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BIOTECHNOLOGICAL COMPETENCE OF A TEACHER IN THE CONDITIONS OF INCLUSIVE EDUCATION

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Abstract

Purpose of the study: The paper discusses a specific experience that is a part of the professional standard of a teacher, examines the ability of a teacher to teach children with special environmental needs.

Methodology: Methods of working with physically challenged children (PCC) are described in the works by V. V. Linkov, N. N. Malofeev, N. M. Nazarov, etc. They consider various methods and techniques of organizing educational work with children having health problems.

Results: The Russian schools from Dagestan have gained some experience in the inclusive education of younger schoolchildren. A number of inclusive classes are functioning in school No.4 in the city of Makhachkala which is the capital of Dagestan. Teachers working in inclusive classes have significant difficulties in implementing the objectives of inclusion. They create the necessary conditions for educational work with physically challenged children; teachers accumulate their experience in teaching children with special educational needs. The levels of biotechnological needs are realized and the coefficients of students learning at the ascertaining and formative stages of the experiment are calculated. At the control stage, measurements were taken and positive trends in the organization of the educational work with physically challenged children were detected.

Applications of this study: This research can be used for the universities, teachers, and students.

Novelty/Originality of this study: In this research, the model of Biotechnological Competence of a Teacher in the Conditions of Inclusive Education is presented in a comprehensive and complete manner.

Keywords*: inclusive class, physically challenged children, children with special educational needs, inclusive practice conditions, individual education plan.*

INTRODUCTION

Today, educational policy in the Russian Federation is aimed at creating biotechnological competence in general education institutions and at developing inclusive education. The origin of the inclusive education ideas in Russia is seen in the Concept of Integrated Education for Persons with Disabilities (with special educational needs), which has been developed at the Correctional Pedagogy Institute of the Russian Academy of Education. In the professional standard of a teacher, the ability to teach children with special educational needs is considered as one of the necessary competencies. In connection with these circumstances, there is a need to prepare future teachers for the implementation of the objectives of inclusive education in secondary school. The main problem in the realization of the inclusion objectives is the lack of scientifically-based technologies for inclusive education and the conditions for their implementation in secondary school. The main goal of the educational institution entering on the path of inclusive practice development is the creation of special conditions for the development and social adaptation of students with special educational needs and their peers. The purpose of the teacher implementing inclusive practice is to create optimal conditions for the development of positive potencies of each child studying in an inclusive class.

RESEARCH METHODS

Methods of working with physically challenged children (PCC) are described in the works by V. V.Linkov, N. N. Malofeev, N. M. Nazarov, etc. They consider various methods and techniques of organizing educational work with children having health problems.

Psychologists and teachers proved that the relations and interaction between healthy children with peers having disabilities are the most important factor ensuring the success of inclusive education.

Tasks of a holistic system for the development of inclusive education is determined, first of all, by the current lack of scientific and methodological support for the development of inclusive educational processes, lack of staffing, organization of training and advanced training for specialists in the field of psychological and pedagogical support of inclusive

education. This allows us to raise the question of the need to create a resource base to support an inclusive process in the general education system (Belyaeva, 2014; Fetalieva, 2016; Ilyasov et al, 2017).

The requirements for staffing conditions for the implementation of the basic educational program of elementary general education include the following provisions:

- The staffing of an educational institution with pedagogical and managerial personnel competent in understanding the special educational needs of physically challenged children;
- Qualification level of pedagogical and other employees of an educational institution in the field of education of physically challenged children;
- Continuity of professional development for pedagogical workers of an educational institution in the sphere of correctional (special) pedagogy, special psychology, and clinical child psychology;
- Inclusion in the real interaction between general education and special (correctional) schools of I-VIII types.

Availability of an accessible network of educational institutions (including both general education and special correctional educational institutions). The implementation of this general condition allows for children to have the most adequate educational route for its developmental characteristics, allows for the fullest and most resource-intensive provision of education and upbringing of children.

The material and technical infrastructure (including informational one), of the educational process should ensure the possibility of creating and using information that takes into account the needs of physically challenged children who are learnt at this institution (including image and sound recording and processing, speaking with audio / video and graphics support, communication on the Internet, etc.) (Khanalievna et al, 2017; Shikhalieva, 2016; Antúnez, 2016).

An important condition for the implementation of inclusive education is to equip an inclusive school. In the Russian and Dagestan schools, a certain amount of experience in the inclusive education of younger schoolchildren has been gained. Inclusive classes are functioning in the school No. 4 in Makhachkala.

MAIN PART

Today, conditions for joint learning are being created, teachers are gaining experience in teaching children with special educational needs.

An entrance to the school: It is necessary to install a ramp for disabled children with disorders of the musculoskeletal system at the entrance to their school. The ramp should be flat enough (10 – 12 degrees) so that a child in his/her wheelchair can climb and descend on it independently. The ramp width must be at least 90 cm. The necessary attributes of a ramp are a fencing curb (with height not less than 5 cm) and handrails (with height 50 - 90 cm), the length of which must exceed the length of the ramp by 30 cm on each side. Doors must open in the opposite direction from the ramp; otherwise, the child on the wheelchair may slide down. It is recommended to equip the entrance to the school with a ring to alert the school guard. For visually impaired children, the extreme steps of the stairs at the entrance to the school should be painted in contrasting colors. Ladders must be equipped with handrails. The door is also necessary to paint with a bright contrasting color. Opening parts of the glass doors should be also marked with bright paint.

The internal space of the school: Corridors along the whole school perimeter must be equipped with handrails. The width of the doorways should be at least 80 - 85 cm, otherwise, a pupil in his/her wheelchair would not pass through it. In order for a child in a wheelchair to be able to climb to the upper floors, at least one elevator must be provided in the school building, as well as hoists on the stairs. If the school has a pay telephone, it is necessary to hang it on to a lower altitude, in order to a child in a wheelchair could use it. For visually impaired children, it is necessary to provide for diverse relief flooring: when changing direction, the floor relief also changes. This may be floor tiles or just carpets. The extreme stair steps inside the school, like at the entrance, need to be painted in bright contrasting colors and equipped with handrails. The names of classrooms should be written on the plates in large print in contrasting colors and duplicated in Braille (Nisawa, 2018; Chiang & Tzou, 2018; Ingavale, 2013).

School locker room: A zone for disabled children at the side of aisles, equipped with handrails, benches, shelves, and hooks for bags and clothes, etc. should be provided. Also, a separate small room can be allocated for these purposes.

Classrooms: In classrooms, a disabled child needs additional space for free movement. The minimum size of a zone for a child sitting in a wheelchair (taking into account the wheelchair sharp turn) is 1.5 x 1.5 m. For physically challenged children with disorders of the musculoskeletal system, it is advisable to provide additional space near the desk for storing his/her wheelchair (if the child moves from it to the chair), crutches, walking sticks, etc. The width of the passage between the rows of tables in the classroom cannot be less than 90 cm. The same width should be at the entrance door without a threshold. In addition, it is recommended to leave a free passage near the board, so that the child in a wheelchair or on crutches can safely move there. If classes take place in a classroom where the board or any equipment is at an elevation, this elevation must be equipped with a ramp. Ameen, A. M., Ahmed, M. F., & Hafez, M. A. A. (2018).

The territory of the school: Even, non-slip asphalted footpaths should be provided around the school grounds in order to ensure the safety and unimpeded movement of physically challenged children. The small level drops on the way should be smoothed. Ramps from curbstones installed along the pavement, with width not less than 90 cm, should be arranged in several places. To this end, it is recommended to cover the surface of the walkway with guide embossed stripes and painted with a bright contrasting color. Bright yellow, bright orange, and bright red colors are considered optimal for labeling (Khanalievna et al, 2017; Eisvandi et al, 2015).

Information support includes the necessary information and methodological base for the education of physically challenged children and the characteristics of the intended information links between the participants in the educational process. Inclusive learning requires coordination, i.e. mandatory regular and high-quality interaction between specialists of general and special education, and also support system specialists. Specialists should be able to access information resources in the field of correctional pedagogy and special psychology, including electronic libraries, portals, and websites, to provide remote advisory services, and receive individual advice from qualified specialists. The possibility of regular exchange of information between specialists of different profiles, specialists and family should be organized. In the context of inclusive practice, organizational and methodological support is required for the "main" teachers: a teacher, an educator, and a class teacher who are directly involved in the process of raising and training children with disabilities. Already at the early stages of inclusive education development, there is an acute problem of unpreparedness of mass school teachers (professional, psychological and methodical unpreparedness) to work with children having special educational needs. There is a lack of professional competence of teachers to work in an inclusive environment; instead of this, the psychological barriers and professional stereotypes are present. *In order to* test the impact of those conditions on the effectiveness of inclusive teaching of elementary school pupils, experimental work was organized in secondary school No. 4 in the city of Makhachkala. The experiment was conducted in 4 "b" class, where 29 children are learning, 2 of them are with health problems (cerebral palsy (CP)) (Ameen et al, 2018).

Tasks of the experiment:

- Create a legal framework for inclusive elementary education models;
- Develop methodological support for inclusive teaching of young people;
- Check the mode of educational process organization for inclusive education;
- Create a technology of psychological and pedagogical support for physically challenged children;
- Check the motivation of parents and teachers involved in working in an inclusive classroom.

IMPLEMENTATION OF THE EXPERIMENT

The experiment was carried out in 3 stages. At the first stage which is ascertaining, the motivation of parents and teachers involved in academic work in an inclusive class, the organizational foundations of inclusive education in an experimental class, students' personal affairs, and education materials of teachers were studied, schoolchildren were monitored, and the success of learning programs was measured. In the course of the ascertaining experiment, problems and difficulties in organizing inclusive schoolchildren were identified; normative requirements for the conditions of inclusive instruction, and their implementation in educational practice were compared. During the ascertaining stage of the pedagogical experiment, it was established which of the conditions for the successful implementation of inclusive education are realized in the state educational institution of the secondary school No. 4 in the city of Makhachkala. Ameen, A. M., Ahmed, M. F., & Hafez, M. A. A. (2018)

Table 1: The implementation of the inclusive education conditions in the experimental class

Item No.	Conditions	Necessary items	Availability
1.	Regulatory legal provision	- provision for inclusive education;	-
		- rules for accepting children in an inclusive class;	-
		- position on the knowledge and skills control of pupils in the inclusive class	-
2	Educational and methodical support	- methodological support inclusive educational process;	
		- adapted educational program;	
		- special educational and methodical literature;	-
		- individual education plan;	-
		- thematic planning;	
		- didactic material;	-
		- take away;	-
		- flow charts;	-
		- notes of lessons;	-
		- summaries of individual correctional lessons;	-
		- special teaching aid	-

			-
3	Logistics	- access to school premises; - spaces for special learning classes; - medical office; - canteen; - school library; - sports hall; - school locker room; - school WC; - transport for children; - ramp; - lift	- - + + + + + + - + -
4	Staffing	- coordinator; - tutor; - educator; - psychologist; - speech therapist; - defectologist - social teacher	- - + + + + +
5.	Professional training for teachers	- information readiness; - mastering of pedagogical technologies; - basic knowledge of psychology and correctional pedagogy; - knowledge of individual differences of children; - the willingness of teachers to simulate a lesson and use variability in the learning process; - knowledge of the individual characteristics of children with various developmental disorders; - readiness for professional interaction and training; a structure of psychological readiness; - teacher motivation; - emotional acceptance of children with various types of developmental disorders (acceptance-rejection); - readiness to include children with different types of violations in the activities of a lesson (inclusion – isolation); - satisfaction with own pedagogical activity	- - - - - - - - - - - -

Analysis of the data in Table 1 “The implementation of the conditions of inclusive education in an experimental class” shows that in secondary school No. 4 in the city of Makhachkala there is no regulatory and teaching support. Judging by the data in Table 1, the conditions related to the material and technical support in the school are mostly not created. For more reliable information, more than 75 people working in elementary schools of the city of Makhachkala, were surveyed. The overwhelming majority of respondents associate the difficulties of introducing co-education with a lack of awareness of school teachers in this field. This is evidenced by the answers to the first question “How do you understand inclusive education?” Only 23.7% of respondents are aware that this is the education of physically challenged children in the same class with ordinary children. The same percentage of respondents associates inclusive education with the presence of disabled children in the same class as ordinary children; 39.5% think that this is the creation of a special correctional class for physically challenged children in an ordinary school, and 13.1% could not answer this question at all. Ameen, A. M., Ahmed, M. F., & Hafez, M. A. A. (2018)

The second question is “How familiar are you with the basic provisions and principles of inclusive education?” It was aimed at revealing informational awareness of teachers about the main provisions and principles of inclusive education. These data show that only 13.1% of respondents are familiar with the main provisions and principles of inclusive education; 23.7% gave a negative answer "not familiar." Over half of the teachers surveyed (63.2%) have insufficient information on this issue. Magomedova, S. A., & Damadaeva, A. S. (2015)

The third question suggested that school teachers have experience in working with physically challenged children. As it turned out, the majority (65.8%) of elementary school teachers does not have such work experience; 13.1% worked with physically challenged children before; 15.8% are currently working, and 5.3% are going to start working in the near future. It is no secret that at present the attitude towards inclusive education in the pedagogical community is ambiguous. Therefore, it was interesting for us to know the opinion of teachers about where it is better and more effective to teach physically challenged children and handicapped children. Half (50%) of respondents believe that it is better to do this on the basis of specialized correctional institutions; 18.4% - on the basis of specialized boarding schools and at home,

respectively. Only one out of ten (10.5%) teachers are convinced that physically challenged children need to learn on the basis of general education schools in an ordinary class (inclusive classes). 2.6% found it difficult to answer this question.

Analysis of the answers to the question "How do you feel about the possibility of joint learning for children with developmental disorders and children without such disorders?" showed that every fifth teacher (21.1%) is sure that inclusion is in principle impossible; 26,3% - allow for such a possibility, but they believe that society is not yet ready for this; about a third of respondents (31.6%) see the need to introduce inclusive education, but they think that fundamental changes should occur in the education system for that purpose; 10.5% of teachers agree that this is inevitable, but they foresee many difficulties along the way; 2.6% found it difficult to give an answer. We were surprised by the position of some teachers (7.9%), who said that there are already no obstacles to the realization of inclusion. Analysis of the answers showed a significant lack of knowledge of respondents in the field of special (correctional) pedagogy and psychology. The survey results are shown in Table 2. Lankshear, C. (1997)

Table 2: The awareness of teachers in the developmental disorders of children with different types of developmental challenges

Types of disorders	Number of teachers familiar with the types of developmental disorders (%)				
	As part of the university educational program	***As part of the school educational program***	***Have taken refresher courses***	***Participated in seminars***	***Special training required***
Behavior disorders	39.5	15.6	23.7	10.5	44.7
Speech disorders	39.5	15.6	15.6	23.7	50
Intellectual disability	36.8	15.6	13.1	15.6	52.6
Hearing disorders	31.6	15.6	5.3	10.5	60.5
Visual disorders	31.6	15.6	10.5	10.5	57.9
Movement disorders	31.6	15.6	13.1	10.5	57.9

As can be seen from Table 2, the majority of respondents answered that they are familiar with the basics of correctional pedagogy and special psychology within the framework of a university or pedagogical college program. A small percentage of teachers took refresher courses (from 5.3% to 23.7%) and participated in seminars (from 12% to 21 %). The overwhelming majority of the interviewed teachers (from 44% to 60%) agreed that they need additional training in correctional pedagogy and psychology. Attitude to the possibility of joint training depends on the leading defect in the structure of the developmental disorders of a child. Thus, for example, 44.7% of teachers believe that violations of the musculoskeletal system in a child are not an obstacle to his/her training in a secondary school. Approximately half (47.4%) of the respondents speak about the possibility of joint education of children with speech disorders. The same percentage of respondents sees no obstacles to learning in the general school of children with behavioral disorders. According to 31.6% of respondents, children with intellectual disabilities can also be trained along with ordinary children. Children with hearing and vision impairments are almost equally assessed in terms of the possibility of including them in the learning process in ordinary school: 26.3% and 23.7%, respectively. 2.6% of respondents believe that all categories of physically challenged children, without exception, can attend an ordinary school. 2.6% of respondents found it difficult to give an answer. Dalton, E. M., Mckenzie, J. A., & Kahonde, C. (2012)

The respondents gave the following answers to the question "What categories of children could you personally begin to work with?": a child with behavioral disorders - 57.9%, speech disorders - 31.6%; intellectual disorders - 28.9%; hearing disorders - 5.3%; visual impairment - 10.5%; movement disorders - 34.2%; none of the above - 18.4%. Slee, R. (2003)

The fact that the smallest number of choices fell on children with sensory impairments (hearing) can be explained in our opinion by two reasons: first, the lack of special knowledge in the field of correctional methods of teaching these children; secondly, the existence of a communication barrier in working with such children. Keith, K., & Ross, E. (1998)

We associated the implementation of this decisive condition for the success of inclusive education and the elimination of the aforementioned reasons for conducting special training for teachers involved in teaching and educational work in inclusive classes. In addition to theoretical classes, practical classes were organized; seminars, trial lessons, and their analysis were conducted. Classes at the school were conducted with the involvement of psychologists, specialists from the Institute for Advanced Studies, and teachers of the DSPU. The results of studying the program content were evaluated by testing the teachers, analyzing the products of their pedagogical activity and lessons learned, as well as changing their motivation.

Control stage

After conducting a formative experiment during training, measurements were taken. Data on testing the students and their scores are summarized in table 3.

Table 3: The success rate in mastering the educational program

Data	Total number of pupils	Score			
		A	B	C	D
Ascertaining stage	31	6	15	8	2
Control stage	31	8	20	2	1

CONCLUSION

To quantify the success rate of mastering the program for children of an inclusive class, a success rate K was introduced, which was defined as the ratio of pupil's score achieved to the possible reference level

$K = P_s / P_r$

The realized level P_s is defined as the sum

$\sum^n . P_s = \sum^n 5 \cdot n_1 + 4\, n_2 + 3 \cdot n_3 + 2\, n_4,$

Where n_1 is the number of pupils who received a grade A, n_2 is the number of pupils who received a grade B, n_3 is the number of pupils who received a grade C, n_4 is the number of pupils who have received a grade D.

The reference level P_r is defined as the maximum possible level that can be achieved by the whole class, it is defined as

$P_r = \sum 5 \cdot n,$

Where n is the total number of pupils.

Using the data of table No. 3, we calculate K_a - the learning coefficient at the ascertaining stage of the experiment, and K_f - at the formative stage. Accordingly, we define the learning success rates at the ascertaining (K_a) and formative (K_f) stages according to the formulas

$K_a = P_{aa} / P_r,$

$K_f = P_{af} / P_r$

Where P_{aa} and P_{af} – the realized levels, respectively, at the ascertaining and formative stages of the experiment.

The levels at the ascertaining and formative stages of the experiment are equal to:

$P_{aa} = \sum^n n_1 \cdot 5 + n_2 \cdot 4 + n_3 \cdot 3n_4 \cdot 2 = 6 \cdot 5 + 15 \cdot 4 + 1 \cdot 8 + 2 \cdot 2 = 118$

$P_{af} = \sum^n n_1 \cdot 5 + n_2 \cdot 4 + n_3 \cdot 3n_4 \cdot 2 = 8 \cdot 5 + 20 \cdot 4 + 2 \cdot 8 + 2 \cdot 1 = 138$

The reference level for both stages is

$\sum^n n \cdot 5 = 31 \cdot 5 = 155$

From these data, we calculate the student learning rates at the ascertaining and formative stages of the experiment.

$K_a = P_a / P_r = 118/155 = 0.76$

$K_f = P_a / P_r = 138/155 = 0{,}9$

The difference in the success of teaching pupils of an inclusive class at the ascertaining and formative stages is

$\Delta K = K_a - K_f = 0.9 - 0.76 = 0.146$

Thus, we implemented the levels and calculated the pupils learning ratios in the ascertaining, formative, and control stages of the experiment.

At the *control* stage, measurements were taken and positive dynamics were revealed. The significance of the obtained results of the conducted research is proved by a significant change not only in quantitative but also in qualitative indicators.

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