

**THE NEED TO CREATE A SUITABLE ENVIRONMENTAL SETTING
FOR THE DEVELOPMENT AND SUPPORT OF CHILDREN WITH
AUTISM SPECTRUM DISORDERS IN THE REPUBLIC OF MOLDOVA**

NECESITATEA FORMĂRII UNUI CADRU DE MEDIU ADECVAT PENTRU
DEZVOLTAREA ȘI SPRIJINUL COPIILOR CU TULBURARE DE SPECTRU
AUTIST ÎN REPUBLICA MOLDOVA

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This study emphasizes the urgent need for specialized infrastructure for children with Autism Spectrum Disorder (ASD) in the Republic of Moldova. The article identifies the essential elements for creating specialized centers, including sensory design and color perception. Findings suggest that these centers should provide a calming environment with muted colors, controlled lighting, and functional spaces. The use of energy-efficient materials and technologies is recommended to ensure a comfortable and sustainable environment. The study highlights the importance of combining specialized design with professional expertise to enhance therapeutic outcomes and support social inclusion.

Keywords: *Autism Spectrum Disorder, specialized centers, interior design, sensory design, color scheme, ambient lighting, energy efficiency*

Acest studiu subliniază necesitatea urgentă a dezvoltării infrastructurii specializate pentru copiii cu tulburare de spectru autist (TSA) în Republica Moldova. Articolul identifică elementele esențiale pentru crearea centrelor specializate, inclusiv designul senzorial și percepția culorilor. Rezultatele indică faptul că aceste centre ar trebui să aibă un mediu calm, cu culori estompate, iluminat controlat și spații funcționale. Se recomandă utilizarea materialelor și tehnologiilor eficiente energetic pentru un mediu confortabil și sustenabil. Studiul evidențiază importanța combinării designului specializat cu expertiza profesională pentru a îmbunătăți rezultatele terapeutice și a sprijini incluziunea socială.

Cuvinte-cheie: *tulburare de spectru autist, centre specializate, design interior, design senzorial, gamă cromatică, iluminat ambiental, eficiență energetică*

Introduction

According to the WHO data, 1 in 160 children worldwide has Autism Spectrum Disorder (ASD). This highlights the growing need for the development of specialized infrastructure for children with autism. Children with ASD are often subjected to discrimination by their peers in public schools, and the situation in kindergartens is far from being ideal. Moreover, parents of children with Autism Spectrum Disorder are seeking more support from the government, as the costs of treatment and rehabilitation are substantial, states Maria König, director of the „Alegor” Correctional Center for Children with Developmental Difficulties in the capital [1].

Objectives. The purpose of this article is to emphasize the need for developing specialized infrastructure for children with Autism Spectrum Disorder (ASD) in the Republic of Moldova. As the country's education and healthcare institutions lack specialized centers and standards for working with these children, we propose the creation of appropriately equipped centers to provide qualified assistance to children with ASD. Additionally, the goal is to establish clear criteria for the set-up of these centers, including working methods, adapted interior design, and the use of energy-efficient materials.

Methods. The study developed recommendations for creating an optimal environment for children with Autism Spectrum Disorder (ASD). It began with a literature review on autism,

color perception, and comfortable space design, followed by empirical research on color preferences among children with autism. Expert consultations further refined the methods, and the collected data was synthesized to create a color palette and design recommendations for specialized centers, ensuring the process was systematic and evidence-based.

Results of the Study. The results of this article indicate that specialized centers for assisting children with Autism Spectrum Disorder should feature a tailored interior designed for the comfort and convenience of these children. This includes using muted colors, providing designated areas for breaks and the expression of aggression, installing indirect lighting, and avoiding long corridors. The primary goal is to create a safe and calming environment to effectively work with children with ASD. The study found that children with autism often perceive colors with greater intensity, showing a preference for pale pink, blue, and green, while red can cause excitement. Recommendations include employing a monochromatic color scheme with limited bright colors and creating a comfortable environment that takes into account the individual preferences of each child with autism. Thermally and acoustically well-insulated windows, as well as adjustable shading systems, are effective solutions for creating a comfortable space free from triggers for children. The development of specialized centers for children with Autism Spectrum Disorder (ASD) is essential to provide both therapeutic support and conducive to the learning environment.

Special characteristics of these centers: 1) the presence of qualified specialists in various fields, such as sensory integration specialists, ABA therapy, occupational therapy, kinesitherapy, and alternative communication; 2) special interior design solutions in these institutions to promote the harmonious development of a child with ASD.

The TEACCH methodology (*Teaching Children with Autism to Mind Read*) is based on the idea that adults should create a special environment for the child, removing all irritating factors to ensure a comfortable personal development [2], (**Figure 1**). An autism-friendly environment in the design of specialized centers [3] for children with special needs should necessarily include: *Special break areas* (safety zones). It is recommended to use the corridors or alcoves. Unoccupied rooms, small spaces under the stairs, corners, etc., can also serve as places for a „pause”, and the lighting should be dimmed. *Canopies at the entrance and partitions in the interior* help reduce the child’s anxiety as they soften the external environment. *Presence of windows*, strategically placed in walls and doors, reduce anxiety in children with ASD and give them the opportunity to reassure themselves that everything is fine and there is nothing to worry

about (**Figure 2**), and *Presence of „trial areas”*. The purpose of such areas is to create special spaces where children can practice and mentally prepare for specific activities in a safe environment, helping them to get ready for participation. *Presence of aggression expression zones* which can be equipped with items like a punching bag, where children can release their emotions in designated, safe areas. *Presence of a play area*, the play areas are equipped with various elements for developing balance and coordination, such as slides, ladders, swings, hammocks, weighted tunnels, balance boards, and stepping objects (**Figure 3**). For the development of fine motor skills, activities with water, sand, and pebbles are used, as well as tools such as tweezers, pipettes, and children's scissors.

Figure 1. Interior for children with ASD.



Source:
<https://www.dreamstime.com/biophilic-house-interior-biophilic-design>

Figure 2. Interior with panoramic windows.



Source:
<https://www.pinterest.com/pin/447686019224462332/>

Figure 3. Interior with a play area.



Source:
<https://www.pinterest.com/pin/399272323238248976/>

Figure 4. Interior in neutral shades.



Source:<https://i.pinimg.com/564x/de/2e/67/de2e6713781399763085b7fc96acb6bb6.jpg>

People with ASD often have problematic interactions with their environment. Several studies emphasize that altered sensory perception and the processing of information from the environment are some of the main challenges in ASD [4]. All children with Autism Spectrum Disorder are highly sensitive to even the slightest discomfort, which is why it is crucial that the interior design of specialized centers is carefully developed, free of irritants, and does not trigger negative reactions. Despite the many challenges people with autism or Autism Spectrum Disorders face, they are often better at focusing on details than neurotypical individuals [5]. Each child is unique and may have personal fears and triggers: loud noises, bright colors or lights, specific objects, etc. However, we will present criteria for an inclusive interior design of specialized centers for children with neurological challenges: 1) Muted, neutral shades for walls and furniture that create harmony and a connection to nature (**Figure 4**); 2) The presence of a visual schedule at the child's eye level. This can include cards or pictures showing the sequence of specific activities: lunch, a walk, sessions with educators, etc.

It is not recommended to clutter the space. Any visual noise creates triggers for a child with ASD. Children should have access to furniture and storage systems for intentional use. It is important to begin adapting children with developmental disabilities to everyday life as early as

possible [6]. Hence the rule: everything the child can use independently should be accessible to him. Low cabinets with easy-to-reach rails and drawers that open easily are recommended.

It is recommended to install indirect lighting, as children with sensory issues are very sensitive to light and bright or flickering lights can be triggering for them [7]. Reducing light levels is essential; for example, this can be achieved by using less bright bulbs with softer lighting. However, it is crucial to ensure that the lighting is not so dim that threatens the child's vision.

Long corridors should be avoided, as children with autism feel unsafe and uncomfortable in such spaces. Recommendations for creating a safe interior for these institutions: a) the furniture should be secured to the walls; b) all outlets should have covers, and wires should be hidden; c) it is recommended to install window locks; d) blinds and Roman shades with cords should be avoided due to documented cases of child strangulation. If fabric blinds are used, they should harmonize with the wall color. Linen, taupe, and soft gray are the best choices; e) only eco-friendly materials should be used: wood, non-toxic paints and varnishes, cotton, etc.; f) the furniture should have rounded edges. Next, we will examine in more detail the most suitable color schemes for the interior of specialized centers for children with ASD. In a test group of children with autism, 85% perceived colors with greater intensity than neurotypical children. Red is perceived by such children almost as fluorescent, extremely intense, and stimulating. Only 10% of autistic individuals perceive red as neurotypical children do, and only 5% see muted colors. This small percentage of children will find themselves alone in seeking bright colors, as they perceive all shades as gray.

Research shows that pale pink is one of the most preferred colors among children with autism. Cool tones like blue and green also have a calming effect. Green is a pain reliever, has hypnotic properties, lowers blood pressure, is beneficial for the heart and eyes, has antimicrobial properties, strengthens muscles, helps with insomnia and migraines, reduces irritability, and is conducive to concentration. Blue calms the pulse, lowers blood pressure, slows breathing, improves focus, and helps with concentration [8]. A monochromatic color scheme is recommended, and textile designs should not be bright or overly saturated. Bright colors should be limited to small toys that can be easily removed if necessary. According to V. Tevelev, head of the Psychotherapy department at the „Mazpen” clinic, „an autistic person may have a favorite color, but it should not be overly used in the interior” [9]. For example, if a child prefers the color yellow, the walls in their room can be painted in a cream or pale yellow shade, with only small details (pillows, stationery, some décor) left in bright yellow. The development of specialized centers for children with Autism Spectrum Disorder (ASD) must include both

qualified professionals and an interior design tailored to their sensory needs. Key elements of an autism-friendly environment include muted colors, accessible furniture, and controlled lighting to prevent triggers. By creating a calm, inclusive, and safe atmosphere, these centers can support the optimal development of children with ASD, promoting their well-being and integration into society.

Energy efficiency in ASD development spaces, materials and windows

One of the key aspects in the creation of specialized centers for children with Autism Spectrum Disorders (ASD) is the use of energy-efficient materials and technologies. This approach not only helps reduce operational costs but also creates a comfortable and safe environment for children with sensory sensitivities. The use of natural and eco-friendly materials, such as wood, hypoallergenic coatings, and fabrics, helps lower the risk of allergic reactions and ensures a safe environment. Additionally, these materials offer good thermal insulation, which aids in maintaining a stable indoor temperature, crucial for children with ASD, who may be sensitive to temperature fluctuations.

Special attention is also given to windows and lighting. High-performance windows with excellent thermal and sound insulation not only reduce heating and cooling costs but also create a more comfortable environment [10] for the children, protecting them from external noise and sudden changes in lighting, which can act as triggers. Installing windows with adjustable shading systems allows for the adaptation of natural light levels, fostering a calm atmosphere essential for children with heightened sensory sensitivity. Thus, energy-efficient solutions, through the selection of appropriate materials and technologies, play a vital role in creating a comfortable and safe environment for the development of children with ASD, while also promoting sustainable and eco-friendly resource use.

Conclusion

The conclusions of this article highlight the need for the development of specialized infrastructure for children with Autism Spectrum Disorder (ASD) in the Republic of Moldova, considering the challenges faced by parents in obtaining necessary treatment and rehabilitation support. To address the complex needs of these children, a multidimensional approach is imperative, integrating both adapted interior design and energy-efficient technologies. These architectural and technological solutions must be complemented by the involvement of qualified specialists in various therapeutic fields, thereby contributing to the development of a coherent and effective working methodology. A fundamental aspect is the creation of a safe and calming

environment, optimized from a sensory perspective, through the use of neutral colors, accessible furniture, and appropriate lighting that minimizes triggers for children with ASD. Therefore, the design of these centers must not only be aesthetic but also functional and therapeutic, supporting the harmonious development of the children. These measures are essential not only for improving accessibility and social inclusion for children with ASD but also for providing systematic support to their families, thus creating conditions for equitable social and educational integration.

Discussions

The conclusions of this article underscore the urgent need for a multidimensional approach to developing specialized centers for children with Autism Spectrum Disorder (ASD) in the Republic of Moldova. Addressing this need effectively requires integrating several critical elements: appropriate interior design, energy-efficient technologies, and the involvement of qualified specialists. A sensory-optimized environment, characterized by neutral colors, accessible furniture, and controlled lighting, is essential for fostering a supportive and therapeutic atmosphere conducive to the development of children with ASD. Future research should focus on several key areas to enhance the effectiveness of these centers. Firstly, material selection and sustainability must be investigated to understand how different building materials impact the sensory experiences of children with ASD. This includes studying the effectiveness of eco-friendly and hypoallergenic materials in creating a safe and comfortable environment. Secondly, exploring energy-efficient technologies in design is crucial for evaluating their impact on operational costs and comfort within specialized centers. Research should assess the performance of various energy-saving solutions in maintaining a stable and suitable indoor climate for children with sensory sensitivities.

Additionally, the sensory impact of interior design needs to be examined. This research should focus on how color schemes, spatial layouts, and textures influence the well-being and behavior of children with ASD, with the goal of optimizing these elements to minimize sensory triggers and promote a calming environment. Furniture design and accessibility also warrant investigation. Studies should analyze the effects of specialized furniture on the daily functioning and development of children with ASD, considering factors such as accessibility, safety features, and adaptability to meet diverse needs. Lighting solutions and their impact on sensory sensitivity should be explored as well. Research should evaluate how different lighting designs affect children with ASD, including the benefits of adjustable lighting systems and the use of indirect lighting to create a soothing environment. Finally, assessing the financial and organizational

models for establishing and maintaining these centers is essential. Research should identify cost-effective and sustainable solutions to ensure the accessibility and effectiveness of the specialized centers.

By addressing these areas, future studies can contribute to the development of more effective, inclusive, and sustainable environments for children with Autism Spectrum Disorder, ultimately supporting their optimal development and integration into society.

Confirmation

This article is the result of the scientific project, entitled: „Models, systems and technologies for energy efficiency, decarbonization and digitalization of processes in energy, industry, construction and transport” (acronym Mosited) for the years 2024-2027, with the cipher 02.04.06

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