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MULTIMODAL STRATEGIES IN EDUCATION: OPPORTUNITIES FOR INCLUSIVE PEDAGOGY AND SUPPORT FOR STUDENTS WITH DYSLEXIA

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Abstract. This article examines the challenges facing the modern education system related to the need to develop innovative pedagogical solutions aimed at ensuring equal opportunities for all learners, regardless of their individual characteristics and limitations, in particular those with dyslexia. The study was conducted with the aim of comprehensively examining the possibilities of multimodal strategies in inclusive pedagogy and support for students with dyslexia. The main areas of research are: analysis of the basic principles and current state of research in the field of multimodal learning and inclusive pedagogy; development of a program using multimodal approaches in pedagogical work with students with dyslexia; evaluation of the effectiveness of multimodal strategies in increasing the learning motivation and academic performance of students with dyslexia. The scientific significance of the research is determined by the possibility of gaining an in-depth understanding of the mechanisms of influence of multimodal strategies on the quality of the educational process in teaching students with dyslexia. The practical value lies in the development of a set of measures that can be used by teachers and educational psychologists working with dyslexic children. The research methodology includes methods of theoretical and empirical research and the development of practical measures. The results of the study confirm the hypothesis, as it has been preliminary empirical evidence suggests that the introduction of multimodal teaching strategies into inclusive education has had a positive impact on the cognitive development, motivation, and academic success of students with dyslexia. The value of the study lies in expanding the theory and practice of inclusive pedagogy, as it proposes a scientifically based approach to the implementation of multimodal strategies in the education of students with dyslexia.

Keywords: multimodal strategies, multimodal approaches, inclusion, inclusive pedagogy, inclusive education, dyslexia, student support, students with dyslexia, student development with dyslexia

Introduction

The modern education system in the Republic of Kazakhstan is often faced with the growing need for inclusive pedagogy based on ensuring equal access to education for all categories of students, especially those who experience particular

difficulties in mastering the curriculum. One of the most common difficulties in mastering educational material is dyslexia, which is characterized by an impaired ability to acquire reading and writing skills, based on the fact that some children have specific characteristics in the way their brains process auditory and visual information. The relevance of this problem is determined by the growing number of children with such difficulties, as well as by the awareness of modern Kazakh society of every child's right to quality education regardless of their individual characteristics.

The problem facing modern inclusive education aimed at supporting students with dyslexia is that traditional educational models do not meet the needs of students with such special educational needs. In practice, standard approaches that focus primarily on traditional auditory and visual perception of information often prove ineffective for children with dyslexia. As a result, there is an urgent need to develop and apply innovative teaching practices that can compensate for the individual perception deficits of students with dyslexia and promote their full involvement in the educational process.

The history of addressing issues related to inclusive education for individuals with dyslexia began in the last century and spans several decades. It should be noted that this problem was initially viewed exclusively as a medical issue, but attention has gradually shifted toward an inclusive educational approach. In this section, the works of the following authors should be noted. C. Sanger [1] and A. Moriña emphasized the importance of diversity in teaching approaches and the need to recognize the special talents and creativity of people with dyslexia [2]. B. Dewsbury offered a fundamentally new view of dyslexia as a special gift rather than a pathology, which had a significant impact on changing public perception of dyslexia and its inclusion in inclusive pedagogy [3].

Contemporary foreign and Kazakhstani researchers emphasize the importance of multimodal and multisensory learning based on the integration of various channels of information perception (visual, auditory, tactile, motor). A. Partington showed that multisensory learning has a significant impact on the reorganization of neural networks and the effective connection of higher cortical areas, improving information processing and increasing overall learning efficiency [4]. S. Symeonidou is known for his contribution to the theory of multimodal learning. Meyer demonstrated that students who received information through two channels simultaneously showed better results in memorizing and reproducing material [5]. P. Khazanchi confirms the benefits of a multisensory approach in teaching music and related disciplines [6]. Zh. Nursaitova studied the characteristics of dyslexia in elementary school [7]. The role of digital technology development is noted by A. Miller, who developed the concept of social-digital fields of exclusion, arguing that digital inequality is linked to the distribution of resources and opportunities and directly affects access to education and vocational training [8]. A. Moriña examines the mechanisms of digital inclusion and shows how digital technologies can promote the integration of vulnerable groups, including people with special educational needs [9]. K. Hankerová explores the problems and prospects of dyslexia in the medical environment [10]. L. Yang has

revealed digital innovations in inclusion for teaching children with special needs [11]. Such works have significantly expanded the set of pedagogical tools for supporting students with dyslexia and made it possible to create more effective interactive environments in preschool and school settings that are adapted to the individual needs of each student, including those with dyslexia [12]. However, important areas such as the direct consideration of the role of multimodal strategies in teaching opportunities for inclusive pedagogy and support for children with dyslexia have not been explored.

The aim of the study is to conduct a comprehensive investigation of the potential of multimodal strategies in teaching for the purposes of inclusive education and support for students with dyslexia.

To achieve this goal, the following tasks have been set:

– to analyze the main provisions and current state of research in the field of multimodal learning and inclusive pedagogy;

– to develop a program using multimodal approaches in pedagogical work with students with dyslexia;

– to evaluate the effectiveness of multimodal strategies in increasing the learning motivation and academic performance of students with dyslexia.

Research hypothesis: if multimodal teaching strategies are systematically implemented in inclusive education, they will have a positive impact on the cognitive development, motivation, and academic success of students with dyslexia. This will also reduce the level of anxiety and dissatisfaction with the learning process among this category of students.

The scientific significance of the study is determined by the possibility of gaining a deeper understanding of the mechanisms by which multimodal strategies influence the quality of the educational process for teaching students with dyslexia.

The practical value lies in the development of a set of measures that can be used by teachers and educational psychologists working with dyslexic children.

Materials and methods

This study was conducted in stages, based on theoretical and empirical research methods and the development of practical measures.

The theoretical basis of the study was determined during the analysis of the literature and scientific publications on the subject under consideration. Within this framework, an in-depth analysis of domestic and foreign scientific literature on multimodal learning and inclusive pedagogy was conducted. Particular attention was paid to works related to the peculiarities of teaching students with reading and writing disabilities.

Contemporary trends in the application of multimodal strategies in inclusive educational practice were examined. Key concepts, theories, and models explaining the mechanisms of formation and development of cognitive processes in children with dyslexia were examined. The basic conceptual framework was defined, and the concept of “multimodal strategies” was clarified in relation to both the inclusive educational environment and dyslexia.

The empirical study was conducted using the following methods: observation; testing; statistical and analytical methods of analysis and processing of material.

The empirical study, using the methods described above, was conducted in stages. First, direct observation of the behavior of students with dyslexia in traditional and multimodal learning environments was organized. The children were preliminarily divided into two groups: experimental and control. In the first group, teaching was conducted using new technology, and in the second, using traditional methods. During the observation, the following indicators were recorded: behavioral characteristics; level of involvement in the process; degree of anxiety and interest in the learning process.

Psychological and pedagogical testing was conducted using standard diagnostic methods that are used to measure the level of cognitive development and academic achievement in schoolchildren.

1. The Wechsler Intelligence Scale for Children (WISC), a version for children, is designed to test children, including those with certain developmental delays. The test is conducted individually and lasts from 45 to 65 minutes, but can be extended depending on the child's characteristics. It allows you to establish a general intelligence quotient (Full Scale IQ) from five primary indices: verbal comprehension; visual-spatial abilities; flexible thinking; working memory; and information processing speed. It provides an opportunity to assess the structure of a child's cognitive abilities and identify the strengths and weaknesses of the cognitive profile in children with learning difficulties, including dyslexia. Interpretation of results by level of intellectual development: 140 and above – very high; 130-140 – high; 120-130 – above average; 110-120 – average, absolute norm; 100-110 – reduced norm; 70-79 – borderline intelligence; 69 and below – mental development defect.

2. WIAT-III test or D. Wexler's individual achievement test. Used to assess academic achievement in reading, writing, mathematics, and reading comprehension. Allows you to establish the child's actual level of academic success and record changes in reading and writing skills after experimental intervention. The original test consists of 16 subtests that have been adapted for children with dyslexia. The version used includes reading aloud, reading speed, writing skills, writing speed, sentence writing, mental and written addition and subtraction.

Both methods are convenient for comparing results before and after the application of multimodal strategies.

The survey methods included interviews with teachers and parents to obtain feedback on the effectiveness of the results obtained in terms of their perception of changes in the educational process and assessment of the effectiveness of the multimodal strategies being implemented.

Stages of empirical research:

– preparation of educational and technological materials;

– assessment of differences in the dynamics of academic performance, motivation, and psycho-emotional state of participants;

– formation of control groups (teaching using traditional methods) and experimental groups (using multimodal strategies). A total of 12 primary school children with reading and writing difficulties (6 in each group) participated in the experiment with the consent of their parents.

Limitations. The present study is in the nature of a small-scale quasi-experimental approbation study. The main limitation of the study is the small sample size (only 12 people, 6 participants in each group), which is due to the difficulties in recruiting participants from this category of children. It is important to emphasize that the conclusions are preliminary and need to be verified on a larger sample.

Statistical methods were used to process the quantitative data obtained. Qualitative analysis was performed using analytical methods based on the results of observation, testing, and interviews.

The following multimodal strategies were used in the pedagogical experiment:

– the Orton-Gillingham method, based on a structured multisensory approach that combines three important components for teaching children with dyslexia: visual, auditory, and motor;

– multimodal game-based learning methods, including the use of special game tasks and exercises that increase children's motivation to learn and reduce stress levels;

– multimodal color differentiation to reduce eye strain and facilitate text perception through the use of colored backgrounds and eye patches;

– digital multimodal strategies (special interactive educational platforms and applications; audiovisual multimedia presentations; virtual and augmented reality (VR/AR) tools; voice assistants and speech synthesizers; mobile applications for independent practice with parents).

At the same time, an individualized approach was taken into account with regard to the individual characteristics and preferences of each child. To this end, the most optimal pace and learning opportunities were selected for each child, and interim assessments of their reading and writing results were conducted on a regular basis.

The criteria for assessing the effectiveness of students with dyslexia are defined as follows: positive change in academic achievement; increased motivation to learn and interest in the educational process; reduced anxiety; increased self-confidence. In addition: improvement in the quality of interpersonal interactions in the classroom where children with dyslexia study; positive assessment of the activities carried out by teachers and parents.

The study complied with the ethical principles and standards established in the field of pedagogical and psychological research with children with special educational needs and abilities. Participation in the study was voluntary, and the study adhered to the conditions of confidentiality of students' personal data.

Results

Contemporary scholars are actively exploring the issues of multimodal learning and inclusive pedagogy, increasingly focusing on the specificities of teaching students with reading and writing disabilities. Based on this, the main provisions of the research topic are revealed:

– multimodal strategies in teaching;

– opportunities for inclusive pedagogy through modern technologies, including multimodal technologies;

– dyslexia, the specifics of teaching children with dyslexia;

– forms of support for students with dyslexia, including through multimodal strategies.

Multimodal strategies refer to integrated approaches to learning that aim to simultaneously engage various sensory channels of perception (vision, hearing, touch, motor skills) in order to increase the effectiveness of the educational process and adapt the learning material to the individual needs of students with special educational needs. Multimodal strategies are used in lessons that combine visual and audio elements, resulting in significant productivity in learning. Teachers are advised to: use combined media resources, which simply involves supplementing teaching materials with graphics, videos, and audio recordings, thereby creating a richer and more engaging educational environment; give students the freedom to choose how they perceive information, taking into account their tendency to perceive visual images or spoken language; organize multi-channel feedback with students in both written and oral forms, providing support for both types of perception. Potential benefits of multimodal strategies: increased audience engagement; deeper understanding of the material; optimization and qualitative improvement of the educational process through the digitization of the educational environment.

Dyslexia is a specific learning disability. It is characterized by persistent difficulties in acquiring reading and writing skills. Dyslexia most often occurs in children without hearing, vision, or intellectual impairments, as well as in children living in unfavorable social conditions [13]. Traditional teaching methods are not entirely suitable for children with dyslexia. It is recommended to take into account their individual characteristics and apply specialized approaches, including multimodal strategies [14].

The main forms of support for students with dyslexia are diverse and aimed at compensating for difficulties in reading, writing, and perceiving information [15]:

1. Special teaching methods – the Orton-Gillingham method, based on the multisensory principle, combining visual, auditory, and kinesthetic sensations;

2. Corrective work with professionals (speech therapist and psychologist);

3. Use of assistive technologies-digital technological solutions (software for converting text to speech and vice versa, special keyboards and screens with enlarged characters, mobile phone applications) that facilitate the perception of information and increase motivation to learn;

4. Social support and bullying prevention, which helps create a friendly and supportive atmosphere in the classroom;

5. Family involvement and cooperation with teachers in the educational process.

6. Effective organization of the learning process, taking into account the individual pace of learning and the characteristics of each child's perception of information.

An experimental teaching program (EG) for children with dyslexia using multimodal strategies has been developed and is shown in Table 1.

Table 1. Training program using multimodal strategies

Program stages	*Activities and content*	*Forms of implementation*	*Expected results*
Preparatory stage	Diagnosis of dyslexia level, identification of strengths and areas for development	Individual consultations, testing	Development of individual correction plans
	Preparation of teaching materials, equipment, and software	Planning, procurement, installation	Infrastructure readiness
Main training period	Classes based on the Orton-Gillingham method (a structured multisensory approach), alternating between oral and written exercises aimed at strengthening the connections between sound, letter image, and hand movement.	Individual and small groups	Reading and writing skills development
	Multimodal game methods (interactive games, competitions, with musical accompaniment and rhythmic tasks to help synchronize movement and speech)	Group classes	Increasing motivation and reducing anxiety
	Multimodal color differentiation (color filters, cards, overlays) that facilitates the recognition of letters, syllables, and words.	Individual and group work	Reduction of visual strain
	Listening to audio recordings (adapted audiobooks, lesson recordings), using repetition of heard texts aloud for better memorization and understanding	Independent and pair work	Improving auditory perception
	Use of digital multimodal strategies (special educational platforms, mobile applications, virtual/augmented reality) that enhance the effectiveness of the educational process and allow the material to be adapted to the individual needs of children with dyslexia	Computer classes, tablets. Homework with parents	Stimulation of cognitive interest

Final stage	Final diagnosis and monitoring of results	Testing, questionnaires	Program effectiveness assessment
	Discussion and exchange of experience with teachers, parents, and specialists	Class hours, round tables	Program improvement

The program aims to integrate effective multimodal strategies into the educational process and contains specific methods, forms of conducting classes, and expected results. The selected strategies are designed to improve the quality of education and reduce the difficulties experienced by children with dyslexia in the learning process.

The proposed program is based on a comprehensive approach to teaching children with dyslexia, as it integrates modern multimodal strategies into the learning process that contribute to the development of cognitive abilities in children with dyslexia, reduce anxiety levels, and form positive learning motivation.

The results obtained during the observation of the indicators by the educational psychologist are shown in Table 2.

Table 2. Results of observation of children with dyslexia, in percent

Indicator	*CG*		*EG*		*Change*	
	At the beginning	At the end	At the beginning	To the end	KG	EG
Behavioral characteristics						
Aggressiveness	25	33	25	8	-8	-13
Withdrawn	33	33	35	17	0	-18
Impulsiveness	42	42	40	25	0	-15
Level of engagement						
High engagement	8	17	8	33	+5	+25
Average engagement	42	50	42	50	+8	+8
Low engagement	50	42	50	17	-8	-33
Level of anxiety						
High level of anxiety	42	33	42	25	-9	-17
Average anxiety level	41	42	42	25	-1	-17
Low anxiety level	17	25	17	50	+8	+33
Showing interest						
Very interested	25	33	25	42	+5	+40
Partially interested	50	50	50	50	0	0
Not very interesting	25	17	25	8	-8	-17

Analysis of the data obtained shows that the following can be confidently stated: the experimental group showed more pronounced positive dynamics in all aspects (a significant decrease in aggression, withdrawal, and impulsivity, increased involvement in the learning process, a significant decrease in anxiety, and increased interest in learning); the control group showed insignificant improvements in most indicators, which indicates that multimodal strategies are more effective for children with dyslexia than traditional methods.

Table 3 shows the dynamics of cognitive indicators of participants in the control (CG) and experimental (EG) groups at the beginning and end of the study.

Table 3. WISC-V test results

Group of indicators	*CG*		*EG*	
	at the beginning	at the end	at the beginning	at the end
Verbal comprehension (VCI)	75	78	75	92
Visual-spatial abilities (VSI)	78	80	76	88
Flexible thinking (FRI)	72	75	72	82
Working memory (WMI)	70	73	70	78
Overall Full Scale IQ	74	77	74	85

Analysis of the indicators shows that the control group experienced moderate growth in all cognitive functions: verbal comprehension increased from 75 to 78 points, visual-spatial abilities from 78 to 80, flexible thinking from 72 to 75, working memory from 70 to 73, and overall intelligence from 74 to 77 points.

The experimental group showed more pronounced improvement in all indicators: verbal comprehension increased from 75 to 92 points, visual-spatial abilities from 76 to 88, flexible thinking from 72 to 82, working memory from 70 to 78, and overall intelligence from 74 to 85 points.

Changes in the control group indicate natural, moderate development of cognitive skills that occurred without specific intervention. The data obtained in the EG indicate the indicative effectiveness of the implemented pedagogical approach aimed at stimulating cognitive processes. The increase in the EG in the area of verbal comprehension and visual-spatial abilities is particularly noticeable, which may be associated with the use of interactive and multimodal teaching methods.

Thus, overall, a comparative analysis of the CG and EG demonstrates that targeted pedagogical intervention significantly accelerates the development of cognitive skills, increases the overall level of intellectual functioning, and forms the basis for further successful learning.

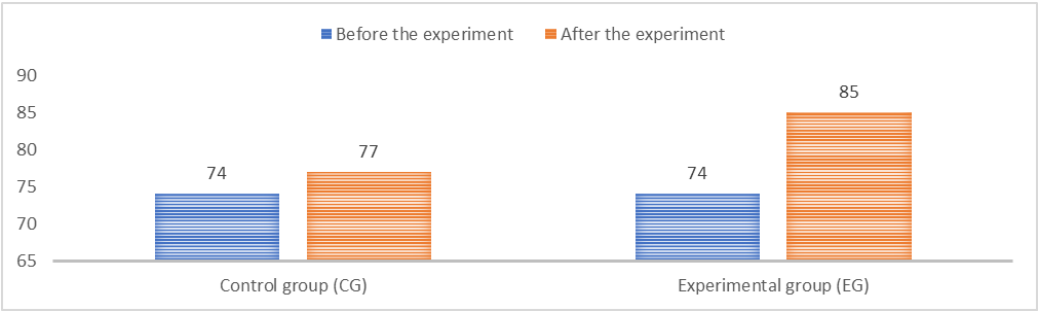

Figure 1 – Dynamics of overall intelligence

The diagram shows that the control group experienced a moderate increase in Full Scale IQ scores, reflecting the normal growth in cognitive abilities without the use of specialized teaching methods.

The increase was more pronounced in the experimental group, indicating a significant impact of pedagogical intervention on the intellectual development of participants. It is particularly noteworthy that the increase in the EG exceeds the similar indicator in the CG by almost 50%, which confirms the effectiveness of the methods implemented to stimulate cognitive activity and the comprehensive development of mental abilities.

Thus, the diagram clearly demonstrates the advantage of the experimental approach over traditional teaching.

Table 4 reflects the dynamics of changes in the categories of intellectual development of participants in the control (CG) and experimental (EG) groups at the beginning and end of the study.

Table 4. Indicators of child development by category of intellectual development

Categories	*CG*		*EG*	
	at the beginning	at the end	at the beginning	at the end
Reduced rate (100-110)	0		0	3 people or 50%
Borderline intelligence (70-79)	6 people or 100%	3 people or 50%	6 people or 100%	3 people or 50%
Mental development defect (69 and below)	0		0	

Analysis of the control group's indicators shows that at the beginning of the study, all participants (100%) were at the borderline level of intelligence. By the end of the study, the number of participants with borderline intelligence had halved (50%), with no students moving into the low-intelligence category. The data obtained indicate a moderate improvement in cognitive indicators.

In the experimental group, 100% of participants were also initially at the borderline level of intelligence. At the end of the experiment, 50% of students reached the reduced norm. These indicators testify to a significant increase in intellectual level, which occurred under the influence of the new pedagogical approach. At the same time, the proportion of participants with mental development defects remained zero. These data indicate the effectiveness of the program used.

Thus, a comparative analysis of the CG and EG demonstrates that targeted pedagogical intervention contributes to the improvement of cognitive abilities, an increase in the level of intelligence, and the maintenance of an optimal structure of intellectual development in students.

Table 5 shows the results of testing participants in the control (CG) and experimental (EG) groups using an adapted version of the WIAT-III. They are presented in percentages and performance levels.

Table 5. Test results for the adapted version of WIAT-III (in percentages) and level

Skill	CG		EG	
	At the beginning	At the end	To the beginning	To the end
Reading aloud	100% (below average)	100% (below average)	100% (below average)	75% (below average) 25% (average)
Reading speed	100% (below average)	100% (below average)	100% (below average)	67% (below average) 33% (average)
Writing skills	100% (below average)	100% (below average)	100% (below average)	67% (below average) 33 (average level)
Writing speed	100% (below average)	100% (below average)	100% (below average)	67% (below average) 33% (average)
Writing sentences	100% (below average)	100% (below average)	100% (below average)	58% (below average) 42% (average)
Mental arithmetic	100% (below average)	100% (below average)	100% (below average)	75% (below average) 25% (average)
Mental subtraction	100% (below average)	100% (below average)	100% (below average)	67% (below average) 33% (average)
Addition on paper	100% (below average)	100% (below average)	100% (below average)	75% (below average) 25% (average)
Subtraction on paper	100% (below average)	100% (below average)	100% (below average)	70% (below average) 30% (average level)

Analysis of the control group's indicators shows no significant changes. All participants remained at a "below average" level in all tested skills.

The experimental group showed noticeable improvement. By the end of the study, some participants had reached an average level in key skills. For example, reading aloud improved to an average level for 25% of participants, reading speed improved to an average level for 33%, writing improved to an average level for 33%, sentence writing improved to an average level for 42%, and math skills improved to an average level for 25-33% of participants. At the same time, the remaining participants remained below average, indicating a gradual and individually expressed improvement in skills.

Thus, a comparative analysis of the CG and EG demonstrates the indicative effectiveness of the pedagogical approach used. The implementation of targeted learning strategies contributed to a significant increase in learning competencies. The results confirm the positive impact of pedagogical intervention on the development of academic skills in students.

Discussion

The analysis of Table 2 shows the dynamics of cognitive indicators of participants in the control (CG) and experimental (EG) groups at the beginning and end of the study. Verbal comprehension (VCI), visual-spatial abilities (VSI), thinking flexibility (FRI), working memory (WMI), and full-scale IQ were used as indicators. Comparing the data at two stages allows us to evaluate the effectiveness of the applied pedagogical intervention and identify changes in the cognitive sphere of students.

In general, a comparative analysis of CG and EG according to Table 3 shows that targeted pedagogical intervention significantly accelerates the development of cognitive skills, increases the overall level of intellectual functioning and forms the basis for further successful learning.

Figure 1 clearly demonstrates the advantage of the experimental approach over traditional teaching, emphasizing the importance of targeted pedagogical strategies in improving the overall level of intelligence of students.

According to Table 4, a comparative analysis of CG and EG demonstrates that targeted pedagogical intervention contributes to improving cognitive abilities, increasing the level of intelligence, and maintaining an optimal structure of students' intellectual development.

Thus, a comparative analysis of the CG and EG demonstrates the indicative effectiveness of the pedagogical approach used: the introduction of targeted teaching strategies contributed to a significant increase in learning competencies, confirming the positive impact of pedagogical intervention on the development of academic skills in students.

A comparative analysis with other studies (N.N. Yuskova describing approaches to teaching children with dyslexia in inclusive education settings), informational articles "Home Health Diseases and Conditions Dyslexia, or reading disorders in children: how to recognize it and what to do" (2024), "Dyslexia in Children" (2025) showed that other researchers most often note the importance of the following aspects: adapting the learning process to children with dyslexia, an individual approach to each student, and adapting learning tasks and methods to them; the use of modern technologies capable of converting text into speech and others; the importance of cooperation with speech therapists, defectologists, psychologists, and parents to develop individual learning paths; the creation of a supportive atmosphere for individual multisensory techniques to form more stable neural connections in children with dyslexia.

Our study differs from existing works in its comprehensive approach, which is based on several areas (multimodal strategies, inclusive pedagogy, support for children with dyslexia), while most existing works consider only individual aspects of the problem under consideration. Unlike other studies, which are mainly descriptive, this study is empirical, with clearly defined criteria for participant selection and a controlled experimental design. As part of the pedagogical experiment, the choice of multimodal strategies was justified and their effectiveness in terms of cognitive development and academic success was proven.

The novelty of the study lies in the comprehensive multimodal approach used to address the challenges of teaching children with dyslexia in an inclusive education setting. This approach incorporates both traditional and innovative methods. It is these methods that create a more solid foundation for ensuring more effective teaching and development of children with dyslexia.

Overall, the value of the study lies in the development and testing of an experimental learning program (ELP) for children with dyslexia using multimodal strategies. Its effectiveness has been confirmed by the results of empirical studies.

Conclusion

Thus, this study represents a theoretical and practical contribution, offering a comprehensive, empirically grounded, and practice-oriented multimodal approach to addressing the problem of teaching children with dyslexia in inclusive education settings. It has been established that a comprehensive approach, including traditional and innovative methods, creates a solid foundation for effective learning and harmonious development of children with dyslexia.

The results of observation and testing confirm the hypothesis that the systematic implementation of multimodal strategies has a positive effect on the cognitive development, motivation, and academic success of students with dyslexia, reduces their anxiety levels, and increases their satisfaction with the learning process. The results of testing using the WISC-V methodology also indicate the effectiveness of multimodal teaching strategies for children with dyslexia, which, in practice, have improved their cognitive abilities, albeit slightly. The results of testing using the adapted version of WIAT-III convincingly confirm the effectiveness of multimodal teaching strategies for children with dyslexia, as they contributed to a significant improvement in their academic performance in terms of reading aloud skills, reading speed, writing skills and speed, sentence writing, and mental and written addition and subtraction.

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БІЛІМ БЕРУДЕГІ МУЛЬТИМОДАЛЬДЫ СТРАТЕГИЯЛАР: ИНКЛЮЗИВТІ ПЕДАГОГИКА МЕН ДИСЛЕКСИЯСЫ БАР БІЛІМ АЛУШЫЛАРДЫ ҚОЛДАУДЫҢ МҮМКІНДІКТЕРІ

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Аңдатпа. Бұл мақалада заманауи білім беру жүйесінің алдында тұрған, барлық білім алушыларға олардың жеке ерекшеліктері мен шектеулеріне қарамастан, атап айтқанда дислексиядан зардап шегетіндерге тең мүмкіндіктер беруге бағытталған инновациялық педагогикалық шешімдерді әзірлеу қажеттілігіне байланысты мәселелер қарастырылады. Зерттеу жұмысы инклюзивті педагогикада мультимодальды стратегиялардың мүмкіндіктерін және дислексиясы бар білім алушыларды қолдауды жан-жақты зерделеу мақсатында жүргізілді. Зерттеудің негізгі бағыттары: мультимодальды оқыту және инклюзивті педагогика саласындағы базалық принциптерді және зерттеулердің қазіргі жағдайын талдау; дислексиясы бар білім алушылармен педагогикалық жұмыста мультимодальды тәсілдерді пайдалана отырып бағдарлама әзірлеу; дислексиясы бар білім алушылардың оқу мотивациясы мен академиялық үлгерімін арттыруда мультимодальды стратегиялардың тиімділігін бағалау арналған зерттеу жұмысы. Зерттеудің ғылыми маңыздылығы дислексиясы бар білім алушыларды оқыту кезінде мультимодальды стратегиялардың білім беру үдерісінің сапасына әсер ету механизмдері туралы тереңдетілген түсінік алу мүмкіндігімен анықталады. Практикалық құндылығы дислексиясы бар білім алушылармен жұмыс істейтін педагогтар мен педагог-психологтар қолдана алатын шаралар кешенін әзірлеуде жатыр. Зерттеу әдіснамасы теориялық және эмпирикалық зерттеу әдістері мен практикалық шараларды әзірлеуді қамтиды. Зерттеу нәтижелері гипотезаны растайды, өйткені инклюзивті білім беруге мультимодальды оқыту стратегияларын енгізу дислексиясы бар білім алушылардың когнитивті дамуына, мотивациясына және академиялық табыстылығына оң әсер еткені эксперименттік жолмен анықталды. Зерттеудің құндылығы инклюзивті педагогиканың теориясы мен практикасын кеңейтуде болып табылады, өйткені онда дислексиясы бар білім алушылар білім беруде мультимодальды стратегияларды іске асырудың ғылыми негізделген тәсілі ұсынылады.

Тірек сөздер: мультимодальды стратегиялар, мультимодальды тәсілдер, инклюзия, инклюзивті педагогика, инклюзивті білім беру, дислексия, дислексиялық білім алушыларды қолдау, дислексиялық білім алушыларды дамыту

МУЛЬТИМОДАЛЬНЫЕ СТРАТЕГИИ В ОБРАЗОВАНИИ: ВОЗМОЖНОСТИ ДЛЯ ИНКЛЮЗИВНОЙ ПЕДАГОГИКИ И ПОДДЕРЖКИ ОБУЧАЩИХСЯ С ДИСЛЕКСИЕЙ

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Аннотация. Данная статья рассматривает проблемы, стоящие перед современной системой образования, связанные с необходимостью разработки инновационных педагогических решений, направленных на обеспечение равных возможностей для всех обучающихся, независимо от их индивидуальных особенностей и ограничений, в частности для тех, кто страдает дислексией. Исследование было проведено с целью всестороннего изучения возможностей мультимодальных стратегий в инклюзивной педагогике и поддержке обучающихся с дислексией. Основными направлениями исследования являются: анализ базовых принципов и современного состояния исследований в области мультимодального обучения и инклюзивной педагогики; разработка программы с использованием мультимодальных подходов в педагогической работе с обучающимися с дислексией; оценка эффективности мультимодальных стратегий в повышении учебной мотивации и академической успеваемости обучающихся с дислексией. Научная значимость исследования определяется возможностью получения углубленного понимания механизмов влияния мультимодальных стратегий на качество образовательного процесса при обучении обучающихся с дислексией. Практическая ценность заключается в разработке комплекса мер, которые могут быть использованы педагогами и педагогами-психологами, работающими с детьми-дислексиками. Методология исследования включает методы теоретического и эмпирического исследования и разработку практических мер. Результаты исследования подтверждают гипотезу, поскольку экспериментально установлено, что внедрение мультимодальных стратегий обучения в инклюзивное образование оказало положительное влияние на когнитивное развитие, мотивацию и академическую успешность обучающихся с дислексией. Ценность исследования заключается в расширении теории и практики инклюзивной педагогики, поскольку в нем предлагается научно обоснованный подход к реализации мультимодальных стратегий в образовании обучающихся с дислексией.

Ключевые слова: мультимодальные стратегии, мультимодальные подходы, инклюзия, инклюзивная педагогика, инклюзивное образование, дислексия, поддержка обучающихся, обучающихся с дислексией, развитие обучающихся с дислексией

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