






# INFORMATION AND COMMUNICATION TECHNOLOGIES USED AT HEI DURING TRAINING OF TEACHERS OF INSTITUTIONS OF PROFESSIONAL EDUCATION

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## ABSTRACT

This research aimed to identify the basic problems and gaps in the process of introducing information and communication systems and technologies in institutions of higher professional education and to outline the possibilities of their later use as the main component of e-education. Research methods: systematization, generalization, comparative analysis, systems analysis, logical approach, synthesis. Results. Based on the analysis of the results of the introduction of information and communication technologies during the organization of training in higher professional education establishments, the urgency of using information technology training technologies was proven; the advantages and disadvantages of e-learning and distance (distance) education platforms were considered; it was distinguished which technical means of information communication systems and technologies were most effective under the condition of a rational combination of the most recent and traditionally existing means of teaching.

**Keywords:** Higher technical education (training in technical areas). Communication process. Communication management. Information and communication technology. E-education platform.

## TECNOLOGIAS DE INFORMAÇÃO E COMUNICAÇÃO UTILIZADAS NA IES NAS FORMAÇÃO DE PROFESSORES DE INSTITUIÇÕES DE EDUCAÇÃO PROFISSIONAL

TECNOLOGÍAS DE INFORMACIÓN Y COMUNICACIÓN UTILIZADAS EN HEI DURANTE LA FORMACIÓN DE PROFESORES DE INSTITUCIONES DE EDUCACIÓN PROFESIONAL

## RESUMO

Essa pesquisa teve como objetivo, identificar os problemas básicos e lacunas no processo de introdução de sistemas e tecnologias de informação e comunicação nas instituições de ensino profissional superior e delinear as possibilidades de sua posterior utilização como componente principal do e-educação. Métodos de pesquisa: sistematização, generalização, análise comparativa, análise de sistemas, abordagem lógica, síntese. Resultados. Com base na análise dos resultados ficou comprovada a urgência de utilização de tecnologias de formação em informática; as vantagens e desvantagens das plataformas de e-learning e de educação à distância (à distância) foram consideradas; distinguiu-se quais os meios técnicos de sistemas e tecnologias de comunicação de informação mais eficazes sob a condição de uma combinação racional dos meios de ensino mais recentes e tradicionalmente existentes.

**Palavras-chave:** Ensino técnico superior (formação em áreas técnicas). Processo de comunicação. Gestão da comunicação. Tecnologia da informação e comunicação. Plataforma de e-educação.

## RESUMEN

Esta investigación tuvo como objetivo identificar los problemas y vacíos básicos en el proceso de introducción de sistemas y tecnologías de información y comunicación en las instituciones de educación superior profesional y esbozar las posibilidades de su uso posterior como componente principal de la educación electrónica. Métodos de investigación: sistematización, generalización, análisis comparativo, análisis de sistemas, enfoque lógico, síntesis. Resultados. A partir del análisis se comprobó la urgencia de utilizar tecnologías de formación en tecnologías de la información; se consideraron las ventajas y desventajas de las plataformas de aprendizaje electrónico y educación a distancia (a distancia); Se distinguió qué medios técnicos de sistemas y tecnologías de la información y la comunicación eran más eficaces si se combinaban racionalmente los medios de enseñanza más recientes y tradicionalmente existentes.

**Palabras-clave:** Educación técnica superior (formación en áreas técnicas). Proceso de comunicación. Gestión de la comunicación. Tecnología de la información y la comunicación. Plataforma de e-educación.

## INTRODUCTION

Modernity requires from the members of the civil society to possess the ability to be independent, active professionalism, extraordinary decision-making; they should be able to easily adapt or adjust to the conditions and pace of modern life in the society, which are constantly evolving and changing. Improving one's own professional and methodological competence of teachers of higher professional educational institutions is relevant not only at the internal regional, but also at the external interstate levels.

In the near future, along with the strengthening of the informatization of the education system, it is necessary to elaborate ways of developing the society and distribute responsibilities for their practical implementation. One of the important responsibilities of every member of the society is the ability to apply scientific and information technologies in solving issues in their professional activities.

Information and communication technologies are tools related to the creation, storage, transmission, processing and management of information. This commonly used term includes all the technologies applied to communicate and work with information. Any pedagogical technology is information technology, forasmuch as the basis of the technological process of learning centers around obtaining and converting information. Live communication is inseparable from information technologies; consequently, at the present stage of development of hardware and software, information technologies are called information and communication technologies. The computer takes its place in these communications. It provides comfortable, individual, diverse, highly intelligent interaction of communication objects.

Currently, methodological and organizational systems of higher professional education, focused on the availability of computer software, are aimed at the perception of the research environment as a whole, clarification of its essence, connections between components and its structural elements, the content of the obtained results, application of synthesized, imaginary thinking in parallel with logic, analytics and abstraction from the unnecessary components when the analysis of models of the research object is carried out. They are directed at setting the ultimate goal, making possible assumptions or hypotheses, constructing models of information systems of the studied objects and processes, the possibility of personal interpretation of the final, preferably correct results obtained with the help of information and communication technologies applied.

The main acting individual of the learning process is a student, the acquirer of a set of knowledge. The purpose of the educational process is to make him aware of the need to change the motive of learning "should" to the motive "I want to know, I'm interested". Solving this complex task urgently requires the use of information and communication technologies in the educational process.

Modern computer-oriented methodological systems of education, on the contrary, are aimed primarily at the holistic perception of the studied phenomenon, clarifying its essence, the interconnections between its individual manifestations, the substantive aspect of the obtained formal solutions, development of synthetic, figurative thinking along with logical, analytical, abstraction from technical details when analyzing models of the researched phenomenon, statement of problems, hypotheses, construction of information models of researched processes and phenomena, material interpretation of the results received by means of the computer.

Coordinated combination of information and communication technologies in the process of e-learning, taking into account the feasibility of their use is one of the main objectives of the modern educational process in the system of higher education. The organization of e-learning is aimed at creating a comfortable learning environment, in which each student is encouraged to professional development and self-development through information and communication technologies. Thus, the issue of choosing information and communication technologies in the organization of the e-learning process for students is relevant.

## THE PURPOSE OF THE RESEARCH

To identify the basic problems and shortcomings in the process of introduction of information and communication systems and technologies in higher professional educational institutions and outline the possibilities of their further use as the main component of e-education.

## Research objectives

1. To describe the most popular modern e-education platforms and identify the fundamental features of their use in the institutions of higher professional education.
2. To analyze and summarize the results of investigations and practical experience of applying modern information and communication technologies in the institutions of higher professional education.
3. To identify and critically evaluate the results of the introduction and use of information technologies in the educational process.
4. To outline further prospects for the introduction of information and communication technologies for students and teachers.

## Literature review

The provision of training for highly qualified professionals capable of performing tasks is specifically noted as the main objective in regulations and investigations that form the basis and requirements for vocational education in relation to professional development in the context of informatization of the society (KOZMA, 2008; MARTIN, MULLIS, FOY, STANCO, 2012).

Research of the problems of properly training professionals who are able to successfully apply scientific and information technologies in practical activities and form the skills of applying the acquired knowledge in practical activities during training remains an urgent problem facing pedagogical science and practice (PAVLYSHYNA, 2015).

Changing the generally accepted approaches to the modern educational process requires the higher school to review the approaches in the training of professionals, the formation of their professionalism, competence, ability to freely use modern innovative forms, tools and methods of personal and social learning (DEINEGA & ANDROSCHUK, 2016; JONES, 2004; KADEMIYA & SHAKHINA, 2011; LOBODA, 2012).

The issue of introduction of information and communication technologies in the professional training of specialists of institutions of higher professional education is given due attention in scientific investigations and works of domestic researchers in this direction, namely: Bykov (2009), Coll (2016), Engel et al. (2018), Spirin (2009), Stavytska (2017), Vyshnivsky et al. (2014), Zakharov (2003), et al. (HASLAMAN, MUMU & USUAL, 2011; KREMENYA, 2010; MYKOLAENKO, 2006; SANGRÀ A. & GONZÁLEZ-SANMAMED, 2014; STEIMLE, GUREVYCH & MUHLHAUSER, 2007).

Despite the due attention paid to the study of issues and methods of application of information and communication technologies in professional training, several important aspects for theory and practice, necessary for proper professional training, are left aside (Rajala et al., 2016; RATHEESWARI, 2018; SHVACHICH et al., 2017). Therefore, the purpose of the academic paper is to study the reasonable choice of modern technologies of information support and communication during the use of electronic forms of training and study the state of introduction of information communication technologies in the process of professional training in the institutions of higher professional education.

The components of modern information technologies of educational communication of higher professional educational institutions classically include the following ones (LAW, PELGRUM, & PLOMP, 2008; Tobias et al., 2011): means of technical support (personal computer equipment, stationary and mobile complexes of computer and software, means of multimedia projection, touch (tactile) classroom boards, etc.); software tools (system, of general sharing, standardized and unique software, including those intended for use in the educational process); tools of communication with the electronic network the Internet and technical support of full-fledged effective work in the network environment (servers, lines of computer network and stationary communication, modems, search software of search works on the Internet, etc.); information (content) software specially developed for use in the system of educational process; educational and methodological support for high-quality and effective use of information and communication technologies in vocational education.

Researchers consistently group the components of modern information technologies of educational communication by the following characteristics, properties and ability (in descending order of importance, although the difference in importance for groups of respondents is in the range of 0, 2-1, 3%).

Functionality (I), which is characterized by the convenience of educational material, the speed of testing the acquired knowledge, the ability to analyze the degree of activity of students, the possibility and complexity of updating educational content; availability of the function of creating copies of control responses, resistance to unauthorized external interference (FRAILLON, SCHULZ, & AINLEY, 2013; WANG & WOO, 2007).

Reasonable cost of implementation (II), forasmuch as the electronic platform is available on free of charge basis; there are almost no restrictions on its use in terms of the number of licenses for students and the number of training courses supported by it (KOVAL, 2009).

Low costs for practical implementation and maintenance of the system, availability of tools for the development of training courses and current support (III), which do not require specialized technical knowledge and software. For instance, any user who has a sufficient level of knowledge in the field of network systems and technologies can be the “administrator” of the system; during the creation of educational content (course) only knowledge in the relevant discipline, from which the electronic educational course is created, is decisive, and in terms of technical special knowledge at its creation it is enough to have skills of the constant user of computer equipment (SHVACHICH et al., 2017).

Sufficient technical characteristics of the electronic system (IV), the presence of already built-in tools and components for the development and editing of the installed educational content, the ability to integrate various educational software materials of a wide variety of nature and purposes and support the international standard for system programming SCORM are the grounds that provide the ability to exchange electronic introductory courses and ensure processes for transferring the necessary resources to other systems, or, conversely, from other systems (NASAH et al., 2010; ZUBEKHINA, 2016).

Modularity of the platform (V), that is, the presence in the developed training courses of a specialized set of blocks of educational material, which are ready for use in other disciplines (GRYSHCHENKO & KRAKHMALYOVA, 2016; GUREVICH, KADEMIYA & SHEVCHENKO, 2012).

Convenience and ease of use (VI), that is, the availability of a clear interface and technological capability of current training, which provides ease of finding and access to the help menu, convenience of transition from one sections to others, an opportunity to address to service of tips and the help of the instructor (ARNSETH, SILSETH, 2013; DEDE, 2009).

Accessibility to the official website model.org. (VII), which is a centralized source of information, discussion platforms and fruitful collaboration between Moodle users, designers, system administrators, researchers, teachers, students, etc. (BENNETT, MATON, KERVIN, 2008).

## METHODS

Implementation of the purpose of the investigation provides involvement of the following research methods, namely:

- systematization, generalization of research results on the use of modern information and communication technologies in institutions of higher professional education;
- method of comparative analysis in order to determine the most popular modern e-learning platforms and the fundamental features of their use;
- critical analysis of the expected results from the introduction and use of information technologies in the educational process;
- system and logical analysis, method of information synthesis concerning the positive and negative impact of information and communication technologies on students and teachers.

The academic paper has used theoretical investigations of scientists who studied the implementation of information and communication technologies in the organization of education in higher professional educational institutions with the use of modern electronic components.

## RESULTS

In the process of using information and communication support, teachers take into account the compliance of goals and objectives with the projected learning outcomes. Forasmuch as the teaching of educational content is a means of improving the quality of the theoretical component of the educational process, a clear structuring

of the theoretical material is of great importance, as well as the rationality of using the selected or author's support (educational software). At the same time, the feasibility of using information and communication support in the teacher's activities, its effectiveness and manufacturability of the formation of the subject competence of students is assessed.

Ways to create conditions for improving the quality of vocational education on the basis and through the introduction of modern new and additional information and communication technologies are reflected in table 1.

**Table 1.** Components of creating conditions for improving the quality of vocational education in higher educational institutions

Components of creating conditions for improving the quality of vocational education	creation and introduction of new, educational and training technologies into the educational process, focused on a specific individual personality
	democratic and at the same time differentiated for the maximum development of personal abilities of the student, taking into account his inquiries and needs for the maximum disclosure of creative individuality and mental potential
	promoting effective learning activities in the team (including extraterritorial and common international aspects, the so-called "education without borders")
	creation of adequate space and free access to information, in particular, foreign international resources of independent education and training, information databases, increasing the capacity of means of formation, storage and retrieval of information materials for education, creation and development of integrated electronic library networks and systems
	creation and involvement of electronic means of the newest generations for providing educational process, in particular, computer software and electronic means of educational direction
	development of new and improvement of existing methods and tools for assessing the results of the educational process, taking into account the mutual connection and mutual influence of educational and other related innovations on the effectiveness and efficiency of learning

**Source:** Compiled by the authors

Thanks to the possibilities of information and communication technologies, the ideas of education "without a break" (open) have been developed; consequently, any student can and should choose the purpose, content, methods, location and time of study. At the same time, higher professional educational institutions face the issues of adequacy, both of the process of providing educational services and the timeliness of receiving a response to a request regarding the need for training. This has led to the disappearance of barriers between formalized, non-formalized and informal learning, which is evident in the e-learning format.

Modern e-learning technologies are focused on the perception of the individual and aimed at maximizing the effective increase of individual resources of students, in particular, its following components: actually personal (motivational, self-assessing, systemic relations); subjective (personal knowledge, skills and abilities); purely individual (individualization of stylistic activity, features of adaptation to the environment), etc. Providing a student with an individualized personal resource can ensure an opportunity for his own professional development in the future.

At the same time, in the process of modeling a component of the practical educational process with information and communication support, which is dominated by practical orientation, the teacher should: select practical tasks that contribute to the formation of research skills and abilities of students; determine appropriate forms of organization of educational activities of the latter; to single out the means of establishing the effectiveness of the use of training's technical components in the process of performing practical tasks by students.

The expected results from the introduction and use of information technologies in the structural components of the educational process of a modern institution of higher professional education are reflected in Figure 2.

**Table 2.** Expected results from the introduction and use of information technologies in the educational process

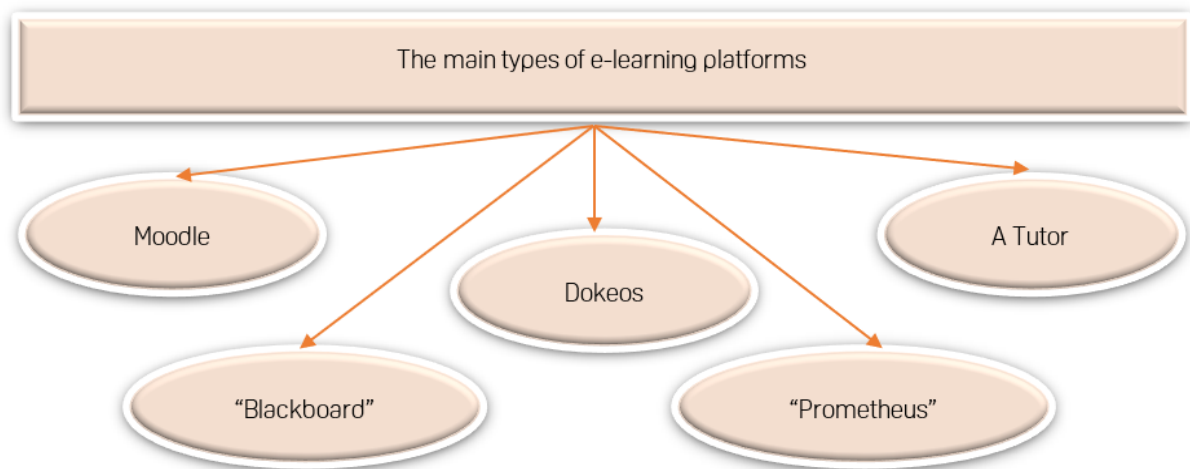
Expected results from the introduction and use of information technologies	improving the quality of training, thanks to the ability to process a large amount of information sources
	increasing the efficiency of the learning process through maximum individualization and increasing personal intensity
	improving the methodology of selection of content, methods and forms of teaching, education intensification of the process of assimilation of information
	formation of independence in studying and information processing
	implementation of an individual approach to the learning process
	maximum adaptation of participants in the process of education to exist in the conditions of an information society
	significant increase in the level of own professional competence and competitiveness in the labor market of professionally identical specialists
	improving the quality of training, thanks to the ability to process a large amount of information sources

**Source:** Compiled by the authors

One of the strategic objectives of modern higher education is training of professionals capable of developing the latest information and communication technologies and effectively apply them in their future professional activities. In modern conditions, when the majority of Ukrainian students combine study with work, in particular abroad, as well as study at several universities, the so-called e-learning becomes especially relevant (e-learning).

The difference in the use of e-learning compared to traditional is that e-learning is generally not based on work in the classroom, but on the work of students independently. In this case, the inactive acquisition of knowledge in the ready state is replaced by active search at an individualized pace for each student. This causes the need to plan activities for working collectively in the team of students and teacher (teachers), thereby increasing the duration of contact and communication between them, as well as for individuals, performed personally. That is, studying in the context of e-learning means not only the availability of new technical means, but also updated forms and methods of presenting educational material, organizing a productive process of independent learning and work of students, an updated approach to the general learning process.

Considering that the priority direction of the reform of the national education system is the activation of the processes of using information communication technologies for the development of e-learning, attention should be paid to the analysis, including by practices, of the fundamental features of the use of the most popular modern e-education platforms (Figure 1).

**Figure 1.** Well-known e-learning platforms

**Source:** Compiled by the authors based on Dyshko, Zubekhina & Pavlyshyna, 2017; Dyshko, 2017

The learning process with the use of these electronic teaching systems provides the creation of a general course of study by the teacher of the educational institution, through the use of various multimedia resources. The student is responsible for its mastering, proper performance of the proposed task and the transfer of the results back to the teacher for checking the quality, correctness and completeness of the tasks performed.

It should be noted that IT professionals have developed many e-learning platforms that help create e-textbooks, distance learning courses, online testing, virtual labs, exercise emulation systems, etc. Moodle is the first system to be distributed on free of charge basis, edited and modified according to current requirements.

Thus, in the system of higher professional education, the electronic platform Moodle is the most popular one; it is actively used not only in higher educational institutions, but also in general educational institutions, schools and other organizations and establishments. The positive aspects of the Moodle system are as follows: unpaid free access; the ability to edit and change program codes in accordance with individually set needs; opportunity to study and conduct training in non-synchronized mode; take part in online classes; carry out stages of network testing of learning outcomes; conduct various studies and much more.

The above mentioned aspects require the presentation of the results of the study, a survey of experts (specialists in the installation and commissioning of educational IT systems, and users who apply them while studying in higher professional educational institutions (teachers and students). Moreover, the degree of importance and satisfaction of the components from using the electronic platform Moodle for all the following components is almost equivalent.

This requires the improvement of qualified training of professionals capable of effective existence in the information society and space, the need for optimal and up-to-date information base, suitable for the introduction of information and communication technologies in the educational process of higher educational institutions. However, in these institutions, in our opinion, not enough attention is paid to the problems and issues of using information and communication technologies in preparing students for professional activity.

The obvious positive consequences of the use of computer systems and tools in the system of information and communication technologies do not give grounds to avoid some of the reasons that prevent their effective establishment in educational institutions of higher professional education. Among such reasons the most important are as follows: psychological, didactic, reasons of sanitation and hygiene, psychophysiological and social ones. Noting the benefits of information and communication technologies, experts emphasize the need to take into account certain dangers to the health of the user, about which both teachers and subjects should be aware of. These include: diseases of the musculoskeletal system, vision, excessive fatigue; development of aggression, psychological dependence, loss of sense of time, use of products of low-quality or unauthorized ones. Hence, the negative manifestations arise, namely: health problems, psychological and mental disorders, reduced attention to the legal and moral and ethical characteristics of the student's personality, which are a sign of the destructive (ruinous) impact of information and communication technologies.

First of all, the active introduction of information and communication technologies in the educational process of institutions of higher professional education is hampered by factors connected with psychological and didactic reasons, namely: training courses are often developed without taking into account the technical and technological capabilities of information and communication technologies; the use of e-learning resources is significantly reduced directly between the personal communication of students with teachers; it is almost impossible to predict how expected, predictable and possible the reaction of the computer program will be on the behavioral actions of the student-user; unfortunately, there is often a low level of psychological readiness of teachers to adjust and change their own professional functions, using information communication technologies in teaching; in the vast majority of cases, the use of standard technologies does not allow students trying to develop and test the strategy of their own behavior, with the manifestation of individual creative approach to solving the problem.

Also, special attention should be paid to the following shortcomings in the use of information and communication technologies, namely: the difficulty of achieving overall coordination and systematization in the use of computer equipment; insufficient educational and methodological support; low awareness of the positive experience of practical implementation of elements of information support processes; non-compliance of software with the needs of the educational process; insufficient information culture of participants of educational process; low level of information exchange between educational institutions about the latest educational technologies; insufficient professionalism and competence of teachers; improper cooperation of staff involved in the creation of software packages with teachers and methodologists; inertia in the structural and content filling of educational curricula

of vocational education; the use of improper methodological support in terms of semantic content and the use of irrelevant organizational measures in the field of informatization. The most important causes of problems in the application of information technology are summarized in Table 3.

**Table 3** - The causes for the problems' existence in the application of the latest information technologies in educational professional activities

Causes	Educators		Students		Total,%
	quantity	%	quantity	%	
Lack of experience in terms of using	50	53,05	31	18,6	30,59
Illiteracy of management	2	2,7	7	6,66	6,03
Lack of moral and material interest	15	17,55	29	31,12	25,57
Frequent changes in standards and programs of the educational process	1	1,36	1	1,11	2,63
Heavy educational workload	10	10,2	6	6,68	12,25
Lack of skills of rational planning and forecasting of own activity	2	2,8	9	10	6,4
Inadequate quality of methodical developments, advanced training courses	8	6,58	14	15,59	10,55
Lack of a unified system of application of the latest information technologies in the educational process	5	4,07	0	0	3,02
Total:	93		97		

**Source:** Compiled by the authors based on Arynbaev, 2015.

The data, presented in the table, are practically correlated with the results obtained by Arynbaev (2015), who notes that the problems of implementation of information and communication technologies may differ for various educational institutions.

There are also another disadvantages connected with application of information and computer technologies in the educational process of higher technical educational institutions. The preparation of a lesson is usually a time-consuming process for the teacher, which takes a lot of time and requires certain knowledge and skills that are not relevant to the topic of study. Personalized learning styles are not taken into account when using a computer, in particular, multimedia equipment. In other words, the real individualization of learning based on the use of multimedia data is carried out only if the cognitive style of the author of multimedia programs coincides with the style of the user (communicative or social-cognitive aspects of learning are not taken into account). However, the use of graphics, video and audio information does not solve the problem of effective communication, which prevents emotional and motivational impact on the student. The implementation of various types of media influences (including sound, graphics, video, animation) does not always solve the problem of improving perception, understanding and memorization of information, and sometimes interferes due to noise in the channels of perception.

There are objective shortcomings in the complex of social and psychological components of the educational process, which prevent the proper speed of implementation of information and communication technologies in the educational professional process. These include, first of all, conservatism and the reluctance of some members of the teaching community to retrain and transit from the traditional form of teaching to conducting classes on a new basis with the use of various electronic learning resources; inertia of the majority of partners, potential employers in the future, who should be especially interested in providing educational institutions with the latest software and hardware, electronic process simulators of updated production equipment, etc.

Representatives of the students' audience are sometimes lacking in the so-called "Internet culture" and do not have the basic skills of proper, correct work in electronic, including social networks, within the requirements of current legislation; consequently, it also creates consequences in the form of psychological, mental and social problems. Uncontrolled and irrational use of Internet resources by students (review of non-educational sites, Internet communication and involvement in computer games during classroom work) is usually the cause of academic debt and other problems. Using the Internet by people who do not follow the basic rules of communication or spending time in cyberspace can lead to:

- irrational uncontrolled use of Internet resources;
- use the access to electronic networks during classroom activities in order to meet personal, non-educational needs;

- uncontrolled and sometimes unauthorized access to sites with disinformation, aggressive or illegal materials located on the Internet;
- the emergence and development of addictive behavior (behavioral disorders with a change in the mental state of a person until the moment when the fact of mental and physical dependence is recorded), which has a destructive effect on the human personality.

The information and communication technologies used in education generally coincide with the provisions of the concept of sharing information and logical forms and methods of teaching. However, due to the ever-increasing number of knowledge and skills important for the implementation of professional activities, education workers notice a clear contradiction: the received volume of the necessary information becomes practically immeasurable; it is often presented to the user who is physically and practically not prepared for its perception and, processing and understanding.

That is, the future specialist develops a generally standardized, sometimes even stereotypical (complex) type of professional nature, unable to take the quick decisions, necessary for effective and rapid resolution of issues and professional tasks. The Internet environment promotes the formation and / or development of addictive behavior – people, suffering from various types of latent addictions, may be revealed in an alternative reality. Thus, communicative addictions (for example, hypersociality, pseudo-behavioral behavior, etc.) can be manifested in communication on Internet forums, teleconferences; some sexual deviations are revealed in cybersexual relations and visiting pornographic sites, ludomania is implemented in computer gambling, addiction to spending money to turn into cyber mania, etc.

## DISCUSSION

Pedagogical observations (MARTIN, MULLIS, FOY & STANCO, 2012; JONES, 2004; LOBODA, 2012) show the formation of students' stereotypes of behavior in the learning process during application of information and communication technologies. For example, the existence of a virtual environment in the educational system imposes a certain load on the psyche of the individual in the process of switching its activities within the "reality - virtuality – reality". Standardized management of computer devices deprives the individual of the opportunity to develop his own strategy and creativity, consistent with the conclusions (BYKOV, 2009; COLL, 2016; STAVYTSKA, 2017; ENGEL et al., 2018). The issue of how the use of information and communication technologies in the educational process affects the formation of a system of operational units of perception, sensory standards that mediate and transform it from the process of image construction into elementary processes of recognition, separation of real and virtual worlds, also remains open. (RAJALA et al., 2016; RATHEESWARI, 2018; SHVACHICH et al., 2017). The information and communication technologies should be applied in the educational process for mastering certain educational material as well as for the comprehensive harmonious development of pupils (students), their creative abilities.

Educational technologies will only preserve the mental health of participants in the learning process when there are no risk factors among their components. Consequently, vice versa, there will be a desire for complete emotional immersion in the learning process, motivation to learn, a favorable, comfortable environment to achieve the goal, relying on their own experience, knowledge, skills and abilities, a sense of control over their learning, the desire to succeed, meet cognitive needs and the need for self-implementation, which coincides with the conclusions specified in works of (KREMENYA, 2010; ENGEL et al. (2018); SANGRÀ A. & GONZÁLEZ-SANMAMED, 2014).

It is obvious that information and communication technologies can provide huge economic and social benefits for learning, but only if they become a common and standardized infrastructure. Unfortunately, in Ukraine the problems of the information sphere haven't been still properly solved yet (STAVYTSKA, 2017; VYSHNIVSKY et al., 2014).

The authors (RAJALA et al., 2016; RATHEESWARI, 2018; SHVACHICH et al., 2017) also pay due attention to the study of issues and methods of application of information and communication technologies in the professional training of specialists in higher educational institutions of vocational education. They pay attention to the the issues of theory and practice necessary for proper professional training. Herewith, the authors (LAW, PELGRUM, & PLOMP, 2008; TOBIAS et al., 2011) emphasize the need to involve modern information technologies of educational communication in the educational process.

The benefits of using information and communication technologies in various fields, in particular in education, are undeniable, however, not all scientists share optimistic views on the widespread uncontrolled spreading of information and communication technologies in education. Many of them, as well as a large part of the pedagogical community, are concerned about the destructive effects of modern technologies on young people. Only scientifically substantiated informatization of the system of vocational education, strengthening of psychological and pedagogical support of this process, observance of sanitary and hygienic norms of work with information and communication technologies will promote increase of efficiency of mastering of knowledge, skills, abilities, acquisition by subjects of training of necessary professional and moral qualities. It will make the educational process more attractive, visual, personality-oriented, as well as guarantee the education of a new generation of highly competent professionals who can effectively solve complex professional problems and adequately respond to all challenges of the information society.

## CONCLUSION

Information and communication technologies, applying in educational process, based on the maximum activation of cognitive activity of students, can be effective only if the psychophysiological and psychological characteristics of future professionals are taken into account, as well as in case of presence of the system of diagnosis and correction of important professional qualities of personality and human condition.

The conducted analysis of the problems of using information computer technologies in the educational process of higher technical educational institutions shows that it is necessary to create conditions for their development, testing and implementation. Rational combination of the newest means of training with traditionally existing one is a difficult educational task, which needs the decision of the whole complex of psychological and pedagogical, organizational, educational and methodical, logistical and other issues. The creation of anthropological and medical-psychological conditions for full, harmonious, mental and spiritual development of a physically healthy person is especially relevant from a practical point of view among the set of tasks for the formation of an effective information and educational environment.

Despite the fact that the use of the latest information technologies is quite common in modern vocational and technical education, educational institutions continue to face shortcomings and problems, the unified solution of which does not exist. Among the prospects for further research that need to be studied, it should be noted about the formation of the regulatory framework for informatization of education, the creation and use of unified teaching materials, as well as the development of e-learning as part of open education.

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