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The Introduction of Information and Communications Technologies into the Learning Process and Promoting Inclusive Education

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ABSTRACT: The presented article deals with the issues of development, use, and implementation of information technologies in the learning process of general education schools. The issues of inclusive education are discussed. The causes of problems arising in the learning process of students with special educational needs are presented. It is shown that in order to improve the learning process of students with special educational needs, it is necessary to develop appropriate software.

KEYWORDS: Inclusive education, information technology, educational problems, software training.

Modern computer technologies have become deeply integrated into various aspects of human activity, including pedagogy. This made it possible to create and develop new directions in the field of pedagogy. Today, computer-based and distance learning, along with the use of animations and other tools, have become essential elements of the teaching and learning process. Training programs are being developed that increase the likelihood of students discovering their abilities, facilitate the learning process, increase motivation, and activate their intellectual and mental abilities.

The Georgian National Curriculum recognizes the ability to use information and communications technologies as one of the key cross-cutting competencies—digital literacy. Its teaching and development cannot be considered independent of academic disciplines, separated from their context. The development of digital competence should occur in all academic disciplines, following the achievement of standard-compliant outcomes. Digital competence should be developed through effective integration with core academic disciplines (Gigiberia I., 2017).

Global experience shows that the use of information and communications technologies is especially effective in lessons where visual support materials play a crucial role. The multimedia nature of technologies allows students to visualize a particular chemical, physical, or biological phenomenon. Students may travel to countries whose language, culture, history, or geography they are studying and etc. (Gigiberia I., 2017).

It is desirable to make maximum use of information and communications technology resources in the teaching-learning process. Printed posters, maps, and similar materials are mainly intended for demonstration, while electronic tools, in addition to effectively delivering material to students, can also involve them in the process of creating new learning resources.

The best results are achieved by assigning homework that requires the use of a computer - searching for material on the Internet, printing text, completing tests, compiling spreadsheets and presentations, making a video clip, marking places on an electronic map, etc.

Such tasks increase motivation. Students enjoy using computers, which are not only entertaining for them, but also a symbol of modernity and success. In addition, any task can be either individual or group.

The use of information and communications technologies is most effective during project work, particularly when preparing materials for a final presentation. At this stage, various digital tools such as cameras, video cameras, dictaphones, scanners, and printers can be utilized, all of which contribute to the development of another key cross-cutting competency outlined in the National Curriculum—media literacy.

Information and communications systems can be used to create various types of electronic tools - texts, spreadsheets and presentations. It is possible to use office programs, photo, audio and video editors. Also, the use of geographic information systems and map-making programs. The Internet may be used both to search for materials and to publish or share materials, etc. By completing such tasks, the student fully masters the purposeful use of information and communications technologies.

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It is common practice to conduct a summative lesson, where a single topic is explored over multiple sessions. At the end, the material is reviewed, and the knowledge and skills gained are consolidated. Activities can be planned in such a way that a single product is created for the summative lesson from the materials created by students over several lessons.

When performing group tasks using a computer, the monitor, which displays the student's work process, becomes a kind of attention mobilizer for the rest of the group members. Everyone can clearly see the text, image, and map displayed on it and is more easily involved in the process. When working in this style, the student is not only provided with new information, but also contributes to the task and builds new knowledge himself/herself.

A projector can also be used in the computer room, offering an excellent way to capture the attention of the entire class. It can display a variety of information dynamically. When the lesson is well planned, the teacher can use the projector for different types of activities. For example: show a picture, or an excerpt from a film, etc. During a mini-lecture, use a small presentation, display the task to be completed in class, make the assessment criteria visible, allow the student to use the projector to present the completed task, etc (Gigiberia I., Samkharadze R., Gachechiladze L., 2016).

Research conducted on the use of information and communications technologies in the teaching and learning process shows that there is currently a serious effort to introduce modern teaching methods and technologies in Georgian schools. However, to improve the quality of this process, great importance is given to the activity of schools and the competence of teachers in the use of information and communications technologies.

Much depends on how the teacher determines the integration scheme of technology into the lesson plan. The teacher should thoughtfully align technological tools with the lesson's learning objectives to more effectively achieve the desired outcomes. Technology should be a support tool, not an unnecessary burden in the classroom, for both the teacher and the students. The teacher should make a good connection between classroom management and the teaching strategies he or she chooses. (Gigiberia I., 2016).

A teacher's ICT competencies include the technical and cognitive skills to use them, and the successful use of these skills when accessing information, processing it, and working with materials in electronic format. These skills are demonstrated when a teacher purposefully uses technologies to solve problems, process and exchange information, as well as to generate new ideas, model, and control devices.

A teacher who has high competence in information and communications technologies is not limited to the technical skills and knowledge related to the use of software and devices. ICT competencies include the skills to adequately select, use, and evaluate technologies in the learning process. A teacher with this competency should be able to evaluate and substantiate the advantages of using ICT in the teaching of a particular subject.

A successful teacher is one who, when planning the use of technology in a lesson, takes into account the following key factors: the students' competence in information and communication technologies, the technical base at his/her disposal, the goal of the lesson he/she has planned and the appropriate pedagogical strategies, the type of lesson (current, summative, project-type, etc.), and, most importantly, the topic of the learning material. Based on these factors, the teacher selects the electronic resources he uses in the teaching process and determines classroom management (Gigiberia I.,2016).

One of the main tasks facing general education is to improve the quality of learning and teaching for students with special educational needs and to facilitate the implementation of inclusive education.

Currently, creating an equal learning environment for people with disabilities is one of the main priorities and challenges of progressive countries around the world. The full inclusion of students with special educational needs in the educational process is a pressing problem throughout the world. It is important to find promising teaching tools and methods based on the analysis of proven schemes in order to create and establish an inclusive learning environment.

To facilitate the process of inclusive education, it is necessary to use and deepen knowledge about the experience of the international community in the field of education, which is characterized by constant changes and the use of modern technologies. To ensure that students with disabilities receive appropriate quality education, it is necessary to study and analyze the experience accumulated internationally, modify it by education experts, and adapt it to the reality of Georgia. (Gigiberia I.,2018).

According to international research, the proper use of information technologies, in particular training programs, in the educational process is considered an effective means of increasing the engagement of students with special educational needs in the educational process and teaching. They, in turn, should be based on modern direction in the development and use of information technologies.

As you know, students with special educational needs have difficulties in learning, which is related to disorders of their physical, mental and emotional development. Accordingly, they need additional educational services, which in turn poses a new challenge to the teacher.

The main duty of a teacher is to plan the learning process based on the individual needs of students, selecting appropriate activities that ensure high levels of student engagement to achieve specific outcomes. Learning should occur in an arranged environment where positive relationships and interactions are prioritized. In such an environment, the student is valued,

recognized, and accountable for their own learning and development. The teaching and learning process, which actively involves the student, is a knowledge-building process grounded in their existing knowledge and experiences. (Gigiberia I.,2018).

Implementing the teaching process of students with different learning needs in the same space is much more convenient with the use of computer technologies in the lesson process. Through technology, the teacher can involve each student in learning activities tailored to their individual needs and provide care for them while engaging the entire class. As a result, students will be able to complete specific tasks, the teacher will monitor them, and give directions. In this case, all students will be able to receive the necessary information and acquire the appropriate skills that will help them prepare for independent living and make future choices. (Gigiberia I.,2018).

Students with special educational needs often possess more advanced computer skills than their teachers and peers. As a result, the integration of information and communication technologies in the classroom is effectively used to provide equal learning opportunities for all students (Gigiberia I.,2016).

Numerous centres worldwide are conducting research to identify and improve modern approaches for supporting the development of literacy and communication skills in children with special educational needs of all ages, using information and communication technologies. For example, in the United States, in Northern California, a center ("K-12 Teaching and Learning from the UNC School of Education") that implements a program for working with students with special educational needs uses a three-part video to improve and assess reading skills.

The work conducted within this study and the analysis of the results confirm the need for integrating information technologies to enhance the educational process. The centre has developed "alternative pencils" for students with special educational needs who struggle with using a regular pencil. A special program has also been developed for students with hearing or vision impairments (Samkharadze R.,2018).

Analyzing the results, it was revealed that the inclusion of information and communications technologies in the educational process and the use of special programs make the teaching and learning process accessible to students with special educational needs. Teachers, experts, and researchers study the teaching process, evaluate and analyze the results obtained, and develop specific schemes for students with similar educational needs.

Obviously, programs developed for this purpose are focused on developing essential life skills for the child, which is important for the integration of a student with special educational needs into society and the development of his or her academic skills.

It is worth noting that no program platform allows teachers to change certain parts of the program and tasks to facilitate students' achievement of the outcomes defined by the subject standards of specific disciplines in accordance with the National Curriculum, while at the same time taking into account their needs and abilities.

This became a prerequisite for us to think about a training program developed based on web technologies, in which it would be possible to take into account the individual needs of students with special educational needs.

In collaboration with the developer, a demo version of a complex computer program was planned and developed, which was successfully tested among target groups.

Cycles of exercises (activities) tailored to the individual needs of specific students were uploaded to the database of the program's demo version, in accordance with the results to be achieved according to various subject standards (mathematics, natural sciences). The exercises were arranged in cycles of increasing difficulty, and in case of failure, the program's functionality ensured a return to the previous task in order to activate previous knowledge. Using the demo version of the training program contributed to increasing the level of involvement of the students with special educational needs in the learning process and improving the results.

Before the creation of the demo version of the training program, tasks tailored to the individual needs of students with special educational needs were provided in the form of cards to students with special educational needs from three different schools, which in turn gave us better results than we would have obtained without the resource created according to individual needs. However, using the demo version of the program, the rate of achieved results changed significantly.

For the next stage, in order to effectively teach elementary school mathematics, software was developed, consisting of several tables for different purposes:

1. Description of activities;
2. Description of exercises;
3. Characterization and separation of groups;
4. Characterization and separation of subjects;
5. Description of difficulties;
6. Keeping a history of student work.

For each stage of the learning cycle, additional instructions (key questions) were included in the program, which were delivered according to different learning modalities (visual and auditory); In case of student failure, the program offered

additional, more detailed instructions, and in case of repeated failures, it provided instructions in an audio format. The student was assisted in completing the task by instructions delivered in a format tailored to his/her preferred modality.

In addition, upon failure at any stage of the cycle of exercises arranged by difficulty, the program activated prior knowledge by returning to the previous task, which facilitated the student's knowledge-building process.

In the process of performing exercises (activities) using a computer program developed based on web technologies, the student with special educational needs did not require the full involvement of the teacher. The teacher facilitated him/her and, if necessary, could change the task cycle with other exercises in the database that led to the same result.

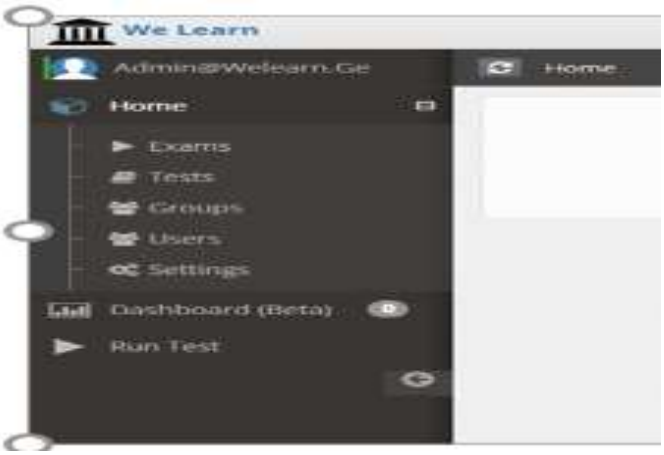

Fig. 1. Complex program menu.

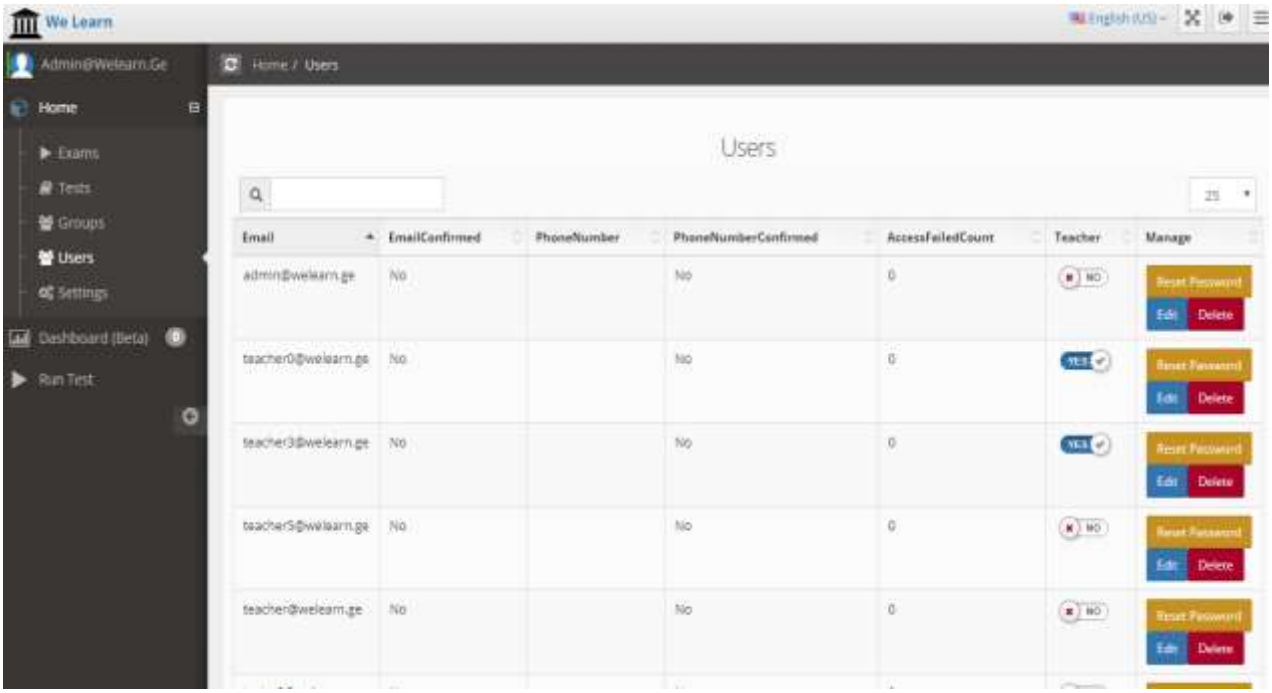

Fig. 2. User management page of the training program

The complex program menu is shown in Fig. 1. The user management page of the training program is shown in Fig. 2.

The program was written in stages. It became more complicated and complex, also gradually - by switching from PHP to asp.net mvc. Accordingly, the database was also switched from MySql to MSSql. In accordance with the needs identified in the process of work, it was refined and gradually improved. This process is dynamic and continues constantly.

Presented in this way, the program became easier to use in the teaching process for a larger number of teachers. At the same time, it became possible for each teacher to use it to work with a larger number of students.

CONCLUSIONS

1. The article shows that the development, use, and implementation of information technologies in the teaching-learning process of general education schools is a rather urgent problem.

2. The causes of problems arising in the teaching-learning process of students with special educational needs are analyzed: different abilities of students to assimilate the material to be studied, different readiness of students, different interests, etc.

3. It is substantiated that to improve the teaching-learning process of students with special educational needs, it is necessary to develop appropriate software training.

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