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DIGITAL COMPETENCE AMONG THE KEY COMPONENTS OF FUTURE MASTERS OF PRIMARY EDUCATION PROFESSIONAL TRAINING: THEORETICAL INTERPRETATIONS

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Abstract. The article draws attention to the issue of professional training of future masters of primary education and the role of digital competence in it. It involves addressing various challenges and considerations to ensure that educators are well-equipped to meet the diverse needs of primary school students. The author outlines several aspects in this direction: innovative pedagogical knowledge and skills, active technology integration, proper classroom management, appropriate assessment and evaluation, and professional development. It is proved that integration of technology into the classroom results in digital competence improvement of future educators. Numerous interpretations of digital competence by Ukrainian and foreign researchers are presented. The international scientific findings proved, the concept of “information and communication competence” is not limited to technological or digital spheres only, on the contrary, it is transformed in a wider context and applied in almost all spheres of an individual’s life. In the context of digitalization of the education system, it is assured that the possession of digital competence aims at purposeful and independent use of ICT tools in educational activities, as well as in the process of methodical and research work; maximum use of the potential of digital technologies in the process of identifying and solving pedagogical tasks. The experience of formation of digital competence of future masters of primary education within their professional training at PNU is presented in the article.

Keywords: digital competence, professional training, masters of primary education, ICT tools.

1. INTRODUCTION

Contemporary world is experiencing rapid and continuous development of technologies. Digital educational resources are becoming an integral part of education and training, contributing to the development of digital literacy of both students and teachers. The use of digital resources increases the quality of education and makes it more interesting and engaging. The current labor market requires primary school teachers to actively use innovative technologies in their professional activities. Preparing future Masters of Primary Education to work with digital resources makes them more competitive and contributes to the improvement of the education sector on a regional level. Digital educational resources provide the opportunity to create individualized curricula that take into account the characteristics of each student. This encourages the support of individualized learning in primary school. The pandemic and the war in Ukraine emphasized the importance of using digital resources and technologies in the educational process. Online tools remain essential in the implementation of a quality educational process during martial law, and will continue to be important in the near future.

Professional activity of primary school educators is guided by the implementation of the state policy and current condition of reformation of education system. Free access to various ICT tools and

resources, improving the level of digital culture of specialists, as well as necessity to use information and communication technologies contribute to the digitalization and informatization of the education sphere. In order to be successful and competitive in the labor market and become an agent of change in modern society, future Masters of Primary Education must gain the skills of using ICT for the effective implementation of various functions in professional activity.

The conceptual principles and priority directions of the development of the educational sector are substantiated in numerous official documents, in particular in the Laws of Ukraine "On Education" (2017), "On Higher Education" (2014), National Strategy for the Development of Education in Ukraine for 2012-2021 (2014); Concepts for the Development of Pedagogical Education (2018), Orders of the Ministry of Education and Science of Ukraine "On Amendments to the Regulation on the Procedure for Implementing Innovative Activities in the Education System of Ukraine (2015), Strategies for the Development of the Information Society in Ukraine (2013), Digital Agenda of Ukraine - 2020 (2016), "Regulations on electronic educational resources" (2018), State program "Information and communication technologies in education and science" (2018), and many others.

2. RESULTS AND DISCUSSION

The processes of digitalization of the national educational system are in the active development, improving the professional training of future primary school teachers. In accordance with the requirements of the current regulatory documents in the conditions of the formation of the New Ukrainian School, the readiness of future masters of primary education to use digital educational resources in their professional activities requires fluency in the technologies of creating and using digital educational resources. Therefore, a systematic study of the student's personal phenomena, one of which is readiness to use digital learning tools in professional activities, is an important direction for changing the key guidelines of professional training of primary school teachers.

The preparation of the future primary school teacher for the use of ICT, digital technologies, digital educational resources, digital learning tools belongs to the actual theoretical and practical problems, some aspects of which are highlighted in their publications by researchers from different countries of the world: H. Al-Huneini, R. Badger, S Golden, I. Gutierrez-Porlan, T. McCrone, P. Rudd, M. Walker, S. Walker, J. Ugomoibgi, and others. (England); B. de Oliveira, M. Ribeiro and others. (Brazil); B. Arteaga Martínez, M. Beneito-Ceoane, L. Villalustre-Martinez, L. Gazo, L. García Aretio, M. García García, M. Grande de Prado, A. Escoda, I. CantonMayo, R. Cañón-Rodríguez, L. Castaneda, J. Collet-Sabe, M. Colmenero, M. Conde, R. Cuzar-Gutierrez, F. Lama-Salguero, A. Martinez de la Muela, M. Moral-Perez, P. Muñoz-Carril, M. Neira-Pineiro, M. Orus, M. Perez, M. Prendes, S. Toledo, M. Fernandez, F. Fernandez, E. Fuentes-Abeledo, M. Ceselkiewicz, and others. (Spain); M. de Rossi, E. Restigliano (Italy); B. Marcano, A. Sartori, S. Hung and others. (Colombia); P. Camilleri and others. (Malta); H. Sanchez-Sordo and others. (Mexico); A. Hashkova, Ya. Zagorets, L. Korenova, M. Munk, A. Nadyova, M. Fuchsova, and others. (Slovakia); J. Aktash, F. Karakoyun, S. Katransioglu, O. Koruku, A. Kuzu and others. (Turkey); O. Viberg, A. Ageli Henlott, O. Gronlund and others. (Sweden); G. Johanson, T. Mochizuki, D. Nakahara, T. Nishimori, H. Oura, T. Sato, M. Tsubakimoto, Y. Yamauchi, and others. (Japan) and others.

Problems of informatization of education, integration of information and communication technologies in the educational process, formation of general competences of IT specialists, peculiarities of formation of professional competences of specialists of various fields, using a cloud-oriented educational environment and others presented in the studies of Ukrainian scientists: V. Bykov, P. Bespalov, T. Blyzniuk, T. Vakalyuk, V. Vember, K. Vlasenko, I. Gerasimenko, A. Gurzhii, G. Datsiv, O. Elizarov, M. Zhaldak, Yu. Zaporozhchenko, L. Zubyk, A. Kocharyan, V. Kruglyk, P. Matyushko, N. Morze, T. Morozova, M. Leshchenko, O. Ovcharuk, V. Rebrina, S. Semeryakov, O. Spivakovsky, O. Spirin, O. Stryzhak, A. Yatsyshyn and others.

Researchers of the issue call the concept of digital competence in different ways. In particular, in their research we encounter the following terms: “information competence”, “information literacy”, “computer competence”, “computer literacy”, “ICT competence”, “digital literacy”, “information technology competence”, “technological literacy”, “ICT skills”, etc. Likewise, there is no universal interpretation of this notion, however, some of them deserve to be taken into account for the successful accomplishment of *the purpose of our research paper* – outlining digital competence as the key component of future masters of primary education professional training considering definitions of scholars.

Researcher O. Ovcharuk emphasizes that the formation of information and communication competence of education seekers and teachers as key objects of the educational process is today a priority direction of the functioning of educational systems of economically developed countries of the world. Studying international strategic documents on educational policy, the scientist analyzed and compared the interpretation of the concept of “information and communication competence”, and also took into account the best experience and research results of Ukrainian and international scientists. According to the findings of O. Ovcharuk’s scientific research, *“information and communication competence is included in the list of key ones in the main strategic international documents, it is end-to-end, multifunctional, and can be applied in various spheres of life”* (Ovarchuk, 2013).

Together with O. Spirin, the scientist developed and printed a collection of works that outlines the problems of standardization of information and communication competence in the Ukrainian education system (Spirin, 2008, pp. 46-48). In their work, the researchers presented the structure of ICT competence, in their opinion, it consists of four key structural components:

- 1) abilities and skills
- 2) knowledge
- 3) skills
- 4) attitude (Fig. 1.).

Continuing to analyze the work of O. Ovcharuk, we consider it necessary to emphasize that in international scientific studies, the concept of “information and communication competence” is not limited to technological or digital spheres, on the contrary, it is transformed in a wider context and applies to almost all spheres of an individual’s life. First of all, of course, it depends on the specialist’s field of activity, but today we often follow examples where the concept of “IT competence” is used for a certain industry or type of activity only because of prevalence, social trend or fashion. That is why, understanding the situation, the scientist derives a generalized understanding of the concept, which can apply to different directions and she interprets it as *“the proven ability to work individually or collectively, using tools, resources, processes and systems that are responsible for accessing and evaluating information (information and data), received through any media resources, and use such information to solve problems, communicate, create informed solutions, products and systems, as well as to obtain new knowledge”* (Ovcharuk, 2013, p. 6).

Another researcher, G. Fedoruk, came to the conclusion that information and communication competence is an integral characteristic of a person, which is manifested in the ability to learn knowledge and achieve goals in the chosen field with the help of a computer (Fedoruk, 2015). In the context of the pedagogical field, she concludes, every teacher must possess he abilities to use IT technologies at a qualitatively high level in order to effectively organize professional activities. O. Myronova and N. Balovsiak emphasize the need for these abilities and skills as one of the components of modern educational practice, as well as human activity in modern society in general (Myronova, 2010, Balovsiak, 2006).

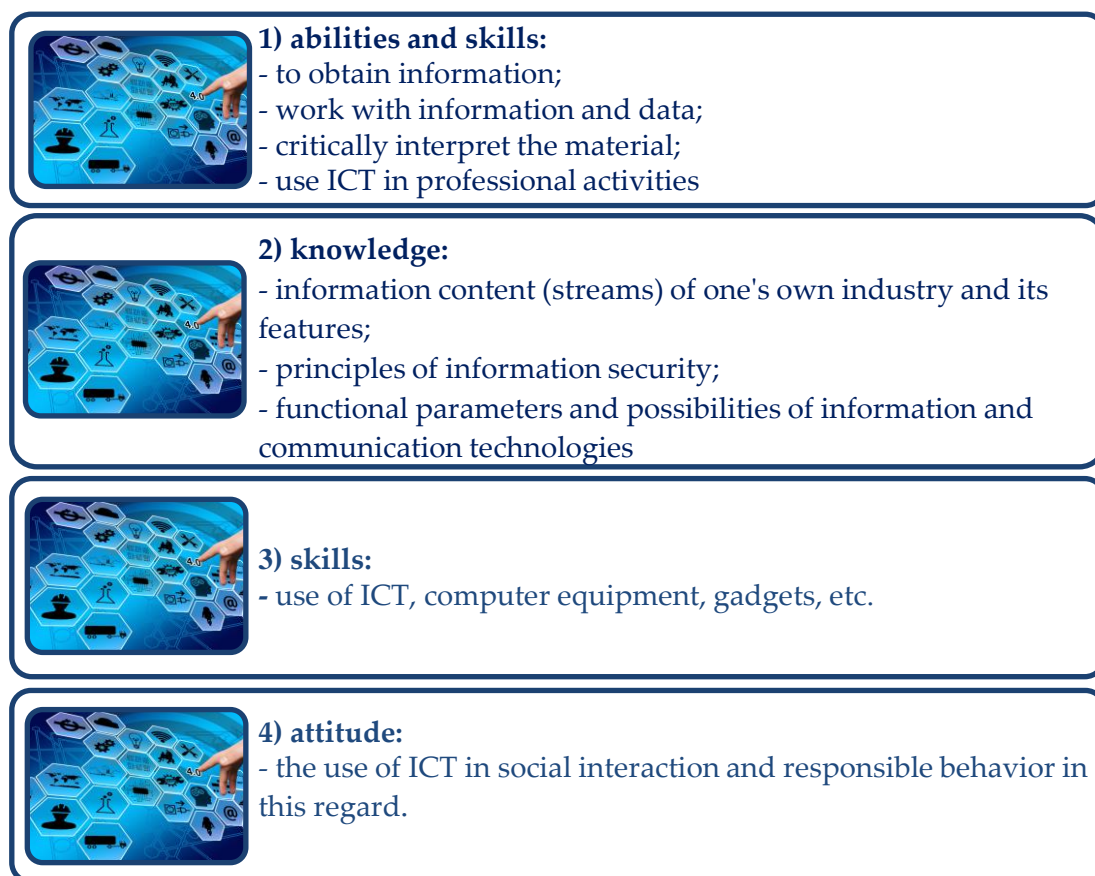


Fig. 1. The structure of information and communication competence of an individual according to O. Spirin

Researcher O. Bozhynska analyzed the structure of the concept of “information competence” and identified the following components:

- 1) cognitive;
- 2) value-motivational (epistemological);
- 3) technical and technological (technological);
- 4) communicative;
- 5) reflexive (Bozhynska, 2015, p. 90).

Despite the above, certain sections in the structure of informational and functional competence are defined. Thus, based on the activity approach, the researcher identified nine sections in accordance with the knowledge, abilities and work skills of the student of ICT education: “collection and storage of information; information search; perception, understanding, selection and analysis of information; organization and presentation of information; creation of an information object based on a person’s internal representation; information planning, communication; modeling; design; management” (Bozhynska, 2015, p. 90).

Aiming at better understanding the concept of “digital competence”, we analyzed the works of O. Boytsova and noted that the researcher supports the opinion of other scientists and believes that there can be 2 approaches to defining the essence of this concept: 1) searching for information, satisfying one's own information needs ; 2) use of IT technologies in the professional sphere. Thus, O. Boytsova singles out two components - personal and professional-informational, where the last component provides three sub-components - informational, computer, which determine the general competences of specialists, as well as procedural-active, the essence of which is determined by the content and direction of professional activity and consists in the use of IT technologies to solve professional tasks (Boytsova).

M. Shevchuk also claims that this competence is manifested both in the everyday life of an individual and in the educational process or industrial activity. It is “social in its essence and content (it is carried out in society, characterized by communicative interaction by society representatives), mediated by the use

of information and communication technologies" (Shevchuk, 2021, p. 278). At the same time, P. Pakhotina understands digital competence as the confident use of computers for collecting, storing, producing and exchanging information in education, research, work and leisure (Pakhotina, 2013).

Researchers O. Furman and A. Kostyuchenko examine digital competence of the personality of teachers in the field of their professional activity in the conditions of digitalization of the education system. They assure that the possession of digital competence aims at purposeful and independent use of ICT tools in educational activities, as well as in the process of methodical and research work; maximum use of the potential of digital technologies in the process of identifying and solving pedagogical tasks (Furman, & Kostyuchenko, p. 303). Similar knowledge, abilities and skills are emphasized by O. Ovcharuk when the researcher talks about the essence of the concept of "digital literacy of a teacher" as the ability to set tasks and find their solutions; search and use information, taking into account the purpose of the educational activity and the target audience; report and argue the chosen methods and methods for solving this or that problem. The scholar defines the constituent components of the digital competence of the student of education, this is "*definition; finding; assessment; creation; communication (communication)*" (Ovcharuk, 2013, p. 5).

The presented scheme is a detailed instruction on professional training and professional development of pedagogical workers in the field of using ICT in the educational process, developed by UNESCO in partnership with leading industry organizations and experts from different countries in response to growing needs and recent achievements. UNESCO's recommendations offer a comprehensive list of competencies that modern educators must possess to effectively integrate ICT into their professional practice with learners to help them achieve curriculum learning outcomes improving digital competence. The document highlights the importance of recent technological advances such as artificial intelligence, mobile technologies, the Internet and open educational resources, and their rapid impact on future masters of primary education professional training.

Important for our research is the third version of the document "Structure of ICT competence of teachers. UNESCO recommendations", the scheme of which will be presented in Fig. 2:

The effective activity of primary school educators as competitive specialists requires radically new approaches to the development and formation of professional abilities and skills, value orientations, gaining experience and, thus, increasing the level of professional competence of those specialists who are still getting their Master's degrees. Digital competence is an important tool for the professional development of a contemporary teacher, because it opens up opportunities to obtain innovative information, exchange experience with foreign colleagues, facilitates, diversifies and optimizes the functioning of the educational sphere. Importantly, today there is still need for more research by Ukrainian scientists on the problem of forming the ICT competence of future masters of primary education professional training.

Studying this issue, we agree with the opinion of a group of Ukrainian scientists that the competent use of Internet resources is a powerful means of developing the professional competence of future primary school educators, and the actualization of their information activities further reveals the importance of the problem we are investigating (Blyznyuk, 2018). Scientists determine that "one of the main tasks of competence development in future educators is to determine a set of the most significant competences: key, basic and specific. There is no single approach to defining a consistent list of key competencies of scientists." Researchers have prepared and published a list of key competencies of future social workers, which also includes informational competence. In their opinion, it reflects the ability of future specialists to receive and analyze information in all its forms to solve various tasks of professional activity and everyday life. They define the digital competence of educators as a component of their professional competence, which includes the ability to use a complex of knowledge and skills in the field of ICT; the ability to effectively search for information and structure it, to adapt educational information to the specifics of work for the further implementation of one's professional activities.

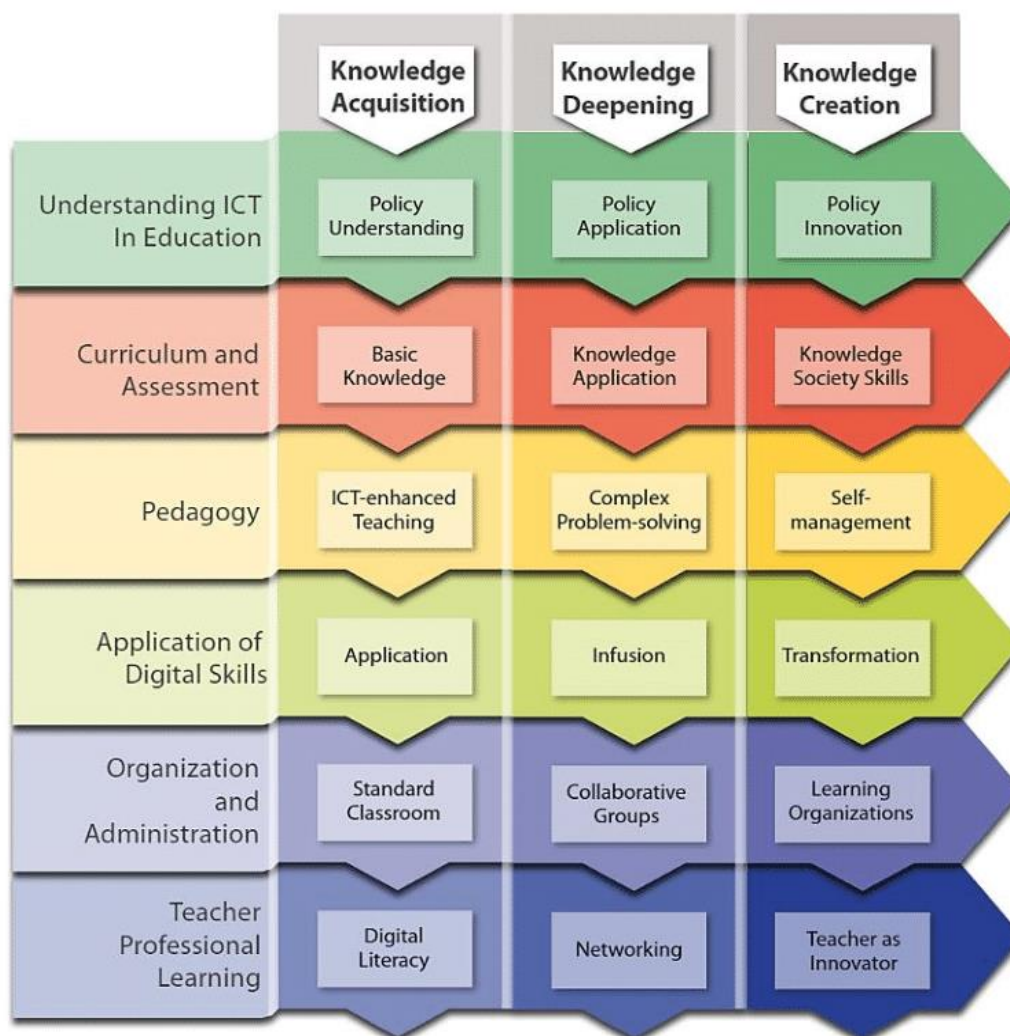


Fig. 2. Structure of teachers' ICT competence. UNESCO recommendations

Source: <https://www.unesco.org/en/digital-competencies-skills/ict-cft>

Formation of digital competence occurs as a result of assimilation of knowledge in the field of ICT, acquisition of practical skills in their application to solve individual, professional tasks, preparation for effective use of information and computer technologies in professional activities. With the intensive development of IT sector, digitalization of all spheres of society's life, the active implementation of distance and mixed learning, the problem of forming the information and communication competence of students acquires particular importance and is at the center of the scientific research of specialists. An indispensable component of students' cognitive activity is the ability to use various types of information, the source of which is mostly Internet resources and mass media. Future specialists must be aware of the reliability of information flows, be able to process this information, analyze and verify it, as well as possess skills in working with innovative technologies and use the acquired knowledge in practice.

Such training is and should further be continuous. Thus, the New Ukrainian School envisages the formation of digital competence of primary education students in the process of studying the IT as well as all other educational subjects. The state standard of primary education states that the goal of the informative educational field is the formation of schoolchildren's "ability to solve problems using digital devices, information and communication technologies and critical thinking for development, creative self-expression, personal and public well-being, skills of safe and ethical activity in the information society" (State Standard of Primary Education).

Blended learning, which is now widely practiced because of constant mining of educational institutions and air alarms in Ukraine, is generally impossible without the use of IT technologies and appropriate digital literacy level of both the teaching staff and students. Therefore, the urgency of the

problem is beyond doubt. In higher education institutions, ICT performs both administrative and academic functions. Students can perform a variety of tasks with the help of computer networks that save time and money for the educational institution, for example, simplifying financial issues of paying for the provision of educational services, requesting and receiving financial aid and/or scholarships, making a schedule of classes, choosing housing, etc. For social work research, ICT is part of the infrastructure for emerging research methodologies (e.g. geographic information systems, computer modeling, network modeling), making it critical for universities to use technology to advance their research developments. ICT has the potential to facilitate a more productive and effective learning environment for both students and educators.

In this context, as noted by T. Blyznyuk, numerous international projects have been implemented and successfully completed by Ukrainian scientists and practitioners who work on the problem of formation of digital competence of education specialists. For instance, the project of the European Union ERAZMUS + CA2 Higher Education Opportunity Project: Modernizing Educational Higher Education Using Innovative Teaching Tools (MoPED) - No. 586098-ERP-1-UA-EPPKA2-CBHE-JP was launched at Vasyl Stefanyk Precarpathian national university in 2017 as one step in this direction (<https://ciot.pnu.edu.ua/en/moped-ecosystem-2/>). When the project was finished its impact on the quality of higher pedagogical education proved to be significant on both national and regional levels. The results substantially increased the digital and didactic competences of future masters of primary education, in-service teachers and university academic staff. It *“contributed to the modernization of UA pedagogical curricular by creating and introducing new educational courses, arranging modern innovative classrooms throughout certain Ukrainian higher educational institutions and enhanced the professional level of pre-/in-service teachers by incorporating new subjects of top-notch ICT teaching tools and inquiry methods”* (Blyznyuk, 2018, p.44).

3. CONCLUSION

Due to a systematic and comprehensive review of scientific literature, analysis of interpretation of digital competence in Ukrainian and foreign findings, we can conclude that the intensive growth of access to the Internet and ICT has significantly affected social, political and economic processes in Ukraine and around the world. It is undeniable that digitalization will continue to influence educators' growth and recipients' of educational content. In the scientific literature and practice, according to our findings, much attention is drawn to the formation of digital competence of future masters of primary education within their professional training. And it will never be sufficient. Among the opinions of scientists today, there is no single correct interpretation of the concept of “ICT or digital competence”, but most researchers support the opinion that it aims at the ability of a personality to use digital achievements and discoveries in personal and professional contexts for the effective implementation of various tasks and problems related to communication in the digital field.

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Близнюк Олександр, Гоцанюк Тетяна. Цифрова компетентність як ключовий компонент професійної підготовки майбутніх магістрів початкової освіти: теоретичні інтерпретації. *Журнал Прикарпатського університету імені Василя Стефаника*, 11 (1) (2024), 164-172.

У статті висвітлено проблему професійної підготовки майбутніх магістрів початкової освіти та значення цифрової компетентності в цьому контексті. Сучасні технології швидко розвиваються, і майбутні педагоги

мають бути готові використовувати нові цифрові інструменти та методи навчання для підтримки інтересів та потреб учнів початкової школи. Авторами окреслено кілька аспектів: інноваційні педагогічні знання та навички, активна інтеграція технологій, належне управління класом, відповідне оцінювання та професійний розвиток майбутнього педагога. Доведено, що інтеграція технологій у навчальну практику призводить до підвищення цифрової компетентності майбутніх педагогів. У статті представлено трактування цифрової компетентності українськими та зарубіжними дослідниками. Наукові висновки довели, що поняття “цифрової компетентності” не обмежується лише технологічною чи цифровою сферами, навпаки, воно трансформується в ширшому контексті та застосовується практично в усіх сферах життя людини. В умовах цифровізації системи освіти визначено, що володіння педагогами належним рівнем цифрової компетентності спрямоване на цілеспрямоване та самостійне використання засобів ІКТ у навчальній діяльності, а також у процесі методичної та науково-дослідної роботи; максимальне використання потенціалу цифрових технологій у процесі визначення та вирішення педагогічних завдань. У статті представлено досвід формування цифрової компетентності майбутніх магістрів початкової освіти в рамках професійної підготовки в ПНУ.

Ключові слова: цифрова компетентність, професійна підготовка, магістри початкової освіти, цифрові навчальні засоби.