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TRANSFORMATIVE PROCESSES OF DIGITALISATION IN HIGHER EDUCATION: HISTORICAL AND ANALYTICAL ASPECTS

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Abstract. This article examines the transformative processes of digitalisation in higher education from historical and analytical perspectives. The relevance of this research stems from the rapid development of information and communication technologies, the need to modernise the higher education system, and the integration of Ukrainian higher education institutions into the global digital educational space. The evolution of digitalisation is analysed, from the stages of computerisation and internetisation to the current digital transformation, which encompasses the use of digital platforms, cloud services, artificial intelligence and innovative educational technologies. The main principles and strategic directions of the digital transformation of universities are identified. It has been established that digitalisation contributes to improving the quality of education, developing digital competence and modernising the educational environment; however, it requires a systematic approach, the development of digital infrastructure and the assurance of information security.

Key words: digitalisation of education, digital transformation, higher education, digital technologies, digital competence, information and communication technologies.

Introduction. The current stage of development of the global higher education system is characterised by large-scale transformative processes linked to the rapid development of digital technologies, information and communication systems, and the globalisation of the educational landscape. The digitalisation of society, changes in professional practice, the emergence of new forms of communication and the transformation of the labour market are having a significant impact on the functioning of higher education institutions, necessitating a rethinking of traditional approaches to the organisation of the educational process. In such conditions, the digitalisation of higher education is not merely a technological phenomenon, but a comprehensive socio-pedagogical process encompassing changes in educational models, teaching methods, management systems, academic communication and the professional training of future specialists. An analysis of scientific research suggests that contemporary global challenges, driven by the dynamic development of information and communication technologies, the proliferation of digital platforms, the automation of professional activities, and increased international competition in the educational services market, identify digitalisation as one of the priority areas for the modernisation of national higher education systems (Kremen, Luhovyi, Saukh, 2021). In today's information society, digital technologies are becoming a key tool for ensuring the accessibility, quality and competitiveness of education. This is precisely why the issue of digital transformation in higher education is becoming particularly relevant in both the global and Ukrainian educational spheres.

It is important to emphasise that, against the backdrop of European integration and integration into the international academic community, Ukraine is also actively engaging in the digital transformation of education. To strengthen the competitiveness of domestic higher education institutions, ensure the quality of educational services, and promote academic mobility and integration into the global scientific and educational space, it is crucial to develop an effective strategy for the digitalisation of higher education. Digital technologies serve not only as a means of optimising the educational process, but also as a key factor in the development of an innovative educational environment, digital culture and new models of interaction between all participants in the educational process (Hurzhii, Bakhmat, Zaichuk, 2021).

To summarise, the transformative processes of digitalisation in higher education are a complex, multidimensional phenomenon encompassing historical, technological, pedagogical, managerial and sociocultural aspects of the development of the modern educational landscape. Studying these processes is crucial for formulating effective strategies for the modernisation of higher education, the development of digital competences, and ensuring the competitiveness of higher education institutions in the context of a global digital society.

The aim of the study is to provide a theoretical and analytical understanding of the transformational processes of digitalisation in higher education within a historical context, to identify the characteristics of the evolution of digital technologies within the higher education system, and to justify the main directions of digital transformation in contemporary higher education institutions.

Main text. To achieve the stated objective, the following research tasks have been identified:

1. To analyse academic approaches to the interpretation of the concepts of 'digitalisation', 'digital transformation' and 'digital learning environment'.
2. To examine the historical background to the emergence and development of digitalisation in higher education.
3. To describe the main stages in the evolution of digital processes within the higher education system: computerisation, internetisation and digital transformation.
4. To outline the prospects for the development of the digital learning environment in the context of contemporary global transformations.

Research materials and methods. The study employed a range of interrelated general and specialised research methods, which enabled a comprehensive analysis of the transformational processes of digitalisation in higher education from both historical and analytical perspectives. The theoretical and methodological framework of the study was based on historical, competence-based and systems-based scientific approaches.

Results and discussion. The concepts of 'digitalisation', 'digital transformation', 'digital learning environment' and 'digital culture' are currently the subject of active academic analysis within the fields of pedagogy, psychology, sociology, educational management and information sciences. Despite the variety of interpretations, researchers agree that digitalisation is a systemic process that changes not only the technical means of organising learning but also the very philosophy of education. The digital transformation of higher education encompasses the modernisation of learning content, the integration of innovative pedagogical technologies, the development of distance and blended learning, and the use of big data, cloud services, artificial intelligence and adaptive educational platforms (Kravchenko, 2020). In modern higher education institutions, digital technologies are being increasingly integrated into all areas of educational activity. The use of distance learning systems, electronic libraries, digital platforms, virtual laboratories, online communication services and digital assessment tools has become an integral part of the functioning of a modern higher education institution. Alongside the positive outcomes of digitalisation, such as the accessibility of education, the personalisation of learning, the development of academic mobility and the expansion of opportunities for international cooperation, a number of problems and challenges arise. Among these, particular

attention should be paid to issues such as inadequate digital infrastructure, unequal access to digital resources, the development of digital skills among those involved in the educational process, the protection of personal data, and the safeguarding of academic integrity and psychological well-being in the digital environment.

In its narrowest sense, digitalisation is primarily associated with the process of converting information, documents, services and individual work processes into digital format using information and communication technologies. In this context, digitalisation aims to automate operations, optimise data processing, increase the speed of access to information and improve communication mechanisms. This primarily involves the introduction of digital tools into existing organisational structures without fundamentally changing how they operate.

In contrast, the definition of 'digital transformation' is a much broader and more complex phenomenon, involving not only technological modernisation but also profound qualitative changes in management systems, organisational culture, interaction models and decision-making processes. Digital transformation encompasses a shift in the organisation's operational philosophy, a rethinking of management approaches, the modernisation of educational and professional practices, as well as the development of new digital competencies among those involved in the process (Kremen, Luhovyi, Saukh, 2021). Within the context of digital transformation, technology is not an end in itself, but a tool for systemic change that affects all levels of an organisation's operations.

The concept of 'digitalisation' has become one of the key terms in the context of the Fourth Industrial Revolution, or the 'Industry 4.0' concept, which is characterised by the integration of digital technologies into all spheres of public life. In general terms, digitalisation is defined as the process of converting various types of activities, services, information resources and communications into a digital format with the aim of improving efficiency, productivity and the accessibility of information (Kovalchuk, 2021). Digital technologies provide new opportunities for rapid data exchange, process automation, remote interaction and the creation of innovative models of work organisation and learning.

At the same time, contemporary research emphasises that digitalisation is not limited to the mere technical conversion of information into digital form. Its essence lies in the transformation of social, economic, educational and managerial processes under the influence of digital technologies. Digitalisation contributes to a change in the nature of interaction between people, organisations and information systems, shaping new models of communication, collaboration and access to knowledge.

The emergence of the concept of 'digitalisation' is directly linked to the processes of computerisation and globalisation of society. Whilst informatisation was primarily focused on the automation of individual processes and the introduction of computer technologies into professional activities, digitalisation encompasses a much broader spectrum of changes. It alters the very nature of interaction between participants in educational, social and professional environments, creating new digital ecosystems and networked forms of communication. A particularly important factor in the development of digitalisation has been the rapid growth of the internet and mobile technologies. It is the global accessibility of digital communications, the proliferation of smartphones, cloud services, social networks and online platforms that have enabled an unprecedented speed of information exchange and the integration of digital technologies into everyday life. In the field of higher education, this has facilitated the development of distance and blended learning, the emergence of digital libraries, virtual learning platforms, learning management systems and digital services for academic communication.

In Ukraine, the process of digitising higher education has gained significant momentum over the past decade. The Ministry of Education and Science of Ukraine and the Ministry of Digital Transformation of Ukraine have identified digital transformation as one of the priority areas of state education policy. This is evidenced by numerous legislative initiatives, concepts for the digital development of education, digital transformation programmes, and the introduction of electronic educational resources. At the same time, the implementation of digital transformation in higher education

institutions is often fragmented due to the lack of a systematic strategic approach, insufficient material and technical resources, and uneven levels of digital readiness among educational institutions.

The historical aspect of the development of digitalisation in education in Ukraine is closely linked to the development of the theoretical and methodological foundations of the informatisation of the educational and scientific sphere in the late 20th and early 21st centuries. Scientific works devoted to the formation of the digital infrastructure of education and pedagogical science in Ukraine are of great importance in the study of the transformational processes of digitalisation.

Particular attention should be paid to research into the organisational foundations for the development of digital resources, electronic libraries and information systems in the field of education. The late 1980s and early 21st century marked an important stage in the intensification of the informatisation of domestic education and science. It was during this period that the gradual introduction of computer technologies into the activities of educational institutions, the creation of the first electronic databases, automated information systems and digital bibliographic resources took place. Universities and research institutions began to actively utilise information and communication technologies for the collection, systematisation and dissemination of scientific information. Of particular significance was the development of digital pedagogical biographies, which became a key component in the formation of Ukraine's electronic scientific and educational space. During this period, there is a marked increase in scholars' interest in researching the history of Ukrainian pedagogical thought and the activities of prominent educators, scholars and educational figures. Historiographical research is beginning to be actively integrated into the digital environment, which facilitates the development of new forms of presenting and preserving scientific information. An important trend has been the creation of digital bibliographic resources, electronic archives and information platforms that provide access to academic works, biographical materials and historical-pedagogical sources. It is the digitisation of bibliographic resources that has paved the way for the creation of a modern digital learning environment and the development of open access to academic knowledge.

To gain a deeper understanding of the nature of contemporary transformational processes, it is important to trace the historical development of the concept of digitalisation within the context of the evolution of the information society. The initial stage of digital transformation is linked to the processes of computerisation that began in the second half of the 20th century. It was during this period that computer hardware and software began to be actively introduced into manufacturing, administrative and educational activities. Universities became important centres for the development of computing technologies, software creation and the training of specialists in the field of information technology.

The next stage in the development of digital processes was the rise of the internet, which gained momentum in the 1990s with the spread of the global internet and World Wide Web technology. The rise of the internet significantly changed the nature of educational activities, opening up opportunities for distance learning, electronic communication, online access to academic resources and international academic collaboration. During this period, the first distance learning programmes, e-courses, virtual libraries and online learning platforms emerged.

In the late 2000s, and particularly in the 2010s, the concept of 'digital transformation' became widely used in academic and administrative discourse. Unlike previous stages, digital transformation involves not only the introduction of technological tools, but also systemic changes to educational models, management mechanisms, forms of learning organisation and academic interaction. In this context, the digitalisation of higher education is viewed as a comprehensive process of modernising the educational environment, encompassing the integration of innovative pedagogical technologies, the use of artificial intelligence, big data, analytical systems, adaptive platforms and digital services to support the educational process.

An analysis of the historical development of digitalisation allows us to identify three main stages in the evolution of digital processes in the field of education: computerisation, internetisation and digital transformation. Each of these stages is characterised by specific technological and pedagogical

changes that have gradually altered the structure of the educational process and shaped a new digital culture within the academic environment.

Research by Ukrainian scholars, in particular the work of the H. Kostyuk Institute of Psychology of the National Academy of Pedagogical Sciences of Ukraine under the leadership of S. Maksymenko and M. Smulson, is of particular significance for the development of the theory of the digitalisation of education. Within the scope of the studies 'Current Issues in the Digitalisation of Ukrainian Education' and 'The Formation of Professional Subjectivity in Virtual Space', the researchers emphasise the need to create a global virtual educational space that will ensure an effective combination of face-to-face, distance and blended learning. The researchers emphasise that only a comprehensive digital transformation of education will enable the Ukrainian higher education system to keep pace with global trends and ensure the competitiveness of Ukrainian science and the economy at the international level.

In the context of the digitalisation of higher education, the digital transformation strategy for higher education institutions constitutes a comprehensive system of management decisions, organisational mechanisms and innovative approaches aimed at the effective implementation of digital technologies across all areas of a university's operations (Kovalchuk, 2021). This involves not merely the technical upgrading of the educational environment or the automation of individual processes, but the systematic modernisation of the educational, research, administrative and communication activities of higher education institutions in line with the contemporary global challenges of the digital society. The digitalisation strategy of a modern university must be based on a clearly defined mission and a strategic vision of the role of digital technologies in the development of higher education. It must encompass the definition of digital transformation goals, priority areas for modernising the educational process, the development of digital infrastructure, the formation of a digital culture within the academic environment, and the enhancement of digital competence among all participants in the educational process. An important component of such a strategy is also the integration of innovative pedagogical technologies, distance and blended learning systems, digital platforms, electronic resources, and services for academic interaction (Ivanenko, 2011).

In today's environment, a higher education institution's digital strategy must be closely aligned with the national policy on the digital transformation of education and take into account international trends in the development of the educational landscape. The effectiveness of digitalisation depends to a large extent on universities' ability to adapt to rapid technological changes, anticipate the needs of the labour market, and ensure the training of specialists who possess modern digital competences. This is precisely why a digitalisation strategy must be developed on the basis of a systematic analysis of the educational environment, an assessment of the institution's level of digital readiness, and consideration of the needs of all stakeholders. One of the key principles of effective digital transformation is that digital initiatives must align with the mission and values of the higher education institution. Digitalisation should not be viewed solely as a technical process of introducing new technologies.

Its primary objective should be to improve the quality of education, refine the educational process, promote research activities, and ensure the competitiveness of higher education institutions within the international academic community. All digital solutions must align with the institution's educational philosophy, promote academic integrity, foster student-centred learning, and help create an innovative educational environment. Equally important is the principle of flexibility and scalability in the digital strategy. In today's digital society, technologies are changing at an extremely rapid pace, and the volume of information is constantly growing. Consequently, the digitalisation strategy must allow for the rapid updating of digital resources, adaptation to new technological challenges, and the scaling of innovative projects. The flexibility of a digital strategy enables universities to respond effectively to changes in the external environment, implement new educational models, and ensure the continuous development of digital infrastructure. An important aspect of digital transformation

is the principle of inclusivity and the involvement of all participants in the educational process in the formulation and implementation of the digital strategy. Effective digitalisation is impossible without active collaboration between the institution's administration, lecturers, students, IT specialists, employers and other stakeholders. It is precisely this comprehensive approach to organising digital transformations that makes it possible to take into account the needs of different user groups, ensure the personalisation of the educational process, and create a supportive digital learning environment.

In the context of digitalisation, issues of data security and protection are becoming particularly important. The widespread use of digital platforms, electronic resources, cloud services and online communication systems is accompanied by an increased risk of breaches of data confidentiality, cyberattacks, personal data leaks and digital threats. This is precisely why the digital transformation strategy for higher education must provide for the creation of an effective cybersecurity system, the protection of information resources and the development of a digital culture of safe technology use.

In today's educational landscape, digitalisation must be focused primarily on improving the quality of education. Digital technologies should not only simplify access to learning materials or automate individual processes, but also ensure the improvement of teaching methods, the development of interactive forms of educational interaction, and an increase in student motivation and the effectiveness of teaching. The use of adaptive educational platforms, learning outcomes analytics systems, artificial intelligence and digital assessment tools creates new opportunities for personalising learning and shaping individual educational pathways. Furthermore, the digital transformation of higher education must go hand in hand with the development of a digital culture within the academic environment. This involves fostering digital literacy, information literacy, critical thinking skills, academic integrity and the responsible use of digital technologies. It is digital culture that ensures the effective functioning of the digital educational space and promotes the harmonious integration of technological innovations with the humanistic values of education.

Conclusion. In the course of their research, the authors analysed the transformational processes of digitalisation in higher education from historical and analytical perspectives. It has been established that the digitalisation of modern higher education is a complex, multi-level process encompassing technological, pedagogical, organisational and socio-cultural changes within the educational environment. It has been demonstrated that the development of digital technologies, the globalisation of the information space and the growing demands for the competitiveness of higher education institutions have become the main drivers of the digital transformation of the education system. The study traces the historical evolution of digitalisation from the stages of computerisation and internetisation to the current digital transformation, which involves the comprehensive implementation of digital technologies, artificial intelligence, cloud services and innovative educational platforms. It has been established that digitalisation is changing not only the technological tools of education but also the very philosophy of organising the educational process, shaping new models of learning, communication and academic interaction. It has been established that effective digital transformation of higher education requires a systematic strategic approach, the development of digital competence among participants in the educational process, the improvement of digital infrastructure and the assurance of information security.

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