EDUCATION AS AN OPEN SYSTEM
IN THE DIGITAL SOCIETY

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Formulation of the problem. The challenges of the 21st century have led to significant changes in society, economy, and science that will have reflective consequences for education. Education must respond quickly to the key influencing factors such as globalization, technology development, the revolutionary improvement in information and communication sphere, and, as a result, the accelerating pace of social change.

All these changes contributed to the transformation of the systemic characteristics of the education system, increasing its responsiveness to innovations in the scientific and technological spheres. This is directly related to the processes of digitalization of the society and, accordingly, to the rapid development of education as its important component. Spatial and temporal barriers and restrictions that served, to some extent, as

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obstacles to a free «open» educational process are being eliminated, while material, social and psychological preconditions for open education are being formed. This leads to the fact that education becomes an «open system», which is associated with the emergence of new social concepts of an open society as the most humane society for the successful existence of mankind in the 21st century.

Because of its openness, the education system is able to predict and take into account changes in the economy, reflect innovations in technology and in the production management, and provide opportunities for lifelong education for people of all ages. In this regard, as a pedagogical technology, open education is based on the principles of modern distance learning. Thus, **the aim of the article** is to characterize the main features of open education and define the principles of open education for higher education institutions.

Analysis of current research. The idea of education as an open system comes from the theories developed after World War II as a reaction to earlier ideas of   and H. Fayol (1908), who described organizations as self-contained entities. Educational institutions as any other organizations adapt to the environment and depend on the relationships with the environment. Contemporary studies use open systems approach to understanding environmental demands and the resulting adaptation of education policy and its implementation.

Several authors have contributed to the discourse on open education systems: D. Wiley, a prominent advocate for open education, has written extensively on topics such as open educational resources, open pedagogy, and open licensing; M. Weller, known for his research on open education and digital scholarship, whose book «The battle for open: how openness won and why it doesn't feel like victory» is a comprehensive exploration of the evolution of open education; J. S. Brown, an author of numerous works on topics related to open education and the future of learning; C. N. Davidson, known for her work on the future of higher education and the role of technology in shaping learning environment, where she discusses the need for innovation and openness in education.

Many Ukrainian researchers devoted their works to the concept of open education, namely V. Bykov, O. Hubina, V. Zhuravsky, V. Kremen, V. Luhovyi, V. Oliinyk, S. Pryima, S. Sysoyeva, B. Shunevych, A. Yaroshenko and others.

The purpose of the article. Because of its openness, the education system is able to predict and take into account changes in the economy, reflect innovations in technology and in the production management, and provide opportunities for lifelong education for people of all ages. In this regard, as a pedagogical technology, open education is based on the principles of modern distance learning. Thus, **the aim of the article** is to characterize the main features of open education and define the principles of open education for higher education institutions.

Research methodology and methods. A set of methods was used in this study to ground the presented ideas, in particular, analysis, synthesis, comparison, generalization of scientific literature to compare the positions of scientists on the content of the concept of «open education» and define its main principles.

Presentation of the main material.
Though the notions of «open education system» and «open education» are often used as interchangeable, S. Sysoyeva (2011) proposes to differentiate the concepts of «education as an open system» and «open education». She argues that «open education» is viewed as an organized educa-

tional activity that allows (with the help of modern information and communication technologies) acquiring any level of education in a free time mode by accumulating credits (points) in individual disciplines. Open education is characterized by accessibility, flexibility and academic mobility. The view of «education as an open system» reflects its objective transformation into a separate independent branch of the economy. It is associated with the formation of the open Ukrainian society, the need for the dialogue with other educational systems, processes of globalization, integration, digitalization, thus creating space for each person's own educational trajectory (Sysoieva, 2011).

Open education is also described as a system in which the learning process is implemented and an individual achieves and confirms an educational qualification. Thus, the basis of the educational process is purposeful, controlled, intensive independent activity in a convenient place, according to an individual schedule, with the possibility of contact with a teacher, using modern means of communication and technology. Traditional forms of education such as full-time, part-time, external, in the open education system are integrated into a shared educational space (Karpan, 2020, p. 37).

Defining the content of the concept of «openness of education» O. Hubina states that this phenomenon appears with the development of the information society, and education, as a means of knowledge transfer, is turning into the main sphere of life in the information society. «Openness» thus is a characteristic of a self-organized system that has the ability to continuously exchange knowledge and information with the external environment (Hubina, 2020, p. 92).

Education as an open system in the digital society refers to the transformation of traditional educational practices through the integration of digital technologies. In this context, education becomes more flexible, accessible, and collaborative, breaking down barriers of time and space. Open educational resources, online courses, virtual classrooms, and adaptive learning platforms are some examples of how digital tools are reshaping education. Openness promotes lifelong learning, customization of learning experiences, and global collaboration among learners and educators. Additionally, it emphasizes the importance of critical thinking, digital literacy, and adaptability in navigating the rapidly evolving digital landscape.

Nowadays open education is often interpreted as a system that provides synchronous or asynchronous distance learning with confirmation of educational qualification (Yaroshenko, 2007). In synchronous learning, students and instructors engage in learning activities simultaneously, often in real-time. This can include live lectures, webinars, video conferences, and virtual classrooms where participants interact in a coordinated manner. Synchronous learning facilitates immediate feedback, real-time discussions, and a sense of community among learners. In the context of open education, synchronous distance learning allows individuals from diverse backgrounds and locations to participate in live learning experiences, regardless of geographical barriers.

Asynchronous learning, on the other hand, allows students to access learning materials and participate in activities at their own pace and convenience. This mode of learning is not bound by specific schedules, allowing learners to engage with course content and complete assignments asynchronously. Common examples include pre-recorded lectures, discussion forums, online quizzes, and self-paced modules. Asynchronous learning provides flexibility for learners who may have conflicting schedules or limited access to reliable internet connections.

The integration of synchronous and asynchronous distance learning offers several benefits:

- *Flexibility*: Learners have the flexibility to choose when and how they engage with course materials and activities, accommodating diverse schedules and learning preferences.

- *Accessibility*: Open educational resources can be accessed from anywhere with an internet connection, allowing individuals from different locations and backgrounds to participate in learning experiences.

- *Interactivity*: Synchronous sessions enable real-time interaction and collaboration among learners and instructors, while asynchronous activities provide opportunities for reflection and deeper engagement with course content.

- *Personalization*: Combining synchronous and asynchronous learning modes allows for a personalized learning experience, catering to the individual needs and preferences of learners.

- *Community Building*: Synchronous sessions foster a sense of community and social presence, while asynchronous activities promote ongoing engagement and collaboration among learners over time.

The openness of the educational system implies the ability of education to provide space for the development of the individual, who explores this open world, free from prejudices and inconsistencies. This means the orientation of the educational system to the interests and needs of the individual and society, the cooperation of the student and the teacher, society and educational institutions.

Education as a system actively interacts with other social systems – economy, law, politics, etc., which in turn characterizes it as an open system. There are mechanisms of mutual influence, and the process of adaptation of education to other social systems has a significant impact on these systems, namely: more successful are, first of all, more educated (and therefore more professional) participants in the economic process; more active, creative (in legal matters) and loyal are more educated citizens; education is becoming an increasingly important condition for a successful political career (Zhuravsky, 2003, p. 416).

The system of training specialists based on principles of open education with the use of digital technologies should reflect the specifics of their future professional activity and develop students' ability to function successfully in the professional environment. It should combine and be methodically based on modern achievements of pedagogy, psychology and computer science (Yaroshenko, 2007).

At the same time, it should be noted that the openness of education is a logically contradictory concept with a threat of gaining a lower level of education, as compared to a rigidly standardized education system, raising questions about the value and validity of credentials earned through online courses or alternative learning pathways. Thus, one of the main concerns with open education is ensuring the quality of the educational resources and experiences available. With the proliferation of open educational resources and online courses, there may be a lack of quality control mechanisms, leading to variability in the content and delivery of education. This inconsistency can result in some learners receiving a lower level of education compared to others, who have access to more rigorous and better designed educational materials.

Despite the efforts to promote openness and accessibility, there are still disparities in access to technology and the Internet. Individuals from marginalized communities or regions with limited internet infrastructure may not have equal opportunities to

benefit from open education initiatives, potentially receiving a lower level of education compared to those with better access to digital resources.

A key aspect of open education is self-directed learning, which is viewed as a complex cognitive process based on constant reflection. Self-directed individuals are described as socially independent, analytical, and individualistic with a deep sense of their own identity (S. Brookfield, 1984). Therefore, important prerequisites for successful self-directed learning are strong internal motivation, openness to learning opportunities, ability to take responsibility and independently use basic learning skills in order to find the necessary resources. This may not be suitable for all learners. Some individuals may require more structured guidance and support from educators to effectively navigate open learning environments. Without sufficient support systems, these learners will struggle to achieve their educational goals and end up receiving a lower level of education than they would in a more traditional educational setting.

If we are following the guidelines of open philosophy and free pedagogy, we face the danger of repeating a significant number of mistakes made by humanity throughout its history. But education should help the society to exclude the mistakes of past generations. To avoid contradictions between the openness of education and the need of the society in a certain model of educational level, a harmonious system of basic principles of the education system functioning is designed.

It should be mentioned that the education system of Ukraine, as well as in other countries, is open and continuously developing. It is focused on the future, aimed at corresponding to the time changes, societal and human development. Thus, it is regularly updated in terms of its purpose, content, educational technologies, organizational forms, and management mechanisms.

Considering the above mentioned, we would like to highlight the principles of open education for higher education institutions:

The personality-oriented approach to educational programs. This principle takes into account the educational needs of the learners and provides a marketing approach to the process of knowledge acquisition.

Practical orientation of the methods and content of study activities. This principle is aimed at ensuring the integrity, consistency of all activities and the practical component of learning.

The problem-based teaching and its dialogical nature can be traced in the ways of organizing the education process and establishing productive interaction in the educational environment.

The principle of reflexivity is expressed through the students' awareness of the content of educational activities, ways of learning, and personal changes.

The principle of supporting motivation is aimed at the development of constant interest of the students in mastering the educational material, taking into account their internal needs and learning motivation.

The principle of modularity makes it possible to form a program curriculum as a set of independent courses-modules, which meet the needs and interests of students.

The principle of cost-effectiveness of training is manifested in the effective use of technical means, concentrated and unified information presented during the study, use and development of computer simulations.

The principle of individual study trajectory of the student, which includes independent planning of training, development of an individual program, plan, independent choice of disciplines.

The principle of interactivity, which reflects the ways of contacts between teachers and students in the education process, the ways of presenting information in order to facilitate feedback, and pedagogical support.

The active nature of teaching means that educational process is a skillfully organized activity of all its participants (group learning, individual, project work, etc.) in a supportive comfortable educational environment.

The principle of individualization means flexibility in planning various types of educational work, assessment and control, which is carried out using digital technologies, which increases the objectivity of the assessment.

The principle of parallelism is that training takes place together (if necessary) with professional activity or with training in another field of study, that is, without interruption from production or other activities.

Any system, including educational, is inherent in the *principle of openness*. It provides for feedback from the external environment.

The above mentioned principles harmonize with the basic ideas, which form the basis for the content development of modern education in Ukraine, namely: humanization, differentiation, integration.

Humanization implies increased attention to the personality as a whole, creating the conditions for the development of all its abilities, physical and moral qualities and is a multidimensional phenomenon that is carried out by the possibilities of not only humanitarian, but also other subjects. The principle of a differentiated approach to the definition of the content of education emphasizes different ways of forming the curricula of the subjects and different ways of organizing its mastering. Integration as a principle of reforming the content of education is aimed at ensuring the integrity of perception of the environment through the introduction of integrated classes and integrated courses that combine heterogeneous knowledge around a particular concept or topic.

The use of new digital technologies in education has led to a change in the traditional model of interaction between the subjects of the educational process. The three-component model of teaching, which included a teacher, a student, and a book, has evolved into a multi-component model, in which traditional components have undergone significant changes, and a number of new ones have appeared.

Of course, the virtual educational process is fundamentally different from the traditional one; it is unique for each student-teacher interaction and is not predetermined for the subjects of interaction. In this regard, traditional pedagogical, psychological and methodological technologies of educational management lose their relevance and cease to work. Virtual environment is deeply individual and depends on different reasons, which need the situational model of management, based on the principles of distance learning. The most important of them is the principle of individual educational trajectory to learn in an open educational space. Thus, education as an open system should become flexible, variable, multifunctional, and responsive to the demands of the society, taking into account the individuality of a student.

Nowadays, learning within open education, despite the remoteness of the participants of the educational process, has united everyone, giving the teacher the opportunity to build a completely different interactive virtual educational environment that encourages students to create their own educational products.

The identification of open education with mass computerization, informatization and the introduction of communication technologies is erroneous. Open education cannot

be equated only with the use of computers and networks as another technical means of learning, despite the different applications of its components and aspects. Open education is primarily new methods and techniques of learning, teaching, training and organization of the educational process and modern approaches to education based on the productive and creative use of the latest technologies. At the same time, it is not the latest technologies per se, but their creative and innovative use in the educational process to improve the quality of education.

Thus, the arsenal of technologies and tools of open education includes means of providing access to educational materials (primarily electronic library systems), visualization tools, tools for collective work with diverse educational content (both within the educational process and for preparation for teachers' classes), as well as a wide range of tools for modern distance education – primarily audio and video communication. A number of tasks that can be successfully solved with the help of tools and methods of open education also include the expansion of opportunities for teamwork in the learning process both at the level of teacher-student, and horizontally – between fellow teachers and teachers from other universities (as well as students and postgraduates in the framework of solving specific educational and research problems).

In addition, open education is reflected in the management of the educational process based on modern computer technologies, which can significantly increase both the level of public awareness of the situation, the existing issues in education and the effectiveness of education system management in general.

The difference between open education and classical education is that the separation of the learner and the educational institution, as the guarantor of the quality of educational services in accordance with state standards, is more significant (Yaroshenko, 2007). It also lies in different approaches, philosophies, and delivery methods. Open education promotes flexible and learner-centered approaches to teaching and learning. It encourages the use of innovative pedagogies, such as open pedagogy and personalized learning, to engage learners and cater to diverse learning needs and preferences. Open pedagogy is based on active learning, collaboration, and learner autonomy, where teachers act as facilitators and mentors, encouraging student engagement, critical thinking, and self-directed exploration of resources.

Comparing to traditional education, it fosters a culture of collaboration, sharing, and knowledge exchange among educators, learners, and institutions, and is not bound by geographical constraints, requiring physical attendance at campuses, learning centers or educational establishments.

Non-verbal cues, body language, and facial expressions play a significant role in acquiring knowledge, conveying emotions, building rapport, and fostering a sense of academic community. Traditional education with face-to-face interactions in classrooms, labs, or during office hours allows for direct emotional contact between students and teachers, which could be missing in open education environment. In traditional settings teachers can provide more personalized attention, support, and feedback to students, which can contribute to a deeper emotional connection and a sense of trust and belonging. The social dynamics of traditional classrooms, including peer interactions, group activities, and collaborative projects, contribute to emotional engagement and a sense of community among students and teachers. In open education, interactions between students and teachers often occur in virtual or online environments, where face-to-face

emotional cues may be limited. Communication primarily relies on written or digital forms, such as emails, chat messages, and video conferences.

Open education platforms should incorporate features for providing emotional support, such as virtual office hours, discussion forums for sharing experiences and challenges, and online counseling services. Teachers can also use empathy, active listening, and responsive communication to establish emotional connections with students. It's essential to recognize that while open education may present challenges in terms of face-to-face emotional contact, it also offers opportunities for innovative approaches to fostering emotional engagement and support. Strategies such as cultivating a supportive online community, incorporating reflective practices, encouraging self-expression, and providing personalized feedback can contribute to enhancing emotional contact between students and teachers in open education environments.

Conclusions and prospects for further research. Thus, taking into account the needs of Ukrainian society, current trends in higher education provision and the complex problems of economic, social and demographic nature due to the war, elements of open education should be widely used in distance education and lifelong learning. The features of open education include accessibility, flexibility, interactivity, personalization, and community building. It should be built on the principles of openness and harmonize with basic ideas of modern education in accordance with the principles of open systems, occupying a significant place in the market of educational services, becoming the basic form of self-education.

It should be mentioned that open education is not equal or limited to open access to educational resources for everyone, although open access is an important prerequisite for its development. It is not synonymous with distance education, although its technologies and open system features can be used in distance learning. Open education, with all its technical and organizational innovations, is traditionally aimed at transferring accumulated and acquiring new knowledge and, thus improving the traditional learning process and opening up new opportunities for it.

The problems of education as an open system that will arise in the course of the proceedings cannot be solved only through organizational and structural reform, but we should return to the conclusion that it is necessary to change the paradigm of education; and the new educational paradigm should meet the state requirements, demands of the modern educational environment and take into account the needs of the digital society. Thus, education as an open system should become flexible, variable, multifunctional, well-managed and responsive to the demands of the society, taking into account the individuality of each student. We consider the analysis of foreign theories and technologies of open education in the digital society aimed at improving its quality and management system to be prospects for further research. Addressing the issues such as quality assurance, digital inclusion, credentialing mechanisms, and support for diverse learning will ensure that the openness of education truly benefits all learners and does not exacerbate existing inequalities.

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Biliakovska O., Horuk N. Education as an Open System in The Digital Society.

The article considers education as an open system that is implemented in digital society through distance education and the use of new information technologies. It has been characterized the researchers' approaches to the interpretation of the studied concept. The need for a paradigm shift in education has been highlighted. It has been noted that the qualitative modernization of the educational sector is aligned with the development of the digital society, primarily the introduction of new types of education, including open education. It has been emphasized that open education should be built in accordance with the principles of open systems, occupying a significant place in the educational services market, as well as complementing traditional educational forms, thus becoming the basic form of self-education.

The main characteristics of open education are accessibility, flexibility, parallelism, modularity, cost-effectiveness, internationality and coordination, which make it possible to get education regardless of place of residence, age, nationality, physical condition through the use of digital learning technologies. It has been determined that the leading trends in the development of open education are the progressive introduction of elements of open education into traditional educational practice; improvement of the system of education management and quality control; development and implementation of methods and means of open learning in the educational process.

Keywords: education system, open education, higher education, distance education, digital technologies, virtual educational environment.

Біляковська О. О., Горук Н. М. Освіта як відкрита система в цифровому суспільстві

У статті розглядається освіта як відкрита система, яка реалізується в умовах цифрового суспільства через дистанційну освіту та вплив нових інформаційних технологій. Схарактеризовано підходи науковців до тлумачення досліджуваного поняття. Висвітлюється необхідність зміни парадигми освіти. Зауважено, що якісна модернізація освітньої галузі, передусім упровадження нових видів освіти, в тому числі, відкритої передбачена розвитком цифрового суспільства. Наголошено, що відкрита освіта має будуватися відповідно до принципів відкритих систем, посідаючи значне місце на ринку освітніх послуг, доповнюючи традиційні освітні форми, стаючи основною формою самоосвіти.

Провідними характеристиками відкритої освіти є доступність, гнучкість, паралельність, модульність, економічність, інтернаціональність та координованість, що надає можливість отримувати освіту незалежно від місця проживання, віку, національності, фізичного стану за допомогою застосування цифрових технологій навчання. Визначено, що провідними тенденціями розвитку відкритої освіти є поступальне упровадження елементів відкритої освіти в традиційну освітню практику; удосконалення системи управління освітою та контролю її якості; розроблення і впровадження в освітній процес методів і засобів відкритого навчання.

Ключові слова: система освіти, відкрита освіта, вища освіта, дистанційна освіта, цифрові технології, віртуальне освітнє середовище.