Ways of implementing information technologies in professional training of future specialists

Шляхи впровадження інформаційних технологій в професійну підготовку майбутніх фахівців

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Abstract

Creation of modern effective technologies, automation, intensification of production, implementation of planning and management with the help of modern information and communication technologies are the main factors of acceleration of scientific and technical progress. The purpose of the article is to show the importance of using information technologies in the training of future specialists. Without the integration of the educational environment of the higher school into the informational educational environment, without the exit of the educational process into the global information space, significant development of modern educational systems is impossible. In order to substantiate the principles of improving the professional training of education seekers, a quantitative analysis of open educational resources is proposed, the most popular platforms on which

Анотація

Створення сучасних ефективних технологій, автоматизація, інтенсифікація виробництва, здійснення планування і управління за допомогою сучасних інформаційно-комунікаційних технологій є головними чинниками прискорення науково-технічного прогресу. Метою статті є показати важливість застосовування інформаційних технологій у підготовці майбутніх фахівців. Без інтеграції освітнього середовища вищої школи в інформаційне освітнє середовища, без виходу освітньо-виховного процесу в глобальний інформаційний простір, суттєвий розвиток сучасних освітніх систем неможливий. З метою обґрунтування засад удосконалення професійної підготовки здобувачів освіти запропоновано кількісний аналіз відкритих

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the path to open educational resources is designed are determined. The article examines the conditions by which the effectiveness of pedagogical support is achieved in the distance learning process. The substantiation of the most essential criteria and indicators involves the assessment of the quality of personality education in the digital educational space. They offer the perfect use of digital information, readiness for communication, critical thinking, digital and social competence.

Keywords: information and communication technologies, professional training of future specialists, open educational resources, distance learning, student.

освітніх ресурсів, визначено найбільш популярні платформи на яких спроектовано шлях до відкритих освітніх ресурсів. Виписано різницю традиційного і дистанційного навчання (за основу взято форми взаємодії викладача і студента). У статті розглянуто умови, за допомогою яких у процесі дистанційного навчання досягається ефективність педагогічного супроводу. Обґрунтування найсуттєвіших критеріїв і показників передбачає оцінка якості виховання особистості в цифровому освітньо-виховному просторі. Вони пропонують досконале використання цифрової інформації, готовність до комунікації, критичне мислення, цифрової і соціальної компетентності.

Ключові слова: інформаційно-комунікаційні технології, професійна підготовка майбутніх фахівців, відкриті освітні ресурси, дистанційне навчання, студент.

Introduction

All over the world, the development of the educational sector is observed and global changes are taking place in the information society, in general, and the intensive development and use of information and communication technologies is being carried out in all spheres of society, including the educational sphere, in particular. Such a situation that has developed in the world significantly affects social relations, the nature of scientific research, the content of production, the educational sector, everyday life, culture, etc. (Lukyanova & Komar, 2020). Therefore, the development of society depends on deep economic and social transformations, which depend on the constant achievements of scientific and technical progress in all spheres of human activity. Therefore, the use of information technologies in the field of education is necessary and opens up positive opportunities not only for the creativity of specialists, but also for the creativity of students (Kuchai, 2014).

A qualitatively new level is beginning the development of the world economy in our time. At the same time, in order to achieve high socio-economic results, the main importance belongs to the knowledge that specialists have acquired during training and information and communication technologies, which are tools for working with knowledge that reveal the competitiveness of a specialist. The level and quality of life of the entire society and the quality of innovative activity of subjects of the world economy depend on the quality and volume of

information and communication technologies. With the help of modern information and communication technologies, an information space is created, which must necessarily be unified and contain databases of scientific information, groups of professionals in a certain specialty, active, not passive consumers, where knowledge is freely available. The higher school sets itself a modern task - to integrate students into the new information and communication space and to provide active access to scientific, modern knowledge and technologies that will be needed in their future profession. Active is the use of educational technologies that allow teaching and learning outside the classroom, and not only in the classroom. In connection with the rapid development of information and communication technologies, we consider the information space not only as a place for education and work, but also as one of the main parts of the living space of a modern individual (Podlesny et al., 2019).

The purpose of the article: to show the importance of using information and communication technologies in the professional training of future specialists. In the article we considered: the task of education using the leading trends of information and communication technologies; models and tools of best global experience;to increase the level of knowledge, the most common free courses; ten educational platforms are interpreted for summarizing the research results; the ways of

development of the young generation; the tasks facing a person in the information society.

Literature Review

O. Kuchai (2014) proposed «…ways to solve the problem, that is, to improve the theoretical and methodical training of specialists by means of information technologies in institutions of higher education». The peculiarities of the use and application of information technologies in the training of specialists, in particular, in the field of pedagogy, are shown.

Yu. Lukyanova & V. Komar (2020) showed «…the necessity of using information and communication technologies in education; revealed the most promising ways of intensive development in the information society and showed the latest approaches to the use of information and communication technologies and their impact on education, scientific research, the nature of production, culture, etc».

S. Podlesny et al., (2019) considered «…the possibilities of information and communication technologies as a necessary part of the human life space of the 21st century, which have become an integral part for work, education, communication».

I. Dotsenko (2017) wrote out the obligations that Ukraine undertook in accordance with the "Geneva Declaration of Principles" ratified by the Verkhovna Rada of Ukraine.

I. Bezzub (2017) wrote Lifelong Learning. The author proves «…the inadequacy of knowledge regarding the use of information and communication technologies for a normal, fulfilling life, which a person receives during education». After graduating from a higher education institution and working professionally, possessing information and communication technologies at the level of an ordinary user, there is a need to constantly update knowledge on the use of information and communication technologies, because professional knowledge is rapidly aging, and information and communication technologies are developing and improving.

D. Dzvinchuk et al., (2020) proves by examples that «…the constant development of modern educational systems cannot exist without purposeful use of information and communication technologies». The authors showed the possibilities of integrating the educational and information environment,

proved the need for education to enter the global information space.

O. Semenikhina, et al., (2020) showed «…the effectiveness and necessity of quantitative characteristics of open educational resources in the field of information and communication technologies, the purpose of which is to identify the main ways of improving the professional training of students».

H. Murasova (2012) in the context of the application of information and communication technologies, identified the main forms of professional training of education seekers and considered distance education that meets the challenges of society.

Methodology

At various stages of the work, theoretical research methods were used - the study of modern psychological, pedagogical and methodical sources on the content of professional education and the educational process gave us the opportunity to clarify the content of the main concepts of research, comparison, systematization; the analysis of the practical work of higher education institutions gave us the opportunity to identify the level of training of future specialists for the use of information technologies, to show the shortcomings that need to be eliminated; applied the design of content, forms and technologies for the formation of specialists' readiness for the use of information technologies in professional activities; analysis and synthesis became necessary to determine the structure of specialists' readiness to use information technologies and the system of its formation.

In the course of the study, praxis methods were also used (analysis of the activities of future specialists based on the results of their professional activities); structural genetic method; methods and information technology (identification of statistical dependencies; correlation analysis; computer-statistical data processing).

New information technologies are an indispensable component of the process of forming the professional potential of university students, so it is necessary to structure the didactic capabilities of these technologies and identify all the appropriate directions for using new information technologies at each stage of the professional training of future specialists. The professional potential of a future specialist is a

type of intellectual potential of a person, including motivational-targeted, meaningful, operational-activity, reflective-evaluative components that reflect the totality of personal qualities and abilities, psychological states, knowledge, skills and abilities necessary to achieve a high level his professional development.

The theoretical and methodological strategy for constructing a concept should be such a scientific approach to the formation of the professional potential of university students using new information technologies, which would ensure its adaptation to the conditions of an external constantly changing environment in the conditions of interaction of all subjects and objects. The principles underlying the theory and practice of the process of forming the professional potential of students with the use of new information technologies must be represented as a three-level system: theoretical, methodological and technological-oriented levels.

The methodology for forming the professional potential of university students using new information technologies should have a structural organization and be implemented in the following substructures: target, content, technological, organizational and executive, level-effective.

Results and Discussion

According to the goal, we have identified the task of education using the leading trends of information and communication technologies.

The world society is constantly moving towards the "knowledge society", the era of the information society, in which there is an urgent need for information and computer technologies. And such a need becomes the main competence requirement for an individual at any stage of his existence. In accordance with the ratified "Geneva Declaration of Principles", education has set itself the task and made commitments:

– to improve the use of information technologies, communication infrastructure, knowledge information;
– update citizens' computer competence;
– increase the security of the use of information technologies;
– create a favorable information environment at all levels of human development;
– to develop new and expand the existing application of information

– to encourage cultural and informational educational diversity in education and to respect it;
– to expand the role of mass media;
– to improve the ethical aspects of the information society, to apply information and communication technologies in international and regional cooperation (Dotsenko, 2017).

Summarizing the best world experience, we will offer the following visualization of the leading trends in the use of information technologies during the transition of humanity to an information society. We describe the selected models and tools.

Computer Based Training - computer support for training plays a major role in the implementation of a high-quality educational process, it involves the following procedure for organizing the cognitive activity of education seekers, in which the key tools are: computer and communication equipment, information and communication technologies, information networks, software.

Global Education Net - an educational environment that is virtual and global, provides participants in the educational process with the opportunity to use the information bases of the world's leading educational institutions, national libraries, museum exhibits and other material useful for the educational space.

Open Educational Resources (OER) – free open educational resources, open to all education seekers and self-educators in freely accessible digital format textbooks, manuals, training programs, online courses, educational tests, video lectures, multimedia presentations, etc. including new software offered by educational centers and universities. The purpose of the proposed depositories is to provide free access to education for a large number of people from different parts of the world; improving the quality of education, improving the educational opportunities of people in the modern world, in which education takes the first place, which is the main guarantee of economic, ecological, and social progress.

Lifelong Learning (LLL) - learning throughout life. This idea is based on the understanding that "today it is not enough to graduate from an educational institution and work competitively with the acquired knowledge and without developing and improving one's abilities, possessing information and communication technologies at the level of an ordinary user.

Constant improvement of fundamental and applied knowledge, as well as knowledge of a technological and production nature, provides such conditions under which the rapid "aging of professional knowledge" occurs, and therefore, a decrease in the competence of a specialist by 50% is observed, and this happens in less than five years" Summarizing best world experience, we will offer such a visualization of the leading trends in the use of information and communication technologies during the transition of humanity to the information society. We describe the selected models and tools.

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such conditions under which rapid "aging of professional knowledge" occurs, and therefore, a decrease in the competence of a specialist by 50% is observed, and this happens in less than five years."(Bezzub, 2017), therefore, it is necessary to constantly update the specialist's professional competences, to provide opportunities for constant mastery of modern knowledge throughout life.

Education Roaming (eduroam) - the international roaming service of scientists and educators of higher education institutions is a network tool for accessing knowledge bases, a global system that provides access to the worldwide educational environment and any registered person (specialist, scientist, graduate student, student) who has a free roaming access to the Internet, can use any open educational resources for free.

Bring Your Own Device (BYOD) – integration of personal gadgets into the educational process. Microsoft Corporation launched a project based on the phenomenon of psychotechnology, the purpose of which is to give the opportunity to young people who are used to not letting go of their own gadgets, to constantly acquire knowledge and improve.

Long-Distance Online Learning (D-learning) - distance online education is a successful practice of using information and communication technologies in the educational environment.

Further development of the educational environment is impossible without the integration of the educational and informational environment, the constant use of information and computer technologies, the exit of the educational process into the global information space (Dzvinchuk et al., 2020).

The Microsoft company is engaged in a constant search for new opportunities for the use of information and communication technologies, the creation of new pedagogical technologies, the development of software and tools, in particular for the management of educational institutions, e-learning, etc. For example, Youth Spark from Microsoft works in three main directions: education, student employment and development of entrepreneurship, creation of innovation centers in higher education institutions.

Educational content, in particular, electronic educational resources in most countries of the world are cheaply and safely stored on cloud servers. This approach makes it possible not only to access them very quickly from a tablet,

smartphone, computer, smart TV, but also to study remotely using multimedia interactive electronic educational resources. The greatest value of Internet educational services is the availability of multimedia electronic educational resources for which distance does not matter, and the possibility of serving users is unlimited and does not depend on regions or countries of the world.

Electronic education is used in all countries of the world and globally. For example, in the USA, more than 90% of universities and schools use this form of education.

On the Internet, you can constantly find and use online courses from well-known educators, for example, Coursera, Muks; many online portals that provide educational materials for free.

To increase the level of knowledge, among the most common free courses available in your area are:

1. Massachusetts Institute of Technology - mit.edu - OpenCourseWare University project.
2. Open University – open.ac.uk – OpenLearn site.
3. Carnegie Mellon University - cmu.edu - materials using the Open Learning Initiative program.
4. Tufts University - tufts.edu - OpenCourseWare university curricula.
5. Stanford - stanford.edu - Stanford University has joined has Tunes U to provide access to Stanford courses.

The use of information technologies in education as a service is a new evolutionary step in the world (Podlesny et al., 2019).

The use of the latest massive open online courses (Massive Open On-line Course (MOOC) is a paradigm shift in the development of the educational sector worldwide. These are large-scale, free, interactive educational courses that operate in open access on the Internet.

The revolution in education is the launch of a new platform for MOEs - NovoED (access mode: http//www.bing.com) developed by experts from Stanford University, which grouped practice-oriented courses with mandatory features characteristic of them (rating system, lack of tests, work on projects, teamwork, increased communication in work groups, performance of joint tasks). Innovations motivate education

seekers to study and contribute to the successful assimilation of knowledge.

MOOC is not only a network project of US educational institutions, but also attracts a large number of educators from all over the world. For example, during the year, the following joined the EDX project: Hong Kong University of Science & Technology (HKUSTx), The University of Hong Kong (HKUx), Kyoto University, Japan (Kyoto University, KyotoUx), China (Peking University, PekingX), South Korea (Seoul National University, South Korea, SNUx), Peking University, Seoul National University, etc. The first European MOE was launched. The project contained 40 courses in 12 different languages, which is important - free and launched by the European Association of Distance Learning Universities (EADTU) (access mode http//www.eadtu.eu). The partners of the project are Italy, Lithuania, the Netherlands, France, Israel, Spain, Great Britain, Turkey, Portugal, Slovakia, etc. Therefore, there is no need for each institution of higher education to develop its own MOOC (Gurevich & Kademiya, 2016).

It is worth highlighting the work in this direction of South Korea, which has been using e-learning since 1997, creating more than 20 cyber universities in which all services are provided electronically. This approach is effective in society, saves time, is flexible, enables round-the-clock training, and is in demand from an economic point of view. Currently, in South Korea, more than 4.4 million students are on e-learning, which is an indicative resource for the country's development. In this country, it was the government that created such an infrastructure, an environment for the widespread use of computer technologies, a system of indicators for monitoring the activities of electronic universities, and this makes a significant saving of money. Control, development and distribution of e-education in the country are handled by established support centers, each such center includes 10 - 15 universities. Such a positive influence of the government on the use of open networks makes it possible to establish cooperation in the international space and to simplify the procedure for the recognition of foreign diplomas of higher education (Podlesny et al., 2019).

Scientists Semenikhina O. et al., (2020) offered «…the most popular platforms that provide access to open educational resources». Recently, the quantity of open informative resources presented by depositories and university project

sites has improved significantly. According to statistics from ClassCentral (Shah, 2018) the online course catalog, which is free, has provided more than 11,500 courses from more than 900 universities in recent years alone. This distribution of courses makes it possible to popularize developers in the fields of "Social Sciences" (about 11%), "Technology" (about 20%), "Business" (about 18%), there is a shortage of courses in the fields of "Art and Design" (5%) and "Mathematics" (3.1%). According to Class Central, the most popular platforms for education seekers are: Coursera - 37 million, Edx - 18 million, XuetangX - 14 million, Udacity - 10 million, FutureLearn - 8.7 million (Shah, 2018).

On the portal reviews.com (The Best MOOC Platforms, 2019) "The Best MOOC Platformsfor 2018" rating was issued, which was influenced by: integrated forums for social interaction, evaluation and review of completed courses, quality and interactive content of presentation of materials by the educator, etc. Coursera received the highest score of 8.8 out of 10, followed by Edx with a score of 7.4 out of 10, followed by Udemy with a score of 0.4 out of 10.

The generalization of the obtained results led us to choose the following, the most important, ten educational platforms: Coursera (Coursera, 2019), Edx (EdX, 2019), Udemy (Udemy, 2019), MIT OpenCourseWare (MIT OpenCourseWare, 2019), OpenLearn (Open University, 2019), Prometheus (Prometheus, 2019), UoPeople (University of the People, 2019), Open Learning Initiative (2019), Maidan Open University (Maidan Open University, 2019) Maidan Open University (vum.org.ua) is the first distance public education platform in Ukraine (Maidan Open University, 2019). The platform offers educational courses, represented by practical tasks, control questions, video lectures, from the best educators of business schools, the public sector, specialists of practitioners from the social sphere and business. Topics of educational courses are social, related to entrepreneurship, personality development, realization of potential (Semenikhina et al., 2020).

Let's consider the importance, necessity and difference of distance learning from traditional in terms of forms of interaction between the educator and the learner. The traditional model of education includes lectures, seminars, laboratories, games, independent work of students, etc. The basis of such training is a book and a educator who provides knowledge.

Distance learning provides fundamentally new learning models in the educational process: project work, trainings, holding conferences and other types of activities with information and communication and non-traditional technologies. The methodical approach to distance education maximally engages students in active learning, increases students' motivation to pursue education and offers their professional training through distance education, which provides the opportunity for: quick feedback, constant presence of a educator, consultations, at the time when it is convenient for the student, creating a forum for communication; interaction between students and the educator contributes to the satisfaction of students from the educational process (Murasova, 2012).

A person's life in the natural and social world and his direct participation in the modern digitalization of the educational process is evidence of his life in a complex civilized society, when there are no boundaries for intercultural constructive exchanges. Such conditions of digital global consumption emphasize the practical and scientific value of the corresponding products, broadcast without limits. In the context of the competence capabilities of a specific individual, the problem of the degree of their use arises (Kuchai, 2018).
With this approach, constant innovative improvement of the educational sphere, which is primarily aimed at the creative development of the student of education, is mandatory. A person who is in the effective field of digitalization learns the number of situations, which is unlimited in terms of content. The situations sufficiently reflect human activity in the professional field. The nature of digital information correlates with the perfection of a person as an individual. Educators need to pay attention to the fact that education in modern conditions of society partially loses its potential. But socialization, in its digital form, plays a very effective transforming and personal role. This position must be taken into account in the modern educational process.

The formation of personality in digital global dimensions provides an opportunity to experience the world both in modern realities and in the future. And as a result, the conclusion will be that it is possible to predict education in the modern conditions of social existence and, as a result, to improve life activities with the help of world contacts. If a person joins the digital global space, then he is widely integrated into society and can join the world community. If a person has exceptional perspectives, then the whole

world obeys him.

With this approach, the young generation moves along an intensive path of development:

- accumulate a volume of information;
- formulate and structure information;
- expand the range of their prediction abilities;
- get the opportunity to predict their career from the perspective of expectations;
- enable prevention of possible failures.

Nowadays, a person's life in all its internal processes is subject to increased tension, because it is in an information all-encompassing intensive field. A person faces a task:

- to prevent mental deviations, actively using internal protective reserves, which a person must manage and own his psyche;
- respond intelligently and in a timely manner to progressive global challenges that dictate one's standards of communication, behavior, and activity.

Assessment of the quality of personality education in the space of using information and communication technologies involves the identification of criteria and indicators that reflect critical thinking, the clear application of digital information, digital and social competence, and the ability to communicate. Such criteria make it possible to determine the level of personal competence of students of education in the digital space of education with the help of: diagnostics, monitoring, testing, questionnaires, analysis of problem situations, the method of expert evaluations, observation and self-observation of students of education, etc. (Kremen et al., 2021).

Conclusions

The importance of using information and communication technologies in the professional training of future specialists is shown. Visualization of the leading trends in the use of the latest tools for the transition of humanity to the information society is offered. The specified models and tools are characterized. Quantitative features of open educational resources in the field of information and communication technologies are analyzed and ways to improve the professional training of education seekers are outlined. Effective platforms available for open educational resources have been identified. Features of distance learning are listed and advantages and differences from traditional ones are indicated. The conditions that affect the

effectiveness of pedagogical support in the process of distance learning are revealed. The criteria and indicators that characterize digital information and its rational use, digital and social competence, critical thinking, readiness for communication is substantiated.

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