Application of Information Technologies is a Necessary Condition for Qualitative Monitoring of Higher Education and Modernization of Educational Process

Olga Oseredchuk[1†], Oleksandra Drachuk[2††], Olena Demchenko[3†††], Natalia Voitsekhivska[4††††], Yuliia Sabadosh[5†††††], Maryna Sorochan[6††††††]

[1†] Department of General Pedagogy and Higher School Pedagogy, Ivan Franko National University of Lviv, Ukraine
[2††] National University of Life and Environmental Sciences of Ukraine, Ukraine
[3†††] Department of Primary Education, Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University, Ukraine
[4††††] Communal Higher Educational Institution «Vinnytsia Humanitarian and Pedagogical College», Ukraine
[5†††††] Department of German Philology, Vinnytsia National Technical University, Vinnytsia, Ukraine
[6††††††] Vinnytsia Municipal Institution of Higher Education «Vinnytsia Humanitarian and Pedagogical College», Ukraine

Summary
Possibilities of using information technologies for high-quality monitoring of higher education and modernization of the educational process in higher education institutions have been clarified. The information support of a higher education institution consists in the selection and appropriate treatment of information that characterizes the state of the educational system. The main functions performed by the system of information support of monitoring and management of the quality of education in the institution of higher education and the main components of information are highlighted. It is characterized by the achievements of modern information technologies in education. Universal computer monitoring has a number of important features due to the program. The forms of scientific and methodical work with the help of which it is possible to conduct monitoring with the help of information technologies are outlined. A number of features that can be used to classify information technology and methods that can be used to monitor the quality of higher education information technology. The national information system includes components that are disclosed in the article. The advantages of the information system based on open technological solutions of the Internet for monitoring the quality of higher education over closed unique technologies are shown. Information technologies of monitoring information processing are considered: centralized, decentralized and mixed. During the COVID-19 pandemic, which changed the lives of the whole society, the role of the teacher in the educational process also changed significantly. It is responsible for such functions as coordinating the cognitive process, adjusting the course being studied, advising students in organizing an individual curriculum, managing their educational projects, assessing students' knowledge and conducting monitoring. Therefore, the features of distance education in terms of communication between teacher and student, which allowed to form a number of advantages of distance education compared to traditional learning and its monitoring.

Keywords: *information technologies, monitoring, higher education, modernization of the educational process, higher education institutions, distance education, advantages of the information system.*

1. Introduction

Information technologies provide great opportunities for the development of professional skills and intellectual potential of future professionals. You need to make the most of these benefits [5].

Monitoring the quality of higher education with the use of information technology is the process of using a set of tools and methods of data collection, processing and transmission to obtain information on the real state of training to further improve the new quality of training needed to perform their professional activities. One of the ways to solve this problem is the computerization of both the learning process and the monitoring of the quality of higher education: the introduction of computer technologies in the educational process and the quality of the training process.

The UN's fourth goal of sustainable development by 2030, which is also being pursued by Ukraine, is to "ensure inclusive and equitable quality education and promote lifelong learning for all" (Universal Declaration of Human Rights, 2020), which cannot be achieved without monitoring the quality of education.

2. Analysis of recent research and publications

Zhabolenko M., & Zhdanova N. note that currently the computerization of the educational process in higher education institutions of Ukraine is considered as one of the first and most promising areas for its improvement. Much attention is paid to this problem, both at the level of ministries and at the level of higher education institutions themselves. However, full-scale computerization of the educational process in higher education institutions is a complex problem that requires long-term focused work and constant attention [22].

Kapto A. considers the necessary provision of management and monitoring of the quality of education in a higher

Manuscript received March 5, 2022
Manuscript revised March 20, 2022
https://doi.org/10.22937/IJCSNS.2022.22.3.64

education institution to be its information support, which consists in the selection and appropriate processing of information that characterizes the state of the educational system. [3].

Despite the diversity of technologies, today there is a general universal algorithm of information-analytical activity, which Yu. Surmin substantiates under the name: "universal technology of analytical activity" [19].

"Technology" means "organized in time and space stable (invariant) in relation to the given variations of the conditions of implementation of a set of methods of operation of certain objects, which leads to the achievement of this goal" [6].

Information technology is a process that uses a set of tools and methods of collecting, accumulating, processing and transmitting data (primary information) to obtain updated data on the state of the object, process or phenomenon (information product) [1].

Semenikhina O., Yurchenko A., Sbruieva A., Kuzminskyi A., Kuchai O., & Bida O. in the article describe the results of quantitative analysis of open educational resources in the field of information technologies. The study is based on the analysis of the content of ten platforms which provide access to open resources. To achieve the goal, the following methods were used: theoretical (analysis and generalization of Internet sources to determine the popularity of educational platforms and resources on them); quantitative data analysis to determine the relative share of IT-courses on different parameters (the relative share of IT-courses in general and on each platform, in particular, the language of teaching, quantitative content in the thematic areas) [18].

Kuzminskyi A., Bida O., Kuchai O., Yezhova O., & Kuchai T. the article based on the theoretical analysis of information access in the system of postgraduate pedagogical education (PPE), and programs of information and library service of teaching staff, it has been rationalized that there is a great necessity for establishing centers of scientific and information support aiming at improving the qualification of teaching staff. [10].

Kuzminskyi A., Bida O., Kuchai O., Chychuk A. considers ways to improve the information function of postgraduate pedagogical education are identified: creation of an automated corporate information system, corporate Internet site for remote search and delivery of electronic copies of materials from the State Scientific and Pedagogical Library, libraries, exchange of resources with other libraries and organizations; development of information and telecommunication technologies in postgraduate education institutions; training of teachers for the use of computer technology, etc. [9].

Kuchai O., Kuchai T., Chychuk A. examines the experience of informatization of educational systems of developed countries shows that one of the conditions for the success of the country is the formation of teachers of both professional information culture and general information culture, understanding it and use in professional activity, as well as for self-development, self-education [7].

Kuchai O., Yakovenko S., Zorochkina T., Okolnycha T., Demchenko I., & Kuchai T. in the article describe the training of specialists in education in the conditions of distance learning. It is lights up the advantages of distance learning and determined the characteristic features of distance learning of students training in the implementation of these technologies in the educational process [24].

Bida, O., Prokhorchuk, O., Radul, O., Yakimenko, P., & Sheychenko, O. present an analysis of distance education in the world during a pandemic, analyzes significant changes, and implements measures in the field of education in Ukraine and around the world. The role of public and international organizations in the implementation of quarantine in the conditions of COVID-19, which partially took over the functions of state and local authorities, is emphasized. The closure of schools under COVID-19 has led to a de facto deterioration in learning outcomes, so we have analyzed the effects of distance learning and digital inequality in the world. It is shown how the COVID-19 pandemic affected access to public services in Ukraine [22].

G. Hutnyk considers information technology as a system of methods, processes and software and hardware that are integrated to collect, process, store, disseminate information, use it for the benefit of users as a set of electronic tools and modes of operation used to monitor and implement activities with improving the quality of higher professional education.

Hardware, software and information components are included in the structure of electronic means [2].

The purpose of the article: to find out the possibilities of using information technology to carry out high-quality monitoring of higher education and modernization of the educational process in higher education institutions.

3. Research methods

To achieve this goal, the following research methods were used: theoretical (analysis of philosophical, pedagogical, psychological literature), that allows to justify the starting points of the study; interpretive-analytical method, on the

basis of which sources are studied using synthesis, analysis, systematization and generalization.

4. Results

As a system concept, new information technologies unite knowledge-intensive methods and provide the level of informatization of higher education, represented by its information environment and infrastructure [15].

New information technology is a set of automated processes of movement (through communication channels) and information processing of a subject area (or a combination thereof).

Information technology is a system-organized to solve problems of monitoring and management set of methods and tools for collecting, registering, transmitting, accumulating, searching, processing and protecting information based on the use of advanced software, computer and communication tools, and methods, through which information is provided to those who need it [20].

Let's highlight the main functions performed by the information support system of monitoring and quality management of education in higher education: to meet the needs of students, teachers, management of higher education and its departments in the information necessary for their activities and interaction; to inform about the state of the educational process in the institution of higher education, about the security of the means of education, about the results of the students' education, about the professional activity and qualification; to pass to students, teachers, management of the department and the documents sent to them; identify the level of development of the intellect, exercise control over checking the state of emotional, physical and physical health; to highlight the educational needs of students; to inform pedagogical workers; to involve stakeholders in the educational process [16].

The main components of information technology are as follows: applied information; hardware and software; final consumer-consumer of information [15].

The conducted theoretical research confirms the conclusion that monitoring the quality of higher education will be effective if modern information technologies are used.

Modern information technologies in education have the following directions: information technologies (information-computer and communication-information); interactive teaching methods; distance learning [14].

Computer monitoring is versatile, has a number of important features due to the program. The main difficulty in creating computer control and monitoring programs is beyond the traditional selective answer to control program questions. If you stay within the usual (intelligent) computer programs, then during the transition to computer control there are additional opportunities to organize the input of the answer (except for selective), expands ways to formulate control questions (tasks) [17].

The use of computers in the implementation of diagnostic techniques helps to avoid various difficulties associated with the human factor, subjectivity.

Monitoring with the help of modern information technologies is a clear, standardized, differentiated way of working, working on innovative methods, optimizing the processes of collecting and analyzing information and more. Electronic communications, digital technology, and computer technology have become an integral part of human life. Penetration into the field of education of modern, in particular multimedia, technologies is necessary and indisputable.

The term multimedia refers to the latest computer technologies and methods (interactive capabilities, use of remote access and external resources, work with databases, animation graphics, etc.). Multimedia teaching aids are universal, as they are used at different stages of the lesson (during motivation, as formulating a problem before learning new material; in the process of explaining new material as illustrations), during consolidation and generalization of knowledge to assess academic achievement, monitor educational quality. Information technologies in education are powerful and universal means of obtaining, processing, storing, transmitting, presenting a variety of information. They are also needed during operations that involve the study of control and evaluation processes. Information technologies in education provide ample opportunities to monitor the academic performance of future teachers [17].

In order to identify factors that affect the effectiveness of the educational process of the teacher, it is advisable to monitor the quality of education of students (pupils). It is appropriate to summarize diagnostic monitoring data using electronic forms created in the MS Excel shell. When processing the results of the questionnaire, it is necessary to create an electronic form for processing the results of the questionnaire, which will provide convenience and save time [4].

Our monitoring of teachers with the help of information technology has become possible through such forms of scientific and methodological work as: a system of permanent seminars, which are planned to improve the work with various computer programs and the introduction of ICT in the educational process; system of ICT literacy courses; system of seminars on the use of ICT; system of master classes, distance learning system; conducting

practical classes using ICT; individual and group consultations; internships with teachers competent in ICT; self-educational activity of pedagogical workers. [20].

V. Varenko argues that any activity is based on information support, including pedagogical and other scientific information. Definitions of "information support", given in various scientific sources, highlight the purpose of information support, its object, means of implementation, procedural-activity and information-resource components.

Information support for monitoring the quality of education is the organization of purposeful arrays of information and information flows, which includes the collection, storage, processing and transmission of information (including the use of computer information systems) to analyze the results for preparation, justification and adoption of management decisions of governing bodies based on monitoring the quality of education.

Decisions are information that has been specifically collected, analyzed and processed by the subjects of monitoring or management.

Analysis of the types of monitoring activities allows to set tasks that will be solved during the monitoring.

Analytical tasks can be classified according to the degree of intelligence and complexity.

The first class of complexity of tasks is simple tasks that consist of formalized procedures. Their implementation for the respondents, in addition to time, is not difficult. These tasks are standardized and programmed. These include monitoring the success of the education sector, accounting, documentation, dissemination of monitoring data, etc. Such tasks are solved by almost all automated information systems. If such tasks are used for decision-making purposes, they are called decision-making tasks in conditions of complete certainty. There are no random or uncertain factors.

The second class of complexity of tasks contains more complex tasks of decision-making in the context of education reform, i.e. in the case when there are random factors, but for which the laws of their influence are known. Statement and solution of such problems are possible on the basis of methods of probability theory, analytical and simulation modeling.

The third class of complexity of tasks are insufficiently structured tasks that contain unknown or unmeasurable components (not quantified). This type of task is characterized by the lack of methods of solving based on direct data processing. Setting tasks is based on making decisions in the context of incomplete information. In some cases, based on the theory of fuzzy sets and applications of this theory, it is possible to construct formal solution schemes.

The fourth class of task complexity is the task of making decisions in the face of resistance or conflict (for example, it is necessary to take into account the presence of active competitors). In the tasks of this class there may be random factors for which the laws of their influence are unknown. Statement and solution of the fourth class of complexity of problems are possible, but not always, by methods of the theory of probabilities, fuzzy sets and the theory of games.

Task Fifth Class offers the most challenging decision-making tasks. Tasks, due to the high degree of uncertainty, are characterized by a lack of formalization. An effective solution is not always possible.

All over the world, information technology is evolving. With their development there is an increase in the benefits that can be provided to the monitoring structure of the information and communication system. Therefore, the issue of creating information and communication systems capable of working effectively with information resources is extremely important.

Today, information technology is used in many educational institutions, organizations and various education authorities.

Classification of information technology can be based on a number of features: the method of implementation in the information system; the degree of coverage of management tasks; classes of performed technological operations; type of user interface, etc. [20].

As the technical power of information technology grows, computers make it easier for people to monitor and allow them to perform operations that were impossible without information technology.

Speaking about the "new" opportunities for us of information technology in monitoring and management, we note that for more than two decades they are used in developed countries, and in Ukraine, are only gaining popularity.

Information technologies have a strategic goal, which is to promote the monitoring of the quality of education, allows to respond qualitatively to the dynamics of the education sector, to create, maintain and deepen competitive advantages. Achieving this goal requires the construction of information technology systems that have:

- maximum accessibility - everyone can get access to information technology resources at any time and from anywhere;

- simultaneous availability - any information object must be accessible to many people at the same time;

- maneuverability of applications - requires a transition to a network architecture that will allow for major changes in the organization and operation of information departments.

Improving the technical means and methods of collecting and processing information and implementing computer information technology (new paperless information technology) is important in monitoring the quality of higher education. That is, there is a real opportunity to collect primary information in education close to real time, to make the transition from solving individual problems to a systematic solution of problems in the management of the educational institution as a whole.

To monitor the quality of higher education with the use of information technology is characterized by: user work in the mode of manipulation; support (information through) at all stages of obtaining information, which is based on an integrated database and provides a single unified form of image, protection, storage, search, display, update of information; convenient paperless information processing process; document storage and intermediate versions of monitoring are communicated to the user through information technology resources at any time and from any place; wide opportunities for the respondent to interactively obtain the necessary indicators during the dialog mode of problem solving; work in one mode of a group of people with the possibility of collective performance of tasks; possibility in the process of solving the problem or obtaining the necessary indicators; performing the task or obtaining the necessary indicators that allow adaptive restructuring of forms and methods of presenting information.

Information technologies can be used in monitoring the quality of higher education in two ways: in local information structures, which are based on the adaptation of new information technology to the existing organizational structure; to improve the existing organizational structure.

The first way to implement new information technology is to improve the monitoring methods that operate at the facility. This method does not change the current organizational structure of the management of higher education. Methods of collecting and processing information at the workplaces of specialists by organizing individual workplaces are rationally used. At the same time there is a merger of operations on collection and processing of the primary information.

The second method of introducing new information technology improves the quality of higher education, and as a result, the organizational structure of the management of the educational institution. The process takes place in such a way that this technology brings efficiency to the management of higher education institutions. At the same time, communications are developed and new information and organizational relationships are developed, the productivity of the organizational structure of monitoring is increased, which in turn leads to the improvement of the management field of education through improved, accurate information processing. There is a convergence of the processed monitoring information to users.

The global information network Internet is: a world source of information, an information superhighway; operational global means of communication; the basis for the development of technology of the future; is the object of investment by international organizations, governments and private firms around the world, which has given rise to corporate information systems, much of which is based on Internet technology.

WWW-technology is a distributed multimedia information system based on special protocols for receiving and transmitting hypertext information [20].

The information used in the distributed information system is stored on tens of millions of geographically distributed computer systems with the corresponding software (Web-servers), connected by telecommunication means of the global Internet.

Using special software - Web-browsers, users who have access to the Internet can receive monitoring information.

Multimedia information is information presented not only in text but also in graphical form using video and audio data.

The information is presented in the form of questionnaires, tests, documents that may contain links to other materials stored on the same or on another server. Using links (hyperlinks), the user of the viewer has the ability to automatically connect to the source of information he needs on the network and request the document to which the link is made. Hyperlinks are selected using a browser, which links over a computer network at the request of a Web server that stores a file with the required document. Upon receipt of the request, the server sends the client this file or a denial message if the required document is unavailable for one reason or another [23].

The national information system includes components: modern telecommunication infrastructure, that is based on cable, satellite, etc. communication channels; distributed computer network, which is part of the information space of the Internet and connects the information systems of different educational institutions; system of national information resources, built on Intranet technology and includes data banks of different levels - a comprehensive information security system.

Advantages of the information system based on open technological solutions of the Internet for monitoring the quality of higher education over closed unique technologies:

integration of information resources of different levels; construction of basic national resources on the technology of distributed data banks; access to information resources throughout the country; interregional information exchange; flexibility and availability, ease of integration of new information systems; minimization of costs for the creation and operation of information systems; organization of centralized support; feedback from citizens at the level of state and local self-government.

Consider the information technology of monitoring information processing.

Let's highlight the main factors influencing the decision-making during the monitoring of the quality of higher education: information-analytical work on the collection, accumulation and processing / analysis of primary information and its analysis and formation on its basis of relevant conclusions; the intellectual level of the subject, his mental and analytical abilities to analyze the situation or problem; personal experience of the head of the educational institution (especially in solving such problems).

At the time of decision-making, the second and third indicators are virtually unchanged, stable. The main factor that decisively influences the opinion of the subject is the information-analytical work on the collection, accumulation and processing / analysis of primary information, as well as the conclusions drawn from this analysis.

Informing external participants, interested stakeholders or educational organizations and users is through the corporate web-site, which allows receiving and "downloading" information, filling out electronic forms of monitoring activities, etc. To communicate and send information to employees and educational organizations can be involved integrated web-based e-mail tools.

There are three data processing technologies: centralized, decentralized and mixed.

Centralized technology includes a unit that, on the one hand, collects information to monitor the quality of higher education and process the data obtained, on the other hand - solving relevant problems with the help of computer technology and obtaining results aimed at improving the education sector. Such a unit is usually the Department of Higher Education Monitoring, which involves qualified specialists in the operation of hardware, design and programming, solving new educational problems, creating and maintaining databases, and which focuses on computing, information, software and other resources.

Decentralized technology is aimed at the group use of personal computers in the workplace of employees of educational institutions. The teaching staff uses computer technology in their professional activities. Due to global computerization, automated workstations, local area networks are being created, which increases the efficiency of monitoring the quality of higher education and, as a result, improving the management functions of the institution through efficiency, reliability, completeness of information within decisions. The specialist enters information into the automated system, by means of computer technology solves the tasks and gets the result.

Mixed technology is based on the widespread use of computer technology, which has a developed system of tools for input, primary processing and accumulation of input information, which provides connection of personal computers to the computer network. Entering information is carried out at remote workstations of users.

Obviously, decentralized data processing in information systems is the most effective because it provides input and processing of information without intermediaries and provides the specialist with the necessary tools to solve educational or managerial problems [20].

In the field of education around the world, in the spring of 2020, the COVID-19 pandemic brought significant changes and caused educational problems in Ukraine. Quarantine forced all educational institutions to switch to distance learning.

The overall goal of quality continuing education is to prepare a specialist for professional activities in the context of informatization of society and mass global communication, able to use the full arsenal of ICT tools to implement the main directions of informatization of education [8].

Information technologies provide great opportunities for the development of professional skills and intellectual potential of future professionals. It is necessary to use these advantages as much as possible in general, and when monitoring the quality of higher education – in particular [5], which is too important during the COVID-19 pandemic.

Computerization of the educational process in higher education institutions of Ukraine is considered as one of the first and most promising areas for improving the quality of education in higher education institutions, which is possible with constant monitoring of the quality of higher education. Much attention is paid to this problem, both at the level of ministries and at the level of higher education institutions themselves. However, full-scale computerization of the educational process in higher education institutions is a complex problem that has purposeful work [22], especially during the COVID-19 pandemic.

Informatization and powerful technical equipment of the educational system significantly contribute to the quality of

monitoring of the educational process. Telecommunication systems, information service systems, reference and information systems, automated decision-making and decision-making systems, modeling and simulation systems, training systems, etc. play an extremely important role. [23].

According to A. Kuzminsky, O. Kuchai, O. Bida, A. Chichuk, I. Sigetiy, T. Kuchai, one of the priority areas of the higher education modernization program during the COVID-19 pandemic is distance learning, which is possible due to the existence of information-educational technologies and communication systems, especially for effective education and its monitoring in higher education institutions. During the COVID-19 pandemic, there is a need to monitor the quality of higher education remotely, due to the need for the COVID-19 pandemic situation.

Distance learning in world practice is one of the established forms of learning. The pandemic has led to significant changes in the field of education around the world, it has caused educational problems in Ukraine. At the beginning of the quarantine in the spring of 2020, all educational institutions in the emergency mode switched to distance learning. Distance learning is the most democratic form of education, which allows to receive educational services to all segments of society. Distance learning methods are used in higher education institutions, in school education, in the system of professional development of specialists, in the system of management training, etc.

In Ukraine, computer and audio-visual equipment is being introduced into the educational process, which is necessary to improve the distance learning system, which is currently being worked on by all higher education institutions in Ukraine.

The methodological basis for working on distance learning and control of educational achievements during the COVID-19 pandemic and for the educational process in general requires the maximum involvement of students in active learning and control of their knowledge. Note the advantages of this process: increases the motivation of students to carry out training by distance learning; feedback speed; constant presence of the teacher; systematic consultations; creation of a special forum for communication between teacher and students; interaction between students and the teacher, which contributes to quality learning – in general, and monitoring activities - in particular.

The effectiveness of pedagogical support of monitoring activities in the process of distance learning is achieved by the following conditions: students have computer literacy; taking into account the psychological patterns of perception, memory, attention and age characteristics of students, their individual and personal characteristics; creation of psychological comfort, which includes the teacher's ability to dialogue through information technology; individual approach to students; implementation of a specially organized self-control of students and systematic monitoring of the teacher on the generalization of knowledge, provided for in the development of appropriate curricula for teaching professional disciplines; students' skills of independent work; ensuring effective interaction of all components of the distance learning system.

Each country needs to build its capacity to provide blended learning models. All educational institutions should be better prepared (if necessary) for the transition: from full-time to distance learning. This will protect education and create opportunities for more individualized approaches to teaching and learning, monitoring educational activities not only during future pandemics, but also during other earthquakes, such as natural disasters, which is possible in the development of flexible curricula that can be taught in person or online.

In addition, all teachers must be well prepared to manage a wide range of IT devices and guide the reform of the education sector in line with the standards of the European Education Area.

During the COVID-19 pandemic, the role of the teacher in the educational process also changes significantly. It is responsible for such functions as coordinating the cognitive process, adjusting the course being studied, advising students in organizing an individual curriculum, managing their educational projects, assessing students' knowledge and conducting monitoring.

Consideration of the features of distance education in terms of communication between teacher and student, gave the opportunity to form a number of advantages of distance education compared to traditional learning and its monitoring: advanced educational technologies; availability of information sources; individualization of training; convenient consulting system; democratic relations between student and teacher; convenient schedule and place of work [11].

The quantitative analysis confirms the popularity of open education: there are currently a large number of platforms that provide access to open educational resources from various fields of knowledge. Where the specialist will be able to use new technologies in education.

The mass share of IT courses in open educational resources in relation to all offered is quite large: on the resource Intuit computer science courses occupy 70% of all courses, on Udemy – 43%, UoPeople – 28%, Edx – 24%.

Most of the courses are offered not only in programming and software development, although the relative weight of these courses is the largest (38.6% of courses considered),

but also in areas related to the study of specialized software in a particular scientific field. information content, with cloud computing, etc. Thus, students have a variety of requests, which are satisfied by the author's courses from the world's leading teachers.

Actively develop and implement open educational resources in the United States and EU countries. There are platforms that are more focused on global distribution - CourseraiUdemy resources offer educational resources in different languages (not only English) - 85% and 46.5% respectively.

During the COVID-19 pandemic, it turned out that we have a large number of courses on foreign open resources and not enough in Ukraine, but such courses are being developed and open educational resources in Ukraine are being launched, but slowly. This is confirmed by the Ukrainian platforms Prometheus and VUM, which offer a small number of courses [18].

The COVID-19 pandemic has transformed the entire education system, including higher education, and the need to adapt to new conditions. The development of new approaches and models of the educational process has become available. Gradually, students and faculty members of higher education institutions adapted to distance learning, which involves the acquisition of digital and other skills. Research and teaching staff were forced to develop new online courses and programs, improve pedagogical skills, while taking into account the specifics of distance learning.

Public authorities involved in promoting distance learning, in particular the Ministry of Digital Transformation of Ukraine, have created appropriate conditions for Internet access, overcoming the problems that existed in rural areas.

In modern conditions, distance learning requires the integration and solution of common problems by public authorities, higher education institutions, NGOs and student government to ensure an effective educational process.

The COVID-19 pandemic and related quarantine restrictions have demonstrated the advantages and disadvantages of distance learning technologies and their application in higher education. Three stakeholders in the field of higher education faced problems of rapid adaptation to the conditions of the pandemic: 1) state institutions; 2) students; 3) research and teaching staff [13].

Students and faculty members of higher education institutions had psychological and organizational difficulties during distance learning. The monitoring system of education has also experienced difficulties. During the pandemic (spring 2020), the State Service for Educational Quality of Ukraine conducted a survey among students and research and teaching staff. According to the results of the survey, the problems faced by higher education seekers were identified: lack of uninterrupted access to the Internet; the risk of biased assessment; insufficient self-organization; irregular communication with the teacher; lack of necessary equipment at home; lack of necessary skills in working with equipment and distance technologies.

To find out the effectiveness of distance learning and develop measures for its further improvement (September 2020) for education and monitoring activities, higher education institutions of Ukraine conducted a survey among students and research and teaching staff. The questionnaires had specifics and different variations depending on the profile of the higher education institution, specialties, etc. Here is an example of a survey of full-time students of the Faculty of Economics and Business of Kyiv National University of Technology and Design, which was attended by 115 students with higher education in the fields of economics: Economics, Management and Administration, Public Administration [12].

The survey of students in the chosen format had a certain level of subjectivity in personal assessments, but the sample was quite representative. The questionnaire, which contained questions about the peculiarities of distance learning, monitoring activities during the quarantine period, included questions about: learning satisfaction, ease of monitoring, the level of knowledge acquisition in the conditions of distance learning during the quarantine period; the need for additional explanation by the teacher of the material submitted remotely; acceptability of monitoring activities and conducting classes by video conferencing (including through Zoom or other similar resource); acquisition of new or improvement of acquired competencies or deterioration of skills in distance learning; changes in the agenda, time spent on training, assessment, monitoring and leisure; advantages and disadvantages of distance learning, assessment, monitoring and leisure during quarantine.

When implementing the educational function of scientific and pedagogical workers, the level of learning satisfaction, ease of monitoring, level of knowledge acquisition, in general, and in the conditions of distance learning during the quarantine period, in particular, is important. According to the results of the survey, 30% of students indicated absolute satisfaction with the distance learning process, convenience of monitoring, level of knowledge acquisition during the general quarantine period, 43% of students considered themselves satisfied, 17% were dissatisfied. We see in the results of the survey the high evaluation of students in the process of organizing the educational process of evaluation, monitoring and leisure during the global quarantine period.

Instead, the measure of the quality of the educational process is not just the level of satisfaction, but the ability to perceive information and the level of knowledge acquisition by students. One third of students reported a lower level of knowledge acquisition compared to full-time study according to their own assessments. Among them: 35% of students have acquired knowledge at the same level; 10% of students improved the level of knowledge acquisition; 55% of students needed additional explanation from the teacher regarding the submitted distance material.

Interesting results were obtained on the question "How is information perceived better?": 19% of students answered "online"; 31% – "in person"; 50% – "information is perceived equally".

Advantages of quarantine restrictions in students' acquisition and development of competencies: ability to manage time; ability to work with information resources; ability to self-control; ability to self-organize.

But 72% of students said they had lost the skills of teamwork and teamwork that are key to future managers and public managers.

There have been some changes in the agenda, time spent on training, assessment, monitoring and leisure. We will note that during leisure students: more began to be engaged in hobbies – 24%; watch movies – 22%; go in for sports – 19%; read books – 18%; communicate on social networks – 17%.

Students named the following advantages of distance learning: flexible learning schedule – 34%; possibility to combine work and study – 29%; opportunity to master additional competencies, courses, hobbies – 20%; increase motivation for self-study – 16%; evaluation, monitoring – 1%.

Students consider the disadvantages of distance learning in the period of general quarantine: technical problems in learning and monitoring, inability to access the Internet – 47%; difficulty of assimilation of material – 36%; ownership of information technology by teachers at a low level – 10%; students' possession of information technologies at a low level – 7%. [12].

5. Conclusions

Thus, the necessary condition for monitoring the quality of higher education is information support, which includes the selection and appropriate treatment of information that characterizes the state of the education system.

Information technologies, the purpose of which is to promote the monitoring of the quality of education, allow to respond qualitatively to the dynamics of the education sector, to create the necessary conditions for effective monitoring.

It is investigated that monitoring the quality of higher education with the use of information technology is necessary for the current process of using tools and methods of data collection, processing and transmission in order to obtain information on the current state of training to improve their training; to form new qualities necessary for their professional activity. The solution of the specified problem is possible at monitoring of quality of higher education and the computerized process of training, that is obligatory introduction in educational process of professional preparation of computer technologies of technology and possibilities of quality and realization professional skills, increase the intellectual potential of future professionals. Therefore, you need to take advantage of information technology.

References

[1] Androschuk, O.V. (2014). Information technologies and their impact on the development of society. *Center for Military and Strategic Studies of the Ivan Chernyakhovsky National University of Defense of Ukraine, 1* (50), 42-47.

[2] Hutnyk, G.V. (1999). Information support of the system with the quality of education. *Informatics and Education, 1*. 7-12.

[3] Kapto, A.E. (1991). Organization of intra-school management. K .: Znannya, 46.

[4] Kapustin, I.V., Goltyay, T.M., Yevtushenko, S.S., Klimova, S.V. (2013). Technology of monitoring research (From experience). Kharkiv: Kharkiv Academy of Continuing Education. 85.

[5] Klepko, S. (1998). Integrative Potential of Informatics and Computer Science in the Educational Process. *Pedagogy and psychology of professional education. 2*. 35-43.

[6] Konotopov, P.Yu. (2004). Analytics: methodology, technology and organization of information-analytical work. M .: RUSAKI. 512.

[7] Kuchai, O., Kuchai, T., Chychuk, A. (2019). Formation of information culture of future specialists in France and Great Britain. *Pedagogical Journal of Volyn: scientific journal. Lutsk: Lesya Ukrainka National University, 3* (14). 10–14.

[8] Kuzminsky, A.I., Kuchai, O.V., Bida, O.A. (2018). Using the Polish experience of training specialists in computer science in the system of pedagogical education of Ukraine. *Information technologies and teaching aids, 68*(6). 206–217. https://journal.iitta.gov.ua/index.php/itlt/article/view/2636

[9] Kuzminskyi, A., Bida, O., Chychuk, A., Kuchai, O. (2020). Information support of pedagogical workers. *Modern information technologies and innovative teaching methods in training: methodology, theory, experience, problems: a collection of scientific papers, 56*. 78-90.

[10] Kuzminskyi, A.I., Bida, O.A., Kuchai, O.V., Yezhova, O.V., & Kuchai, T.P. (2019). Information Support of

Educationalists as an Important Function of a Postgraduate Education System. *Revista Romaneasca Pentru Educatie Multidimensionala, 11*(3), 263-279.

[11] Kuzminskyi, A.I., Kuchai, O.V., Bida, O.A., Chychuk, A.P., Sigetiy, I.P., Kuchai, T.P. (2021). Distance learning in the training of specialists in higher education. *Modern information technologies and innovative teaching methods in the training of specialists: methodology, theory, experience, problems: a collection of scientific papers, 60*. 50-58.

[12] Oleshko, A., Rovnyagin, O., Godz, V. (2021). Improving distance learning in higher education in the context of pandemic constraints. Electronic Public Administration: *Improvement and Development*. 201.

[13] Oleshko, A.A., Bondarenko, S.M., (2020). Improving the system of distance learning in higher education in the context of the COVID-19 pandemic. *Proceedings of the International scientific-practical conference "Problems of integration of education, science and business in the context of globalization": abstracts, 189*. 78 - 79.

[14] Palamapchuk, V.F. (1994). Innovative processes in pedagogy. *Pedagogical innovations in modern school*. 4-5.

[15] Petrychenko, L.O. (2014). Theoretical and methodological principles of education quality management in higher pedagogical educational institution: dis. dr. ped. Sciences: 13.00.06. Kharkiv. 599.

[16] Pumyantseva, D.I. (1994). Innovative functions of education management. *Pedagogical innovations in science*, 36–44.

[17] Savchenko, L.O. (2014). Theoretical and methodological principles of training future teachers for pedagogical diagnosis of the quality of education. dis. dr. ped. Sciences: 13.00.04. Kryvyi Rih. 590.

[18] Semenikhina, O.V., Yurchenko, A.O., Sbrueva, A.A., Kuzminskyi, A.I., Kuchai, O.V., Bida, O.A. (2020). Open digital educational resources in the field of IT: quantitative analysis. *Information technologies and teaching aids, 75*(1). 331–348.

[19] Surmin, Y.P., Tulenkov, N.V. (2004). *Theory of social technologies*: Textbook. allowance. K.: МАУП. 608.

[20] Varenko, V.M. (2014). *Information and analytical activities*: Textbook. K .: University "Ukraine". 417.

[21] Yakimenko, P., Bida, O., Prokhorchuk, O., Radul, O., & Sheychenko, O. (2021). Covid-19 and Distance Education: Analysis of the Problems and Consequences of the Pandemic. *International Journal Of Computer Science And Network Security, 21*(12). 629-635. DOI 10.22937/IJCSNS.2021.21.12.86

[22] Zhabolenko, M., Zhdanova, N. (2007). Innovations in the field of using information and communication technologies in the educational process. *The Strategy of Innovative Development of the Higher Education System in Ukraine: Materials International. science-practice conf*, 157-161.

[23] Zhaldak, M. (2002). Pedagogical potential of informatization of educational process. *Development of pedagogical and psychological sciences in Ukraine 1992-2002. Sciences Works for the 10th anniversary of the Academy of Pedagogical Sciences of Ukraine*, 1. 371-383.

[24] Zorochkina, T., Kuchai, O., Yakovenko, S., Okolnycha, T., Demchenko, I., & Kuchai, T. (2021) Problems of Distance Learning in Specialists Training in Modern Terms of the Informative Society During COVID-19. *IJCSNS International Journal of Computer Science and Network Security, 21*(12), 143-148. https://doi.org/10.22937/IJCSNS.2021.21.12.21