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**FORMATION OF INFORMATION AND DIGITAL COMPETENCE OF FUTURE TEACHERS IN THE CONTEXT OF THE DEVELOPMENT OF THE NEW UKRAINIAN SCHOOL**

**UDC 378.147:372**

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***Abstract.*** *A scientific analysis of the essence of the concepts of “information and digital preparation of the future teacher”, “information and digital competence”, “digitalization of education”, and “the New Ukrainian School” has been carried out. The article proves that one of the factors contributing to the effective development of the educational process is the formation of information and digital competence of future teachers in the context of the development of the New Ukrainian school, because in education precedes a new ideology based on “Digital project activity” and “Digitalization” of education, where in place of traditional teachers come «gaming-teachers», «coordinators of online platforms and educational trajectories». It is determined that the result of the formation of information and digital training of future teachers in the context of the development of the New Ukrainian School is a formed information and digital competence, which is composed of: motivational-value, cognitive, operational components. The research methods have been characterized for verification of the formation of the information and digital competence of future teachers in the context of the development of the New Ukrainian School according to certain criteria (motivational, cognitive, reflexive-corrective).The results of the conducted questionnaires, testing and interrogation provided grounds to state mainly the medium and low levels of formation of the information and digital competence of future teachers in the context of the development of the New Ukrainian School. On the basis of the obtained results, theoretically substantiated the concept and developed the technology of forming the information and digital competence of future teachers in the context of the development of the New Ukrainian school, which is planned to be implemented at the following stages: professional-motivational, content-activity, reflexive-correctional.*

***Key words:*** *information and digital competence, formation, future teacher, concept, technology, means.*

**Formulation of the problem.** In modern conditions, information flows are growing at a tremendous speed, technologies for its processing and storage are developing, the real life is becoming more and more “digital”. One of the public institutions that have also been influenced by information has become the education system, since the development of information and digital technologies leads to the development of new teaching tools and makes the learning process more effective.

**Relevance of research.** Therefore, contradictions arise: the presence of a wide arsenal of means of preparing future teachers for professional activities and the insufficient use of digital technologies in the educational process of the university; unlimited number of information sources and the inability to use them in their professional activities; the urgent need for a new Ukrainian school in teachers who possess digital educational technologies and the real state of development of information-digital competence of future teachers. This determines the need to solve *the problem* of forming the information and digital competence of future teachers in the context of the development of the New Ukrainian School.

**The connection of the author's work with important scientific and practical tasks.** The confirmation of the urgency in the need for the formation of the information and digital competence of future teachers in the context of the development of the New Ukrainian School is the normative documents: the Law of Ukraine "On Education", the Law of Ukraine "On Information"; Concept of the New Ukrainian School; Accompanying the document Proposal for a council recommendation on Key Competences for Lifelong Learning European commission Brussels, Declaration on Promoting citizenship and the common values of freedom, tolerance and non-discrimination through education.

**Analysis of recent research and publications.** The basis of the formation of information and digital competence of future teachers in the context of the development of the New Ukrainian school were the work of scientists in the following areas: the essence and structure of information and digital competence and information and digital culture of future teachers as purpose-setting pedagogical categories (A. Hurzhii, N. Morse, O. Spirin); the use of information and digital educational technologies in higher education (V. Bykov, M. Shishkina). The specificity of these scientific works is that the subject of the research is the study of pedagogical phenomena occurring in the pedagogical reality, which covers physical and virtual (digital) space. Based on the use of modern ICT educational activities (formal and informal) occur at the intersection of two worlds: real and virtual. The methodology and methods of pedagogical studies of classical pedagogy require revision and improvement in the context of the current realities of the educational process, the needs and interests of all its subjects. The limited use of the pedagogical potential of ICT is due to the lack of awareness of the pedagogical community about the possibilities of using digital educational technologies for the individualization of learning, the cognitive and creative development of students, the coordination of interaction in solving educational and research tasks and organizational and managerial tasks, etc.

**The purpose of the paper**: on the basis of the analysis of the conceptual principles of the digital approach to learning and the methodological foundations for its introduction, clarify the essence of the formation of the information and digital competence of future teachers in the context of the development of the New Ukrainian school, theoretically substantiate its concept, develop the technology and stages of its implementation, identify the means that will contribute the formation of the information and digital competence of a modern teacher, as the result of appropriate training. In accordance with the purpose defined tasks: 1. To reveal the essence of the notions of "information and digital training", "information and digital competence", "digitalization of education", "the New Ukrainian school". 2. Theoretically substantiate the concept of formation of information and digital competence of future teachers in the context of the development of the New Ukrainian school. 3. To develop the technology, stages of its realization and to determine the means of forming the information and digital competence of future teachers in the context of the development of the New Ukrainian school.

**Scientific novelty.** In the process of the research, the concept of formation of information and digital competence of future teachers in the context of the development of the New Ukrainian School was substantiated; the technology was developed and the means of forming the information and digital competence of future teachers in the context of the development of the New Ukrainian School were determined. The result: the formation of information and digital competence of future teachers in the context of the development of the New Ukrainian School.

**Methods.** For the solution of the tasks and achievement of the research purpose, the following research methods will be used in the complex: *theoretical*: analysis of pedagogical and psychological works, the systematization of the views and achievements of scientists (to identify the state of development of the problem, to define the essence of the basic concepts of research, to develop methodological principles for the implementation of the information and digital approach to learning, as well as to study normative documents (to determine the specifics of the formation of information and digital competence of future teachers in the context of the development of the New Ukrainian School); methods of pedagogical modeling for building a technology for the formation of the information and digital competence of future teachers in the context of the development of the New Ukrainian school (for which an analysis of curricula, textbooks and teaching aids and an analysis of the potential of instrumental environments will be carried out); *experimental*: pedagogical experiment – to test the hypothesis of the study; diagnostic – questionnaires, observations, analysis of the products of educational activities of future teachers (for collecting data on the formation of information and digital competence of future teachers in the context of the development of the New Ukrainian school as a result of their training).

**Statement of the main material.** The limited use of the pedagogical potential of ICT is due to the lack of awareness of the pedagogical community about the possibilities of using digital educational technologies for the individualization of learning, the cognitive and creative development of future teachers in the aspect of the buildout of the New Ukrainian School, the coordination of interaction in solving educational and research tasks and organizational and managerial tasks, etc. In our opinion, theoretical and methodological substantiation of the concept of formation of information and digital competence of future teachers in the context of the development of the new Ukrainian school can qualitatively improve the situation, integrates -bio and -techno and explains how to organize the educational process in terms of its occurrence in real-virtual space.

The present requires the transition to a qualitatively higher level of the use of information and digital technologies in education, and the improvement of state management by this process.

In order to solve these and other problems – in view of the current state and potential of the development of the Ukrainian information and digital sector – it is necessary to coordinate the main strategic goals, mechanisms and normative provision of the development of the information society in Ukraine in the near future in the way of creating the "Unified digital platform in education"(UDPiE). One of the factors contributing to the effective development of the educational process is the formation of information and digital competence of future teachers in the context of the development of the New Ukrainian school, because in education precedes a new ideology based on “Digital project activity” and “Digitalization” of education, where in place of traditional teachers come «gaming-teachers», «coordinators of online platforms and educational trajectories» (Romanovskyi, Grineva, Zhernovnykova, Shtefan, Fazan, 2018).

The Digital Agenda for Europe development is foreseen in the following areas:

• digital society (skills and vacancies, health and aging, intelligent life, utilities, cyber security and privacy, Internet trust, etc.);

• research and innovation (innovation, digital infrastructure, new technologies, components and systems, open science, robotics, research consultants, etc.);

• access and communications (broadband access in Europe, telecommunications, open internet, etc.);

• digital education (startup Europe; data; cloud technologies; future of the Internet; consultants etc.) (Hurzhii, 2013).

The dissemination of Digitalization successfully takes place in the areas of e-learning, IT (information technology), TKS (telecommunication services), etc. (Nalyvaiko, 2017).

In the process of research, it was determined that information and digital competence is recognized as one of the key in the context of lifelong learning in the European Union countries, which contributes to the formation of an individual’s ability to confidently, critically and creatively use information and communication technologies to achieve goals related to the employment, learning, leisure, inclusion and participation in society. This competence is seen as transversal, contributing to the achievement of other competences relating to the spheres of languages, mathematics, learning to learn, cultural awareness, etc., and belong to the skills of the 21st century that all citizens need to achieve in order to ensure their active participation in society and its economic development (Bykov, Leshchenko, Tymchuk 2017).

The analysis of scientific literature has provided grounds for arguing that the concept of information and digital competence refers to the totality of knowledge, skills and abilities used for information and communication educational systems, including the digital means employed and, in particular, the ability to implement web design, to develop presentations, use graphic programs, information on online libraries, web browsers, Word applications, etc (Bykov, Leshchenko, Tymchuk 2017).

The information and digital competence lies within the category of "interactive use of means", where such key competencies are pointed out: the ability to interactively apply language, symbols, texts; ability to use knowledge (information literacy); the ability to apply (new) interactive technologies (Formation of Information and Communication Competencies, 2014).

The eight key competences for lifelong learning identified in the European Framework of Reference for Lifelong Learning includes: communication in the mother tongue; communication in foreign languages; mathematical competence and basic competences in science and technology; digital competence; learning to learn; social and civic competences; sense of initiative and entrepreneurship; cultural awareness and expression (European Commission, 2007).

In determining *the content of the structural components* of the formation of the information and digital competence of future teachers in the context of the development of the New Ukrainian school, account was taken of the specifics of the educational system, its practically oriented direction, educational and qualification characteristics of the students of H.S. Skovoroda Kharkiv National Pedagogical University and V. N. Karazin Kharkiv National University, as well as the purpose, task and content of the introduction of teaching aids in the educational process of institutions of higher education (Zhernovnykova, Nalyvaiko, Nalyvaiko, 2017).

*The motivational-value component* of the formation of the informational and digital competence of future teachers in the context of the development of the New Ukrainian School is determined by the focus on the organization of the educational process of students in the real-virtual space, which contains: value orientations and target settings, personally significant cognitive and professional motives for organizing the educational process , giving preference to other types of pedagogical activity (Zolotukhina, Bashkir, Zhernovnykova, 2018).

*The cognitive component* of the formation of the information and digital competence of future teachers in the context of the development of the New Ukrainian School involves the presence of students psychological-pedagogical and methodological knowledge that includes knowledge on the introduction of modern means of education in a real-virtual educational process, in particular psychological and pedagogical knowledge contains knowledge the peculiarities of the use of digital technologies in the professional activity of the teacher. Methodological knowledge is knowledge of general methods and methods of organizing educational process using digital technologies (Nalyvaiko, Nalyvaiko, 2017). The cognitive component determines the level of knowledge and innovative style of student thinking and is characterized by six indicators (gnostic, design, constructive, organizational, communicative, and creative) that a modern teacher of the New Ukrainian school should possess.

It is revealed that the informational and educational environment significantly and positively influences the process of preparing future teachers for professional activity, is a system-balanced combination of internal and external factors and conditions, and is based on the principles of direct and feedback links (Zhernovnykova, 2015). The informational and educational environment for preparing students is an innovative open educational environment in which the leading role is in humanistic style of interaction between the subjects of the environment using digital technology (Nalyvaiko, 2018).

The signs of an open informational and educational environment for the training of future teachers in the context of the New Ukrainian School are: availability of informational and educational resources of the environment; the massive use of environmental resources is due not only to the ability of a student studying at any faculty to address them, but also to the degree of their re-use; self-organization of the environment, which is conditioned both by the expansion of the educational resources of the environment, and the construction of various connections between its resources and participants; the presence in the environment of mechanisms of collective co-creation involving students of different courses and faculties (Zhernovnykova, Shtefan, Fazan, 2017).

It is proved that the combination of various forms of training in the process of preparing future teachers for professional work by means of digital technologies positively influences the result of their professional training.

*The operational component* reflects the formation of informational and digital competence of future teachers in the context of the New Ukrainian School, defines the level of mastering the skills of organizing the educational process of education applicants, aimed at monitoring and assessing the level of formation of the readiness of students of pedagogical universities to professional work by means of digital technologies, appropriate correction of this process.

It is determined that the conceptual basis of formation the information and digital competence of future teachers in the context of the New Ukrainian school are systemic, personally oriented, competence, activity, technological and informational approaches.

On the basis of the obtained results, theoretically substantiated the concept and developed the technology of forming the information and digital competence of future teachers in the context of the development of the New Ukrainian school, which is planned to be implemented at the following stages: professional-motivational, content-activity, reflexive-correctional. To test the development of the formation of information and digital competence of future teachers in the context of the development of the New Ukrainian School the following criteria are defined: motivational, cognitive and reflexive-corrective. At the ascertaining stage of the pedagogical experiment, 202 students of H. S. Skovoroda Kharkiv National Pedagogical University and V. N. Karazin Kharkiv National University took part, 102 of which entered the experimental group (EG) and 100 in the control group (CG) (look table). Indicators of the level of formation of information and digital competence of future teachers in the context of the development of the New Ukrainian school according to the relevant criteria are: motivational – positive attitude to future professional activities, the desire for success, motivation for productive activities – was determined by the methods of psychodiagnostics; cognitive – knowledge of the application of digital technologies in the educational process of the New Ukrainian School – was determined by levels of taxonomy of knowledge; reflective-corrective – ability to carry out self-examination and self-assessment of future professional activity. The levels of formation of information and digital competence of future teachers in the context of the development of the New Ukrainian school (high, medium, low) were also determined.

The results of the conducted questionnaires, testing and interrogation provided grounds to state mainly the medium and low levels of formation of the information and digital competence of future teachers in the context of the development of the New Ukrainian School according to all criteria.

*Table*

**The results of the ascertaining stage of the pedagogical experiment on the formation of informational and digital competences of future teachers in the context of the development of the New Ukrainian School**

|  |  |  |  |
| --- | --- | --- | --- |
| Criterions | Levels | ЕG (102 persons) | CG (100 persons) |
| At the beginning of the experiment | І section |
| Motivational | H | – | – |
| M | 34,2 | 33,5 |
| L | 65,8 | 66,5 |
| Cognitive | H | - | - |
| M | 26,8 | 23,6 |
| L | 73,2 | 76,4 |
| Reflexive-corrective | H | 11,0 | 9,9 |
| M | 42,0 | 42,3 |
| L | 47,0 | 47,8 |

Note: H – high, M – medium, L – low levels of the formation of the digital competence of future mathematics teachers.

**Conclusions.** Thus, on the basis of the analysis of scientific literature, provided grounds for arguing that the concept of “Information and digital competence of future teachers in the context of the development of the New Ukrainian School” refers to the totality of knowledge, skills and abilities used for information and communication educational systems, including the digital means employed and, in particular, the ability to implement web design, to develop presentations, use graphic programs, information on online libraries, web browsers, Word applications, etc. In the article the theoretically substantiated the concept based on system, personally oriented, competence, activity, technological and informational approaches, developed the technology and stages of its realization, which will promote the formation of information and digital competency of the modern teacher, as the result of appropriate training.

**Prospects for using research results.** The theoretically substantiated concept and the developed technology are planned to be implemented in the educational process of G.S. Skovoroda Kharkiv National Pedagogical University and V.N. Karazin Kharkiv National University.

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