aims (more on the topic can be found in Slunjski, 2011). In these kindergartens the very structure and organization of space, as well as the unity of educational process, reflect an appreciation of individual characteristics of children on the one hand, and enable a diversity of their activities and social interactions on the other hand (Picture 1).

Picture 1

Spatial structure and organization which resulted from the cooperation between architects and pedagogues

Multipurpose space in which children can isolate themselves if they wish, or space from which they can open to the rest of the facility and connect with it.

Glass surface which separates the children's toilet from the rest of the space has been mounted in such a way so that it does not invade children's privacy while using the toilet.

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1 3rd International Symposium ‘Hura arhitektura!’ was held as a part of the international programme “Architecture and Children”, 22nd – 25th April, 2009, at The Faculty of Architecture in Zagreb, and was organized by The Croatian Chamber of Architects and Civil Engineers (HKAIG).

2 11th “Days of Kindergartens in the City of Zagreb” were held on May 10, 2007 in Panorama Hotel, and were organized by the City Office for Education, Culture and Sports.
Conclusion

Spatial environment of an early childhood education institution has a direct impact on the quality of educational process, development of the child’s potential, the amount of social interaction and the entire learning process. The structure and organization of space should be designed in such a way that it encourages children to make contacts with other children, communicate and interact with them, and its purpose should be to help children develop their autonomy and emancipation. The indicators of the quality of spatial and material environment of the contemporary kindergarten are its functionality, stimulating effect on children, multisensory approach, flexibility, openness and sustainability. A thorough understanding of the child and his/her perception of space is an important precondition for a quality organization, formation and pedagogical design of the spatial environment in an early childhood education institution, for which the Mosaic approach might be used.

There is a pronounced need for applying a multidisciplinary approach while designing spatial environment in an early childhood education institution, which requires active engagement of experts in various fields, such as pedagogues, teachers, architects, designers, etc. Bringing pedagogy and architecture together makes room for the balance between the form and the function, that is, it enables achievement of a quality architectural work inspired and informed by education. Positive experiences of some Croatian kindergartens which have succeeded in achieving a high level of spatial quality due to the joint efforts invested by architects and pedagogues point to the fact that the era of the real connection of these two fields of expertise is yet to come.
References


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Multidisciplinarni pristup kreiranju prostora vrtića kao pretpostavka kvalitetnog odgojno-obrazovnog procesa

**Sažetak**

Kvalitetu odgojno-obrazovnog procesa u vrtiću određuje nekoliko čimbenika, među kojima i kreiranje prostornog okruženja. Ono znatno utječe na perspektivu učenja i odgoja djeteta, kao i na mogućnosti stupaanja djeteta u različite socijalne interakcije. Afirmacija multidisciplinarnog pristupa u procesu kreiranja prostornog okruženja vrtića iziskuje povezivanje i suradnju stručnjaka pedagoške i arhitektonske struke. Odgajatelj, pedagog, arhitekt, dizajner, krajobrazni arhitekt i drugi stručnjaci pristupaju zajedničkom osmišljavanju, oblikovanju i projektiranju građevine i njezine prostorne značajke. Oživljavanje pedagoških ideja u arhitektonskoj izvedbi prostora vrtića omogućuje preveniranje i nadvladavanje barijera koje djeluju nepovoljno na kvalitetu odgojno-obrazovnog procesa. Sensibiliziranje stručnjaka arhitektonske struke za bolje razumijevanje perspektive djeteta, kao i složenog procesa njegova odgoja i učenja, u tom procesu ima posebno važnu ulogu. Ono omogućuje dizajniranje prostornih uvjeta koji odražavaju suvremeno shvaćanje djeteta i institucijskog djetinjstva, u čijem su središtu slobodan izbor, aktivnost, istraživanje, otkrivanje, kretanje, inicijativa djeteta i samoorganizacija njegovih aktivnosti. U radu se raspravlja o različitim mogućnostima povezivanja i suradnje stručnjaka pedagoškog i arhitektonskog profila u procesu oblikovanja prostora vrtića i mogućnostima uključivanja djeteta u taj proces.

**Ključne riječi:** arhitekt; multidisciplinarni pristup; pedagog; prostorno okruženje; rani odgoj i obrazovanje.