

DOI: <https://doi.org/10.34069/AI/2023.70.10.9>

How to Cite:

Dzhurynskyi, P., Grytsenko, I., Sydorenko, N., Lashkul, V., & Priadko, O. (2023). Open education technologies: an important component of higher education digitalization for quality professional training. *Amazonia Investiga*, 12(70), 102-112. <https://doi.org/10.34069/AI/2023.70.10.9>

Open education technologies: an important component of higher education digitalization for quality professional training

Технології відкритої освіти: важлива складова цифровізації вищої освіти для якісної професійної підготовки

Received: August 3, 2023

Accepted: September 29, 2023

Written by:

Petro Dzhurynskyi¹ <https://orcid.org/0000-0003-3102-9124>**Iryna Grytsenko²** <https://orcid.org/0000-0003-2653-6113>**Nataliia Sydorenko³** <https://orcid.org/0000-0003-2050-4938>**Valerii Lashkul⁴** <https://orcid.org/0000-0002-3709-3306>**Oleksandr Priadko⁵** <https://orcid.org/0000-0002-9142-2473>


Abstract


The article proved the importance of introducing open education technology as an important component of the informatization of the higher education institution for high-quality training of specialists has been proven and shown. The main goal of open education (preparation of education seekers in the conditions of the information society for effective, full participation in professional and social life) and leading and specific features of open education are clarified, and the main principles of open education are highlighted. Generalizing factors that led to the emergence of open education are emphasized. The role of distance learning in the student's independent work is shown and the main principles of the distance education system are highlighted. The most important services that should be used in the education of a modern institution of higher education are shown. An experimental study was conducted, the purpose of which was: to prove the importance and show the


Анотація


Доведено важливість та показано необхідність упровадження технології відкритої освіти, як важливої складової інформатизації закладу вищої освіти для якісної підготовки фахівців. З'ясовано головну мету відкритої освіти (підготовка в умовах інформаційного суспільства здобувачів освіти до ефективної, повноцінної участі в професійному і суспільному житті) та провідні й специфічні ознаки відкритої освіти, виокремлено основні принципи відкритої освіти. Наголошено на узагальнюючих чинниках, що спричинили появу відкритої освіти. Показано роль дистанційного навчання у самостійній роботі студента та виокремлено головні принципи системи дистанційної освіти. Показано найголовніші сервіси, які варто використовувати в освіті сучасного закладу вищої освіти. Зазначено переваги відкритої


¹ Doctor of Pedagogical Sciences, Professor, Director of Educational and Scientific Institute of Physical Education, Sports and Rehabilitation, State institution "South Ukrainian National Pedagogical University named after K. D. Ushinsky", Ukraine.

 WoS Researcher ID: D-4617-2018

² Ph.D. in Pedagogical Sciences, Associate Professor, Department of Pedagogy and Psychology of Preschool and Primary Education, Kherson State University, Ukraine.  WoS Researcher ID: AAD-3255-2021

³ Ph.D. in Philological Sciences, Associate Professor, Department of Theory and Methods of Preschool and Primary Education, Kherson State University, Ukraine.  WoS Researcher ID: AAD-1762-2021

⁴ Ph.D. in Pedagogical Sciences, Senior Lecturer at the Department of Romance and Germanic Languages and Translation, National University of Life and Environmental Sciences of Ukraine, Ukraine.  WoS Researcher ID: GZH-6373-2022

⁵ Postgraduate Student, Department of Pedagogy, National University of Life and Environmental Sciences of Ukraine, Ukraine.  WoS Researcher ID: JAO-3515-2023

necessity of introducing open education technologies as an important component of informatization of a higher education institution for high-quality training of specialists, to find out the leading and specific features of open education, to highlight the main principles of open education.

Keywords: technologies of open education, informatization of the higher education institution, high-quality training of specialists, independent work, distance learning.

Introduction

In the 21st century, such a set of features has been created for society, where important elements are the globalization of education, politics, economy, culture, the spread of innovative network forms for communication, the use of information and communication technologies, etc. Modern society, as a means of implementing the principle of lifelong learning, emphasizes the development of open education for humanity. To solve a significant number of important tasks, it is necessary to informatize the entire educational space and society as a whole, where the main place at the world level is occupied by the problem of the implementation of open education.

Today, it is open education, remote forms of education, acquired experience in the application of modern innovative information and communication technologies, and mastering the relevant skills, abilities, and competencies of the individual that acquires significant importance. Scientific and practical interest in the phenomenon of open education is connected with new educational opportunities, in particular:

- deepening democratization (regardless of material and social status, state of health, national, racial, and gender characteristics, ensuring equal access to education for all participants of the educational process based on the use of information and communication technologies);
- expansion and deepening of educational and research projects, source information base, etc.;
- individualization of educational activity (the educational process of higher education seekers using innovative information and communication technologies is implemented by specifying the methods and means of learning, the content of education,

and the activation of independent activities of young people based on taking into account the individual characteristics of students);

- the flexibility of the organization of the educational process (the possibility of applying the spatio-temporal characteristics of the educational process variably: the availability of education for students of higher education at a time convenient for them and regardless of their location).

Ключові слова: технології відкритої освіти, інформатизація закладу вищої освіти, якісна підготовка фахівців, самостійна робота, дистанційне навчання.

Therefore, we believe that the main goal of open education is to prepare students in the information society for effective and full participation in professional and social life.

The modern tool of innovative development of education is its informatization, which is the basis for the development of open education. Using the principles of such education makes it possible to significantly expand the potential space of the educational environment, to ensure the formation of an open educational space that is accessible to all participants of the educational process.

Open education is characterized by the availability and improvement of information and resource provision of methodical training systems and the expansion of the range of teaching aids and pedagogical technologies. An open educational environment is potentially unlimited in terms of the amount of resources that can be used in the educational process and the number of users. Technologies of open education diversify the learning process, increase its effectiveness, and contribute to the formation of a personality capable of quickly acquiring new and applying previously acquired knowledge to non-standard situations, thinking creatively and

deeply, rationalizing promising ideas, and their implementation in future activities.

The relevance of the article is related to the informatization and computerization of the education system and is caused by the following factors: lack of special research on the chosen topic; the theoretical, scientific, and practical significance of the topic; the need to transition from the subject paradigm of education to a competent paradigm, which involves the formation of a complete competent personality; the dominance of informational components in the modern system of higher professional education; the need to develop the informational and communicative competence of future specialists under conditions of rapid activation of the technological potential of society; the expediency of developing the skills to adapt in the modern information society; the need to ensure the level of general and professional culture adequate to the needs of the world community.

Modern trends in the development of the educational sector and society direct the efforts of higher education institutions to create a competitive system of constant updating of the competencies and knowledge of future specialists because the economic prosperity of the entire society in the international arena depends on it (Prokopenko, 2020).

A set of features, among which the main ones are the globalization of the economy, education, politics, culture, the spread of network forms of communication, the use of information and communication technologies, etc., are inherent in the society of the 21st century. The means of implementing the principle of education during life is most pronounced in modern society through the development of open education. Informatization of society solves a significant number of tasks, among which the problem of implementing open education occupies an important and leading place at the world level and in individual countries (Osadchuk, 2022).

The modern digital world is becoming increasingly virtual and open. In connection with the development of the modern information society in the system of university education, the acquisition of relevant skills and abilities, the introduction of remote forms of learning and new information technologies into the educational process by students of higher education, the development of the open education system is gaining relevance. The lack of higher education institutions with the appropriate level of

readiness for the transition to the principles of openness, the use of open education technology, as a necessary component of the informatization of the higher education institution for high-quality training of specialists, necessitates the study of the issue of improving educational content and high-quality open education (Hurzhii et al., 2021).

Several factors of an internal and external nature, such as inconsistency of the existing quality of education with modern requirements, insufficient degree of implementation in the educational process information technologies, insufficient access to quality education, insufficient efficiency of education financing, deepening of the disparity between the training of specialists and the demand for them in the labor market provides reasons to talk about the need to reform the education system and form a coherent and effective educational and scientific system that fully meets the requirements of the time.

Literature Review

One of the promising ways to overcome the challenges of the information society in the Ukrainian educational system and ensure its progressive development is the implementation of open education. The very application of the latest information technologies and innovative work methods based on these technologies in the educational process at all levels can play a significant positive role in reforming various areas of educational activity – from ensuring effective monitoring to creating integrated systems for ensuring access to educational resources and sharing advanced pedagogical experience and methodical materials.

Various aspects of the use of information and communication technologies in the educational process are presented in publications A. Hurzhii, O. Hlazunova, & T. Voloshyna (2021) analyzed the concept of open education based on the availability of educational resources, principles of informatization of the educational space, flexibility and extraterritoriality of education and identified the features of digital educational content that can be used in open education systems of higher education institutions: electronic manuals, educational games, instructions, methodological recommendations, presentations, tests and questionnaires, screencasts and podcasts, diagrams, graphic images, graphs, video lessons, infographics, virtual and augmented reality resources, video lectures.

Aspects of the formation of an open educational and scientific space and the use of open technologies education for educational purposes are highlighted in the works of scientists.

V. Bykov (2008) from the system positions of open education laid out the foundations of the theory of modeling organizational systems. Based on the analysis of tools for the development of the higher education system, modern approaches, the determined methodological apparatus of organizational systems research, and system presentation, a model of organizational systems was designed for open education.

A significant contribution to the research of open education in universities made by researchers, in particular, such as M. Leshchenko, & A. Yatsyshyn (2014), offer a comparative vision of the examination of the essential characteristics and genesis of open education by domestic and foreign scientists, emphasize the importance of open education, dwell on the integral component of informatization of society, reflect the general trend of the successive transition of education processes from one state to another.

V. Osadchuk (2022) in a retrospective analysis of the development of open education, revealed its weak and strong positions. The author reveals open education as a factor of anticipatory development of society, a modern educational technology aimed at the individual to promote the openness of knowledge.

O. Sagan, S. Yakovleva, E. Anisimova, A. Balokha, & H. Yermenko (2020) explore the shift towards digital didactics as society evolves and education transforms. It emphasizes the need for a new model and introduces novel principles, methods, and forms of organizing education.

As pointed out by scholars such as A. Kuzminskyi, O. Kuchai, O. Bida, A. Chychuk, I. Sihetii, & T. Kuchai (2021) a key focus of the higher education modernization program amid the COVID-19 pandemic revolves around remote learning. This approach has become feasible due to the presence of information, educational technologies, and communication systems, particularly for enhancing effective education and its oversight within higher education institutions.

The need to analyze the works of scientists is pedagogical the importance of the problem, as well as its insufficient reflection among scientists' researchers, the lack of a justified

methodical system of its formation in institutions of higher education allowed us to cover the problem in more detail in the article open education technologies as an important component of higher education digitalization for quality professional training.

The analysis of literary journals made it possible to find out the main points of consideration of open education technologies by scientists (interpretation of the phenomenon of open education, cloud technologies; showing the necessity of using information technologies in human life, their implementation in the educational innovation process of higher education institutions to provide educational services in conditions of remote and traditional education) and highlight issues that are not sufficiently clarified in the modern educational space. Therefore, our research is aimed at proving the necessity of implementing open education technologies, clarifying the leading and specific features of open education, and highlighting the main principles of open education.

The purpose of the article. To prove the importance and show necessity of introducing open education technology as an important component of the informatization of a higher education institution for high-quality training of specialists.

Methodology

In the conditions of an open education system, an adult person who studies not only acquires certain knowledge but also develops the need for continuous renewal, a creative approach to knowledge throughout his life. Thus, open education is based on worldview and methodological principles of openness and continuity of the learning process.

The methodological substantiation of open education as a new educational paradigm is built in the domestic theory of education on the fundamental principles of modern philosophical concepts, in particular, such as pedagogical synergy, philosophical humanism, and the theory of self-organization.

To realize the goal, the following research methods were used: theoretical – analysis of literature: pedagogical, psychological, methodical on the topic in question, comparison, synthesis, deduction, induction, juxtaposition, analogy, due to which the state of working out the problem was characterized in the scientific

literature, studying documents in the field of education, electronic resources, scientific works, work experience of the best scientific and pedagogical personnel of higher education institutions; modeling, forecasting, generalization, design for theoretical argumentation of quality training of future specialists; empirical – survey, interview, questionnaire, conversation, pedagogical observation, testing to find out the importance of using open education technologies for the informatization of a higher education institution for quality training of specialists.

The implementation of the search for solutions for the implementation of open education technologies for the informatization of the institution of higher education for high-quality training of specialists covers interrelated concepts: methodological, theoretical, and methodical.

The methodological concept presents methods of diagnosing the results of the implementation of open education technologies for the informatization of a higher education institution for quality training of specialists, organization, study, goal setting, and planning of professional training of future specialists. The concept is implemented through the implementation and development of scientific and methodological support for professional quality training of future specialists, improvement of forms, content, means, and methods of training for effective formation of professional competence of future specialists.

In the research work, we used biased sampling in the process of selecting a sample, that is, it is a bias in which the sample is collected in such a way that some members of the target population have a significantly lower than others, or a significantly higher probability of being included in the sample during the experiment. It is this approach that leads to a biased general population of the sample (there may be factors not related to human factors), where not all individuals were equally likely to be selected in an experimental study. Therefore, we took this position into account to eliminate the fallacy of the results, which are attributed to the studied phenomenon, and not to the method of sampling.

The validity of the study of the system of implementation of open education technologies developed by us, as an important component of the informatization of the institution of higher education for the quality training of specialists, indicates that the diagnostic tool of the research

work measured what we expected to measure and proved the achievement of the goal of our research. We are talking about the relevance of the theory (empirical relevance). The internal validity of the methodology indicated how the research items and intended tasks are related to the theoretical propositions that we presented and revealed in the article and proved their effectiveness in our research and compared the results of already developed methods with the results of the diagnostic tool.

In the experimental study, the ethics of the respondents were taken into account, because it is important, necessary, covers mainly regulative aspects of morality in science, is part of one of the aspects of the ethics of science, and justifies the professional morality of the respondents.

After proving the importance and necessity of introducing open education technologies as an important component of informatization of the institution of higher education and clarifying the leading and specific features of open education, highlighting the main principles of open education, a control survey of students and teachers was conducted. In addition, we decided not to significantly change the questions and tasks of the initial cut to track the dynamics of the students' training level.

Comparing the results obtained during the control survey in the experimental group before and after the research and experimental work, it is possible to note changes in the levels of development of the skills of students and teachers in the use of open education technologies. And, by the end of the formative experiment, the number of students with a high level of development of information competence increased by 38.8%; the number of students in the experimental group with a low level of development of information competence decreased by 45%.

The analysis of the results of the data displayed in the table and histogram shows that as the technologies of open education are applied, the percentage of students who have improved their professional qualifications has increased. This makes it possible to characterize education when applying open education technologies to increase its effectiveness.

To prove the effectiveness of research and experimental work, it is necessary to identify a statistically significant trend in the shift (shift) of indicators. To solve similar problems, the

research used a non-parametric difference criterion: the sign criterion.

The results of our work in the experimental group showed that after using open education technologies, the respondents changed their opinion about the influence of various factors on becoming a specialist. Thus, during the re-ranking, work in the electronic library of a higher education institution, searching the Internet, as well as creating electronic presentations took higher positions (30-37%). 60% of students answered that they communicate with teachers using open education technologies.

Results and Discussion

According to the definition of UNESCO, "open educational resources are educational and scientific resources that exist in open access or are released under a license that allows their free use and modification by third parties".

Open education is a global education, an integral world system of high-quality, mostly higher education, which incorporates common traditional components into its being, on a new technological basis. The main goal of open education is to prepare students for effective and full participation in professional and social life in the conditions of the information society (Kovalska et al., 2023).

The leading features of open education are:

- accessibility (access to education of various social groups);
- flexibility (the ability of education seekers to study in a city convenient for them and at a convenient time);
- cost-effectiveness (economy of financial and human resources, material costs through the use of open education technologies);
- parallelism (carrying out educational activities without separation from production, i.e. simultaneously with professional activities);
- coordination (introduction of the function of coordinator of the educational process and creation of the position of mentor-consultant);
- social equality (the use of ideas of social equality in education with the help of equal access to its acquisition);
- internationality (acquiring higher education without leaving one's country in foreign educational institutions, the possibility of providing educational services to compatriots, foreign citizens, and education seekers temporarily living abroad);

- modularity (the formation of an individual curriculum that has a set of independent course modules) (Korzhylova, 2014).

In such a modern system, the educational process provides an opportunity for high-quality learning to become creative and open, with it there is freedom of choice, provision of free access to information resources, an individualized approach, and the creation of conditions for creative joint mastering of the world.

Open education ensures innovative changes like the relations of participants in educational activities and ensures continuity of learning, efficiency, and accessibility in obtaining knowledge throughout life (Stepanova et al., 2023).

Successful experience, the implementation of open education technologies for the informatization of higher education institutions for high-quality training of specialists, innovative methods, approaches to such an educational process, and clear solutions of open education are actively implemented in many countries and regions (Osadchuk, 2022).

Nowadays offers a new dimension of open education. Scientists D. Araya, R. Britez, M. Peters, Sh. Takdeo (Peters et al., 2008) propose a transition to the paradigm of open education, which is an integral component of an open society and digital economy and is not limited to open resources.

Studying the issue of improving educational content and quality open education showed the need for experimental research.

The purpose of the experiment: to prove the importance and necessity of introducing open education technologies as an important component of the informatization of a higher education institution for high-quality training of specialists, to find out the leading and specific features of open education, to highlight the main principles of open education.

A survey of students and teachers was conducted, in which the analysis of the questionnaires made it possible to build a study that allows:

- to assess the influence of several motives on respondents' mastery of modern technologies of open education, as an important component of informatization of a higher education institution;

- determine for what purposes they use open education technologies.

All survey participants answered that mastering open education technologies at the user level is an integral part of any specialist's training.

Many students and teachers (88%) would like to increase their level of mastery of open education technologies and acquire additional professional knowledge, skills, and abilities.

We deliberately did not divide the answers of students and teachers into groups, as they received an equal percentage ratio and turned out to be close in terms of the use of open education technologies in educational activities.

We invited students to rank the main types and forms of student activity in a higher education institution, which significantly influence the formation of students' personalities, their worldviews, becoming a specialist and professionals in their field.

The conclusion of the ascertaining stage of the research and experimental work was the conclusion about the need for the purposeful formation of information competence in future specialists and the increase in the introduction of open education technologies into the education process.

We asked the respondents of higher education institutions the following questions: "Do you think that mastering open education technologies is necessary for a teacher of a higher school and a student?", "Do you use open education technologies as a tool that helps you in preparing for classes, in working with students, in self-education?", "What technologies of open education, in your opinion, must be mastered by a modern worker?".

All respondents who took part in the survey (100%) answered affirmatively to these questions. For the last question, such information technologies as Internet search, communication by e-mail, participation in teleconferences, and services developed by Google were offered (Prokopenko, 2020).

Nowadays, open education is seen by the world community as a complex phenomenon that involves active interaction and participation of education seekers in the dimension of lifelong learning, in addition, to open access to educational resources (life-wide learning) (Lokshyna, 2018).

Let's emphasize the generalizing factors that caused the emergence of open education:

- 1) caused by the processes of the development of society, which are objective: the emergence of new requirements for the pace and nature of the acquisition of education by those seeking education, for the educational level of all people;
 - 2) caused by the need to create a climate to ensure the personal development of a person and the nature of obtaining a quality education in modern conditions, connected with the emergence of new individual needs of education seekers;
 - 3) caused by the objective processes of human development, which are associated with new educational opportunities and appeared with the advent of the education system (Akhnovska, 2019).
- additional conditions for personal individual development;
 - innovative content and pedagogical technologies of learning;
 - large-scale informatization of the education system;
 - in-depth processes of integration and democratization of education. The mentioned factors complement each other and are mutually dependent. The modern educational paradigm was the reaction of the educational system to the mentioned factors, declared and defined the principles of open education (Bykov, 2008).

Modern open education requires the introduction of distance learning for the constant improvement of the educational space to increase the competitiveness of future specialists, and quality training of specialists (Plakhotnik et al., 2023).

The process of distance education of specialists is ensured by: flexibility; modularity; the importance of the quantitative audience; economy; technology; social equality; renewal of the teaching position; positive impact on the audience; quality level of education; and efficiency (Mala, 2022). So, the main principles of the distance education system are flexibility, openness, modularity, dynamism, continuity, adaptability, and creativity (Yaroshenko, 2019).

Nowadays, in the process of educational and management activities, the use of innovative technologies (cloud-oriented) in institutions of higher education is gaining a global scale, for example, Google company is actively working on the improvement of existing and on the

development and release of new cloud technologies (applications and services).

The advantages of open education, which is an important component of the informatization of a higher education institution for high-quality training of specialists, include:

- providing every individual with educational opportunities at any stage of career and life development;
- elimination of barriers in education (geography, cost, admission requirements, time);
- since open education is implemented through digital technologies, we highlight the promotion of education modernization,
- since open education creates a bridge between informal and formal education, we emphasize the development of education throughout life (Inamorato Dos Santos et al., 2016). An important component of the informatization of a higher education institution for high-

quality training of specialists and innovative support for the independent work of education seekers is the strategy of open education, which provides for the interaction of all interested parties horizontally and vertically at all levels: between the central government, Brussels and member states, educational institutions, regional and local educational bodies; employers and the education sector; educators, students of education, parents, listeners; informal and formal education (Lokshyna, 2018).

According to statistics from the free online course catalog Class Central (Shah, 2018) more than 11,500 courses from more than 900 universities were offered in 2018 alone.

The subject distribution of courses (Fig. 1) shows the popularity among developers of various fields: 20% "Technology", 18% "Business", 11% "Social sciences", the fewest courses (5%) were created from the fields "Art and design" and (3.1%) "Mathematics" etc.

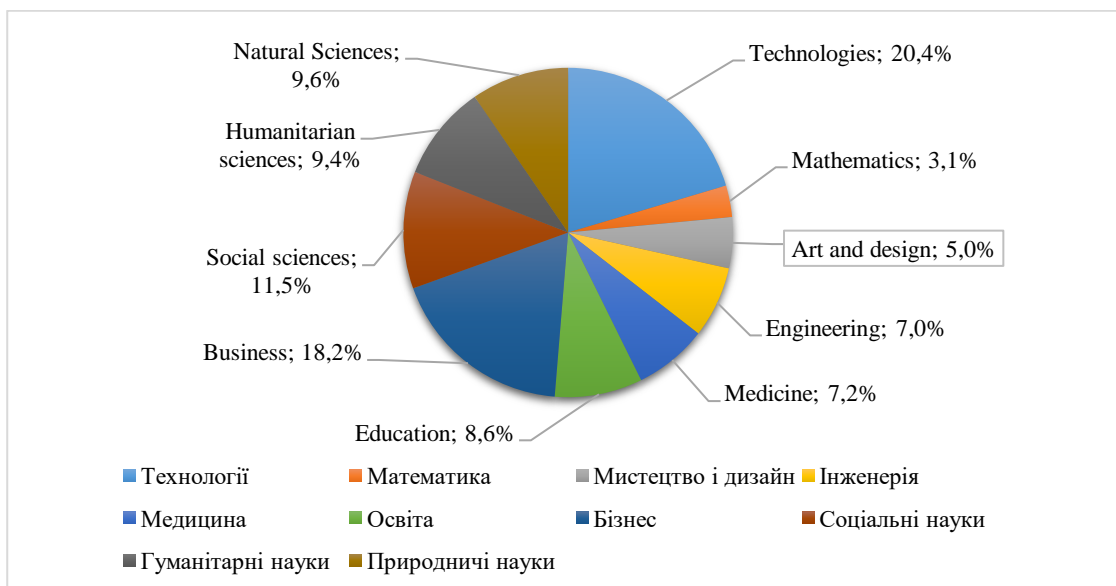


Figure 1. Distribution of courses by fields of knowledge according to ClassCentral research

According to the version of ClassCentral, among the popular platforms for consumers of educational content: FutureLearn – 8.7 million, Udacity – 10 million, XuetaangX – 14 million, Edx – 18 million, Coursera – 37 million (Shah, 2018).

At the portal reviews.com "The Best MOOC Platforms for 2018" evaluation is submitted, which is affected by: the presence of integrated forums for social interaction, the ability to review and evaluate completed courses, the quality of materials submitted by the teacher, etc. Coursera received the highest rating of 8.8 out of 10,

followed by Edx with a rating of 7.4 out of 10, and Udemy in sixth place with a rating of 0.4 out of 10. The generalization of the obtained results guided the choice of scientists (Semenikhina et al., 2020) at research of such educational platforms: Edx (www.edx.org), Coursera (www.coursera.org), MIT OpenCourseWare (www.ocw.mit.edu), OpenLearn (www.open.edu), Udemy (www.udemy.com), Prometheus (www.prometheus.org.ua), UoPeople (www.uopeople.edu), Maidan Open University (www.vum.org.ua), OpenLearningInitiative (www.oli.cmu.edu).

Appropriate educational systems are created for practical implementation of the ideas of open education (computer-technological, psychological-pedagogical, organizational-management, normative-legal, financial-economic). It is worth highlighting and emphasizing the importance of the psychological and pedagogical problem, the solution of which is the most difficult task. This problem is the main factor in ensuring the quality of higher education, it is the creation of open education for quality training of specialists (Bykov, 2008).

The main principles of open education include:

- lack of strict regulation in the performance of tasks;
- internal differentiation;

Table 1.

The level of development of students and teachers' skills in the use of open education technologies

Level informative competence	To be held experiment (%)	After conducting experiment (%)
Low	69,4	24,4
Average	26,5	32,7
High	41	42,9

Comparing the results obtained during the control survey in the experimental group before and after the research and experimental work, it is possible to note changes in the levels of development of the skills of students and teachers in the use of open education technologies. And, by the end of the formative experiment, the number of students with a high level of development of information competence increased by 38.8%; the number of students in the experimental group with a low level of development of information competence decreased by 45%.

The analysis of the results of the data displayed in the table and histogram shows that as the technologies of open education are applied, the percentage of students who have improved their professional qualifications has increased. This makes it possible to characterize education when applying open education technologies to increase its effectiveness.

To prove the effectiveness of research and experimental work, it is necessary to identify a statistically significant trend in the shift (shift) of indicators. To solve similar problems, the research used a non-parametric difference criterion: the sign criterion.

- suitable time for studying;
- conscious learning;
- teaching social interaction;
- the integrity of the learning process;
- orientation to the applied nature of knowledge (Yatsura, 2018).

After proving the importance and necessity of introducing open education technologies as an important component of informatization of the institution of higher education and clarifying the leading and specific features of open education, highlighting the main principles of open education, a control survey of students and teachers was conducted. In addition, we decided not to significantly change the questions and tasks of the initial cut to track the dynamics of the students' training level.

In our case, we have that the results of two tests are measured on an interval scale. In these conditions, it is possible to use the sign criterion to identify the tendency to change the state of knowledge of students and teachers after the application of open education technologies, since all the assumptions of this criterion are fulfilled.

A survey was conducted to reveal the opinion of respondents about the need to use open education technologies, the results of the survey analysis are given below.

90% of students believe that the use of open education technologies reduces the time they spend on studying a discipline, promotes quality learning, and helps them remember the main categories more clearly and present their content more deeply, contributing to better assimilation of the material;

92% of students answered that they want the use of open education technologies to take place in all disciplines of subject training;

76% of students are attracted by visuality in the application of open education technologies;

89% – accessibility of the presentation of the material;

59% -the possibility of choosing an "educational route";

75% – logical presentation of the material.

The results of our work in the experimental group showed that after using open education technologies, the respondents changed their opinion about the influence of various factors on becoming a specialist. Thus, during the re-ranking, work in the electronic library of a higher education institution, searching the Internet, as well as creating electronic presentations took higher positions (30-37%). 60% of students answered that they communicate with teachers using open education technologies.

So, the results obtained in the course of research and experimental work indicate that if the educational process is carried out based on substantiated leading and specific features of open education, the main principles of open education are highlighted with the use of the most important services. The level of information competence of students and teachers will increase and will lead to high-quality training of specialists in institutions of higher education (Bykov, 2008).

As teachers and students of higher education get expanded access to digital resources in the conditions of open education, the traditional education tools used for the educational space are changing. Students work with modern digital devices connected to the Internet, which is important for innovative support for the independent work of students, and textbooks are not the main source of information. With this approach, electronic content should be more than just a digitized textbook. Students of higher education must create new resources, interact with digital content, post in a personal digital environment send work for review, and communicate with the teacher and other students of higher education. The teacher can choose resources for the personalized training of each student of higher education, organize the educational activities of students using mixed technology, combine online learning in groups during laboratory work and lectures, and monitor the individual work of the student with resources previously prepared for processing, to organize projects in cooperation with educational space acquirers of other specialties or other groups (Hurzhii et al., 2021).

Conclusions

The introduction into the system of higher education of open education technologies, an important component of the informatization of the institution of higher education for the high-quality training of specialists and innovative support for the independent work of education

seekers, will create new educational conditions for the formation of a modern competitive specialist, will contribute to the establishment of a high authority of education in the world, will allow the introduction of innovative reserves of potential progressive development, will contribute to the confident and purposeful entry of any country into the developed countries of Europe and the world.

Open education provides innovative changes like the relationships of participants in educational activities, continuity of learning, efficiency, and accessibility in acquiring knowledge, and innovative support for independent work of education seekers throughout their lives.

The importance of the introduction of open education technology, an important component of the informatization of a higher education institution for the quality training of specialists and innovative support for the independent work of education seekers, is proven and shown.

The main goal of open education and leading and specific features of open education are clarified, and the main principles of open education are highlighted.

The role of the most important services that should be used in the education of a modern institution of higher education is substantiated. The advantages of open education, which is an important component of the informatization of a higher education institution for high-quality training of specialists, are indicated. Generalizing factors that led to the emergence of open education are emphasized.

Prospects for further research consist of the analysis of leading and specific features of open education.

Bibliographic references

- Akhnovska, I.O. (2019). Open and non-formal education: a comparative analysis. *Economics and management organization*, 4(36), 66-76. <https://doi.org/10.31558/2307-2318.2019.4.7>
- Bykov, V.Yu. (2008). *Models of organizational systems of open education*: Monograph, Kyiv: Atika, 684. ISBN 978-966-326-317-5 (In Ukrainian)
- Hurzhii, A., Hlazunova, O., & Voloshyna, T. (2021). Digital educational content for the open education system. *Modern Information Technologies and Innovation Methodologies of Education in Professional Training*

- Methodology: Theory Experience Problems*, 55, 22-30. <https://doi.org/10.31652/2412-1142-2020-55-22-30>
- Inamorato Dos Santos, A., Punie, Y., & Castaño Muñoz, J. (2016). *Opening up Education: A Support Framework for Higher Education Institutions*. EUR 27938. Luxembourg (Luxembourg): Publications Office of the European Union. <https://doi.org/10.2791/293408>
- Korzhylova, O.Yu. (2014). Open education as a global educational system: status and development. *Pedagogical sciences: theory, history, innovative technologies*, 3(37), 48-54. <https://repository.sspu.edu.ua/bitstream/123456789/2546/1/Vidkryta%20osvita.pdf>
- Kovalska, K., Ivanenko, L., Fabian, M., Mokliuk, M., & Khoroshev, O. (2023). Development factors and directions for improving distance learning in the higher education system of Ukraine. *Revista Eduweb*, 17(1), 42-51. <https://doi.org/10.46502/issn.1856-7576/2023.17.01.5>
- Kuzminskyi, A.I., Kuchai, O.V., Bida, O.A., Chychuk, A.P., Sihetii, I.P., Kuchai, T.P. (2021). Distance learning in the training of specialists in higher education. *Modern information technologies and innovative teaching methods in training specialists: methodology, theory, experience, problems: a collection of scientific papers*, 60, 50-58. <https://acortar.link/Tyhyv7>
- Leshchenko, M.P., & Yatsyshyn, A.V. (2014). Open education in the categorical field of domestic and foreign scientists. *Information technologies and teaching aids*. *Information Technologies and Learning Tools*, 39(1), 1-16. http://nbuv.gov.ua/UJRN/ITZN_2014_39_1_3
- Lokshyna, O. (2018). Open education in the European area: development strategy. *Pedagogical sciences: theory, history, innovative technologies*, 2(76), 75-86. http://nbuv.gov.ua/UJRN/pednauk_2018_2_10
- Mala, I. (2022). Distance education as an effective tool of management education. *Scientific Notes of the University "KROK"*, 2(66), 132-151. <https://doi.org/10.31732/2663-2209-2022-66-132-151>
- Osadchuk, V. (2022). Development of open education as a phenomenon of the XXI century. *Adult education: theory, experience, perspectives*, 21(1), 58-67. [https://doi.org/10.35387/od.1\(21\).2022.58-67](https://doi.org/10.35387/od.1(21).2022.58-67)
- Peters, M.A., & Britez, R.G. (Eds.). (2008). *Open Education and Education for Openness*. Rotterdam, the Netherlands: Sense Publishers.
- Plakhotnik, O., Zlatnikov, V., Strazhnikova, I., Bidyuk, N., Shkodyn, A., & Kuchai, O. (2023). Use of information technologies for quality training of future specialists. *Amazonia Investiga*, 12(65), 49-58. <https://doi.org/10.34069/AI/2023.65.05.5>
- Prokopenko, A.O. (2020). Application of cloud and fog technologies in the educational process of the institution of higher education "Problems of Engineering and Pedagogical Education". *Modern educational technologies*, 68, 113-120. <http://lib.pnu.edu.ua:8080/handle/123456789/8458>
- Sagan, O., Yakovleva, S., Anisimova, E., Balokha, A., & Yeremenko, H. (2020). Digital didactics as a new model in the theory of education. *Revista Inclusiones*, 7(num Especial), 193-204. <https://revistainclusiones.org/index.php/inclu/article/view/312>
- Shah, D. (2018). *By the numbers: MOOCS in 2018*. Class Central. <https://www.class-central.com/report/mooc-stats-2018>
- Semenikhina, O.V., Yurchenko, A., Sbruieva, A., Kuzminskyi, A., Kuchai, O., & Bida, O. (2020). Open Digital Educational Resources in IT: A Quantitative Analysis. *Information technologies and learning tools*, 75(1), 331-348.
- Stepanova, T., Khayruddinov, M., Kuznetsova, O., Kurchatova, A., & Korniienko, I. (2023). Modern didactic system of open education in Ukraine: problems, solutions. *Revista Eduweb*, 17(2), 188-198. <https://doi.org/10.46502/issn.1856-7576/2023.17.02.16>
- Yaroshenko, T.O. (2019). Distance learning in the system of higher education: modern trends. *Engineering and educational technologies*, 7(4), 8-21. <https://doi.org/10.30929/2307-9770.2019.07.04.01>
- Yatsura, K.G. (2018). The openness of education: essence and basic principles. *Modern society*, 2, 230-238. http://nbuv.gov.ua/UJRN/cuc_2018_2_21

