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HIGHER EDUCATION: INTEGRATIVE CAPABILITIES OF NATIONAL SYSTEMS (INFORMATION AND COMMUNICATION MODEL)

EDUCAÇÃO SUPERIOR: RECURSOS INTEGRATIVOS DOS SISTEMAS NACIONAIS (MODELO DE INFORMAÇÃO E COMUNICAÇÃO)

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ABSTRACT

Quarantine restrictions related to the COVID-19 pandemic have also given impetus to using the benefits of digitalization to improve the education sector. The purpose of the article is to characterize the importance of information and communication technologies through the prism of the integration of national educational systems. The methodological basis of the study was a questionnaire survey of teachers of higher education institutions of Ukraine, the results of which were processed through the use of system analysis, prognostic method, and comparison. In the results, the general trends and foundations of the integration of national systems of higher education in the countries of the European Union were observed. The integrative potential of information and communication forms of educational organization in the modern world is also emphasized. It has been established that ICT contributes to the development of a number of directions and functions of education. In particular, they increase the accessibility of education, improve organizational and material, and technical support, and contribute to the emergence of new opportunities in the choice of a personally-oriented trajectory of education. The conclusions emphasize that, the absolute majority of teachers are convinced that ICT is a necessary condition for modern work.

Keywords: Higher Education, Distance Learning, Information and Communication Technologies, Integration.

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RESUMO

As restrições de quarentena relacionadas à pandemia da COVID-19 também deram impulso ao uso dos benefícios da digitalização para melhorar o setor educacional. O objetivo do artigo é caracterizar a importância das tecnologias de informação e comunicação pelo prisma da integração dos sistemas educacionais nacionais. A base metodológica do estudo foi uma pesquisa por questionário com professores de instituições de ensino superior da Ucrânia, cujos resultados foram processados com o uso de análise de sistema, método de prognóstico e comparação. Nos resultados, foram observadas as tendências gerais e os fundamentos da integração dos sistemas nacionais de ensino superior nos países da União Europeia. O potencial integrativo das formas de informação e comunicação da organização educacional no mundo moderno também é enfatizado. Foi estabelecido que as TICs contribuem para o desenvolvimento de várias direções e funções da educação. Em particular, elas aumentam a acessibilidade da educação, melhoram o suporte organizacional, material e técnico e contribuem para o surgimento de novas oportunidades na escolha de uma trajetória de educação orientada para o indivíduo. As conclusões enfatizam que a maioria absoluta dos professores está convencida de que as TIC são uma condição necessária para o trabalho moderno.

Palavras-chave: Ensino superior, Ensino a distância, Tecnologias de informação e comunicação, Integração.

Introduction

The term “integration” was first used in the 1930s. The etymology of this concept is related to the Latin words “integration” (meaning “restoration”, “renewal”) and “integer” (meaning “whole”). Integration refers to the direction of the development process, which is associated with the unification of previously heterogeneous parts and elements into a single whole (Datta et al., 2021). Other researchers note that integration is “the act or process of combining two or more parts in such a way that they function together” (Bakhmat et al., 2022). Integration processes can occur both within an existing system and in the process of creating a new system from previously unrelated elements. At the same time, individual elements of the integrated whole may have different degrees of autonomy. The result of integration is a certain degree of unification, which reflects the state of the orderly functioning of the parts of the whole. This process ensures the consistency of the final result and preserves the individual properties of the integration elements. Modern globalization processes in the world, transformations in the united Europe create the integration of national educational systems, adapting them to a single European and innovative world educational and scientific space (Kekoni

et al., 2022). This process is permanent and mandatory for national university systems. Under current circumstances, higher education is going through a period of harmonization of various educational policies. As a result, European spaces are transforming into a unity of individuals and institutions that are linked at different levels by vertical and horizontal ideas, objectives, and practices (Linhares Ponte Filho, 2020). The importance of integration processes in the field of education and the use of information and communication technologies has also become the harmonization of national educational standards, specific classifiers for professional activities, qualification frameworks in accordance with the European Qualifications Framework, and the specifics of ensuring and assessing the quality of education.

The purpose of the article is to characterize the importance of information and communication technologies through the prism of integration of national educational systems.

Research Methodology

Design

The research work on determining the features of the implementation of the information and communication model of higher education in the context of digitalization was carried out on the basis of the following stages: theoretical, experimental, and research, and final. At the theoretical stage, the role of ICT in the higher education system was determined, the peculiarities of using these technologies in the training of future specialists were investigated. At the experimental stage, the information competence of modern teachers was tested. The attitude of the surveyed teachers to the use of digital technologies was also investigated, the attitude of the respondents to the integrative capabilities of ICT was characterized, and their readiness for further use of innovations in the national education system was determined. At the final stage, the authors formulate their own interpretations of the results, compare the data obtained with other researchers, and characterize further integrative capabilities of the information and communication model of the national higher education system.

Participants

To achieve the main objective of the study, a special research experiment was organized among teachers of Ukrainian higher education institutions based on a survey (the latter was anonymous, and potential respondents agreed to participate and use their answers). This survey involved 200 teachers with different teaching experience (from 3 to 42 years). Therefore, it can be assumed that they had different experience of using ICT in the national higher education system.

Instruments

In order to determine the integrative capabilities of the national education system based on the use of ICTs, a research survey of teachers of higher education institutions of Ukraine was conducted using the capabilities of the Internet. The survey was conducted on the basis of Google-forms. The link to this survey was distributed through special messengers (Telegram, Viber, Whats Up) and social networks (Facebook, Instagram). This made it possible to reach a wider range of teachers, not limited to the geographical factor. It should be noted that the survey was implemented on the basis of the established provisions of DigComp: The European Digital Competence Framework 2019 and DigComp 2.2: Digital Competence Framework for Citizens. The information received was processed using Microsoft Excel.

Data collection

In order to explore the integrative possibilities of education using modern ICTs, the authors of the article compiled closed and open-ended questions. In closed questions, respondents had to evaluate a particular statement on a 5-point scale, where 1 point meant categorical disagreement with the statement, and a score of 5 points meant full agreement with the proposed opinion. Some of the questions were formulated in accordance with the provisions of such documents as DigComp: The European Digital Competence Framework 2019 and DigComp 2.2: Digital Competence Framework for Citizens, which are generally accepted for the digital

transformation of education in the EU. Experimental data were collected from 10.10.2022 to 10.02.2023, i.e., during the first part of the academic year.

Data analysis

The study uses system analysis to characterize the integrative capabilities of the information and communication model of education. In the system analysis, a decomposition of the system into separate elements is performed and how they interact for the effective organization of ICT-enhanced learning is investigated. On the basis of the prognostic method, further integrative possibilities of the information and communication model of the national higher education system are determined.

Ethical criteria

The study was conducted in accordance with the following ethical criteria:

1. no gender discrimination;
2. no discrimination based on age;
3. voluntary participation;
4. anonymity of the survey;

Results

Integration features of modern higher education: European experience

Integration processes in modern higher education systems take place due to the coexistence of national educational systems within a single European educational environment (Sarasola Sánchez-Serrano et al., 2020). The existence of such an association is regulated by a number of normative documents, primarily the Bologna Declaration "European Higher Education Area" (adopted in Bologna in 1999), which has become a strategic guideline in the process of forming a unified educational environment in Europe; the Berlin Conference of Ministers of Higher Education (held in Berlin in 2003); the Budapest-Vienna Conference of Ministers of Higher Education (held in Berlin in 2003).); Budapest-Vienna Declaration on the

Establishment of the European Higher Education Area (adopted in Budapest and signed in Vienna in 2010); Standards and Guidelines for Quality Management in the European Higher Education Area (2015); Paris Communiqué (adopted in Paris in 2018) (Rak-Młynarska, 2022).

According to Huda (2023), the use of the Moodle platform in higher education institutions during the training of masters has highlighted several issues faced by students, particularly under martial law. The rapid shift to distance learning during the full-scale war in Ukraine underscored the advantages and challenges of such platforms. The study emphasizes the necessity of continued improvements in distance learning platforms to address these challenges and enhance the educational experience (Huda, 2023).

Scholars have established the view that the system of European educational environments has objective and subjective elements (Zhao et al., 2022). The objective components include a single space for conducting scientific and pedagogical research and scientific transfers, creating appropriate curricula. Educational disciplines, etc. The subjective components include documents of national importance - the national doctrine of the educational process, other legislative initiatives, and their implementation in practice.

Relatively recently, new terms have been proposed for scientific use - transnational educational environment and transnational higher education, which were first defined in 2005 in Germany. To define the concepts of transnational higher education in heterogeneous interstate English-language documents, scientific research (both in monographs and in professional journals), similar terms are used (Milanković Jovanov et al., 2022). First of all, they use foreign higher education, international higher education, cross-border higher education, and higher education without borders. At the current stage of development, foreign higher education performs various tasks, such as increasing financial flows from foreign students, expanding educational opportunities at foreign universities, creating international partnerships, and improving the quality of education through participation in international knowledge exchange (Malaniuk, 2020). The development of national education systems is linked to their integration into the

European education area, which is the highest level of integration. According to foreign sources, transnational higher education helps to achieve these goals.

Access to modern information and communication technologies is a means of accelerating integration processes (Tsekhmister et al., 2021; Järvis, Tambovceva & Virovere, 2021). Thanks to the use of current technological solutions, it is possible to establish relevant and effective cooperation at different levels of the organization of education (Sushchenko, 2019). The use of distance technologies has further actualized this process, forming innovative integrated environments for multinational audiences in short periods of time. With the introduction of the latest communication technologies, integration processes have accelerated significantly.

Information and Communication Forms in the Modern World: Integrative Potential

Today, there is a demand for the development of information competence, the mastery of modern and new information and communication technologies for teachers and students in the educational process. The Law of Ukraine "On Education" (2017) provides for information literacy and digital competence. Information and communication technologies are a productive mechanism for developing core competencies that are increasingly relevant, increasing the level of digital literacy, communication culture and competitiveness in general. In 2016, the EU countries adopted the Digital Competence Framework for Citizens, which laid the foundation for future educational reforms and increased the competitiveness of the educational system (Avby, 2022). For Ukraine, the task of introducing ICTs into the educational process and, accordingly, developing information competence among teachers and students is necessary (Bader et al., 2022). This will affect the development of critical and creative thinking, skills for independent, autonomous, persuasive judgment, and the emergence of lifelong learning. These factors lead to total modernization and socio-economic development.

Information and communication forms are transforming rapidly in the modern world and are beginning to define the tools of activity in many educational practices (Abbasimehr, Paki & Bahrini, 2021). To a large extent, this was facilitated

by the fact that the spread of the COVID-19 pandemic has pushed for the widespread introduction of distance learning at universities, which has become a significant basis for the use of ICT in education (Zahorodna et al., 2022). Thus, the survey found that 62% of teachers constantly use information and communication technologies, while 35% use them systematically. The survey data show that 96% of teachers believe that it is necessary to use ICT in education today.

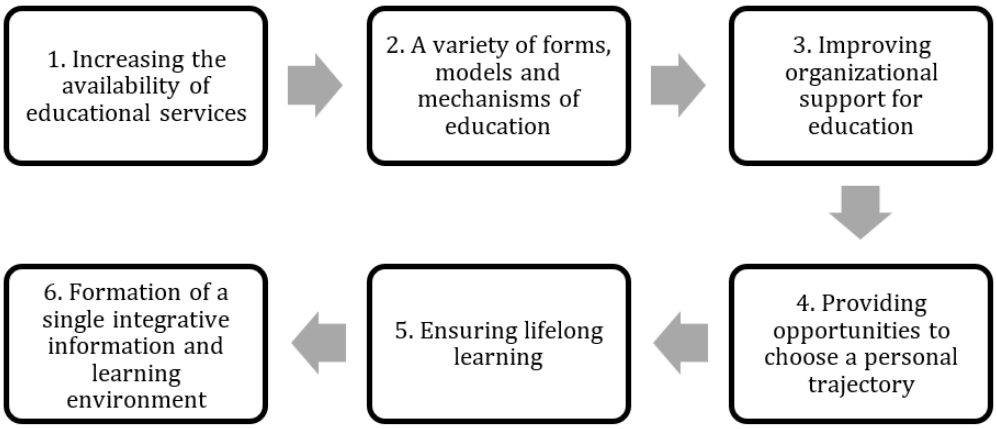
It was found that integrated classes with the use of multimedia tools are now widespread in higher education, and educational presentations have become an integral element of the presentation of materials (79% of respondents confirmed this thesis). The use of videos and educational graphics is also widespread among teachers. They are used by more than 72% of respondents. Therefore, we believe that the use of video materials, graphic images, and animation technologies contributes to the modern integrative presentation of material and forms a new integrative and innovative educational environment in the national education system. With the help of multimedia, a teacher receives a powerful tool for presenting educational information in various forms (video, text, animation, graphics, sound, etc.), and independently decides the sequence and forms of presentation of educational information. In the case of integrative needs, special slides can be generated that contain detailed diagrams, graphs, or charts to clarify complex issues in a lecture or to provide additional explanations. 83% of the respondents noted that for seminars and practical information and communication forms of organizing classes, they also have important opportunities to organize effective learning through students' independent work with electronic information. For this reason, special Internet opportunities that promote digital integration of the learning space are effective. In particular, 21% of respondents stated that an important method in this context is to search for the necessary information among a huge number of sources; 25% believe that the use of cloud technologies is important in the information and communication model of education; 26% noted the use of digital forms of monitoring students' educational results. At the same time, 28% emphasized the importance of organizing competitions, webinars, or other forms of research. Based on the survey, it is possible to define the

infrastructure of an integrated educational environment (based on ICT), which consists of the following elements:

1. Special educational Web applications;
2. Educational mobile applications;
3. Learning Management System;
4. Big Data;
5. Augmented or virtual reality tools, immersive toolsм;
6. Communication platforms.

ICTs contribute to the development of a number of areas and functions of education. In particular, they influence the increase of accessibility of education, improvement of organizational and logistical support of education, emergence of opportunities to choose a personality-oriented learning path, lifelong learning, which in general contributes to the emergence of a single integrative information and educational environment (see Figure 1).

Figure 1 – Model of information and communication capabilities



Source: authors' development.

Discussion

According to Avby (2022), the use of innovative technologies in an integrated education system is an integral and reciprocal educational process "through which an organization transforms ideas into better value". Linhares Ponte Filho (2020) believe that information and communication technologies are a source of education

that combines known ways and means of disseminating and exchanging information. At the same time, according to Stosic et al. (2020), the expansion of the use of ICT in education creates real conditions for students to become subjects of their cognitive activity, which will further develop information literacy in society and professionalism in general. Thus, the problem of studying students' attitudes towards the use of ICT as a source of education is highlighted in Stosic et al. (2020). At the same time, Bader, Oleksiienko, and Mereniuk (2022) identified the main barriers to the digitalization of education. In particular, the authors identify the following: lack of motivation among teachers, digital divide among teachers and students, use of ICTs based on traditional didactic environments, outdated legislative regulation of educational innovations, low-quality digital educational content, paid access to several educational platforms, and security factors. On the other hand, the study by Sarasola Sánchez-Serrano et al. (2020) shows that the use of ICTs can have negative consequences, mainly for teachers, especially due to the lack of proper training in the use of such tools in an integrated system. A similar view is expressed in Prokopenko (2021), which characterizes the main technological challenges of the digitalization of the educational process. At the same time, Rani, Kaur, and Sharma (2022) investigated the main opportunities and challenges faced in the implementation of digital education. These authors also emphasize the inadequate level of information literacy and the problems of accessibility of computer technologies (especially in developing countries).

The results show that one of the most common information and communication tools is multimedia, which affects the visualization of educational information in various forms. This thesis is confirmed by a number of other researchers. In particular, Sun (2022) notes that the emergence and further development of multimedia technologies is closely linked to the transformation of electronic learning environments. In this process, network technologies are of great importance, as they influence the change in multimedia functionality. Sun's (2022) study identifies the following ICT capabilities:

1. Interactivity. It means that users have the opportunity to interact with various information carriers of computers.

2. Complexity. This factor relates primarily to the variety of information processing tools.

3. Integration. All types of learning materials, technologies, and software need to be integrated.

In order to introduce information and communication technologies into the Ukrainian education system, important tasks include further improvement of the information and telecommunication system of the Unified State Electronic Database on Education (USEDE) and its links with other information systems, development of relevant Internet platforms and improvement of the automation system of inclusive resource centers (IRC) in the context of the implementation of the National Strategy for Creating a Barrier-Free Space in Ukraine until 2030.

Conclusions

Thus, information and communication technologies play an important role in the integration processes in modern higher education. This process has also been facilitated by the spread of the COVID-19 pandemic, which has led to the active use of distance learning in higher education institutions. The study has shown that, in general, teachers are constantly using information and communication technologies, and the vast majority are convinced that ICT is a prerequisite for modern work. It has been established that integrated classes with the use of multimedia tools are now widespread in higher education, and educational presentations have become an integral element of the presentation of materials (this thesis is also confirmed by the survey, where 79% of respondents consider it relevant). It was also found that the use of video and audiovisual materials, work with graphics and animation technologies forms a modern integrative presentation of educational material and generally contributes to an integrative and innovative educational environment in the national education system.

In general, ICTs are important for the integrative capabilities of the educational system. The use of information and communication technologies in education contributes to the creation of a new form of continuous education based

on independent learning activities supported by modern ICT tools. At the current stage of development of society in general and education in particular, ICTs are not only an auxiliary tool for coordinating the learning process but are becoming an integral part of the learning process with great potential. Informatization and digitalization of the education system is a continuous process and an inevitable trend in the development of modern education. Today, the use of ICT in education is one of the main directions of its development. It is important to understand that ICT is primarily a tool for development, not for teaching specific subjects. Today's specific subject competencies may become obsolete tomorrow. Therefore, the main task of education is not to acquire specific subject knowledge, but to develop the ability to search for it and to consciously master it critically. The integration of ICTs into educational processes is aimed at achieving this goal. Given the existing forms of ICT and the new challenges that have arisen in the education system due to the acceleration of socio-political and socio-economic processes in the world, as well as the COVID-19 pandemic and the need to move to an increased share of online education.

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