The Digital Competences of a Specialist: Contemporary Realities of the Information and Technological Paradigm in the Age of Globalization

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Abstract: The article recounts that against the background of globalization processes that swept the world in the late twentieth century and left an indelible mark on the further progress of mankind there was a need to adapt the educational and social systems of Ukraine to functioning in the new conditions of crucial transformations caused by the dynamic changes triggered by universal digitalization, which now penetrates all branches and spheres of public life. It has been noted that the educational sphere is in a state of permanent change, trying to adapt to the new environment in order to ensure a decent level of training specialists of the relevant educational and qualification level capable of adapting to rapidly changing conditions, taking into account the competence acquired in the process of training. As a result, it is shown that in today's globalized world, the need to master digital competence at an appropriate qualification level comes to the fore, taking into consideration the factors of stair stepping and succession, in response to requirements and challenges of today's world, which even in a short period of time are able to significantly influence any sphere, transforming its further functioning. The content analysis of regulatory documents enabled to identify the main problematic aspects of the educational industry in the context of ensuring the compliance of the process of standardization of education at the relevant qualification levels, which is characterized by certain fragmentarity and inconsistency and requires further weighted and step-by-step transformative phases in the educational system of Ukraine ensuring its correlation with the European educational standards and guaranteeing its quality.

Keywords: *competence of specialist, digital competence, qualification levels, educational system, digitalization, regulatory documents.*

1. Introduction

Nowadays, in the conditions of evanescent changes and transformations, creation of new means of interaction, emergence of new challenges, the tasks of dynamic and timely response are raised before societies. These circumstances concern not only certain individuals, but also various forms of public cooperation, which, in turn, determine change in the established approaches to organization and support of functioning of individual industries and spheres of public activities, partly having the global nature.

Consequently, each country in the world is forced to adapt to act in the globalized world, adjusting the state's own mechanism and its components for the latest needs. The latter explains the need for permanent reform of basic industries and spheres of the state in order to ensure their effective functioning.

That is why in the national strategy for development of education in Ukraine for the period up to 2021 (Decree of the President of Ukraine No. 344/2013) the main ways of further innovative development of state policy in the sphere of education are indicated, the provision of which is dictated by the need to carry out fundamental changes taking into account new sociocultural conditions for its implementation, adapting to ongoing changes in the socio-economic, spiritual and humanitarian spheres.

However, in today's conditions, although "the priority of educational development is introduction of contemporary information and communication technologies that ensure improvement of the educational process, the availability and effectiveness of education, preparation of the younger generation to life in the information society" (Decree of the President of Ukraine No 344/2013), at the present stage of the development of the educational sphere, one of the problems is "low … ICT competencies and digital competencies of the population, the use of obsolete approaches in training and low motivation of the subjects of the educational process on the use of progressive ICT" (Bykov, 2019), and "… the large-scale nature of application of ICT tools in the global educational system has led to emergence of new methods and forms of training …, which are slowly introduced in the contemporary national educational system of Ukraine" (Bykov et al., 2017).

At the same time, the Concept of development of the digital economy and society of Ukraine for 2018-2020 (Decree of the CMU NO 67-R, 2018) provides that at present the basic industries of Ukraine undergo the stage of modernization, and education with the latest digital technologies can become much more efficient, creating new value and quality; in this

process, a prominent place is assigned to development of contemporary competencies, relevant to the current stage of public transformations on a global scale, and digital literacy is announced one of the main competences.

And the concept of development of digital competencies (Decree of the CMU No 167-R, 2021) points that in the current realities of the information and technological paradigm of the age of globalization, there is a need to improve the quality of training of employees to make possible modernization of the country's economy in accordance with the current requirements, since the absence of conceptual foundations of formation of state policy in the sphere of development of digital skills and digital competencies of citizens does not allow to ensure development of all areas of public life. All this predetermines the need to ensure readiness of the society to such processes, mastering key combinations of knowledge, skills, ways of thinking, views, other personal qualities in the sphere of information-communication and digital technologies (digital competence).

In the last few years, a number of publications have emerged in current scientific discourse in which scientists are trying to implement a comprehensive justification for the definition of "digital competence", exploring it in various aspects. Having conducted our own scientific research, we tried to follow the main trend on the analysis of the subject in the aspect of formation and development of the communicative personality, which gave us the opportunity to systematically approach its coverage. Therefore, having analysed the main approaches to the interpretation of the concept chosen by us to study, we consider it necessary to focus on the following.

Considering the problems of development of digital competence of the teacher in the information and educational environment of a general secondary education institution, the team of authors summarizes that "digital competence is the quality of the teacher, which means the ability and skill of systematic, logical and system use of ICT, indicating its actualness, mobility and competitiveness" (Kartashova et al., 2018).

Learning digital competence as one of the professionally significant competences of future teachers allowed the researcher to offer one's own vision of this category, characterizing it as a "complex complicated phenomenon that determines human activity in the information society and includes four types of competence" (Henseruk, 2019; Nerubasska et al., 2020; Nerubasska & Maksymchuk, 2020), in particular information and media competence; communicative competence; technical competence; consumer competence, having examined features of each of them.

Analysing contemporary educational phenomena of digital culture, digital literacy and digital competence, the authors state that "the concept of

"digital competence" compared to … the definitions of "digital culture" and "digital literacy" are much wider and is more general, since its semantic content contains both the skills of working in an information and communication (digital) environment as a leading sign of digital literacy, and a sociocultural component (new artifacts, new digital culture practices with relevant value targets and personal experience)" (Havrilova & Topolnyk, 2017).

The study of information and digital competence as a component of the current educational process made it possible to argue that the latter "is all but the most important component of the current educational process", which, in its essence, is "the integrative education, which reflects ability of a personality to define information needs, search for information and efficient work with it in all its forms and representations both in traditional, printed form and electronically; the ability to work with computer equipment and multimedia technologies, the skills to apply them in professional activities and everyday life" (Zaporozhtseva, 2019).

The scientific research of the team of authors enabled to identify "components of formation of digital competence…: value-motivational…, meaningful…, activity…, reflexion …", "… the levels of formed digital competence … (high, medium, low)", "criteria and formation indicators … of digital competence – motivational…, cognitive-information…, technological-activity…, personality-reflexive…" (Romanovskyi et al., 2018).

The content analysis of the digital competence framework for citizens in order to determine the level of competence in the field of digital technology allowed the researcher to conclude that it "can be used to develop training programs at different levels, taking into account that … the descriptors are such that may be achieved by integrating into various items … In addition, it is important that the descriptors are reflected at the level of evaluation of key competencies of a person, which today is achieved through the standards of … education, as well as professional qualifications requirements" (Ovcharuk, 2018).

Developing the specified direction in other publications, the scientist claims that "the digital competence today is defined as one of the key competences for lifelong study and is reflected in the latest strategic documents of international organizations and in the European educational standards" (Ovcharuk, 2020). In addition, the digital competence framework for citizens "have turned into a landmark for most European educational systems that create standards and training programs for educational institutions of all levels. It should be emphasized that it complies with strategic instructions, proclaimed by the European educational community in the updated framework of key competencies for lifelong learning…, where

digital competence is determined by key and end-to-end competences"
(Ovcharuk, 2020).

In the aspect of our study, new scientific publications of foreign
authors who reveal other, less studied aspects of the problems addressed by
us are important. So, the approaches described in (Cahen & Borini, 2020)
and (Falloon, 2020) that allow to evaluate anew the existing state of affairs in
this area and offer the latest solutions the search of which requires a deep
scientific analysis, deserve attention.

The purpose of the article is the analysis, systematization and
coverage of the main approaches to understanding the digital competence of
a specialist through the prism of regulatory documents in the conditions of
implementation of the policy of further digital development of the state and
the universal digitalization of the basic industries of Ukraine, in particular
digitalization of education, which is intended to contribute to formation and
further development of the communicative personality who has the
necessary knowledge and skills.

Having selected as the purpose of the study the digital competence
of a specialist, the basis of the submitted article included a number of
interrelated and interdependent methods of scientific research, and first of
all we used the basic approaches of comparativistics, which envisages
comparison of a certain system (a set of skills and knowledge at an
appropriate educational level, which fixed by the current regulatory
documents of Ukraine, designed as a whole to form a holistic education
contributing to the formation and further development of a communicative
personality) with others (NQF, ISCEd, EQF, Digcomp), which ultimately
allowed to identify and clearly demonstrate their specificity. In the course of
the study, elements of the decomposition method were used to split a
complex subject of research to its simple components with the involvement
of the decomposition modelling methodology, that is, reproduction of the
decomposition model and comparing the new model with the existing
before the system decomposition. Considering the specifics of the object of
the study, we also used a regulatory method, which is justified by the set of
standards, which now reflect the efficiency of the system (target and real),
where at the final stage the real system was compared with the normative,
which made it possible to identify the nature of deviation from the norm,
focusing on the need to implement corrective measures. In addition, we
used the method of analogies to identify commonalities and differences and
(where it was necessary) transfer of the explanation system from one object
to another. Obviously, the study would be incomplete without application of
the method of patterns concluded in the search for stable and non-random

characteristics, setting of links between individual elements of the subject of research, as well as the systematization method through consolidation of the available research information into the system, which made it possible to explain them from the position of the system approach, and the method of generalization, the application of which made it possible to carry out the transition from individual to the general.

2. The main trends in digital education in the context of postmodern experience and globalization

Recently, the social fact that the hyper-liberal legacy of postmodern culture and, on the other hand, digital technologies have dramatically changed life, psyche, society, ways of knowing and self-expressing of an individual, which has both significant global and personal meaning and significance, has become too obvious. (Keengwe, 2018; Walters & Kop, 2009). In this regard, as well as in the context of the stated topic, it is worth focusing on the main trends in digital education (and even the existence) of the individual, who became an immanent carrier of postmodern globalization phenomena, and now even went beyond cultural and historical boundaries (the "Post-" era). We are especially interested in the educational metamorphoses of the late twentieth and early twenty-first centuries.

Thus, back in the late 1990s and early 2000s, a metaphorical notion of cyberspace or "hyperuniversity" emerged as a place and tool for postmodern education (O'Gorman, 2004). On the one hand, such education presupposes the maximum movement of the individual in the digital environment in search of the most relevant knowledge and competencies, on the other hand - the phenomenon of postmodern hyperreality includes not so much physical and social laws as the "movement of simulacra", cultural meanings that can be artificial, interdisciplinary, short-lived, etc., but should be taken into account by those who are going to professionally interact with society and fulfill one's potential. It is clear that acquisition of relevant competencies by a non-marginalized individual in such conditions presupposes transactionality, performativity, generation of knowledge here and now, total digitalization and the ability to stay in it as an alternative but full-fledged reality and the source.

With the development and accessibility of the Internet at the end of the 1980s-1990s, which coincided with the peak of development of the postmodern consciousness (non-conformist and individualistic in its essence), the problem of a total revision of digital education and a new type of competencies necessary for an individual in the globalist era was posed. The postmodern educational philosophy assumes that the classical

foundations of the education system and even the individual pedagogical styles of teachers in no way can be an example of a flexible and universal model for a single, indefinite and multimodal personality. In this regard, Uzun defines the main problem of education: it remains static, administered and regulated, while the postmodern globalized reality requires effectiveness, flexibility, and relevance. However, not so much knowledge as instant competencies in solving indefinite spontaneous tasks (Uzun, 2017, p. 42). It is clear that digital self-education, as well as basic digital competencies, are becoming necessary factors of personal development and adaptation to a new type of cultural and social reality.

For a long time, education was based on the modernist principles – "the search for truth, self-government and self-fulfilment". But they failed in the digital era, since the latter (coinciding with the postmodernism) presupposes a rejection of classical universalism in favor of self-creation of a personality with self-acceptance of its unique modalities, which are difficult to fit into a concept, but are easy to develop in a totally accessible digital space. A few years ago, Feldman appreciated the freedom of postmodern self-expression and self-creation of a personality using digital opportunities and came to the conclusion that the synergy of postmodernism, digitalization and globalization contributes to "a permanent ongoing creative and dynamic process of the self-emergence of a personality", which is essentially the highest form of liberalism, democracy and the opportunity to fulfil personal existence (Feldman, 2017).

Since postmodernism is a society of opportunities, hedonism and polyphony of meanings and life goals, new communicative tactics using digital media continue to form on its experience even in recent decades, focused on management, transformation of society, marketing, fashion, politics, etc. Thus, the concepts of "commodity", "demand" and "need" are maximally expanded and require new communication strategies, the use of digital potential, interactivity, generation of meaning and many other phenomena (Goneos-Malka et al., 2013). On the one hand, this opens up new opportunities for business and art, on the other, it requires a contemporary person to develop new competencies, both in terms of resistance to the polysemantic continuum and in terms of active participation in it.

It is known that, taking into account the postmodern experience of the end of the twentieth century, as well as the constantly expanding computer and Internet capabilities, the digital education system in Europe and the United States has finally acquired the direction of general accessibility to the educational platforms, development of mobility and the

ability to continuous self-learning in a smart environment, etc. But problems remain: for example, it is still not clear who will control and be responsible for the individual digital self-education of future professionals, how can individual competency profiles be correlated with statistical, industrial and national requirements? In this context Tammaro carefully analyses the "Digital heritage of Europe". He comes to the conclusion that the learner in the digital environment is not a student, but a user who uses and creates: "The digital shift has radically changed the way of creation, distribution, access, consumption and monetization of cultural heritage. One of the most important revolutions is that the role of the user has changed dramatically, moving from passive observers to active participants and content producers with many new and exciting opportunities for interaction, creative use and access" (Tammaro, 2017, p. 290). Proceeding from this, everyone should understand that he/she (using the digital opportunities of education, self-education and transformation in some part of the culture) bears part of one's personal responsibility and involvement in global processes.

Now everyone has finally understood: digital education after the "Post-" era is no longer about a structure and a system, but an indefinite environment with a high level of entropy, which we must personally organize and sort out. This changes the phenomenology and existence of the contemporary young person, who, before starting one's studies, is already in a digital dynamic environment. And it is not just a tool, but a way of the existence of a person. Scientists Balyer and Öz grew interested in the digital transformation as a qualitative parameter of a person in the globalization era. They collected opinions and views on digital education and governance among professionals through a semi-structured interview form (Balyer & Öz, 2018). The main conclusion of the scientists is the need for minimal control of the digital educational process and the maximum provision of space, time, content and infrastructure, within which an average competence person can self-organize.

At this stage, we probably need to come to certain conclusions: personal and summarized from authoritative sources. Thus, Batat, who reviewed postmodern studies, came to the conclusion about the emergence of a special consumer culture that covers a wide range of anthropological phenomena: from instinctive ones to educational and ideological ones. The author made an important generalization: "The main patterns of behaviour of the 'new consumer' can be defined in various categories, such as: empirical and hedonistic behaviour, digital and competent behaviour, paradoxical behaviour, responsible and ethical behaviour, co-production and active participation, extension of rights and opportunities, independent

behaviour" (Batat, 2011). This heterogeneous set of motivational resources of the digital person testifies to his / her active role in the segmented transformation of oneself and society, simultaneously with the ability to stay in a relatively autonomous existential modality.

Now we can say that digital and even analogue education is more likely not a purposeful activity with specific goals, but rather a way of an individual stay "within social, political and historical contexts" (Fernández-Balboa, 2003, p. 151). This total process even touched upon such classical aspects as ethical and physical upbringing and education. Now every more or less conscious person creates oneself within the framework of personal performance pedagogy and, naturally, uses digital resources, simulacra, cultural meanings and even ways of fulfilling one's needs as sources of sensory, intellectual and value knowledge.

3. Case Justification

The current realities testify that the world around is constantly changing, and a contemporary person is forced to permanently adapt to life and activities in the latest conditions, because now public transformations occur quite dynamically, which tells on all spheres of society functioning. Under such circumstances, the problem of training a specialist who can effectively cope with the current requirements and challenges is growing significantly important, and the education system is designed to play a decisive role in their preparation to this process, the main purpose of which at this time is seen in ensuring their development as personality, in formation of their value, motivational, spiritual and moral components, horizons and worldviews, which jointly form their competence.

Each historical era of social development predetermined priority of certain skills and knowledge necessary to a specialist for effective vital activity in the relevant realities. Consequently, together with the crucial changes, which are currently undergoing in the globalized world, the results of training specialists which allow them to find their way around and act in current conditions, which are embodied in the concept of their digital competence, chosen by us for more detailed consideration come to the fore.

4. Multifactorial Case Analysis

Taking into account the fact that until recently the Ukrainian legislator did not use the concept of "digital competence", we decided to analyse the generic concept of "competence", which, as it turned out, has a different

context, depending on the regulatory and administrative document in which it appears. The corresponding generalization is given by us in Table 1.

Table1. Definition of "Competence" in the regulatory environment of Ukraine

Regulatory document	Definition
Resolution of the Cabinet of Ministers of Ukraine "On Approval of the National Qualifications Framework" 2011 (Resolution of the CMU No 1341, 2011)	human ability to fulfil a certain type of activity, expressed through knowledge, understanding, skills, values, other personal qualities
– Law of Ukraine "On Education" (Law of Ukraine No2145-VIII, 2017) – Resolutions of the Cabinet of Ministers of Ukraine "On Approval of the National Qualifications Framework", 2019. (Resolution of the CMU No509, 2019) and 2020 (Resolution of the CMU No519, 2020) – Order of the Ministry of Social Policy of Ukraine "On Approval of the Methodology for Development of Professional Standards" (Order of the Min. Soc. Policy No74, 2018)	a flexible and dynamic system of qualities of the human psyche (from reflex - to worldview), which determines the level of adaptive, activity and creative abilities of a person in society
Law of Ukraine "On Higher Education", 2014 (Law of Ukraine No1556-VII, 2014a)	dynamic combination of knowledge and practical skills, ways of thinking, professional, ideological and civil qualities, moral and ethical values, which determines the human ability to successfully implement professional and further educational activities and is the result of training at a certain level of higher education
Law of Ukraine "On Higher Education", 2019 (Law of Ukraine No 1556-VII, 2014b)	personal characteristics of a person that determine the need, opportunity and quality of social adaptation, including communication, training, professional activity, civic engagement, etc.

Besides, in the opening part of the National Qualifications Framework of 2011, which is the basis for determining the competence of a specialist of the relevant qualification level, it is stated that the purpose of its implementation is, among other things, "introduction of the European standards and principles of ensuring quality of education, taking into account the labour market requirements to competences of specialists" (Resolution of the CMU No 1341, 2011).

The first mentioning of the concept of "digital competence" at the legislative level in Ukraine was made in the Concept of digital competencies development adopted in early March 2021 (Decree of the CMU No 167-r, 2021), where this concept is understood as "dynamic combination of knowledge, skills, methods of thinking, views, other personal qualities in the field of information-communication and digital technologies, which determine the ability of a person to be successfully socialized, to carry out professional and/or further educational activities using such technologies".

According to the European Qualifications Framework of 2017, the competence is a proven ability to use knowledge, skills and personal, social and/or methodological abilities in working or educational situations, in professional and personal development (Council Recommendation 2017/C 189/03, 2017).

In May 2018, the EU Council adopted Recommendation on key eight competences for lifelong learning. According to this document, the key competences are considered to be those that all people need for personal fulfilment and development, the opportunities of employment, social involvement, maintaining a sustainable lifestyle, ensuring successful residence in peaceful communities, a conscious attitude to one's own life and health, active citizenship. These competencies are designed to be gained by individuals throughout their lives, starting from early childhood and ending in the adult life, through formal, informal learning of all kinds. All key competencies are considered equally important; each of them contributes to ensuring a successful social life. They are combined with each other, and critical thinking, solving problems, teamwork, communication and negotiation skills, analytical skills, creativity and intercultural skills are innate in all key competencies (Council Recommendation 2018/C 189/01, 2018).

One of the mentioned key competencies is the digital competence, which involves confident, critical and responsible use of digital technologies for study, work and public participation, interaction with them.

To confirm the expressed argument, the European experts on organization of the educational process, the digital competence is considered as a set of knowledge, skills, views, abilities, strategies, values, and awareness

necessary in the process of using ICT and digital media in order to fulfil the tasks, solving problems, communication, information management, cooperation, creating and distributing content, acquisition of knowledge on the principles of performance, efficiency, compliance, critical relationship, creative approach, autonomously, flexibly, ethically, which has its own manifestation in work, rest, participation, training, socialization, consumption and exercise of authority (Ferrari, 2012).

Digital competence frame for DigComp 2.0 citizens, which was released in 2016, is considered by its authors as a multipurpose tool that can be used in the context of education, specialists' training and employment, in particular regarding formation and maintenance of relevant policies; education planning, specialists' training and employment estimates and certification (Vuorikari et al., 2016).

The conceptual reference model DigComp 2.0 provides five spheres of digital competence, namely: information and literacy on data use (1.1 Review, search and filtering data, information and digital content; 1.2 Evaluation of data, information and digital content; 1.3 Management of data, information and digital content); communication and cooperation (2.1 Interaction through digital technologies; 2.2 Exchange through digital technologies; 2.3 Implementation of one's own civic position through digital technologies; 2.4 Collaboration through digital technologies; 2.5 Network etiquette; 2.6 Digital identity management); Creating digital content (3.1 Development of digital content; 3.2 Integration and re-development of digital content; 3.3 Copyright and license; 3.4 Programming); safety (4.1 Device protection; 4.2 Protection of personal data and privacy; 4.3 Health protection and ensuring well-being; 4.4 Environmental protection); solving problems (5.1 Solving technical problems; 5.2 Determination of the needs and technological measures of response; 5.3 Creative use of digital technologies; 5.4 Identifying gaps in digital competence) (Vuorikari et al., 2016).

The continuation and advanced version of DigComp 2.0 became DigComp 2.1, which was made public in 2017 and it gives an idea of the eight levels of skill: base (1 and 2), medium (3 and 4), advanced (5 and 6), highly specialized (7 and 8), in each of which a stepwise approach for acquiring competence by a person in accordance with their cognitive abilities, the complexity of the tasks they carry out and autonomy, on their successful completion. The eight levels of skill mentioned above for each competence were defined in the form of learning outcomes; at the same time, the European Qualifications Framework (EQF) was taken into account (Carretero et al., 2017), which allows us to make an assumption of mutual correlation of EQF levels (Council Recommendation 2017/C 189/03, 2017) with the skills

levels DigComp 2.1 (Carretero et al., 2017), the display of which on one of the spheres of digital competence we present in Table. 2.

In general, the considered Digital Competence Framework for citizens DigComp 2.1 contains 168 descriptors that reflect the corresponding skill level (1 and 2 – base; 3 and 4 - medium; 5 and 6 – advanced; 7 and 8 - highly specialized), each of which contains knowledge, skills and abilities embodied in a single generalized description for a certain level of each of the five areas of digital competence, which are detailed in DigComp 2.0, which, in our opinion, are designed to contribute to formation and further development of a communicative personality in the contemporary globalized world.

Table 2. Correlation of the EQF levels with the components of the digital competence Framework for citizens (DigComp 2.1) in the context of the educational system Modelling Strategy in the Conditions of Ukraine

EQF Level	Skill levels and components of DigComp 2.1 (on the example of the sphere of digital competence 1. Information and literacy on the use of data)		
Primary Education (1)	Base	1	At the base level under guidance, a specialist is capable of the following: – feel and comprehend one's information needs and capabilities, – navigate the information environment in order to optimally search for data, – find, qualify and use digital data in the most efficient way, – determine the quality, reliability and relevance of data, – choose the best way to store, structure, use and transform content.
Base Secondary Education (2)		2	At the base level, autonomously and with the relevant recommendations, where it is necessary, a specialist is capable of the following: – feel and comprehend one's information needs and capabilities, – navigate the information environment in order to optimally search for data, – find, qualify and use digital data in the most efficient way, – determine the quality, reliability and relevance of data, – choose the best way to store, structure, use and transform content.

Secondary Education (3)	Medium	3	Solving clearly formulated problems, a specialist is capable to do the following independently: – argue the nature, goals and prospects of one's information needs, – possess algorithms for data search and work with different types of content, – be able to communicate digital competencies and personal experience with data to others, – be able to communicate to others routine and creative methods and strategies for finding the necessary data, – analyse data for relevance, reliability, – select, stratify, qualify, analyse and process relevant data, – explain to others how to find, check, select, process, analyse information in a digital structured space in routine and creative ways and strategies.
Post-Secondary Education (4)		4	Independently, in accordance with one's own needs and in the process of solving clearly defined and non-standard problems, a specialist is capable to do the following: – make visual one's information needs, – organize search of data, information and content in digital environments, – describe how one can access these data, information and content and navigate them, – organize personal search strategies, – analyse, compare and interpret in the necessary aspects data and content in the digital environment, – structure information for optimal placement in the digital environment.
Short Cycle of Higher Education (5)	Advanced	5	In addition to guiding others, a specialist is able to do the following: – adequately and effectively implement one's information needs, – use standard and personal strategies for searching, selecting and processing data in the digital environment, – possess personal tools for assessing reliability, effectiveness, relevance and liquidity of data and content, – transform relevant content and data for a more convenient and efficient use,

			– master the basic methods of manipulating information in a structured environment.
First Cycle of Higher Education (6)		6	At an advanced level, in accordance with one's own needs and the needs of others, as well as in difficult situations, a specialist is able to do the following: – assess information needs, – adapt one's own search strategy in order to find the most relevant data, information and content in digital environments, – explain how this most relevant data, information and content can be accessed and navigated, – vary personal search strategies, – critically assess validity and reliability of data sources, information and digital content, – critically evaluate data, information and digital content.
Second Cycle of Higher Education (7)	Highly Specialized	7	At a highly specialized level, a specialist is able to do the following: – design solutions to complex problems under conditions of uncertainty associated with: a) browsing, searching and filtering data, information and digital content; b) analysis and evaluation of valid and reliable sources of data, information and content in digital environments; c) management of data, information and content in order to organize, store and retrieve them in a structured digital environment, – generalize one's knowledge, contributing to development of professional practice and knowledge, instructing other people on the following: a) viewing, searching and filtering data, information and digital content; b) analysis and assessment of reliability and authenticity of data, information and digital content, as well as their sources.
Third Cycle of Higher Education (8)		8	At the highly advanced and specialized level, a specialist is able to do the following: – design solutions to complex problems with many interrelated factors on: a) viewing, searching and filtering data, information and digital content; b) analysis and evaluation of reliable and authentic

			sources of data, information and content in digital environments; c) management of data, information and content in order to organize, store and retrieve them in a structured digital environment, – propose new ideas and establish processes in the relevant field.

Sources: Council Recommendation (2017)/C 189/03 (2017); Carretero et al. (2017)

Let us now focus on the study of Ukrainian realities. So, according to the current legislation of Ukraine, competences and learning outcomes are the basis for awarding educational and / or professional qualifications; their receipt by a future specialist of the appropriate qualification level can occur both in the system of formal ("education received through educational programs in accordance with the levels of education determined by legislation, branches of knowledge, specialties (professions), which implies that students achieve learning outcomes of the corresponding level of education, determined by educational standards, obtaining qualifications recognized by the state" (Law of Ukraine No 2145-VIII, 2017)), non-formal ("education obtained, as a rule, through educational programs that does not provide for the award of state-recognized educational qualifications by educational levels, which, however, may end with awarding professional and / or partial educational qualifications" (Law of Ukraine No 2145-VIII, 2017)) or non-formal education ("education that provides for self-organized acquisition of certain competencies by a person, in particular in the process of daily activities related to professional, social or other activities, family or leisure" (Law of Ukraine No 2145-VIII, 2017), so-called self-education).

Thus, a student - a future specialist of the corresponding qualification level should receive a complete list of competencies of the corresponding level (0-8) of the National Qualifications Framework. Such an exhaustive list of competencies in accordance with the normative documents of Ukraine should be determined by the relevant education standard, which establishes "requirements to mandatory competencies and learning outcomes of a student of the appropriate level" (Law of Ukraine No 2145-VIII, 2017) and it is based on the National Qualifications Framework, which, in turn, is the basis for development of an appropriate educational program for a certain qualification level, and the latter assumes achievement of learning outcomes (competencies) by students, defined by the corresponding educational standard. Given that the National Qualifications Framework has undergone several transformational changes, we consider it appropriate to provide its

comparative analysis over several years (Resolutions of the CMU No 1341, 2011; No 509, 2019; No 519, 2020), given by us in Table 3.

In general, the toolkit of the National Qualifications Framework makes it possible to quite clearly classify, compare and standardize competencies at the corresponding qualification levels (0-8) and forms the basis for qualifications obtained in the education system of Ukraine.

Table 3. Comparison of editions of the National Qualifications Framework over past several years

Qualification level	Editions of National Qualifications Framework		
	2011 (Resolution of the CMU No 1341, 2011)	**2019** (Resolution of the CMU No 509, 2019)	**2020** (Resolution of the CMU No 519, 2020)
	Integral competency (a generalized description of the qualification level, which expresses the main competence characteristics of the level of training (since 2019 - learning outcomes) and / or professional activity)		**competency**
0	The ability to act adequately in known simple situations under direct control. Readiness for systematic training	The ability of a person to act adequately in known simple situations under the direct control of another person	Dynamic combination of knowledge, abilities, skills, ways of thinking, attitudes, values, other personal qualities that determine a person's ability to socialize successfully, carry out professional and / or further educational activities
1	The ability to perform simple tasks in typical situations in a well-defined, structured area of work or study. Performing tasks under direct supervision. Readiness to learn at the next level	The ability of a person to perform simple tasks in typical situations in a well-defined structured area of work and / or study, to perform tasks under direct supervision of another person	
2	The ability to perform typical, simple tasks in typical situations in a well-defined structured area of work or study. Guided tasks with elements of self-reliance	The ability of a person to perform typical simple tasks in typical situations in a well-defined structured area of work and / or study, to perform tasks under guidance with elements of independence	
3	The ability to perform production or educational tasks of average complexity according to certain algorithms as per established norms of time and quality	The ability of a person to perform production or educational tasks of average complexity according to certain algorithms and established norms of time and quality	

4	The ability to personally solve high-level professional production problems using non-standard approaches	The ability to personally solve high-level professional production problems using non-standard approaches	
5	The ability to solve typical specialized tasks in a specific area of professional activity or in the learning process, involving application of provisions and methods of the relevant science and characterized by a certain uncertainty of conditions	The ability to solve non-standard educational and professional problems in a specialized field responsibly and effectively and be responsible for the results in any regular situation. The ability of a person to independently solve complex specialized production or educational problems in a particular area of professional activity and / or in the learning process, to be responsible for the results of one's activities and the activities of others in certain situations.	
6	Ability to solve production problems in uncertain conditions using special scientific or practical methods.	The ability to solve typical problems of a certain professional sphere in conditions of uncertainty, complex complicating parameters, as well as to be responsible for the results of practical professional activity, to be able to manage others and be responsible for them.	
7	Have the ability to achieve professional results through innovation, research and operational self-learning.	Solve complex, multifaceted production problems using the latest effective methods and self-study under conditions of uncertainty. The ability of a person to solve complex specialized tasks and practical problems in a certain area of professional activity or in the learning process, involving application of certain theories and methods of the relevant sciences and characterized by the complexity and uncertainty of conditions.	

8	The ability to solve complex problems in the field of professional and / or experimental and innovative activities, involving a deep rethinking of existing and creation of new holistic knowledge and / or professional practice	Ability to solve complex professional problems in uncertain conditions that require prompt solution, self-study and / or research.	
9	The ability to define and achieve social goals, which are key to ensure sustainable development and require creation of new systemic knowledge and progressive technologies	To comprehensively solve professional problems that require creative rethinking of their essence and production of new knowledge and solution strategies.	n/a
10	n/a	The ability to outline a systemic social problem associated with sustainable development of society; to have the ability to develop new personal strategies for solving it with the help of innovative technologies and complex interdisciplinary knowledge.	n/a

According to the updated in 2020 National Qualifications Framework, the number of qualification levels corresponds to the number of levels of the European Qualifications Framework, as stated in (Law of Ukraine No 2145-VIII, 2017).

Taking into account the fact that the National Qualifications Framework was developed taking into account the best world achievements in the field of education, and the national education systems on a global scale are very different both in structure and content, it is important to have tools that would ensure comparability of the relevant components. So, for comparison, we have selected three documents, the first of which applies to the national education system, the second - to the international, and the third one - to the European level. Ratio of the National Qualifications Framework (Resolution of the CMU No 519, 2020), International Standard Classification of Education (ISCEd 2011; 2012) and the European Qualifications Framework (Council Recommendation 2017/C 189/03, 2017) are given in Table 4.

Table 4. Inter-relation of NQF (2020), ISCEd (2011) and EQF (2017)

NQF 2020 (Resolution of the CMU No 519, 2020)		ISCEd 2011 (ISCEd 2011, 2012)		EQF 2017 (Council Recommendation 2017/C 189/03, 2017)	
NQF Level	Level of Education	ISCEd Level	Level of Education	EQF Level	Level of Education
0	preschool education	0	Young children education (01 early childhood development; 02 preschool education)	n/a	
1	primary education	1	primary education	1	primary education
2	– basic secondary education – first (initial) level of professional (vocational) education	2	first stage of secondary education	2	basic secondary education
3	– field-specific secondary education – second (basic) level of professional (vocational) education	3	second stage of secondary education	3	secondary education
4	third (highest) level of professional (vocational) education	4	post-secondary non-tertiary education	4	post-secondary general education
5	– third (highest) level of professional (vocational) education – vocational pre-higher – entry level (short cycle) of higher education	5	short cycle of tertiary education	5	short cycle of higher education
6	first (bachelor's) level of higher education	6	undergraduate or equivalent	6	first cycle of higher education

| 7 | second (master's) level of higher education | 7 | Master's programme or its equivalent | 7 | second cycle of higher education |
| 8 | – third (scientific and creative) level of higher education (*was brought into the scientific sphere in April*) | 8 | doctoral programme or its equivalent | 8 | third cycle of higher education |

5. Implementation and evaluation

As noted above, an exhaustive list of competencies at the appropriate level (0-8) of the National Qualifications Framework should be determined by the relevant educational standard. Therefore, taking into account the stage of transformational changes in Ukrainian education and introduction of the latest trends of our time into the practice of the education system, in particular its digitalization, we set ourselves the goal to investigate how the provisions of regulatory and administrative documents of Ukraine correlate with the corresponding educational standards.

In general, we are impressed by the approach proposed by the team of authors, where they substantiate the idea of the necessity to introduce a structured and delimited approach to standardization of competencies, which is relevant to our research and, in our opinion, to a certain extent correlates with the National Qualifications Framework, International standard classification of education and the European Qualifications Framework we discussed earlier. Thus, it is proposed to rank competencies according to the following levels: I initial (possession of an idea) or introductory; II minimum-basic; III basic; IV higher (expansion of basic competencies) / advanced; V advanced / research; VI research / expert (Bykov et al., 2010), which we partially used when making the Table 5.

Table 5. Comparison of educational standards in Ukraine in terms of formation of digital competence in a specialist

NQF 2020 Level	Education standard	Components designed to form digital competence in a specialist
0	The basic component of preschool education (State standard for preschool education) (Order of the MESU No33, 2021)	*Educational direction "A child in the sensory-cognitive space. Computer literacy" of variable component* Digital competence is the ability to use information, communication and digital technologies to meet one's own individual needs and to solve educational, game problems based on the acquired elementary knowledge, skills, a positive attitude to

		computer and digital technology. *Skills*: a child is able independently or with partial help from an adult, to turn on computer equipment and use it during play, drawing, designing, modelling. He/she knows how to receive the necessary information, consciously consume media products, is capable of transferring active practical knowledge to the field of sharing experience. He/she follows the safety rules when using computer technology. He/she controls oneself while communicating on the Internet and computer games, shows the ability to behave safely with strangers on the network. He/she shows responsibility in relation to respect for computer technology. He/she can deliberately differentiate and select cognitive and game content, characterizes its content. He/she demonstrates the ability to finish using a device (computer, tablet) in time.
1	State standard for primary education (Resolution of the CMU No87, 2018)	The key competencies include *information and communication competence*, which provides for mastering the basics of digital literacy for development and communication, the ability to safely and ethically use the means of information and communication competence in learning and other life situations. The goal of the *informatics educational sphere* is formation of information and communication competence and other key competencies, the ability to solve problems using digital devices, information and communication technologies and critical thinking for development, creative expression, personal and public welfare, skills of safe and ethical activities in the information society. *A student:* – finds, submits, transforms, analyses, summarizes and systematizes data, critically evaluates information for solving life problems (examines the information surrounding world; finds, submits, transforms, analyses and stores data of various types; selects objects to create models; critically evaluates information from different sources); – creates information products and programs for effective solution of tasks / problems, creative self-expression individually and in cooperation,

			with the help of digital devices and without them (develops and implements algorithms; creates and debugs software projects, develops modular projects; processes and creates information products using data of various types; collaborates in a team to create an information product); – deliberately uses information and communication technologies and digital devices for access to information, communication and cooperation as a creator and (or) consumer, and also independently learns new skills (uses a wide range of digital devices; organizes one's own information environment; communicates, learns and collaborates in the network communities); – realizes the consequences of the use of information technologies for oneself, society, the surrounding world and sustainable development, adheres to the ethical, intercultural and legal norms of information interaction (responsibly uses information technologies in everyday life, protects oneself and one's own information space; observes the norms of social, intercultural and interpersonal interaction; observes the norms of legal interaction).
2	State standard for basic secondary education (Resolution of the CMU No 898, 2020)	State standards for vocational (vocational and technical) education (MESU. Professional education, 2021)	The key competencies include the *information and communication competence*, which provides for the confident, critical and responsible use of digital technologies for one's own development and communication; the ability to safely use information and communication tools in learning and other life situations, observing the principles of academic honesty, manifested in the following skills: – solve problems with the use of digital devices, information and communication technologies for one's own and social development and well-being; – find, submit, transform, analyse, summarize and organize data using digital devices and programs to solve life problems; – apply an algorithmic approach and computational thinking to plan, develop and debug software projects for efficient problem solving and creative self-expression; – create information products individually or in a team using various digital devices and information technologies;
3			

			– use logical, systemic and structural thinking to build information models and understand the information picture of the world. The purpose of the *informative educational sphere* is to develop the personality of a student who is able to use digital tools and technologies to solve problems, develop, creative self-expression, ensuring one's own and public welfare, think critically, act safely and responsibly in the information society. Requirements for compulsory learning outcomes for students with an emphasis on the informatics education field assume that the student: – finds, analyses, transforms, summarizes, organizes and presents data, critically evaluates information to solve life problems; – creates information products and programs for effective problem / task solving, creative self-expression individually and in collaboration with others with or without digital devices; – deliberately uses information and communication technologies and digital tools for access to information, communication and cooperation as a creator and (or) consumer, and also independently masters new technologies; – realizes the consequences of the use of information technologies for oneself, society, the natural environment, complies with ethical, cultural and legal norms of information interaction. Besides, the student: – is ready to critically assess information, its significance and impact on individuals and society; – seeks to responsibly and safely use information and communication technologies and digital devices to access information, communicate and collaborate; – takes a balanced approach to the use of information technologies, adheres to ethical, intercultural and legal norms of information interaction.

4	No educational standards		For professional (vocational) education, the totality of the required set of competencies is determined by the relevant state standards for each profession specified in the State List of Professions for the training of skilled workers, in particular: – 377 vocational education standards dated 2006–2016; – 61 vocational education standards dated 2017; – 15 vocational education standards dated 2018; – 69 vocational education standards dated 2019; – 29 vocational education standards dated 2020; – 10 vocational education standards dated 2021 (as of early August).
5			For vocational pre-higher education and for the entry-level (short cycle) higher education, there are no approved educational standards and they only exist as projects. In July (Order of the MESU No 918, 2020) and in April 2020 (Order of the MESU No 584, 2020) the relevant Methodological Recommendations were approved, according to which such standards will be developed for each specialty, where among the general competencies are envisaged the following: the ability to use information and communication technologies, the ability to search, process and analyse information from various sources, the ability to interpersonal interaction, etc., which should correlate with the description of the respective qualification level of the NQF.
6	Higher education standards (MESU. Scientific and Methodological Council, 2021a)		The totality of the required set of competencies (in particular for the first, second and third levels) is determined by corresponding standards of higher education for each specialty, taking into account the basic requirements of the Methodological Recommendations (Order of the MESU No 584, 2020) (general competencies: the ability to use information and communication technologies, the ability to search, process and analyse information from various sources, the ability to interpersonal interaction, etc., which should correlate with the description of corresponding qualification level of NQF).
7			

		In particular, during 2018–2021 (as of early August) 195 standards were approved, specifically: – 107 standards for the first (bachelor's) level of higher education; – 88 standards for the second (master's) level of higher education
8	no educational standards	For the third (educational-scientific / educational-creative) level, there are no approved educational standards and they only exist as projects (MESU. Scientific and Methodological Council, 2021b). The norm that the educational and scientific program of postgraduate studies (adjunct studies) of a higher education institution (research institution) should provide for a graduate student (adjunct) to obtain a certain set of competencies in accordance with the NQF, in particular those related to the use of contemporary information technologies in scientific activities, are placed including without limitation in (Resolution of the CMU No 261, 2016). There are no educational standards for the scientific level of higher education, their development is not provided for by any regulatory and administrative document, except for the mention in the Law of Ukraine "On Education" that the educational standard determines the requirements for compulsory competencies and learning outcomes of a student at the appropriate level; the total scope of the student's workload; other components provided for by special laws, and is developed in accordance with the NQF, and the level of education is considered the completed stage of education, characterized by the level of complexity of the educational program, a set of competencies, determined, as a rule, by the educational standard and corresponding to a certain level of NQF (Law of Ukraine No2145-VIII, 2017). Similar formulations are also contained in special legislation, in particular in the Law of Ukraine "On Higher Education" (Law of Ukraine No1556-VII, 2014b).

Thus, taking into account the main results of the study, we have proved that in the conditions of crucial transformations which we experience right now, the need for specialists to obtain competencies relevant to the current period of social development is of primary importance, and the state's approach to formation and implementation of the corresponding state policy in this area should be characterized by consistency, continuity and sustainability.

In addition, the need for further transformations in the education system of Ukraine in the aspect of our research, in particular those related to development of standards for digital competencies of subjects of the educational process, is noted and most systematized is described in publications (Bykov, 2019; Bykov et al., 2010).

6. Conclusions

Summing up and generalising the results of the study set out during its implementation, we would like to note that a visual analysis shows that the education system of Ukraine, specifically the component of its standardization on the relevant qualification levels, designed to contribute to formation and further development of the communicative personality, who has the necessary set of knowledge and skills and abilities are characterized by certain fragmentarity and inconsistency. The identified gaps are manifested in breakdowns of continuity and the step structure of assimilation of relevant learning outcomes by a specialist, which, as a whole, actualizes the need for further improvement of this subject area.

Today, the education system faces new requirements and challenges caused by indigenous changes in all sectors and spheres of social activities, which to an extent is due to the course for their further digitalization, which in the next few years will determine their further transformation and necessitates adaptation to work and functioning in such public realities. The main task of all areas of social activities is seen here in creating favourable conditions to ensure their further efficiency and effectiveness in conditions of such dynamic changes.

Now the basic areas of social activities, trying to keep up with the times, adequately responding to new public transformation are becoming prioritized. Such basic areas include the education system, the main purpose of which is to ensure training of specialists of the relevant qualification level to effective and efficient work and activities, taking into account the requirements and challenges of modernity, which apparently lies in formation of their competence.

Therefore, tasks step forward depending on the need of arranging an educational process in such a way that, given the permanent dynamic changes, be able to prepare a specialist for further independent life. Certainly, currently acquired in the process of learning knowledge, skills and abilities (the so-called hard skills) will not be considered as a constant, however, they are able to become a basis for further improvement (acquisition of the so-called soft skills) throughout the life in the process of further development of communicative personality.

The contemporary stage of development of the education system should also be adapted to the requirements and challenges of modernity, expectations of the public and strive to form a reliable basis for future specialists, which is reflected in their competence. Unfortunately, the conducted study showed a certain non-systemic attitude in achieving this difficult goal, which, however, subject to ensuring consistency, reasonableness and sustainability, consideration of the best global achievements and practices can be overcome in a short period of time.

That is why we are convinced that the use of a holistic approach to reformation of the education system and its content can bring positive changes and results for all participants in the educational process in the near future.

In connection with the stated above, the promising direction in the context of the study, seems the analysis of the procedural aspects of standardization of the education content for individual sectors of knowledge and specialties, development and implementation of the necessary set of knowledge, skills and abilities in the practical activity, taking into account the latest global public trends characterized by the decisive influence for further development of both individual industries and spheres of public activities and ensuring effective functioning of the entire mechanism of the state.

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