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Improving education through implementation of information technologies into the educational process

Удосконалення освіти шляхом упровадження в навчальний процес інформаційних технологій

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Abstract

The ways of improving the educational space through the introduction of information technologies into the educational process are clarified and the decisive factors of the qualitative application of information technologies in the educational process are singled out. The main professional tasks of using information technologies in the educational process are listed, and the positive factors of information technologies that contribute to increasing the effectiveness of student education are highlighted. The main ways of qualitative informatization of education are shown. The didactic possibilities of ways to improve education through the introduction of information technologies into the educational process are highlighted. Groups of conditions for the effective use of information technologies for the improvement of the educational space are


Анотація


З'ясовано шляхи удосконалення освітнього простору за допомогою упровадження в освітній процес інформаційних технологій та виокремлено вирішальні фактори якісного застосування в навчальному процесі інформаційних технологій. Перераховано головні професійні задачі застосування в освітньому процесі інформаційних технологій та виділено позитивні чинники інформаційних технологій, які сприяють підвищенню ефективності освіти студентів. Показано головні шляхи якісної інформатизації освіти. Виокремлено дидактичні можливості шляхів удосконалення освіти за допомогою упровадження в навчальний процес інформаційних технологій. Визначено групи умов ефективного використання інформаційних технологій для удосконалення освітнього простору. Підкреслено переваги

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defined. The advantages of using information technologies to improve the educational space, which are manifested in the content, organizational, and functional aspects of the learning process, are emphasized. Features of virtual reality and augmented reality are shown. The necessity of distance education and multimedia technologies in the process of professional training of competitive specialists in institutions of higher education is proven and the principles that are effective when using multimedia in educational classes are described.

Keywords: educational process, information technologies, remote technologies, multimedia technologies, virtual and augmented reality.

Introduction

Global trends in the development of both education and the management of educational institutions are aimed at the transition to digital transformation. This means that all educational, scientific, management and other processes of the institution of higher education should be completely transferred to the digital environment. Without digital transformation, a higher education institution cannot effectively organize a high-quality educational process and remote work of its departments with documents, cannot function normally in competitive conditions, which negatively affects students, teachers, and employees.

Traditional approaches to automating the activities of a higher education institution have lost their effectiveness and can no longer meet modern requirements. New approaches, new concepts of digital transformation of higher education institutions are needed. Approaches that will allow to combine all the processes of creation and use of software and information tools for the construction of digital universities. Therefore, an urgent scientific task arises, which consists in the development of methods and models of digitization of institutions of higher education based on the unification of all functions, procedures and information bases into a single concentric information technology for the digital transformation of educational activities of the institution of higher education.

The 21st century is a century that is completely dependent on the information society and its main feature is the processing of information into one of the most important production resources. Taking this into account, professional readiness for the use of information technologies,

використання інформаційних технологій для удосконалення освітнього простору, що виявляються в змістових, організаційних, функціональних аспектах процесу навчання. Показано особливості віртуальної реальності та доповненої реальності. Доведено необхідність дистанційної освіти та мультимедійних технологій у процесі фахової підготовки конкурентоздатних фахівців у закладах вищої освіти та описано принципи, які є дієвими при використанні на навчальних заняттях мультимедіа.

Ключові слова: освітній процес, інформаційні технології, дистанційні технології, мультимедійні технології, віртуальна та доповнена реальність.

information culture, and professional training of future specialists not only require special attention but also act as a guarantee of the introduction of information and communication technologies into all spheres of society (Hurevych et al., 2012).

In the modern information society, it is necessary to be able to use information, think critically, and acquire knowledge by mastering information technologies, because the volume of knowledge doubles every two to three years. The informatization of education is the basis of the global process of informatization of society and it should precede the informatization of all areas of society's activity because general cultural, psychological, social, and professional foundations for the informatization of society are being formed. The active role of information technologies is manifested in the educational field and is because computer-oriented teaching aids allow the implementation of pedagogical modern innovative teaching technologies, and provide new education opportunities compared to traditional teaching and methodical (Vember, 2007). Therefore, the problem of improving education through the introduction of information technologies into the educational process is relevant and effective today.

In the conditions of a modern high-tech information society, the formation of information competence is the process of acquiring a set of spiritual values in the field of information relations created by mankind in the course of historical development. Nowadays, it is necessary to prepare a person for quick perception and processing of large amounts of information, mastering modern means, methods

and technology of working with information resources in the process of forming the teacher's professional competence in educational space.

Modern education in institutions of higher education is increasing technological, which involves not only the computerization of the learning process, but also the introduction of new forms of pedagogical management of this process, in connection with which additional theoretical and applied pedagogical research is updated: a special place among them is occupied by works related to the preparation of students for pedagogical activity in the conditions of new social challenges with the use of information and communication technologies.

The following aspects are considered in the article: the main professional tasks of the experience of using information technologies in the educational process; positive factors of information technology, which contribute to increasing the effectiveness of student learning; the main ways of qualitative informatization of education; didactic possibilities of ways to improve education by introducing information technologies into the educational process; principles of organization of innovative educational process of integrated use of information technologies; groups of conditions for the effective use of information technologies to improve the educational space; principles of using multimedia and information technologies in educational classes; the main methods of e-learning organization of educational activities in the educational space.

Literature Review

The introduction of information technologies into the educational process in today's conditions is the main, relevant, and essential direction of the organization of professional training of competitive specialists. Therefore, we analyzed the works that reveal different approaches to the introduction of information technologies into the educational process in the training of specialists. I. Nechvohlod, & V. Shamonina (2020) proved the need for innovative inclusion of advanced information technologies in the types and forms of educational activity of future specialists. They proved the unprofitability of using traditional non-electronic learning technologies. The requirements for the use of advanced information technologies were clarified, in connection with the need to implement distance learning (a new and unexpected form of learning) in the global educational space, where independent work, the use of media, video, and digital materials by a

teacher from each subject. When organizing search and cognitive educational activities of future specialists, an analysis of the possibilities of integration of information and traditional technologies was carried out and it was found that it is not information technologies themselves that are important, but their skillful application in the educational process of the educational field, which serves to achieve educational goals. Ways to ensure the best educational result with an appropriate combination of innovative and traditional means of organizing autonomous training of education seekers have been proven. O. Semenikhina, A. Yurchenko, A. Sbruyeva, A. Kuzminskyi, O. Kuchai, & O. Bida (2020) in the field of information and communication technologies showed effective quantitative characteristics of open educational resources and proved their necessity; found out the purpose of open educational resources, which is the identification of the main ways of improving the competitive professional training of higher education seekers. Considering the possibility and expediency of introducing information technologies into the educational process of higher education institutions, in particular, analyzed the development of the author's courses in the form of an information and educational environment, showed their advantages based on the Moodle distance learning platform.

I. Masheiko, G. Peleshenko, & A. Masheiko (2017) analyzed the materials of scientific sources on the optimization of the educational process during the involvement of the distance learning system, showed the most effective ways to improve the results of passing the "STEP" licensing test exams and increase the quality of success of education seekers; based on the Moodle distance learning platform, they developed innovative courses in professional disciplines and analyzed the success of education seekers according to the presented author's methodology, proved the need for the operation of the Moodle distance learning system, which allows the development of training programs with independent tasks developed by the teacher through actions and allows significantly saving the time of teachers, to organize extracurricular independent work of students and monitor it effectively, to increase the motivation of students to study materials.

O. Kuchai (2014) revealed the main ways of solving the problem of improving the methodical and theoretical training of higher education applicants using information technologies. Electronic courses have been created in professional disciplines, which are a base of

scientific competitive knowledge, to which students of education will have the opportunity to refer at any time to consolidate or repeat new material, or previous courses to facilitate the assimilation of current material. Features of application and features of use in the training of information technology specialists are shown.

Yu. Radchenko (2012) revealed the essence, content, and features of information technologies; the socio-pedagogical foundations of the use of information technologies are substantiated in the educational process of pedagogical colleges, the peculiarities of the use of information technologies in college conditions are revealed in the professional training of future specialists; generalization of features, theoretical analysis and experimentally proved the most effective ways of using modern information technologies in the professional training of future specialists; Questionnaires are proposed for students and teachers to identify the level of information competence in them and the state of readiness for professional activity with the use of information technologies.

H. Murasova (2012) revealed the ways of using information technologies, determined in the context of the study the main forms of professional training for those seeking education, and presented distance education, which is necessary for the information society. Showed the importance of the phenomenon of professional skill development of a differentiated, continuous, multi-level process of using information technologies.

V. Vember (2007) considered the role of informatization of education and showed its significance for the professional training of specialists, analyzed the state of electronic means of educational purposes, experimentally analyzed the provision of higher education institutions with pedagogical software tools, outlined the problems that arise in educational practice when introducing information technologies into the educational process. Ways that overcome the urgent problems of information technology implementation in different countries of the world are shown.

Purpose of the article. Find out ways to improve the educational space by introducing information technologies into the educational process.

Methodology

To achieve the goal of the research, a complex of theoretical and complementary research methods

was used, namely: synthesis and analysis – to isolate the essence of the phenomenon under study, to identify factors influencing the development of education through the introduction of information technologies into the educational process; system-historical method – to systematize the research of scientists, clarifying their scientific views on improving education through the introduction of information technologies into the educational process; the method of terminological analysis – to substantiate the conceptual apparatus of our research; modeling – to develop and substantiating ways to improve education by introducing information technologies into the educational process; generalization – for formulating conclusions, systematizing and determining directions for further research;

The basis of our research is the provisions of the anticipatory approach of pedeutology, philosophy, psychology, sociology, and pedagogy regarding the improvement of the educational field through the introduction of information technologies into the educational process, their features, and development prospects for the educational field.

The leading idea of the study is based on the idea of the phenomenon of information technologies as a specially organized process in the education system of a multi-level, continuous, differentiated process, in the conditions under which training of a professional specialist is carried out. The research is based on the understanding of the development of professional skills in the implementation of information technologies as a guide for the professional and personal growth of a modern specialist, which ensures the acquisition of practical experience, the professional development of practical skills, and the ability to self-improve.

The analysis of scientific works dedicated to the disclosure of ways to improve education through the use of information technologies in the educational process, and the development of the professional skills of specialists in the education system, thanks to such innovations, made it possible to substantiate the main concepts that provide the leading idea of the research. Let's reveal these concepts.

The methodological concept provides substantiation of the conceptual foundations of the development of education improvement through the introduction of information technologies and professional skills of specialists

into the educational process, reveals the interdependence, the relationship of specific scientific approaches and general scientific approaches to the solution and study of the researched problem:

- the andragogic approach helps to take into account personal needs in conscious practice-oriented activities based on professional practical experience;
- the interdisciplinary approach promotes the realization of connections between professional disciplines for holistic and comprehensive application of knowledge in practice, synthesis, and analysis;
- the competence approach provides ways to improve education through the introduction of information technologies into the educational process and promotes the development of the professional competence of specialists, helping realize the ability to carry out innovative professional activities;
- the systemic approach helps to create conditions for the consideration of improving education through the introduction of information technologies into the educational process as a whole system of interconnected educational, scientific, and accessible components, allowing exploring connections, relations, and not only the object itself.

The theoretical concept allows you to substantiate the conceptual and terminological apparatus, which is related to the study of the main definitions of the study; and makes it possible to determine the categorical status of information technologies and their characteristic features.

The methodological concept gives priority to the improvement of education through the introduction of information technologies into the educational process, the development of the professional skills of specialists, and the development of appropriate support for such an innovative process.

Results and Discussion

The goal of the information society is the full development of the individual, the creation of conditions for the mental and spiritual enrichment of a person, and the increase of human national capital as the basis for the development of social, political, humanitarian, economic, cultural and other spheres of public life to increase the efficiency of the economy and the well-being of citizens.

Bringing higher education to a new high-quality, competitive level is a significant factor not only in equipping higher education institutions with computer equipment but also in the development and implementation of pedagogical quality software tools in various professional subjects. Therefore, in our time, the tasks of developing appropriate didactic support for the educational process, new learning content, innovative methods, effective teaching tools, and psychological-pedagogical and scientific-methodical substantiation of ways to improve the educational space with the help of information technologies are becoming relevant (Vember, 2007).

1. The main professional tasks of the experience of using information technologies in the educational process

Nowadays, information technologies are increasingly used to optimize the process of high-quality professional training of future specialists. Currently, higher education institutions have accumulated extensive experience in the use of information technologies in the educational process, where the main professional tasks are productively solved with their help, namely:

- execution of calculations, which take a lot of working time, is intensified;
- the process of training future specialists is optimized with the help of application and development of appropriate software products;
- information is searched through automated information and search systems;
- the use of information technologies in the educational process allows for the automated design of tasks, maps, various documentation, and drawings;
- the problems of creating dynamic models of ways of using information technologies for various purposes in the educational process, and evaluating their functioning are solved.

For high-quality training of specialists, such innovative technologies are increasingly used in the educational space as multimedia equipment, computer programs, computer role-playing, interactive, business games; elements of "brainstorming"; interactive complexes: multimedia, modeling, calculation, distance learning, software, express control of acquired knowledge. In the course of conducting educational classes in institutions of higher education with the use of innovative information technologies, it is possible to achieve significant results in the training of specialists. For this, the

educational process should include various subject areas: educational and informational complexes, program and pedagogical tools for educational purposes, electronic educational and methodical complexes, electronic textbooks, virtual laboratory works, and multimedia technologies.

The use of information technologies in the educational process ensures interactivity of education for students, due to direct feedback, and is carried out during exercises, practicals, and laboratory work. Taking into account the fact that students themselves determine the pace of work, and have the opportunity to work from any place, the possibility of individual education for each willing student opens up for them.

The decisive factor for the high-quality successful use of information technologies in the educational process is the willingness and ability of teachers to introduce information technologies into the educational process, to master not only the means of information technologies but also to introduce appropriate innovative methods of their use in the educational process (Plakhotnik et al., 2023).

Multimedia technologies have become widespread in the educational process. They have become the most popular and promising pedagogical information technologies that allow the creation of innovative texts, images, and data accompanied by animations, video, sound, and other visual effects (Simulation); including management mechanisms, in particular, an interactive interface.

2. Positive factors of information technology, which contribute to increasing the effectiveness of student learning

Let's highlight the positive factors of information technologies that contribute to increasing the effectiveness of student education:

- 1) creation of a comfortable environment for education;
- 2) increasing the activity of the educational process;
- 3) differentiation and individualization of education;
- 4) helps intensify the educational process;
- 5) creation of favorable conditions for independent work of education seekers;
- 6) increasing the motivation of the quality educational process;
- 7) promoting the formation of self-esteem among students;

- 8) creation of a single informational educational environment of a higher education institution, which provides an opportunity for each student to ensure the expansion of interactive interaction, to immerse himself in an interactive environment that is as close as possible to the real environment (Hurevych et al., 2012).

3. The main ways of qualitative informatization of education

Let's highlight the main ways of high-quality informatization of education:

- development of new information technologies for the improvement of education, modernization of their psycho-physiological and psychological-pedagogical foundations;
- improvement of education management by introducing information technologies into the educational process;
- training of competitive pedagogical personnel;
- formation of the foundations of the information culture of education seekers and teachers
- resource support for informatization of education.
- elimination of problems arising from the reliance on information technologies for certain educational functions;
- design of the process of information technologies and means of their design;
- elucidation of fundamental issues of pedagogical psychology and didactics;
- formation of an innovative educational space for education seekers;
- use of active learning methods;
- integration of educational activities (research, training, etc.);
- increasing the intellectual and creative potential of the educational activity of the students;
- adaptation of education information technologies to the individual characteristics of education seekers;
- the development of information technologies in the educational space, which contribute to increasing the motivation and activation of the cognitive activity of those seeking education and mastering the methods and tools of informatics to effectively apply them in professional activities;



- mandatory use of distance learning information technologies;
 - ensuring continuity and continuity in education;
 - improvement of the software and methodological support of the innovative modern educational space (Skubashevskaya, 2004).
4. Didactic possibilities of ways to improve education by introducing information technologies into the educational process

Let's highlight the didactic possibilities of ways to improve education through the introduction of information technologies into the educational process:

- instant feedback between the student of education and the means of information technologies, to ensure the implementation of an interactive dialogue;
 - visual presentation on the screen (visualization of educational information regarding the process, and object being studied);
 - preservation of large volumes of information, archiving with the provision of easy access to information, its duplication, and transmission;
 - interpretation and modeling of information regarding the objects being researched or studied;
 - automation of the organizational management of educational activities of the processes of informational and methodological support, monitoring and control of the results of assimilation;
 - automation of the processing of the results of an educational experiment, information search, and computing activity with the possibility of multiple repetitions (Hordiichuk, 2011).
5. Principles of organization of innovative educational process of integrated use of information technologies

We will show the foundations on which the organization of the innovative educational process of integrated use of information technologies is built:

1. Expediency of application. Information technologies in education should be used to provide students with knowledge that is very difficult or impossible to obtain without a computer.

2. Maximum approach to the abilities of education seekers and their needs (adherence to a humanistic approach when using information technologies regarding the personal orientation of the education seeker).
 3. Minimization of information – concentration of the acquirer of the educational space and the teacher on the assimilation of new educational material based on information technologies.
 4. Prioritizing the leading role of the individual in all interactions with computer systems and a humanistic approach over a hardware-technological one.
 5. Practical value of acquired knowledge and skills and the possibility of their use in practical activities.
 6. Friendly interaction of students with the teacher and correct use of the computer.
 7. Variability and integrability of the educational process.
 8. Computer security (psychophysical and psychological control of education seekers, technical control of teaching aids) (Radchenko, 2012).
6. Groups of conditions for the effective use of information technologies to improve the educational space

We will define groups of conditions for the effective use of information technologies to improve the educational space:

- 1) conditions that ensure the key personal characteristics of the student of education in the conditions of wide use of information technologies, the formation of cognitive and social activity, the variability of programs, the choice of programs, access to databases (information), the choice of activities at the level of a higher education institution;
- 2) conditions that ensure the continuous development of a young independent person: availability of the final result in objective form, dialogic nature of the programs, results at intermediate stages of the educational process, variability of program performers and languages;
- 3) conditions that contribute to the development of the ability to self-realize the individual: determining the addressee of educational programs (programmer or user), productive intellectual work;
- 4) conditions that ensure the individual harmony and individuality of the student of education; the ratio of logical and figurative components in programs, the ratio of the

level and possibilities of realizing cognitive needs, and the ratio of rational and emotional in the organization of computerized education.

The introduction of information technologies into the educational process of a higher education institution leads to ensuring the implementation of individualization of education thanks to the student's independent choice of the sequence of high-quality learning paths, the pace of learning new material, the ability to quickly find additional information, repeat the studied material, select the most effective options for control tasks, etc.

Let's emphasize the advantages of using information technologies to improve the educational space, which are manifested in the content, organizational, and functional aspects of the learning process: the possibility of saving time in the learning process and preparation for its high-quality conduct, convenience in conducting classes, the ability to build any types of classes, use in a larger the number of various types of educational activities of education seekers; assimilation of a significant volume of material, increased opportunities for visualization during the educational process, the use of various types of tasks, the possibility of mastering a large number of exercises in a short time, the use of innovative accompanying materials for classes, etc. (Radchenko, 2012).

The active use of innovative teaching methods and information technologies in education, contributes to effective integration into the European and global educational space, improving the quality of the educational sector, and is one of the priority directions of the state policy of any country. It is the introduction of information technologies into the educational process that makes it possible to form the educational environment of higher education institutions for the exchange of information, productive communication, and the cooperation of students and teachers to improve the effectiveness and efficiency of the educational process.

The rapid development of information technologies has opened favorable conditions for distance education to improve the educational space. In distance learning, the educational process is structured as a process of interaction between the student of education and the educational environment, which includes the teacher, students of education, and educational materials. When organizing educational

interaction "student-student" during distance learning, the mentoring position of the teacher plays a significant role. Several questions arise in the process of interaction: how to interest students of education, how to activate the desire to learn and achieve their subject position. An interactive board (Jamboard) is of great importance for quality education. The interactive service from Google can provide opportunities to use creative and creative material during classes, transfer of own ideas, learn to work in a group, and demonstrate interesting developments through joint efforts. The use of an interactive service (Jamboard) activates the work of students, allows to increase the efficiency of independent work of students, makes the educational process diverse, and provides the possibility of simultaneous communication of many students who exchange knowledge in the process of joint training, share impressions and experiences, increases the level of motivation to learn new knowledge and skills, stimulates the development of the intellectual potential of education seekers. The educational process organized in this way makes it possible to approach learning in a slightly different way. Here the emphasis is on the independence of searching for the acquirer, updating his knowledge. By systematizing, analyzing, and summarizing the new information received, students organize and control this process, consult with the teacher, and visually analyze how well the students themselves have mastered the topic. During distance learning, students are distant in time and space from the teacher but can maintain a dialogue using communication tools (Andriichuk, 2022).

A significant step in the application of modern information technologies in the educational process is the development of distance learning. Among various distance learning systems, the most common in higher education institutions are Veda System, Radmin, iSpring, PLATO, and others. Due to its wide functionality and open-source code, the Moodle software shell (modular object-oriented dynamic learning environment) has become widely used in many countries of the world. Australian teacher and IT specialist Martin Dougiamas introduced and developed Moodle in 2002. Now it is an international project coordinated and led by the Australian company Moodle HQ with the financial support of a network of service companies (Scherl, 2012). The functionality of the Moodle distance learning system allows you to organize independent out-of-class work of students, allows you to draw up training programs with a given teacher through actions, effectively control

the educational sector, significantly increasing the motivation of students, saving the time of teachers and students to quickly process materials.

The organization of the educational process in the Moodle system enables teachers to dynamically monitor the process of assimilation of disciplines by students and conduct remote testing as part of quality preparation for the "STEP-1" and "STEP-2" exams.

The modern, promising electronic educational courses created for students of education are an innovative knowledge base based on the professional experience of teachers and the data of scientific literary sources, which students of education can refer to at any time to repeat the material of previous courses, which will facilitate the assimilation of the material of professional disciplines and allow forming a competitive specialist.

The implementation of effective information technologies in institutions of higher education opens up the opportunity to create a single information and educational base that will create conditions for improving the quality of the educational process and contribute to increasing the level of knowledge of future specialists (Masheiko et al., 2017).

The use of virtual and augmented reality technologies to improve the educational process is of great importance in education. With the help of such active learning, students can immerse themselves in the research process to improve their professional skills and the level of assimilation of educational material. Such technologies contribute to the improvement of the educational environment, transfer the main part of the scientific research work of students of education to the plane of innovative learning, and contribute to the formation of the development of imagination, thinking, emotional intelligence, and research skills in school students. Virtual and augmented reality technologies help to promote the success of education seekers in the educational process, increase motivation to study and stimulate brain activity. Various interesting digital resources are available to modern students, which allow them to visually show processes and phenomena that seem simply impossible, and unattainable. Thanks to virtual and augmented reality, students solve complex tasks and conduct experiments with interest, learning becomes exciting and understandable and playfully takes place. At the same time, students gain research experience, and learn to

work with digital tools; subject skills are rapidly formed into universal learning activities.

The peculiarity of virtual reality is the creation of a digital copy of a physical object, a "digital double", which is used in a virtual environment for modeling, testing, and optimizing a physical object before using it in a real environment (Stratan-Artyshkova et al., 2022).

Virtual space allows you to consider processes and objects in detail when it is very difficult or impossible to trace them in the real world because a person in the virtual world is practically not affected by external stimuli. It is virtual reality that makes it possible to create comfortable conditions for the training of students, no one thinks for the student during training, he rethinks all the information himself, which is easily perceived and mastered independently. With the help of virtual reality, the learner can concentrate completely on the material and consciously memorize it. Virtual reality allows you to improve management skills, perform complex operations, and experiment. With the use of virtual reality, the learning effectiveness of education seekers is about 10% higher than with the classical format.

The main task of augmented reality is the projection of any digital information (video, image, graphics, text) over the screen of innovative devices. The implementation of augmented reality technology looks like this: a two-dimensional image, a special marker image, which can be printed on a simple sheet of paper, is placed in front of a webcam that is connected to a computer. Augmented reality is realized with the help of applications for ordinary stationary screens, tablets, smartphones, augmented reality glasses, projection spaces, and other technologies. A special program launched on the computer analyzes the image received from the camera and supplements it with virtual objects on the monitor screen. The real world is supplemented with new information and artificial elements (Velhach & Hryniv, 2022).

The capabilities of the computer during use (the Internet, software products, demonstration, and network equipment), that is, additional technologies adapted to it, make up the material base of information and communication technologies. Wide opportunities are provided by the use of information technologies to make the educational process useful, informative, vivid, unforgettable, and practically significant for those seeking education. Didactic opportunities allow you to combine the presentation of

educational material in various ways, focus on the implementation of the learning goal, contribute to development and education, and are inexhaustible (Semerikov et al., 2012).

7. Principles of using multimedia and information technologies in educational classes

In the process of teaching in institutions of higher education, multimedia technologies are of great importance. The use of multimedia in educational classes implements many principles:

- the principle of clarity – allows you to use sound material, illustrative material, and resources of rare illustrations in any educational session. The visibility of the material engages all channels of perception of the students of education (tactile, visual, auditory), increases the assimilation of the material by the students of education;
- the principle of accessibility – development and educational programs implement a differentiated approach to education, orient students to the conscious assimilation of educational material, and not to memorization when presenting tasks from simple to complex;
- the principle of strength of knowledge – allows you to repeat and consolidate the material of previous classes, and repeatedly return to the researched or studied material, this is facilitated by the use of presentations and training programs in classes; learning material is better remembered and in a larger volume;
- the principle of systematicity – the use of class presentations allows you to display elements of previous classes on the screen, explain new ones, and develop a system of classes on one topic (Kukhareno, 2016).

When using information technologies in the educational process, new principles emerged:

- the principle of educational value, as the most important component of the educational process, consists in the involvement of education seekers in the modern process of informatization;
- the principle of didactic significance, in which didactic significance is determined by the possibility of building didactic optimal routes for the development of skills, knowledge, and abilities of each student of education (selection of tasks of different levels of activity, a set of tasks of research, creative, cognitive nature, individualization

of the formation of educational skills (the ability to work with information, the ability of self-control) and the development of the system of skills and knowledge;

- the principle of pedagogical expediency speaks of the expediency of information technology if it allows obtaining results that cannot be obtained without the use of such technology, in particular, with the use of information technologies to create pedagogical comfort in the process of performing tasks, taking into account the special qualities of the personality of the students of education;
- the principle of methodical efficiency: the efficiency of the use of information technologies at the methodical level depends on the efficiency of the methods and techniques of students' activities in the education system (Nechvohlod & Shamonia, 2020).

During the informatization of the educational space, the use of information technologies and mobile communication tools, and new technologies for organizing students' autonomous learning appeared. These are e-learning, mobile learning, combined learning, and blended learning (Polishchuk et al., 2022).

8. The main methods of e-learning organization of educational activities in the educational space

Electronic learning (E-learning – Electronic Learning) includes in its essence the management of the educational process with the help of telecommunication and information technologies and the transfer of knowledge. During the application of e-learning, electronic interactive means of obtaining information are used mainly via the Internet (Adams, 2008). Two main methods of organizing the educational activities of educational space seekers can be implemented in e-learning:

- work in a group, organized in the form of chats, forums, asynchronous or synchronous teleconferences;
- work on an individual trajectory includes individualized educational independent activity of education seekers and group work using electronic content. Educational interaction is carried out here, mainly asynchronously, using e-mail, forums, tele- and web conferences.

Let us name the advantages of e-learning over traditional learning during the organization of

independent educational activities of education seekers, in particular:

- information, there is an increase in the amount of educational information and its delivery channels (hypertext and network technologies, interactive web channels, teleconferences, publications);
- economic, due to the reduction of education costs on the material side and the transfer of all paperwork to electronic form;
- pedagogical, educational process becomes more interactive, motivated, individualized, and technological;
- psychological, thanks to the support of information technologies, an emotionally comfortable educational environment is created;
- operational, due to the absence of territorial, spatial, and time barriers when receiving professional educational information;
- communication, obtaining high-quality knowledge by increasing the number of participants in the educational process, establishing operational feedback, and the real possibility of working in planetary groups;
- ergonomic, due to educational technology, a free choice of schedule, rhythm, pace of education, and choice of technical equipment is available for students and teachers.

Mobile learning is a type of electronic learning that provides access to remote local educational content, to all multimedia educational tools using mobile devices (smartphones, phones, tablets), during which the teacher monitors and manages the independent educational activities of the student in real-time and provides high content saturation (Kuchai et al., 2022). With this approach, the learner gets the opportunity to learn anytime, anywhere, autonomously.

In the technologies of mixed and combined learning, the leading sources of knowledge are the teacher and the informational educational environment that functions in the conditions of distance learning. The main task of mixed and combined education is to compensate for the disadvantages and combine the advantages of distance and traditional education (Shuliak et al., 2022).

Blended learning promotes an organic combination of computer-oriented and traditional methods with the complex use of non-electronic and electronic information carriers, traditional and computer-oriented learning tools;

distance forms and traditional ones are introduced for the organization of the educational process according to the principle of mutual complementation.

Blended learning promotes the application of a mechanical approach to mixing different forms of education, is in the context of any combination of distance learning and traditional, when thorough assimilation of knowledge is possible, optimal organization of the educational process, and better monitoring of the education of students. It is in blended learning that 70% of distance learning technologies and 30% of traditional learning technologies are combined.

Therefore, to improve the educational space, it is necessary to introduce information technologies into the educational process for obtaining knowledge, practical skills, control, monitoring, and correction of the knowledge of education seekers, for the qualitative organization of independent educational activities of students (Nechvohlod & Shamonina, 2020).

Conclusions

The ways of improving the educational space through the introduction of information technologies into the educational process are clarified and the decisive factors of the qualitative application of information technologies in the educational process are singled out.

The main professional tasks of using information technologies in the educational process are listed, and the positive factors of information technologies that contribute to increasing the effectiveness of student education are highlighted. The main ways of qualitative informatization of education are shown.

The didactic possibilities of ways to improve education through the introduction of information technologies into the educational process and the basis on which the organization of the innovative educational process of the integrated use of information technologies is built are highlighted. Groups of conditions for the effective use of information technologies for the improvement of the educational space are defined.

The advantages of using information technologies to improve the educational space, which are manifested in the content, organizational, and functional aspects of the learning process, are emphasized.

The rapid development of information technologies has opened favorable conditions for distance education to improve the educational space.

The use of virtual and augmented reality technologies to improve the educational process is of great importance in education. Features of virtual reality and augmented reality are shown. In the process of professional training of competitive specialists in institutions of higher education, multimedia technologies are of great importance. The necessity of multimedia technologies in education is proven and the principles that are effective when using multimedia in educational classes are described. New technologies for organizing students' autonomous learning, which are significant in education (electronic, mobile, combined, mixed learning), are analyzed.

The advantages of e-learning over traditional learning are listed.

Further research will focus on a type of e-learning, mobile learning, which involves access to remote local learning content.

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