

# **SCIENCE, INNOVATIONS AND EDUCATION: PROBLEMS AND PROSPECTS**

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## PHYSICAL AND MATHEMATICAL SCIENCES

47. *Kumeda M. A., Sukhodub L. B., Shevel A. Ye., Sukhodub L. F., Derevyanko V. H.* 266  
INVESTIGATION OF NOVEL POLYMER WOUND HEALING MATERIAL.
48. *Кондратенко П. А.* 271  
ОБ ОПРЕДЕЛЕНИИ РАССТОЯНИЙ ВО ВСЕЛЕННОЙ.

## GEOGRAPHICAL SCIENCES

49. *Олейник В., Алтухова В.* 282  
КРУИЗНЫЙ ТУРИЗМ В ЕВРОПЕ.

## ARCHITECTURE

50. *Mandrighenko O. E., Demydenko T. P.* 287  
USE OF COMPUTER TECHNOLOGIES IN ARCHITECTURAL EDUCATIONAL DESIGN.
51. *Ветрова П. О., Васильев П. О.* 291  
АДАПТАЦІЯ ОСВІТНЬО-ПРОФЕСІЙНОЇ ПРОГРАМИ "АРХІТЕКТУРА ТА МІСТОБУДУВАННЯ" ДО ПОТРЕБ СТАЛОГО РОЗВИТКУ СУСПІЛЬСТВА ЧЕРЕЗ МІЖДИСЦИПЛІНАРНИЙ ПІДХІД ДО ПРОФЕСІЙНОГО РОЗВИТКУ ТА ЗАПРОВАДЖЕННЯ АЛЬТЕРНАТИВНИХ ПРАКТИК.
52. *Черносова Т. О., Бабенко М. В.* 300  
КОНЦЕПЦІЯ «SMART CITY» ЯК ЧАСТИНА РОЗВИТКУ ТА БЛАГОУСТРОЮ МІСЬКОЇ ТЕРИТОРІЇ.

## PEDAGOGICAL SCIENCES

53. *Gubareva O., Shatihina V.* 308  
ENGINEER-EDUCATOR: FEATURES OF TRAINING?
54. *Khalina V., Butskiy V.* 313  
FORMATION OF LEARNING RESULTS.
55. *Nagornyi V. V., Murzina O. A., Nahorna N. O.* 319  
DIGITALIZATION OF EDUCATIONAL SPACE AS A PRIORITY COMPETENCE OF HIGHER EDUCATION DEVELOPMENT.
56. *Антонов А. В., Воронина О. В.* 328  
ОЦЕНКА ПОКАЗАТЕЛЕЙ ФИЗИЧЕСКОЙ ПОДГОТОВЛЕННОСТИ ЗАНИМАЮЩИХСЯ В УДАРНЫХ ЕДИНОБОРСТВАХ.
57. *Антонов А. В., Воронина О. В., Аушева О. С.* 332  
ИЗМЕНЕНИЕ ФИЗИЧЕСКОЙ ПОДГОТОВЛЕННОСТИ СПОРТСМЕНОВ В УДАРНЫХ ЕДИНОБОРСТВАХ.
58. *Гончаренко А. А.* 337  
ФОРМУВАННЯ ФАХОВИХ УМІНЬ ЗАСОБАМИ ФАНТОМНОГО НАВЧАННЯ.

**DIGITALIZATION OF EDUCATIONAL SPACE AS A PRIORITY  
COMPETENCE OF HIGHER EDUCATION DEVELOPMENT**

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**Abstract:** The article substantiates the essence of digitalization of education as one based on the use of digital computer technologies in the educational process. The content of digital competence is justified in view of the fact that it includes critical and responsible use of digital technologies and interaction with them during learning. The described digital technologies bring to the fore the issue of formation of digital competencies necessary for the systematic modernization of the institute of education.

**Key words:** digitalization of higher education, digital university, educational process, digital competencies, distance learning.

In recent years, digitalization (digitalization) of higher education institutions is a response to today's societal challenges. Particular attention to the issue of digitalization of higher education began to be paid during the pandemic and the transition of higher education institutions to blended and distance learning. The concept of «digital university» is also common when it comes to the main trends in the modernization of higher education.

Reform and systematic modernization of the institute of education, which are increasingly based on modern digital technologies, bring to the fore the issue of the formation of digital competencies. The processes taking place today make it possible

to put on the agenda the emergence of a new model of education, where the dominant importance of the processing, storage, transmission and use of growing data, which accelerates the innovation and digitalization of educational space.

It is obvious that qualitative changes in the domestic educational space are impossible without global transformations and digitalization - the introduction of modern digital technologies. However, digitalization is often perceived only in the perspective of a fashionable educational trend, contenting with its superficial implementation - the use to assess student knowledge or visualization of educational material, functionality of cloud technologies, digital data processing, software.

In view of the above and in order to achieve qualitative transformations, there is a need for total digitalization, digital transformation, which will involve the introduction of a new educational paradigm.

The concept of «digitalization of higher education» is much broader in scope and content than the simple «introduction of modern information and communication technologies» in the educational process of universities. Modern digital university is a fundamentally changed in the structure, content of education, approaches to administration, human capital development, research, education quality management system [1].

The need for digitalization of the educational sphere is emphasized in a number of legal documents. In particular, the Law of Ukraine «On Education» (2017) defines information and communication as one of the key competencies. The draft Concept of the Digital Agenda of Ukraine - 2020 states that digitalization should become the object of focused and integrated public administration [2]. The need for the development of «e-learning and the formation of digital competence of participants in the educational process" is stated in the order of the Ministry of Education and Science of Ukraine». «On approval of the Regulations on the National Educational Electronic Platform» (2018) [3].

Various aspects of the introduction of digitalization in the educational space have been the subject of foreign research (K. Bassett), C. Gere, C. Creeber, G. Creeber, M. Deuze, M. G. Greeber & R. Martin, L. Vanovich, J. Stommel,

M. Hand and M. Hand and V. Dome, D. Bykov, D. Galkin, M. Zhaldak, M. Leshchenko, P. Matyushko, O. Ovcharuk, V. Rebrina, O. Strizhak, M. Shishkina, A. Yatsyshyn) scientists.

Digital technologies make life easier by optimizing routine processes, leveling borders in the educational space that extends beyond their country and continent.

Digitization is a reflection of the modern paradigm of society development, when competitiveness and efficiency appear as vital qualities. «Digitalization simplifies the educational process, making it more flexible, adapted to the realities of modern times, which ensures the formation of competitive professionals» [4].

But the digitalization of higher education is a complex and ambiguous process. According to Ukrainian researchers, digitalization has a downside that should be taken into account when planning transformations. Scientists point to a real decline in the status of university degrees in open and online learning, the actual increase in the workload of teachers in terms of digitalization of education, which is not yet normatively taken into account in the system of wage rationing. In addition, the function of socialization of students, who mostly drop out of the micro-society of higher education institutions and are individualized in the digital environment, is leveled. There are potential threats to the destruction of the traditional model of education, which is reflected in the devaluation of humanitarian knowledge in the processes of digitalization of education and the economy [5].

In 2020, with the introduction of mass blended and distance learning, our universities were forced to rapidly enter the digital education environment. And the concept of "digital university" from scientific publications to the definition of real models of organization of education in higher education. Ukrainian universities have faced a number of challenges, namely:

- search for a model of digitalization by each institution of higher education within a certain autonomy;
- the need to form the optimal structure of a higher education institution and combine the components of this structure into an effective system, on the basis of which a digital university is formed;

- a combination of elements of information and communication technologies that exist in each university, in the system on the basis of which the digital university is formed, and technical means of learning into effective network tools;

- defining the role, tasks and activities for scientific, scientific-pedagogical and pedagogical staff of such a university;

- replacement of the traditional "classroom" educational space with a virtual network;

- search for methods and techniques of distance learning appropriate to educational tasks;

- establishing effective communication of all participants in the educational process in the network environment [6].

Today there is a growing need to improve organizational forms, methods, teaching aids, creating an effective digital educational space through the digitalization of education. Thanks to a carefully organized digital environment, education becomes more accessible and comfortable, which is extremely important with minimal costs - time, financial, human resources. And for modern youth - this is also the usual plane, which has all the conditions for development, a kind of lifting to realize the individuality of each person and the comfortable implementation of innovations. It is important not only the information technologies themselves, but also their proper selection, combination and management in order to establish effective work. The benefits of the digital transformation of education are obvious. In particular, it provides favorable conditions for:

- development of skills to learn independently, to single out the most valuable material for self-development;

- formation of personality mobility, ability to quickly adapt to changing conditions unpredictably and rapidly;

- strengthening motivation for self-education and self-development;

- reaching a diverse audience (content becomes personalized), ensuring cooperation and integrativity;

- construction of individual educational trajectory;
- learning in the most comfortable conditions - at a comfortable pace, but with optimal use of time set aside to perform certain tasks.

And, most importantly, digitalization ensures the transition from "education for all to education for everyone". Thus, a modern educational space is being built, which has all the conditions for mastering basic (supra-professional) competencies [7].

Educational digital technologies make the learning process mobile, differentiated, individual, interesting and rich. At the same time, the latest educational technologies do not replace the teacher, but complement him. Such classes are characterized by adaptability, manageability, interactivity, a combination of individual and group work, unlimited learning. Educational digital technologies open new opportunities for the teacher, allow students to enjoy communication and learning.

Educational technologies allow teachers to automate most of their work, freeing up human resources for search, communication, individual work with students, provide instant feedback, improve the management of teaching and research processes and education in general.

**Among the competencies that are basic as a result of reforming the education system of Ukraine are:**

- literacy;
- language competence;
- mathematical competence and competence in scientific technologies, engineering;
- digital competence;
- personal, social and educational competence;
- civic competence;
- competence of cultural awareness and self-expression.

Digital competence has a number of structural components that an individual must possess and be able to operate as a result of successful implementation in the practice of digital education. Their content is given in table 1.



**Table 1****Digital competences produced by digital education**

<b>Digital competencies</b>	<b>Content and general characteristics of digital competencies</b>
Digital content	Ability to change, improve, use digital content to create new content; awareness of copyright and data licensing policies; ability to write program code.
Problem solving	Ability to solve technical problems that arise with computer hardware, software, networks; ability to solve needs and find appropriate technical solutions; creative use; ability to independently determine the need for additional new digital skills.
Communication and interaction	Ability to communicate using digital technologies; ability to share information using digital technologies; ability to communicate with society, use public and private services through the use of digital technologies.
Information literacy and data literacy	Ability to search, filter data; ability to evaluate information; ability to use and manage data and digital content.
Security	Ability to protect devices and content, knowledge of security measures, understanding of risks and threats; protection of personal data and privacy; understanding the impact of digital technologies on the environment; knowledge and skills to maintain your health.

Digital competence includes confident, critical and responsible use and interaction with digital technologies for learning, work and participation in society.

Individuals with digital competencies must understand the general principles, mechanisms, and logic underlying digital technologies that are evolving, as well as the basics of the operation and use of various devices, programs, and networks. [8].

Digital competences are a set of knowledge, abilities, characteristics and behaviors that are necessary for a person to be able to use ICT and digital technologies to achieve goals in their personal or professional life. Competence in digital technology should be seen not only as knowledge related to technical skills, but also as knowledge focused more on the cognitive, social and emotional aspects of work and life in the digital environment. Digital competence is a multifaceted evolving process that is constantly changing with the advent of new technologies [9].

Significant work has been done by the European Community to build capacity

for the digital transformation of education and training, in particular to change the skills and competence requirements of citizens. The work focused on developing a digital competence framework for citizens (DigComp), for educators (DigCompEdu), for educational organizations (DigCompOrg) and for consumers (DigCompConsumers). In 2016, a system of approaches to open higher education institutions (OpenEdu) was published, as well as a framework of entrepreneurial competence (EntreComp). Additional research has been conducted by the European community in the field of computational thinking (CompuThink) and training in analytics and mass discovery of online courses (MOOCs) (MOOCNowledge, MOOCs4inclusion).

An important aspect is the integration of the framework into the Europass system, which allows those who are employed and trained to assess their own digital competence and present the results of this assessment (an example is the competence block dedicated to the evaluation of data, information and digital content). In particular, a person must be able to analyze, compare and critically evaluate the reliability and reliability of data sources, information and digital content; analyze, interpret and critically evaluate data, information and digital content) [10].

Digitalization provides a fundamentally new format of educational environment, based on digital technologies that provide convenient and accessible services and platforms to increase competitiveness, more effective interaction of all participants in the learning process, increase its transparency, increase the role of intellectual property, digital skills.

The challenge to the domestic system of higher education in 2020 was a radical change in the organization of the educational environment. The organization of independent work of students, effective interaction of teacher and student have become the main problems that require modern teaching methods and technologies. Higher school pedagogy began a transformation on the principles of andragogy, which is based on the phenomenon of "self": self-development, self-improvement, self-education. For teachers the skills and abilities to methodically competently and technically optimally select the content of educational material, to be able to visualize

the main parts of this content, to form cases for independent work of students, to organize interactive activities while learning new material, to apply innovative methods combining elements of blended and distance learning etc. And in these conditions for students in the first place are the competencies of self-study, planning, self-development and others.

Thus, the direction of formation and development of digital competencies should be based on a quality institute of education and creative innovators. In addition, digital education should be designed in the form of standards, norms and rules. Therefore, digitalization appears as a key factor in improving the education system. In addition to directly affecting the effectiveness of the educational process, digitalization provides a chain of indirect benefits. Digitalization makes the educational process more personalized, accessible and flexible. This, in turn, provides a comfortable environment for self-study, effective development and career growth.

Thus, digital transformation (digitalization) in higher education institutions is not just a trend of the time, but a necessity and a search for a new meaning of the educational process.

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