

Digital technologies aimed at the development of personal and professional readiness in the work of teachers in inclusive education

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Abstract — The relevance of the studied problem is due to the need for the search for qualitatively new ways and means of professional training for future teachers that meet the challenges and requirements of the modern world. On the one hand, there is an introduction of digital educational technologies based on the technical progress of modern society, on the other hand, there is the necessity to help students with disabilities. The purpose of the article is to prioritize digital technologies in teacher training as a means of overcoming reproductive trends in the process of their professional training and as an educational resource that contributes to the positive self-determination of students in the profession and management of the content of their own professional development. The article discloses two stages of professional training: personal readiness for professional activity in the conditions of inclusive education and the stage of preparation of the methodological support of the educational process, which is based on the inclusion of digital technologies as an enhancement tool of the future teachers' professional competencies development. Each stage has clearly substantiated content and diagnostic methods. The results are presented as a summary of the pedagogical activities of teachers and students' vocational and educational activities, proving the effectiveness of training in a professional context and practical saturation with communication elements, which, in turn, helps future teachers to understand the prospects of their professional development. The materials in the article can be used by specialists both in the field of teacher training and in teacher training courses.

Keywords — *digital technologies, inclusive education, students with disabilities, personal and professional readiness, adaptive module.*

I. INTRODUCTION

The development of digital technologies is an adequate response of the education system to the processes of integration, globalization and informatization of society in the world. The modern view of foreign and domestic researchers is expressed in the fact that the decisive pedagogical goal of the use of digital technologies is the intensification of all levels of the educational process [7, 8].

According to the national project in the field of education, which will be implemented until 2024, one of the federal projects is the digital educational environment, as a result of the implementation of which a network of digital education centers for children "IT club" will be established. Coverage of students in such centers will be 136 thousand people by 2024.

Based on this, there is no doubt that the use of information and communication technologies and electronic educational resources in educational institutions is an urgent task.

The effectiveness of using digital technologies in the educational process lies in the fact that this learning method makes it possible to individualize a knowledge acquisition based on the personal characteristics of students, with this approach, both a student and a teacher are subjects of education. Another advantage of innovative methods in education is that a student is able to not only understand information through the visual and auditory sensory organs at the same time but also actively participate in the cognition of this information [4].

According to domestic and foreign researchers [5, 9, 10, 11], such features for the use of digital technologies become a condition for the quality and effectiveness of the educational process: individualization of education; the use of innovative methods; the use of a new generation of electronic educational tools; the organization of effective collective educational activities; increasing free access to educational information resources.

Digital technologies implement an individual approach, which is always noted by teachers practitioners as a significant advantage as compared with traditional methods. These are the possibilities of choosing an individual trajectory for studying educational material, regulating the pace of its mastery, activating the intellectual and emotional processes of its perception, comprehension, and interpretation [10].

Methods of individualization and activation of learning developed in the framework of innovative pedagogical technologies are of particular importance for the effective educational activities of students, namely: visual teaching methods of e-learning (multimedia lectures, electronic presentations of teaching material); discussion methods (debates, discussion groups, computer conferences, nominal group methods, brainstorming, forums); collective teaching methods (simulations, role-playing games, educational games, telecommunication projects, webinars); methods of educational control and self-control (electronic testing) [10].

To overcome the negative consequences [10] of the use of information technologies in the educational process, it is

necessary that communication means, software, workplace organization, etc. comply with the sanitary norms and rules established by this law, are certified for the use in educational institutions. The use of these technologies should correspond to the standard time, depending on the age of students. Moreover, a student in the process of mastering new information should not only reinforce the material received but also be able to use it in the form of skills.

The modern educational information environment poses new challenges to a teacher, such as advising on the preparation of an individual educational route; the development of individual educational paths, based on the difference in attainment levels of students, the desired degree of individualization of the educational process, thereby a teacher must have a greater degree of competence than before the introduction of information technology in the educational process. Also, a teacher needs to demonstrate their own abilities to see the technological, organizational and socio-psychological possibilities of obtaining the maximum pedagogical result. But in addition to the new challenges that are posed to a teacher, the traditional ones do not leave the learning process, they also perform the functions of a leader, informer, educator. This article presents the scientifically based experience in implementing digital technologies based on the content of the subject "Fundamentals of inclusive education"

The methodological basis of our study is philosophy as a science of the universal laws of the development of nature, society, and thinking; psychology as a science about the laws of development and functioning of psyche as a special form of life; pedagogical psychology as a science that studies the psychological problems of training and education, including for the implementation of inclusive education.

The study sources are fundamental provisions:

- on the unity of consciousness and activity (B.G. Ananyev, A.G. Asmolov, B.S. Bratus, L.S. Vygotsky, V.V. Davydov, V.P. Zinchenko, A.N. Leontyev, A.V. Petrovsky, S.L. Rubinstein);

The following things are essential in terms of conceptuality:

- theories and concepts of personality presented in domestic and foreign psychology (A.L. Zhuravlev, V.P. Zinchenko, B.F. Lomov, G. Olport, A.V. Petrovsky, K. Rogers, D.I. Feldstein, and others);
- theories and concepts of a subject in general and a subject approach in particular (K.A. Abulhanova-Slavskaya, B.G. Ananyev, L.I. Antsiferova, S.K. Bondareva, A.V. Brushlinsky, A.A. Derkach, A.L. Zhuravlev, V.V. Znakov, etc.);
- concepts of psychological mechanisms of development of the semantic sphere of personality (E.Yu. Artemyeva, B.S. Bratus, L.S. Vygotsky, A.N. Leontyev, D.A. Leontyev, A. Lobok, S. Muddy, V.F. Petrenko, K. Rogers, S.L. Rubinstein, V. Frankl, and others);

- concepts of psychological mechanisms of understanding (A.A. Brudny, S.A. Vasiliev, V.P. Zinchenko, V.V. Znakov, E.E. Sapogova, A.N. Slavskaya).

II. STUDY METHODS

In December 2006, the UN General Assembly adopted the Convention on the Rights of Persons with Disabilities, which enshrined the fundamental rights and freedoms of the individual with respect to people with disabilities, the first comprehensive human rights treaty of the 21st century. In 2012, the Convention was signed by 155 states, 126 states, including the Russian Federation, ratified it. In 2012, Federal Law No. 46-FL On Ratification of the Convention on the Rights of Persons with Disabilities entered into force.

The Convention changes the understanding of disability, recognizing that disability is an evolving concept. It is "the result of the interaction that occurs between people with impaired health and relational and environmental barriers and which prevents their full and effective participation in society on an equal basis with others" [2]. Thus, the Convention recognizes that a person is disabled not only because of the limitations that he or she has, but also because of the barriers that exist in society. Ratification of the Convention marks the state's intention to create a material environment for the full life of a disabled person — a full member of society, to develop an inclusive education system [1].

The full implementation of the provisions of the Convention has contributed to the adoption of important legislative documents whose action is aimed at improving the quality of life of people with disabilities.

According to the official statistics in Russia, there are about 13 million people with disabilities, which is 9.2% of the population, according to the unofficial data, there are 25 million people with disabilities, while the number of people with disabilities increases by 1 million every year. According to the official data, in the academic year, 2015–2016, about 467 thousand children with disabilities and children with special health needs (SHN) studied in Russian schools.

Recently, the model of an inclusive society, the accessibility of education and services that determine the quality of life for people with disabilities, is being increasingly promoted. However, when implementing this model, it must be understood that inclusion is not only the creation of a barrier-free, architectural and social environment, it is also the provision of accessibility of services, including education.

Inclusive education — ensuring equal access to education for all students, taking into account the diversity of special educational needs and individual opportunities (P. 1) [3].

Professional educational organizations and educational institutions of higher education must create *special conditions* for the training of teachers and education for students with special health needs (P. 79) [3].

In order to create legal, economic and institutional conditions conducive to the integration of people with disabilities in society and to improve their standard of living, the Government of the Russian Federation dated December 1,

2015 No. 1297 extended the validity of the State Program "Accessible Environment" for 2011–2020.

The study of the psychological and pedagogical conditions of the educational environment using digital technologies for the implementation of inclusive education in Russia is determined by the following tasks: training teachers to work in an inclusive education environment; development of the necessary methodological support for the implementation of inclusive education; inclusion of informatization of education to prepare teachers for work in an inclusive education environment.

Stage 1. Understanding the essence of inclusive education, the critical attitude of teachers towards the opportunities and limitations of inclusion are a factor determining the success of the introduction of such a model of teaching children with special health needs in a general education school.

In this regard, we determined a goal: to study the personal readiness of future teachers of inclusive education as a direction of their own professional activity; to study the professional readiness of future teachers of inclusive education as a direction of their own professional activity.

The study of the personal and professional readiness of teachers to implement inclusive education was carried out on the basis of the study of the opinions of third-year students, future teachers, and teachers who have 3–5 years of experience, but who do not have professional experience in inclusive education.

The study of the characteristics of the personal readiness was carried out by writing "Essay" on the topic "Inclusive education in the modern world", the study of the characteristics of the professional readiness - based on the author's questionnaire "The teacher competencies' of inclusive education."

The following conditions were set for writing an essay: express your own attitude to the essence of inclusive education, explain, give an example; to think over the structural content of the essay.

The objective of the study was to study the interest and deep understanding of the problems associated with inclusive education.

Three criteria for evaluating the study, the method of "Essay" were identified: aimed at studying the perception of inclusive education among future teachers: "attitude", "depth", "interest".

The study of the professional readiness of future teachers of inclusive education as a direction of their own professional activity was based on a survey highlighting the presence or absence of teacher competencies that implement their professional activities in vocational education. To do this students and teachers were invited to imagine that they engage in their pedagogical activities in an inclusive education environment and, based on the list of competencies, highlight the competencies that, according to the respondents, have already been formed.

The inclusive competence of teachers is an integrative personal education, which determines the ability to carry out professional functions in the process of inclusive education, taking into account different educational needs and ensuring the inclusion of a child with special health needs in the educational institution and creating conditions for their growth and self-development.

Survey form

Groups of professional competencies of teachers working in an inclusive education:

1. "General professional competencies."
 - Able to take into account the general, specific and individual characteristics of the development of children, the regulation of human behavior and activity at various age levels;
 - Ready to use diagnostic methods for the development, communication, activities of children of different ages;
 - Ready to organize various activities: game, educational, subject, productive, cultural and leisure;
 - Able to organize joint activities and interpersonal interaction of subjects of the educational environment;
 - Able to use health-saving technologies in professional activities, take into account the risks and dangers of the social environment and educational space
2. "Knowledge of the psychological characteristics of the development of children with SHN"
 - To know the structural features of the psyche and the laws of its development in ontogenesis and phylogenesis;
 - To know the development options for various types of dysontogenesis;
 - To know and apply in practice qualitative and quantitative methods of psychological and pedagogical diagnostics aimed at identifying developmental characteristics;
 - To know the basic principles of professional ethics in psychological and pedagogical activity;
 - To know the models of the organization of inclusive education.
3. "Organization of the learning process."
 - Ready to use knowledge of various approaches to teaching children with SHN;
 - Ready, taking into account the peculiarities of the development of a child with SHN, to model the main educational programs for students of preschool, primary school age and adolescence;
 - Able to organize joint and individual activities of children with different types of developmental impairments in accordance with their age, sensory and intellectual characteristics;
 - Ready to apply the recommended methods and technologies to solve diagnostic and correctional development problems;

- Able to effectively interact with teachers of an educational institution and specialists in the development of students in communicative, game and educational activities
 - Able to prepare educational routes and individual development plans for a child with SHN in inclusive education;
 - To create a subject-developing environment in an educational institution in an inclusive education environment.
4. "Organization of the educational process."
- Ready to use the knowledge of various theories of education and development, to organize the educational process of students of preschool, primary school age and adolescence;
 - Ready to organize various activities: game, educational, subject, productive, cultural and leisure;
 - Able to organize joint activities and interpersonal interaction of subjects of the educational environment;
 - Able to control the stability of his emotional state when interacting with children with SHN and their parents.
5. "Organization of the conditions of socialization."
- To organize the sociocultural space of EI that activate the socialization of children with SHN;
 - Able to use diagnostic methods and procedures used for the criterion score of social and personal psychological adaptation of students with SHN;
 - Able to prepare an individual card of rehabilitation and socialization of students with SHN;
 - Able to use the potential of the classroom team for the successful socialization of a student with SHN.

A special place in the organization of inclusive education is given to the coordination of all interested parties in the organization of the educational process:

6. Organization of the coordination activities:

Coordinator is a member of the administrative group: creating an inclusive culture, developing an inclusive policy and introducing an inclusive practice.

Coordinator is a member of an interdisciplinary team of specialists: the function of stimulating and uniting the teaching staff, the organization of work with parents.

"Professional competence":

- Able to organize the work of the service of psychological and pedagogical support and their own in relation to a specific child
- Able to use the criteria for evaluating the effectiveness of supporting a child with SHN.

Analysis of the results of the methodology was carried out on the basis of a quantitative analysis of the respondent choice: 70–100% — high level, the respondent identifies the possibility of realization of 18 or more competencies; 30–70%

— average level, the respondent identifies the presence of 8 proposed competencies; 0–30% — low level, the respondent identifies the presence of 8 or less competencies.

Stage 2. The implementation of inclusive education requires a special methodological support. The professional readiness to create such support, based on the educational standard and special educational needs, requires a teacher to be able to prepare the educational process for children with SHN, based on the issues of correctional pedagogy: remedial, educational and preventive, aimed at the prevention of social disadaptation. The ability to develop a special educational route and, moreover, offer an appropriate course of individual work, formed the basis for studying the methodological competence of students and teachers to work in inclusive education.

III. RESULTS OF THE STUDY AND THEIR DISCUSSION

In total, about 53 respondents took part in the study. Among them: 39 3rd-year students of the Pedagogical Institute of the Pacific State University and 14 teachers with experience in a comprehensive school, but not in inclusive education.

The first criterion revealed a positive student attitude — 83, 1%; a negative student attitude — 1, 8%; a neutral student attitude — 15, 1%.

The second criterion: 66.1% of students wrote essays deliberately, 33.9% did not sufficiently disclose and reveal the nature of their work.

According to the third criterion, the percentage of disinterested respondents (24.5), interested respondents (75.5%).

The percentage of the results of the "Essay" method analysis for teachers is as follows: a positive respondent attitude — 81.3%; a negative student attitude — 1.6%; a neutral student attitude — 17.1%. According to the second criterion, the results show the following: 67.5% of respondents wrote essays deliberately, 32.5% did not sufficiently disclose and reveal the nature of their work.

According to the third criterion, the percentage of disinterested respondents (21.6%), interested respondents (78.4%). These results only slightly differ from the results of 3rd-year students of future teachers. That is, without creating special conditions, the personal readiness for the implementation of professional activities in an inclusive education does not develop, and is based only on the humanistic component of the personality of a specialist.

Thus, all respondents have positive results for all three criteria. These people when writing a certain type of essay expressed their thoughts, quoted various teachers and examples from personal experience, which proved the positive side of the respondents' interest and their attitude towards inclusive education. It is recorded about respondents who do not have sufficient information about inclusive education and are not interested in it. Some of them do not also accept inclusive education as a positive fact or want to leave education as it is at the moment. To a large extent, the personal readiness of teachers for inclusive education of future teachers is positive, despite the great responsibility, because

the future inclusive culture of a particular educational organization will largely depend on their attitude and competence.

The results of studying the professional readiness of students and teachers to implement inclusive education showed the following:

Only 9% of the 3rd-year students have an average level of professional readiness for work in inclusive education, the rest have a low one. 11% of teachers with experience have an average level, while the rest have a low one. This shows that both students and teachers have the same difficulties in the readiness to implement competencies associated with special knowledge and without specially created conditions aimed at building knowledge, skills, and abilities to work with students with SHN — it is difficult to talk about the possibility of implementing an inclusive education practice.

The focus in the educational process on the building of special knowledge in the field of special pedagogy, which is necessary for all professionals who implement professional activities in inclusive education, is best carried out using information technology.

By information technology we mean the use of the Internet's information resources in the educational process in full-time and part-time form and in the external system. The technology provides an increase in the effectiveness of the educational process, and also provides each student with the opportunity to immerse themselves in the problem to realize its magnitude and go through a situation of personal self-determination — this is important. According to it, it is possible to build a personal readiness to work as a teacher in an inclusive education environment, especially of that group of students who are critical of the introduction of inclusive education. However, it is not enough to create conditions for immersion in the Internet to search for information, it is necessary to create psychological and pedagogical conditions so that the process of mastering the information takes place at a high level, for that the information search tasks are supplemented by a system of work aimed at dividing the information flow into components (information analysis) and generalization of conclusions (synthesis of knowledge). To this end, the course "Fundamentals of Inclusive Education" was accompanied by a system of lectures and practical classes, and each type of independent work included the mandatory table completion. Approximate topics of practical tasks and types of work aimed at mastering the content of the material:

1. The regulatory support for inclusive education at the present stage

TABLE I. TASK: BASED ON THE STUDY OF INTERNATIONAL LEGAL ACTS TO DRAW UP A SUMMARIZING TABLE

Name of a document	Principles	Children's rights, which allow for inclusive education
The UN Convention on the Rights of the Child (1989)		
The World Declaration on Education for All (1990)		
The UN General Assembly Declaration on the rights of the		

mentally retarded persons (1971)		
The UN Declaration on the Rights of Persons with Disabilities (1975)		
The Salamanca Declaration on Principles, Policy and Practical Activities in the Field of Education for Persons with Special Needs (1994)		
The convention to combat discrimination in the area of education (1960);		
The Convention on the Rights of Persons with Disabilities (2006)		

2. Inclusive education: state and prospects

TABLE II. TASK: WHEN STUDYING MATERIALS, DRAW UP A COMPARATIVE TABLE "EXPERIENCE IN THE IMPLEMENTATION OF INCLUSIVE EDUCATION IN DIFFERENT COUNTRIES OF THE WORLD"

The level of education	The normative base adopted in this country	Economic support	Model and / or forms and methods of psychological and pedagogical support for children with SHN in inclusive education
Country			
Preschool education			
Primary school education			
Secondary education			

3. Formation of a tolerant attitude towards people with SHN

TABLE III. TASK: TO DRAW UP A COMPARATIVE TABLE "TOLERANT / INTOLERANT ATTITUDE TOWARDS PEOPLE WITH SHN" (DESIGNATE FROM 5 TO 10 DEMONSTRATIONS)

Demonstration of a tolerant attitude	Demonstration of an intolerant attitude
1...10 demonstration	1...10 demonstration

And one of the final topics, for comparison: "Technology of psychological and pedagogical support of a special child's family in an educational organization."

TABLE IV. TASK: TO PRESENT THE EXPERIENCE OF USING VARIOUS FORMS OF WORK WITH FAMILIES OF CHILDREN WITH SHN. IT CAN BE:

Groups of forms of work with families raising a student with SHN	Forms of work with families raising a student with SHN
-information-analytical forms:	
cognitive forms	
leisure forms	
visually traditional forms	
visually informative forms	

The effectiveness of the influence of this stage on the readiness for professional activity in the conditions of inclusive education was determined on the basis of an analysis of the attitude and quality of materials, methodological

support for organizing the educational process for students with SHN.

The results of the 2nd-stage of the study are aimed at studying the abilities and skills to build the educational trajectory of a student with SHN, methodological support.

At the same time, it was understood that it was necessary to create conditions in order to implement an individual educational route for people with SHN. Special conditions for education for students with disabilities — conditions for training, education and development of students, including the use of special educational programs and methods, special textbooks, teaching aids and didactic materials, special technical teaching aids for collective and individual use, the provision of assistant services (assistant), providing students with the necessary technical assistance, group and individual remedial classes, providing access to the buildings of organizations engaged in educational activities, and other conditions without which it is impossible or difficult to master educational programs for students with SHN (P.79) [3].

The conditions are implemented at three levels of software: 1. an adapted educational program (AE); 2. a set of educational and methodological documentation that regulates the content, organization and assessment of the quality of training of students and graduates with SHN and students with disabilities in the training course (specialty) of higher education, including the curriculum, the calendar training curriculum, the work programs of modules (disciplines), determines the volume and content of education in the training course, the planned results of mastering of the educational program; 3. the special conditions for educational activities.

The development and implementation of AEP is focused on the following tasks: the formation of competencies, established by the relevant federal state educational standards, for students with SHN and students with disabilities; the creation in the educational organization of higher education of special conditions necessary for education by persons with SHN and disabled people, their adaptation and socialization; the improvement of the accessibility and quality of education for persons with SHN and disabled people; the possibility of forming an individual educational trajectory for a student with SHN or a student with disabilities; the formation of a tolerant sociocultural environment in the educational organization.

It is possible to present the adaptation module as an element of the adapted educational program of higher education, aimed at minimizing and eliminating the influence of the health restrictions of students with SHN and students with disabilities on the formation of general cultural, professional competencies, as well as individual correction of educational and communication skills in order to achieve the planned results of mastering the educational program. At the same time, the educational organization should provide qualified assistance to the adequate selection of adaptation modules for students with SHN and persons with disabilities, taking into account the assessment of the characteristics of their psychophysical development and individual educational needs. The selection of adaptation modules is carried out by students with SHN and people with disabilities depending on their individual needs and is fixed in an individual curriculum.

The module is aimed at breaking the mental tension that a student with special educational needs may experience, which may be due to disadaptation factors: psychological, social, etc. Highlighting a significant module, we lay it at the basis of the pedagogical design of an adaptive program, such as, for example, “Adaptive information and communication technologies”, “Fundamentals of intellectual work”. The presented topic shows that students and teachers who have experience in education after mastering the course “Fundamentals of inclusive education” not only decided on personal and professional readiness to work with students with SHN, but also demonstrated their willingness to work out a methodological support (95% of respondents), presented for final certification a methodological guidance aimed at enhancing and developing the personality of a student with SHN.

IV. CONCLUSION

Thus, the analysis of this study justifies the need for the implementation of digital technologies in the mastering of modern knowledge, since this approach fully allows the student to self-determine personally in relation to the knowledge gained and highlight the existing experience in the implementation of professional activities.

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