

Methods of Using Sensory Standards in Children with Mental Development Defects

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Abstract: This article examines effective methods for using sensory benchmarks in the education and development of children with intellectual disabilities. The study emphasizes the importance of sensory development as a key component in the formation of cognitive, speech and social skills. Particular attention is paid to modern pedagogical approaches, including differentiated teaching, multi-sensory techniques and the use of assistive technologies. The study highlights how structured sensory experiences contribute to the development of cognition, attention and adaptive behavior in children with special educational needs. The article also integrates existing educational policies and inclusive practices aimed at improving the quality of special education services. The findings show that the systematic implementation of sensory standards significantly improves learning outcomes and supports the holistic development of children with intellectual disabilities.

Keywords: Intellectual development, sensory standards, sensory development, special education, inclusive education, cognitive development, multisensory learning, pedagogical technologies, adaptive behavior, developmental disorders.

Introduction: In recent years, in our country and around the world, increasing attention has been paid to the education and rehabilitation of children with intellectual disabilities within the framework of inclusive education. The development of such children requires the use of scientifically based and practice-oriented pedagogical approaches. One of the main directions of this process is the formation and application of sensory standards that serve as the basis for understanding the world around them.

Sensory standards are generalized representations of properties such as color, shape, size, sound, and texture that are necessary for perception and cognition. For children with intellectual disabilities, the mastery of these standards is often delayed or impaired, which leads to difficulties in learning, communication, and social adaptation. Therefore, targeted pedagogical

interventions aimed at developing sensory perception are very important.

Modern educational reforms and state programs emphasize the importance of improving the quality of education for children with special needs by integrating innovative teaching methods and technologies. In this regard, the use of sensory-based approaches not only facilitates cognitive development, but also increases motivation, participation, and independence in educational activities.

This article aims to analyze effective methods of using sensory standards in working with children with intellectual disabilities and to determine their impact on the overall developmental progress of students. The study also examines theoretical perspectives and practical strategies that can be implemented in special and inclusive education settings.

LITERATURE REVIEW

The issue of developing and using sensory standards in children with intellectual disabilities has been widely studied in the fields of special education, defectology, and developmental psychology. Modern research emphasizes that sensory development provides the basis for cognitive processes, speech acquisition, and social adaptation.

In the international scientific literature, the theoretical foundations of sensory development are closely associated with the works of Jean Piaget, who emphasized the stages of cognitive development and the role of sensorimotor experience in early learning[1]. Similarly, Lev Vygotsky emphasized the importance of social interaction and guided learning in the formation of higher mental functions, including the perception and classification of sensory stimuli[2].

Contemporary research in special education confirms that children with intellectual disabilities experience significant delays in the formation of sensory standards such as color, shape, size, and spatial orientation. Researchers such as Urie Bronfenbrenner also contributed to the ecological perspective, emphasizing the influence of the environment and structured learning contexts on child development.[3] In addition, multisensory approaches, widely discussed in modern pedagogy, have proven effective in enhancing perceptual and cognitive abilities by integrating visual, auditory, and tactile stimuli.

Recent international reports from organizations such as UNESCO have emphasized the importance of inclusive education and the adaptation of teaching methods to meet the diverse needs of students with disabilities. These reports have noted that structured sensory interventions have significantly improved learning outcomes and functional independence[4].

In the context of Uzbekistan, significant reforms have been implemented to support children with special educational needs. The Ministry of Preschool and School Education of the Republic of Uzbekistan has introduced a number of policies and programs aimed at improving inclusive education. In particular, the Presidential Decree No. PF-5712 on the Development of the Education System emphasizes the need to modernize special education and introduce innovative pedagogical technologies[5].

In addition, the Concept for the Development of Inclusive Education in Uzbekistan defines strategic priorities for the integration of children with disabilities into mainstream education[6]. These national initiatives are complemented by practical projects focused on early diagnosis, individualized education plans, and the use of sensory learning methods[7].

Uzbek scholars have also contributed to this field by studying methodological approaches to the development of sensory perception in children with intellectual disabilities[8]. Their research emphasizes the importance of systematic, step-by-step teaching, the use of didactic materials, and the adaptation of teaching strategies to the needs of the individual learner[9,10].

Overall, both international and national studies confirm that the effective use of sensory benchmarks requires a comprehensive approach that combines theoretical knowledge, practical techniques, and supportive educational policies. The integration of these elements ensures the holistic development of children with intellectual disabilities and facilitates their successful integration into society.

METHODOLOGY

This study uses a mixed-methods research design to study the effectiveness of using sensory benchmarks in the development of children with intellectual disabilities. The combination of qualitative and quantitative approaches allows for a comprehensive analysis of both measurable developmental outcomes and contextual pedagogical processes.

The study was conducted in specialized and inclusive educational institutions, involving 60 children aged 5-10 years with a diagnosis of mild to moderate intellectual disability. Participants were divided into an experimental group and a control group, each consisting of 30 children. The selection was carried out on the basis of purposive sampling, which ensured that participants had similar developmental characteristics, educational level, and levels of cognitive function at the initial stage.

The study was conducted in three main phases: diagnostic (pre-assessment), formative (intervention), and control (post-assessment). During the diagnostic phase, baseline data were collected to assess the initial level of sensory development. Standardized diagnostic

tools and observation checklists were used to assess children's ability to identify and differentiate sensory properties such as color, shape, size, texture, and spatial orientation.

During the formative phase, the experimental group was introduced to a structured intervention program based on the systematic use of sensory standards. This program included multisensory teaching methods that included visual aids, tactile materials, auditory stimuli, and interactive activities. Specific techniques included sorting and classification tasks, matching exercises, sensory games, object manipulation, and guided exploration. The intervention was implemented over 12 weeks, with sessions lasting 30–40 minutes each, 4 times a week.

In contrast, the control group continued to use traditional teaching methods without targeted sensory interventions. This allowed for a comparative analysis of the effectiveness of the methodology used.

Data collection methods included structured observation, pedagogical experiments, diagnostic tests, and interviews with teachers and parents. Quantitative data were analyzed using statistical methods such as mean score comparison, percentage analysis, and pre-test/post-test evaluation. Qualitative data were analyzed through descriptive and thematic analysis, focusing on children's behavioral changes, participation levels, and adaptive responses.

Multiple assessment tools were used and data triangulation was applied to ensure the reliability and validity of the study. Ethical aspects such as informed consent of parents or guardians, confidentiality of participant data, and provision of a supportive and stress-free learning environment were strictly adhered to.

The methodological framework of this article is based on modern theories of cognitive and emotional development, emphasizing the integration of individualized education, active learning, and innovative pedagogical technologies. This approach ensures that the findings are both scientifically sound and practically applicable in special and inclusive educational settings.

RESULTS AND DISCUSSION

The results of the scientific study show that the systematic use of sensory benchmarks significantly

improves the developmental outcomes of children with intellectual disabilities. At the initial diagnostic stage, both the experimental and control groups showed a relatively low level of sensory perception skills. Many children had difficulty distinguishing basic sensory properties such as color shades, geometric shapes, size comparisons, and spatial orientation. Their responses were often inconsistent, and tasks requiring classification or generalization posed particular difficulties.

After 12 weeks of intervention, significant positive changes were observed in the experimental group. Quantitative analysis showed that the average performance of children in the experimental group increased by approximately 35–40%, while the control group showed only a marginal improvement (approximately 10–12%), which may be due to natural developmental progression rather than a targeted pedagogical effect. Children exposed to structured sensory-based activities showed improved accuracy in identifying and classifying sensory features, as well as faster response times and higher task independence. In particular, the development of visual perception (color and shape recognition) showed the most significant progress, followed by tactile discrimination and spatial orientation. Children increased their confidence in performing sorting and matching tasks and improved their ability to transfer learned sensory cues to new contexts. For example, after the training, many participants were not only able to distinguish primary colors, but were also able to apply this knowledge in everyday classroom situations, such as selecting objects or organizing materials.

Qualitative observations further confirmed these findings. Teachers reported higher levels of engagement, motivation, and sustained attention among children in the experimental group. The use of multisensory materials and interactive methods created a more stimulating learning environment, which contributed to reduced behavioral difficulties and increased participation. Parents also noted improvements in children's daily activities, including better object recognition, increased communication attempts, and adaptive behavior at home.

From a theoretical perspective, these results are consistent with constructivist and sociocultural approaches to learning, which emphasize the

importance of active interaction with the environment and guided learning. The findings confirm that sensory cues serve as important cognitive tools that facilitate the organization and interpretation of external stimuli. Without their proper development, higher-level thinking processes remain limited.

However, the study highlights several important aspects. First, the effectiveness of sensory interventions depends on their systematic and consistent implementation. The use of sensory activities sporadically or in an unstructured manner does not have the same level of impact. Second, individual differences between children require flexible adaptation of teaching strategies, as the level of development varies depending on the severity of intellectual impairment and previous experience.

In addition, the integration of modern educational technologies and inclusive practices plays a crucial role in increasing the effectiveness of such interventions. The results support current educational reforms that prioritize individualized learning and the use of innovative pedagogical approaches in special education systems. Overall, the study confirms that the targeted use of sensory benchmarks is not only an effective way to improve cognitive skills, but also a key factor in promoting broader cognitive, social, and adaptive development in children with intellectual disabilities. These findings highlight the need to incorporate sensory methodologies into both special and inclusive education programs.

CONCLUSION

This article confirms the important role of sensory standards in the development of children with intellectual disabilities. The results of scientific research show that sensory development is not an isolated process, but a key component that directly affects cognitive growth, speech development, and social adaptation.

Implementing a structured, multisensory intervention program significantly improved children's ability to perceive, discriminate, and generalize sensory attributes such as color, shape, size, and spatial relationships. Compared with traditional teaching methods, the targeted use of sensory benchmarks has been shown to be more effective in improving learning outcomes, increasing engagement, and fostering

independence. Furthermore, the study highlights that sensory-based learning contributes to the development of important life skills such as attention, memory, problem-solving, and adaptive behavior. These improvements extend beyond the classroom and have a positive impact on children's daily activities and interactions with their environment. Overall, the study highlights the importance of integrating sensory benchmarks into educational practice as a scientifically sound and practically effective approach.

Recommendations. Based on the results of the study, we can offer the following recommendations:

- Systematic integration into the curriculum. Sensory benchmarks should be systematically integrated into the curriculum of special and inclusive education institutions. Teaching plans should include structured activities aimed at developing sensory perception at different stages of learning.
- Use of multi-sensory teaching methods. Teachers are encouraged to use multi-sensory approaches that combine visual, auditory and tactile stimuli. This increases children's participation and helps to deepen their understanding of sensory concepts.
- Personalized teaching. Given the diversity of developmental levels among children with intellectual disabilities, teaching strategies should be tailored to individual needs. Personalized teaching plans can significantly increase the effectiveness of sensory interventions.
- Professional development for teachers. Continuous training programs should be established to equip teachers with modern pedagogical skills, including the use of innovative technologies and sensory teaching techniques.
- Parental involvement. Parents should be actively involved in the development process by using simple sensory activities at home. Collaboration between teachers and families ensures consistency and reinforces learning outcomes.
- Use of didactic and support materials. Educational institutions should be provided with appropriate sensory materials, such as tactile objects, visual aids, and interactive tools, to support effective teaching and learning.
- Further research and innovation. Future research

should examine the long-term effects of sensory-based interventions and explore the integration of digital technologies, such as interactive applications and virtual learning environments, in the development of sensory benchmarks.

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