THE ROLE OF INFORMATION TECHNOLOGIES IN TRAINING OF MODERN HIGHER EDUCATION GRADUATES (IN UKRAINIAN CONTEXT)

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Abstract: The relevance of the chosen topic is due to the fast-moving process of digitalization of the life activities of society in general, and education in particular. Traditional education is losing its relevance and competitiveness in the modern labor market, which causes the tendency to transform the educational process towards digitalization. The use of information technologies in the educational process (both traditional and modern) makes it possible to provide all participants of the educational process with continuous education in the period of the distance format. Purpose of the article was to analyze the role of information technologies in the preparation of modern graduates of higher education institutions, taking into account the martial law. To achieve the purpose of the article, the following general scientific methods of learning social phenomena and processes are used: logical-historical, structural-functional and comparative; analysis and synthesis; classifications; structural and functional analysis; generalization. The term "information technologies" was analyzed and it was highlighted that they contribute to the provision of a new level of education (the ability to study from any corner of the world, build an individual student trajectory, facilitate communication between a student and a teacher, etc.). Varieties of information technologies in the educational process and its digitalization as a whole are studied: automated educational systems, intelligent educational systems, interactive programs, multimedia technologies, virtual reality, the Internet. The place of innovation in the educational process and its difference from novelty are highlighted. It is emphasized that the strategic task of the state today is the modernization of higher education of Ukraine at the level of international standards, and the fulfillment of this task becomes possible under the condition of improving pedagogical skills and introducing the latest information technologies into the educational process. Taking into account the close connection between a person's level of education and his professional development, the introduction of information technologies into the educational process is gaining increasingly more relevance. And solving this problem requires, first of all, joint efforts and mobility around the reconstruction of the system of higher education during the period of martial law, and, accordingly, its complete transition to a digital format.

Keywords: information technologies; higher education institutions; educational process; latest information technologies; innovations; traditional information technologies.

1 Introduction

The fast-moving social process of informatization of modern Ukrainian society consists primarily in the production, accumulation, processing, preservation, and transmission of information flows, which contributes not only to the improvement of everyday life, but also to the creation of an interactive educational environment. Traditional higher education is losing its competitiveness (especially in view of the distance mode of its conduct for the 3rd year in a row), which leads to the use of a large number of information technology tools and methods in the educational process, that form a modern paradigm of relationships focused on multifaceted personality development, according to requirements of the modern labor market. The educational process has acquired a certain brightness and multifacetedness, acquiring at the same time constant feedback and emotional coloring. Along with the use of information technologies in the educational process, the quality of information delivery, its specificity, content, structure, and the means of assimilation of this knowledge by students in the learning process have completely changed.

One of the main factors of the transformations caused by the influence of information technologies, in particular, was the type of thinking of modern students and the distance mode of the educational process in which we found ourselves (given the martial law). Almost all modern students belong to generation Z, who were born at the beginning of the 21st century and found themselves at the center of digitalization of society and can no longer imagine their lives without the Internet and modern gadgets. Since birth, people of Generation Z have been included in information flows and learned to analyze them. The most important thing is that they know how to quickly process large amounts of information and find the right answers. They are able to simultaneously perceive and process information from different sources and significantly increase the speed of its processing.

In particular, if to talk about the modern world, in which information has become of paramount value, it can be noted that the quick assimilation of information flows is a really useful and important habit (which previous generations lacked). However, in this regard, there are 'adverse reactions' of the mind to the reduction of information, for example, it may begin to get bored or slow down due to a lack of information or its slow delivery. Namely this was one of the impetuses for the informatization of the educational process, which set the primary goals in the form of the introduction of modern information technologies at all stages of preparing students for the labor market.

For the system of modern Ukrainian higher education, the formation in students of a systematic approach to the acquisition and assimilation of relevant knowledge, strategic thinking, the ability for academic mobility, the drive for self-study and self-improvement during professional life, starting from the period of study at the higher education institution, should be the determining factor [1]. And it is quite possible to achieve this during the period of study at a higher education institution, as stated in the Strategy for the Development of Higher Education in Ukraine for 2022-2032 [12], and this is primarily due to the transformation of the skills of teachers of the higher education institutions, their mastery of the latest modern approaches to professional activity in relevant field of knowledge, etc.

Based on the above, it can be argued that the chosen topic is becoming extremely relevant, however, there is a certain contradiction between existing research and the modern realities of Ukrainian society in which we find ourselves, namely, the waging of a full-scale war by Russia against Ukraine, due to which higher education found itself in a comprehensive distance educational process Previous studies by scientists (both Ukrainian and foreign) are based on the introduction of information technologies into the traditional system of higher education. But we are talking about the complete transformation of higher education and its transition towards digitalization (without the traditional component). And the transition to information technologies was forced and not adapted to modern realities (in particular, it is about technical means, teachers' skills, students' readiness, etc.), which determines the choice of topic.

2 Materials and Methods

To achieve the purpose of the article, the following general scientific methods of learning social phenomena and processes are used: logical-historical, structural-functional and comparative - to analyze the terms "information technologies", "latest information technologies"; analysis and synthesis - to highlight the content and specifics of information technologies in the educational process; classifications – for typology of types of information technologies in higher education; structural and functional analysis - to clarify the main directions of modernization of higher education, which requires studying and rethinking the most effective means of developing the quality of the individual; generalization - to determine the quality of higher education in view of the distance format of work and the use of the latest information technologies in it.

The fundamental scientific provisions in the field of information technologies in the educational process, presented in works of the following scientists, served as a theoretical base of research: R. Gurevich, I. Dychkivska, M. Zhaldak, N. Kiyanovska, Yu.

Kolisnyk-Humenyuk, V. Kremen, I. Melnychuk, I. Podlasiy, E. Polat, H. Selevko, O. Romanyshina, Yu. Trius, T. Turkot, D. Chernilevsky, and others. The general trends of higher education in view of the globalizing world process are revealed in the work of P. Saukh. The theoretical aspects of the implementation of digitization of the educational environment in higher education institutions are revealed in the studies of I. Dychkivska, E. Polat, and others. A large number of scientists paid attention to the combination of traditional teaching methods and informational methods in the context of the transformation of higher education in view of the modern requirements of the labor market – in particular, T. Turkot, D. Chernilevskyi. The methodological requirements of the formation of professional identity through information technologies in the educational process are disclosed in the works of O. Romanyshina.

However, firstly, the rapid development of the scientific and technical process and the updating of information technologies, and secondly, the martial law in which Ukrainian society is located open up new aspects of the introduction of modern information technologies (both the latest and traditional ones) into the educational process of higher education institutions, which prompts us to the analysis of this topic.

3 Results and Discussion

During the period of martial law in Ukraine, digitization of all spheres of life is the main factor in the formation and growth of modern society [8]. Based on the Digital Agenda of Ukraine [12], namely the system of higher education and its transformation towards digitalization is important for the implementation of digitalization processes in Ukrainian society. The legislative framework of Ukraine states that the priority direction of higher education is the open and transparent activity of higher education institutions, which is not limited by time and place of access to all educational materials and integration with the European educational space. Digitization of HEIs is a certain challenge and at the same time a positive aspect for universities. This will contribute to increasing competitiveness, attracting additional resources (in particular, from abroad), improving digital infrastructure, enhancing the quality of the educational process, promoting academic mobility, raising the flexibility level of the educational process, etc. [10].

The phrase "He who owns information owns the world" is gaining considerable relevance today. The current state of the implementation of information technologies in all spheres of life in society requires the expansion of their implementation in the educational process. In view of this, it is necessary to dwell in more detail on the term "information technologies" and its use in the educational process. N. Kiyanovska notes that information technology (IT) is a general term that emphasizes the role of unified technologies and the integration of telecommunications, computers, firmware, software, storage and audiovisual systems that allow users to create, access, store, transfer and change information [4, p. 119]. According to Yu. Trius, innovative information technologies of education are original technologies (methods, means, ways) of creating, transmitting, and preserving educational materials, other information resources for educational purposes, as well as organization and support of the educational process (traditional, electronic, remote, mobile) with the help of telecommunications and computer systems and networks, which are purposefully, systematically and consistently introduced into pedagogical practice with the aim of improving the quality of education [14].

Yu. Kolisnyk-Humenyuk notes that all technologies that use special technical information means (audio, video, film) are included in the number of educational information technologies. An important component of educational information technologies is multimedia (multicomponent environment) - combining several means of presenting information in one computer system: text, sound, graphics, animation, video, illustrations (images), spatial modeling. Other forms of multimedia, such as presentation of information in the form of slides and magnetic recording, interactive video and video

production, which have been used for a long time, also do not lose their relevance [5, p. 344].

Information technologies of education contribute to the provision of a new level of education. Their application in the educational process of a higher school will increase the quality of professional training of specialists. The goal of informatization of education, according to Yu. Zhuk, consists of the global rationalization of intellectual activity due to the use of new information technologies, a radical increase in the efficiency and quality of training specialists with a new type of thinking that meets the requirements of modern society, the formation of a new information culture of thinking through the individualization of education [2; 11].

In particular, based on the above, it can be argued that the introduction of information technologies (and in some cases the complete transition of the educational process towards digitalization) diversifies the process of communication between a student and a teacher, and greatly simplifies it. To date, when the level of informatization of higher education institutions has reached the level of forming a single informational educational space, when information technologies allow higher education institutions to reach a new level of modernization of educational resources, when the standards of transmission of messages are changing, namely distance learning is becoming increasingly more relevant. It encourages students to independently process a significant amount of educational material and self-discipline themselves. The majority of scientists believe that the teacher, in the context of the informational educational environment, performs the function of a consultant or coordinator and aims to strengthen the cognitive and creative functions of students, to help achieve goals in accordance with the perspectives defined by the student.

The primary task of information technologies in the educational process (given the analysis of the terminology of this concept) is the implementation of the latest programs in professional activity, which in turn help to develop and motivate students to study, to work independently with information arrays, to form creative and critical thinking, i.e., comprehensively develop the student, in accordance with the requirements of the modern labor market.

The information society requires from specialists: intellectual (constructive thinking) and creative (creative thinking) development; development of communication skills based on implementation of joint projects; professional development (formation of the ability to make optimal professional decisions during computer business games); development of research activity skills; formation of information culture (when using text, graphic and tabular editors, local and network databases) [5, p. 344]. That is it is necessary to focus on the analysis of the types of information technologies in the educational process and its digitalization as a whole.

First, these are automated educational systems that act as comprehensive educational and methodological material for students (theoretical, practical, controlling, etc.) and the corresponding software (programs, platforms, etc.), which helps in managing the educational process. The appropriate software products are their electronic versions (presentations, handbooks, textbooks, test tasks, etc.).

Secondly, these are intelligent learning systems that are able to independently perform relevant tasks, using logic and rules, and have the ability to accumulate knowledge. Namely intelligent systems combine computerization and human potential, increase the value of expert knowledge and make it quickly mastered. This technology is capable of the following: independently modeling the educational process; using the existing knowledge base and dynamically accumulating it (using both traditional and innovative knowledge); automation of the learning strategy of each individual student; automation of accounting for the arrival of new information, etc. However, despite the convenience of this technology, it has not yet been widely used by modern higher education institutions in Ukraine.

Thirdly, these are interactive programs, which include graphs, charts, diagrams, drawings, etc. The use of additional graphic materials in the educational process makes it possible to transfer information to students at an improved level, which greatly facilitates its analysis and assimilation.

Fifth, these are multimedia technologies - combining of several means of presenting information in one computer system: text, sound, graphics, animation, video, illustrations (images), spatial modeling. Other forms of multimedia, such as presentation of information in the form of slides and magnetic recording, interactive video and video production, have been used for a long time. But the term "multimedia" became popular relatively recently, in connection with the appearance of powerful inexpensive computers equipped with monitors with great operational capabilities. Currently, there are personal computers capable of working with sound and video information, manipulating it to obtain special effects, synthesizing and reproducing sounds and video information, creating all kinds of graphic information, including animated images, and combining all this into a single multimedia presentation. The educational process using multimedia tools is exciting because they simultaneously affect several senses and, therefore, cause increased interest and sustained attention of the audience [13].

Sixth, there is virtual reality, which is implemented with the help of multimedia and the illusion of presence in real time. In virtual reality, illusions of the user's location in the virtual world are created.

Seventh, it is the Internet that gives a new impetus to the educational process. The global Internet network provides all participants in the educational process with access to masses of information stored in different parts of the world. With a gadget in hand, a student can study from any corner of the world thanks to the Internet. And in this aspect, the Internet network should be divided into subdivisions, taking into account the educational process: the general Internet network (search system); Moodle (electronic student account); social networks (TikTok, Instagram, Facebook); messengers (Telegram, Viber).

The specificity of Internet technologies is that they provide enormous opportunities for choosing information sources: basic information on network servers; operational information sent by e-mail; various databases of leading libraries, scientific and educational centers, museums; information about CDs, video and audio materials, books and magazines distributed through Internet stores. Means of telecommunication (e-mail, global, regional and local networks of communication and data exchange) provide the widest opportunities for learning, in particular: prompt transmission of information of any volume and form over different distances; interactivity and operational feedback; access to various sources of information; organization of joint telecommunications projects; request information on any issue through the electronic conference system [13].

The active introduction of innovative information technologies into the educational process of higher education institutions, and their replacement of traditional technologies, led to the emergence of a whole series of scientific studies, which we will dwell on. Innovation in education is necessary: to solve those pedagogical problems that have been solved differently so far; as "the result of a creative search for original, non-standard solutions to various pedagogical problems"; as systemic new formations emerging on the basis of various initiatives; as products of innovative educational activity, which are characterized by the processes of creation, distribution, and use of a new tool in the field of scientific research [7].

In the general sense, the word "innovation" translated from the Latin language means the introduction of a new, replacement of the old, certain renewal of the existing system. In the educational process, innovation acts as a certain update of the system, which improves the progress and results of student learning. Also, innovation can be considered as a certain process (replacement of a system or activity, partial or large-scale) and the very product of this activity. Thus, it can be distinguished that

innovative information technologies used in the educational process are purposeful, systematic, and consistent implementation of the latest techniques, methods, actions of the teacher in the pedagogical activity, which cover the entire educational process and lead to certain results of student learning.

Innovation in education is the process of creating, implementing, and spreading in educational practice of new ideas, tools, pedagogical and management technologies, as a result of which the indicators (levels) of achievements of the structural components of education increase, the system transitions to a qualitatively new state [3]. The word "innovation" is ambiguous, as it consists of two forms - the ideas themselves and the process of their practical implementation [6, p. 338–340].

In general, it can be noted that innovation represents novelties that improve the education system and introduce information technologies into it, which improves the quality of education in higher education institutions, especially considering the martial law of the country and the distance learning format. Very often, the term "innovation" is equated with novelty, the essence of which is the creation and use of a new product that will satisfy certain needs of society as a whole or of an individual. However, innovations in education necessarily aim at the successful implementation of a certain activity and an effective end result.

Having considered traditional information technologies, and based on the research of scientists regarding innovative information technologies in the educational process, we can distinguish three stages of its path. The first stage is the use of computers or any interactive gadgets that organize the educational process of all its participants. The second stage is the introduction of the Internet into the educational process and the integration of traditional educational processes towards informational side. The third stage is the introduction of the latest information technologies into the educational process, and their replacement of the traditional system of functioning of higher education institutions, and namely at this stage the wide use of information technologies in education, the introduction of distance learning, various forms of electronic learning, etc. takes place.

In particular, the emergence of the latest information technologies is due to the emergence of computers and the Internet, which makes it possible to effectively introduce and use them in the educational process. The creation of a virtual higher education institution enables the participants of the educational process to use all the resources of the institution from any corner of the world. The Internet facilitates the communication of all participants in the educational process. The main formats of such communication are as follows:

- E-mail, social networks, instant messengers, which provide an opportunity to exchange messages at any time and from any place;
- A teleconference using Skype, Zoom, or Google Meet, which makes it possible to conduct classes with all students who are in different cities, thus making the educational process continuous.

Innovative activities in education are specific and quite complex, requiring special knowledge, skills, and abilities. The introduction of innovations is impossible without a teacher-researcher who possesses systemic thinking, a developed capacity for creativity, and a formed and conscious readiness for innovations. A significant impetus for the development of innovations was the use of information technologies for conducting lectures, which involves the use of multimedia presentations to accompany the presentation of theoretical material and electronic lectures. Accompanying lectures with presentation materials makes them more visual, concentrates the attention of listeners thanks to the visual presentation of the material, stimulates its memorization, and increases the amount of presentation of educational information. The use of electronic lectures, which are presented in the format of a web document, makes it possible to save lecture time. These resources have a

convenient structure, the possibility to navigate and search for information; they are characterized by a logical system of presentation of theoretical material with the selection of the main terms and provisions, and are distinguished by the accessibility of the material available in them. Electronic lectures make it possible to transfer the study of simple (but very important) theoretical material to the plane of independent work of the student [6].

Let us emphasize the implementation of information technologies for conducting various classes (lectures, seminars, practical, etc.), which include the following advantages: saving time in submitting materials (presentation of theoretical material on the Moodle platform); the opportunity to do homework at own pace and at any convenient time; improving the quality of independent work and its control, successful implementation of the student's individual trajectory, etc. Information technologies in the educational process significantly improve the capabilities of both the teacher and students, unnecessary time is not spent on the construction of graphic material, there is constant communication between the student and the teacher, the content of the disciplines is updated in a timely manner, and so on.

One of the innovations that have been used in education relatively recently is a webinar. A webinar is an online conference that can be conducted by one or more presenters, and there can be up to a thousand participants. And this is really a convenient form - firstly, the student can connect from any place, or view the recording later, secondly, nothing is needed except an Internet connection and a gadget.

It is also appropriate to mention the innovative technology of web-quest - this is a problem task with elements of a role-playing game, for the implementation of which information resources of the Internet are used. I. Sokol considers the quest as a technology that has a clearly defined didactic task, a game concept, necessarily has a leader (mentor), clear rules and is implemented with the aim of improving students' knowledge and skills of the 21st century [9, p. 28-32].

Experience shows that the web quest has six components. First, the teacher sets a topic and creates a problem situation. Secondly, the teacher verbalizes a specific task within the framework of the selected topic, which is understandable, interesting, and feasible. Thirdly, the teacher selects and offers students a list of links to Internet resources in advance. At the next stage, students begin the process of searching for the necessary information on the Internet, using the description of the work procedure that each student must perform during the independent completion of the task (stages). After that, students should prepare a presentation of the found and processed information, which can be implemented in any form (slides, Internet pages, etc.). At the fifth stage, the teacher can make a guide to action (how to organize and present the collected information), which can be presented in the form of questions that direct and organize the educational work. The final, sixth component of the web quest is the evaluation of the work performed by the students themselves. Evaluation criteria may be different (for example, by presentation time, originality, innovation, etc.). The basis of web quests is the project method, which is focused on the independent activity of students - individual, pair, group, that is carried out over a certain period of time. This method is organically combined with a group approach to learning (cooperative learning). The project activity is most effective if it can be connected with the program material, significantly expanding and deepening the knowledge of students in the process of working on the project. The project method always involves solving a problem. Solving a significant problem contributes to the fact that it is possible to switch the attention of students from the form of expression to its content [9].

The implementation of the latest system of the educational process, which is oriented towards entering the European educational space, requires from Ukrainian higher education institutions global changes in the innovative direction in the training of modern graduates. And in our opinion, the decisive

moment in the implementation of innovative information technologies in education is the uncompromising replacement of the function of the teacher, who should cease to be a translator of knowledge and a rigid controlling body, and instead should become a teacher-manager who guides students and consults and develops together with them.

And in this aspect, it is very important not to lose the quality of education, but, on the contrary, to improve it. Therefore, it should be noted that the quality of education in higher education institutions in the process of transition of the educational process to information technologies depends primarily on how all work processes are established in the conditions of the distance format. In this format, it is crucially important to take into account several factors: the appropriate infrastructure of higher education institutions; stable Internet connection of all participants of the educational process; competence of teachers in matters of information technologies (both traditional and modern).

4 Conclusions

Thus, summarizing the above, it can be stated that the strategic task of the state today is the modernization of higher education in Ukraine at the level of international standards. And the fulfillment of this task becomes possible under the condition of improving pedagogical skills and introducing the latest information technologies into the educational process. That is why information technologies have already actively entered the field of education and require all participants in the educational process to take appropriate actions for their adaptation in the system.

Taking into account the close connection between a person's level of education and his professional development, the introduction of information technologies into the educational process is gaining more and more relevance. And the solution to this problem requires from us, first of all, joint efforts and mobility around the reconstruction of the system of higher education during the period of martial law, and, accordingly, its complete transition to a digital format.

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