

## GLOBAL TRENDS OF UNIVERSITIES DIGITALIZATION UNDER THE SUSTAINABLE DEVELOPMENT CONCEPT

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### Abstract

Within the article it is proved that digitization is an important aspect of the modern educational process and has a significant impact on sustainable development, as it contributes to the efficient use of resources and ensures the availability of education for all social groups. The purpose of the article is to study the global trends and to identify the best world practices of digitalization of higher education institutions, as well as to determine the prospects for further development of higher education institutions in the conditions of global digital transformations. The advantages and disadvantages of digitalization of higher education institutions are analyzed. It is justified that in the conditions of rapid development of digitalization, it is extremely important to find a balance between traditional and digital methods of education. The main global trends in digitalization of higher education institutions have been determined. The dynamics of individual indicators of online education in European universities are analyzed. Experience of the world's best digital campuses is analyzed. The global trends in the distribution of distance education courses and tools for gamification of learning are considered.

**Keywords:** digitalization, digital technologies, higher education institutions, university, higher education, online learning, distance learning, hybrid learning, sustainable development, sustainability.

**JEL Codes:** I20, I21, O15.

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### Introduction

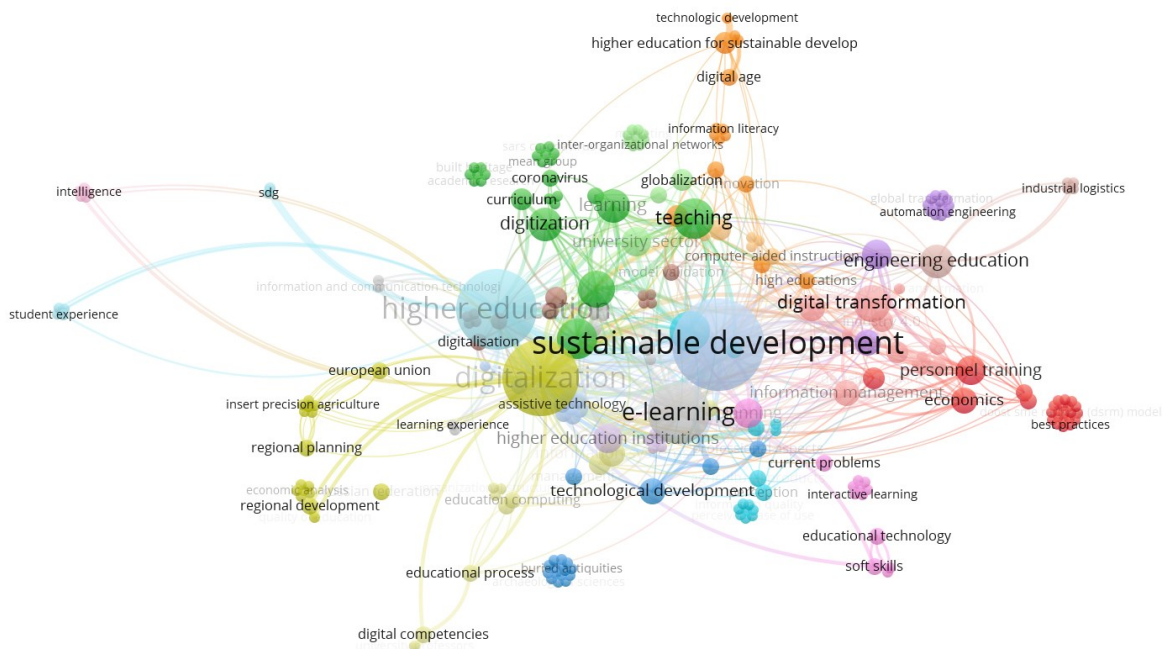
The integration of digital technologies into the functioning of the higher education system is a prerequisite to ensure sustainability and efficiency of educational institutions at the present stage. Rapid development of technological solutions and the spread of digitalization of higher education contributes to improving the quality of educational services.

However, identifying the patterns in the implementation and identifying the trends in digitalization of the higher education system in general, and higher education institutions in particular will improve scientific understanding of the best practices in the implementation of digital solutions and transformation of the values created and transmitted by higher education institutions.

The purpose of the article is to study the global trends and identify the world's best practices in digitalization of higher education institutions, as well as to determine the prospects for further development of higher education institutions in the context of the global digital transformation.

## Literature review

Digitalization of higher education institutions is an extremely relevant and timely area of research. Many scientific publications by domestic and foreign scholars are devoted to this issue. In Fig. 1, the interconnection of scientific publications from different countries of the world is shown, in which the keywords “sustainable development”, “higher education” and “digitalization” are found.



**Figure 1. Visualization of the interconnection of scientific publications with the following keywords: “sustainable development”, “higher education” and “digitalization”**

\*Source: compiled by the authors based on the Scopus database.

Looking at the analysis, it can be confirmed that the digitalization process of higher education is rapidly developing and is a subject of scientific research by many authors. Publications (Li M. et al. (2022); Pu Ruihui et al. (2022)) consider the digitalization process of higher education as a determinant of sustainable development, including the consideration of the Covid-19 pandemic. Also, scientists (Toader Tudorel et al. (2021); Fernández A. et al. (2023)) analyzed the impact of digitalization on higher education in the context of achieving the goals of sustainable development, considered challenges of online learning, and analyzed initiatives to transform the educational component in the conditions of digitalization.

The studies (Thompson S. (2023); Subhash S. et al. (2018); Schwartz N. (2019)) analyzed the features of gamified learning in higher education and investigated the impact on the degree of the student's involvement in the educational process. In the context of the implementation of the sustainable development concept, scientists (Ahel, O. et al. (2020); Alam Md. Jahangir et al. (2023)) investigate the possibilities and restraining factors of digitalization of higher education, as well as the attitude of students to these processes. Also of practical importance is the study (Hudrea Adrian et al. (2023)), in which digital tools in higher education are investigated.

Given a considerable number of scientific works on the peculiarities of the digitalization of higher education institutions, the trends of these processes in the global context remain insufficiently studied, which proves the necessity and relevance of this study.

### **Methodical approach**

The study is based on a systematic approach. In order to solve the tasks set out in the article, the following general scientific and specific methods of scientific knowledge were used: 1) regularization method - bringing a significant influx of digitalization of the most important information into the current development, which is explained by the effective use of resources and the ensured availability of information for all social groups; 2) dialectical method – identification of interactions and balance between traditional and digital methods of learning; 3) method of regularization and systematization - systematization of the world's leading digital campuses; 4) graphical method – analysis of the dynamics of various indicators of the online development in European universities and visualization of the features of digitalization of the foundations of the world; 5) abstraction method - grounding of conceptual ambushes of digitalization of the foundations of the world in the context of modern development; 6) method of equal analysis - analysis of the main trends in the digitalization of buildings in the world; 7) monographic and corporate method – establishing a practical basis for the world's universities in the vicoristic hybrid form, starting and promoting distance education courses; 8) method of formalization and

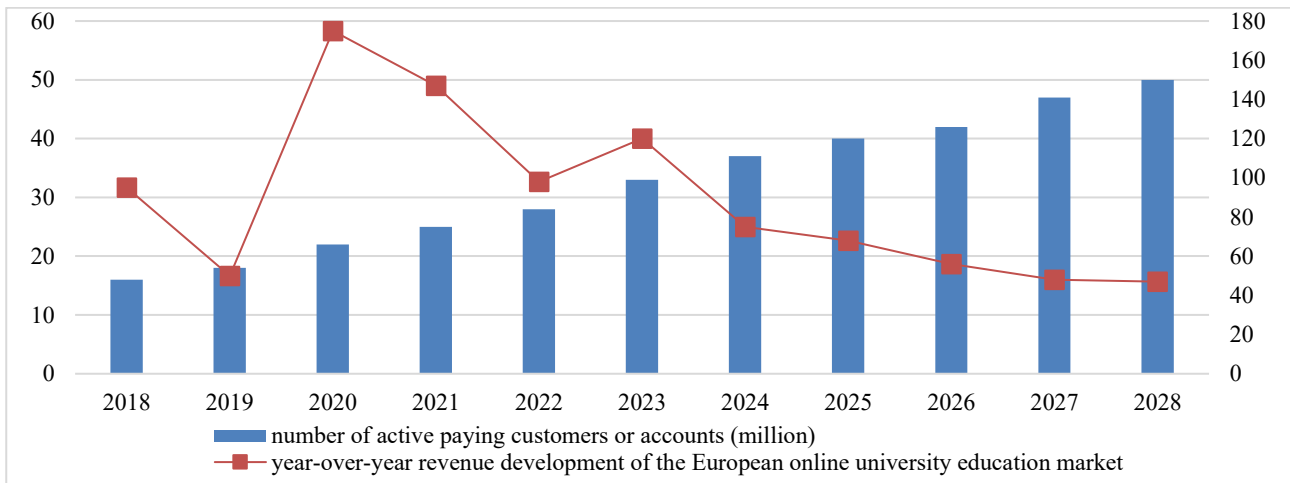
synthesis – a significant advantage and incomplete digitalization of the foundations of high light; 9) decomposition method – analysis of obvious light practices using gamification tools; 10) grouping method – selection of the most popular digital technologies that are based on the foundations of great information.

### **Results**

Digitalization of the high leigh deposits is one of the stages of digital transformation of the marriage. The expansion of digital technologies is fundamentally changing the process of creating, transferring and distributing intellectual capital to more initial investments. It is important to note that digitalization of the stock of high-quality lighting makes a significant contribution to the current development, as it ensures an effective allocation of resources and ensures the availability of lighting for all social groups.

Digitalization of deposits is of great light and is an objectively real phenomenon, which is due to the revolutionary development of technology and the advancement of the insignificant external medium, which is capable of generating a significant inflow into the industrial process and intensity of learning.

According to the data (Hudrea Adrian et al. (2023)), a significant increase in the online education in European universities is expected. It is predicted that the number of users in the online education market in universities will reach 8.3 million people by 2028. It is noted that the average income per 1 user is USD 2.39 thousand. The average user penetration in Europe in 2024 is 0.7%, while the United States is projected to reach 2.3%. This proves a powerful potential of universities in further development of the online education (Fig.2).



**Figure 2. Number of active paying customers or accounts (million) and the year-over-year revenue development of the European online university education market (%)**

*\*Source: systematized based on (Statista.com (2023)).*

Based on Gartner data, 89% of the core data of initial investments, the need for the investments digitalization in greater light is emphasized, and 79% consider such changes necessary for survival universities (ZipDo (2023)). According to the research (Fernández A. et al. (2023)), among the most popular digital technologies, which are based on the foundations of high light, there is expanded analytics (23%), dark technologies (20%) and individual intelligence (16%). Universities are also considering the possibility of using such technologies as a complement to virtual reality: for example, Stanford School of Business in 2016 introduced a certification program to students, which is still possible to fully embrace the technologies in virtual reality. The emergence of “metavosvet” has already been recorded in the UK (Queen Mary University London), and Arizona State University (USA) has launched a Learn Lab, which allows students of advanced knowledge in the virtual reality to use their hands freely by using the ta tactile turn signal (Thompson S (2023)). Using the Internet of speeches allows one to expand the digital arsenal and provide valuable insight into the history of “smart souls”; extension systems that allow you to select hundreds of extension lectures; sensors; screen reading program. In addition, among technological solutions of deposits, you can see a lot of information:

- easier communication process for video conferences (Microsoft Teams, Microsoft

Outlook; Zoom, Google Meets, Skype, WebEx etc.);

- content visualization: Canva, Prezi, Google Presentations; The D3 Gallery; Datawrapper; Easy Timelines; Exhibit; Gephi; GraphViz etc.);

- testing: Kahoot!, Quizizz, Google Forms; Microsoft Forms.

Among the advantages of digitalization of higher education institutions, it is advisable to single out the following (Fig. 3): increased accessibility, expansion of opportunities, development of individualized learning, ease of communication and cooperation of students and teachers, rational use of students' time, automation of the of students' evaluation and reporting, introduction into the educational process of modern tools and programs, ensuring the convenience and flexibility of training, increasing efficiency and effectiveness by using interactive training methods and innovative practices, etc. It should be noted that in the conditions of rapid digitalization development, it is extremely important to find a balance between traditional and digital methods of education.

Digitization of higher education institutions is an important aspect of the modern educational process, but it has certain disadvantages, including: significant financial costs for the purchase of equipment, software and staff training, loss of personal contact between teachers and students, possible technical problems that slow down the learning

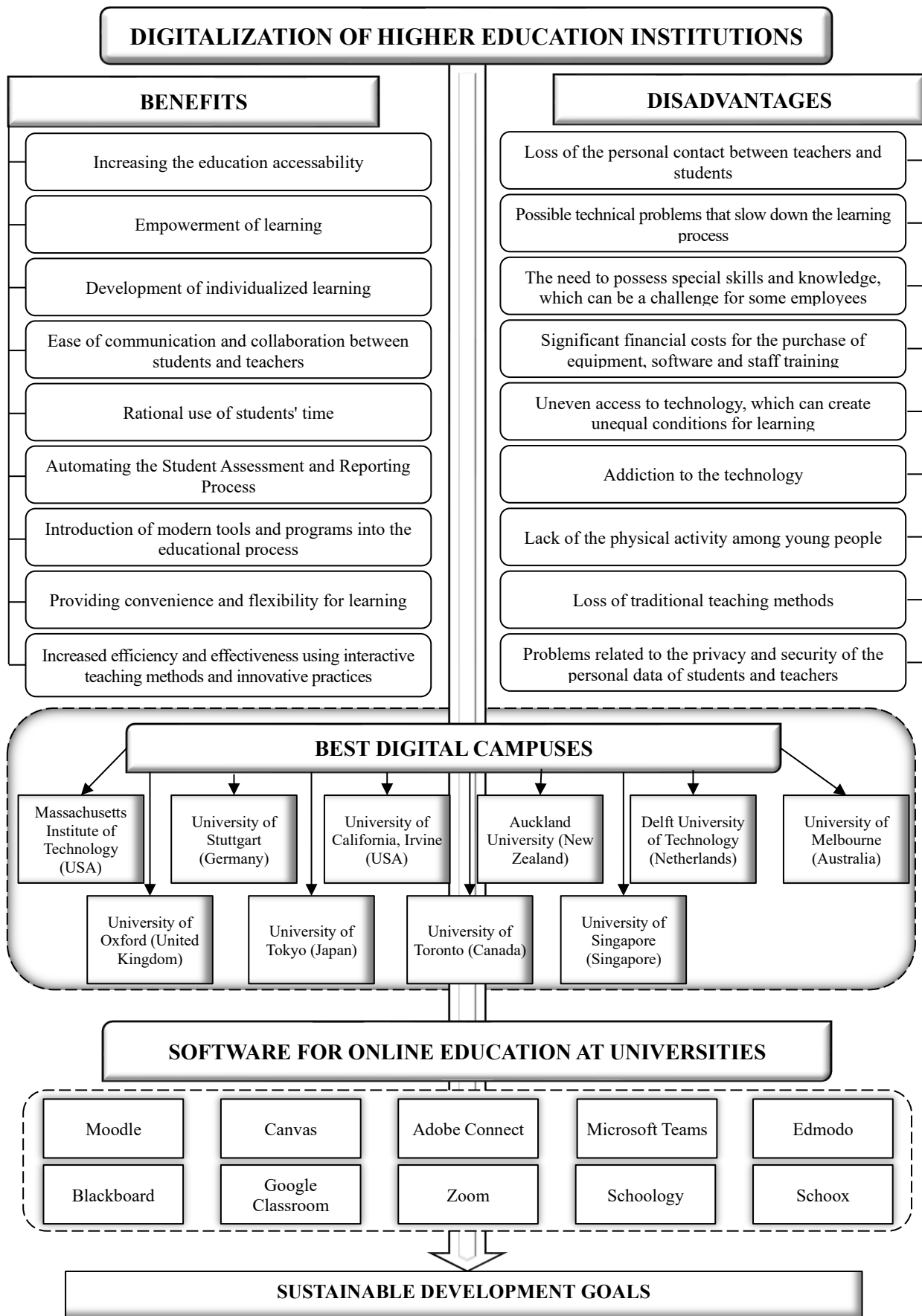
process, the need possession of special skills and knowledge, which can be a challenge for some employees, uneven access to technology, which can create unequal conditions for learning, problems related to privacy and security of personal data of students and teachers, dependence on the technology, lack of physical activity of young people, loss of traditional teaching methods, etc.

Among the main trends of digitalization of higher education institutions, it is appropriate to note as follows: spread of hybrid education; development of “digital campuses”, implementation of distance education courses; use of a virtual learning environment; gamification of learning; spread of “lifelong education” practice.

The spread of hybrid learning, which in its essence is a mixed educational model, where about half of the learning process is adapted to the online format, while the rest of the time is aimed at implementation in classrooms, and the boundaries of the transition between learning formats are minimized. For example, the University of Edinburgh (University of Edinburgh) implemented a hybrid study model after the lifting of the main Covid-19 restrictions, and some elements of this model are still being

implemented today: policy of recording the lectures for later review has become widespread, ability for students to choose the study period offline and online, etc. Similar programs are presented in higher education institutions of the European Union (University College Cork and University of Galway, Ireland; University of Bamberg, Germany; University of Economics and Innovation in Lublin, Poland, etc.).

Hybrid forms of learning allow higher education institutions respond to learning needs in changing environments, thereby reflecting the adaptation of universities and creating greater flexibility and opportunities for students. Implementation of hybrid learning requires the training of teachers who are able to effectively integrate the technology into teaching; supporting students as well as ensuring collaboration between stakeholders in potential learning outcomes (*LEAD School (2023)*). In this case, the teacher's cooperation is implemented through real communication, using web technologies. In addition, students are also able to communicate with each other through breakout room technology.



**Figure 3. Features of digitalization of higher education institutions**

*\*Source: developed by the authors.*

Digital campuses, which are aimed at digitizing the University's experience and its possible use is as an addition to the traditional educational process, are gaining significant popularity, thereby increasing benefits of implementing hybrid education. Digital campuses are actively used in the European Union (for example, EU Business School, European Civic University Digital Campus, Virtual Campus of the University of Barcelona, etc.), Great Britain (St. George's University of London Digital Campus, University of Wolverhampton), the USA (Walsh University's Digital Campus). In addition, universities are spreading the possibility of obtaining scientific degrees online: for example, the IU International University of Applied Sciences (Germany) implements possible obtaining of the bachelor's programs in a number of areas. Among the advantages of the digital campus, it is worth highlighting the use of a digital structure for teaching, administration and management of the university, as well as the possibility of providing a personalized approach to learning, taking into account capabilities and wishes of the student, and all information about the educational process is presented in electronic form (*IB School Kerala (2019)*).

Dissemination of distance education courses. World-renowned educational platforms Coursera, edX, Udemy, Udacity, Treehouse, Khan Academy, FutureLearn collaborate with universities around the world to provide students with the structured educational content. Most of these online platforms use the model of massive open online courses (MOOCs), which can be distributed online to anyone for a fee or free of charge under certain conditions. Using these courses is aimed at the career development or career change, corporate training, as well as promotion of the "lifelong learning" concept. Completion of courses or educational specializations can be counted as additional credits by the educational institution, while the student can work on the tasks at an individual pace, based on his own capabilities. In

addition, specific types of online courses are gaining popularity, such as NOOC courses, which are focused on a specific subject, but usually limited in time, as well as SPOCs - courses (Small Private Online Courses), or small private online courses focused on a limited number of participants, and may involve the collaboration of teachers from several universities, where tasks and lectures are implemented live, recorded or in mixed formats (*Emeritus Online Courses (2021)*).

Creation of the virtual learning environment (Virtual Learning Environment, VLE) allows you creating a separate or shared digital environment where it is possible to organize learning materials, manage course content, control the quality of students' work, monitor the success of students and report on learning results; while higher education students have opportunities to access course materials, digital databases and libraries, university resources, submit assignments and receive feedback. Moodle, BrightSpace or Blackboard are among the most common platforms. These platforms are the balanced digital ecosystems that allow participants to freely use existing functions to increase the effectiveness of educational activities.

Learning gamification tools are gaining in popularity. Gamification of learning is the process of using game tools to achieve learning outcomes, which can be defined as "the use of game design elements in non-game contexts" (Subhash S. et al. (2018)). Gamification of learning gives students the opportunity to independently learn the material by stimulating cooperation and competition, as well as to promote the formation of a positive attitude to the educational material. Among the platforms for the education gamification, it is worth highlighting Scavify (aimed at increasing student engagement and strengthening cooperation), Arcademics (using games and quizzes), Bookwidgets (provides interactive exercises and assessments), Brainspace (flashcards), etc. (Scavify.com (2023)). In addition, gamification can be used to increase the involvement of higher education students

in the life of the students' community: for example, the University of Southern California's Pullias Center for Higher Education created an initiative in which students receive valuable gifts for using campus resources (Schwartz N. (2019)). Thus, the spread of gamification tools can make the learning process more interactive, interesting and effective.

Digitization of a higher education institution should be based on the internal development strategy. This can be a barrier, because not all higher education institutions have included the intentions of digitization and digital transformation in their own strategy. Thus, the Information Age study shows that only 68% of higher education institutions have a digital transformation strategy (ZipDo (2023)). At the same time, the strategy of an individual university can differ significantly in the nature and methods of obtaining digital competitive advantages, and, as a result, be based on the internal potential and capabilities of the higher education institution.

## Conclusions

Digitalization of higher education institutions is a natural process on spreading

technologies and is promising from the point of view of maximizing the benefits of introducing technological innovations and transforming the relationships between the key participants in the educational process. Among the key directions of digitalization of higher education institutions, the following trends are highlighted: spread of hybrid learning; development of "digital campuses", implementation of distance education courses; use of a virtual learning environment; gamification of learning; spread of the "lifelong education" practice.

With the development and improvement of digital technologies, the transformation of higher education institutions will tend to deepen and complicate and will also require additional research into the short-term and long-term effects of the digital experience of participants in the educational process in the context of implementation of sustainable development goals. It has been established that the spread of digital technologies is unlikely to completely replace physical forms of the educational process, so further research will be focused on the study of the most effective forms of coexistence of digital and traditional forms of providing educational services.

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