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DIGITALIZATION AS A PROSPECTIVE DIRECTION OF THE CONTEMPORARY EDUCATION SYSTEM

Summary. The issues of digitalization, digitalization of the society and educational environment are covered. It is investigated that digitalization is aimed at ensuring the longlife learning process, as well as its individualization on the basis of advanced learning technologies. Digitization of education directly depends on the level of mastery of educator's digital awareness which is aimed at making educational activities up to date and more productive. The scheme of the digital education system is given. The management of digitalization in the educational environment is carried out through digital marketing, aimed at organizing the interaction with teaching and support staff, research and teaching staff, graduates, students, applicants using a range of digital communication channels; monitoring changes in the formation of a positive image of the educational institution; stimulating the creation of new digital communities and innovations; development of personalized marketing materials for target audiences. The factors influencing the digital transformation of educational institutions are considered in the article. It is established that one of the main elements of education digitalization is digital literacy, which is defined as a set of knowledge and skills necessary for the safe and effective use of the digital technologies and Internet resources. Based on the analysis of various sources, digital literacy is based on the digital competence of the educator and is defined as the willingness and ability to use digital resources, computers, mobile devices and cloud technologies in the educational process, and to create and effectively use educational digital system opportunities and all its components in the educational process. The fundamental difference between digital literacy and digital competence is the inclusion of a component of motivation and responsibility. The types

of skills on which digital literacy and its components depend on are highlighted. The main components of digital competence of educators are listed. The levels of educator's digital competence are considered and characterized at the following levels: basic, advanced and proficient.

Key words: digitalization; society digitalization; education digitalization; digital literacy of a contemporary educator; digital competence.

1. INTRODUCTION

Formulation of the problem. Understanding the fundamental role of information in the social development has necessitated the creation of a special information culture of individuals. New way of thinking is required to apply the latest computer technologies in education. Therefore, the use of digital technologies in the educational process is an urgent problem of the contemporary education. Education should be seen not only as the acquisition of the necessary amount of educational information by students, but also as the development of needs and abilities to acquire new knowledge and skills independently using various sources of information.

In contemporary education one of the priority areas of development is the informatization and implementation of computer technology in the educational process, which significantly improves the quality and efficiency of training of future professionals, increases their competitiveness in the labor market [1, c. 102]. The use of computer technology requires a review of the forms and methods of educational activities. It should be noted that computer technology is an effective but subsidiary learning aid. The use of computer technologies increases students' activity, leads to the restructuring of the educational process towards independent forms of learning. The educator can intensify the learning process in the context of specialized training through the rational use of computer technologies without overloading the educational process. The use of modern technical means to solve professional problems on the basis of computer training is the key to the competitiveness of future professionals.

The main point for the future specialist in the modern information environment is the further use of computer technologies, namely digital ones, as methods and tools of future pedagogical activities to solve the problems of the subject area.

Solving the problems of education should begin with the professional training of specialists. It is necessary to conduct training in the field of digital technologies well. Teachers should be able to select and use those technologies that best meet the content and objectives of a particular subject, help the harmonious development of students, taking into account their individual characteristics.

The global processes of society digitalization have identified the need to build a digital learning process of professional education, the formation and improvement of digital competences of educators. Wide digitalization has resulted from the forced mass transition to distance learning due to the COVID-19 pandemic. The current epidemiological situation in the country determines the need for dynamic development of professional competences among pedagogical staff to ensure the success in solving tasks qualitatively and in time.

An exceptional role in the formation of students' digital competence is assigned to educators. In order to realize this task successfully, the educators should have the sufficient knowledge and skills not only to communicate on an equal footing with advanced students in the field of Internet technologies, but also to teach them digital technologies, as well as to use them in life situations safely.

The intensive introduction of the information and communication technologies in various fields determined the development of such a process as digitalization.

Analysis of recent research. The strategic priorities of education digitalization for 2021-2027, presented by the European Commission, are: promoting the creation of a highly efficient digital educational ecosystem and raising the level of digital skills and competencies for the digital age. The digital educational environment, as noted in the document, should be part of the modern digital ecosystem [2].

The areas of society digitalization, in particular in the field of education, are the Digital Strategy of the EU (European Union). “2030 Digital Compass: The European Way for the Digital Decade”, presented by the EU Commission in March 2021, is a tool that sets the EU’s trajectory for increasing the pace of digital transformation, closing gaps in ICT implementation in all areas of European life, effective use of the opportunities provided by digital technologies, as well as the implementation of digital principles. The features of digital principles define the implementation of universal digital education, the development of digital skills and the creation of a safe and secure online environment [3].

The education digitization, introduction of computer-oriented technologies in the educational process of higher and vocational educational institutions have been the subject of research by a large number of researchers (I. Androschuk, V. Bykov, J. Cachelin, C. Frey, R. Gurevych, I. Gurevych, A. Gurzhiy, N. Dmitrenko, M. Kademiya, V. Kukharenko, N. Morse, A. Murray, V. Osadchyi, M. Osborne, Ye. Polat, M. Prigodiy, V. Radkevich, J. Widmer, M. Zhaldak, etc.)

The purpose of the article is to cover the issue of digitalization, society digitalization and educational environment; to analyze the digital literacy of a contemporary educator; to consider the levels of educators’ digital competences.

2. RESULTS OF THE RESEARCH

The modern information community considers the term “digitalization” as “digital way of communication, recording, data transmission using digital devices”. A. Murray considers digitalization as a paradigm shift in communication and interaction with each other and society [4]. Some scientists clarify the meaning of this concept, they define it as not only the transmitting information into digital form, but a comprehensive solution of infrastructural, managerial, behavioral, cultural nature [5, p. 75].

Thus, we can conclude that the development of the Internet and mobile communications are the basic technologies of digitalization.

The term “digitization” today tends to be used to describe a transformation that goes beyond simply replacing an analog or physical resource with a digital one. For example, books do not just turn into e-books, but provide a range of interactive and multimedia resources. Accordingly, the processes can become online dialogues between different participants of the educational process [6, p. 13].

Digitization is a kind of paradigm shift in how we think, how we act, how we communicate with the environment and with each other, and technology here is more of a tool than a goal. In simple terms, digitalization simplifies the learning process, making it more flexible, adapted to the realities of modern times, which in turn ensures the formation of competitive professionals.

The first publications on the introduction of digital technologies in the educational process were published in the United States. Digital technologies have allowed educators to master information and communication skills to organize and manage the educational process and to become digital mentors for learners.

The UNESCO recommendations emphasize that it is not enough for a modern educator to be technologically literate and able to develop appropriate technological skills in students [7]. The modern educator should help students use knowledge and skills to cooperate successfully, solve emerging problems and become a professional in demand in the labor market.

It should be noted that in education the digitalization is aimed at ensuring the continuity of the learning process, i.e. lifelong learning, as well as its individualization on the basis of advanced learning technologies [8, p. 63]. There is no established definition of this term yet, but it includes the use of significant data on the process of mastering certain disciplines by individual students and largely automatic adaptation of the educational process based on them; the use of virtualization, augmented reality and cloud computing and many other technologies [9, p. 5].

It should be added that the digitalization of education directly depends on the educator’s level in digital awareness which is aimed at making educational activities more productive. According to N. Bityutska, today there is a need for educators to develop the ability to navigate the flow of digital information, to work with it, to process and integrate it into new pedagogical technology [10]. The

information format is based on digital presentation of information. Unlike the electronic format, the digital format represents information more accurately, ensuring its free circulation, placement, processing, usage in computer networks. The digital education system includes information resources, telecommunications, management system (Fig. 1).

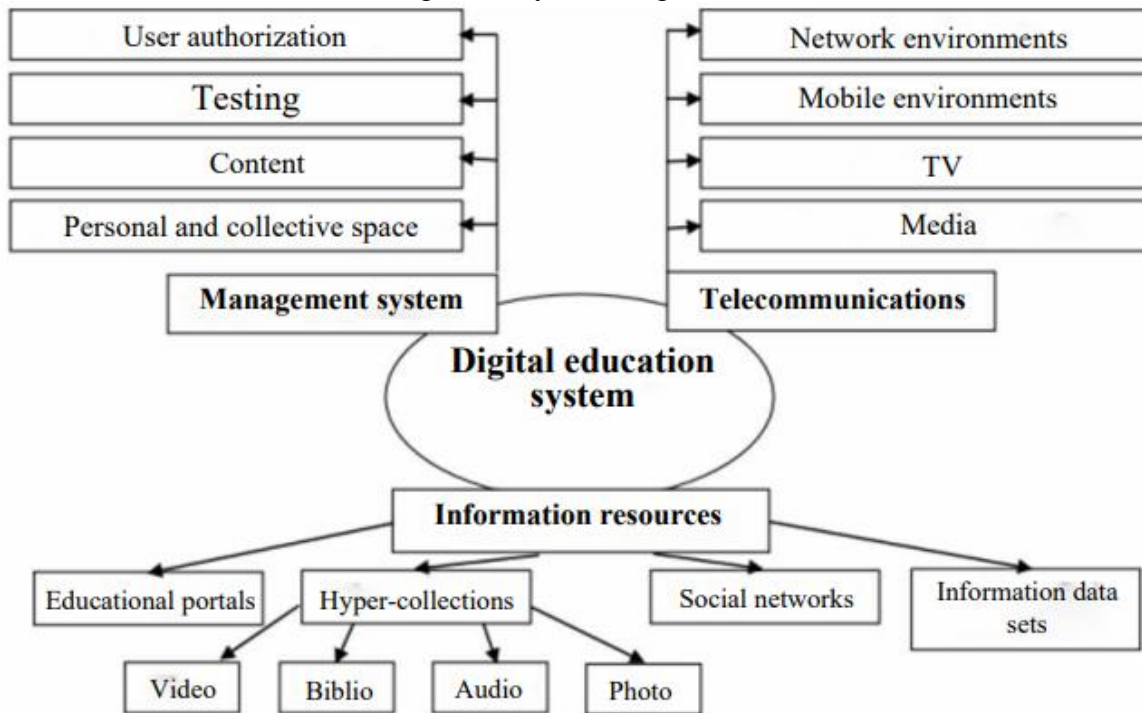


Fig. 1. Digital education system

Management of digitalization in the educational environment is carried out through digital marketing, aimed at organizing interaction with teaching and support staff, research and teaching staff, graduates, students, applicants using a range of digital communication channels; monitoring changes in the formation of a positive image of the institution; stimulating the creation of new digital communities and innovations; development of personalized marketing materials for target audiences.

As it is given the above, now every higher educational institution faces the task of digital transformation, which involves the introduction of more flexible processes, changing corporate culture, process optimization. This transition is due to several factors.

Firstly, now almost all students belong to the generation of digital natives, they show a much greater tendency to apply new technologies in their daily lives. This is especially true of IT and Internet technologies, as well as their usage not only in the professional sphere, but also for socialization and communication. Thus, the digitalization of the university will make it more suitable for the target audience. It will definitely increase the competitiveness of higher educational institutions in the education market, will create additional value and attract students [11].

The second argument is the increase in competition among higher educational institutions, especially in top universities. Due to the globalization of the market, the struggle for the student will no longer take place within one country or cluster of countries, but at the international level. Thus, the creation and maintenance of a competitive advantage of the university will be determined by the timeliness of the introduction of new technologies and, as a consequence, readiness for fundamental changes towards a new generation educational system.

The third argument stems from the need to digitize the internal processes of the university to increase the effectiveness of the interaction of departments at the level of the entire educational institution. This is necessary for all the innovative and cultural transformations required of the university in the transition to a new educational model [12, p. 309].

Taking into account the mentioned above information, we can say that the main goal of any higher educational institution that strives for the development and wants to change the status for “a

digital higher educational institution” is to focus all efforts on automating processes within the university, which will make them more efficient by reallocating resources and virtual environment.

Thus, it is possible to formulate the tasks of digitalization that should be set by the institution of higher education:

- providing training and upgrading professional skills of the teaching staff of the university in terms of digital technologies in educational activities;
- implementation of digital technologies in the educational process;
- enabling the collective use of digital resources and free access to them in cloud services;
- ensuring an increase in the level of motivation for professional use of digital technologies by educators and students;
- creation of the innovative conditions for development through the introduction of digital technologies;
- providing the information and consulting services on the use of digital and cloud technologies with unlimited resources;
- accumulation, systematization and dissemination of the information on the use of digital and cloud technologies by higher education institutions.

By fulfilling these tasks, the education system will be able to provide the society with a confident transition to the digital age, focused on increasing the productivity of the educational process, building the individual learning routes, managing the learning outcomes, virtual and augmented reality and more.

Due to the informatization of educational process, the scope and content of educational material is changing, a restructuring of curriculum programs takes place, which leads to a change in the structure and content of the courses, and, consequently, the structure and content of education, which in turn leads to changes of certain teaching methods [13, p. 164].

It is worth noting that the digital resources used today in everyday life, allow learners to overcome barriers to traditional learning: the pace of mastering the curriculum, the choice of an educator, learning forms and methods. In addition, the information and communication and digital technologies provide an opportunity to intensify the educational process, improve the level of quality and perception, understanding and assimilation of knowledge. With the help of the media and interactive tools, it is easier for educators to use the teaching approach based on the introduction of the innovative approaches, including the use of “cases”, projects, business games. As a result, the students absorb the information much better and develop relevant skills, being in an emotionally comfortable environment, do not lose the desire to learn and generate ideas.

The successful education digitalization does not depend on the number of computers, but on the quality of teaching aids and methodological support for their use. Even the best e-learning tools will be a “dead weight” on computers if their use is not methodically ensured, if there is no computer-based learning and information space for both teachers and students [14, p. 209].

The digital technologies in the modern world are not only a tool, but an environment that opens new opportunities: learning at any convenient time, longlife education, the ability to design the individual educational routes for users who become creators of electronic resources but not only consumers.

By that means, the education digitalization involves the use of the mobile and Internet technologies by students, expanding the horizons of students’ knowledge, making it limitless. Productive use of the digital technologies, involving students in independent research, selection of information, participation in project activities forms the XXI century competences necessary for students [15].

One of the main elements of education digitalization is digital literacy, which is defined as “a set of knowledge and skills necessary for the safe and efficient use of the digital technologies and Internet resources”. The emergence of the concept of “digital literacy” is associated with the name of the American scientist and journalist Paul Gilster, the author of the monograph “Digital Literacy” published in 1997 [16].

The analysis of various sources showed that digital literacy is based on educator's digital competence, which determines the willingness and ability to use the digital resources, computers, mobile devices and cloud technologies in the educational process, as well as to create and use the digital education system and all its components effectively. Therefore, the fundamental difference between digital literacy and digital competence is the inclusion of a motivation component and responsibility.

The concept of "digital literacy" as a tool for information activities has gone beyond the ability to use only a computer and is considered as the knowledge related to technological literacy: computer and ICT literacy. Computer literacy includes user and special technical skills in the field of computers.

ICT literacy includes a communication component as a set of user skills for using computer-supported services and applications distributed over the Internet, and an information component that focuses on the key aspects of the society and is based on knowledge: the ability to work optimally, to receive, choose, process, transmit, create and use digital information [17].

Digital literacy depends on the formation of three types of skills:

- the skills to interact with a computer and any other device that can be used to access the Internet or create digital artifacts;
- the skills of interaction with software that provide opportunities to work with content;
- the universal skills in working with digital technologies, including designing, developing a digital online or offline environment.

The digitalization of the country brings positive changes in all spheres of life – from education and medicine to science and business. At the same time, there is one fundamental thing without which it is impossible to digitize the country successfully. This is the digital literacy of the population [18]. Just using a smartphone or laptop and accessing the Internet does not mean to have digital literacy. Digital literacy is the ability to use the modern digital technologies in work and study, in professional and personal development effectively and safely (Fig. 2).



Fig. 2. Components of the concept "digital literacy"

An innovative challenge for the traditional education system is the need to expand the professional competences of educators on the basis of advanced technologies and longlife learning process.

We believe that for the development of digital competence the educators need (Fig. 3):

- to develop and implement the modern programs of additional professional development for educators (certificate training, professional training);
- create various distance and online courses for educators' professional development;
- to create electronic resources and libraries for methodological assistance for educators;
- conduct various online consultations;
- to organize methodological associations that manage the implementation of education digitalization in the organization.

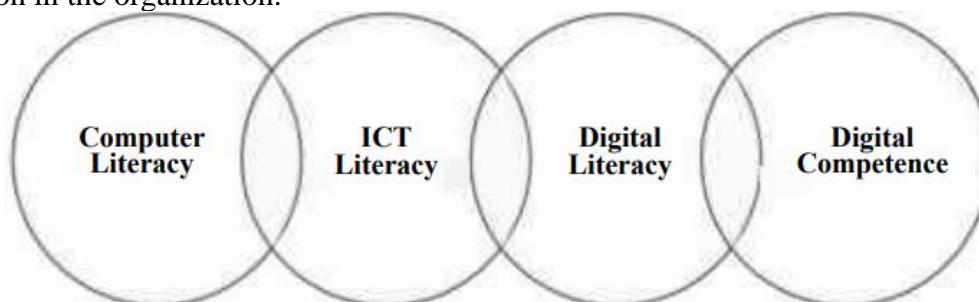


Fig. 3. Digital competence

It is not enough to talk about the formation of educator's digital competence, there should be criteria for its assessment. Digital competence is difficult to define because it includes a lot of aggregated skills and abilities, and conventional assessment tests do not show the whole reality. The European framework for digital competence of educators (DigCompEdu) [19] offers us the opportunity to provide our own system for assessing the development of educator's digital competence. All components of digital competence (Fig. 4) are divided into 3 components:

1. general professional digital competences – the use of digital technologies for professional communication, cooperation and professional development, search, creation and dissemination of digital educational systems;
2. pedagogy of digital learning – the use of digital technologies in the educational process, as well as technologies and assessment strategies;
3. transferring competences – the use of digital technologies to ensure personalization, inclusion and involvement of students, promoting the development of students' digital skills, to cultivate the habit of creative, responsible use of digital technologies.

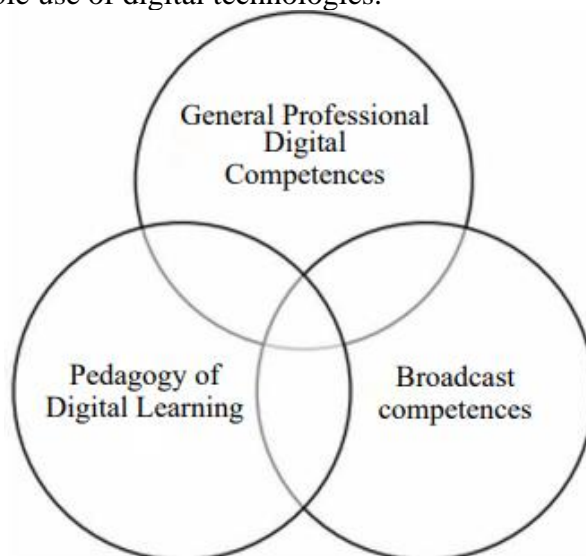


Fig. 4. Components of educator's digital competence

The levels of mastering of digital competences by teachers are the following (Table 1):

1. Elementary. Educators know how to use a digital tool, know the specifics of e-learning, can choose the digital educational technologies and plan e-learning.

2. Intermediate. Practical use of digital technologies in pedagogical practice (the use of blended learning and online courses).

3. Proficient. Teaching students and colleagues how to use the digital technologies (mutual assistance of educators in teaching the use of digital technologies).

Table 1

Assessment Levels of the educator's digital competence

Competences	Elementary	Intermediate	Proficient
General professional digital	Selection and use of digital technologies to increase the effectiveness of communication with students and their representatives, to develop organizational communication strategies within the organization. Choice of digital resources. Finding, accessing and selecting resources for teaching and learning, understanding the access conditions and usability from a copyright perspective.	Formation, granting access rights and publication of digital resources. Creating resource selections both for your own use and for giving an access to other users. Publishing digital resources, providing access to resources for students with copyright. Understanding the rules for using and creating open licenses for digital educational resources.	Converting and using open licensed resources and other permitted materials as the basis of the educational content. Creating (including jointly) new digital educational resources. Taking into account the educational goals, the usage context, the characteristics of the target audience of students and pedagogical technologies in the design, planning and planning of the use of digital educational resources. Using digital resources and resources for professional self-development. Analyze, critically evaluate and actively develop your own teaching activities.
Pedagogy of digital learning	Include the use of digital technologies and digital educational resources in the educational process in order to increase efficiency, as well as for formative and final assessment. Provide expediency and optimal scenario to use of digital innovations in the educational process. Experiment and implement new educational formats and practices.	Ability to use the digital tools to meet different needs of students, different routes and personal learning goals, offer alternative approaches and tools that provide different speeds of learning according to students' individual needs and goals. Experiment and implement new formats of pedagogical support and counseling. Generate, select, critically evaluate and interpret digital data on students' educational activity, progress and advancement to inform educators and students.	Convert and use open licensed resources and other permitted materials as the basis of educational content. Create new digital educational resources, taking into account the goals, context, features of the target audience and pedagogical technologies. Use digital technologies to support the process of self-learning: during the development and adherence to the personal learning programme, during the monitoring and reflection on students' personal achievements, during the exchange of experiences and creative solutions.

Transferring	Involve students to use digital tools in order to stimulate creative students' involvement to disciplines. Provide the access to the digital educational resources and educational activities for all students, including the staff in higher education institutions. Provide digital expectations and eliminate prejudices about the use of digital technologies in the educational process.	Include the educational activities, tasks and assessment materials in the educational process that encourage students to use digital tools effectively and responsibly for communication, collaboration and participation in social projects; express thoughts, create and convert the content in various formats using digital tools.	Include the educational activities in the learning process that encourage students to identify and solve technical problems. Take measures to ensure physical, psychological and social comfort when using digital technologies. Expand students' opportunities in risk management and the use of digital technologies to ensure learners' well-being.
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As teaching is an extremely difficult activity for assessment, we believe that the most effective method of assessing an educator's digital competence is to assess the behavior in real situations. The proposed model provides for the development of digital competence at three levels, which together presents a digital competence index (DCI). For a quick external assessment of the educator's DCI (Fig. 5) or for a self-analysis, the following scheme is proposed, based on the digital instrument Mentimeter. The maximum DCI is 18 points which tends to expand given the current conditions.

Assessment of the Educator's Digital Competence

.4 Mentimeter

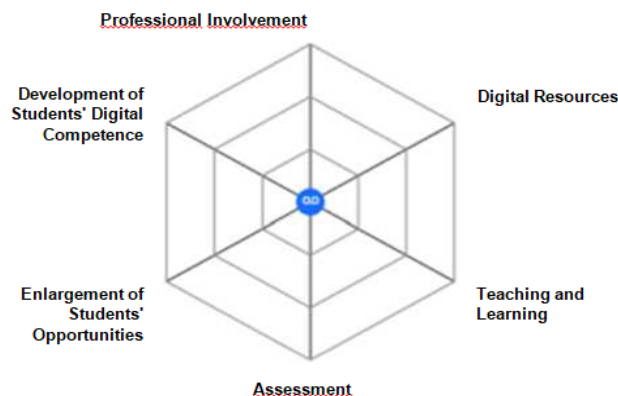


Fig. 5. Index of educators' digital competence

The educator's personal website, which today is becoming an integral part of the professional activities of teachers, should also contribute to the development of educator's digital competence. In this regard, it is proposed to create personal websites for educators with the required characteristics:

- the level of digital competence mastery (the scale shows the existing level and the need to master skills to move to the next level);
- the educator's rating which is formed from surveys of students, colleagues and parents;
- the educator's personal website is a portfolio that the employee designs and administers, thus proving one of the elements of the educator's digital competence.

Thus, the modern living conditions determine the need for the educator's professional development in the field of digitalization, which determines the formation of digital competence.

3. CONCLUSIONS AND PROSPECTS OF FURTHER RESEARCH

The significant and rapid pace of the scientific and technological progress has revolutionized the digital education sector, as the modern information society needs fundamentally new approaches to quality the education starting from preschool age. In this context, new ways, means and methods are used to train highly qualified specialists who will have the basics of digital literacy and will be able to develop, implement and disseminate the digital education. This task can be achieved through a well-established educational process.

Digitalization is not only transferring the information into the digital form, but a comprehensive solution of the infrastructural, managerial, behavioral, cultural nature. Therefore, the development of the Internet and mobile communications are the basic technologies of digitalization.

The results of the study show that digitalization simplifies the educational process, making it more flexible, adapted to the modern realities, which in turn ensures the formation of competitive professionals. The education digitization directly depends on the level of mastery of educators' digital technologies in order to use them productively in educational activities. In addition, digitalization involves the ability to use the mobile and Internet technologies, expanding the horizons of students' knowledge, making it limitless. Productive use of the digital technologies, involving students in independent research, selection of information, participation in project activities forms the XXI century competences in students.

Thus, promising areas of our further research in the field of the education digitalization are cover the issues of improving educators' skills in digital literacy, focused not only on the development of courses, but also on the use of digital environment in the educational process. The digital environment requires teachers to have a different mentality, a picture of the world, better ways and forms of working with students.

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ЦИФРОВІЗАЦІЯ – ЯК ПЕРСПЕКТИВНИЙ НАПРЯМ РОЗВИТКУ СУЧАСНОЇ СИСТЕМИ ОСВІТИ

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Анотація. Висвітлюється питання цифровізації, цифровізації суспільства та освітнього середовища. Досліджено, що цифровізація спрямована на забезпечення безперервності процесу навчання, а також його індивідуалізацію на основі технологій просунутого навчання. Цифровізація освіти

безпосередньо залежить від рівня володіння цифровими технологіями педагога з метою їх продуктивного застосування в освітній діяльності. Наведено схему системи цифрової освіти. Управління цифровізацією в освітньому середовищі здійснюється за допомогою цифрового маркетингу, спрямованого на організацію взаємодії з навчально-допоміжним персоналом, науково-педагогічними працівниками, випускниками, студентами, абітурієнтами із застосуванням спектра цифрових каналів комунікації; моніторингу змін щодо формування позитивного іміджу закладу; стимулювання створення нових цифрових спільнот та інновацій; розробки персоналізованих маркетингових матеріалів для цільових аудиторій. Розглянуто фактори, що впливають на цифрову трансформацію закладів освіти. Встановлено, що одним із основних елементів цифровізації освіти є цифрова грамотність, що визначається як набір знань та вмінь, які необхідні для безпечного та ефективного використання цифрових технологій та ресурсів Інтернету. На основі аналізу різних джерел виявлено, що на цифровій грамотності ґрунтується цифрова компетентність педагога, яка визначається як готовність і здатність використовувати цифрові ресурси, застосовувати ПК, мобільні пристрої та хмарні технології в освітньому процесі, а також створювати та ефективно використовувати в освітньому процесі можливості цифрової освітньої системи та всіх її складових. Принциповою відмінністю цифрової грамотності від цифрової компетентності є включення компонента мотивації та відповідальності. Виділено типи навичок від яких залежить цифрова грамотність та її складові. Перелічено основні компоненти цифрової компетентності педагогічних працівників. Розглянуто та охарактеризовано рівні володіння педагогами цифровими компетенціями: базовий, просунутий та професійний.

Ключові слова: цифровізація; цифровізація суспільства; цифровізація освіти; цифрова грамотність сучасного педагога; цифрова компетентність.

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