

Role of Information and Communication Technologies in Modern Rehabilitation Process of Inclusive Education

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Abstract—The introduction of information and communication technologies is one of the main problems in the organization of school education of students with disabilities. Means of informatization can play a significant role in creating a barrier-free educational environment. Information computer technologies pursuing special educational and rehabilitation purposes are a special set of activities that optimally ensure the implementation and assimilation of state educational programs and standards. Information and communication technologies are creating a system of measures aimed at eliminating or compensating, as much as possible, the limitations of life. The use of Internet resources in distance learning of such students contributes to their familiarization with the world information and educational field, and the possibility of obtaining knowledge that meets the individual needs of the individual.

Keywords—*information technologies; communication technologies; rehabilitation process; information culture; inclusive education; pedagogical support*

I. INTRODUCTION

Informatization has firmly entered the life of modern society, continuing to open up new areas and areas of its application, creating tremendous changes and modernization of the global and local levels. At the state level, all key areas that ensure the development of Russian society are included in the process of informatization. ICT (information and communication technologies) have become an integral part of our lives, and the new education system is increasingly part of the global information and education space. Informatization of school education is one of the largest innovations that appeared in the Russian school at the end of the last and the beginning of this century [1-16].

The main purpose and objective of this article is to expand the intellectual capabilities of man and the development of his critical thinking. The lightning speed of expansion of the knowledge accumulated by mankind in the modern world has reached unprecedented values. As a result, in the new Millennium has very changed the concept of learning: the

place of assimilation of knowledge came instead of the art of using information.

The study and practice of such teachers and scholars as Z. A. Andreyko, S. M. Anokhin, N. I. Erchova, T. G. Kudryashov, N. I. Novoazhimova, E. S. Polat and others show that information and communication technologies give the school a wide range of possibilities: demonstration lessons educational video clips or movies using the computer DVD player, TV, projector, demonstration of animated models, activating visual and auditory perception of information from multimedia media or from the Internet etc. Internet technologies play a special place in the educational process of the school, as the Internet is the largest, constantly updated information resource in the world. Practice shows that the Internet provides great opportunities for education. Students and teachers have access to modern achievements in all branches of science, to the transfer of a variety of formats of text, image, sound. Internet resources offer an infinite amount of text information in different languages. It gives an opportunity to get acquainted with the world practice, to present modern processes to students more clearly.

However, with obvious advantages, there are a number of problems associated with the use of the Internet in the educational process. E. Polat, I. I. Khomenko and other scientists note in their articles that the Internet is mainly mastered by students spontaneously and the task of the school, parents and society is to instill such moral values in children, to form such critical thinking that can protect them from "bad" Internet information. With the change of the educational paradigm in our country, it is necessary to change the paradigm of personal attitude and personal responsibility of teachers in the implementation of new teaching technologies. That is, we are talking about the formation of "information culture of the teacher", "information culture of the student", "information culture of parents" and "information culture of society".[1]

Thus, the informatization of education and the formation of information culture of the individual can occur only with the integration of ICT in the educational process, and not through its complete replacement. Awareness of man and his environment reaches incredible speeds and especially ICT affect this process. This is followed by changes in the form and quality of knowledge, followed by the type of culture. Therefore, the information culture of the individual today is considered as a holistic perception of the world, the organization of information processes of communication, analysis and evaluation of decisions. They develop the personality of the student in the conditions of modern society of information and mass communication, form the information culture of the student, intensify, improve the quality of education, and motivate to receive education, deepen interdisciplinary connections.

In the educational process, according to N. V. Kuzmina includes the following structural components: «the purpose, the content of education (educational information), and means of pedagogical communication, students and teachers." Based on this statement, the concept of the educational process opens in four components: management, content, organization, communication/communication, which is presented in the unity of its three elements: information, interactive, perceptual [1-5].

Having analyzed the ideas of such scientists as Babansky, V. P. Bepalko, E. V. Bondarevskaya, etc.), it is possible to present a model of the educational environment, which will include the following structural components: purpose, educational and practical information, means of communication, students and teachers, parents, didactic processes, educational material base of the school, the output of the educational environment in society. The matrix of modernization of the educational environment, considered in the works of O. V. Akulova, S. A. Pisareva, A. p. Tryapitsina, can be used as a basis for modernizing a modern school. The main purpose of these transformations should be the development of new pedagogical thinking, the formation of a team of like-minded teachers, the development of the school team, the formation of a unified information environment of society and school; education graduate with an established set of competencies. At the same time, the content of education (educational information), the means of pedagogical communication, and pedagogical technologies must meet modern requirements and "work" to increase the motivation of students, teachers and the final result. The emphasis is on the use of adaptive technologies, technologies for creating information and educational environment, educational technologies [1-5].

II. DISCUSSION

In the educational process, information and communication technologies open up prospects, as they expand the didactic field of the educational process. A distinctive didactic feature of ICT is to provide visibility and dynamic presentation of educational information, remote access to information resources, information support of all subjects and disciplines of the educational process, the ability to disclose and identify the creative individual abilities of the

student. Thus, with the skillful use of ICT tools, we are talking about the implementation of the principles of open education, formulated in the state program "New school".

The emergence of new didactic possibilities of information technologies that can be used and through which you can interact at a distance allows the new possibilities in the educational process. The most important properties of information technologies in the didactic aspect are the forms of information interaction in the educational process:

- the interaction of remote participants in the learning process between a teacher and a student or a group of students, for example, in e-mail correspondence, organization of discussions through teleconferences and video conferences;

- the interaction of participants in the learning process (teacher, students) with remote sources of information, for example, in the search and systematization of information, moving (navigation) on hypertext resources of the global network.

In the context of the GEF, the information educational environment of the educational institution includes: a set of information educational resources, including digital educational resources, a set of information and educational technologies, a system of modern pedagogical technologies that provide training in the modern information educational environment.

In our educational activities, we use interactive whiteboards at different stages of the lesson, and it all visualizes the learners information using electronic maps, tables, diagrams, photos, etc. with the help of an interactive whiteboard, we can simulate abstract ideas and concepts without referring to the computer, change the model, the location of the object on the screen or establish new relationships between objects. Using the interactive whiteboard, we present more information in less time, and students are more active in the classroom and better understand the complex material. The Internet, as the main channel of many ICT tools, also has didactic properties and functions, as it is the most global information and communication technology.[3]

The basic didactic properties of the Internet are:

- high speed of information transfer;
- possibility of one-way and two-way communication, ensuring the interactivity of the educational process;
- working conditions with hypertext and multimedia, etc.;
- implementation of the didactic component of the functioning of certain services and network services.

E-mail (e-mail) provides remote access, allows teachers and students to exchange text and graphic messages. In order to work in e-mail mode, users must be provided with a computer/laptop/tablet/smart phone, a printer and appropriate software. The delivery time of a message or information consists of the time the message is sent from the sender's device to the recipient's device, and the time after which the recipient will access his or her "mailbox". This type of

electronic communication allows users to work asynchronously, i.e. in a convenient non-synchronous (off-line) time scale. Computer networks in addition to the actual computer didactic properties include and proper telecommunications:

- transmission of messages and information that are stored in memory in advance in the form of files or computer programs or prepared immediately before sending;
- storage in computer memory or e-mail educational information with the ability to access it at any time;
- demonstration of texts and graphics on the screen of the device or with the transfer to the screen of another (projector);
- preparation and editing of text messages, both received and sent;
- usage and forwarding of computer training programs.

For didactic purposes, e-mail can be used to organize so-called "virtual training": the use of the "mailing list" mode, which makes it possible to communicate with groups of users. This type of communication can be attributed to the programs "What's app" and "Viber", which are most popular among owners of smart phones and tablets, where each message sent to the discussion group by any of its participants is automatically sent to all participants. One of the participants is a teacher. [4]

Thus, e-mail and similar means of communication can be used for non-verbal communication of participants in the educational process. This type of communication is also attractive from the point of view of time saving, as it allows communicating through the address links to the information source of the document databases. In the process of communication, subscribers do not necessarily have to be in place at the time of communication, but can exchange information asynchronously.

Teachers and students can use e - mail and the "What's app" and "Viber" programs in the following educational activities:

- the preparation for the classes,
- the search for the material on the Internet,
- the conducting the e-lessons, the class hours, etc.

Thus, e-mail and programs "What's app" and "Viber" can be widely used in the educational process.

The Internet provides all the above-mentioned opportunities, and they can be successfully used in the educational process. Didactic properties are thus determined by the effectiveness of the possibility of information exchange, including file, between the participants of the educational process.

Video (Skype) provides two-way communication between teacher and students. There is a simultaneous two-way transmission of video, sound with the ability to simultaneously send text, graphic documents, and links to information sources. There is a possibility of group classes and conference

lessons. Video communication allows you to fully apply in the learning process traditional and innovative forms of learning.

Electronic libraries are actively implementing the state program for the modernization of education. The library of the educational institution has been reformatted and acts as a new media center: the traditional book Fund has been supplemented with new working areas equipped with computers with Internet access and an electronic catalog. In the modern world, there is a decrease in human interest in printed sources of information as a result of the large-scale introduction of the latest gadgets. In education, information technology is changing the very essence of the creation, storage, processing and transfer of knowledge. ICT in the educational space can be briefly presented:

1. The interactive whiteboard transmits information in various formats, including in a dynamic form.
2. Educational TV programs.
3. Software for text, voice and video communication between computers.
4. E-learning materials, knowledge bases provide students with free access to information.
5. Electronic simulators - the latest multimedia technology created for working out of theoretical material in practice.

The use of ICT in the learning process makes it easier to assimilate the material through sound and visual impact on the student, increases the availability of knowledge through their more visual presentation – the use of video data and 3d-models.

The practical use of ICT in the educational process with the help of sound, color, graphics create a real environment of activity, demonstrate the practical importance of the material under study, expand the range of tasks implemented by the active involvement of students in the educational process, i.e. their direct management of educational activities, offers a new form of control over the activities of students, as well as participates in the implementation of General didactic goals (development of thinking, imagination, creativity, cognitive activity, etc.) and particular (development of algorithmic thinking style, the skill of using a PC, working with a large amount of information, translation of text information into graphic and numerical representation). Information activity of students is the core of the system, developing the information culture of the student's personality [5].

The project method with the use of multimedia technologies comprehensively demonstrates the practical value of these educational methods, allow students not only to get acquainted with various means of computer programs, but also to gain practical skills in creating multimedia applications. The term "multimedia" ("multi" - "many", "media" - "environment") means the simultaneous impact on the user through several information channels with the active role of the user. "Multimedia is interactive (interactive) systems that provide simultaneous work with sound, animated computer graphics, video frames, static images and texts." The use of multimedia technologies in project activities motivates

the development of students' interest in information technology in the educational process; improves the skills of students in the use of multimedia technologies and the creation of their projects; develops the skill of teamwork and teamwork. Project activities based on multimedia technologies: will allow to practically prepare the application of the acquired skills in educational and daily activities; develops creative abilities of students and forms skills of independent, group research and creative work, stimulates the development of critical thinking; encourages students to cooperate, etc.

Thus, on the basis of the considered aspects of ICT adaptation to the educational environment and taking into account the concept of Farmstead classification of students' activity, we can systematize students' products using ICT [1].

Research-database research, essay, abstract, report are the inevitable parts of the educational process, as art production-graphics, scanned drawings, photos, videos, animated videos. Below some notations are presented:

- Technical production is the computer model of object, schemes, and the figures in the animation format, geometrical modeling or designing.
- Spectacular products are the demonstration of yourself and your classmates in creative activity through multimedia through presentations, videos...
- Pedagogical production is the text, the presentation, the sites of the demonstration of the nature, fitness, quizzes, crosswords, etc. on the topics of school subjects.
- Methodological products are the new techniques and methods of the work in the tool environments.

Thus, it can be argued that the combination of traditional and information and communication forms of education increase the possibilities of the educational process and enrich it. Such projects include websites of educational and training institutions, which have become a universal means of solving many educational problems: information about the practical methodological body of the educational process, concepts and educational tools, virtual libraries, feedback channels, etc. School website is a mirror of all aspects of the school and not just its information component. Features of school websites that expand the educational process:

1. The teacher's private office.
2. The creative pedagogical workshops.
3. The broadcast of electronic conferences.
4. The access to electronic textbooks.
5. The demonstration of creative projects of students.
6. The professional workshops (workshop of the student's future profession).
7. The results of the school's cooperation with the region and the business environment, etc.

According to G. K. Selevko, it is the presence of "elements and technologies that are in relations and connections between

themselves and form a certain integrity and unity", the stability of unity and integrity of which is carried out at the expense of the integral properties of these elements and technologies. The concept of the educational process opens in four components: management, content, organization, communication (communication, which are presented in the unity of its three elements: information, interactive, perceptive).

After analyzing the ideas of scientists such as N. V. Kuzmina, E. V. Bondarevskaya, etc., it is possible to present a model of the educational environment in the modern rehabilitation process of inclusive education, which will include the following structural components: purpose, educational and practical information, means of communication (pedagogical and informal), students and teachers, parents, organizational forms of pedagogical activity, didactic processes, educational and material base of the school, the output of the educational environment in society.

The matrix of modernization of the educational environment can be used as a basis for the modernization of modern schools. The main purpose of these transformations should be the development of new pedagogical thinking, the formation of a unified information environment of society and school; education graduate with an established set of competencies.

At the same time, the content of education (educational information), the means of pedagogical communication, and pedagogical technologies must meet modern requirements and "work" to increase the motivation of students, teachers and the final result. The emphasis is on the use of adaptive technologies, technologies for creating information and educational environment and educational technologies aimed at the rehabilitation of students in an inclusive education.

The most important properties of information technologies in the didactic aspect are the forms of information interaction in the educational process:

- interaction of remote participants in the learning process with each other, for example, in electronic correspondence, organization of discussions through teleconferences and video conferences;
- Interaction of participants in the learning process with remote sources of information, for example, in the implementation of search and systematization of information, moving (navigation) on hypertext resources of the global network.

The use of interactive whiteboard by school teachers at different stages of the lesson visualizes information to students using electronic maps, tables, charts, diagrams, photos, etc. with the help of an interactive whiteboard, the teacher can simulate abstract ideas and concepts without referring to the computer, change the model, the location of the object on the screen or establish new connections between objects. Teachers note that using an interactive whiteboard, they can provide more information in less time, and students are more active in the classroom and better understand complex material. For example, «the use of an interactive whiteboard in mathematics lessons in high school allows students to present

three-dimensional figures, and promotes the development of organic unity of thought and design and practice of students.

The Internet, as the main channel of many ICT tools, also has didactic properties and functions, as it is the most global information and communication technology. The use of multimedia technologies in project activities motivates the development of students' interest in information technology in the educational process; improves the skills of students in the use of new technologies and the creation of their projects; develops the skill of teamwork and teamwork. Project activity on the basis of multimedia technologies: will allow to prepare practically application of the received skills in educational and daily activity; develops creative abilities of pupils and forms skills of independent, group research and creative work, stimulates development of critical thinking; encourages pupils to cooperation.

However, our technology implication experiment shows that this integration is a slow and complex process and depends on many factors, which include organizational factors (availability of equipment), the teacher factor (level of knowledge of modern technologies), and factors related to the technologies themselves.

We also experimentally found that the process of technology integration is cultivated by the school administration through the introduction of information and communication technologies in the school culture, as technology itself can not participate in educational reform, is a powerful tool for teachers in the process of reforming the educational environment. The percentages were established by us in the course of the experiment, using questionnaires and surveys to teachers and students, observation of lessons and extra-curricular activities with the use of these technologies. As a result, it has been found that 22% of teachers use ICT in their work, 50% of students in grades 5-9 own a personal computer at the user level, 52% of students in grades 10-11 - at the level of confident users. More than 10% of schoolteachers regularly use the Internet and other multimedia facilities of the school as a whole (Internet, computers, etc.).

Students, with homework, not having home computers and using the school, the more thoroughly do your homework, especially of a creative nature (reports, essays and messages). Moreover, the percentage of use of sites with ready written works is quite high-75%.

Information and communication technologies in inclusive education have three main roles:

- * Compensatory-technical assistance to facilitate traditional educational activities: reading and writing.
- * Didactic-the process of using modern technologies in General and change in this regard approaches to learning. There are many opportunities to use information and communication technologies as a didactic tool to create a suitable learning environment.
- * Communication — for communication technology-often related to the use of supportive alternative communication systems.

The main types of information and communication technology tools used to train persons with disabilities and capable of performing these functions are as follows:

- * Standard technologies-for example, computers that have built-in configuration functions for persons with disabilities.
- * available data formats, also known as alternative formats-for example, accessible HTML, talking books of DAISY system (Digital Accessibility Information System — electronic accessible information system); and "low-tech" formats such as Braille system.
- Assistive technology: hearing AIDS, devices for screen readers, keyboard with special capabilities, etc. Assistive technology is devices, products, equipment, software or services to enhance, support, or improve the functional capabilities of people with disabilities. The category of funds for rehabilitation includes individual funds — for example, devices to facilitate mobility (wheelchair), the system supports alternative communications, and hardware and software to facilitate access to the computer (for example, special keyboard, screen reader). The latest technologies that have emerged in the last two decades have fundamentally changed the availability of education.

III. CONCLUSION

Systematic monitoring of training activities and timely correction can also be carried out through ICT. "The use of testing programs at the stage of updating knowledge or testing the assimilation of the studied material allows one to objectively assessing the knowledge of students, and their use at home develops skills of control and self-control. They help to carry out ongoing, thematic and final checks, to constantly accumulate information about the results of training activities, in particular, the results of solving training tasks and creating projects" [3]. At the same time, control based on ICT becomes a platform for the development of self-assessment and self-control of students. The effective use of ICT in combination with traditional technologies increases ICT competence of students and interest in the subjects taught. When teaching students with disabilities, ICT act as special educational and rehabilitation technologies that ensure the implementation, assimilation of educational programs in the volume and quality provided by state educational standards. This is ultimately aimed at eliminating or possibly more fully compensating for the lost functions that led to the restriction of life.

In the educational process, information and communication technologies open up prospects, as they expand the didactic field of the educational process. A distinctive didactic property of these technologies is to provide visibility and dynamic presentation of educational information, remote access to information resources, information support of all subjects and disciplines of the educational process, the ability to disclose and identify the creative individual abilities of the student. Thus, with the skillful use of information and communication technologies, we are talking about the implementation of the principles of open education.

Adaptation of new information and communication technologies to the educational environment and educational process in the modern rehabilitation process of inclusive education is of great importance.

So the development of the entire information resource for the rehabilitation is the actual task in front of the modern education. The inherent connection between the education and humanity enables us to find the new methods of helping the people with different diseases. The best method of understanding of such people is to look on the surroundings from their side and the information technologies are the best way to improve the style of living and rehabilitation process.

We hope that this investigation will help to all the development of the modern rehabilitation process.

Summarizing the above, we can conclude that the use of information technologies in the process of social rehabilitation of students with disabilities radically change approaches to them and help to find an individual approach to each individual. Moreover, this work will unify all the advantages of the common usual group therapy and the individual approach with the modern information techniques and apparatuses. The future rapid development of such the approach is inevitable and has many prospective directions and new possibilities. The prospective role of such the approach is the focus of this paper.

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