

WAYS TO MODERNIZE TECHNICAL EDUCATION BASED ON INFORMATION AND COMMUNICATION TECHNOLOGIES

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Abstract: *This article analyzes the role and importance of information and communication technologies in modernizing the system of technical education. Didactic and practical aspects of the effective use of modern digital tools, virtual laboratories, distance learning platforms and interactive educational resources are covered. Also, in the process of training specialists in the technical direction, the advantages of using ICT-based innovative techniques, the role in the formation of independent thinking, technical thinking and practical skills in students are revealed. According to the results of the study, digitization of technical education is assessed as an important factor in improving the quality and effectiveness of Education.*

Keywords: *Information Culture, Information and communication technologies, technical education, modernization, digital education, innovative methods, virtual laboratory, distance learning, technical thinking.*

INTRODUCTION

The processes of globalization and digital transformation are radically changing the educational system. Especially in the field of technical education, the rapid development of information and communication technologies (ICT) creates the need to modernize the content, methodology and management system of Education. Today, the automation of production processes, the widespread introduction of digital platforms and AI-based control systems require new skills from specialists trained in technical areas.

Therefore, the development of technical education on the basis of ICT, modern digital tools - computer modeling, effective use of virtual laboratories,



simulation programs and distance learning platforms - are becoming an important factor in improving the quality of Education. By modernizing educational programs in the technical direction, students are able to independently think, analyze problem situations, form technical thinking and practical skills. In this regard, the application of information and communication technologies in technical education not only increases the effectiveness of education, but also serves to train competitive specialists who meet the requirements of the digital economy.

The origin, existence of global problems and the need to resolve them require a new civilizational and qualitative change in society. In order to understand the essence of this process, it is necessary to pay attention to its speed, depth and scale. For social relations, which were considered to be beyond change for dozens or even hundreds of years, have recently changed radically in a very short time. This process occurs all over the world in the main areas of human life.

The processes of informatization of modern society and the closely related processes of informatization of all forms of educational activity are characterized by the processes of improvement and mass dissemination of modern information and communication technologies (ICT). Such technologies are actively used to transfer information and ensure teacher-student interaction in modern open and distance education systems. A modern teacher should not only have knowledge in the field of ICT, but also be an expert in their application in their professional activities.

The word “technology” has Greek roots and in translation means science, a set of methods and techniques for processing or processing raw materials, semi-finished products, products and converting them into consumer goods. The modern understanding of this word includes the application of scientific and engineering knowledge to solve practical problems. In this case, information and telecommunication technologies can be considered such technologies that are aimed at processing and transforming information.

Information and communication technologies (ICT) It is a generalizing concept that describes various devices, mechanisms, methods, and algorithms for information processing. The most important modern ICT devices are a computer equipped with appropriate software and telecommunications facilities along with the information posted on them. The main means of ICT for the information environment of any educational system is a personal computer, the capabilities of which are determined by the software installed on it. The main categories of software tools are system programs, application programs, and software development tools. First of all, system programs include operating



systems that ensure the interaction of all other programs with hardware and the interaction of a personal computer user with programs. This category also includes utility or service programs. Application programs include software that is a toolkit of information technology – technologies for working with texts, graphics, tabular data, etc. [1]. Universal office applications and ICT tools are widely used in modern education systems: word processors, spreadsheets, presentation preparation programs, database management systems, organizers, graphics packages, etc.

With the advent of computer networks and other similar ICT tools, education has acquired a new quality, primarily related to the ability to quickly receive information from anywhere in the world. Through the Internet global computer network, instant access to global information resources (electronic libraries, databases, file repositories, etc.) is possible. About two billion multimedia documents are published in the most popular Internet resource, the World Wide Web. Other common ICT tools are available online, including e-mail, mailing lists, newsgroups, and chat. Special programs have been developed for real-time communication, allowing you to transfer text entered from the keyboard, as well as sound, image, and any files after establishing a connection. These programs allow remote users to collaborate with a program running on a local computer[2].

With the advent of new data compression algorithms, the sound quality available for transmission over a computer network has significantly improved and has begun to approach the sound quality in conventional telephone networks. As a result, a relatively new ICT tool, Internet telephony, began to develop very actively. Audio and video conferences can be conducted over the Internet using special hardware and software. To ensure effective information search in telecommunication networks, there are automated search tools, the purpose of which is to collect data on information resources of a global computer network and provide users with a quick search service. Using search engines, you can search for World Wide Web documents, multimedia files and software, and address information about organizations and people. With the help of online ICT tools, it becomes possible to have wide access to educational, methodological and scientific information, organize operational consulting, simulate research activities, and conduct virtual training sessions (seminars, lectures) in real time.

Another important aspect of ICT use in technical education is the development of digital competencies. The reader should have not only technical knowledge, but also the skills of working with information, analysis, algorithmic thinking, data processing. This makes him a competitive



professional in the modern labor market. The psychological and pedagogical aspects of the organization of ICT-based education also occupy an important place. Such an approach increases the interest of students in the educational process, encourages them to search independently, develops creativity and the ability to solve problem situations.

Through interactive methods, the student is formed as an active subject in a centrally placed educational model. At the same time, in the process of modernizing technical education, it is also relevant to increase the information and pedagogical culture of teachers. Because for the effective use of ICT tools, it is necessary that the educator is a specialist who has mastered digital technologies, is able to methodically correctly.

Classification of ICT tools by methodological purpose:

- Improving the productivity of students ' self - study;
- Individualization of the teacher 's own work; •
- Acceleration of replication and access to achievements of pedagogical practice; •
- Increased motivation to learn;
- Activation of the learning process, the possibility of involving students in research activities; •
- Ensuring the flexibility of the learning process[3].

To ensure the effectiveness of the use of information and communication technologies (ICT) in technical education, attention should be paid to a number of important aspects. First of all, the technological tools and methodological approaches used in the educational process should be in harmony with the content of Education. Any technology in itself does not increase the quality of education, it gives the expected result only in combination with correctly selected didactic and pedagogical approaches.

In the modernization of technical education on the basis of ICT, it is necessary first of all to carefully develop scientific and methodological foundations. The concepts used by the researcher or teacher – such terms as “information and communication technologies”, “modernization”, “digital competence”-should be explained in clear scientific content.

When viewed from a pedagogical point of view, the use of ICT in technical education is necessary to make students an active subject, develop their thinking, analysis, independent decision-making and technical thinking skills. Therefore, the teacher should be able to adapt them to the logical system of the educational process, not limited only to the use of technological tools. When applying ICT, it is important to take into account the age characteristics, interests and level of training of students.



The use of information resources published on the Internet often leads to negative consequences. Most often, when using such ICT tools, the principle of saving energy inherent to all living things is triggered: ready-made projects, abstracts, reports and problem solutions borrowed from the Internet have become a familiar fact today, which does not contribute to improving the effectiveness of education and upbringing.

CONCLUSION

The above analysis shows that the role of information and communication technologies in the modernization of the system of technical education is incomparable. The effective use of ICT tools increases the quality of the educational process, ensures the interactivity of education and makes it possible to prepare students in harmony with modern production requirements. Virtual laboratories, digital simulations, distance learning systems and online learning platforms facilitate the acquisition of technical disciplines and enhance integration between theory and practice.

Also, ICT - based educational techniques help students develop independent thinking, correct decision making in problem situations, technical thinking and creativity. And the digitization of the process of technical education is an important guarantee not only to improve the effectiveness of education, but also to train innovative thinkers, competitive, highly qualified specialists. Therefore, the widespread introduction of ICT in technical education and the improvement of its pedagogical mechanisms on a scientific basis is one of the priorities of modern educational policy.

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