Punkty Informacji Europejskiej w Ostrołęce
Europe Direct

Publikacja wydana ze wsparciem
finansowym
Komisji Europejskiej w ramach projektu
Europe Direct

Galyna Gorshkova
Khortytsia National Academy

RESEARCH OF THE STATE OF DIGITAL COMPETENCE OF TEACHERS OF HIGHER EDUCATION INSTITUTIONS IN THE CONDITIONS OF POST-COVID-19 EDUCATIONAL SPACE

Introduction

The 21st century is recognized as a time of global revolution that changed the way people live, think, communicate, understand welfare. In addition to this, it has changed the vision of the future. Due to the constant development of technology, the emergence of new inventions, there are new opportunities for the formation of new and enhancing existing competencies. If a modern person remains with the knowledge received at school or university a few years ago, it will be difficult for this individual to live in modern society, for which an important condition is rapid adaptation to new information [1]. Although, in many countries, there is a system of continuing education for professional development, in today's world this is not enough. The world's leading countries are changing the education system, adhering to the concept of lifelong learning with the following elements: the ability to learn at any age, obtaining maximum skills, formal and non-formal education. According to scientists, if you keep the brain in shape, train it, a person remains young [4]. Such a person has the following qualities: effective thinking, good memory, attentiveness, clarity of mind, quick problem solving. It should be noted that lifelong learning has the effect of increasing professional competence, which contributes to professional development and career growth [1]. 2020 has forever changed the lives of people on our planet. The global Covid-19 pandemic has forced people to reconsider their way of life in general, as a consequence the educational process in higher education institutions was adapted – distance learning. Digital competence is the key to the efficiency and effectiveness of the professional activity of a teacher of a higher education institution in the new conditions. In this regard, the study of the state of digital competence of teachers of higher education institutions in the period: the beginning of 2019-2020 academic year – the end of 2020-2021 academic year is relevant, to solve a difficult task - reproduce the educational process during quarantine.

Purpose, subject and research methods

The aim of the article is to carry out a comparative analysis of the results obtained during the survey in the period: beginning of 2019-2020 academic year – end of 2020-2021 academic year. This is done to investigate the state of digital competence of teachers of higher education institutions in connection with the introduction of distance learning as the only possible in the post-COVID-19 educational space. The subject of the research is the digital competence of teachers of higher education institutions. Research methods: comparison, analysis and synthesis, generalization of the obtained data.

The processes of globalization have covered all spheres of society and led to the emergence of the concept of «educational space» among the professional terms of the education system. Educational space, as a subject of scientific research, is in the center of attention of domestic and foreign scientists: N. Bastun, O. Veryaev, S. Bondireva, S. Gershunsky, B. Elkonin, N. Rybka, O. Leonova, V. Ginetsinsky, A. Samodrin, T. Tkach, V. Slobodchikov, I. Frumin, I. Shendryk, I. Shalayev, G. Shchevelyova, T. Chernetskaya, etc. Scholars consider the educational space in two aspects: institutional (as a certain part of society, where the conditions for personal development are created) and substantial / individual (as the possibility and presence of the formation of personal space of the subject of the educational process). In the context of our study, we agree with A. Tsymbalaru, which has pointed that «the educational space is a pedagogical reality, containing a meeting, interaction, understanding and cognition of the individual (event) of the surrounding elements-carriers of culture (educational environment), progressive development of objects (participants and objects)» [6].

Thus, the post-COVID-19 educational space is an educational space in which the interaction of its participants takes place under conditions of quarantine restrictions during distance learning, as it is the only possible form, through digital services, programs, platforms, etc., for which teachers of higher education institutions must have a certain level of digital competence.

M. Cherepaniak-Walczak considers competence to be a harmonious composition of knowledge, efficiency, understanding and desire [3]. In the Law of Ukraine «On Education», competence is defined as «a dynamic combination of knowledge, skills, practical skills, ways of thinking, professional, ideological and social qualities, moral and ethical values» [1, s. I, p. 1, p. 13] of the specialist who needs to be fed constantly during a life in view of social and economic, technological and sociocultural changes. This is what the state policy of Ukraine concerning continuing education, which is covered in the National Doctrine of Education Development of Ukraine in the XXI century [5]. Modern approaches concerning the problem of competence are covered in the scientific works of N. Volkova, O. Gura, N. Kuzmina, O. Pometun and others. Analysis of scientific and pedagogical literature on the concept of «competence» shows that competence, as a dynamic stereotype of combinations, needs constant

development and improvement taking into account the characteristics of the individual as a carrier of competence: motives, psychophysiological features, self-concept, knowledge, skills, and its main basic characteristics and socio-cultural conditions in which this person lives. According to I. Taranenko, in the education of «a competent employee who not only has the necessary knowledge, professionalism, but also knows how to act adequately in relevant situations, applying this knowledge and takes responsibility for certain activities» is the essence of professional competence [8].

In the Framework Program of updated key competences for lifelong learning, digital competence appears to be one of the key competences for lifelong learning. The document defines digital competence as «a complex phenomenon that characterizes the ability of an individual to act in the information society» [2]. Digital competence is a strategic tool, which is enshrined in the definitions used in government documents and research [6]. According to scientists, digital competence is «confident, critical and responsible use and interaction with digital technologies for learning, professional activities (work) and participation in society» [1].

The formation of digital competence in education has been widely discussed and studied by the international community of scientists. I. P. Vorotnikov notes that a group of scholars analyzed the work of scientists on the topic of digital literacy and competence and presented the dynamics of the number of scientific publications on this topic [4, 5] (Figure 1).
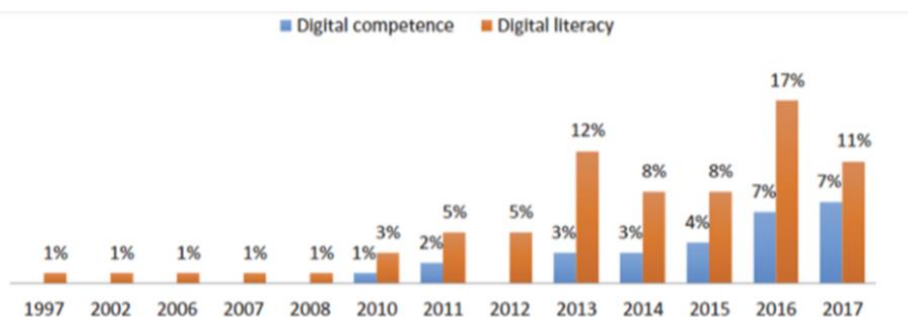

Figure 1. Screenshot of the data on the number of scientific articles devoted to the study of the formation of digital competence and digital literacy during 1997-2017
Source: Vorotnykova I. P. Conditions for forming the teacher's digital competency in the postgraduate education. Open educational e-environment of modern University. 2019. № 6. p. 103

Todays` digital competence, compared to the last decade, acquires a social burden, manifests through the focus on effective activities in the information society, personal attitude to these activities, based on a sense of responsibility, the ability and willingness of the individual to confidently, effectively, critically and safely choose and apply information and communication technologies. Digital competence has a certain structure, which consists of information and communication (updating knowledge, use of digital tools and technologies for cooperation with other subjects of communication, etc.) component, motivational (system of motives) component and responsibility component (conscious control of results). Scientists have determined the conditions for the formation of digital competence – digitalization of education and the availability of the necessary legal documents, the readiness of the higher education system to ensure the formation of digital competence of teachers, developed IT-infrastructure of higher education, teacher motivation for professional development.

We should emphasize that in most higher education institutions of Ukraine these conditions has been created before the beginning of 2019-2020 academic year. However, the educational process usually took place traditionally: classes were held in classrooms with the technical means, with which the rooms are equipped; class presentations were usually created in Microsoft PowerPoint Presentation; used some Internet resources, etc .; attracted a small amount of digital programs, services, platforms. Even if a higher education institution has a learning platform (for example, Moodle), teachers did not always use it in their professional activities. The reason is that it required additional training, time and energy from the teacher. With the introduction of distance learning during the quarantine period, as the only opportunity to restore the educational process, teachers of higher education institutions faced the question of mastering digital programs, services, platforms in a short time. The tools for raising the level of digital competence were: the Moodle platform of higher education institutions; Zoom and Microsoft Teams programs; Google cloud services multimedia and educational Internet services Learning Apps, learnis, Padlet, miro, Canva, etc .; Microsoft applications, services, programs: Sway, Flipgrid, etc .; programs for creating mental maps FreeMind, Xmind, MindMeister, BubblUs, etc .; messengers Viber, WhatsApp, Telegram, etc. Computers, laptops, tablets, smartphones, Wi-Fi routers, etc., and the Internet itself have become necessary equipment to increase digital competence. With the introduction of distance learning during the quarantine period, teachers faced the following problem: the lack of some of the teachers of some of this equipment and the need to buy and master it in a short time. But all the difficulties were successfully overcome, as evidenced by the fact that the educational process in higher education took place in full and the result of the winter and summer sessions of 2020-2021 academic year.

Research results

We conducted a research of the state of digital competence of teachers of higher education institutions in the post-COVID-19 educational space. To this end, we interviewed 24 teachers of various specialties (special education, primary education, social work, physical education and sports, design, medical professionals, etc.) Khortyts`ka National Academy, Zaporizhzhia National University, participants of international internships at the University of Agribusiness in Lomza (Poland), who are representatives of the Cherkasy Medical Academy of Postgraduate Education, Zhytomyr National University, etc.

Teachers increased their digital competence through self-education on the Internet, through textbooks or from people around them (children, colleagues, etc.); in higher education institutions where teachers work or study, where certain training courses, seminars or trainings have taken place; at special courses, seminars, webinars, trainings (Universal education, Google applications in educational activities, International Foundation for Scientists and Educators, etc.); during an international internship.

From the obtained data, we can conclude that by the end of 2020-2021 academic year the percentage of teachers who increased their digital competence decreased by 40%. However, in educational institutions where teachers work or study, it increased by 14%. The number of teachers who attended special courses, seminars, trainings, webinars also increased by 22%. In addition, the level of digital competence was increased during the international internship by 8% of teachers, which was not the case at the beginning of 2019-2020 academic year. The percentage of teachers who did not increase their digital competence decreased by 4% (Figure 2).
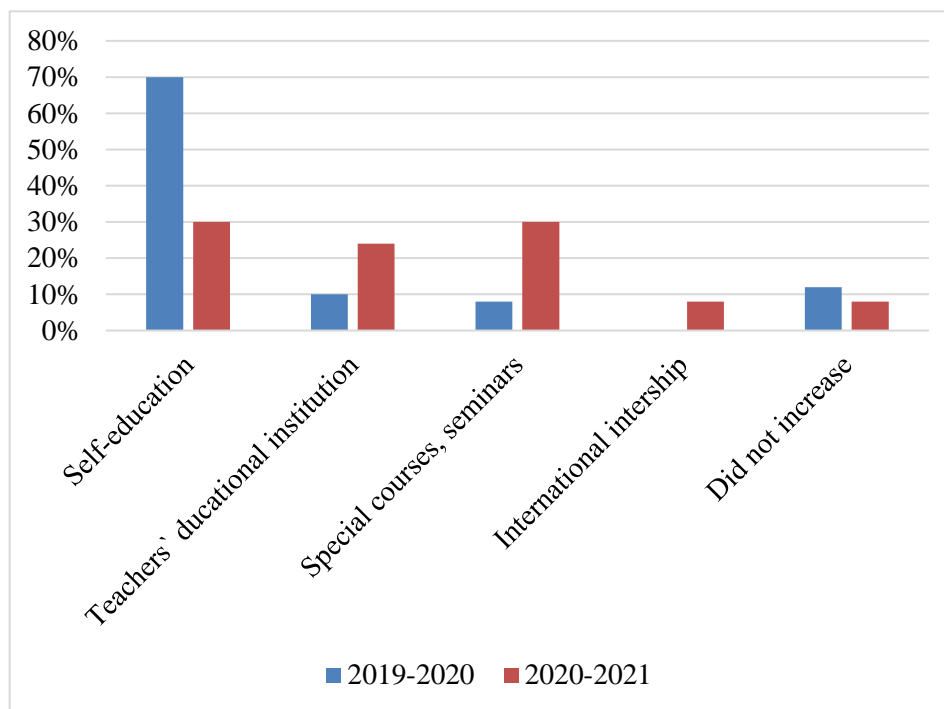
Figure 2. Comparative analysis of how to increase the level of digital competence of teachers of higher education institutions at the beginning of 2019-2020 academic year – end of 2020-2021 academic year
Source: research of the author of the article through a survey of teachers of Khortytsia National Academy, Zaporizhzhia National University, participants of the internship at the University Higher School of Agribusiness in Lomza 10.05.-18.06.2021

To communicate with students and colleagues in the educational process, teachers of higher education institutions used messengers Viber, WhatsApp, Telegram, etc. At the end of 2020-2021 academic year Whatsapp usage increased by 16%, Telegram by 25%, others by 15%, Viber remained at 96%, growth did not occur, and «did not use» decreased by 4%. (Figure 3).

Figure 3. Comparative analysis of the use of messengers Viber, WhatsApp, Telegram by teachers of higher education institutions at the beginning of 2019-2020 academic year – end of 2020-2021 academic year
Source: research of the author of the article through a survey of teachers of Khortytsia National Academy, Zaporizhzhia National University, participants of the internship at the University Higher School of Agribusiness in Lomza 10.05.-18.06.2021

According to the answers of teachers, it can be stated that not all of them correctly understand the terms «service», «program», «platform», which are important for further improving the digital competence of respondents. Such services and programs as Canva, Sway, miro, learnis, Learning Apps were not used by teachers at all in their professional activities, and G suite, ArchiCAD, Loom, Descord were isolated cases (Figure 4).
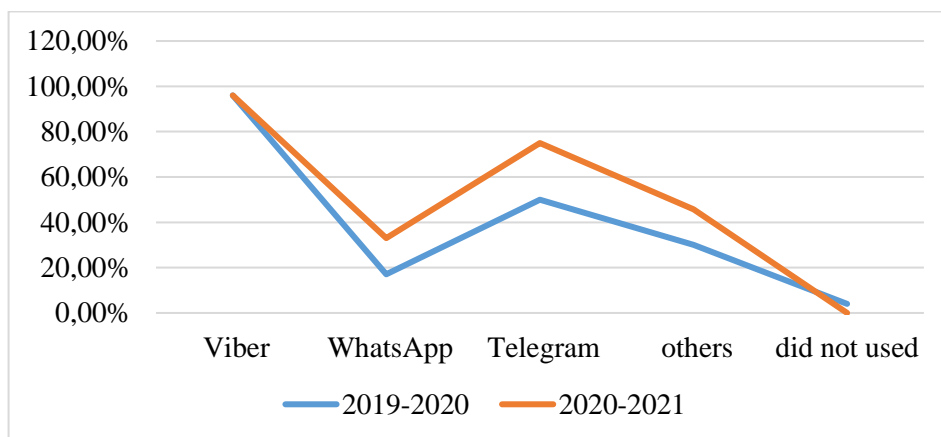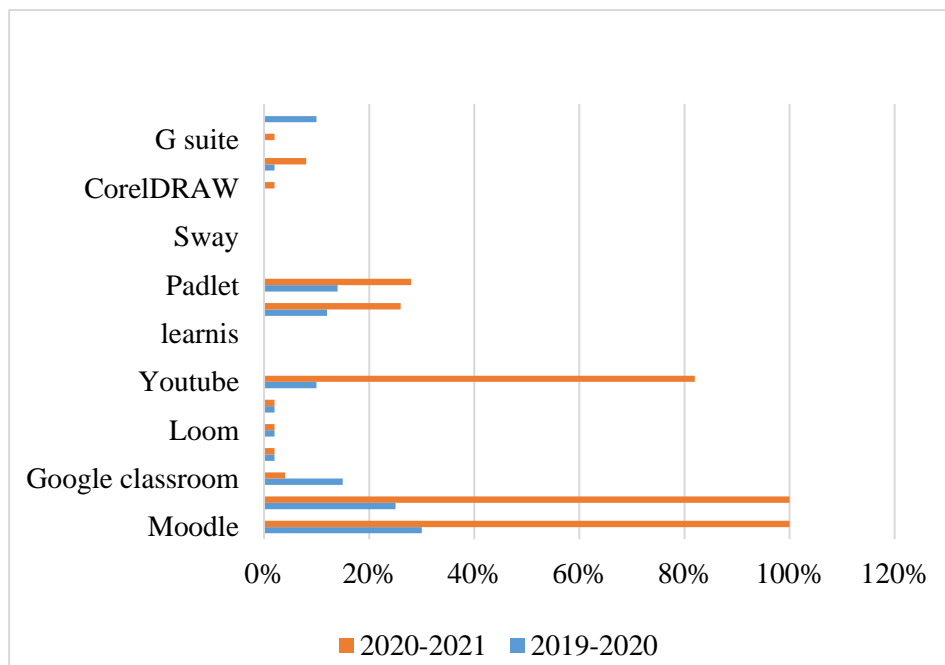
Figure 4. Comparative analysis of the use of services, programs, platforms by teachers of higher education institutions at the beginning of 2019-2020 academic year – end of 2020-2021 academic year in professional activities
Source: research of the author of the article through a survey of teachers of Khortytsia National Academy, Zaporizhzhia National University, participants of the internship at the University Higher School of Agribusiness in Lomza 10.05.-18.06.2021

The apply of Google's cloud service with applications appears to be an effective and efficient means of saving teachers' time, their personal and natural resources, motivating teachers and students, optimizing the educational process. We investigated the level of professional use of Google cloud applications by teachers. It can be pointed that at the end of 2020-2021 academic year the level of use increased: Classroom – by 30%, Classtime – by 4%, Google-form – by 30%, Google-document – remained at the same level, Google-keer – by 4%, Google-picture – by 8%, Google-presentation – by 8%, other applications – by 12%, and the level of non-use of applications decreased by 17% (Figure 5).
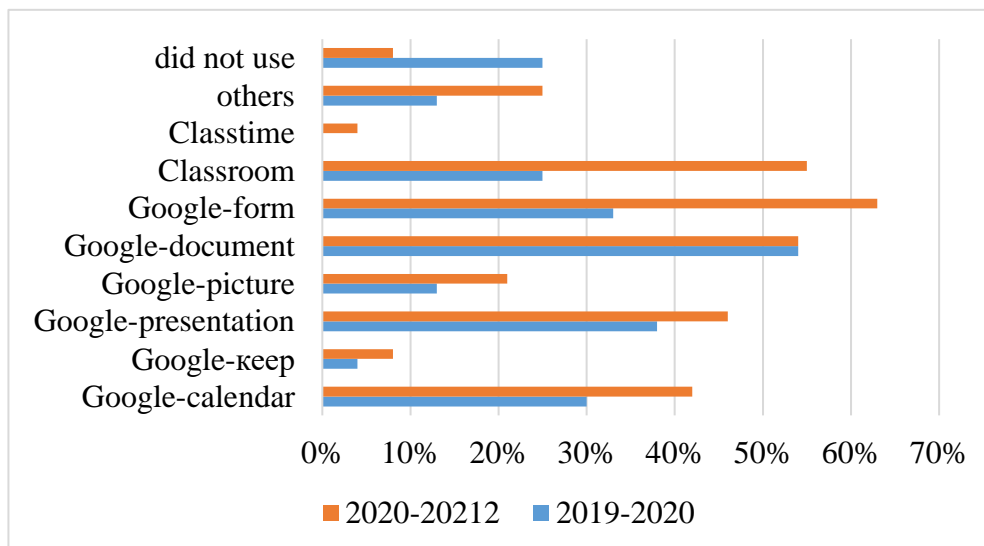
Figure 5. Comparative analysis of the use of higher education applications of Google cloud service by teachers of higher education institutions in professional activities at the beginning of 2019-2020 academic year –end of 2020-2021 academic year
Source: research of the author of the article through a survey of teachers of Khortytsia National Academy, Zaporizhzhia National University, participants of the internship at the University Higher School of Agribusiness in Lomza 10.05.-18.06.2021

During the quarantine, teachers and students were able to conduct classes in the format of visual communication programs, platforms, services Zoom, Moodle, Skype, Microsoft Teams, Viber, Whatsapp and more. The level of their use during professional activity at the end of 2020-2021 academic year increased: Zoom – by 42%, Moodle – by 29%, Skype – 5%, Microsoft Teams – by 17%, Whatsapp – by 4%, others – by 17%, Viber decreased by 8%, category «did not use» – by 13 % and was 0%, which means that such respondents are absent (Figure 6).

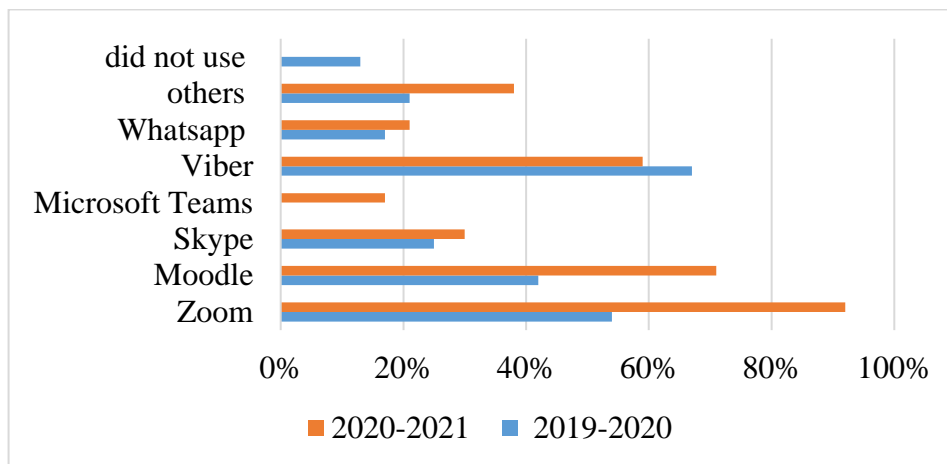**Figure 6. Comparative analysis of the use by teachers of higher education institutions of programs, platforms, services for visual communication with students in professional activities at the beginning of 2019-2020 academic year – end of 2020-2021 academic year**
Source: research of the author of the article through a survey of teachers of Khortytsia National Academy, Zaporizhzhia National University, participants of the internship at the University Higher School of Agribusiness in Lomza 10.05.-18.06.2021

Mental maps appear to be a tool for optimizing the educational process. They are created using FreeMind, XMind, MindMeister, BubblUs, Mind42, Mind map, etc. From the answers of teachers it can be concluded that they are not familiar with the term "mental map", do not know about these programs and do not know how to create them.

For effective professional activity, teachers need to create presentations. We researched what services, programs, etc. they use for this. According to the survey, it can be concluded that at the end of 2020-2021 academic year the arsenal of tools for creating presentations has been significantly expanded. Thus, the level of use of Google-presentation increased by 21%, Canva – by 13%, Sway – by 4%, Microsoft PowerPoint – by 4, others – 4%, and the level of did not use decreased by 5%. (Figure 7).
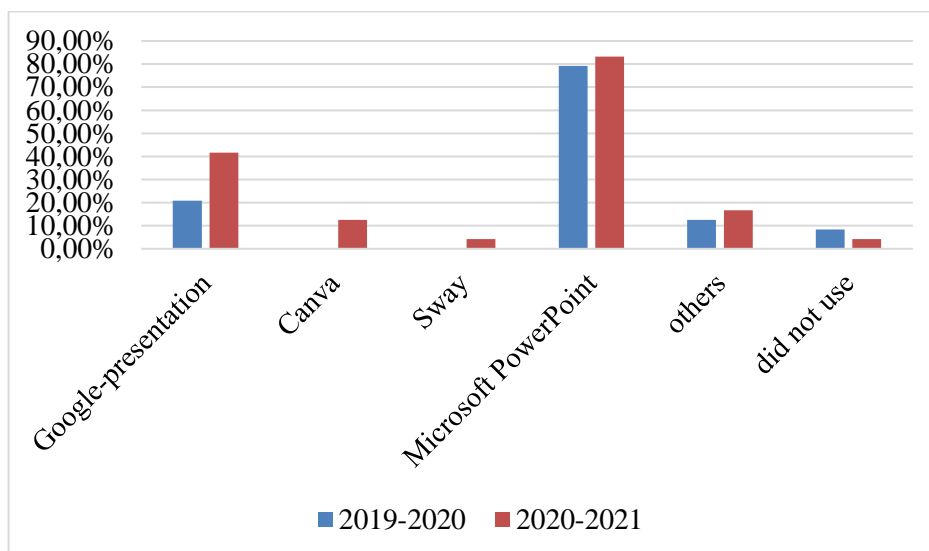
Figure 7. Comparative analysis of the use of higher education services by teachers, programs for creating presentations for use in professional activities at the beginning of 2019-2020 academic year – end of 2020-2021 academic year
Source: research of the author of the article through a survey of teachers of Khortytsia National Academy, Zaporizhia National University, participants of the internship at the University Higher School of Agribusiness in Lomza 10.05.-18.06.2021

Comparative results of the level of Digital competence and the ability to use Moodle, Zoom, Microsoft Teams, Messengers in professional activities at the beginning of 2019-2020 academic year - end of 2020-2021 academic year are given in Table 1. During the survey of respondents it was found that the level of maximum inability to use the Zoom program at the end of 2020-2021 academic year decreased by 33.3% and maximum skill increased by 29.3%. The level of maximum inability to use the Microsoft Teams program at the end of 2020-2021 academic year decreased by 25% and maximum skill increased by 4.2%. The level of inability to use the Moodle platform at the end of 2020-2021 academic year decreased by 20.8% and maximum skill increased by 4.2%. The level of maximum ability to use a variety of Messengers increased by 4.2%. The level of Digital competence according to the maximum indicators at the end of 2020-2021 academic year increased by 4.2%.

Table 1. Comparative analysis of the level of Digital competence and the ability of teachers of higher education institutions to use Moodle, Zoom, Microsoft Teams, Messengers in professional activities at the beginning of 2019-2020 academic year – end of 2020-2021 academic year

Level of usage skills, where 0 – do not have 10 – have	The results for the beginning of 2019-2020 academic year – end of 2020-2021 academic year, are given in %									
	Digital competence		Moodle		Zoom		Microsoft Teams		Messengers	
	2019-2020	2020-2021	2019-2020	2020-2021	2019-2020	2020-2021	2019-2020	2020-2021	2019-2020	2020-2021
0	0	**0**	0	**0**	33,3	**0**	0	**0**	0	**0**
1	4,2	**0**	25	**4,2**	8,3	**0**	66,7	**41,7**	4,2	**0**
2	4,2	**0**	0	**0**	8,3	**0**	8,3	**4,2**	4,2	**0**
3	4,2	**0**	4,2	**0**	4,2	**0**	4,2	**0**	4,2	**0**
4	8,3	**0**	12,5	**0**	4,2	**0**	4,2	**8,3**	4,2	**0**
5	25	**4,2**	12,5	**0**	4,2	**4,2**	16,7	**16,7**	12,5	**4,2**
6	20,8	**20,8**	4,2	**4,2**	4,2	**0**	0	**4,2**	8,3	**4,2**
7	8,3	**16,7**	8,3	**8,3**	4,2	**20,8**	0	**4,2**	8,3	**12,5**
8	4,2	**25**	8,3	**20,8**	8,3	**16,7**	0	**16,7**	0	**16,7**
9	4,2	**12,5**	12,5	**45,8**	16,7	**25**	0	**0**	16,7	**20,8**
10	16,7	**20,8**	12,5	**16,7**	4,2	**33,3**	0	**4,2**	37,5	**41,7**

Source: research of the author of the article through a survey of teachers of Khortytsia National Academy, Zaporizhzhia National University, participants of the internship at the University Higher School of Agribusiness in Lomza 10.05.-18.06.2021

Conclusions

According to the results of a survey of teachers of educational institutions, it can be stated that distance learning is the only one possible during quarantine. In general, there is a positive attitude to distance learning as a progressive and modern. Its advantages are defined: increasing the level of digital competence of the teacher, increasing the quality of his knowledge and skills; convenience and mobility; knowledge of the new; promoting the formation of the ability to express their opinions during communication with the teacher; improving the ability to work independently, the formation of self-discipline in the student: saving the time of the teacher, whose presence in the classroom is not required; no need to publish methodical materials for classes; high mobility; learning in a comfortable environment. A number of problems have also been identified, the main one is the lack of a centralized increase in the level of digital competence of teachers; spending time searching for verified sources for self-study; inadequate provision of gadgets for professional activity and quality of content of disciplines; lack of personal contact with students, which makes it impossible for the teacher to react immediately to changes in the atmosphere in the classroom; almost complete lack of communication both in the study group between students and between the student and the teacher; inability to control the independent performance of tasks by students because there is an opportunity to «write off» in others; difficulties in maintaining high motivation of students to study; dependence on external circumstances (power outage, internet connection, malfunction of technical means); difficulties in developing practical skills; the need to adapt educational material to distance learning; increase the amount of time spent on the gadget and the load on teachers and students, the number of reports; a sharp decline in the quality of knowledge and skills of some students, due to the unwillingness of students to distance learning. It is also suggested that distance learning is an ancillary, forced replacement of classroom learning, but not the main form that should be used as a blended learning. The survey shows that in the educational process of design students, medical students and physical education the introduction of distance learning with an arsenal of its digital technologies is a forced ineffective measure during quarantine, and in the educational process of specialties in special pedagogy and psychology, primary education quite successful and productive.

Consequently, in our opinion, increasing the level of digital competence would contribute to the development of distance learning and reduce the shortcomings in its application.

Therefore, having carried out comparative analysis of the state of digital competence of teachers of different specialties of higher education institutions in the period: beginning of 2019-2020 academic year – end of 2020-2021 academic year, we investigated the state of their digital competence in connection with the introduction of distance learning form in the conditions of post-COVID-19

educational space. We came to the conclusion that teachers of various specialties of higher education institutions have significantly increased their digital competence in the post-COVID-19 educational space, which allowed the educational process to take place in full during the period under study. A summary of teachers' opinions on the introduction of distance learning in higher education institutions in a post-COVID-19 educational space is shown in Figure 8.
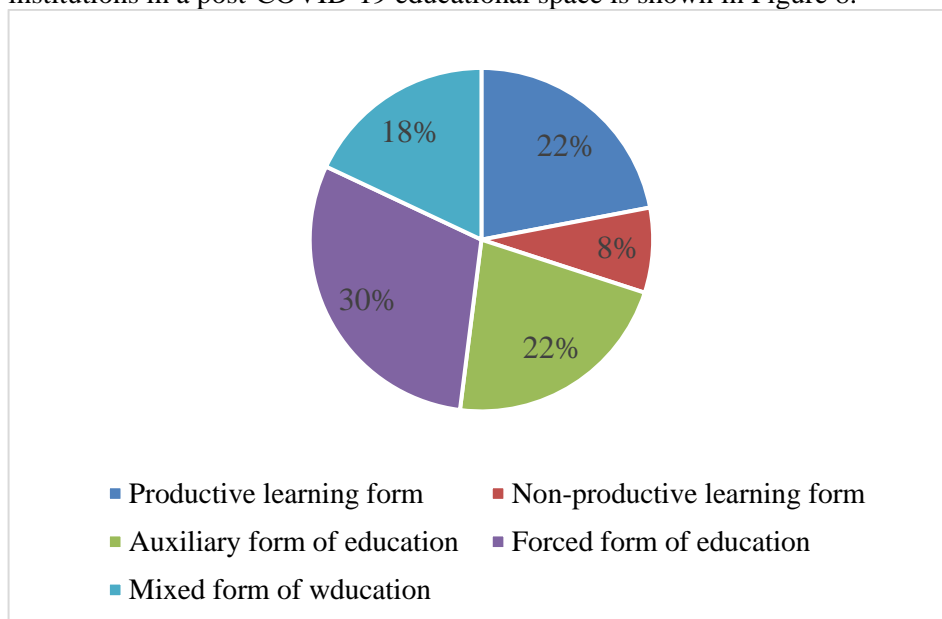

Figure 8. The results of a survey of teachers of higher education institutions regarding their attitude to the effectiveness of the introduction of distance learning in the educational process in a post-study educational space
Source: research of the author of the article through a survey of teachers of Khortytsia National Academy, Zaporizhzhia National University, participants of the internship at the University Higher School of Agribusiness in Lomza 10.05.-18.06.2021

The problem of increasing the digital competence of teachers of higher education institutions in the context of post-COVID-19 educational space contains many unresolved issues and requires further research.

References
1. Multimedia training course «Education based on life skills». URL: http://dlse.multycourse.com.ua/ua/basic/14 (date of application: 21.05.2021). {Мультимедійний навчальний курс «Освіта на основі життєвих навичок». URL : http://dlse.multycourse.com.ua/ua/basic/14 (дата звернення : 21.05.2021)}.

2.	Proposal for a COUNCIL RECOMMENDATION on Key Competences for Lifelong Learning. URL : https://eur-lex.europa.eu/resource.html?uri=cellar:395443f6-fb6d-11e7-b8f5-01aa75ed71a1.0001.02/DOC_1&format=PDF (date of application : 07.06.2021).

3.	Cherepaniak-Valchak M., *Competence: it`s a keyword or Locksmith in Education?* Poznan: Scientific Publishing House of Adam Mickiewicz University, 1999, P. 88. {Черепаниак-Вальчак М. Компетенция: ключевое слово или слесарь в образовании? Познань: Научное издательство Университета Адама Мицкевича, 1999. С. 88.}

4.	Vorotnikova I. P., *Conditions for the formation of digital competence of teachers in postgraduate education.* Open educational e-environment of modern University. 2019. № 6. P. 101-118. {Воротникова I. П. Умови формування цифрової компетентності вчителя у післядипломній освіті. Open educational e-environment of modern University. 2019. № 6. C. 101-118.}

5.	*Fundamentals of standardization of information and communication competencies in the education system of Ukraine: method, recommendations / for general ed.* V. Yu. Bykova, O. M Spirina, O. V. Ovcharuk. Kiev: Attica, 2010. 88 p. {Основи стандартизації інформаційно-комунікаційних компетентностей в системі освіти Ураїни : метод. рекомендації / за заг. ред. В. Ю. Бикова, О. М. Спіріна, О. В. Овчарук. Київ : Атіка, 2010. 88 с.}

6.	Tsymbalaru A.D., *Educational space: the essence, structure and mechanisms of creation.* Ukrainian pedagogical journal. [Osvitniy prostir: sutnist′, struktura i mekhanizmy stvorennya. Ukrayins′kyy pedahohichnyy zhurnal]. 2016. № 1. P. 41-50. {Цимбалару А. Д. Освітній простір: сутність, структура і механізми створення. Український педагогічний журнал. 2016. № 1. C. 41-50.}

Abstract

The article examines the state of digital competence of teachers of higher education institutions in the conditions of post-COVID-19 educational space in the period from the beginning 2019-2020 academic year till the end of 2020-2021 academic year. The concepts of «educational space», «competence», «digital competence» are clarified and the concept of «post-COVID-19 educational space» is revealed. The structure of digital competence, conditions of its formation, tools and equipment for its increase are determined. A comparative analysis of the results of a survey of teachers of educational institutions proved to increase the level of their digital competence in the specified period in the post-COVID-19 educational space, which allowed the educational process to take place in full under quarantine.

Keywords: teacher of higher education institution, distance learning, competence, post-COVID-19 educational space, digital competence.