

DIGITAL TECHNOLOGIES IN INCLUSIVE EDUCATION

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Abstract

In the article the authors appeal to one of the relevant issues – using digital technologies in inclusive educational process. The main concepts of the study are analyzed: technology, inclusive education, digitalization and digital technologies. The authors justify the specifics of using specific digital tools in correctional and developmental work with students with physical and intellectual disabilities.

The results of the study of the digitalization in educational organizations of the Republic of Tatarstan are also presented. These results allowed to plan specific steps for the development of professional competencies among teachers of all educational levels in using digital technologies in inclusive educational process on a person-centered basis.

Keywords: inclusive education, digitalization, digital technologies, person-centered approach, students with disabilities.

► Nowadays serious changes take place in all spheres of our society. These changes are connected with the intentions of many governments to improve the technological progress in their countries, the quality of their citizens' life. In modern conditions the technological progress can't be realized without the intensification of digitalization.

Currently, digital technologies are widely used in the education system: many teachers in educational organizations have already mastered distance learning tools, database automation and processing tools, video-audio tools, etc. At the same time inclusive education has become an important issue in education at all levels. Therefore the process of digitalization in inclusive education has attracted much attention of teachers, defectologists, psychologists, special education teachers. This area of research is still not deeply studied; there are many important aspects of this issue such as: finding the right digital technologies for children according to their mental and physical disorders, teachers' digital competence in inclusive education, psycho-pedagogical support in digitalization, students' motivation in learning process using digital tools.

Nowadays Research Institute of Pedagogical Innovations and Inclusive Education of Kazan Innovative University named after V. G. Timiryasov (Kazan, Russia) realizes the research in the framework of the federal innovation project «Design and implementation

of training programs for pedagogical, scientific and scientific-pedagogical staff in the field of digitalization of inclusive education». The main idea of this innovative project is the search, analysis and correct selection of digital technologies for further application in inclusive education system using person-centered approach. In order to realize this idea we carry out 5 steps of research:

1. Exploring digital technologies available for inclusive education.
2. Analysis of digital technologies in the context of applying them for children with special disorders.
3. Characterizing digital technologies and exploring the methodology that can foster an inclusive educational practice and correctional practice.
4. Identifying risks and barriers of digitalization in inclusive education.
5. Designing and testing training programs «Digital technologies in inclusive education» for teachers at all education levels.

The theoretical study was carried out by us and was aimed at identifying the essence of such concepts as: «technology», «inclusive education», «digital technologies», «person-centered approach». The concept «technology» is studied by many Russian and foreign scientists: L. R. Fazleeva [4], I. P. Volkov [7], D. Z. Akhmetova [1], M. A. Choshanov [2]. Any pedagogical technology can be considered as a set of methods and techniques, which are used in the educational process. In our opinion, a wide definition of «pedagogical technology» was given by the famous scientist I. P. Volkov: «Pedagogical technology is a description of the process of achieving the expected learning outcomes» [7].

Digitalization in education is associated both with the automation of the educational process and with the construction of an educational system for students at their own pace. Kaur Harpreet writes that «digitization refers to the process of translating a piece of information such as a book, journal articles, sound recordings, pictures, audio tapes or videos recordings, etc. into bits» [5]. Using digital technologies in a right way allows to intensify and accelerate the students' success, helps students to assimilate the material, makes lessons more engaging, strengthens the interaction between students and teachers; the lessons are carried out with positive emotions. An appropriate definition of educational technology is given by UNESCO: «systematic way of designing, carrying out and evaluating the total process of learning and teaching in terms of specific objectives and employing a combination of human and technical resources to bring about more instruction» [3].

Another important concept of our research is inclusive education. Inclusive education is one of the main trends in the development of educational systems in the world. It provides all children without exception (children with disabilities, gifted children, vulnerable children, migrants, etc.) to receive a quality education on an equal basis with other children, to participate in the life of the kindergarten, school, college, University, to adapt to society, to participate in social and cultural life of society.

Digitalization of inclusive education, in our opinion, should be realized taking into account the specifics of children disorders (emotional, behavioral or physical), because it is necessary to provide students with assistive technologies that facilitate their motor skills (for children with musculoskeletal disorders), sensory perception (for children with visual and hearing impairments), education material assimilation (for children with intellectual disabilities). While designing the digitalization of the inclusive education system, we used the person-centered approach as a methodological basis. In modern researches this approach is considered as «a system of interrelated concepts, ideas, methods and actions to ensure and support the processes of self-knowledge, self-building and self-realization of the child's personality, the development of his/her unique individuality» [6]. The person-centered approach implies the diagnostics of student's personal characteristics such as: inclinations and abilities, cognitive processes (perception, attention, imagination, memory), bio-psychological features (gender, age), cultural background, individual skills, knowledge, interests, aspiration. At the same time the person-centered approach implies taking into account psychopedagogical characteristics of children with special disorders.

We developed the model of using special digital technologies in educational and correctional work with children with disabilities (see Table 1).

Table 1 . Model of using special digital technologies in inclusive education

Disorders	Digital technology	Benefits
Hearing impairments	Laboratory of Virtual Reality ZPACE	<ul style="list-style-type: none"> improvement of hearing perception due to active and passive multisensory sound stimulation; improvement of spatial and speech hearing.
	Software «I-communicator»	<ul style="list-style-type: none"> the program converts speech into text and gesture formats. A communicative environment is being formed for deaf children who speak written and signed language.
Visual impairments	Laboratory of Virtual Reality ZPACE	<ul style="list-style-type: none"> improvement of visual perception through active and passive multi-sensory visual stimulation
	Universal digital device for reading, listening to tutorials, reference books, textbooks, etc.	<ul style="list-style-type: none"> playback of «talking» books, converts text into voice format using built-in speech synthesizer
Speech disorders	Laboratory of Virtual Reality ZPACE	<ul style="list-style-type: none"> improvement of speech development through auditory-visual perception.
	Digital platforms for speech development (for example, AR Tutor)	<ul style="list-style-type: none"> improvement of oral speech, conversational skills, vocabulary
Musculoskeletal disorders	Laboratory of Virtual Reality ZPACE	<ul style="list-style-type: none"> training of motor functions, improving motor skills, adjusting the accuracy of limb movement.
	Digital platform «Planty Go»	<ul style="list-style-type: none"> the work of the vestibular apparatus is improved, the muscles of the lower back and lower extremities are strengthened. This platform helps to improve memory, attention, speech, spatial representations, increase the ability to self-control; spatial representations are formed.
Mental retardation	Laboratory of Virtual Reality ZPACE	<ul style="list-style-type: none"> reduces anxiety in children, discomfort, improves the psycho-emotional state; develops emotional intelligence.
	Mobile App «AR Tutor»	<ul style="list-style-type: none"> development of communication skills, thinking, attention, memory, visual-spatial representations.
Intellectual disorders (including autism spectrum disorder)	Platform Cognifit	<ul style="list-style-type: none"> exercises are aimed at training and improving the mental abilities of the child.
	Mobile Apps: e-PECS, «My communicator», «Autism: communication», «Language and cognitive therapy»	<ul style="list-style-type: none"> improvement of conversational skills

At the same time, the following barriers should be taken into account when introducing digital technologies into inclusive education:

- cognitive (while the perception of educational material through digital technologies);
- content barriers (the language of the working device or software does not match students native language);
- didactic (students are not ready to study using digital technologies, and the teachers don't have facilitation skills in inclusive education).

In order to enhance teachers' competence in using digital technologies in inclusive education we developed the program «Person-centered selection and application of digital tools in correctional work for students with physical and intellectual disorders». The program includes the following chapters:

1. The legal basis of digitalization in inclusive education.
2. Methodological and psycho-pedagogical basis of digitalization in inclusive education.
3. Selection of digital technologies according to students' nosologies.
4. Designing inclusive learning environment using digital technologies.
5. Person-centered approach to using digital technologies in correction of physical and intellectual disorders.
6. Educational consulting for parents in using digital tools in inclusive education process.
7. Practice and final exam: mini-projects of using digital tools in inclusive education and correctional work.

In order to assess the level of digitalization in inclusive educational organizations in Tatarstan Republic (Russia) the special survey was conducted. Teachers of 226 kindergartens, 361 schools, 41 colleges and 140 teachers of Kazan Innovative University named after V. G. Timiryasov participated in it. The results of the study are presented on the Diagram 1.

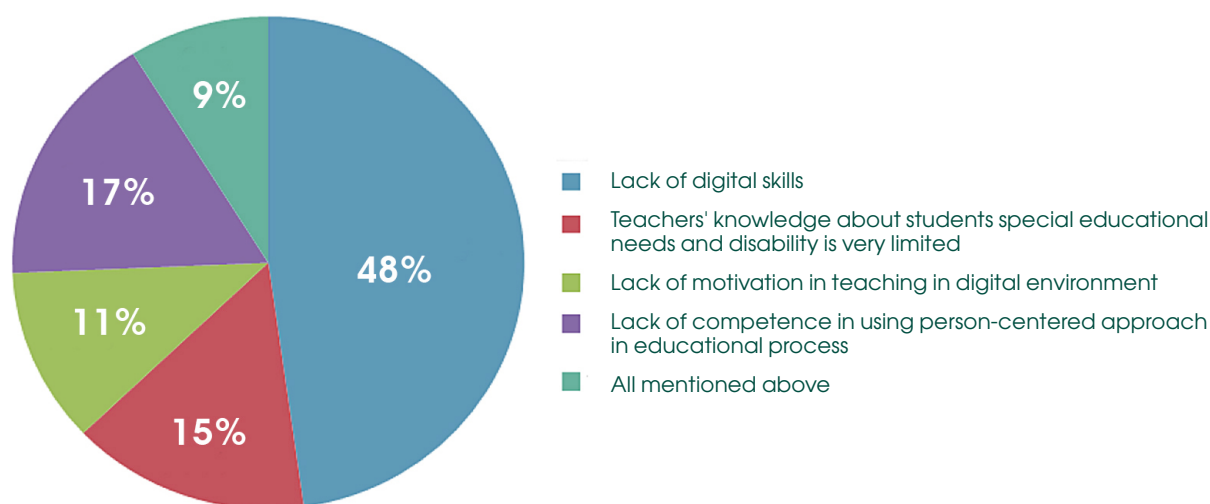


Diagram 1. The results of the teachers' survey to assess level of digitalization in inclusive education.

According to these results we can notice that that many teachers (54 %) lack digital skills and deeper conceptual understanding of how to use person-centered approach in inclusive educational and correctional process (19 %). This proves our hypothesis about the importance of enhancing teachers' competence in using digital technologies in inclusive education in order to improve the effectiveness of educational and correctional work for students with disabilities.

CONCLUSION

Using digital technologies in inclusive education is a complex work which requires the knowledge of the methodological and psycho-pedagogical foundations of inclusive education, the ability to carry out correct selection of digital technologies, taking into account the nosology of students and the ability to implement a person-centered approach to teaching students using digital tools. Kazan Innovative University named after V. G. Timiryasov plans to develop, test training programs for teachers in the field of using digital technologies in inclusive education and to spread this experience in Tatarstan and other Russian regions.

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