KAPITEL 2 / *CHAPTER 2* [2]
UKRAINIAN EXPERIENCE OF THE FORMATION OF DIGITAL COMPETENCE OF ECONOMISTS

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Introduction

Digital transformation and technological innovations in the field of use of information and communication technologies, automated production, diversification and improvement of robots cause radical changes in the quality of human capital and create new requirements to the level of knowledge and competencies of digital skills of any economic activity. The need of having digital competence for the future economist is a professional need and challenge in the condition of rapid development of innovative technologies. Moreover, digital skills are necessary for the population as in professional activities - for complex data analysis and development of algorithms, programs, work in automated production systems, providing services, trade, business running, as in the process of forming digital and media literacy necessary to find information [17, p.16]. The development of digital technologies opens for Ukraine a «window of opportunity» for the growth of the national economy, improving the quality of life of citizens. The usage of these opportunities is a serious challenge and an important task of Ukrainian society [7]. In order to realize these opportunities and overcome the challenges of digitalization of the economy, it is important to find the ways of forming the digital competence of future economists in the process of learning, considering European experience.

2.1. Ways of formation of digital competence of specialists in economics

Tne necessity of using information and communication technologies in the training of economic specialists is defined by a number of regulations: Law of Ukraine «On Higher Education» [1], Law of Ukraine «On Education» [2], Concept of new Ukrainian school [3], Concept of digital competencies [4], Description of the framework of digital competencies of citizens [7], Standards of higher education of Subject Area 051 Economics by educational degree, bachelor [5], master [6] and others.

The reseach defines modern tendencies of the development of economic education in Ukraine [10], it is studied the theoretical foundations of the formation of competencies of economic professionals in the works of M. Boliubash [8], L. Havrilova [9], T. Priidak [19] and others. Also, the researches [11] justify theoretical bases of formation of mathematical competences of future economists, in work [18] it is offered the system of application of information technologies in professional

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training of future economists. The research [14] highlights foreign experience of training future economists. Sudies [13], [20], [21] identifies the requirements for professional training of specialists in economic specialties and ways of their implemention in the educational process of higher education. The works of A. Oleshko and A. Usatenko [17] are devoted to the problem of formation and development of digital competence of the personnel of national corporations.

The works of V. Bykov, V. Zabolotnii, I. Hulivata, O. Spivakovskii, O. Spirin and others are devoted to the use of information and communication technologies in the educational process.

Analysis of the essence of the concept of digital competence is clarified in studies of such national (Zaporozhtseva Yu. [12], Oleshko A. [17], Priidak T. [19], etc.) and foreign (Batalla J. [22], Carretero S. [23], Ferrari A. [24] and others) scientists. In particular, the study [19] defines digital competence as an integral characteristic of a modern economic specialist and a necessary condition of ensuring the competitiveness of future economists.

O. Ovcharuk's research is devoted to determining the level of competence in the field of digital technologies on the basis of European standards of digital technology ownership [16].

Considering the current tendencies of digitalization of the economy, there is a necessesity to find ways of forming digital competencies of future economists during obtaining higher education.

Possession of digital competence is necessary not only of the competitive specialist in the labor market, but also of any citizen of Ukraine who wants to live comfortably in a digital country through access to public services and reduce the risk of dangers while using the Internet.

The European Community has taken a number of steps towards the digitalization of all spheres of human activity, in particular, developed a framework of digital competence for citizens - DigComp 2.1: Digital Competence Framework for Citizens [23], which outlines the educational standards of digital human competence. It identifies five areas of competence: information and digital literacy, communication and cooperation, digital content creation, security, and problem solving. The digital competence framework includes the following levels: basic user, independent and professional user.

Today, the Digital Competence Framework for Citizens 2.1 is one of the latest modern European strategic documents developed by the European community of countries that create educational standards and educational technologies.

The authors and developers of the Human Digital Competence Framework have found that at the present stage of digitalization there is no clearly established the definition of human ability to use ICT. Therefore, it is proposed to operate with the concept of «digital competence», which is synonymous with «information and digital», «information-ъ and communication» and other definitions that describe a

person's ability to use ICT in life, learning and work, constantly updating it throughout the life [16].

The European Qualifications Framework of Citizens DigComp 2.1 was adapted by Ukrainian experts based on research conducted during the implementation of the international project Erasmus + «Framework structure of digital competencies for Ukrainian teachers and other citizens». On March 3, 2021, the Cabinet of Ministers of Ukraine approved the Concept of the Development of Digital Competences until 2025 and approved an action plan of its implementation. It outlines the challenges of developing digital competencies in Ukrainian society, identifies ways to overcome them and the expected results of its implementation, lays the foundation for creating a national strategy and strategic action plan of the development of digital competencies in society [4]. The approach provided by this document allows to increase the competitiveness of specialists in the labor market, to create opportunities for continuous learning.

The Digital Competences Framework of Citizens [7] was created to improve the digital competences of Ukrainians, help in creating state policy and plan educational initiatives aimed at improving digital literacy and the practical use of IT tools and services by specific target groups. This framework also contributes to a common understanding of the definition of key concepts and components of digital competence, its descriptors and skill levels. The framework of digital competencies of citizens can be considered as a standard and guide to digital competencies for citizens of Ukraine, which outline a certain amount of knowledge, skills and practical skills needed by a wide range of citizens for decent competition in Ukrainian and European labor market and comfortable use of modern digital technologies [7, p. 7].

Digital competence is a key competence in the context of the fourth industrial revolution. This term contains a certain critical and responsible use and interaction with digital technologies for education, employment, work, leisure and participation in public life [7, p. 6].

In accordance with the Concept of the new Ukrainian school, information and digital competence involves confident and at the same time critical application of information and communication technologies for creation, searching, processing, exchange of information at work, in public space and private communication; information and media literacy; Internet security skills; understanding the ethics of working with information (copyright, intellectual property, etc.) [3].

In the research of Zaporozhtseva Yu. information competence is considered as an integrative education, which reflects the ability of the individual to identify information needs, search information and effective work with it in all its forms and representations, both in traditional, printed form and in electronic form; ability to work with computer technology and multimedia technologies, skills to apply them in professional activities and everyday life [12].

The Digital Competences Framework of Citizens states that digital competence

is an integral characteristic of a person that dynamically combines knowledge, skills, abilities and attitudes towards the use of digital technologies for communication, personal development, learning, working, participation in public life, according to competences, properly (safe, creative, critical, responsible, ethical) [7, p.52].

Zaporozhtseva Yu. believes that information and digital competence involves the confident and at the same time critical application of information and communication technologies by the individual to create, search, process, exchange information at work, in public space and in private communication; level of information and media literacy; Internet security skills; understanding the ethics of working with information (copyright, intellectual property, etc.) [12].

The content of the Framework [7] includes the following areas:

– basics of computer literacy, information literacy;
– ability to work with data, create digital content;
– communication and interaction in the digital society;
– security in the digital environment;
– solving problems in the digital environment and throughout life learning.

According to I. Nikolina, implementation of the digital strategy of Ukraine's economic development requires the government reflected the regulatory, organizational and functional components of the governance mechanism, according to increase the threats caused by total digital transformation. In addition to the undoubted benefits of digitalization for society, there are a number of threats associated with it. The study [15] substantiates that the introduction of digitalization creates the preconditions for increasing the level of cybercrime.

Levels of possession of the digital competence indicate a certain minimum required set of knowledge, skills and abilities of citizens, which they must have to perform a given set of functions, depending on the helding position or the task. The framework defines the following levels: basic, avarage, high (Table 1).

Table 1 - Levels of possession of the digital competence [7]

Levels of possesion		Complexity of tasks	Autonomy of work	Cognitive domain
Basic	A1	Simple tasks	With the head	Memorization
	A2	Simple tasks	Independently, or with the head if necessary	Memorization
Average	B1	Clearly defined and standard tasks	Independently	Understanding
	B2	Tasks and clearly defined non-standard problems	Independently and according to own needs	Understanding
High	C1	Tasks and problems of different degrees of complexity	Manages the work of other users	Application and evaluation
	C2	Complex tasks with a limited range of possible solutions	Integrated contribution to the professional practice and management of other users	Evaluation and creativity

However, the standards of higher education [5, 6] provide the following requirements for the formation of digital competencies to ensure learning outcomes. The required level of digital competences that meet the requirements of the standard of higher education of Subject Area 051 Economics is defined in table 2.

Table 2 - Conformity of the level of possession of the digital competences (CC) with the standards of higher education of Subject Area **051 Economics [5, 6]**

Components of the higher education standard	**Educational degree**	**Required competence or learning outcomes**	**The level of possession of the Central Committee**
Coverage by subject area	bachelor	Tools and equipment: modern information and communication equipment, information systems and software products used in professional activities.	C1
	master		C2
General and special competencies	bachelor	SC4. Ability to explain economic and social processes and phenomena on the basis of theoretical models, analyze and meaningful interpret obtained results.	B2
		SC7. Ability to use computer technologies and data processing software to solve economic tasks, analyze information and prepare analytical reports. SC9. Ability to predict social and economic processes based on standard theoretical and econometric models.	B2
			B2
		SC10. Ability to use modern sources of economic, social, managerial, accounting information for preparing official documents and analytical reports.	B2
		SK11. Ability to substantiate economic decisions based on understanding the laws of economic systems and processes and using modern methodological tools.	C1
	master	ZK7. Skills of using information and communication technologies. ZK8. Ability to search, process and analyze information from various sources. SC4. Ability to use modern information technologies, methods and techniques of research of economic and social processes, adequate to the established needs of research. Additionally for educational and scientific programs **: SK13 **. Ability to acquire new knowledge independently, using modern educational and research technologies in the field of economics.	B2
			B2
			B2
			B2
Normative content of training, formulated in terms of	bachelor	8. Apply appropriate economic and mathematical methods and models to solve economic problems. 19. Use information and communication technologies to solve social and economic problems, prepare and present analytical reports.	B2
			B2

learning outcomes	master	8. Collect, process and analyze statistical data, scientific and analytical materials needed to solve complex economic problems.	C1
		9. Make effective decisions under uncertain conditions and requirements that need the application of new approaches, methods and tools of social and economic research.	C2
		10. Apply modern information technologies and specialized program software in social and economic research and management of social and economic systems.	C2
		Additionally for educational and professional programs *: 15. Organize the development and implementation of social and economic projects considering information, methodological, material, financial and personnel support.	C2
		Additionally for educational and scientific programs **: 16. Plan and perform scientific and / or applied research, make reasonable conclusions based on research results, present results, argue your opinion.	C2
		17. Carry out teaching activities in higher education institutions, develop teaching materials.	C2
		18. Use modern educational and research technologies in the field of economics.	C2

2.2. The role of mathematical disciplines in the process of forming the digital competence of future economists

The formation of the digital economy requires new approaches to the organization of the educational process in economic higher educational institution. The relevance of the implementation of modern digital technologies in higher education institutions is reflected in the works of both national and foreign scientists. Particularly, Shevchenko L. substantiates the necessity of using digital tools in the university educational process, the transition to new digital models of studying, Areshonkov V., Buinytska O. define a number of tasks for public administration bodies, collectives and administrations of universities, the implementation of which will contribute to the processes of digitalization of national university education, M. Aliushyn, L. Kolobashkina, A. Burgieiev considered the possibility of using digital technologies in assessing the level of knowledge, actions and skills. I. Laptieva and O. Pakhmutova, considering the feasibility of integrating digital technologies in the studying process in higher education, believes that this is largely due to the fact that the reduction of classroom hours entails an increase the amount of individual work of students. V. Nabiieva, O. Pozdniakova is convinced that the combination of traditional lectures with online lectures can increase the availability of

material, the convenience of its study, the ability to reach more students. Despite the presence of significant scientific achievements in the field of information technology in education, the concept of «digitization» in the context of teaching mathematical disciplines has not yet received a stable definition – first of all it is related to complexity of the researched phenomenon and the variety of positions of authors, who have studied it.

The new reality of today fully reflects the digitalization of all spheres of modern society, making available any information for professional activities, recreation, education. Digitalization of the economy provides effective two-way interaction of the state, society, business, person with the help of digital technologies in the presence of all participants of the communication appropriate digital competencies [15, p. 191]. It may be said confidently that in modern conditions, in connection with the process of mathematization of science and practice, future professionals in various fields need serious mathematical training, which, in turn, determines the place of mathematical disciplines in the system of education. Related sciences use different amounts of mathematical knowledge and set new challenges to the content, forms and methods of studying this range of disciplines, which contributes the formation of students' modern style of scientific thinking and its application in specific sciences.

Traditional learning simplifies students' ability to internalize mathematical disciplines and is prevented their understanding of the structure and function of the course, by making students passive recipients of the knowledge. In this way it is difficult to achieve the educational goal.

An important role is played the use of modern information and communication technologies in the mathematical training of economic professionals, since without deep knowledge of the disciplines of this range the professional competence in this area is extremely difficult to achieve. Therefore, the question of how to provide the educational process with appropriate information tools and training programs acquires special significance so that the higher education institution, lecturer and lecturer training system meets modern challenges, provides support in the sphere of digital technology, develops and forms the relationship with modern mathematical and digital competencies.

The choice of certain traditional and computer-oriented methodological approaches for a particular classes of mathematical disciplines is also related with the necessity to develop some universal skills that meet the key competencies of future economists, among which firstly can be distinguished: communicative (skills work with educational information presented in various forms); analytical (components of analytical anf synthetic activity on cognitive information processing); graphic (ability to work with information presented in graphical form) [26, p. 50].

Let us consider the practice of using digital technologies and effectiveness of the implementation of digitalization in the process of studying mathematical disciplines

on the example of Vinnytsia Institute of Trade and Economics of SUTE.

Currently, the educational process it is used the system of e- and distance studying Moodle, where most of the theoretical knowledge students independently receive from lecture courses, tasks for individual work of students, consisting of methodical recommendations and involve passing intermediate and final online tests through a mobile device

The key task at this stage of digitalization of the education is to achieve the maximum possible effectiveness of studying mathematical disciplines not only in terms of content, but also in terms of teaching methods.

In the process of digital transformation of higher education, the main thing is not only the availability of computer technology in different versions of its implementation (personal computers, tablets, smartphones, etc.) and high-speed Internet, but also the ability of lecturers and students to use new digital tools, information sources and services in the studying process. Ii is needed appropriate to time digital educational environment for the implementation of educational and cognitive activities of students and a high level of information competence of both students and lecturers. The difficulty in organizing and implementing the studying process is that some students and lecturers may have different access to digital devices, resources and services both at the institute and at home, the so-called «technological digital gap». However, no less serious can be the «new digital gap» - inequality in the ability of students to use digital technologies in educational and cognitive, pedagogical (educational, scientific, methodological) activities.

One of the means of overcoming the digital barrier is modern educational technologies, which allow to form digital competence - the ability to apply digital technologies in various spheres of life, including in the educational process of higher education. Decreasing the digital barrier is also facilitated by increasing the digital competence of lecturers, wider use of distance studying technologies, mass open online courses, mediatization and gamification of the education [27].

In order to introduce digitalization in the educational process, lecturers of the mathematical cycle are faced with the following tasks: passing full-time training courses to improve digital literacy (possible variation in the form of online studying); effective use of the electronic system in education on the basis of a permanent process of improving their own knowledge and skills; development of the system of open online courses for lecturers along with theoretical lectures in order to increase the temporary period of practical and project activities of the students.

Conclusions

1. Important for modern educational reforms is the task of ensuring standards of higher education in economics based on the requirements of DigiComp 2.1 and the national Qualifications Framework of digital competence of citizens. The development and formation of digital competencies of economic professionals should be carried out in the following areas: information management skills; responsible participation in online communities and interaction with other users on the Internet; communication, considering confidentiality, security and network etiquette; creation of content and knowledge through the use of ICT, which are distributed through the Internet; proper ethical behavior on the Internet; assessment and problem solving; technical operation of safe and appropriate use of ICT in professional and educational activities.

2. As a result of the analysis of features of digital technologies and process of digitalization of educational process on the basis of practical realizations, it is possible to conclude that digital technologies make process of studying mathematical disciplines mobile, differentiated and individual. At the same time, they do not replace the lecturer, but harmoniously complement his/her activities. Classes based on the use of digital technologies are inherent adaptability, controllability, interactivity, a combination of individual and group work, as well as temporary unlimited studying. In addition, digital technologies provide a number of new opportunities for both lecturers and students, including: enjoying the exciting process of communication and cognition; automation of mostly teaching work, which frees up time for searching, communication, self-improvement, individual work with students; providing feedback; correction of individual development of future specialists; improving the efficiency of educational process management. Formation and development of digital competencies of students, improving the professionalism of lecturers in the sphere of application of digital technologies during studying mathematical disciplines - necessary conditions for successful training of highly competent bachelors and professionals for life and professional activity in the information society. Areas of further researches include determining the principles of digitization of mathematical disciplines and specifying the conditions necessary for their implementation in higher education institution.