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## Digital technology as a factor in the development of an informatized society: an educational perspective

### La tecnología digital como factor de desarrollo de una sociedad informatizada: Una perspectiva educativa

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### Abstract

Scientific exploration aims to analyze the synergistic effects of interaction and the mutual influence of educational and digital potential in the process of society development. The task of the article is to consider the information and digital factors relevant to the current Ukrainian socio-cultural space, affecting the level of education. The methodology used in the study is based on the methods of scientific and pedagogical discourse. So, the digitalization of education is an important element in the development of Ukrainian

society, as the skillful use of digital technology expands the worldview and professional skills of the participants in the educational process.

**Keywords:** digitalization of education, flexible skills, digital learning environment.

## Resumen

El objetivo de la exploración científica es analizar los efectos sinérgicos de la interacción y la influencia mutua del potencial educativo y digital en el proceso de desarrollo de la sociedad. La tarea del artículo es considerar los factores informativos y digitales relevantes para el espacio sociocultural ucraniano actual, que afectan al nivel de la educación. La metodología utilizada en el estudio se basa en los métodos del discurso científico y pedagógico. Así, la digitalización de la educación es un elemento importante en el desarrollo de la sociedad ucraniana, ya que el uso hábil de la tecnología digital amplía la visión del mundo y las habilidades profesionales de los participantes en el proceso educativo.

**Palabras clave:** digitalización de la educación, habilidades flexibles, entorno de aprendizaje digital.

## 1. Introduction

Informatization of Ukrainian society is an irreversible process of socio-cultural development of the community, experiencing the influence of globalization processes. Despite all the difficulties faced by Ukrainian society in recent years, the process of digitalization has not suffered a decline, but on the contrary, has become a kind of benchmark for further development. Digitalization has embraced all spheres of social activity, but it is the educational space that has become the environment in which ICT elements become the engines of development. Digitalization is implemented in theoretical and methodological and educational and practical dimensions in the educational system. The relevant issue is the relationship between the general level of public digital literacy in Ukraine and the qualitative indicators of the digital competencies of the participants in the educational process. Such principles form the education of the future, the basis of which is digitalization (Devadze et al., 2022). If we consider the prospects of positioning education in social advancement, we should consider it in the context of scientific and worldview paradigms. Consequently, we observe the signs of a post-non-classical model of education, in which digitalization plays a key role as the main source of educational knowledge and skills (Sanetra et al., 2022).

Digitalization of education in Ukraine is developing quite rapidly, as evidenced not only by the level of technological implementation of electronic digital learning environments but also by the awareness of the content of the digital component among the participants in the educational process. In particular, there is a clear distinction between online learning formats with the justification of the difference between distance and e-learning

(Goloborodko, 2022). Such a simple example shows the understanding of the role and status of ICT elements in the educational system. In particular, the information and digital cluster is defined not only as an auxiliary component of the traditional learning space but also implemented as an autonomous learning platform.

The modern world is developing dynamically, which is expressed in the intensification of all processes in the educational environment. Under such conditions, the problem of mechanisms and tools capable of supporting this advancement arises. ICT elements prove their effectiveness in pedagogical, research, international, economic, and economic clusters of educational space (Kholiavko et al., 2021).

Modern principles of pragmatism and competitiveness determine the prospects of educational development. Ukrainian educational institutions at all levels have accepted the challenges that are actualized in the modern socio-cultural space (Kryvoshein et al., 2022). Digitalization is characterized by the dynamism of educational activity, which leads to a certain chaotic nature of all processes related to pedagogical or scientific activities. The educational sphere is based on well-established principles, so it requires a clear ordering of its development. The content and form of the educational process should be structured and provide clear and reasonable goals for its activities. Such principles are spelled out in long-term and short-term educational strategies, which indicate both strategic planning of the status and role of the ICT factor in the development of education, and the operational inclusion of information and digital components in the educational system. The task of the modern scientific picture of the world is to form a nucleus through which the further development of society will take place, and ICTs are becoming one of the key components of this nucleus (Hörberg et al., 2019).

The aim of the article is to update the existing theoretical-methodological and educational-practical precepts of the process of education digitalization, taking into account modern socio-cultural trends in the development of information society. Transformations in education take place using synergetic methodological principles, due to which the innovative digital space is correlated with traditional models of educational strategies. The successful integration of information and digital components into the modern educational system confirms the effectiveness of the processes of digitalization and informatization of public activity.

## **2. Theoretical Framework or Literature Review**

The problem of digitalization in the Ukrainian system of education became more relevant with the introduction of ICT elements in the educational process. At the same time, the practical application of digital learning environments significantly warmed up this topic in the scientific and pedagogical discourse (Morze & Strutynska, 2021). Experience in implementing the digital component in the educational system Ukrainian education acquired the advanced examples of countries with a high level of technological development (Kryvoshein et al., 2022).

Sociocultural realities of recent years play a key role in the implementation of the principles of digitalization of education, forming signs of the revolutionary nature of these transformations, rather than evolutionary development. These aspects are reflected in the scientific research on the processes of education digitalization in today's realities (Chernenko, 2021). Note that the processes of digitalization of education have their own specificity when positioned at the global level (Karacabey et al., 2019) and in the national context (Kraus et al., 2021).

The constraints of the COVID-19 pandemic have actualized a number of scholarly studies that analyze the specifics of digitalized science and pedagogy (Williamson et al., 2020). The digitalization of education in scientific and pedagogical intelligence is considered in the context of different educational levels: primary and secondary school levels (Budnyk, 2018), higher education (Holovko & Kanishchenko, 2021).

The processes of digitalization in education have their own peculiarities in relation to individual knowledge clusters. The natural sciences, humanities, or philological sciences have their pedagogical specificity in the digital learning environment. Peculiarities of the application of ICT elements in philological education are investigated in the scientific exploration of Tolochko et al. (2019).

### 3. Methodology

The methodology used to study digital technologies in the educational development of society can be divided into several major clusters:

- general scientific methods (analysis, systematization), thanks to which a general understanding of the development of the Ukrainian educational environment in modern conditions of total digitalization of all components of its functioning is formed;
- methods of scientific and pedagogical discourse (pedagogical observation, modeling, forecasting), which allow to determine the features of the use of ICT elements directly in the educational process;
- scientific and sociological methods (classification, content analysis, social observation), the use of which allows to trace the processes of digitalization of education in the dynamics of social progress and identify the strengths and weaknesses of this process;
- scientific and philosophical methods (synergy) that contribute to the development of principles of interaction between the digital world and educational space to improve the quality of education and the overall level of digital competencies of participants in the educational process.

Relevant methods of research on the problems of digitalization of education have become: generalization - as a way to study the nature and essence of digital education; structuring - through which the prerequisites necessary to reform education through digital principles are explained (Kraus et al., 2021).

A separate methodological niche is a set of sociological methods, through which the understanding of the sociocultural dimension of the digitalization of education is formed. Social distancing, management of information flows (dosage of information, response to misinformation), work with large volumes of data, accounting of statistical indicators, behavioral technologies are all methodological tools relevant in the context of the current relationship between society, education, science, technology (Williamson et al., 2020). The use of a co-directed methodology helps to correlate the results of the digital transformation of education and the overall development of society.

#### 4. Results and Discussion

According to Chernenko (2021), there is a reorientation of digitalization according to the trend or popular trend to the demand of the time. This positioning requires a more thorough approach to the development of theoretical and methodological interpretations of the principles of digitalization in education and the development of practice-oriented elements of educational digitalization. According to Verharen (2020), philosophy responds to existential threats through the prism of ethics in education.

The importance of the processes of digitalization in education is that this process conditions the feeding of other spheres of social activity by participants with a high level of digital literacy (Morze & Strutynska, 2021). Applicants at educational levels acquire fundamental professional skills (hard-skills) while simultaneously acquiring digital competencies (digital-skills). Consequently, the economic, political, social, and cultural spheres are filled with specialists who operate not only directly with professional skills, but also with digital literacy.

The organizational and logistical component is actually universal for education and other spheres of social activity. In addition, the organization of digital space has a national and international character. Practical manifestations of the social dimension of digitalization of education are the increase in the transparency of the educational process, the improvement of feedback tools, the reorganization of educational institutions, the increased role of the human dimension in the educational system, and the creation of a competitive professional environment in all spheres of public activity (Holovko & Kanishchenko, 2021).

“The needs of digital transformation require modern universities to be particularly flexible in order to ensure the realization of society's requirements through innovative learning and IR technologies. Modern universities create digital learning environments to support learning activities. The development of a digital learning environment offers the advantage of overcoming significant challenges to the adoption of higher education technology and enhances digital competence. Trends in the digitalization of education affect the increased competitiveness of students and faculty” (Kuzminska et al., 2020).

The key problem of the digital transformation of education in Ukraine is the qualification of pedagogical specialist (Dudar et al., 2021) and the material and technical capabilities

of educational institutions. The organization of the educational process in a digital electronic format needs theoretical knowledge and practical skills of working in this environment. For a long time, this issue in Ukrainian education has not been given due attention due to socio-economic problems. The scientific and pedagogical community actually tried to form a certain digital educational potential and increase the level of digital competencies with their own efforts. In Ukrainian society, there was a somewhat paradoxical situation when digital technologies fully embraced the practical life of man, while at the same time not having a corresponding manifestation in the educational sphere, which remained conservative in its positions.

However, the comprehensive transition of education to online mode at a time of pandemic restrictions was the impetus for the formation of digital learning environments in an emergency mode. All participants in the educational process at their levels actively contributed to the implementation of the processes of digitalization of education:

- administrations of educational institutions solved organizational and logistical issues regarding access of participants of the educational process to electronic digital platforms and learning tools, arrangement of the teacher's workplace for conducting the educational process in electronic mode;
- teachers formed educational and methodological content taking into account its implementation not in full-time, but in electronic and digital format;
- students have adapted their digital skills acquired in the everyday use of ICT to educational requirements.

An important aspect of understanding the problems of the low level of transformation processes in Ukrainian education is the socio-economic state of the community (Kraus et al., 2021). Limited opportunities for public funding of the innovative sector in education, the critical gap between educational systems and practical business in terms of training specialists in qualitatively new soft-skills & digital skills - all this has not contributed to strengthening the role of education in the general cultural national understanding of digitalization.

One of the actual manifestations of the digitalization of education is the concept of 3D mapping of Ukrainian digital education. The basis for this manifestation of digitalization is the experience of the implementation of digital transformation in the educational systems of Western countries. At the same time, the issue of the general level of digital literacy in society and the need to form specific pedagogical digital competencies is actualized.

“The need for profound modification aimed at improving the quality and competitiveness of education leads to a change in the role of scientific and pedagogical staff in Ukraine in accordance with the requirements of the modern world. Comprehensive analysis of public policies and regulatory frameworks in leading Western countries in the field of digital skills and competencies determines the structure of digital competence for citizens DigComp 2.0 and the structure of digital competence for teachers DigCompEdu, as well as the

requirements for digital literacy in the United States, in particular, the standards of the International Society for Technology in Education (ISTE)” (Dziabenko & Morze, 2019).

Any innovative process in education involves a period of alignment with the traditional fundamental formats of this sphere of social activity (see Table 1)

**Table 1.**

*Potential formats for the relationship between traditional and innovative educational strategies.*

Type of interaction	Detection of interaction
Information and digital elements are an auxiliary tool for a traditional educational environment	ICT elements are used to strengthen the positions of traditional teaching, methodological and organizational components of the educational process and do not require the participants of the educational system to have the appropriate digital competencies
Information and digital elements are an alternative learning environment that functions alongside the traditional format of the educational space	If necessary or on the initiative of participants in the educational process, a separate organizational, logistical and educational niche is formed, in which the educational process is carried out with the help of ICT elements.
Information and digital elements in education are progressing to the level when they begin to dominate and acquire the status of a traditional educational space	ICT elements are a determining factor in the organization of the educational process, and participants are obliged to meet the level of digital literacy to be able to implement pedagogical activities or acquire an educational level.

Source: authors' own development

In addition, there is a correlation between the dynamics of innovation and the socio-cultural conditions that characterize the level of development of a particular community (see Table 2).

**Table 2.**

*Dynamics of introducing ICT elements into the sociocultural space of the digital society.*

Gradual transition to information and digital learning environment	Implemented through short-term and long-term educational strategies, gradually integrating into the education system: <ul style="list-style-type: none"> <li>• planning new organizational formats of the educational process with the active use of digital and electronic components;</li> <li>• transformation of the content of educational content, which includes social and communicative and electronic digital information component;</li> <li>• the need for gradual training of appropriate digital literacy competencies of teachers and students for the successful implementation of educational ICT strategies through education, professional development, training, etc.</li> </ul>
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The rapid transition to information and digital learning environment

It is determined by socio-cultural factors (pandemic restrictions, the impact of martial law events, etc.) and is implemented in real-time directly during the educational process:

- the introduction of innovative electronic and digital formats takes place without prior planning or preparation, under the conditions of organizing a new learning environment as the only possible format for continuing the educational process (for example, the transition to a distance learning format during the pandemic restrictions);
  - new forms of presentation of educational content, which leads to a radical change in its content elements that have socio-cultural dimensions (information, communication, social, technological);
  - acquisition of digital competencies takes place in real-time when participants of the educational process form a new digital pedagogical environment directly in the course of educational activity.
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Source: authors' own development

Based on the proposed elements of the correlation between the socio-cultural conditions in which Ukrainian society is and the pace of digitalization of Ukrainian education, we will highlight potentially threatening factors that express the risks of the digitalization process in the educational system. At the same time, the uniqueness of the educational system lies in its ability to turn risks into potential conditions for development and progress. Therefore, the difficulties faced by the current Ukrainian society motivate to find and actualize ways to improve.

- lack of proper training (retraining, advanced training) in pedagogical digital competencies, which leads to the need for teachers to form individual digital-skills independently and directly during the educational process;
- low level of practically-oriented digital skills of educational nature among applicants for educational levels, which actualizes the involvement of general digital awareness of students or pupils, thanks to which adaptation to the educational pedagogical environment is easy;
- organizational and logistical support of educational institutions does not take into account the current needs for information and technological support of innovative learning formats, which requires joint efforts (logistical and technological) between participants in the educational process.

One of the ways to implement the digital transformation of education, which has practical sociocultural implications is the use of STEAM technologies, presented in various forms: from the development of curricula and plans to the creation of scientific and educational



clusters of technical education, which function during the extracurricular time but play an important educational role (Budnyk, 2018). The concentration of science, technology, engineering, and information components in cultural and educational centers (learning, entertainment) motivates education applicants to study STEAM disciplines, the basis of which is digitalization. The practical example of the popularity and progressiveness of digitalization in the STEAM cluster is the best example of the demand for digital competencies in the educational space. The task of today's society is to realize the effectiveness of the principles of digitalization and to understand the need for the formation of digital literacy. It is interesting for the study of the digitalization of education to consider these processes in separate spheres of pedagogical and research activities. In particular, examining the role and status of ICT elements in philological education we note some features of digital transformation in this cluster (Tolochko et al., 2019). A significant number of digital learning environments are now being recorded that contribute to the study or improvement of individual speech proficiency or form a mixed methodological framework that allows the study of several languages at once while in the corresponding space.

The philological cluster is important in the processes of digitalization because through it the communicative component, which is one of the key ones in the ICT space, is realized. Understanding the subtleties of educational content is possible with proper philological training. If we consider synergistic effects in Ukrainian education, philological manifestation is formed in the context of the skillful use of both the Ukrainian language as a carrier of information and a foreign language (mainly English) as an international translator of the digital world.

However, modern scientific and pedagogical discourse faces the problem of interpreting the status of ICT in education. The rapid spread of information and digital technologies poses a threat of transforming the educational system into an environment for the realization of ICT potential. Such an approach is rather contradictory since under such conditions another fundamental component of education is leveled - the humanitarian-value component.

One of the debatable issues of modern scientific and pedagogical discourse is the prospects of information and digital format in the educational system. The main question is whether the appeal to digital education will be temporary (forced) or will continue on a permanent (mandatory) condition (Sherman et al., 2022).

## 5. Conclusions

Thus, the digitalization of education in the modern sociocultural dimension has two worldview directions:

- digital transformation is the driving force that allows education, using innovative potential, to achieve high-quality education;

- digitalization is a response to the global challenges faced by modern society and, thanks to its innovative potential, allows to respond to threats.

In the modern Ukrainian educational system, there is a rapid development of the digital component. The overall level of digital literacy in Ukrainian society is also growing rapidly. This indicates the inevitability of mutual influences between social advancement and educational realities associated with the need to harmonize innovative principles of digital transformation. Education acts as a platform where digitalization acquires clear substantive characteristics, focusing on the positioning of digital competencies as a necessary component for the acquisition of an educational level of professionalism in any field.

Thus, the most effective manifestation of the interaction between society and education in the processes of digitalization is a synergistic effect, through which the overall level of digital literacy of Ukrainian society will correlate with the level of professional digital competencies to be acquired in the educational process. This is how the relationship and interaction of educational and digital potential are formed in the process of societal development. Innovative trends in socio-cultural development dictate the need for digital transformation of education. At the same time, the capabilities of the educational system make it possible to acquire appropriate and relevant digital competencies.

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