

# UNIVERSITY AND INSTITUTIONAL SCIENTIFIC RESEARCH



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## FORMATION OF DIGITAL COMPETENCE IN STUDENTS OF PEDAGOGICAL INSTITUTIONS OF HIGHER EDUCATION IN UKRAINE IN THE POST-COVID SPACE

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**Abstract.** The article considers the digital competence of students and the impact of post-COVID on the process of its formation. The latest works of scientists on the proposed problem on the determining the digital competence of the future specialists in preschool and primary education have been analyzed. The concept of “digital competence” has been specified, its components specific to students of pedagogical institutions have been described. The state of formation of digital competence of the students of higher education institutions has been characterized. It is suggested that the students in the sphere of knowledge 01 – “Education/Pedagogy” should develop unique digital competencies that can qualitatively influence the planning and organization of the educational process with children of preschool and primary school age. In the course of the research the general and professional digital competencies of the future educators of preschool education institutions and primary school teachers have been determined. The article analyzes the results of self-testing of students majoring in 012 Preschool Education and 013 Primary Education. The results of the research provide a basis for a more in-depth study of the impact of post-COVID on the attitude of the students of the level of higher education “Bachelor” to information and communication technologies, what digital competencies they have and what digital security rules they use in the educational process. The results of the research can be used in the development of strategies for the formation of digital competence of students of other higher education institutions.

**Keywords:** post-COVID, digital competence, students of pedagogical specialties.

**Topicality.** The development of digital technologies has created conditions for unhindered and variable access to information. Data from global statistics for 2021 show that over the past ten years the quality of the Internet connection has improved significantly, the number of the Internet users has increased by 2.5 times, and there has been not only an increase but also a qualitative diversification of social media content, people aged 16 to 24 years are the most active users in the Internet space [1].

Digital competence is a basic component of the skill of the specialist of the XXI century. EU governments are increasingly paying attention

to the level of digital competence of citizens as an important factor in professional growth of the personality and a prerequisite for successful learning. European society's trends towards digitalization produce new priorities in the training of a specialist competitive in the labor market. The use of various digital learning tools is a new technological trend that affects all areas of human activity.

The scientific and educational society of the countries of the European Union is actively implementing the digital transformation in the sphere of education. Thus, European research centers and institutes have created the joint project Learning and Skills for the Digital Era, which provides for the definition of indicators of digital competence of modern person and the development of relevant recommendations [2]. EU countries have also developed a digital competence framework for citizens, pedagogues and educational organizations (DigComp) [3]. The DigComp framework is constantly being refined and improved and serves as a basis for the implementation of European strategic objectives.

**The purpose of the article:** to determine the state of formation of digital competence of the first-year students of pedagogical specialties in the conditions of COVID-19 pandemic.

The need for the formation of digital competence of students of pedagogical institutions of higher education is mentioned in many state regulations: the Law of Ukraine "On Higher Education" (2019); the Concept of Development of Digital Competencies in the Society of Ukraine (2020). An important component of modern digital change in Ukraine is the digitalization of the education system. In 2021, the Ministry of Digital Transformation of Ukraine described the framework of digital competence for the citizens of Ukraine, which was adapted by Ukrainian experts based on the results of research under the aegis of the dComFra project. The European conceptual and reference model of digital competencies for citizens DigComp 2.1 was taken as a basis. [4].

The concept of digital competence is actively discussed in studies of the Internet space (O. Boinytska A. Ferrari, J. Janssen, Y. Punie, E. Lopez-Meneses, J. Ramírez-Hurtado N. Selvin, F. Sirignano, S. Stoyanov, E. Vázquez-Cano et al.). The European Parliament defines digital competence as the confident, critical and responsible use of digital technologies for realization of educational, professional, training and other tasks [2]. In scientific sources, both national and foreign, the essence of the concept of digital competence is covered in various ways. Thus,

A. Sánchez-Caballé characterized this definition as the ability of the subject to use a variety of digital devices, consciously and critically evaluate information from digital and media content for further communication [5]. According to O. Ovcharuk, it is a set of practical skills of the subject that improve the process of information management, increase the effectiveness of cooperation for work, leisure, study, communication, etc. [6].

Digital competence provides the ability to protect personal data, the ability to analyze, isolate and effectively manage digital devices, rationally use, critically evaluate and independently create a variety of digital content. The space of digital technologies allows to solve many multifaceted problems [7]. Involving of students to work with various digital content while learning is becoming commonplace. Thus, the authors (M. Sharples, A. Adams, R. Ferguson, M. Gaved, P. McAndrew, B. Rienties, M. Weller, D. Whitelock et al.) suggest the use of gadgets and digital devices belonging to students in the educational process (BYOD approach). According to this approach, the teacher loses the function of the single source of knowledge, but the administrative and organizational functions come to the fore [8].

Under the conditions of accelerated development and improvement of digital environment, students of pedagogical institutions of higher education must have qualities that will allow them to effectively acquire professional knowledge and produce the necessary professional skills, namely: skills of work in global social networks and virtual groups, to analyze and process various data, to communicate with the use of digital content, to create safe conditions for the preservation and protection of their own digital data, to apply modern digital technologies to solve certain pedagogical problems [9]. Thus, in our opinion, digital competence is the ability of students of pedagogical specialties to effectively, in accordance with the stated purpose to use information and communication technologies in the educational process of the institution of higher education to solve pedagogical problems. It can improve navigation in fast information flows, provide modern data processing tools, optimize educational and future professional activities.

Many scholars substantiate the relationship between the formation of students' digital competence and the development of education in the digital environment, study the negative attitude of students to digital technologies, study the digital literacy skills they possess [10]. The following scientists N. Abramović, O. Boinytska, M. Gisbert-Cervera,

A. Sánchez-Caballé, N. Vukčević et al. paid attention to the study of various aspects of digital competence in student education. Researches and discussions on the need to form digital competence of students of higher education institutions (Y. Zhao, M. Sánchez Gómez, A. Pinto Llorente) have become relevant in scientific sources. Researchers emphasize the positive perception of digital innovations by students, which can qualitatively influence the development of education in the future under the influence of the digital environment [11].

The attention of scientists to the study of digital competence of students is due to a number of reasons. Thus, first of all, the rapid growth of opportunities provided by the Internet and the growth of its popularity among students characterize the Internet not only as a sphere of specific activities. The Internet for the modern student is the whole world, with a wealth of opportunities and activities that are not inferior to the world “offline” and mediate all spheres of life [12]. Secondly, the use of digital technologies in the educational process of higher education institution affects the content of teaching activities of both teachers and students, which in turn implies the need to study the outlined processes occurring in the educational circle. Thirdly, the transition to the concept of digital competence has a practical basis, as it is well aligned with current changes in the education system and opens the possibility for the application of the latest developments in the field of digital competence. The outlined reasons were the impetus for conducting own research on the formation of digital competence of students of pedagogical specialties [13].

**The impact of the COVID-19 pandemic on the educational process in higher education institutions.** It is clear that in the times of the active use of digital technologies, the educational process of higher education institution can not be left out. The years of the Covid-19 pandemic have made distance learning a leading means of obtaining higher education [14]. The use of information and communication technologies by teachers and students during distance learning has become the most relevant. The opportunity to acquire knowledge without leaving your own home creates comfortable and flexible conditions. However, not all students were ready for this form of education [15].

Not all higher education institutions were ready for such changes. Self-isolation became a significant factor that influenced the further process of organizing continuing education. Recently, a number of researches have emerged on the negative impact of the mentioned pan-

demic on the learning process of students (G. Bruno, L. Carpinelli, X. Wang, R. Zhang et al.). During online learning, students' problems such as lack of necessary psychological and organizational conditions for learning at home, inequality of technical conditions during learning (instability of online communication, insufficient power or lack of quality digital device (computer, laptop) etc. became apparent [16]. For many students, the lack of a computer during the COVID pandemic has been a significant barrier to learning and communicating with friends.

However, the COVID-19 pandemic also provoked positive changes in Ukraine's education system. The sudden transition to distance learning has led to increased motivation of both teachers and students to find interesting, non-standard digital tools that would diversify the educational process and make it more attractive [17]. Thus, during the COVID pandemic, the demand for the use of potential of digital technologies for active distance learning and the formation of students' digital skills has increased significantly.

**Description of the research.** The research aimed to determine the initial level of digital competence of the first-year students of the level of higher education "bachelor". The verification of the state of digital competence of students was done with the help of the Spanish test IKANOS [18]. The IKANOS self-diagnostic test determines the level of digital competence formation according to five general criteria, namely: information and ability to work with data; communication and cooperation; creation of digital content; security; problem solving. It allows to quickly and conveniently obtain data on the individual profile of digital competence. This test is based on the conceptual reference European model of digital competence DigComp 2.1.

The students of pedagogical higher education institutions in the sphere of knowledge 01 – "Education / Pedagogy" participated in the research. In the process of research activities, a multi-stage stratified sample was used: 369 students majoring in specialty 012 Preschool Education and 013 Primary Education aged 17-19, living in 23 cities of 5 regions of Ukraine. The testing was organized by the teachers of the Department of Preschool Education of Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University.

Students of the first year of study were asked to independently determine the profile of their own digital competence (self-testing method). Students' reports on the test were provided on request with observance of the rules of anonymity. The obtained data were grouped according

to the test indicators in the general table. The obtained data were processed, compared, analyzed and verified by ranking. The researchers are aware that due to the nature of the method used, the results obtained should be considered as a pilot study.

**Research results.** Therefore, we will analyze the test results according to each criterion. Thus, the criterion “Information and ability to work with data” allows to determine the need of respondents to use search engines to obtain information from the digital environment. This criterion is characterized by the following indicators: viewing, searching and filtering information and digital content; evaluation of information data and digital content; data, information and digital content management.

The first criterion determines how students create and update personal search strategies, how they access data, information, and content. The obtained diagnostic data on the indicator “*Viewing, searching and filtering information and digital content*” showed that the vast majority of students characterize their level of search and filtering information as “basic” - 42.86%. They successfully formulate information needs in more than one language and are able to find the necessary information on a particular website. 26.98% of respondents use the personal monitoring system when searching for the necessary information - the “average” level of the mentioned skills. Respondents of this group use combinations of various keywords in the search, use dots to find accurate results. Students with initial level of data search (14.29%) express a desire to constantly use the usual digital content, search for the necessary information mainly by keywords, synonymous and related terms. 15.87% of students said that they use technological and methodological digital innovations in the search and filtering of information, successfully synchronize their search tools with all their devices, prefer the advanced search system (advanced level).

The indicator “*Assessment of information and digital content*” identifies how the respondents analyze, compare and critically evaluate the reliability and trustworthiness of data sources, information and digital content. Analysis of test data shows that 28.57% of students have a “basic” level of information analysis, which is manifested in the desire to use reliable and verified sources on the advice of acquaintances and friends, can determine the purpose of online information sources. 25.41% of students try to use verified digital content, express a desire to critically check the reliability of information provided on the Internet, check the number, updates and quality of calls to websites (average level of eval-

uation of data from the digital environment). Among the respondents, 23.81% admit that they often use unreliable and insecure information from digital content (initial level). According to 22.21% of respondents, they successfully analyze, compare and critically evaluate the reliability of information from digital sources, apply criteria to assess the objectivity of content, authorship, timeliness and structure of information (advanced level of information evaluation).

The indicator *"Data, information and digital content management"* allows to determine how students organize, store and select data, information and content in digital environments. Analysis of the results of this indicator showed that 30.16% of the respondents manage data at the basic level. Students at this level said they know how to organize digital content with folders or tags. 28.56% of the respondents have an average level of data management, which is manifested in the ability to copy and move files between folders and devices or in the Internet cloud. 14.29% of students chose the initial level of data management, noting that they mainly use media such as internal or external disk, flash drive, memory card, etc. to store information. The lowest rate of data and digital content management was recorded at the advanced level - 26.99%, respectively. Such students know how to manage data and analyze it with the help of software, use clear rules for sorting and filtering files and folders. Thus, the results of the survey showed that the vast majority of students are aware of the possibilities of the Internet, they can easily find the necessary information, understand the interface settings of the new device or create their own news feed.

The criterion *"Communication and cooperation"* is characterized by the following indicators: interaction through digital technologies; information exchange using digital technologies; participation in public activities with the help of digital technologies; cooperation with the help of digital technologies; ethics of using digital technologies; digital identity management.

Statistics on the indicator *"Interaction through digital technologies"* show that 31.75% of students describe their result as corresponding to the level of "average". Students successfully use advanced video conferencing features (moderation, audio and video recording). 41.27% of the respondents are at the advanced level in interaction with other entities using digital devices. They by themselves determine the appropriateness of digital communications for specific content, know which communication tools and services are suitable for use in different circum-

stances. According to the results of the survey, 20.63% of students said that their level of interaction through digital technology corresponds to the level of “basic”. The respondents said that they know when to use synchronous and asynchronous communication, successfully manage spam. Only 6.35% chose the initial level of interaction with the help of digital technologies. This level is characterized by the ability to send, reply and forward emails.

Analysis of data on the indicator *“Information exchange using digital technologies”* allows us to conclude that 17.45% of students of pedagogical specialties use digital technologies to exchange information according to the levels of “initial” and “basic”. Students of the initial level share digital content that they think can be interesting and useful, exchange information with peers and teachers in a shared online space. Students with the basic level know how to use cloud services on the Internet (Google Disk, Dropbox, OneDrive, etc.). According to 34.92% of the respondents, their level of use of digital technologies for information exchange corresponds to the level of “average”. They know how to modify and share content, manage content by filtering, selecting and editing information in order to obtain knowledge available online. It was also recorded that the answers of 30.18% of students correspond to the advanced level of communication using digital technologies. The students noted that they know how to mark the source of documents found on the Internet. It should be noted that the vast majority of students use their smartphones, mobile phones, computers and laptops. Mobile Internet is the most popular among students. Students use the Internet to find interesting information and search for information to study.

Analysis of the results on the indicator *“Participation in public activities with the help of digital technologies”* showed that 26.98% of students use digital services at the basic (actively use public services on the Internet) and average levels (know how to shop online, pay for the necessary goods and services). 25.40% have an initial level of use of public digital services – they have experience in conducting online surveys, post photos and resumes on the Internet. Only 20.64% have the advanced level of use of digital technologies in public activities. Students in this group seek to discuss various social issues on the Internet, using online forums and social networks.

The obtained diagnostic data on the indicator *“Cooperation with the help of digital technologies”* showed that the vast majority of students describe their level of cooperation as “average” [28, 57]. They have the nec-

essary multimedia skills to manage virtual meeting settings. 23.81% of the respondents believe that they have a “basic” level of cooperation with the help of digital devices. They use a variety of tools to collaborate online, know how to use social networks as channels to participate in virtual meetings. 22.22% of students of pedagogical specialties marked their level of cooperation with the help of digital technologies as “initial”. Students at this level are aware of the benefits of online collaboration, but rarely use it. 25.4% of students stated that they belong to the “advanced” level of establishing cooperation through digital devices. Students of the advanced level have the skills to create online documents, can invite and grant permissions for joint processing.

The indicator “*Ethics of using digital technologies*” helps to determine students’ knowledge of the rules of behaviors and know-how on the use of digital technologies and interaction in digital environments, as well as the extent to which the respondents are able to adapt communication strategies to specific audiences and take into account cultural diversity and generational contradictions in digital environments. Analysis of test data on the mentioned indicator shows that 52.39% of students know how to behave formally and informally on the Internet, try to communicate calmly and productively under any circumstances (advanced level); 28.57% of students believe that they follow ethical rules when using digital devices in accordance with the average level. Students in this group say they try to follow ethical rules, as well as they try to take action against people who behave unethically on the Internet. Unfortunately, 9.52% of respondents said that they have “initial” and “basic” levels of use of ethical norms in the digital environment. They state that they have knowledge of the ethics of publishing other people’s personal information and try to follow ethical rules when communicating online.

Creating of one or more digital identities and the ability to manage them allows anyone to improve their reputation. The extent to which students are able to work with data created with multiple digital tools, environments and services characterizes their ability to manage digital identity. Statistics on the indicator “*Digital identity management*” show that 36.51% of students describe their result as the one, corresponding to the level of “average”. Students of this group say they have multiple digital identities that they use depending on their purpose and content. 34.92% of the respondents believe that they personify their data at the advanced level. They are wary of the information they publish, know how to act, and who to turn to when digital identification issues arise.

20.63% of students have the skills to track their own Internet activity and describe their level of digital identity as basic. Unfortunately, 7.94% described their level of digital identity as corresponding to the initial. Students of this level are able to create their own profile on social networks and note that they would like to improve their own digital identity. Thus, both in learning activities on the Internet and in communication, students spend the same amount of time. They share data, information and digital content with others with the help of relevant digital technologies, can act as an intermediary, know practical methods of creating vocation and attribution.

Many students are focused on instant messaging, continuous news flow and participation in conversations in chat rooms, messengers and social networks. The focus of students on the instantaneous receipt of the necessary information creates the conditions for the use in the educational activities of communities and individual groups to share knowledge and experience in social networks.

The criterion "*Creation of digital content*" is characterized by the following indicators: creation and editing of digital content; integration and processing of digital content; compliance with copyright; programming. The obtained diagnostic data on the indicator "*Creation and editing of digital content*" showed that the vast majority of students create and edit digital content at the basic level - 36.51% (can create dynamic presentations and edit images). According to 25.40% of the respondents, they have "average" level of digital content editing, which is manifested in the skills of image editing using PhotoShop, Gimp, Coreldraw and others. 25.39% of students of pedagogical specialties showed such skills of creating digital content as video editing, audio editing and web page design (advanced level). 12.70% of students said that they belong to the "initial" level of digital content editing. The respondents with the initial level of editing mainly understand how to use text editors and creating presentations.

Determining the ability of students to change, refine, improve and integrate information and content into the existing body of knowledge to create new, original and relevant knowledge and content was determined using the indicator "*Integration and processing of digital content*". Obtained empirical data show that 31.75% of students have "basic" level of integration and processing of digital content. They know how to create digital content on the Internet (blog posts, videos on YouTube channels, etc.); 26.98% chose the "initial" level of integration and processing

of digital content. Students with initial level seek to create new digital content by combining and modifying information from the existing sources. The respondents noted their skills in creating and editing digital text files in various formats. 22.22% of the respondents say they have average level of integration and processing of digital content. Students with average level note the ability to create infographics, multimedia presentations with text, images, audio and video elements. 19.05% believe that they are at advanced level of integration and processing of digital content, respectively [19]. The students mentioned that they carefully select the type of digital media according to the goal and adapt it to the desired audience, try to structure and aesthetically design the created documents.

Analysis of the results on the indicator *"Compliance with copyright"* showed that 47.62% of students consider copyright at an advanced level. Students note that they respect the moral and economic rights of authors to their works. 26.98% of the respondents can determine when digital content becomes available illegally. They sometimes hold copyright (average level). The lowest rate of student compliance with copyright was recorded at the primary and basic levels - 12.7%, respectively. Students at both levels note that they constantly respect the copyright of digital content and are aware of its ethical and legal implications.

The ability of students to plan and develop sequences of clear instructions for the computer system to solve a specific problem or to implement a specific solution was determined using the indicator *"Programming"*. Analysis of the results according to the above criteria showed that 63.49% of students master programming at the elementary level. That is, the vast majority of skills that students have are technical in nature. 23.81% have a basic level of programming. Students often have some knowledge of programming tools. 6.35% chose the average and advanced levels of programming. Thus, it can be concluded that the indicator of *"programming"* is insufficiently formed in the respondents.

The criterion *"Security"* is characterized by the following indicators: security of use of digital devices; protection of personal data and confidentiality; health and well-being care; environmental protection.

Statistics on the indicator *"Security of use of digital devices"* show that 34.92% of students describe the level of security when using digital devices as corresponding to the level of *"basic"*. They are aware of the dangers of the Internet and understand the benefits of using special devices and systems. Some students know how computer viruses work and how

to protect their computers, but they do not always follow safety rules when using digital technology (28.57%). They believe that their level of security in the digital environment corresponds to the initial level. 23.81% of students said that they understand the importance of supporting the operating system, antivirus and other software to prevent security problems (average level), 12.7% are able to configure the settings of the firewall on various devices these respondents described their level of security as advanced.

Analysis of the indicator "*Protection of personal data and confidentiality*" allows us to conclude that the vast majority of students protect their personal data at the initial level - 31.75%. Students noted that they know how to restrict or deny access to their own geolocation, but can not always identify suspicious messages coming to the digital device. 28.57% of students of pedagogical specialties protect their own data and ensure the confidentiality of information about themselves in accordance with the level of "basic". This level is characterized by the ability of students to block messages dangerous to the digital device and determine the security of websites. 20.63% of respondents have an average level of protection of personal data. Students note that they are selective about providing information on social networks. 19.04% of the respondents indicated that their level of protection of personal information and privacy corresponds to the level of "advanced", they carefully check the privacy of digital services they use.

Analysis of the results on the indicator "*health and well-being care*" showed that 31.75% of students take care of their health while working on a computer at the level of "basic". Such students are attentive to ergonomic factors when using a digital device. Symptoms of technological dependence can be identified by 22.22% of the respondents. They believe that they take care of their health according to the average level. 33.33% of students have an advanced level of health care in the digital environment, which is determined by the ability to track the signs of cyberbullying and cyber intimidation. Unfortunately, 12.70% of the respondents have an initial level of health care when using digital applications. Students know that they need to control the time spent at the computer and take into account ergonomic factors, but do not always put their knowledge into practice.

These data coincide with the study of L. Carpinelli, G. Bruno and G. Savarese, which describes the attitude of Italian students to their own health during distance learning [15].

The obtained diagnostic data on the indicator "*Environmental protection*" showed that the vast majority of students carry out environmental protection in accordance with the level of "average" - 26.98%. Students try to reduce the power consumption of their devices. 19.04% of the respondents know how to dispose of digital devices and their components. They protect the environment according to the "basic" level. 14.3% of students of pedagogical specialties marked their level of care for the environment as "initial", looking for ways to use digital technologies more environmentally friendly. 39.68% of students said that they belong to the "advanced" level in environmental protection. They are guided by the rules of environmental behavior when buying and using digital devices.

The criterion "*Troubleshooting*" is characterized by the following indicators: solving technical problems when using digital devices; identification of needs and technological solutions; creative use of digital technologies; ways to improve digital competencies.

Analysis of test data on the indicator "*Solving technical problems when using digital devices*" shows that 28.57% of students have a "basic" level. They have knowledge of some of the causes of technical problems with digital devices, know where to look for the information on the Internet to solve technical problems and try to solve them through trial and error. These data correlate with the results of the study of digital competence of Montenegrin students [20]. 22.22% of students indicated that if they face a technical problem, they try to solve it on their own, are able to diagnose the operating system of the device and identify the problem (average level); 31.74% of the respondents said that they can independently edit operating system configurations on their own devices to solve technical problems (advanced level); 17.47% of the respondents believe that they are not able to cope with the basic technical problems of digital devices, but try to determine them step by step (initial level).

Statistics on the indicator "*Identification of needs and technological solutions*" show that 34.93% of students describe their result as corresponding to the level of "average". They know how to choose a device or service to solve the defined task, use the capabilities of their own computers. 34.92% of the respondents have knowledge of various technological solutions. Students say that they can translate different languages, enlarge or scale the text in different formats, have the ability to make technological decisions in accordance with the advanced level. 19.04% of students (basic level) have the functions of the most common digital devices. The initial level of search for technological solutions was

chosen by 11.11%. Students in this group do not have specific skills, but quickly adapt to new versions of programs.

The obtained diagnostic data on the indicator "*Creative use of digital technologies*" showed that the vast majority of students (34.92%) are aware of the possibilities of using digital technologies to solve various social and educational problems but use them elsewhere (initial level). 26.98% of the respondents believe that they have a "basic" level of creative use of digital content. 23.81% of students of pedagogical specialties noted their level of creative use of digital content as "average". The respondents noted that they can use a variety of data processing tools that systematize complex information. 14.29% of students stated that they belong to the "advanced" level, respectively. Students in this group have information about software learning algorithms.

Analysis of test data on the indicator "*Ways to improve digital competencies*" shows that 31.75% of students have "initial" and "basic" levels in the quest to improve knowledge of digital technologies. The respondents from both groups say they are interested in new digital devices and applications and want to improve them. 22.22% of students are characterized by the "average" level of improvement of knowledge of digital content. Students say they have online learning experience to improve their digital skills. 14.28% are following new trends in the digital world. Students marked their level of digital competence as "advanced". Therefore, in order to be active participants in modern digital trends, students need to constantly improve their digital competence. The future professional activity of students of pedagogical specialties also requires them to constantly search for, develop and use in the educational process with children of different ages a variety of digital applications. However, in our opinion, the digital competence of the future educators of preschool education institutions and primary school teachers should be determined not only by general but also by professional digital competencies.

Undoubtedly, the number of participants in the self-test is not fully representative. However, we believe that the pilot study allows us to outline the problems and identify students' requests to increase the level of digital competence as an important factor in the competitiveness of modern professionals. In the future, we plan, among other things, to expand the sample of respondents by increasing the total number of participants.

**Conclusions.** The results of the conducted research confirmed and supplemented the existing developments, as well as contributed to obtaining new data on the research problem. According to the results of the research, three groups of data were obtained: confirmed data (N. Drohovor et al.), experimental data of the research of checking the level of digital competence of students of pedagogical specialties; confirmed and supplemented data (N. Vukčević, N. Abramović, N. Perović, O. Ovcharuk et al.) on the data of the empirical study of digital competence of Montenegrin students, the use of digital learning tools by students; the experimental data (O. Buinytska et al.) were clarified and concretized; the results of our research supplemented the conclusions of scientists (L. Zdanevych, K. Kruty et al.) on the effectiveness of the formation of competencies during the training of students. The new results of the research include: the state of digital competence of students majoring in 012 Preschool Education and 013 Primary Education have been analyzed; the impact of the COVID-19 pandemic on the process of digital competence formation has been characterized.

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