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## INTEGRATION OF THE EDUCATIONAL PROCESS IN HIGHER EDUCATION WITH DIGITAL TECHNOLOGIES

**Purpose.** To estimate the possibilities and prospects of integrating the educational process in higher education (EPHE) with digital technologies (DT), identify prerequisites and challenges, establish directions for integration, assess the availability of changes in the spectrum of student competencies to the dynamics of labor market requirements; indicate the directions of educational process modification in the conditions of digitalization.

**Methodology.** General scientific and dialectical methods are used: argumentative-deductive method – for identification of disproportion between scope of specialist training and needs of the market; inductive method – formation of an inseparable trajectory of competencies; logical generalization – establishment of integration training areas for the specialist to acquire multi-potential; analysis and synthesis – establishing the permanence of integration process; system analysis – identification of prerequisites, directions, stages, problems of integration.

**Findings.** Prerequisites and directions of methodical, organizational and structural changes in the higher school, the stages and problematic issues of the integration of higher education institutions were identified, a platform structure of the digital educational environment of higher education institutions was proposed and directions for the modification of the educational process in the conditions of digitalization were determined.

**Originality.** The permanent nature of the integration of EPHE with DT is indicated. The trend of integration of the main areas of acquiring educational skills and the need for the formation of fundamental education in all areas of study are indicated. The need to ensure an unbreakable trajectory of student competencies is indicated.

**Practical value.** The proposed direction of the integration of the EPHE with DT on the formation of the specialist's multi-potential will increase their adaptation to the requirements of the labor market. The developed recommendations can be used by scientists and practitioners in the integration of EPHE with DT.

**Keywords:** *digital technologies, integration of the educational process, professional education, soft and hard skills of professional education*

**Introduction.** The fourth industrial revolution is changing the global economy based on intelligent digital technologies. The globalization of the economy stimulates the globalization of professional education. A higher school in such conditions will be successful only after mastering digital technologies. This mastery should not be limited only to the use of digital tools in the educational process, or even to the tasks of forming the digital competencies of future specialists, which is the focus of a significant amount of scientific research. Digital technologies should become a catalyst for comprehensive transformation of the higher education system. Slowing down such a transformation will result not only in the failure of higher education, but also in the loss of competitiveness of the national economy, which, in turn, will lead to significant social problems.

At the same time, it should be noted that digitalization of education has not only positive consequences, but also creates new threats, which must be taken into account in the process of introducing the integration of the educational process in higher education with digital technologies. Digital technologies are mastering more and more spheres of economic activity, algorithmization and automation of many specialties are taking place. This conditions the growth of the pace of digitization of professional education in the indicated spheres of activity.

The transformation of education should also not be focused only on the implementation of digital technologies, but should be focused on the goals of higher education, which necessitates the introduction of both strategic planning and

mechanisms of operational adaptation to external challenges in higher education institutions (HEIs). Digital transformation should also be extended to the national institutional structures of higher education management. At the same time, in addition to the traditional vertical subordination of higher education institutions to national management structures, a horizontal network of close cooperation between higher education institutions should be formed, which will spread beyond the national borders. This, in particular, will provide a solution to the problem of adapting the educational programs of Ukrainian higher education institutions to the European level in an evolutionary way. This will also allow higher education institutions to effectively bridge the gap between past and present forms and directions of educational activity and become the driving force of economic changes on a regional, national, and even global scale.

**Literature review.** The problems of integrating the educational process in higher education with digital technologies were studied by domestic and foreign scientists. The directions of research on the indicated issues are detailed in the review work by Benavides L., et al. [1]. One of the conclusions of the specified scientific work is that none of the proposals given in the articles considered in the review regarding the integration of the educational process in higher education with digital technologies has been fully implemented, which indicates a significant level of obstacles to the specified integration.

In the scientific work by Rof A., et al. [2] digital influences on the transformation of the traditional business model of higher education institutions (HEIs) are studied. Obstacles to the integration of the educational process of vocational educa-

tion and training with digital technologies are indicated and solutions to overcome them are developed. An innovative business model of digitalization of higher education institutions is proposed to reduce the level of resistance of management, teachers and students to organizational measures aimed at integrating the educational process with digital technologies. Approaches to solving problematic issues of digitalization of higher educational institutions proposed by Rof A., et al. [2] are discussed in detail in the presented article.

Bond M., et al. [3] with the study of the process of digitalization of education at Oldenburg University confirms the thesis by Rof A., et al. [2] about the differentiation of the attitude of the main stakeholders to this process as one of the main reasons for the slowdown in the implementation of innovations. It is noted that both teachers and students are adapted to only part of the proposed digital technologies. This is considered in the presented article.

In the article, Buinytska O., et al. [4] compared the directions of integration of the educational process and digital technologies using the example of Kyiv University named after B. Hrinchenko. It is claimed that the direction of the “digital campus” is the most expedient in modern Ukrainian realities. Also, Buinytska O., and others [4] defined the main stages of implementation and components of the “digital campus”: digital – science, education, management and marketing, and digital infrastructure.

In the research by Babayev V., et al. [5] it is stated that nowadays the Ukrainian state education system does not correspond to the global trends of digitization of all spheres of society. It is assumed that commercial education is more adaptable to the digital challenges of modern times, but it also does not sufficiently satisfy the requirements of the labor market. The strategic directions of “digitalization” of higher education are indicated.

Kaminskyi O. Y., et al. [6] consider it necessary to develop and implement a strategy for the digital transformation of higher education in Ukraine. Directions of digitization and services of higher education institutions and related business activities are proposed, in particular, implementation of blockchain management of educational content. According to the authors, the integration of blockchain modules of individual higher education institutions should become a platform for a cloud-based system for supporting the educational process. At the same time, Kaminskyi O. Y., etc. [6] did not pay enough attention to the driving forces of this strategy in the article.

Huzhva V. [7] for the effective digitization of higher education, proposed to spread the principles of a single information space to the educational process, which, according to Huzhva V. [7], will contribute to the transformation of information into knowledge, skills and professional opportunities. At the same time, it is stated that the competences of future specialists will also be influenced by what technical means, what software and on what organizational basis the educational process will take place.

In the article by Shayery A., et al. [8], the directions of digitalization of the educational process of higher schools are investigated, comparative characteristics of digital services introduced in higher educational institutions are given, promising forms of organization of digital complexes are indicated for the formation of professional competence of future specialists.

Kanevska I., et al. [9] indicated that increasing the level of integration of digital technologies and higher education already today allows revealing a tendency to increase the flexibility of the educational process, mobility and remoteness of its subjects, and provides new opportunities for optimizing the educational environment. Collectively, this will lead to significant changes in the forms of education and management of the educational process.

In the article by Areshonkov V. [10] for determining the importance of digital influences on the educational process in higher education institutions, it is proposed to fundamentally

change higher education by introducing Ukrainian digital universities as a rational response to the challenges of the times. For this, according to Areshonkov V. [10], it is necessary to form not only regulatory and legal bases, reorganize the institutional structures of higher education management, but also to fulfill the task of rethinking their activities by collectives and administrations of higher education institutions, improve the achievement of professional standards, and introduce motivational factors, update teachers’ salary standards, etc. These theses are expanded in the presented article.

In the article by Kotukha O., et al. [11] the main priorities of digitization of higher education are summarized. The need for constant monitoring of labor market requirements and corresponding changes in educational programs that determine the competencies of future specialists is indicated. It is indicated that there is a tendency towards mutual influence of digital and educational technologies.

Shyshenko I. [12] indicated that the integration of the educational process with digital technologies in higher education should have a systemic, planned nature and should be aimed not only at the acquisition of competencies by future specialists, but also at increasing the effectiveness of education, increasing the motivation of students, and determining their role as stakeholders of educational process.

Guraliuk A. [13] noted that the digitalization of the educational process leads to the manifestation of new factors that change the configuration of higher education. In particular, according to Guraliuk A. [13], improper implementation of digitalization can have negative consequences.

The volume and depth of research on the specified problem, as evidenced by the review of the latest scientific publications, is significant. At the same time, the rapid changes in the economic situation in the country, the dynamics of changes in employers’ requirements for the set of competencies and the quality of graduates of Ukrainian higher education institutions require the updating of research on the state of integration of the educational process in higher education with digital technologies. It is also necessary to define the prerequisites, prospects, obstacles, challenges and directions of integration. It is necessary to establish directions for the modification of the educational process in the conditions of digitalization.

**The purpose of the article.** The purpose of the article is to investigate the possibilities and prospects of integrating the educational process in higher education with digital technologies.

The tasks of the article are:

- to identify prerequisites, challenges and establish directions of integration;
- to assess whether changes in the spectrum of competencies of a higher education applicant are compatible with the dynamics of labor market requirements;
- to indicate directions of modification of the educational process in conditions of digitalization.

**Methods.** The research is based on the use of general scientific and dialectical methods. The argumentative-deductive method was used to identify the disproportion between the scope of specialist training and the needs of the labor market. The inductive method was used to establish the need to monitor the competencies of the higher education seeker to the needs of the market and modify the specified set to form an inseparable trajectory of the seeker’s competencies. The method of logical generalization is used to establish the integration of training areas for the formation of multipotentiality in the future specialist, which leads to a paradigm shift in the training of a specialist, the rejection of the formation of a narrow-profile specialist and the need to provide a student with a broad fundamental education. The method of analysis and synthesis made it possible to establish that the process of integration will have the beginning but will not have the final end due to the constant appearance of new challenges and new technologies. The method of system analysis made it possible to identify the prerequisites and directions of methodical, organizational and

structural changes, stages and problematic issues of the integration of the educational process and digital technologies, to propose a platform structure of the digital educational environment of higher education institutions and to determine the directions of modification of the educational process in conditions of digitalization.

**Results.** Today, professional education is actually not adjusted to the needs of the labor market, even in the ultra-modern digital industry, in particular, in the field of digital services. For example, in the field of digital services “customer/technical support” according to Djinni.co data [14] for the last six months, the number of vacancies was ~239, and the number of candidates was ~2226, with a gap in the level of salary required by candidates for positions and which is offered by the employer in 70 %. This calls into question the effectiveness of labor market assessment by higher professional education institutions that train specialists of the specified profile. At the same time, the ratio of the number of vacancies to the number of candidates for positions over the last six months in the direction of “ERP-system” was ~0.66 with an advantage of the average salary offer to the average requirements of candidates for positions by more than 14 %, which is an indicator of the high demand for the named specialists and, accordingly, the lack of volumes of their training by the higher school.

It is telling that the ratio of the number of jobs offers to the number of vacancies in the specialty of Project Manager, which was often mentioned as promising and in which specialists are trained in higher education institutions of various sectoral orientations, for the last six months takes a record value of ~12.2. This, in particular, testifies to the inconsistency of specialist training volumes among higher education institutions and the insufficiency of the level of adjustment by institutional structures of the quantitative indicators of specialist training in accordance with their needs.

Attempts to adapt higher education to dynamic changes in labor market requirements by introducing fragmented digitization of the educational process in higher education do not yet appear sufficiently effective. For example, the forced unplanned introduction of distance education due to the COVID-19 pandemic, without finding the optimal ratio of the shares of online education and traditional classroom teaching, led to a decrease in the quality of education [15, 16] and, even, to a decrease in the status level of a higher education diploma [10].

Distance education also set new requirements for methodical support of the educational process, indicated the need for pedagogical innovations in the spheres of worldview, educational acquisition of skills by students of higher education, revealed the incompatibility of pedagogical technologies with the applied digital tools.

Before the mass introduction of online education, a certain adaptive role of the student to the peculiarities of the functioning of higher education institutions was played by his communication with fellow and senior students. Online education has significantly narrowed this opportunity. Strengthening such communication requires the introduction of a new

set of pedagogical and technological methods. In particular, therefore, the need for the digitization of the educational process to introduce new roles of the teacher: consultative, adaptive to the digital peculiarities of higher education institutions, mediator, professional support and guidance in the acquisition of competencies by the teaching staff, mentor of the student of higher education for the formation of an individual competence trajectory, etc., needs scientific review.

The training of specialists in higher education has three directions. This is the formation of “hard skills”, “soft skills” and the recent increase in attention to “digital skills”.

Hard skills are competencies and professional skills. Soft skills are communication skills and general values, professional communication as a social component of professional training. Digital skills involve the ability to use digital equipment, experience in using software and, in general, the digital working ecosystem, the ability to quickly adapt to the emergence of new digital technologies. The importance of these areas differs to some extent among teaching scientists who prefer “soft skills” [17] and scientists with a broader view of the gradation of specialist training areas [18].

In view of the dynamic changes in the labor market, there is a need for constant evaluation of the qualification level and the formation of both off-line and online evaluation of the competence profile demanded by the market in each of the above-mentioned areas [19], which is also an opportunity to provide an additional service to a potential education seeker, and an effective marketing event, and a tool for managing the educational process.

Students of higher education also need constant assessment of acquired knowledge and competences due to the considerable length of study at higher education institutions. During training, the configuration of competencies demanded by the market may change, in particular, due to the significant dynamics of changes in digital technologies, which, accordingly, will require adjustments in the acquisition of competencies of a higher education student. Assessment of higher education seekers should also form an inseparable trajectory of their competencies. Disruption of the specified trajectory may indicate poor management of the educational process of higher education institutions.

The above in general creates the need for individualization, personalization of the assessment of the portfolio of competencies of each student of higher education and, accordingly, the differentiation of the educational process. In particular, it requires the teacher’s attention and efforts to create differentiated training courses according to the educational areas and disciplines chosen by the students and in accordance with the requirements of changing the individual trajectory of their competencies. This, in turn, becomes a prerequisite and determines the direction of integration of the educational process with digital technologies.

According to Desk Search [20] (Table), today there are common requirements for “hard skills”, “soft skills” and “digital skills” for radically different areas of activity, which indi-

Table

Basic requirements for candidates, % of the total number of vacancies for each category of employees

Areas of skill acquisition	IT	Management and administration	Health sphere	Humanitarian sphere
hard skills	Programming languages, 84 % English, 34 %	English, 15 %	English, 0.4 %	English, 6.6 %
soft skills	Sociability, 7 % Responsibility, 5 %	Sociability, 17 % Responsibility, 13 %	Sociability, 10.8 % Responsibility, 10.9 %	Sociability, 15 % Responsibility, 15 %
digital skills	Comprehensive mastery of digital technologies, 96 %	Proficiency in computer, 16 % Proficiency in MS Office, 17 % Possession of accounting software, 15 %	Proficiency in computer, 13 % Proficiency in MS Office, 7 %	Proficiency in computer, 17 % Proficiency in MS Office, 4.5 %

cates both certain common areas in the fundamental training of specialists, and common directions of personality formation of future specialists.

Therefore, it is important not to focus only on the technological renewal of higher education, but to make digital innovations the engine of methodical, organizational and structural innovative changes in the formation of fundamental skills of future specialists. A certain sign of this is that digital skills is only one of the three areas mentioned above.

Today, the areas of “hard skills”, “soft skills”, “digital skills” have a tendency towards integration due to the need to form the so-called multipotential specialist with a wide range of competencies, skills, experience, and professional skills.

With the predicted increase in the rate of digital renewal of all spheres of human activity, this will allow a graduate of higher education to change professions and quickly adapt to new spheres of activity. This will also allow him/her to level the risks of changes in the labor market by using the possibilities of his/her own multipotentiality, in particular, the possibility of performing official duties in interdisciplinary formats. This is where permanent learning using the latest digital technologies becomes important.

The importance of multidisciplinary training is confirmed, according to Sudakov M. and Lisohor L. [21], by a survey conducted among employers (Fig. 1).

Attempts by some managers of humanitarian higher education institutions to properly devalue the need for complex implementation of “hard skills”, “soft skills”, “digital skills” are the result of not understanding that the pace of global digital changes is much greater than the pace of adaptation to them of the basic concepts of human life. And this should lead to a person’s loss of value orientations and the meaning of life. Philosophers, psychologists, specialists of other humanitarian professions, whom the higher school should prepare for such activities, which will also require an appropriate level of mastery of digital technologies, should help with this.

This is confirmed by the data presented in the table, which show that already today employers are beginning to demand knowledge of digital technologies from representatives of the health care and humanitarian spheres.

This also indicates a paradigm shift in specialist training and the need to abandon the formation of a narrow-profile specialist. In order to acquire multipotentiality, it is necessary to provide the student with a broader fundamental education that covers not only basic, but also related specialties. This will require wider access to information and wider use of digital technologies in the educational process.

At the same time, this creates additional difficulties in the digital transformation of those educational institutions that are aimed at providing narrowly specialized professional education. This, in particular, involves a radical revision of the content and the ratio of digital skills and hard skills of professional education. In general, the above corresponds to the general trends of globalization of higher education.

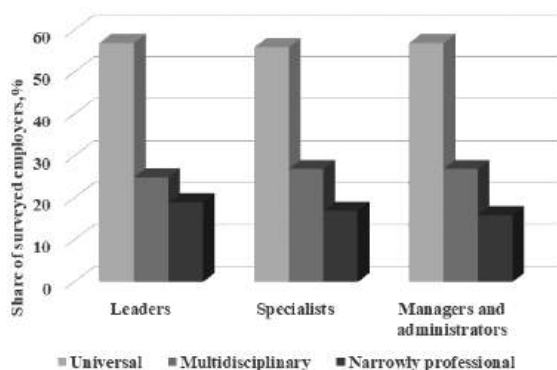


Fig. 1. Requirements of employers to the skills of employees according to their categories

The effective integration of the educational process with digital technologies in higher education institutions of the EU countries using innovations, in particular, such as Open Credentials, Semantic Competency Directory, digital methods for collective learning, etc., contributes to the created digital gap between higher education in Ukraine and higher education in the European Union, which will lead to an increase in the gap in competitiveness of economies. Therefore, urgent measures are needed to overcome this gap, the expansion of which will lead to the devaluation of higher education in Ukraine.

This integration should be continuous, take into account the dynamics of challenges, in particular, the dynamics of changes in labor market requirements for the necessary set of competencies of a job seeker and the impact of new innovative digital technologies.

Thus, the process of integrating the educational process with digital technologies will have a beginning in time, but will not have a final end due to the constant appearance of new challenges and new technologies. That is, the model of digital reorganization of higher education institutions must be constantly transformed, which increases the importance of operational adaptation of the specified model to external challenges. This determines the modular (block) nature of the model of digital reorganization of higher education institutions, in particular, in view of the need to create a separate educational environment.

When introducing the process of integrating education with digital technologies, it should be taken into account that it will affect many related processes and a significant number of interested persons, which will cause significant obstacles to the effective digitalization of higher education. This will significantly increase organizational difficulties, both in the implementation of innovative educational and digital technologies, and in the development of new skills, effective use of available resources of higher education institutions, creation of new directions of education, etc.

All of the above leads to the need to revise the tactical and strategic goals and tasks of Ukrainian higher education.

For example, the effective integration of the educational process with digital technologies contributes to the acquisition of a new level of competitiveness of HEIs in the global educational space. On the way to this goal, higher educational institutions open up new opportunities for their graduates to enter the domestic labor market, which increases the importance of the higher education institution among potential students, creates favorable conditions for improving the financial condition of higher educational institutions due to the contractual form of education and the provision of additional educational services.

This will contribute to increasing the pace of methodical and technological innovations, and to the acquisition of the process of integrating the educational process with digital technologies of an irreversible multiplicative nature. This will also lead to a reduction in the level of risks in the implementation of innovative technologies while gaining experience, and an increase in the resource security of higher education institutions. Reducing the level of risks will have the effect of reducing uncertainty in the further planning of the process of integrating learning with digital technologies, which will affect the increasing relevance of HEI plans.

The first higher education institutions that initiate methodological and organizational changes in the implementation of the integration process will have more time to adapt to the challenges, which will reduce the level of opposition to it among the staff of the educational institution. Those HEIs that start the integration process later will have to overcome much more resistance to the introduction of innovative technologies due to the necessarily greater pace of change, catching up with the leaders.

Methodological changes in this context mean not only the modernization and digitization of educational programs, their alignment with international standards of higher education, the use of digital learning methods and the use of ICT tech-



nologies. This is, first of all, adaptation to new relations between subjects of the digital educational sphere. Methodological changes will also be effective only with continuous operational improvement of the set of competences of teachers, which becomes one of the urgent tasks of the management of higher education institutions.

Specific directions of such methodical changes can be named:

- an individual educational plan, differentiated for each student of higher education, a plan that flexibly responds to changes in the requirements of the labor market;
- creation of virtual digital workplaces for both higher education students and teachers;
- constant evaluation and improvement of teaching staff competencies in conditions of digitalization of higher education institutions;
- the possibility of simultaneous use of several digital educational platforms and the possibility of integration of several educational programs, etc.;
- expansion of personal interaction between the teacher and the student through the use of ICT technologies;
- introduction of the general digital curriculum of higher education institutions, which takes into account the digitization of the processes of education administration.

Organizational and structural changes will require the improvement of the administrative management model, increasing the level of operational efficiency of decision-making through the use of modern automated forecasting systems and support of management actions, in particular, in the substantiation of the introduction of new concepts of higher education, the introduction of flexible digital infrastructure, the departure from academic models and the spread of the use of modern business-models, but, first of all, changes in the thinking of management and teaching staff of higher education institutions and their mental readiness for inevitable digital changes.

Organizational and structural changes are also due to the fact that the digital transformation of higher education will require an increase in the autonomy and self-management of individual structural divisions of higher education institutions.

The process of integration of education and digital technologies will require a deep restructuring of all related processes, which will affect the interests of all parties of the educational process, therefore the integration process will require stages and a certain extension in time for gradual adaptation to the changes of all stakeholders. In particular, the integration process requires the introduction of the digitization stage of the entire set of business processes of higher education institutions. Next, the stage of coordination, consolidation and optimization of all administrative and educational procedures should be implemented, which should include digital management of the educational cycle of the student of higher education, the integration of information systems of administration with platforms for the formation of educational programs, modules, access to information environments, information and communication support of educational process, etc. The detailing of the stages largely depends on the goals, tasks, peculiarities and selected pedagogical strategies of higher education.

In the conditions of integration of education with digital technologies, institutions of higher education will require the use of modern forecasting and activity planning systems, coordination of tactical tasks of the distribution of innovative resources with the management strategy of higher education institutions, taking into account changes in the regulatory field, external and internal challenges.

Increasing the relevance of forecasting and the accuracy of assessing the needs of the labor market can be facilitated by a digital partnership with subjects of the country's economic activity. The above said determines the need to form mutually beneficial cooperation of higher education institutions with enterprises, corporations, and companies in the relevant spheres of economic activity. Subjects of economic activity

should be interested in such cooperation not only because of the need for quality labor resources, but also, for example, because of the possibility of access to forecasts of the Ministry of Education and Culture regarding the dynamics and prospects of development of certain economic spheres of the regions and, as a whole, the country.

A problematic issue in the process of integrating education with digital technologies is the increasing workload on the teacher. Failure to pay due attention by the management of higher educational institutions to ensuring the balance of the specified load with the level of material and moral stimulation can lead to the outflow of personnel with the necessary qualifications for teaching. The specified problem is complicated by the lack of a proper regulatory and legal mechanism for correlating the growth of the teacher's workload in the conditions of the digitalization of the educational process and the salary of the teaching staff. The increase in the load on teachers will also lead to a significant deformation of the ratio of scientific and pedagogical work of the staff and, as a final result, the impossibility of combining scientific and research work by the teaching staff. This will significantly reduce the scientific competence of the staff of higher education institutions and will require changes in regulatory requirements, in particular, regarding mandatory reporting of scientific publications in leading journals.

Digitization of the educational process can lead to a number of other negative consequences. For example: the incommensurability of the pace and volume of this process with the dynamics of changes in labor market requirements and the level of understanding of these requirements by those seeking education leads to significant social deformation of higher education. Also, the personalization of education can be perceived by students as social inequality and, thereby, lead to the desocialization of higher education seekers, a drastic deterioration of their soft skills. This can be prevented by increasing the humanitarian component of curricula and introducing pedagogical innovations.

Also, an increase in the share of distance learning in the educational process can lead to a decrease in responsibility, the level of self-discipline, and even the professional training of future specialists. Both methodical and administrative efforts of higher education institutions should be aimed at avoiding these negative consequences.

The integration of the educational process in higher education with digital technologies should lead to the formation of a digital educational environment of higher education institutions (Fig. 2).

The form of this environment should be determined by each higher education institution based on the defined tasks, peculiarities and selected pedagogical strategies. It can be a

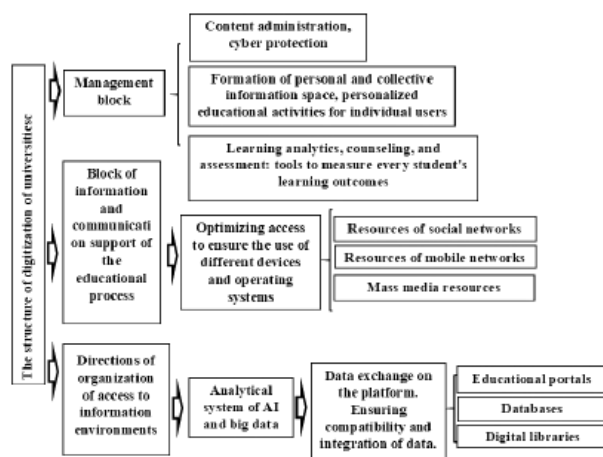


Fig. 2. The structure of the digital educational environment of higher education institutions

digital campus, a digital university, a cloud platform for managing a higher education student's digital workplace, individual EdTech components (Cluster, SMART HCM&LMS, TESLA EDU, etc.) or their complex, etc. But all the specified forms of the educational environment should have blocks of tasks of managing the specified environment, information and communication support of the educational process, organization of access to information environments and corresponding subordinate blocks (Fig. 2).

The requirements for the proper level of integration of the student in the educational process determine the need to form a block of information and communication support for the educational process with software adaptable to various digital devices that can be used by students and teachers and various operating systems of these devices.

The unit for organizing access to information environments meets the requirements for compatibility and integration of data and the creation of a unified data model of higher educational institutions with the provision of the possibility of unhindered exchange of information between various institutions of higher education, ensuring the possibility of receiving higher education simultaneously in several higher education institutions with individual optimization of the student's competence trajectory and joint management of his educational cycle, opportunities to exchange educational and methodical materials between HEIs, etc.

The formation of a single digital infrastructure of the educational environment of the Higher Education Institution, which uses the specified blocks, necessitates the creation of a cloud platform of the institution with separate platforms for accompanying administrative structures.

The above said, in turn, forms the prerequisites for the introduction of a single cloud platform for Ukrainian higher education, which will facilitate the process of integrating the educational process with digital technologies for each individual higher education institution, increase the opportunities, directions and forms of communication between teachers and students of various Ukrainian educational institutions, and the possibility of cooperation between higher educational institution scientists in inter-university projects, combining the efforts of various higher education institutions in monitoring the labor market and identifying changes in the needs for the competencies of students of higher education, etc.

This significantly expands the possible set of priorities for the formation of the digital educational environment of higher education institutions in relation to the priorities given in the article by Bykov V., et al. [15].

The prospects of further integration of the digital educational environment of a separate HEI into the national and even global digital educational environment imposes additional requirements on the architecture of the specified HEI environment, which in a certain way affects the process of integrating the educational process with digital technologies.

Today, higher education administrations and institutional structures do not pay enough attention to informal higher education, the digitalization process of which in commercial higher education institutions is much more successful than in state educational institutions. Nowadays in state higher education institutions, only postgraduate education is considered as a direction of obtaining higher education during life, the amount of state funding of which is only ~3 % of the total state budget expenditures on higher education. At the same time, higher education in Ukraine must be prepared for a significant change in the ratio of services in the provision of formal and informal education or lose this market of educational services due to significant competition from EdTech institutions, which are still represented mainly by foreign companies in Ukraine.

The growing popularity of non-formal education is particularly confirmed by trends in higher education in EU countries, where ~42.1 % of the adult population receives non-formal education and only ~5.1 % receives formal education. In-

formal education in the field of information and communication technologies for this category of the population exceeds formal education by ~2.14 times in the percentage of time spent on education.

The restraining factors of the development of the market of non-formal educational services in the higher education institutions of Ukraine are:

- insufficient rates of implementation of digital infrastructure, first of all, high-speed mobile Internet and significant disparity in digital coverage of different regions of Ukraine;
- non-acceptance of non-formal education by administrations and teachers of Ukrainian higher education institutions;
- lack of methodological basis and practice of implementation of informal educational services;
- significant cost of non-formal educational services of higher education institutions, which in the conditions of the economic crisis, reduces the number of their recipients;
- lack of state subsidies for inclusive non-formal higher education;
- insufficient level of coherence of the regulatory and legal framework of Ukraine in this area with the informal educational initiatives of the leading countries of the world.

The solution of the problem could be facilitated by the formation of partnership relations between academic institutions of higher education and commercial primary institutions that provide services in the field of non-formal education.

The directions for reorganizing the educational process for its digitalization can be proposed as follows: reduction of total learning time with a significant increase in its intensity under the conditions of the use of educational and digital innovations; introduction of new certification educational programs; increasing the number of modules beyond the planned number of ECTS modules with a higher level of differentiation of their focus; combination of modules for differentiation and individualization of the educational process; emphasis of educational programs on their systemic interrelationship for the combination of several areas of education to facilitate their assimilation by the students.

At one of the stages of integration, it is advisable to form target educational academic groups in accordance with the individual profiles of acquiring education and, accordingly, to use an adaptable digital learning management system. This is significantly different from traditional education, in particular, due to the significant difference in teaching methods, curricula, etc.

The transparency of education, which is formed by the specified process of integration, requires a new quality of teaching, which cannot be replaced by the experience and skills of traditional teaching acquired by teachers. This is stimulated, in particular, by the fact that in the new conditions, each lecture, each practical session in both digital and online format of each of the teachers can be open to an outside observer. The independent assessment of the specified observer can be instantly made public and become known to both potential students and representatives of institutional structures. The above can have significant consequences for higher education institutions in acquiring financial, in particular, budgetary resources. This example also shows the complex, all-encompassing impact of digitalization on all aspects of the activities of higher education institutions in new conditions, and attempts to limit this impact by introducing business card sites, online services of higher education institutions, distance learning, etc. are groundless.

A significant problem in the implementation of digital technologies in the educational process is also the lack of proven pedagogical methods [15], mechanisms for assessing the level of digitalization of higher education institutions, assessing the impact of digitalization on the quality of education, methods for determining the directions of integration of higher education with innovative technologies for their coordination with the needs of the economy.

The process of planning the implementation of the educational environment, forming the architecture of the reformed higher education institution is a conceptual tool for the management of each higher education institution to deeply understand its future in Industry 5.0.

A peculiarity of the digital educational environment of higher education institutions is that it may not be tied to a specific geographic location, an example of which is Campus on Cloud [4]. This is important, in particular, in view of the possibility of launching rocket-bomb attacks on the territory of the HEI in the conditions of martial law and in view of the expansion of the use of distance education.

Inadequate formation of the digital educational environment of higher education institutions can lead to unsuccessful integration of the educational process with digital technologies.

Institutional structures should contribute to the avoidance of digital inequality in higher education institutions, as this creates prerequisites for social inequality.

Directions of modification of the educational process in conditions of digitalization:

1. Direction to receive fundamental education.
2. Creation of pedagogical methods of student personality development for increasing the share of online education in the educational process.
3. Formation of students' skills for quick adaptation to changes in market requirements for specialists' competencies.
4. Anticipatory nature of providing students with basic skills in view of the development of digital technologies.
5. Making educational services more accessible through the use of remote technologies, promoting self-education and assisting in obtaining a second higher education.
6. Education based on project work, implementation of learning management systems, improvement of professional competences throughout the professional career.
7. Intensification of the activities of institutional structures in promoting the integration of the educational process with digital technologies for the formation of a systemic national policy in this area, improvement of the regulatory framework on these issues.

Rapid changes create significant uncertainty in the professional future of specialists, therefore it is important to form a personality ready for changes, a specialist who is not afraid of changes but is stimulated by them.

The third point necessitates the formation of a constantly operating, adaptive system for forecasting areas of professional training and the formation of a mechanism for students to acquire the skills of rapid transformation of their competencies depending on dynamic changes in market needs.

**Conclusions.** By comparing the number of vacancies and the number of candidates for these vacancies, significant disparities were established between the scope of specialist training and the needs of the labor market. This, in particular, testifies to the inconsistency of specialist training volumes between higher education institutions and the insufficiency of the level of adjustment by institutional structures of the quantitative indicators of specialist training in accordance with their needs.

It was established that the integration of the educational process in higher education with digital technologies has an unregulated, fragmented nature without proper methodological support. As an example, the introduction of distance education, due to the COVID-19 pandemic, without finding the optimal ratio of online and offline learning, without proper methodical training, which led to a decrease in the quality of education, is indicated.

The need to introduce new roles of the teacher is pointed out: advisory, adaptive to the digital peculiarities of higher education, mediator, professional support and guidance in the acquisition of the appropriate level and scope of competencies by the teaching staff, mentor of the student of higher education, etc.

The necessity of constant monitoring of the compliance of the set of competencies of higher education seekers with the

needs of the market and modification of the specified set in order to form an inseparable trajectory of the seeker's competencies is indicated. This determines the need for individualization, personalization of the assessment of the portfolio of competencies of each student of higher education and, accordingly, the differentiation of the educational process, which becomes one of the prerequisites for the integration of the educational process with digital technologies.

It is indicated that the previously separated areas of training: "hard skills", "soft skills", "digital skills" have a tendency towards integration in view of the need to form in the future specialist the so-called multipotential which means a wide range of competencies, skills, experience, and professional skills.

This also indicates a paradigm shift in the training of a specialist and the rejection of the formation of a narrow-profile specialist. In order to acquire multipotentiality, it becomes necessary to provide the student with a broader fundamental education. This will require a wider use of digital technologies in the educational process.

It is indicated that the slowing down of the process of integration of learning and digital technologies in Ukrainian higher education institutions will lead to the widening of the digital gap between higher education in Ukraine and higher education in the European Union, which will result in an increase in the gap in the competitiveness of economies. This process should be continuous. It will have the beginning in time but will not have the final end due to the constant appearance of new challenges and new technologies. Therefore, the model of digital reorganization of higher education institutions must be constantly transformed, which increases the importance of operational adaptation of the specified model to external challenges.

The process of integration will affect many related processes and a significant number of interested persons, which will cause significant obstacles to the effective digitization of higher education institutions, will increase organizational difficulties, both in the implementation of innovative educational and digital technologies, and in the development of new skills, the effective use of available resources of higher education institutions, and the creation of new directions of education etc. All of the above leads to the need to revise the tactical and strategic goals of Ukrainian higher education.

Prerequisites for methodical, organizational and structural changes in digitalization of higher education institutions are indicated, specific directions of methodical changes, stages and problematic issues of integration of the educational process and digital technologies are determined, a modular platform structure of the digital educational environment of higher education institutions is proposed. It is indicated that the specified platform structure will contribute to the formation of the national digital educational environment and its integration into the global educational space. The directions of modification of the educational process in the conditions of digitalization are determined.

The prospect of further research is to identify the features of the integration of the educational process and digital technologies for higher education institutions of various sectoral orientations, to develop effective ways and methods of this integration.

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## Інтеграція навчального процесу у вищій школі із цифровими технологіями

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**Мета.** Оцінити можливості й перспективи інтеграції навчального процесу у вищій школі (НПВШ) із цифровими технологіями (ЦТ), виявити передумови й виклики, встановити напрями інтеграції, оцінити забезпеченість зміни спектру компетентностей студента динаміці вимог ринку праці, вказати напрями модифікації НПВШ в умовах цифровізації.

**Методика.** Використані загальнонаукові й діалектичні методи: аргументативно-дедуктивний – для виявлення диспропорції між обсягами підготовки фахівців і потребами ринку; індуктивний – формування нерозривної траєкторії компетенцій; логічного узагальнення – встановлення інтеграції напрямів підготовки для набування фахівцем мультипотенціалу; аналізу й синтезу – встановлення перманентності процесу інтеграції НПВШ із ЦТ; системного аналізу – виявлення передумов, напрямів, етапів, проблем інтеграції.

**Результати.** Виявлені передумови й напрями методичних, організаційних і структурних змін вищої школи, етапи та проблемні питання інтеграції НПВШ із ЦТ, запропонована платформна структура цифрового освітнього середовища ЗВО та визначені напрями модифікації освітнього процесу в умовах цифровізації.

**Наукова новизна.** Зазначено перманентний характер інтеграції НПВШ із ЦТ. Указано на тенденцію інтеграції основних напрямів набування освітніх навичок і потреб у формування фундаментальної освіти за всіма напрямками навчання. Зазначена необхідність забезпечення нерозривної траєкторії компетентностей студента.

**Практична значимість.** Запропоноване спрямування інтеграції НПВШ із ЦТ на формування мультипотенціалу фахівця збільшить його адаптацію до вимог ринку праці. Розроблені рекомендації можуть бути використані науковцями та практиками при інтеграції НПВШ із ЦТ.

**Ключові слова:** цифрові технології, інтеграція навчального процесу, професійна освіта, soft та hard skills професвіту

The manuscript was submitted 06.01.24.