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Digital transformation of education in the context of the realities of the information society: problems, prospects

Transformación digital de la educación en el contexto de las realidades de la sociedad de la información: problemas, perspectivas

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Abstract

Scientific exploration aims to identify the level of synergy in the educational environment between society and the digital world. The task is to determine the balance between traditional social principles and innovative information and digital technologies. The methodology of scientific research is provided by a general scientific and philosophical-scientific arsenal, focused on social-humanitarian and information-technological dimensions. The level of influence of the information and digital cluster on the public understanding of education remains a debatable issue. There are increasing reservations about the failure of society to respond appropriately to the risks associated with the digitalization of education. The findings of this research point to two dichotomously oriented formats of manifestation

of the digitalization of education in the socio-cultural space: internal-external and horizontal-vertical. A promising direction of the study of digital transformations in the context of the information society is to develop balances through which digitalization will introduce an innovative model in the educational system without violating the traditional educational paradigms, concerning primarily the multinomial aspect in education. The results of the study highlight the controlling and regulating function of the information dimension as a prerequisite for the effectiveness of innovation processes in education.

Keywords: digitalization of education, digital learning, ICT, educational innovations, philosophy of education.

Resumen

La exploración científica pretende determinar el nivel de sinergia en el entorno educativo entre la sociedad y el mundo digital. Se trata de determinar el equilibrio entre los principios sociales tradicionales y las tecnologías digitales y de la información innovadoras. La metodología de la investigación científica viene dada por un arsenal científico y filosófico-científico general, centrado en las dimensiones social-humanitaria e informacional-tecnológica. El nivel de influencia de la agrupación de la información y lo digital en la comprensión pública de la educación sigue siendo una cuestión discutible. Cada vez hay más reservas sobre la incapacidad de la sociedad para responder adecuadamente a los riesgos asociados a la digitalización de la educación. Las conclusiones de esta investigación apuntan a dos formatos dicotómicamente orientados de manifestación de la digitalización de la educación en el espacio sociocultural: interno-externo y horizontal-vertical. Una dirección prometedora del estudio de las transformaciones digitales en el contexto de la sociedad de la información es desarrollar equilibrios a través de los cuales la digitalización introduzca un modelo innovador en el sistema educativo sin violar los paradigmas educativos tradicionales, concernientes principalmente al aspecto multinomial en la educación.

Palabras clave: digitalización de la educación, aprendizaje digital, TIC, innovaciones educativas, filosofía de la educación.

1. Introduction

The modern information society is relatively new in its sociocultural advancement. The key components of this community are focused on innovation, progress, and development. Information acts as the main source of the rational and moral dimension of the participants in the educational process. Technologies are designed to ensure the creation and broadcasting of informative content. Thus, a new educational paradigm was formed, the foundation of which is informativeness, communicativeness, digitalization, and technologization. New principles of educational activity were established according to the same principle: dynamism, accessibility, and openness.

"The digital transformation of learning processes is guided and supported by the integral use of technological, human, organizational, and pedagogical factors. Learning 4.0 aims to equip students with cognitive, social, interpersonal, and technical skills, among others, considering the needs of the 4th industrial revolution and global challenges" (Oliveira & de Souza, 2021).

Among the main manifestations of the digital transformation of education, we identify virtual and augmented reality, the use of artificial intelligence, gamification, STEMization, the Internet of Things, big data analysis, etc. (Zain, 2021; Skakun, 2021). All of these elements are integrated into the social

consciousness in one way or another, so their use in education is already verified by society. Digitalization encompasses the educational level at both the everyday practical and strategic macro levels (Xiao, 2019). The information society is a definition that combines issues of both attitudinal interpretations of digital or technological transformation and includes material and technical issues related to infrastructure, organization, etc.

2. Methodology

General scientific methods allow us to investigate the fundamental aspects of the development of information and digital impact on the education system. Thanks to scientific analysis, we form a systematic view of digitalization as an integral part of the educational process. Taking into account the specifics of the study, scientific-pedagogical (pedagogical experiment, classification) and socio-scientific methodologies (statistics, classification) are actualized.

The methodological cluster focused on the study of future prospects of digital transformation in the educational space requires special attention (Chrásková & Chráska, 2021). Forecasting and modeling, thanks to which strategies of coexistence of innovative and traditional segments in the educational system are developed, are actualized first.

As we study digital technologies in education in the context of the information society, it is necessary to involve scientific sociology as a method of the research of public trends and opinions about innovations in education.

- The philosophical-scientific methodology is represented by two classical manifestations:
- dialectical, expressing the contradictions arising in the sphere of education between innovative ICT-strategies and traditional educational formats;
- synergetic, providing interconnections and mutual influence formed in the educational cluster of the modern information society.

Relevant now are scientific and pedagogical methodologies that use elements of digital transformation. In particular, multimodality adapting to personalized learning (Rof, Bikfalvi & Marques, 2022).

Since we are dealing with a rather powerful and comprehensive trend in society and education, it is obvious that the methodology of behaviorism, which can trace the behavioral characteristics of all stakeholders of the educational space, will be important (Zhang, 2021).

If we reduce to a common denominator all available methodologies specializing separately on digitalization, separately on educational discourse, on social moments, we get a methodological model of digital pedagogy (Väätäjä & Ruokamo, 2018).

In the public consciousness digital transformation is associated with progress, so in the context of development, digitalization is also considered in education (Sarker et al., 2019).

3. Literature Review

The problem of the digitalization of education in theoretical scientific and humanitarian discourse has gained prominence with the rapid development of information and digital technologies. In recent years, studies of digital transformation in the educational sphere have become more relevant in a

practically oriented dimension, as the COVID-19 pandemic has confronted the academic community with a situation where the digital world has completely replaced the traditional educational process. Understandably, the results of this extraordinary but global phenomenon have interested many scientists, educators, methodologists, sociologists, culturologists, and philosophers. On the essential characteristics of digital transformation in the educational space notes Balyer & Öz (2018). An academic vision of digital technological innovation is presented by Balyer & Öz (Benavides et al., 2020). The impact of digitalization on a separate cluster of education, higher education, is concretized (Lazar, Panisoara & Panisoara, 2020).

The societal paradigms that shape the conditions for the emergence and development of digital transformations in education are characterized by Oliveira & de Souza (2022). The humanistic paradigm of the latest educational sociocultural development is actualized by Rašan (2021). García-Peñalvo (2021) points out the negative sociocultural impact of digital technologies in education. Separate studies focus on further perspectives and potential transformations of the digital world in the information society (Bygstad et al., 2022). Ways to improve the effectiveness of the digital world in education are suggested (Sarker et al., 2019).

4. Results and Discussion

Globalization is a key trend of modern public development. Of course, education is designed to fully provide all the processes for the development of globalization processes. However, unlike the political, economic, or cultural segments, education is guided by other tools. Digitalization is meant to transcend physical and institutional boundaries (Bygstad et al., 2022). Defining this definition is an emphasis on overcoming boundaries rather than breaking them. The digital world is rather difficult to delimit or set boundaries for itself. When educational segments are located on digital platforms, they automatically acquire the status: "without borders". This is how the openness and accessibility of education in today's information society is formed. At the same time, the erasure of borders makes it impossible to control educational content that could potentially have anti-scientific or anti-human influences.

For any society, a vital element is the management system that regulates all processes (Balyer & Öz, 2018). In an educational setting, the management issue does not arise as acutely because traditionally mentoring roles have been endowed with the necessary leverage to not only guide educational applicants, but also the authority to shape effective communication between educational stakeholders. The impact of ICTs on education has touched this segment as well, transforming fundamental management models in a certain way. Firstly, a completely new managerial unit appeared - an administrator (software, network, infrastructure). Secondly, the relationships that used to take shape in a certain community have undergone changes, as the technological-digital cluster has taken over some of the functions of an educational process participant at any level, and the means of communication have expanded considerably.

Currently, in the public consciousness, the format of sustainable or sustainable management is considered the most relevant management model (Abad-Segura et al., 2020). We get a contradiction between the main trend of educational development and social realities (see Fig. 1).

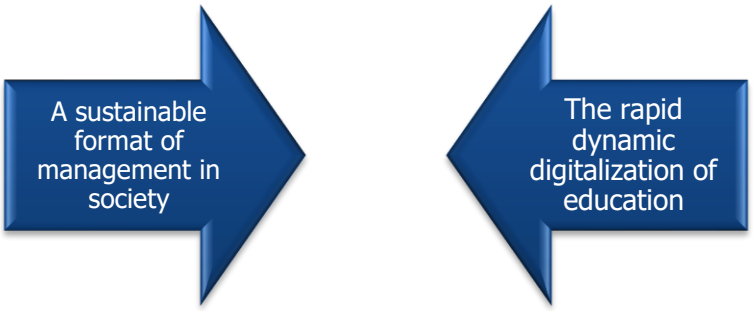

Figure 1. Social format of management and innovative promotion of education
Source: authors' own development

To align the principles of governance and innovative digital development has become a change management strategy (Jackson, 2019). Digital transformation in all areas of public activity has become synonymous with success. The use of ICT provides a competitive advantage. This principle has become basic to educational strategies. Competition generates a need for improvement, which information and digital technology has successfully addressed. Digital transformation has significantly changed the organizational and administrative structure of education. Digitalization involves the simplification of processes through supercomplex things. Education is now targeted to develop new methods and practices that will aim to improve the educational process (Alenezi, 2021). Digital transformation responds to contemporary societal demands, among which the concept of pragmatism is dominant. The main feature of the full existence of society is the formation of a system of laws and rules governing all processes. In the education of the digital society, too, a system of norms and controls is formed. A kind of reference framework has been used to introduce the digital format into the educational system (García-Peñalvo, 2021). Society in general, and the educational community in particular, seeks to control all moments related to the digital transformation in the industry:

- regulation of software activity protocols;
- control of technological manifestations of digitalization;
- regulation of information flows;
- streamlining communication measurements;
- compliance with moral and ethical standards.

People's social behavior is an important key to social development (Singh, 2022). We can state that education and the digital world have become two powerful platforms for shaping human behavior. Whereas education and family were formerly considered along with professional activities or religious beliefs, the digital world is steadily gaining this place. If we consider education and technology in a single synergetic field, then the interaction that would be relevant to such a combination would be astounding in its potential impact on the individual and society. It is hard to imagine a more effective method of flooding human opinions than the combination of the teaching and learning arsenal of education and the practically oriented cluster of the digital world. "Globalization and digital disruption have led to transformative innovation. Educational institutions must develop quality human resources, knowledge, competencies, and skills appropriate to different changes. Therefore, it is necessary to develop systems and a variety of supporting factors that are relevant at the same time. With regard to teaching and learning systems, service systems, and infrastructure, there is an emphasis on improving the structure and system of educational management so that they are flexible, efficient, and effective in terms of quality and standards of international education" (Tungpantong, Nilsook &

Wannapiroon, 2021). The creation of cyber-physical systems, the use of artificial intelligence, and the use of virtual and augmented reality formats are becoming mainstream in information society education (Harteis, 2017). The main dilemma now facing society is not whether to implement digital transformation in education, but whether to fully (Malott, 2020).

One of the debatable questions of the level of coverage of education clusters by the processes of digitalization is which component of education is most covered by the elements of digital transformation. For today's information society, it is not simply a matter of identifying the educational leader in the issue of digitalization by elementary curiosity. Statistics in the modern educational system is one of the main methods for identifying problematic phenomena, determining the level of effectiveness or relevance, and predicting further use.

Digital transformation covers all levels of education. The higher education cluster is more permeated by the technological process when viewed through the sociocultural dimension (Benavides et al., 2020). Applicants to higher education actually become specialists in the labor market immediately after obtaining the appropriate qualification level. The period of study in higher education is more about acquiring skills and competencies than knowledge in the classical sense. If in primary or general school the information segment is focused on the presentation of knowledge and worldview principles, then higher education requires the information learning content to be practically directed. It is no coincidence that such concepts as soft-skills and digital-skills have characterized the higher education system in recent decades.

The COVID-19 pandemic has recognized the inevitability of digital transformation in the education system (Marks, AL-Ali & Atassi, 2020). At the same time, understanding the maturity process of digital transformation remains a problematic issue. At least the pre-pandemic period was saturated with discussions about the integrity and perfection of ICT strategies in the educational space. There were many pros and cons of the total digitalization of education. The COVID-19 pandemic actually ended the debate, because, during this period (which continues to this day), which is quite long for the educational process, the digital educational format did not become a supplement or alternative to the traditional format, but completely replaced it.

This state of affairs is alarming for scholars because it is impossible to determine the maturity of the process of digital transformation of education. Therefore, the educational community is in a state of uncertainty. On the one hand, there is excitement about the potential of the digital world, which has flooded the educational life; on the other hand, there is a lack of understanding of the mutual influence of education, technology, information, and society. All this forms the potential dangers that generally characterize the information society. For example, modern society has already faced an economic crisis, largely due to information and digital capabilities. Consequently, mechanisms for analyzing crisis phenomena and ways out of them in the digital world already exist. Whether they will be useful for education can be seen in the near future.

Using the existing potential of the digital world in education, society is increasingly aware of the further prospects of digitalization. At present, the possibilities of digital technology do seem limitless (Demartini et al., 2020). In this regard, educational strategies that will still regulate these processes must be actualized. It would be reckless to allow the uncontrolled functioning of ICTs in the education system because there are threats of leveling the personal qualities of participants in the educational process (see Table 1).

Table 1.
Participants in the educational process in the context of digital transformation

Digital transformation is controlled by social regulators.	**Uncontrollable processes of digital transformation for education.**
The role of the teacher is shifting from mentoring to coordinating.	The role of the teacher is devalued and becomes statistical rather than active.
Education applicants can use the synergy of comprehensive information resources and their teaching and learning support.	Education applicants gain unlimited access to educational content but lose the focus of methodological guidance on the acquisition of knowledge or professional skills.
The administration of the educational institution uses digital learning as one of the effective ways to organize the educational process.	The administration of the educational institution gives the full advantage to digitalization, which gradually but irreversibly leads to the decline of the traditional educational model.

Source: authors' own development.

The information society has its own nature, so all the processes taking place in it are also brought to a common paradigm. A common position is also formed for the participants of the educational process (Teräs, Teräs & Suoranta, 2022). Society is historically structured in such a way that it requires interpretations of any processes, especially new ones. Thus, with regard to digital transformation in education, tools describing the benefits of digitalization and the positive aspects of digitalization, in general, have become in demand (Santos, Batista & Marques, 2019). The educational community must first provide a clear and comprehensive answer as to whether the digital transformation is effective for them. Then, a comparative analysis is actualized, when an attempt is made to identify the advantages and disadvantages of the traditional and innovative format in education. Finally, the scientific and pedagogical discourse will be able to draw its conclusions on the implementation of ICT. At the same time, public institutions will draw their conclusions about the feasibility of using digital technologies in the educational system and determine acceptable levels of intensity of this process, which will not damage the fundamental target principles of education.

On the sociocultural phenomenon of the digitalization of education Rašan (2021), points out that the purpose of education is not only the formation of knowledge or skills but also the integration into social institutions. The digital transformation in this process provides the rational and material components, while the moral-spiritual remains under the control of humanization. Thus, the creation of a balance between humanization and digitalization ensures the functioning of a harmonious system in the educational environment and society as a whole. For all the accessibility and openness of digital transformation, there are still many points that need to be interpreted (Lazar, Panisoara & Panisoara, 2020).

5. Conclusions

Thus, digital transformation has become an integral part of the modern educational space. The scale of the use of information and digital technologies requires increased attention from social institutions. The information society has enough means to control and regulate all the processes associated with the introduction of innovative formats in education to preserve existential and axiological dimensions in this sphere. Digital transformation in education is inevitable, but it must be clearly defined and understood by all participants in the educational process in the long run.

In the practice-oriented dimension and theoretical and methodological level, digital transformation is realized in two manifestations:

- internal-external (the use of digital technologies within the educational system as a result of the evolution of the system itself or as a consequence of the imposition of economic, infrastructural, or cultural realities);
- horizontal-vertical (implementation of digital technologies by the participants of the educational process by agreement or by instructions or recommendations of management or public opinion).

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