

Psychological and Pedagogical Technologies in Working with Children with Special Educational Needs: Neuropedagogical Aspect

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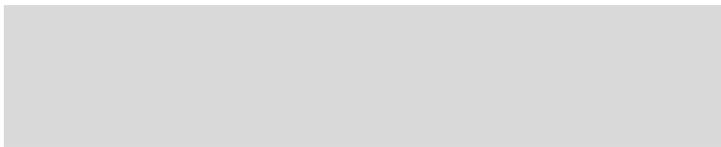
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Abstract: *The topic of the article is relevant, as the education of children with special needs (OOP) is one of the most pressing and debatable problems of modern education today. The issue of education of children with disabilities becomes relevant due to the significant increase in the number of this group in society, on the one hand, and emerging new opportunities for their adaptation in society, on the other hand. The purpose of the article is to study the functioning system of special education support centers in working with children with special educational needs; familiarization with requirements for psychological and educational support for the development of a child with disabilities; psychological and pedagogical neurotechnologies in working with children with special educational needs; presentation of effective psychological and pedagogical technologies in working with children with special educational needs. As a social group of society, the children must first of all receive real conditions for obtaining quality education, starting from school, and then for obtaining professional training with further employment and adaptation in society. Changes in the school education system could affect only the content of corrective and developmental education for children with disabilities.*

Keywords: *Inclusive education; construct of the educational environment; special education support centers; educational support of child development; modern neurotechnologies.*

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Introduction

The development of the personality of a child with developmental disabilities presupposes a certain construct of the educational environment. Inclusive education occupies a special place in the modern education system, as it involves the education and upbringing of children with special educational needs. As a part of all children subject to inclusive education, this group of children psychologically and pedagogically needs working approaches focused not only on overcoming secondary deviations as a result of primary organic damage, but also on in-depth individual intervention, directly related to the formation of skills for independent social functioning.

The conditions of work in a secondary school do not always provide the teacher with opportunities to develop his activities in the direction of overcoming pedagogical and psychological difficulties faced by a child with disabilities, both in the direction of learning the curriculum and in the direction of social learning. General and additional support provided for the development of their abilities and skills, as well as for their inclusion and participation in the preschool and school community, involves the development of the teacher's activity in the discourse of individual characteristics of children in this group.

In the works of domestic and foreign researchers, there are studies on the topic. In his scientific research (Ashytok, 2015) investigated functioning of special education support centers in working with children with special educational needs and described his vision of the functioning of special education support centers (based on foreign experience). Voloshina and Dmitrenko (2017) studied the experience of foreign scientists on this issue and presented requirements for the psychological and educational support of the development of a child with disabilities. The work of Raptis and Spanaki (2017), who presented psychological and pedagogical neurotechnologies in working with children with special educational needs, described their neuropedagogical value.

Functioning of special education support centers in working with children with special educational needs

Special education support centers for children with special educational needs (OOP) should be connected and interact with other institutions in the preschool and school education system with specialized institutions for children, social services in the community, parents, representatives of children or with guardians and with society.

Ashytok (2015) believed that in the organizational and functional plans, the focus of these centers is not only the work on the individual development of each child, but also the qualified pedagogical activity of a specialist working in institutions of this type.

The provided short-term and long-term support for a child with special educational needs is based on the activities of various specialists working in the Center for Special Educational Support. In order to cover the entire range of problems that arise in the process of teaching and raising children with disabilities, activities in these centers should be provided by various specialists working in a team. Moreover, their activity is not episodic (in the classroom twice a week), but covers all organizational moments of the day (Anishchuk, 2016).

For the purpose of optimizing the individual support of a child with special educational needs, depending on whether it is short-term or long-term, there are such specialists:

- coordinator, who conducts meetings of the coordination group and team members, specialists from various areas;
- special pedagogues;
- psychologists;
- speech therapists;
- rehabilitator (kinesitherapist);
- art therapist;
- social pedagogue.

The team develops a card for each child to assess their individual needs, marked according to the following parameters:

- support plan;
- individual training according to the plan;
- individual training programs for individual subjects;
- medical and rehabilitation programs.

At any moment, the implementation of this plan undoubtedly depends on the training and professional vision of each specialist. The development of pedagogical neuroscience (neuropedagogy) determines the need for deepening and expanding the training of both pedagogical specialists who work with children with special educational needs, as well as all specialists who are involved in the education and socialization of this group of children (Karasievykh et al., 2021; Kosholap et al., 2021).

Pedagogical and psychosocial rehabilitation determines the application of approaches, methods and tools to help and support those children who go beyond the usual and seek opportunities to overcome their shortcomings with the help of new advances in technology aimed at helping

people. The organization of work in the Center for Special Educational Support provides exceptional opportunities for the application of new technologies (Chupakhina, 2019a).

These opportunities are within the scope of professional development of relevant specialists to work with new technologies, the temporal order of their application, such as the duration of work with the relevant technology, frequency of application and possibility of direct monitoring of the results of application for each specific child.

Psychological and educational support for the development of a child with disabilities

The purpose of psychological and educational development support for a child with disabilities is to create psychological conditions for normal development and successful learning.

The main tasks of psychological and pedagogical support for the development of children with disabilities in preschool educational institutions are:

- creation of an emotionally favorable microclimate for the child in the group and communication between teachers and children;
- taking into account individual characteristics of the child's development in the unity of the intellectual, emotional and behavioral sphere of their manifestation;
- support for children who need special educational programs and special forms of organizing their activities;
- increasing the psychological competence of educators and parents in matters of child upbringing and development (Chupakhina, 2019b).

Children with disabilities are students with physical or mental disabilities, confirmed by the psychological, medical and pedagogical examination.

The term "support" in the research is defined in different ways:

- as a special form of education aimed at interaction in the process of personal growth, choice of behavior and decision-making;
- as a holistic process of learning, development and correction of the professional growth of the individual;
- as an interaction of accompaniment and maintainers in order to solve life problems of accompanying persons;
- as a system of professional activity, ensuring the creation of conditions for successful adaptation of a person to his conditions of life;
- as a system-integrative "technique" of social and psychological assistance of the individual;

- as an activity that ensures the creation of conditions for adoption of the topic of developing an optimal solution in various situations of life choice;

- as a complex procedure, based on interaction, aimed at solving current problems of the development of the accompanying ones.

Analysis of literature has shown that psychological and pedagogical support is possible and is considered in several aspects: as a professional activity of a teacher in order to gain the ability to provide assistance and support in the individual education of a child; as a process involving a number of purposeful, consistent pedagogical actions that help the student to make a morally independent decision to solve educational problems for the child; interaction between the manager and the attendant; as a technology involving several successive stages (Crowl, 1997).

The purpose of psychological and educational support for the development of a child with disabilities is to create psychological conditions for normal development and successful learning.

The activities of a teacher, psychologist and other specialists in providing educational achievement of students; as a system that characterizes the relationship and interdependence of elements: purpose, content, procedure, and performance.

An integrated system approach is important, which involves the coordinated work of all specialists of a preschool educational institution.

The accompanying process is carried out by specialists who know psychophysiological features of children (defectologist, speech therapist, music director and educational psychologist).

This contains:

- creation of a subject development environment;

- material and technical equipment;

- development of individual training and development programs;

The main principles of psychological and educational support are:

- comprehensive and interdisciplinary approach to solving any problem of child development and training;

- continuity of child development support in the educational process;

- information and methodological support process;

- socio-pedagogical and psychological design ([prognosis](#)) of related activities;

- active involvement of parents, teachers and educators.

Basic principles of organizing psychological and educational support (Berehova, 2019):

- principle of democracy (assumes recognition of the right to voluntary direct participation in the support of subjects of the educational process);
- principle of creative position (provides constant readiness to search for non-standard solutions and flexibility in performing practical tasks depending on a specific situation);
- principle of partnership (means the exclusion of the dominant position of the topic of the educational process in relation to each other);
- principle of consistency (involves the performance of psychological and educational support as a system of specialists in a certain logical and reasonable order);
- principle of variability (involves the introduction into the process of maintaining a wide range of psychological and educational means, forms and methods that can be used both completely and partially in order to flexibly change special conditions in relation to them);
- principle of prevention (aimed at preventing possible dissatisfaction and ensuring the safety of the physical and mental health of the student);
- principle of environmental friendliness (ensures the need for constant correlation of the used means and methods of psychological and educational support with the set goal).

Implementation of the goal of psychological and educational support is achieved through the main functions: information, guidance and development. The information function of support consists in widely notifying all interested parties about forms and methods of support. This especially applies to teachers, school administration and parents of participating students.

An important result of inclusive education is the formation of life skills. The following technologies for improving social skills can be distinguished: early intervention; direct teaching of social skills; formation of social skills through imitation and organization of group activities, including games.

Working with a child with disabilities in a preschool educational institution when implementing early intervention technologies (Martynychuk, 2018):

- early detection and timely elimination of violations;
- creation of an individual correction path for the adopted child;
- selection of corrective programs and methods optimal for child development;
- corrective work with the child (according to the individual program);

- the child's general state of health and prevention of the child's concomitant diseases.

The following requirements must be met when implementing early intervention technology:

- mandatory existence of an individual early intervention program;
- availability of an educational environment appropriate to the child's abilities;

- provision of special educational support provided by an interdisciplinary team; – clear functional demarcation of all members of the interdisciplinary team involved in the process of habilitation, adaptation and integration;

- teaching parents the ability to stimulate communication with their child.

The formation of social skills through imitation involves mutual learning of children, that is, a more competent child in a certain area becomes a role model for other children. However, learning by imitation is important for every child, it is especially important for learning children with intellectual disabilities and for children with autism spectrum disorders. Therefore, learning is more effective not in homogeneous, but in heterogeneous groups.

The main methods of psychocorrective practice in preschool age can be conventionally divided into four large groups: the method of play therapy, methods of art therapy, methods of behavioral therapy, and methods of social therapy (Darling-Hammond, 2010). Game therapy is a psychotherapeutic method based on the principles of dynamics of mental development and aimed at removing emotions. Art therapy is a synthesis of several in connection with the education of people with disabilities.

Fields of scientific knowledge (art, medicine and psychology) are a set of techniques based on the use of various types of art in a special symbolic form and make it possible to correct psychosomatic and psycho-emotional disorders by stimulating the artistic and creative manifestations of a child with developmental problems.

Usually, the following types of art therapy are distinguished: music therapy (through the perception of music, voice therapy is through singing), physical therapy (dance therapy, rhythm correction, psycho-immunology is the therapeutic effect of movements); bibliotherapy (corrective effects through reading), storytelling, short story writing; Imago therapy (influence through image, dramatization): puppet theater, figurative role-playing production, and psychodrama; Isotherapy (pulling therapy) has corrective effect by means of fine art: drawing, modeling, needlework, art, etc.

Behavioral correction methods have been developed as part of behavioral therapy in the form of behavioral therapy. Behavioral intervention uses principles and models of learning theory and behavioral science (behaviorism) in goal-setting and psychocorrectional procedures, as well as an objective assessment of their results. Therefore, psychological correction and rehabilitation technologies are represented by a large arsenal of means and methods, the use of which should correspond to the age and individual characteristics of children, and the nature of existing malformations. Their potential helps to equalize negative personalities and behavioral manifestations that significantly contribute to the inclusion of a "special" child in society (Kearsley, 1992).

In other words, prerequisites for inclusion in preschool age are needed:

- mandatory availability of an individual program of corrective development and upbringing of a child with certain developmental disabilities;
- necessity of creating a protective educational and subject-supporting environment appropriate to the child's abilities;
- availability of special educational support by a team with the leading role of a teacher-defectologist;
- clear division of functions of all specialists involved in inclusion in preschool education;
- teaching parents the ability to stimulate communication with their own child;
- psychological and educational support of normally developing preschool children involved in mixed education.

Psychological and pedagogical neurotechnologies in work with children with special educational needs

According to Raptis and Spanaki (2017), when teaching "special" children, the so-called multisensory approach is used, based on the idea that educational material is perceived much more easily when several sensory channels are stimulated simultaneously. To this end, multimedia learning resources are developed and created that simultaneously visualize, voice and require action from students, which has a greater impact on children with special educational needs.

The main thing in the education of such children is to attract and keep their attention in order to conduct an active educational process.

The multisensory approach attracts more attention and increases concentration, which is the reason for the most holistic perception of educational material (Bielawski, 2003).

It is particularly important to note that this method of learning is effective for all modern students, regardless of whether they have specific difficulties. Today's children live in the environment and conditions of information communication. From an early age, they actively use information and communication technologies and expect similar interaction in the process in educational institutions. Educational neurobiology and new technologies in their relationship are new perspectives of education and upbringing, especially for children with disabilities.

During the academic year, psychosocial rehabilitation classes are held at school, in a psychologist's office, in the Montessori classroom, a sensory room or together with a teacher in the classroom to achieve the goals of developing cognitive, communicative and social skills, improving behavioral and emotional functioning, developing independence and social integration (Treviranus, 2010).

The idea of using neurotechnologies in the process of teaching such children is based on the achievements of neuropedagogy, the concept of neuroplasticity of the brain, as well as the understanding that the biopsychosocial nature of a person allows influence on certain functions of the brain and, therefore, on the course of mental processes, acting externally, but in a physiological and safe way. A combined method of applying neuro and psychological pedagogical technologies in work is also used. Depending on the type of damage, the degree of violation, at the discretion of the team working with children, audiovisual stimulation technologies (light and sound stimulation), a system of full sensorimotor integration, biological feedback using the galvanic skin response, as well as a visual tracking system are used.

Audiovisual systems of interaction allow influencing the general mental state of the children in a completely physiological way. Taking into account the fact that these children mostly experience significant difficulties in managing their behavior, experience anxiety and difficult control over their emotional state (factors that prevent the implementation of an effective educational process), the team of specialists should use the idea of using audiovisual engagement systems as a preliminary training of children with the specified deviations before the beginning of classes. The system is operated by well-trained psychologists and has shown good results in all age groups. The capabilities of these systems allow you to stimulate thinking processes by influencing the characteristics of attention (which are sometimes severely impaired before the use of the light-sound stimulation

system). The systems can be used, again, by applying the appropriate programs included in them, to children with special needs and reading disorders (dyslexia). The results of the use of these neurotechnologies will be evaluated at the end of the academic year (Mattson & Hansen, 2009).

An interesting approach for both teachers and the children themselves is the use of biological feedback systems using the galvanic skin response. The general approach of this methodology consists in the use of certain software in the form of a game and the study of feedback (through the skin galvanic reaction) of the child. Both psychologists and special educators work with this method.

Proper use allows you to adequately control and train the activity of the autonomic nervous system and achieve a balance between its two parts. As a secondary, but quite important effect, there is the control and improvement of the attention and emotional state of the child who "plays" on the system. And this, undoubtedly, leads to an improvement in its perception, and therefore to its development in the cognitive sphere. The applied approach is to use this system with all children who have difficulty controlling their emotions in order to achieve a balanced state and adequately respond to the learning process (Gnoevska, 2016).

Systems of full sensorimotor integration have proven themselves to be an indispensable assistant for special educators and psychologists. The concept behind the use of these systems is the full integration of sensory systems along with motor activity in children with developmental disabilities. The integration of sensory modalities for these children is usually quite difficult, and when motor activity must be added to this integration, the task is extremely difficult. In the form of game technology with the help of software, the system of sensorimotor integration made it possible to adapt the child to the game conditions as quickly as possible, improve visual and auditory functions, as well as adequately control the movements of the hand or body on the playing field for the development of the game scene.

In addition, with the help of this technology, the work of visual, auditory and kinesthetic analyzers is positively influenced by the simultaneous inclusion of a motor analyzer in this process. Undoubtedly, the total integration of these systems should improve the cognitive development of a child with developmental disabilities. The successes achieved in the offered "game" undoubtedly improve the child's mood, self-confidence, and help the proper development of his emotional state.

The eye-tracking system is used to help special educators. Like all other neurotechnologies, it is used individually for each child. Due to the use

of eye-tracking, very good control over characteristics of attention in children is achieved.

Controlling the visual movements and, accordingly, the attention of the child by means of a graphical view representation on the system monitor, and the duration of individual visual movements can be reflected in numerical indicators, such as time interval and sequence, and as the so-called "Temperature map."

By using a graphical representation of eye movements on the system screen, it becomes possible to achieve three types of attention control in a child. First of all, it is unconscious or involuntary control. The movements of the marker arouse the child's interest, and he unconsciously turns his attention to it. The second type is external. This is revealed in the indication or commands where the child should direct his gaze. The third type of attention control is conscious voluntary control. This control is achieved as a last resort and requires mastering self-regulation mechanisms (Kasyanenko, 2018).

The mentioned model of working with children with special educational needs reflects the ideas embedded in the interdisciplinary science of neuropedagogy, about a person-oriented approach in education, and in particular, in special education. Taking into account the specifics and individual characteristics of each child with developmental disabilities, the used model allows optimal and creative solving of various pedagogical tasks in the process of teaching such children, using knowledge of individual characteristics during their mental functions.

Effective psychological and pedagogical technologies in working with children with special educational needs

Voloshina and Dmitrenko (2017) proved the effectiveness of a relatively new technology of multi-level learning, taking into account the individual characteristics of each child, creating comfortable psychological and pedagogical conditions for the active cognitive activity of students, the development of their thinking and independence. The technology is relatively new, as it is based on the same principles that have long been used in pedagogy (individualization and differentiation of learning).

And now the technology of multi-level education is one of the key directions of the school's work. The technology of multi-level education is a technology of organizing the educational process, in which, depending on the abilities and individual characteristics of each student, a different level of assimilation of educational materials is assumed, but not lower than the basic one.

The purpose of this technology is to ensure that all students acquire the basic level of knowledge and skills, and possibility of their promotion. Working according to this method makes it possible to develop individual skills of students and to approach professional and social self-determination more consciously.

Level differentiation is recommended when studying complex topics or sections. It can also be used while studying a new subject. Such training helps to transform learning into a differentiated one, taking into account individual characteristics of students (Budnyk, 2019).

When teaching children with disabilities, one of the most important conditions for a teacher is the understanding that these children need a special individual approach to realize their potential and create conditions for development. The essence of this situation is that children with OOP do not obey the rules and conditions of society, but are included in life on their own terms, accepted and taken into account by society.

The teacher's task is to create such a model of teaching children with disabilities, in which each student has a mechanism to compensate for the existing deficiency, on the basis of which their integration into modern society becomes possible. The system of corrective and developmental education is aimed at the multifaceted development of students' personalities and contributes to their intellectual development.

The technology of problem-based learning is effective, which aims to develop a comprehensively harmonious personality in the child and create a good pedagogical base. In the classroom, during the conversation, a teacher poses a problematic task to the children, followed by a series of consecutive and interrelated questions, the answers to which lead to the solution of the problem.

Students try to independently solve the task set before them. When difficulties arise, the teacher always tries to provide children with corrective help, giving an action plan, offering individual steps when difficulties arise, and creating a situation of success in the lesson.

Sometimes the lesson can be completely devoted to the solution of the problem. But most often, lessons combine traditional learning with elements of problem-based learning, providing for individual problem-based tasks. At the same time, the general system of creative search activities of schoolchildren includes knowledge that they receive in a ready form from the teacher's presentation, the text of the textbook, etc. The key stage in modern education is the level of motivation. It is necessary to present such a problem to the children, which will be interesting and meaningful for everyone. The motivational process requires a special creative approach

from the teacher, everything must be foreseen and calculated. The effectiveness of the entire lesson depends on proper motivation (Bondarenko, 2019).

Such classes create a special atmosphere in which there are elements of creativity and free choice. The ability to work in a group is developed: its success depends on the personal efforts of each individual. Very often this requires the student to overcome his own shyness, indecision, and disbelief in his own abilities.

Gaming technology can be used as a whole activity, for example, a game is a trip. There are didactic games for consolidation, repetition and generalization of materials, crosswords, puzzles etc. Thus, the didactic game in the lesson supplements, deepens and expands knowledge. Also, this game is a means of comprehensive development of the child, his mental, intellectual and creative abilities, evokes positive emotions, fills the life of the student with interesting content and promotes the development of students.

The introduction of ICT in the school makes it possible, first of all, to improve the quality of education, to increase the motivation, to acquire and learn new knowledge by students with disabilities, because, in addition to the systemic underdevelopment of all components of the language system, they have a lack of cognitive activity, thinking, verbal memory, and attention.

Conclusion

The article examines the functioning system of special education support centers in working with children with special educational needs; the requirements for psychological and educational support for the development of a child with disabilities and psychological/pedagogical neurotechnologies in work were introduced; effective psychological/pedagogical technologies in working with children with special educational needs were described.

When working with children with special needs, special educational and developmental methods are used to achieve positive dynamics in upbringing and education. Currently, the development of neuropedagogy opens up great prospects in the search for new means, forms and methods of education and upbringing. New approaches to organizing the inclusive process are constantly appearing. Nowadays, every teacher is looking for the most effective way to improve the educational process and increase students' motivation to study.

Mastering modern pedagogical technologies for working with children with special educational needs and their application by a teacher is a mandatory competence of every teacher's professional activity.

When teaching children with disabilities, one of the most important conditions for a teacher is to understand that these children need a special individual approach to realize their potential and create conditions for development. The essence of this situation is that children with OOP do not obey the rules and conditions of society, but are included in life on their own terms, accepted and taken into account by society.

The task of teachers is to create such a model of education for children with disabilities, according to which each student has a mechanism to compensate for an existing deficiency, on the basis of which their integration into modern society becomes possible. The system of corrective and developmental education is aimed at the multifaceted development of the personality of students and promotes their intellectual development.

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