Interior design of habilitation centers for young children

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Abstract. The development of young children’s habilitation system in Russia and habilitation centers and departments emergence requires architects to develop optimal interior solutions to ensure that the architectural environment meets the habilitation process requirements. The article discusses the principles of the architectural habilitation environment formation and the techniques for their implementation in the interior design of the habilitation centers. Formation recommendations on the interior design concepts, functional spaces zoning, color solutions, the choice of finishing materials, furniture, equipment and lighting are given.

Introduction
The number increase of infants with disabilities in recent years has led to the appearance of centers and departments for the children’s habilitation. Habilitation implies a complex medical, psychological and pedagogical support for young children (up to 3-4 years), aimed at minimizing the existing developmental disorders and the necessary skills and body functions formation.

Specially organized architectural environment is necessary to provide an effective assistance to the child. Let us call it “architectural habilitation environment” [1].

Today, many scientific studies are devoted to the interior design for young children or children with disabilities [2-4]. However, the applicability of the proposed interior decoration techniques for habilitation centers must be studied.

The purpose of this work is to identify the principles and techniques for creating interior design for children's habilitation centers, allowing forming an effective architectural habilitation environment taking into account the technology of training sessions, anthropometric, psychophysical, cognitive features of young children with developmental disabilities.

Formation principles of the architectural habilitation environment.
As a result of the investigations into the habilitation specifics and various factors affecting the architectural habilitation environment parameters, the basic principles of its formation were identified.

The planning flexibility and variability principle is determined by the individual approach in habilitation to each child: an individual selection of the lesson plan, auxiliary equipment and didactic materials. It is expressed in providing the ability to quickly change the room function, configuration and the subject-spatial environment adaptation for children, depending on the people who are present at the lesson, their psychophysical features, and the scenario of the classes.
The environment comfort principle for children and parents is due to the mandatory presence at the parent's habilitation classes. In the study spaces and recreational spaces, it is necessary to provide places for comfortable parents’ accommodation next to the child.

The principle of the environment accessibility taking into account children’s physical characteristics. In the interior, it is necessary to ensure accessibility for mobility impaired people, including parents with children in wheelchairs or in their arms, as well as young children themselves. Accessible environment for children is projected to be adjusted for their small stature and motion dynamics, different from the adult dynamics.

*The principle of the emotional environment with the characteristics of children’s sensory perception.* The architectural environment of the habilitation center should positively influence the psycho-emotional state of the children, give them diverse and changing impressions (be interesting), stimulate physical and mental activity, this environment property in pedagogy is called “emotiogenicity”.

The environment perception in children with developmental disabilities and without deviations is generally the same; therefore, it is advisable to take into account the existing recommendations on the architectural-spatial environment construction in preschool institutions for healthy children: the use of associative artistic images, alternating zones of activity and relaxation, etc. [4, 5]. The preschool children explore the world through sensory perception and play. According to psychologists, the best development is provided by toys that stimulate the child’s associative thinking and imagination, i.e. not realistically reproducing an object or phenomenon, but figuratively hinting at it. Sensory development stimulation is especially important for children with visual or hearing impairments. In this case, the enhanced development of other senses helps to compensate for the existing deficiencies in perception.

**Architectural and artistic techniques for designing the habilitation centers interiors**

Interior design is formed by such architectural means as composition, scale, color, lighting, textures and fibers of finishing materials, furniture and equipment.

At the first stage, when forming a design concept, it is necessary to determine by what means the desired emotionality, interior attractiveness for the child will be achieved, what artistic motive will combine all the interiors of the habitation center into a single architectural environment. The concept may consist in the choice of a mainstream associative image for children or a fairy tale. Associative shaping of the interior individual elements, for example, imitation of the natural or urban environment (stylized trees, lawns, clouds, streets, roads) stimulates cognitive functions in children (refer with Figure 1). Similarly, traditional color associations can be used (yellow - sun, green - grass, blue - sky) [1].

**Figure 1.** Construction example of a stylized street space (trees, houses, lawn) in the interior. Joplin Early Childhood Center, Joplin Missouri, USA, Hollis + Miller Architects, 2018. (Electronic resource: https://www.aiakc.org/award/joplin-early-childhood-center-interior-architecture-citation)

In the individual rooms interior, the concept can be defined by the presence of one of the most interesting interior element for the child (painting on the wall, playing corner, etc.).
At the stage of functional space zoning the most important are the principles of planning flexibility and variability of the architectural habilitation environment, as well as comfort for children and parents.

For young children it is recommended to change the activity type every 10-15 minutes. Thus, the child’s lessons with a specialist (psychologist, defectologist) with a duration of 30-40 minutes usually includes static games (on the floor or at the table), motor games (free space is needed), and relaxation sessions. To ensure the space versatility, it is necessary to provide flexible functional zoning, options for rapid movement and equipment transformation, a sufficient number of places for storing equipment and didactic aids. Gaming equipment should not create obstacles in the movement paths.

The most difficult task in the interior design of the habilitation centers is the adaptation of the architectural environment for children with different psycho-types. In recreational areas, it is recommended to provide both visually open spaces for group games and chamber spaces for the child’s privacy if necessary. The use of curved lines, rounded corners in the space plastic increases not only its physical safety, but also the psychological comfort level for the child, regardless of the deviations type (refer with Figure 2).

Figure 2. The use example of the streamlined curved lines in the interior plastic and from the walls white color as the main one with marking contrasting of individual elements. Family Box in Beijing, SAKO architects, 2013 (electronic resource: https://karmatrendz.wordpress.com/2014/11/03/family-box-in-beijing-by-sako-architects/)

In the study spaces and recreational spaces, it is necessary to provide places for comfortable parents’ accommodation (sofa or chairs, table, information boards).

There are currently no special sanitary norms and rules for habilitation centers. When choosing finishing materials, furniture and lighting devices, it is advisable to use the current requirement documents for preschool educational organizations (medical - for medical purposes).

Materials used in the interior decoration should be safe for health, comply with the required fire hazard category, and should be resistant to abrasion, deformation, shock, and wet cleaning.

For the ceilings finishing, it is recommended to use water-based paint on gypsum board or floor slabs, suspended panels made of aluminum and other materials similar to the fire resistance and environmental friendliness.

For walls, the best solution is painting or smooth decorative plaster. Separate walls fragments can be decorated with cork, soft panels, mirrors, photo wallpapers, and wooden panels.

Floor coverings should be smooth, non-slip, shock absorbing, without cracks and defects. The use of polyurethane or rubber coatings, flooring, parquet, linoleum, soft flooring or underfloor heating in outdoor play areas is recommended.

Coloring interiors for habilitation is directly related to the characteristics of psychology and visual perception in children (the emotionality principle). Numerous studies by scientists, neurologists and
psychologists prove that different colors differently affect the person’s vegetative and nervous systems. Red color has a stimulating effect, blue - calming, green promotes concentration. During habilitation, each particular child needs his own balance of excitatory or sedative stimulants. For example, children with autism spectrum disorder do not like subject matter overloading; they are tired of yellow color [6, 7].

In addition, psychologists have found that young children perceive only pure, simple bright colors (red, yellow, green, blue) well and poorly capture nuanced differences in shades and tones. The situation worsens if the child has a visual impairment, signs of color blindness.

Thus, the use of light neutral colors as the base (warm pastel shades of walls and large-sized furniture) with the inclusion of contrasting color accents ensuring the emotional environment is recommended in the habilitation centers interiors (refer with Figures 2,3) [7]. It is possible to use mobile color screens, curtains to temporarily change the interior color scheme.

Figure 3. Example of an interior solution with the walls white color as the main and contrast markings of individual elements. Lodève childcare center, Lodève, France, A + A Architects, 2015 (electronic resource https://www.e-architect.co.uk/france/lodeve-childcare-center-in-france).

Contrasting marking of doors, furniture, marking with color or texture of tactile beacons, movement paths is recommended. The highlighting of informationally important parts and traumatic items, preferably in warm saturated colors, because they are perceived better than the cold. The number of used contrast colors should be no more than 3-4.

Coloristic techniques can also emphasize functional room zoning (highlight areas of motion activity, relaxation, etc.).

The main furniture and equipment requirement for children is safety and ergonomics. The commensurate growth elements use creates a sense of security and self-worth in the child, making attendance more enjoyable. As examples of such elements, the doorways duplication with low doorways for children, the stairs arrangement with small steps, partially reduced wardrobe racks, and children's sanitary equipment in the bathrooms can be noted [1].

When choosing the furniture, preference should be given to transformable and lightly mobile models designed for children of different ages. Tables and chairs can be foldable, adjustable in height and configuration. Today, frameless furniture, soft game modules is gaining in popularity. All developing wall stands should be located at a comfortable height for children (60-100 cm from the floor).

Specialists use a wide range of didactic materials. Separate storage rooms or closed storage systems should be designed for them. Textbooks and toys on the open shelves distract children from school and creates "visual noise."
All study rooms for children should have natural light. Provision of uniform artificial illumination adjustable depending on the child’s vision level is of no small importance. As an additional illumination point and ribbon, illumination can be used, including color illumination. Lighting devices characteristics must meet the standards for preschool institutions.

Summary
The interior design of the habilitation centers must be created taking into account the principles of the architectural habilitation environment formation: planning flexibility and variability comfort for children and parents, accessibility and emotionality for children visiting the centers. Competent functional room zoning, coloristic that have a beneficial effect on the children’s psyche, safe and practical finishing materials, multifunctional furniture and gaming equipment that stimulate the child’s development play an important role in implementation of these principles.

The theoretical foundations of interior design for children’s habilitation based on interdisciplinary knowledge in the field of architecture, medicine, psychology, correctional pedagogy, hygiene. The study of this problem in architectural science should continue to develop in parallel with the development of habilitation technologies, and the results should be tested in practice.

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