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## INFORMATION AND DIGITAL COMPETENCE AS A KEY DEMAND OF MODERN UKRAINIAN EDUCATION

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### ABSTRACT

Nowadays, digitalization in education is a digital transformation that is not a trend but a requirement of the times. Thus, the main task of teaching is the introduction of digital technologies, which provide education improvement, accessibility and efficiency, training the young generation for life in the digital society. Digital technologies are changed, in turn, it requires students and teachers to improve their knowledge, skills and to focus on the development. Information and digital competence in the education process helps teachers to teach the content effectively using the latest means that contribute to the achievement of the best results. With the development of key competencies, as an information and digital one, there is an urgent need to form it in the process of learning.

The article is devoted to the problem of analyzing the meaning of the term “information and digital competence” in the conditions of modern Ukrainian education.

The **purpose** of the article is to explore the term “information and digital competence” in scientific and pedagogic literature.

To achieve the purpose the general theoretical scientific **methods** are used such as analysis, synthesis and systematization of researchers’ works as for terms: “competence”, “information competence”, “digital competence”, “information and digital competence”; logical-systemic, problem-targeted, comparative analyses as for theoretical basics of components of information and digital competence.

There are some research **results**. The detailed analysis of terms that are related to the definition “information and digital competence” is made, and the stages of their development are considered. The particular attention is paid to the main competencies for learning.

Based on the analysis of scientific and pedagogical literature, we can **conclude** that the information and digital competence of specialists in various fields is an urgent issue in pedagogical science.

**KEYWORDS:** Digital Competence, Information Competence, Key Competence, Students.

## INTRODUCTION

In the times of total informatization of human life, education faces new requirements that are put forward. This triggers modernization and constant changes in the educational process. Various aspects of the introduction of digital technologies in the educational process of the educational institution and related formation and development of relevant competencies are the highly topical issue as part of modern education reform in Ukraine.

It is beyond the argument that total digitalization of the educational process puts forward new requirements for education. In connection with this a modernization of education and constant changes in the educational process may be observed, which are specified in the national education regulations, namely: National Strategy for the Development of Education in Ukraine until 2021, the Law of Ukraine on Education, “New Ukrainian school” Concept, etc.

These regulations stipulate that ensuring a high quality of education of citizens and creating conditions for the development and self-actualization of each individual is the main purpose of the Ukrainian educational system. The modern Ukrainian education system is associated with the transition to a

new educational paradigm, based on a competency-based approach.

Teachers’ training universities are focused on the formation of the necessary competencies in young people. This makes the concept of competence of future professionals a relevant issue. It is the formed competencies that determine the readiness of the future specialist for further independent life, work, development, and active civic stance. Proceeding from the modern labour market characteristic aspects, the priority qualities of the future specialist include mastering information and digital technologies that meet the needs of modern society.

## THEORETICAL FRAMEWORK

To define the concept of “information and digital competence” using particular terms: “competence”, “information competence”, and “digital competence”.

## PURPOSE

The paper aims to analyze the subject matter and content of the term “information and digital competence” in academic and pedagogical publications.

## OBJECTIVES

To determine the notion of the terms: “competence”, “information competence” and “digital competence”; to analyze the classification of key competencies; to

describe the elements of digital and information competence.

## METHODOLOGY

To achieve the purpose the general theoretical scientific methods are used such as analysis, synthesis and systematization of researchers' works as for terms: "competence", "information competence", "digital competence", "information and digital competence"; logical-systemic, problem-targeted, comparative analyses as for theoretical basics of components of information and digital competence.

## RESULTS

Needless to say, academic and pedagogical publications contain different approaches to the definition of "competence". This term was in use as early as the last century. In attempts to find an interpretation of the content and subject matter of this concept, we have identified certain criteria. However, only recently this concept has been increasingly taking the attention of researchers in the area of future professionals training.

Let's start with the analysis of regulatory documents. According to the Law of Ukraine on Education, "competence is a dynamic combination of knowledge, skills, abilities, modes of thought, attitudes, values, other personal qualities that determine a person's ability to successfully socialize, conduct professional and/or further educational activities".

Major international organizations pay attention to the concept of "competence", namely UNESCO interprets this concept as a combination of knowledge, skills, values and attitudes applicable in everyday life.

Experts of the European Union define competence as the ability to apply knowledge and skills that ensure the active application of educational achievements in

new situations. DeSeCo experts (Definition and Selection of Competencies: Theoretical and Conceptual Foundations), which has been operating since 1997, suggest interpreting competencies as the ability to successfully meet individual or social needs, carry out activities or perform tasks.

Each competence is based on a combination of mutually consistent cognitive attitudes and practical skills, values, emotions, behavioural components, knowledge and skills, all that can be mobilized for active action (Rychen, & Salganik, 2002, p. 8).

The International Board of Standards for Training, Performance and Instruction (IBSTPI) defines "competencies as the ability to conduct activities, perform tasks or work in a competent manner. In addition, the concept of competence includes a set of knowledge, abilities and attitudes that make it possible for the individuals to act efficiently or perform certain functions aimed at achieving certain standards in the professional area or certain activities" (Spector, & Teja, 2001, p.2).

As it follows from the analysis of academic sources, the question of competence arose a long time ago. As it is known, "competence" is a structured set of knowledge, skills, abilities, and attitudes acquired in the course of learning, through which a person defines, i.e. identifies and solves, regardless of the context (situation), the problems typical of a certain area of activity.

A large number of educators, scholars, and researchers consider the concept and subject matter of competence through personal qualities, as an actualized, integrative, intellectually and socioculturally conditioned integrated personal quality of an individual based on knowledge, which is manifested in personal activity and behaviour, as well as in its interaction with other people in solving various tasks.

According to the analysis of pedagogical literature, competence is not only professional knowledge, skills, and experience in the speciality, but also attitude to work, determined (positive) inclinations, interests and aspirations, ability to use knowledge and skills efficiently, as well as personal qualities to obtain the desired result in a particular job in a particular occupational situation.

Therefore, given the above analysis, it is certain that competence is a multifactorial quality of the future specialist. Based on this, we can agree with the International Board of Standards for Training on the definition of “competence” that it is not only a combination of knowledge, skills, values, and attitudes but also the ability to apply them in professional and everyday life (Spector, & Teja, 2001).

Summarizing all the above said about the subject matter and analysis of the concept of competence, in this paper we will consider it using the “general – personal” criterion. From this perspective, competence is a personal quality with an integrative effect and a willingness to perform the necessary professional actions.

Thus, the analysis of the concept of competence provided an opportunity to consider the importance of implementing a competency-based approach into the educational process in the institutions of higher pedagogical education.

As is commonly known, the concept of a competency-based approach in education at the present stage of reforming the education sector is the basis of innovation. The competency-based approach in Ukraine is an entirely natural process and corresponds to the changes in the educational sector.

In the scope of our study, the substantiation of the factors of the emergence of the competency-based approach in education is

worthy of special mention. An important strategy to modernize education in many countries today is to update the content of education and learning technologies, reconciling them with modern needs.

The curricula should be focused on the competency-based approach; the effective mechanisms for its implementation should be developed; and devote attention to updating the content of education, creating new programs, and updating the educational and methodological base.

According to that, most educational systems of economically developed countries with high educational rates develop this approach due to such factors as the transition to a new form of modern society; the need for higher standards in the education system; integration of educational systems into the world educational system; the need for new component knowledge necessary for a successful life in society.

Thus, the analysis of academic and pedagogical literature suggests that the purpose of the competency-based approach is learning, education, training of future professionals in various areas of the relevant level and profile, which will be competitive in the labour market, i.e. competent workers who not only have excellent skills in their profession, but know their way around in related areas of activity, and are ready for constant professional growth, social and professional mobility.

It should be emphasized that there is an opinion among scholars about the need to choose a limited set of competencies that are most important, integrated and fundamental. The issue of choosing key competencies has recently caused an extensive discussion among both Ukrainian and foreign experts.

It is worth noting the considerable experience of the European Parliament and

the Council of the European Union, which on 17 January 2018 approved the framework of the Key Competences for Lifelong Learning, which is currently one of the latest modern European strategic documents developed by the European Community of countries which create educational standards.

Therefore, the recommendation identifies eight key competences people need for personal life, healthy and sustainable lifestyles, employment, active civic stance, and social inclusion, namely: literacy; language competence; mathematical competence and competence in science, technology and engineering; digital competence; personal, social and educational competence; civic competence; entrepreneurial competence; cultural awareness and expression competence.

The Organization for Economic Co-operation and Development (OECD) also examines in detail the implementation of key competencies in the content of education. It is the OECD member countries that have established that the theoretical and conceptual foundations of competencies, knowledge, and skills have not been sufficiently explored.

In order to define the above concepts, a group of experts from various areas of

education, business, labour, health, representatives of international, national and educational institutions launched the program “Definition and Selection of Competencies: Theoretical and Conceptual Foundations” abbreviated as “DeSeCo” (1997). The DeSeCo program summarizes the experience of many countries in identifying and selecting key competencies (Rychen, & Salganik, 2002).

Thus, according to OECD representatives, key competencies enable individuals to participate productively in many social spheres and make a significant contribution to the development of the quality of society and personal success, which can be applied to many areas of life.

Key competencies are the main set of the most general concepts that should be detailed in the complex of knowledge, skills, abilities, values, and attitudes in the areas of study and life. One of the generalizations was the definition by the OECD representatives of three categories of key competencies as a conceptual framework, namely: acting autonomously; using tools interactively; interacting in heterogeneous groups (Rychen, & Tiana, 2004).

For convenience, we offer a table presenting the classification of key competencies as defined by the OECD (Table 1).

Table 1

*Classification of Key Competencies as Defined by the OECD*

Categories	Acting autonomously	Using tools interactively	Interacting in heterogeneous groups
<b>CRITERIA</b>	The ability to protect and care for the responsibilities, rights, interests and needs of others.	Ability to use language, symbols and texts interactively.	Ability to resolve conflicts.
	Ability to make and implement plans and personal projects.	Ability to use knowledge and information literacy.	Ability to cooperate.
	Ability to act in a considerable/broad context.	Ability to apply new interactive technologies	Ability to interact successfully with others.

Analyzing the categories of key competencies presented by OECD experts, we believe that the main one to define the basic concept of information and digital competence for our work is “The ability to use tools interactively”, which is a set of knowledge, skills and abilities to work with information and communication technologies (hereinafter referred to as “ICT”), which is the main element of information and digital competence.

According to the educational reform, we find the “New Ukrainian School” concept interesting, which also identifies 10 key competencies, the content of which determines the implementation and development of personality, active life position, inclusion, employment and the ability to ensure the success and implementation of lifelong learning (Hrynevych et al., 2016), namely:

1. Communication in the official (and if different in native) languages;
2. Basic competencies in natural sciences and technologies;
3. Information and digital competence;
4. Lifelong learning ability;
5. Communication in foreign languages;
6. Initiative and entrepreneurial attitude;
7. Mathematical competence;
8. Awareness and self-expression in culture;
9. Environmental literacy and healthy living;
10. Social and civic competence.

It should be noted that based on the results of the Ukrainian scholars’ works a list of key competencies was also suggested, namely: educational, civic, cultural, informational, social, health caring, which are detailed in the complex of knowledge, skills, abilities, values, attitudes, capabilities in domains of study and life of students.

The key competencies are the ability of a person to perform complex multifunctional, multidisciplinary, cultural activities, efficiently solving current individual and social problems.

Based on the analysis of the existing variety of definitions of “key competencies”, we believe that it is a set of knowledge, abilities, qualities that must be mastered in school for further development of independent and competitive personality in higher education institution, who can choose profession thereafter and be confident in oneself and one’s profession.

Thus, based on the analysis of the academic publications, we found that international and Ukrainian experts have the same view on the list of key competencies. All experts identify key competence related to the area of ICT refer to it as information, digital, information and communication, and information and digital competence.

According to new changes and requirements to the profession of the future specialist and for a better understanding of current trends in the educational process, we will analyze and disclose the subject matter and content of the concept of information and digital competence in our thesis, including the terms: “information competence”, “digital competence”, and “information and digital competence”.

Therefore, information and digital competence is a confident work with information using various means of information and communication technologies and responsible use and interaction with digital resources in the educational process.

It should be noted that continuous use of digital technologies, starting from childhood, shapes a society, which, in our opinion, is based on the mass engagement of digital technologies. We see that the

emergence of digital technologies has contributed not only to the change, supply, processing, analysis and retrieval of information, as alternative information sources have appeared but also to the emergence of professional technical competencies that shape digital technology skills and abilities.

One of the main tasks of our study is to consider the formation of information and digital competence of future foreign language teachers, which includes other technical competencies, one of which is information competence.

The analysis of the subject matter of the concept of “information competence” is found in the works of many national and foreign scholars.

Based on the analysis of the academic publications, we concluded that scholars have not found a common understanding of this concept. The concept of “information competence” has different approaches to the definition.

Information competence is studied by researchers in two senses, both broad and narrow. In a broad sense, it is the ability to carry out analytical processing of information, apply information technology, solve search and information problems, using library resources as an information retrieval system, and interact with information using information technology. In the narrow sense, it is the ability to use technical and methodological tools of information technology to search, process, present, and transfer information.

Kostikova and Miasoiedova (2019) consider information competence “as the possession of ICT means, information search on the Internet, the use of electronic dictionaries and catalogues, as well as any search for information using media and work in

various search engines, and critical analysis of the information found”.

It is common knowledge, that information competence is the ability to perform information activities efficiently (in solving professional problems in everyday life) using ICT, which involves information competence available and formed readiness (which includes personal qualities) to solve relevant tasks taking into account the experience gained, with the possibility of independent organization of own activities, implementation of self-control and awareness of personal role in their implementation and possible consequences of its implementation.

Analyzing this competence Ukrainian scholars point that information competence is an integrative formation of personality, which reflects its ability to identify information needs, search for information and work efficiently with them in all their forms and representations, both in traditional, printed form and in electronic form; ability to work with computers and telecommunications technologies, and the ability to apply them in professional activities and everyday life.

IT is a proven ability of an individual to use information technology for guaranteed communication and mastery of the material to meet own individual needs and social requirements for the formation of general and professional competencies (Chernenko, 2019; Kostikova, & Miasoiedova, 2019).

Summarizing these various academic approaches to interpretations of the concept of “information competence”, we give concrete expression to the basic concept of our research. Thus, in our work, information competence is the first element of information and digital competence, namely an integrative dynamic characteristic of the individual, which includes skills in working

with information (analysis, transformation, search, etc.) and information technology, as well as special knowledge, skills, and abilities necessary for the reasonable choice and their best use when solving educational and professional problems amidst digitalization and requirements of a society.

We consider it necessary to emphasize that it is important for further use in our research to clarify the subject matter of the concept of “information”, which underpins the development of all areas of human activity. We have no doubt that increasing globalization of learning processes in Ukraine requires the information and communication system, which, in turn, promotes the exchange of large scope of information.

Naturally, the term “information” is quite controversial in science. Despite its extensive use, it has changed many times, and the boundaries of the concept have both expanded and narrowed.

As is commonly known, the term “information” derives from the Latin word “informatio”, which means explanation; presentation of facts, events; explanation; concept; studying.

The Law of Ukraine “On Information” specifies information as “any information and/or data that can be stored on physical media or displayed in electronic form”.

The Merriam-Webster dictionary (Merriam-Webster, Inc., former name G & C Merriam Company) defines information as communication or the acquisition of knowledge or intelligence; knowledge gained from the investigation, study, or instruction.

There are many definitions and interpretations of this term depending on the area of human activity, but many researchers have concluded that finding a

common definition of “information” is impossible.

Certainly, the absence of a single interpretation of the content of the concept under discussion is explained by the fact that “modern definitions of the category of “information” try to reflect the philosophical essence at first, and then the most important features of social relations”.

Analyzing the various definitions of “information” it should be noted that it is not only data or information but also a leading component that enables comprehensive development in all areas of human activity and is the main impetus in the formation of modern information and developed society.

The information society is a modern stage of human development, when using information and communication technologies it is possible to receive, process and disseminate information, and the state must ensure a high-quality level of informatization of all industries.

Taking into consideration the formation of the information society, scholar Novytskyi (2011) defines the following features of humanity’s transition to the information society era, which are quite natural, namely: information, technology, network, methodological, sociological, cultural, prognostic, epistemological, administrative-political, synergetic, and institutional features.

This analysis shows that the main in the information society are people, information, and information and communication technologies.

It should be noted that it is important for our study to understand the concept of “digital competence”, which is the second important element of information and digital competence.

Having analyzed the existing interpretations of digital competence, it can be said that there is no single concept for defining this type of competence among scholars. In most cases, two terms are used as synonyms: “digital competence” and “digital literacy” (Chernenko, 2019).

As it is commonly known, in 2018, the Commission of the European Parliament and the Council of the European Union adopted updated Council Recommendation on Key Competences for Lifelong Learning. Digital competence is one of the eight key competencies, which is treated as confident, critical and responsible use of digital technologies for learning, work and participation in society and interaction with it.

It includes information and information literacy; communication and cooperation; media literacy; creation of digital content (including programming); security (including digital well-being and competencies related to cybersecurity); intellectual property issues; ability to quickly solve problems and skills of critical thinking.

In 2018, with the support of the International Visegrad Fund and the Ministry of Foreign Affairs of the Kingdom of the Netherlands, the implementation of the international project was launched (Kalinin, 2018). The project points out the general competencies of teachers for the professional and pedagogical profile, where digital competence is considered profoundly.

So, the digital competence of the teacher involves the use of ICT during professional training and creating new information resources. Also, their availability changes the traditional model of the teaching and learning process, creates conditions for the development of a multi-component

educational model, interactive virtual environment and more.

Considering the above, the competence of a high school teacher to work with information on the basis of critical thinking, the use of ICT and the creation of new information resources needs further development. The subject matter of this process is to expand the teacher’s understanding of the information environment, introduce new information trends and opportunities for their use to the teacher.

According to foreign scholars, digital competence is the technical skills needed to use digital technologies, the ability to use digital technologies to work efficiently in various activities for learning, education, and everyday life in general, the ability to critically evaluate digital technologies, and motivation, to participate in digital culture (Ilomäki et al., 2016; Vuorikari et al., 2016).

The authors of the Digital Competence Framework for Citizens (DigComp 2.1) note that digital competence is the ability to use digital media and ICT, understand and critically evaluate various aspects of digital media and media content, as well as be able to communicate efficiently in different contexts (Carretero et al., 2017).

Norwegian framework for professional digital competence of teachers (Professional Digital Competence Framework for Teachers) contains seven components: subject and basic skills, school in society, ethics, pedagogy and subject didactics, leadership in the educational process, interaction and communication, change and development. Each component described through knowledge, skills and competencies (Kelentrić et al., 2018).

Foreign scholars give a quite smart interpretation of digital competence as a set of knowledge, skills, attitudes (including

abilities, strategies, values and awareness) necessary for the use of ICT and digital media to perform tasks; solve problems; for communication; information management; cooperation; creation and distribution of content; building knowledge efficiently, productively, adequately, critically, creatively, independently, flexibly, ethically, reflexively for work, leisure, joint activities, learning, communication, meeting consumer needs and providing opportunities for the exercise of rights (Martin, & Grudziecki, 2006).

Thus, considering common features of the above interpretations, all previous

definitions can be summarized in the wording published by the European Research Center, where digital competence is understood as information and media literacy; communication and cooperation; creation of digital content and responsible use of digital technologies (Redecker, & Punie, 2017).

So, to share the experience, I'd like to show some ICT tools I used with my students during the practice of teaching English in 2021. They are Canva, Kahoot, Prezi, Learning Apps (Fig.1).

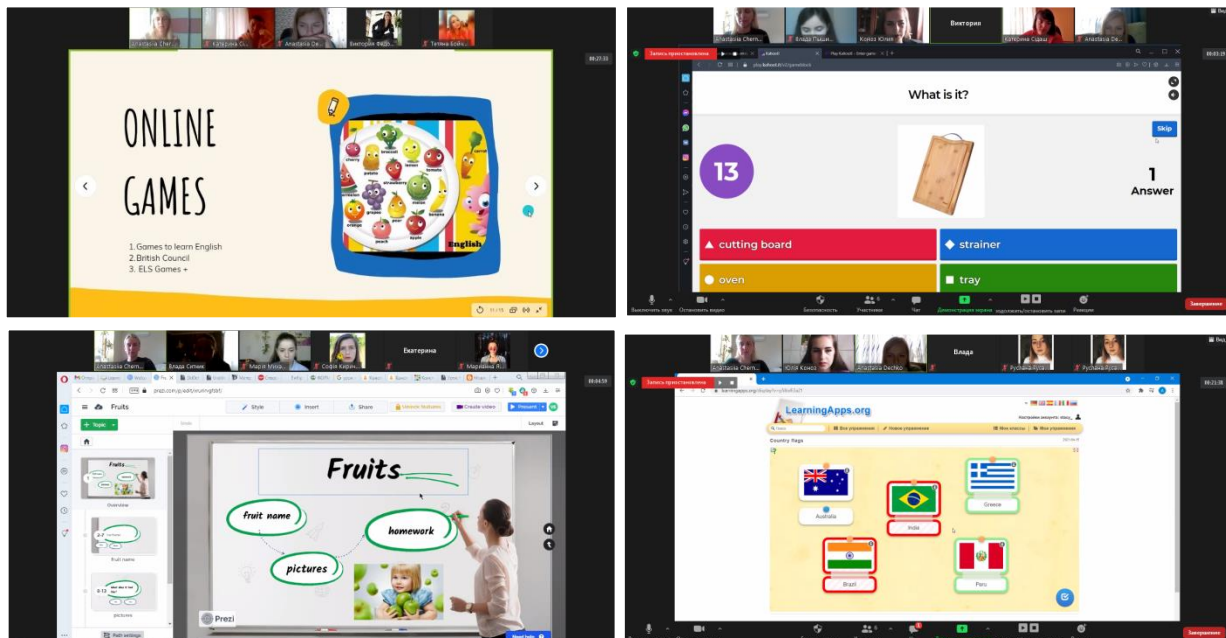


Figure 1. The practice of teaching English using ICT tools

## DISCUSSION

In considering the nature of general information and digital competence, we support the point made by Janssen et al. (2013) whose comment that digital and information competence clearly involves more than knowing how to use devices and application which is intricately connected with skills to communicate with ICT, as well as information skills.

Sensible and healthy use of ICT requires particular knowledge and attitudes regarding legal and ethical aspects, privacy and security, as well as understanding the role of ICT in society and a balanced attitude towards technology.

However, most scholars define information and digital competence as a set of skills, abilities and knowledge in the area of ICT and reflect the diversity of its elements, as well as its crucial role in the development of

the personality of the future specialist (Ilomäki, et al. 2016).

Due to its nature, we would like to note that amidst the formation of digital society, information and digital competence deserves special attention as an integrated element of the modern specialist, ensuring the productivity of its activities in various areas.

Based on the requirements of the latest reforms, information and digital competence allows solving problems in various areas of human activity on the basis of the ability to search, process information using digital technologies.

Thus, our analysis of the subject matter and content of the concept of “information and digital competence” in the academic and pedagogical publications is important for our study.

In our study, the concept of “information and digital competence” will be considered based on the interpretations of the concepts of “information competence” and “digital competence” provided above.

## CONCLUSION

Therefore, based on the analysis of academic and pedagogical publications, it can be concluded that the information and digital competence of specialists in various areas is a pressing issue in pedagogical science.

The academic community discusses the subject matter of the concept of information and digital competence. We found that the structure of information and digital competence is understudied. This necessitates further clarification of the structural-component analysis of information and digital competence.

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## CONFLICT OF INTERESTS

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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**АНОТАЦІЯ / ABSTRACT [in Ukrainian]:****ІНФОРМАЦІЙНО-ЦИФРОВА КОМПЕТЕНТНІСТЬ ЯК КЛЮЧОВА ВИМОГА СУЧАСНОЇ УКРАЇНСЬКОЇ ОСВІТИ**

Сьогодні, диджиталізації в освіті являє собою цифрову трансформацію, яка є не трендом, а вимогою часу. Таким чином, головним завданням навчання є впровадження цифрових технологій, які забезпечують удосконалення навчально-виховного процесу, доступність та ефективність освіти, підготовку молодого покоління до життєдіяльності у цифровому суспільстві. Цифрові технології змінюються, що в свою чергу потребує від студентів та викладачів вдосконалення своїх знань, вмінь і постійного розвитку. Інформаційно-цифрова компетентність в освітньому процесі допомагає викладачам реалізувати ефективно викладання матеріалу, використовуючи цифрові технології, які сприяють досягненню найкращих результатів. З розвитком ключових компетентностей, а саме

інформаційно-цифрової, виникає нагальна потреба – її формування у процесі навчання. Стаття присвячена проблемі аналізу сутності та змісту поняття інформаційно-цифрової компетентності в умовах сучасної української освіти.

**Метою** статті є дослідження поняття «інформаційно-цифрової компетентності» у науково-педагогічній літературі.

Для досягнення мети використано загальнонаукові **методи** теоретичного рівня: аналіз, синтез і систематизація праць авторів із проблеми дослідження поняття «компетентність», «інформаційна компетентність», «цифрова компетентність» та «інформаційно-цифрова компетентність»; логіко-системний, проблемно-цільовий, порівняльний аналіз з метою теоретичного обґрунтування особливостей інформаційно-цифрової компетентності.

**Результати дослідження:** у роботі зроблений ретельний аналіз термінів, що стосуються поняття «інформаційно-цифрова компетентність»; описані основні етапи розвитку цих понять; розглянуті та описані найбільш затребувані компетентності для навчання.

На основі аналізу науково-педагогічної літератури можна дійти **висновку**, що інформаційно-цифрова компетентність фахівців різних галузей є нагальним питанням у педагогічній науці.

**КЛЮЧОВІ СЛОВА:** цифрова компетентність, інформаційна компетентність, ключова компетентність, студенти.

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