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Humanization of the urban environment for children (on example of the residential yards in city of Vladivostok)

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Abstract. This study is due to the need to develop principles for the humanization of the living environment in the housing of the city of Vladivostok, contributing to the socialization of children in a contemporary city and to reduce the anthropogenic impact of the urban environment on them. The following research methods were used in the work: systematization of theoretical and practical sources - Russian and foreign scientific publications and real examples of children's playgrounds; observation and behavioral mapping, photo-fixation, description of functional and aesthetic characteristics; analysis of requirements of normative and technical documentation and requirements for taking into account climate and terrain conditions, experimental design method. The results of the study were: criteria for evaluating the playgrounds for determining the degree of children socialization in the urban environment and the level of comfort of the residential yards; the principles for the humanization of outdoors spaces for children as a means of achieving a comfortable and educational environment for children in the conditions of the city of Vladivostok. The pilot project showed the effectiveness of the basic principles of the humanization of the urban environment for children proposed by the authors.

Keywords. Landscape architecture, urban environment, residential yards, humanization, children's play space, playground.

1 Introduction

The relevance of the study is determined by the need to create a comfortable, safe and educational residential environment in modern urban space. "Humanization of the urban environment is the central problem of the modern stage of Russian architecture because the current environment is characterized by shortcomings and contradictions" (Moor, Erysheva [1]). The urban environment, in particular, the residential yards, which are an important structural element of public open space (POS) network, has a significant impact on the development of children. Nevertheless, it is the organization of the courtyard spaces of Vladivostok that is most often not adapted to the needs of children. The purpose of the study is to develop the principles for the humanization of outdoor spaces for children as a means of achieving a comfortable and educational urban environment for children in the conditions of the city of Vladivostok.

The authors have collected, generalized and analyzed information from literary and Internet sources. The basic information on theoretical developments was obtained from Russian and foreign scientific journals, including those presented on the E-library portal and Elsevier's multidisciplinary ScienceDirect platform. The review of information sources revealed the state of scientific development of the problem. In this paper, the authors relied on the work of Russian and foreign authors who considered: questions of the psychosocial development of children (Erikson [2]); social foundations of the architectural formation of the environment (Kiyanenko [3], Levin & 2 more [4]); questions of the formation of various structural elements of public open spaces (POS) (Gehl [5, 6],



Maslovskaia [7]); spatial features of residential yards, as well as the identification of their level of comfort (Kopeva [8], Aleinikov [9], Strikauskas & 2 more [10], Pavlovskaia [11]); problems of playing spaces (Liik [12], Strikauskas & 2 more [13]); directions of increasing consumer properties of the living environment based on modern concepts of greening the environment (Vavilova [14]).

The Placemaking method is of particular interest (Jacobs, Whyte [15], Jeleński [16]. What is placemaking? [17]). It is a method for determining the comfort of urban space. This method is one of the most famous among foreign studies and is the “engine” with the help of which new urban public spaces around the world are formed.

The general and particular problems of the formation of an urban environment for children are considered in many Russian and foreign studies. The most numerous works consider playgrounds as an important source of physical activity for children and adolescents (Schneider, Bolbos & 2 more [18], Talarowski, Cohen & 2 more [19], Pluhar, Piko & 3 more [20], Boldemann, Blennow & 5 more [21], McBride [22], Sharp, Maguire & 6 more [23]). Some works assess of the gaming and social value of modern playgrounds (Liik [12], Czalczyńska-Podolska [24]).

“The natural world has long been associated with health and described as a therapeutic landscape, and a growing body of research demonstrates the benefits of interacting with nature for mental and physical health” (Beyer, Bizub & 5 more [25], Xing, Liu & 3 more [26], Wang, Woolley & 3 more [27], Lindemann-Matthies, Brieger [28], del Pulgar & 2 more [29], Khrapko & 2 more [30], Kopeva & 2 more [31], Kopeva, Ivanova [32]). S. Herrington and K. Studtmann [33] argue that arranging greenery and other landscape elements in playgrounds contributes to children’s social, emotional and cognitive development. M. Czalczyńska-Podolska [24] reveals that playgrounds possess considerable potential for child development. According to S. P. Dewi [34], playgrounds are essential in fulfilling the idea of creating a child-friendly city environment.

Some modern foreign studies demonstrate the successful experience of “active participation of children at every stage of the planning process, from the analysis-synthesis study and design-planning-implementation process to use and monitoring/control stage” (Özdemir [35], Costa, Batista & 2 more [36], Menconi, Grohmann [37]). The principle of designing interactive playgrounds aimed to ensure effective learning and the formation of various skills of children is described in the work of Z. Amouzegar, H. S. Naeini, and R. Jafari [38].

A significant number of authors studies the issues of creating a comfortable and safe environment in residential yards and playgrounds: creating a favorable microclimate (Olsen & 2 more [39], Vanos, Middel & 3 more [40], Teshnehdel, Mirnezami & 3 more [41], Ouala, K. El Harroun & 2 more [42]); providing conditions that prevent injuries (Fahlstedt & 2 more [43]); providing conditions for healthy activities without smoking (McIntosh & 2 more [44]); creating conditions that ensure “minimize the negative effects on children's neurodevelopment that we found to be associated with the exposure to air pollution” (Rivas, Querol & 2 more [45]).

The survey of contemporary literature shows the interest of modern scholars to the inclusive issues and the use of the principles of universal design on the playgrounds of a densely populated city (Ivanova & 2 more [46], Kopeva & 2 more [47], Ivanova & 2 more [48], Wai, Siu & 2 more [49]; Fornasari, Chittaro & 7 more [50]).

Despite a large number of works devoted to the formation of public open spaces and, in particular, the residential yards, there are no studies on the environment of residential yards to adapt it for children in Vladivostok.

2 Materials and methods

At the stage of collecting and studying the source data, the following methods were used. At the stage of determining the degree of knowledge of the problem, a method was used to systematize theoretical sources: Russian and foreign scientific publications, including journals presented on the E-library portal and Elsevier's multidisciplinary ScienceDirect platform. At the stage of analysis of Russian and foreign illustrative examples of experience in creating children's playgrounds, the emphasis was

placed on the typology of playgrounds, their educational function, and the search for semantic images of the environment.

At the pre-project stage of the study of district No. 89, an analysis of the existing children's activity, urban planning and natural-climatic analyzes of the district environment, and analysis of the state of the children's play environment were carried out. At the stage of assessing the condition of the playgrounds and determining the level of comfort of the residential yards, the following methods were used: observation and behavioral mapping, photo-fixation, description of functional and aesthetic characteristics. The condition of the territories was assessed based on the requirements of normative and technical documentation (SR (Set of Regulations) 31-115-2006 [51], SR 42.13330.2011 [52]).

Analysis of theoretical sources and real examples of children's playgrounds, map, and other source data, field analysis of the state of playgrounds and courtyards in Vladivostok served as the basis for determining the principles of the humanization of the urban environment for children as a means of achieving a humane, comfortable and educational urban environment of the city of Vladivostok. These principles, in turn, served as the basis for applying the method of experimental design and creating project proposals for the five types of the territories of District No. 89, united by pedestrian links into a single harmonious composition: spaces for communication and play for children of younger, middle and older age, places for sports and recreation.

3 Results

As a result of the research the disadvantages of the existing residential yards and children's playgrounds of the city of Vladivostok were identified. Those disadvantages became the basis for the formation of the principles of the urban environment humanization, as well as the main points that should be avoided when designing new territories. Eight principles have been developed for the humanization of the urban environment for children using the example of renovation of the residential yards of the city of Vladivostok. The renovation based on these principles is designed to optimize residential yards, make them 'points of attraction' for citizens and visitors, increase the overall level of comfort and well-being of the neighborhood, and create additional playgrounds with inclusive children's and sports equipment. The pilot project for the renovation of three depressive territories at district No. 89 of Vladivostok based on elaborated theoretical principles was developed. The practical value of the study lies in that these findings can be used in any Russian city. The study can be used in the educational process in the direction of Architecture. The project proposal, as well as materials collected about the developed territory, can be used in real practice of yards renovation.

4 Discussion

In order to determine the principles of the humanization of the Vladivostok urban environment for children, the analyzes of theoretical sources and real examples of children's playgrounds, analysis of map and other source data, field analysis of the state of playgrounds and residential yards of the city of Vladivostok were executed.

In accordance with the research of K. Liik [12], which divides children's play spaces into traditional, modern, adventure and creative, the types of existing and planned playgrounds were determined. Each type of playground is characterized by different age categories and the duration of the game on the playground, the skills that the playground develops, game and sports equipment that are used on it. The absence of adventure and creative types of playgrounds in the designed area predetermined the choice of the design solution.

Five aspects of child development highlighted in Erik Erikson's studies [2] were taken into account during designing functional processes and choosing playground equipment. These aspects are physical/motor and sensory development, perceptual, emotional, social, and intellectual development. To serve such multifunctional purposes a contemporary children's play space should not only be safe and comfortable but also be educational.

At the stage of analysis of domestic and foreign examples of experience in creating children's playgrounds, the emphasis was placed on the search for semantic images of the environment. The

analysis of examples of creative and adventure children's playgrounds showed that the common semantic images that exist in each of the analogs are: natural forms in geoplastics, bionic motifs in the structure of gaming equipment, as well as individual images that are characteristic of the unique environment.

Pre-project analysis of the children's play environment in Vladivostok. At this stage, the general and alternative data on the children's play environment of Vladivostok were examined. The level of comfort, the completeness of gaming and sports equipment following SR-31-115-2006 [51], the degree of popularity of various environmental objects were determined. By visualizing data from open cartographic sources, information on the total number of children's playgrounds in the city of Vladivostok was obtained, the most popular of them were identified, the playgrounds were systematized according to the territorial type of location - in the residential yards, in parks and green zones, near embankments, near public service places. The criteria for evaluating the effectiveness of playgrounds were data on the total number of children visiting the playground during the day, the number of children of different ages, the coefficient of parental interest, the number of activities held on the playground with the children, the time the children were on the playground, and the number of children injured during the games at the site. The most favorable, comfortable and frequented children's play spaces were sites located in parks and near embankments. Among the most dysfunctional playgrounds were the sites located in the residential yards and near public service areas.

Vladivostok district No. 89 was chosen as the territory for the experimental design of a humane children's environment. The total area of the district is 965 ha, the built-up area is 650 ha, and the landscaping area is 405 ha. The prerequisites for choosing this district are the presence of the main types of urban housing on its territory, the presence of a relief characteristic of the city of Vladivostok, the existing children's play environment that needs renovation. At the pre-project stage of the study of district No. 89, an analysis of the existing children's activity, urban planning and natural-climatic analyzes of the district environment, and analysis of the state of the children's play environment were carried out.

Urban planning analysis showed that the district has a developed road transport network. The buildings are mainly low-rise 2-3 floors, and of medium height 4-9 floors interspersed with buildings of 12 or more floors. The natural-climatic analysis of the territory of the district revealed that potential renovation sites are located at heights of 50 and 75 m above sea level; mainly on slopes from 5 to 15 % on the northern and north-western slopes and in conditions of moderate wind and insolation regimes.

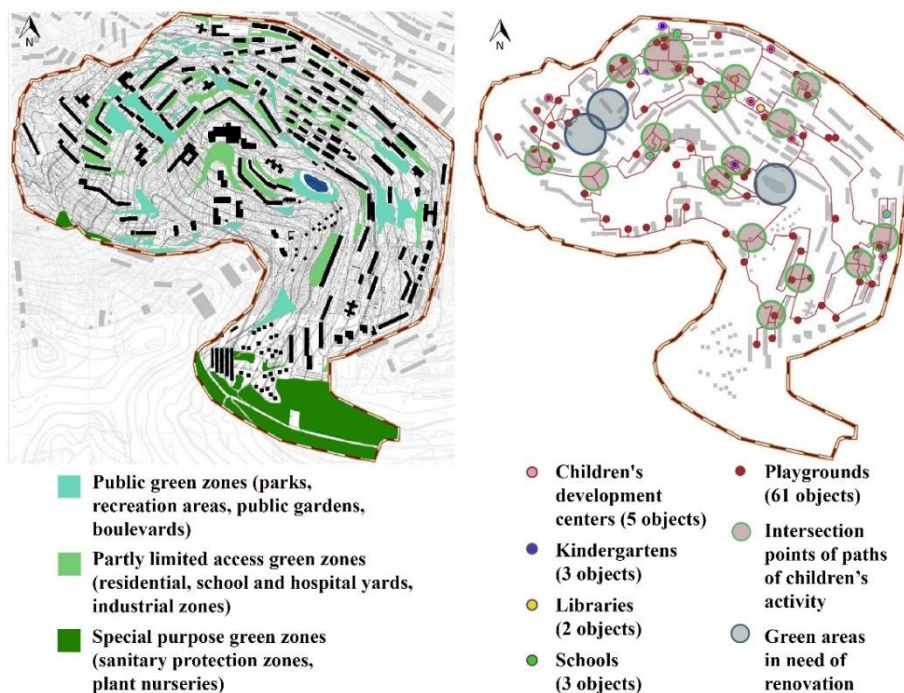


Figure 1. Outline of the existing green zones on the territory of the district № 89 in the city of Vladivostok

Figure 2. Outline of the existing children's activity on the territory of the district № 89 in the city of Vladivostok

Based on the analysis of the existing children's activity, the authors identified places in the district that could become the most popular among children. These territories were found by finding intersections between the main routes of children's movement (between 5 children's development centers, 3 kindergartens, 2 libraries, 3 schools) and secondary paths between residential yards (figure 1 and figure 2). 16 intersection nodes were found. An analysis of the territorial distribution of potential territories for renovation showed that 47 % of them are located in residential yards, 16 % are in green areas, 21 % are in kindergartens and schools, and 16 % are in depressed and abandoned areas.

As a result of the analysis of the zones distribution, the 5 most potential zones were selected for the renovation of the children's play environment. Mostly, they are located in the central part and represent the most attractive territories - parks, squares, territories with water bodies, residential yards. For the selected territories, an analysis of the functional content was carried out, which showed the inferiority and poverty of the images and infrastructure of the territories. Thus, the theory of the need for renovation of these potential nodes of the children's activities is confirmed.

The principles of humanization of the urban environment for children. The principles were formed from the totality of the main provisions of four studies on the level of comfort in the public open spaces: "12 qualities of a comfortable environment" (J. Gale [6]), the method of determining the level of comfort "Placemaking" (J. Jacobs, W. White and others [15, 16, 17]), a methodology for assessing the condition of residential yards on slopes based on requirements for taking climate and relief into account (by A. V. Kopyeva [8]), a distribution scheme of functional processes in the residential yards (according to S. V. Aleinikov [9]).

Based on the main provisions of the above methods, eight basic principles of the humanization of the urban environment for children were formed. These principles are effective architectural and planning organization of the yard space; functional fullness of the infrastructure of the house

environment; environmental sustainability and safety of structural elements; inclusive design; consideration of climatic factors in the design of children's play and recreational spaces; taking into account social and cultural factors in the design of children's play and recreational spaces; compositional correspondence of spatial structures; the artistic-figurative personality of the children's play area as part of the local area. These principles are implemented in experimental design proposals.

Experimental design. On the territory of the Vladivostok district No. 89, a design solution for the renovation of three objects was proposed: a space for communication and games for preschoolers, school-aged children and adolescent in a child's playground created instead of a car park; green space of the yard park; recreational and leisure space on the territory of the lake.

The authors gave design proposals for urban planning and architectural solution of these renovation sites, combined by pedestrian links into a single harmonious composition, taking into account the specifics of a particular place and taking into account the zoning of the territory of the city of Vladivostok. For these sites, design proposals have also been developed for gaming equipment, which is a bionic form resembling plant elements and having the following functional purpose: climbing; demarcation of space; skating and/or sliding and a combined function that combines all of the above.

The experimental projects for the creation of a children's play environment in the territory of district No. 89 of the city of Vladivostok are unique since all of their subsystems are combined in a holistic architectural solution designed for specific urban conditions.

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