

DETERMINATION OF DIGITALIZATION TRENDS IN UKRAINIAN HIGHER EDUCATION: STAKEHOLDERS' NEEDS AND PREFERENCES

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Methods. The results were obtained by applying the following methods: stratified sampling – when determining the preferences, experience and expectations of students regarding the integration of digital tools into education, as well as the quality and formats of digital educational materials; data collection – in order to study the key aspects of the digitalization of higher education; case-study – to identify the best practices and strategies used by higher education institutions to improve the quality and accessibility of education; data analysis – to generalize the preferences and needs of students and teachers of higher education institutions when implementing digital tools into education.

Results. A survey of teachers and students was conducted among more than 50% of the total number of higher education institutions in Ukraine regarding the digitalization of educational content and general trends in modern higher education. The adaptability of students and teachers of higher education institutions in Ukraine to the modern conditions of functioning and digitalization of higher education with the has been identified the need for constant improvement of the disciplines taught. The need for adaptation of curricula, as well as enhanced cooperation with European universities in both educational and scientific activities, has been identified to create modern content that will meet the needs of students and the labor market and their competitiveness in modern conditions of globalization.

Novelty. The results of the study indicate the need to improve digital educational technologies and content by Ukrainian universities, their active involvement in new formats of learning and integration of international experience with the creation of joint educational initiatives with foreign partners and expanding opportunities for the internationalization of higher education.

Practical value. Strategic ways of developing the Ukrainian higher education system are identified, which consist in integrating educational content into the European educational space by creating joint educational programs and scientific projects that will ensure the exchange of experience and increase the competitiveness of Ukrainian higher education institutions.

Keywords: economic development, competitiveness, labor market. digitalization of education, higher education, educational content, internationalization.

Statement of problem. This paper explores the trends in digitalization within the context of Ukrainian higher education, focusing on the needs and preferences of various

stakeholders, including students, faculty, and administrators. With the rapid growth of digital tools in education, especially accelerated by the COVID-19 pandemic and the ongoing war, the

shift towards online and blended learning has become essential for maintaining access to education. The study identifies key aspects of this digital transformation, alongside the challenges faced by Ukrainian institutions, including limited access to high-speed internet and insufficient faculty training.

Furthermore, the paper emphasizes the increasing demand for flexible learning models and the integration of digital resources across various disciplines. The research also highlights the importance of international collaboration, particularly with European universities, to improve digital content and teaching methods. Results suggest that both students and faculty recognize the urgent need for digitalization, with a particular focus on enhancing the quality of online courses and ensuring that educational content aligns with the evolving needs of the labor market. The paper concludes by advocating for strategic investments in digital infrastructure and content development to foster a competitive and sustainable higher education system in Ukraine.

Analyses of recent papers. The intensity and direction of the digitalization processes of the European Union's economy and society determine its economic growth. Current trends in the development of the sector depend on digital transformation and its active involvement in all areas of society [1].

The widespread use of information and communication technologies and the increase in their areas of application have led to major changes in the different industries in terms of supply and demand [2, 3, 4]. Digital transformation has become a prominent aspect of modern education, with emerging trends and best practices shaping educational landscapes across borders [5, 6, 7, 8, 9]. The integration of digital technologies into teaching and learning, the use of data analytics for personalized learning, the importance of digital literacy and skills development, the role of artificial intelligence and machine learning in education, as well as the impact of digital transformation on educational equity and access define the main directions of the overall digitalization of not only education, but also society as a whole.

Digitalization in higher education has emerged as a transformative force globally, and Ukraine is not an exception. As universities

increasingly integrate digital technologies into teaching, learning, and administrative processes, understanding the stakeholders' needs and preferences is crucial for ensuring the success of these initiatives.

The integration of digital tools and technologies into higher education is a rapidly evolving trend worldwide. According to a paper [10], the COVID-19 pandemic accelerated the shift to online learning, forcing institutions to adopt new digital platforms to continue providing education. This shift highlighted the importance of digital literacy, both for students and faculty, and underscored the need for robust technological infrastructure. Today, there is a need to adapt Ukrainian higher education to today's external conditions of uncertainty. The COVID-19 pandemic and hostilities have changed approaches to learning, making digital tools indispensable for ensuring access to education. Applicants, teachers and scientists are forced to quickly adapt to online formats of interaction and look for effective ways to maintain the quality of education [11]. In the conditions of war, most students study online or in a blended format, which creates challenges in providing them with relevant and high-quality educational content in synchronous and asynchronous formats. At the same time, integration into the European educational space is becoming not only a strategic goal, but also a necessary condition for maintaining the quality and competitiveness of Ukrainian higher education [12]. The study highlights the need for universities to embrace digitalization and creativity to stay competitive and equip students with the skills required for future entrepreneurial success. It recommends that universities adopt AI-powered tools to support creative learning and innovation, ensuring that graduates are business-ready in an increasingly digitalized world [13, 14, 15].

The Government of Ukraine has developed national programs for the recovery of the country, which will be implemented after the end of the war and during hostilities. Such programs also include programs for the development of the education system, including the university system, such as: «Restoration and modernization of the scientific infrastructure of Ukraine», «Investing in R&D through grants for researchers, private co-investment in

researchers and think-tanks», «Establishment of digital management of the educational institution and learning platforms; implementation of a digital learning passport» and others, which are aimed, among other things, at the digitalization of education and the educational space [16].

The Ukrainian higher education system is undergoing significant changes, with increasing efforts to integrate digital technologies in response to both internal and external challenges. The education system faces uncertainties shaped by the probabilistic nature of societal demands. The education sector must also evolve to address unpredictable trends. Probabilistic changes in technology, labor markets, and learner preferences necessitate flexible structures, innovative teaching methodologies, and data-driven decision-making processes [17, 18]. By integrating adaptive frameworks and predictive tools, educational institutions can enhance responsiveness, optimize resource allocation, and meet diverse stakeholder needs, ensuring relevance and sustainability in an increasingly volatile environment. The Ukrainian Ministry of Education and Science outlines the national strategy for digital transformation, which emphasizes the importance of digital literacy in higher education and the creation of digital infrastructure [19].

The effective implementation of digital transformation necessitates robust technological infrastructure, innovative pedagogical approaches, comprehensive policy and regulatory frameworks [20]. The integration of digital tools is shown significant potential in creating dynamic, personalized learning environments, enhancing student engagement and fostering inclusive education.

Ukrainian universities have been gradually adopting Learning Management Systems, virtual classrooms, and digital libraries to support both academic and administrative functions. Despite these advancements, significant gaps remain in terms of access to high-speed internet, digital content development, and faculty training.

In order to successfully implement digitalization initiatives, it is essential to understand the needs and preferences of key stakeholders, including students, faculty, and

university administrators. In Ukraine generally prefer flexible learning options, with a growing demand for blended learning models that combine in-person and online components [21, 22].

There are several opportunities to enhance the digitalization of higher education in Ukraine such as development of open educational resources and massive open online courses presents a cost-effective solution for expanding access to quality education, as well as partnerships between Ukrainian and international universities.

Furthermore, the Ukrainian government's support for digital transformation in education, as outlined in the Concept of digital transformation of education and science for the period until 2026, offers significant opportunities for improving infrastructure, funding digital projects, and promoting digital literacy across all levels of education.

Materials and methods. This study aims to investigate the trends in the digitalization of Ukrainian higher education by analyzing the needs and preferences of key stakeholders. The research combines qualitative and quantitative methods to provide a comprehensive understanding of the current state of digital transformation in the sector.

- Survey Design

A stratified sampling method was used to ensure the representativeness of the data. Two primary groups were targeted: university faculty members and students from various disciplines and institutions across Ukraine. The faculty sample included respondents from 64 higher education institutions (HEIs) across all regions of Ukraine, ensuring a diverse representation in terms of university size, ownership type, and geographical location. A total of 404 faculty members participated, including individuals with varying teaching experience, positions, and academic fields.

The student sample consisted of 770 students enrolled in different courses at 64 universities. The survey aimed to capture the preferences, experiences, and expectations of students regarding the integration of digital tools into education, as well as the quality and formats of digital learning materials. The survey included both closed-ended and open-ended questions to capture both quantitative data on preferences and

qualitative insights into the barriers and opportunities identified by stakeholders.

- *Data Collection*

The surveys were designed to explore key aspects of digitalization in higher education, such as:

- The use and effectiveness of Learning Management Systems (LMS) and digital content in online and blended learning environments.
- The demand for digital skills and training among faculty and students.
- Preferences for learning models (online, hybrid, or face-to-face).
- The perceived barriers to effective digital learning, including technological access and quality of digital content.

In addition to the surveys, in-depth interviews were conducted with a select group of faculty members and administrators to gather qualitative insights into their specific needs, challenges, and expectations regarding digitalization. Teachers were interviewed to understand their roles in implementing digital strategies, training programs, and the overall vision for digital education at their institutions. Students were also interviewed to explore their experiences and satisfaction with digital learning formats.

- *Case Studies*

The study also included case studies of universities in Ukraine that have successfully implemented digital learning platforms and content. These case studies examined the specific digital tools used, the challenges faced, and the outcomes of digitalization efforts in improving educational delivery. The case studies provided practical insights into best practices and the strategies employed by these institutions to enhance the quality and accessibility of education.

- *Data Analysis*

Survey data were analyzed using statistical techniques to identify trends and patterns across different groups of respondents. Descriptive statistics were used to summarize the preferences and needs of students and faculty, while comparative analysis was applied to identify differences in responses based on institution type, geographical location, and academic discipline.

Qualitative data from interviews were

transcribed and coded thematically to identify recurring themes related to the barriers and opportunities of digitalization. These insights were then integrated with the survey findings to provide a comprehensive understanding of the digitalization landscape in Ukrainian higher education.

Results and discussion. The paper presents the results of a study aimed at identifying the needs and expectations of teachers and applicants for higher education to improve the quality of digital content in Ukrainian universities, as well as assessing the formats, topics and learning approaches that they consider most effective in distance and blended education.

For the study, two target audiences were identified: teachers of Ukrainian higher education institutions (HEIs) of various forms of ownership and applicants for higher education in Ukraine, who study in different specialties and involve the use of digital educational materials.

In order to achieve representativeness of the data, a stratified sample was chosen, where teachers from 64 different universities represent all regions of Ukraine. The use of stratification allows to take into account differences in the characteristics of institutions and distribute the sample by type of institutions, size and location. The sample size is 404 people, which meets the standards of representativeness for large samples. The sample includes teachers with different experiences, positions and areas of teaching, which allows to cover a wider range of opinions and ensure the accuracy of conclusions.

The stratified sample of students includes representatives of various specialties and courses of study. A sample of 770 students from 64 universities in Ukraine is representative, as it provides a sufficient amount of data to analyze the preferences and needs of students from different regions of Ukraine and different educational institutions.

Geographically, higher education institutions of Ukraine are located in all regions of the country and provide a variety of educational services for students. Each region has its own specific institutions, which emphasizes regional characteristics and contributes to the development of specific industries in these regions. Educational institutions of the following regions of Ukraine

took part in the study (figure 1).

The war in Ukraine has significantly affected the accessibility and organization of the educational process for Ukrainian students. Due to security risks, shelling, lack of stable communication, and other difficulties, most students can no longer attend lectures and practical classes in a traditional offline form. Special needs are of paramount importance in international equitable education. The focus on students with special needs has become the basis of current special education and education reform. The world is currently undergoing a pivotal phase of digital transformation, with educational digitalization gradually developing [21]. Under these conditions, digital

technologies play a key role, offering both synchronous (real-time online lectures) and asynchronous (video recordings, online courses, test platforms) teaching methods. According to the results of the study, most Ukrainian students are currently studying remotely. Only 27% of respondents have the opportunity to attend classes offline, while 15.3% use a blended learning format that combines online and offline classes. The vast majority, namely 57.6%, study exclusively online. This data demonstrates a significant shift towards distance learning, which was a consequence of security requirements and technological capabilities in difficult war conditions.

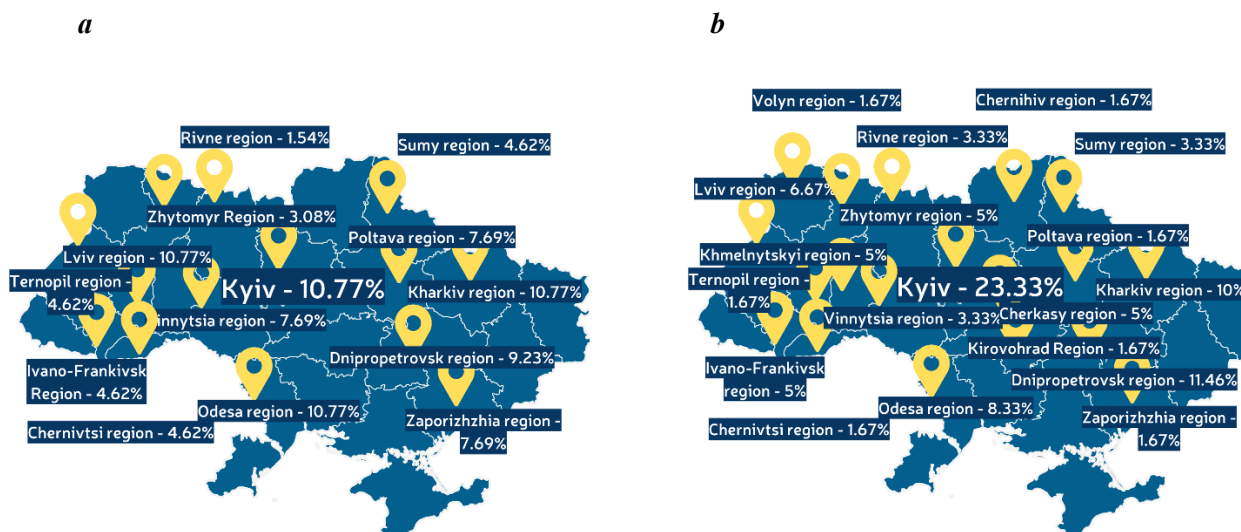


Figure 1. Percentage distribution of interviewed teachers (a) and students (b) by regions of Ukraine

The study showed (figure 2) that the majority of applicants (75.8%) consider it necessary to improve digital courses, in particular online lectures, practical and laboratory classes (figure 3). This indicates a demand for improvements in materials and learning platforms to provide a better and more interactive experience. Only 22.5% of the surveyed students believe that such improvements are not necessary.

The overwhelming majority of teachers (48%) are constantly improving their courses (figure 2). The need to update courses from time to time arises for 36.9% of teachers. It should be noted that 12.4% of teachers need to improve digital content for practical/laboratory classes. So, in the current environment, 97.3%

of the teachers surveyed recognize the need to improve digital content for the courses they teach. This indicates a high level of awareness of the importance of adapting educational materials to modern requirements and circumstances.

Ukrainian students feel a significant need to improve the digital content of courses taught by Ukrainian teachers. The most requests for improvement are in the field of Economic and Business Management (36.9%), followed by Mathematics and Information Technology (19.9%) and Chemistry, Physics and Bioscience (13.4%). Other priorities include Engineering Science (6.8%), Environmental Science (8.6%), and Earth Sciences and Geophysics (3.5%).

The survey conducted among the teachers

of higher education institutions (figure 4) on the creation of digital educational content by fields of knowledge in relative indicators coincides with the survey of students: Economic and Business Management (25.5%), Mathematics and Information Technology (20.0%), Engineering Science (19.1%), Chemistry, Physics and Bioscience (11.6%), Environmental Science (10.9%), which indicates the similarity of the

vision of different categories of higher education stakeholders in Ukraine in modern learning conditions and compliance with labor market requirements. This distribution indicates that teachers are aware of the need to develop digital educational content in these areas in order to improve the quality of education and meet the modern requirements of the labor market.

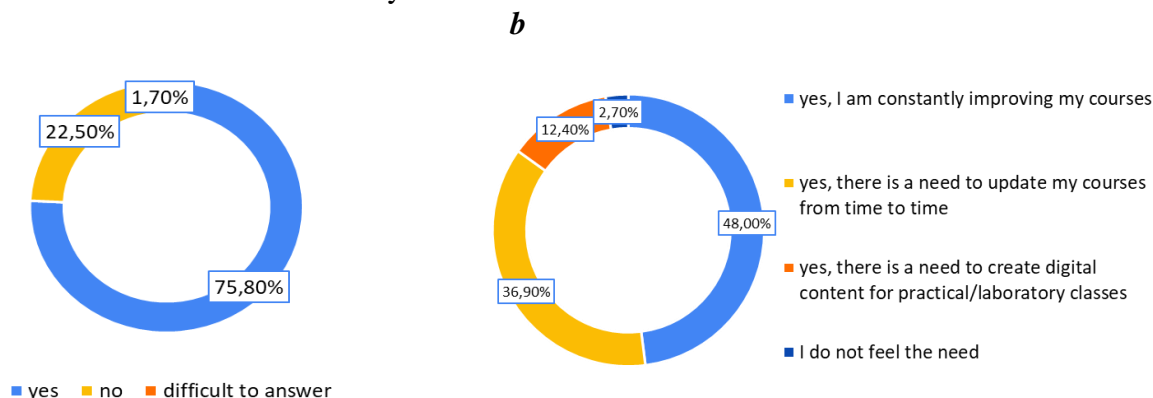


Figure 2. The relevance of improving digital courses for students (a) and the need to improve digital courses for Ukrainian teachers (b) in the face of modern challenges

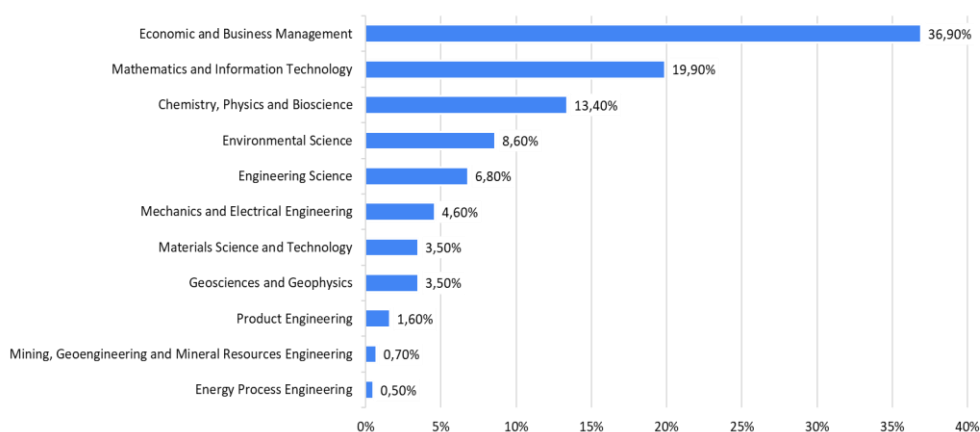


Figure 3. Areas of knowledge in which Ukrainian students would like to see improved digital educational content

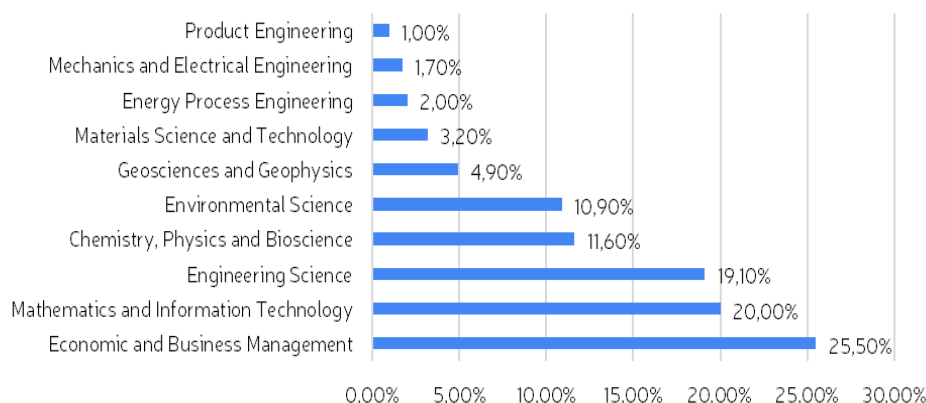


Figure 4. Areas of knowledge in which Ukrainian teachers need to create digital educational content

A study of the relationship between scientific research and improvement of educational content in Ukraine showed that the majority of teachers (52.7%) regularly integrate the scientific results into their educational process (figure 5). This indicates the active use of scientific achievements to improve the

quality of education. In addition, 39.4% of respondents expressed their intention to improve educational content based on the results of scientific research. Only 7.8% of respondents do not consider it necessary to implement scientific results in the educational process.

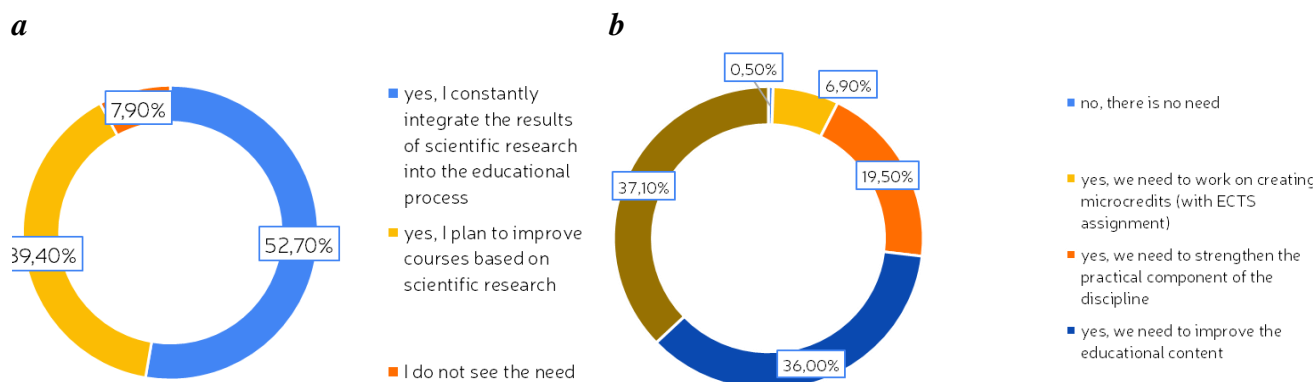


Figure 5. The need to conduct scientific research to create educational content (**a**) and the need for support of Ukrainian higher education institutions by European universities (**b**)

Teachers of Ukrainian higher education institutions today need support from European universities (figure 6). According to the results of the study, it was found that 37.1% of teachers believe that scientific cooperation with European universities will provide new prospects for the development of Ukrainian universities. 35.4% of teachers need support to improve educational content in the established languages. 19.3% need support in strengthening practical component of disciplines. It should be noted that 6.4% of teachers feel the need for support in creating micro-credit courses (with the assignment of ECTS), which is a current trend in European education. In general, about 55% of respondents need the support of European universities in order to improve digital content.

The interest of Ukrainian universities in improving digital courses (lectures, practical/laboratory, etc.) or conducting scientific research within the framework of cooperation with teachers from European universities through the creation of teaching tandems "Teacher Twinning" are analyzed. It is an approach that allows professors from Ukraine to find professors from partner universities with the EU to work together on the creation of digital educational content for use in courses at universities in Ukraine and aims to establish a professional connection

between colleagues to facilitate further collaboration in the future, for example to conduct joint research, teaching or work together on projects.

The results of the study showed significant interest of Ukrainian higher education institutions in the «Teacher Twinning» program, which is aimed at creating teaching tandems with professors of partner universities from the EU for the joint creation of digital educational content and further cooperation. More than 90% of Ukrainian universities are interested in such cooperation. 26% of respondents, having a demand for creating a tandem, face the problem of finding a partner at a European university, only 3.5% already have such a partner.

The most popular fields in which Ukrainian teachers need cooperation are Economic and Business Management (21.1%), Mathematics and Information Technology (18.6%), Engineering Science (13.9%), Popular science courses, general education courses, advanced training courses (12.4%), Chemistry, Physics and Bioscience (11.1%), Environmental Science (8,5%).

An assessment of Ukrainian teachers' expectations from cooperation with a partner teacher from a European university shows that the most expected are the exchange of

experience (76.5%), joint preparation of publications or projects (65.5%), obtaining new ideas and approaches in the educational process (61.9%), establishing partnerships (60.6%),

improving the quality of teaching (58.5%), professional development (57.5%), involvement in international networks and initiatives (51.0%) (figure 6a).

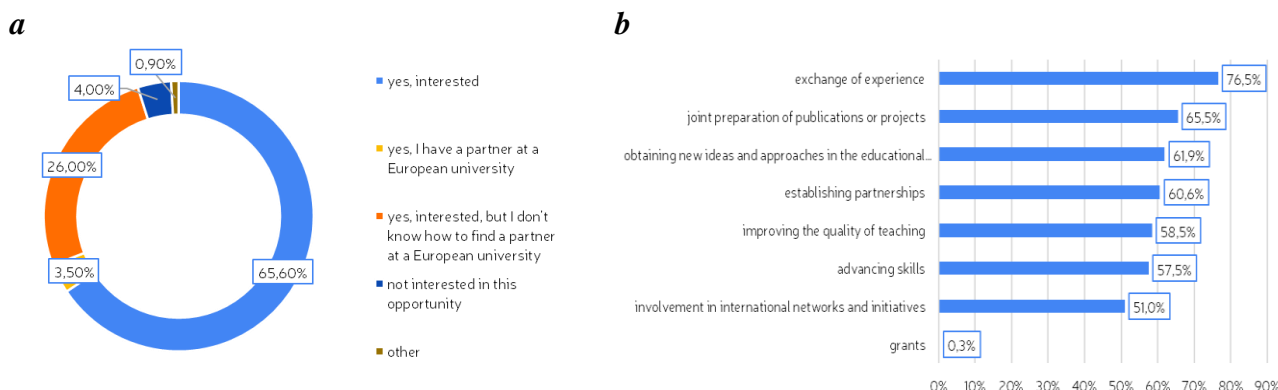


Figure 6. Interest of Ukrainian HEIs in the creation of teaching tandems «Teacher Twinning» (a) and expectations from cooperation with a partner teacher from a European university (b)

The study also assessed the intentions of Ukrainian students to study in digital courses developed by Ukrainian teachers in partnership with teachers from European universities (figure 7a). The results showed that 81.5% of respondents showed interest in such courses, which indicates a positive perception of the possibility of integrating European educational practices into the educational process. Only 9.6% of students are already studying in these courses, while 7.8% of respondents are not interested in such courses. showed interest in learning digital courses.

The results indicate a high interest of Ukrainian students in learning digital courses developed jointly with European teachers, which may indicate their desire to receive quality education and integration into the European educational space. This opens up opportunities for the development of new courses and programs that meet the modern

requirements of the labor market and provides access to international experience. The presence of 9.6% of students already enrolled in such courses indicates the gradual implementation of this initiative, but there are still significant opportunities to attract other students to online learning.

The results of the study revealed a number of motives that encourage Ukrainian students to study in digital courses developed by Ukrainian teachers in cooperation with European universities. Most of the surveyed students (63.1%) are interested in the opportunity to receive knowledge from European teachers, which indicates their interest in high standards of education and professional development. This is followed by the desire to work on scientific projects with European researchers (62.2%), which confirms the desire of students to integrate into the international scientific community.

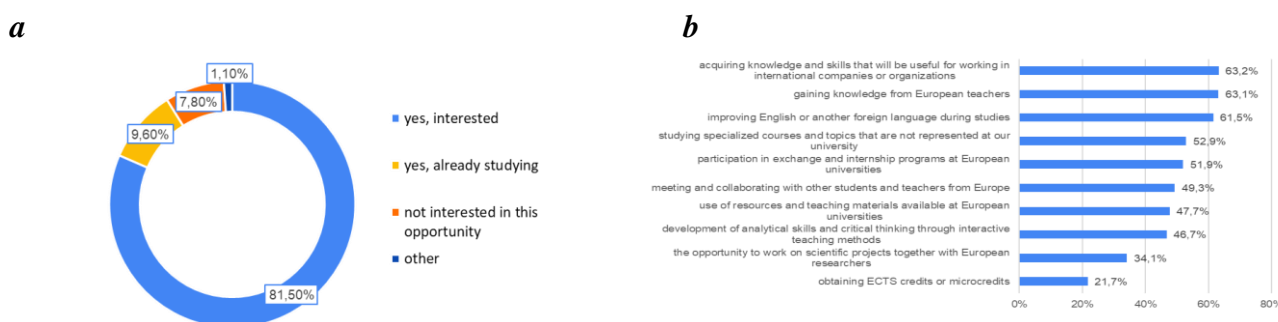


Figure 7. Intentions (a) and motivation (b) of Ukrainian students to study in digital courses developed by Ukrainian teachers together with teachers from European universities

The results of the study indicate a variety of factors that motivate Ukrainian students to study digital courses with European teachers. The highest motivation is the desire to gain knowledge from European teachers and the opportunity to collaborate with international researchers, which confirms the desire of students to integrate into the global educational community. The importance of improving language skills and studying specialized courses shows the willingness of students to expand their professional horizons. Involvement in exchange and internship programs is an important factor in the development of international connections, which opens up new career prospects. In general, the motivation of students to study in such courses reflects their desire to achieve high standards of education and readiness to actively participate in the international scientific environment.

The implementation of approaches to improving digital content in Ukrainian universities will contribute to the further development of digital content that meets the modern needs of Ukrainian universities and increase the level of competencies of Ukrainian students to ensure their competitiveness both in the national and international labor markets.

Conclusions. Ukrainian teachers in modern conditions have demonstrated significant adaptability by switching to online and blended learning formats, which indicates their professional maturity. The vast majority of teachers (97.3%) feel the need to improve digital content for the courses they teach, in particular, 48% actively update their teaching materials. The importance of integrating theory with practice is confirmed by 12.4% of teachers who need to improve digital content for practical classes. Assessing interest in collaborating with European universities through programs such as Teacher Twinning opens up new opportunities for collaborative courses and research.

Most Ukrainian students are currently studying online due to security and technological aspects. Only 27% could attend classes offline, while 15.3% use a mixed format combining online and offline classes. The overwhelming majority of students (57.6%) chose exclusively distance learning.

The need of students to improve digital educational resources has been identified. The majority of respondents (75.8%) support the modernization of online courses, including lectures, hands-on, and laboratory classes, to improve their quality and provide a better interactive experience. The biggest demand for improvement concerns the fields of economics and business management, mathematics and IT, as well as natural sciences.

The majority of students positively assess the experience of learning in digital courses, in particular on international educational platforms, and 81.5% expressed interest in studying in courses developed by Ukrainian teachers together with European ones. This confirms their desire to integrate into the European educational space and to obtain modern knowledge and skills.

The results of the study emphasize the need to improve digital educational technologies and content, actively engage new learning formats and integrate international experience. Universities are faced with the need to integrate innovative learning formats, joint educational initiatives with foreign partners, and expand opportunities for internationalization.

The enhancement of integration into the global educational space through collaboration in the fields of education and science is poised to elevate the quality of higher education in Ukraine. This integration is crucial for improving the competitiveness of graduates from higher educational institutions in both the national and international labor markets. Such an approach not only fosters the exchange of knowledge and best practices but also facilitates the development of curricula that are aligned with global standards. Ultimately, this strategic alignment is essential for equipping students with the skills and competencies necessary to thrive in an increasingly interconnected world. As Ukraine seeks to position itself within the broader context of global education, it becomes imperative to prioritize initiatives that promote international cooperation and knowledge sharing, thereby enhancing the overall educational landscape and contributing to the nation's socio-economic development.

Conclusions. The presented results have been obtained within the framework of the project EdUp - Support and Expansion of the Ukrainian Higher Education Sector in the Area of Resources and Technology. Funded by the Erasmus+, KA220-HED – Cooperation partnerships in higher education.

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ТЕНДЕНЦІЇ ЦИФРОВІЗАЦІЇ В УКРАЇНСЬКІЙ ВИЩІЙ ОСВІТІ: ПОТРЕБИ ТА ВПОДОБАННЯ ЗАЦІКАВЛЕНИХ СТОРІН

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Методологія дослідження. Результати отримані за рахунок застосування методів: стратифікованої вибірки – при визначенні вподобань, досвіду та очікувань студентів щодо інтеграції цифрових інструментів в освіту, а також якості і формати цифрових навчальних матеріалів; збору даних – з метою вивчення ключових аспектів цифровізації вищої освіти; case-study – для визначення найкращих практик та стратегій, які використовують ЗВО для підвищення якості та доступності освіти; аналізу даних – для узагальнення вподобань і потреб студентів і викладачів ЗВО при впровадженні цифрових інструментів в освіту.

Результати. Проведено опитування викладачів та студентів серед більш ніж 50% від загальної кількості ЗВО України щодо цифровізації освітнього контенту та загальних трендів в сучасній вищій освіті. Встановлено адаптивність студентів та викладачів ЗВО України до сучасних умов функціонування та цифровізації вищої освіти з необхідністю (на рівні більш ніж 90%) постійного удосконалення дисциплін, що викладаються. Визначено необхідність адаптації навчальних програм, а також посиленій співпраці з європейськими університетами як в освітній, так і в науковій діяльності для створення сучасного контенту, який відповідатиме потребам студентів та ринку праці та їх конкурентоспроможності в сучасних умовах глобалізації.

Новизна. Результати дослідження зазначають необхідність вдосконалення цифрових освітніх технологій і контенту університетами України, їх активного залучення до нових форматів навчання та інтеграції міжнародного досвіду зі створенням спільних освітніх ініціатив з іноземними партнерами та розширенням можливостей для інтернаціоналізації вищої освіти.

Практична значущість. Визначені стратегічні шляхи розвитку української системи вищої освіти, які полягають в інтеграції освітнього контенту в Європейській освітній простір шляхом створення спільних освітніх програм та наукових проєктів, які забезпечать обмін досвідом та підвищать конкурентоспроможність ЗВО України та випускників на глобальному ринку праці.

Ключові слова: економічний розвиток, конкурентоспроможність, ринок праці. цифровізація освіти, вища освіта, освітній контент, інтернаціоналізація.

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