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Lakusha Nataliia,
PhD in Philosophy, Associate Professor,
Associate Professor at Philosophy
Kyiv National University of Construction and Architecture
orcid.org/0000-0001-8816-3178
lakusha.nm@knuba.edu.ua

Chervona Lesya,
PhD in Philosophy, Senior Researcher,
Leading Researcher of the Department
of Interaction between Higher Education and the Labor Market
Institute of Higher Education
National Academy of Pedagogical Sciences of Ukraine
orcid.org/0000-0002-3036-3668
l.chervona@ihed.org.ua

Iehupov Mykola,
Ph.D. in Philosophy, Associate Professor,
Associate Professor at the Department of History and Theory of Olympic Sports
National University of Physical Education and Sports of Ukraine
orcid.org/0000-0001-8192-4720
oyeremenko@uni-sport.edu.ua

SYNERGY OF HIGHER EDUCATION AND THE LABOR MARKET UNDER GLOBALIZATION TRANSFORMATIONS

The article examines the key aspects of synergy between higher education and the labor market in the context of globalization transformations, specifically through the lens of multiculturalism and the integration of modern technologies. The role of higher education as an instrument for personality development and the training of specialists capable of navigating the global world is analyzed, taking into account the challenges of migration, the consolidation of democratic values, and the overall globalization process. By analyzing the integration of higher education and business, the study outlines the primary areas of cooperation: internships, collaborative research, and startups. It is emphasized that universities foster competencies that meet employer requirements, particularly interdisciplinary thinking and creativity. Special attention is paid to the implementation of modern technologies (VR, AI) in educational practice, which contributes to the creation of a dynamic environment, personalization of learning, and the development of key competencies (critical thinking, technological literacy). Technologies are considered a crucial factor in forming a competitive specialist and developing an innovative society. The mechanisms of integrating education, science, and business are demonstrated through the case study of the Kyiv National University of Construction and Architecture (KNUBA). In the context of the analyzed challenges, mechanisms for achieving synergy between higher education and the labor market are identified. These include developing students' capacity to design, implement, and manage innovative scientific projects; the ability to use modern modeling and forecasting methods involving the latest application software, computer systems, and networks; and the generation of ideas for the practical implementation of scientific results. The potential of artificial intelligence in higher education is revealed as a tool for individualizing curricula and increasing the efficiency of training qualified personnel for high-tech industries.

Key words: higher education, business, integration, labor market, globalization transformations, artificial intelligence (AI), competitive specialist.

Лакуша Наталія,
кандидат філософських наук, доцент, доцент кафедри філософії
Київського національного університету будівництва і архітектури
orcid.org/0000-0001-8816-3178
lakusha.nm@knuba.edu.ua

Червона Леся,
кандидат філософських наук, старший науковий співробітник,
провідний науковий співробітник відділу взаємодії
вищої освіти та ринку праці
Інституту вищої освіти
Національної академії педагогічних наук України
orcid.org/0000-0002-3036-3668
l.chervona@ihed.org.ua

Єгупов Микола,
кандидат філософських наук, доцент,
доцент кафедри історії та теорії олімпійського спорту
Національного університету фізичного виховання і спорту України
orcid.org/0000-0001-8192-4720
oyeremenko@uni-sport.edu.ua

СИНЕРГІЯ ВИЩОЇ ОСВІТИ Й РИНКУ ПРАЦІ В УМОВАХ ГЛОБАЛІЗАЦІЙНИХ ТРАНСФОРМАЦІЙ

У статті досліджуються ключові аспекти синергії вищої освіти й ринку праці в умовах глобалізаційної трансформації, зокрема через призму полікультурності й інтеграції сучасних технологій. Проаналізовано роль вищої освіти як інструмента розвитку особистості та підготовки фахівця, здатного орієнтуватися в глобальному світі, ураховуючи при цьому виклики міграційних рухів, утвердження демократичних цінностей і процесу глобалізації. Аналізуючи процес інтеграції вищої освіти й бізнесу, окреслили основні напрями співпраці: стажування, партнерські дослідження, стартапи. Наголошується, що університети формують компетенції, які відповідають вимогам роботодавців, особливо міждисциплінарне мислення та креативність. Особлива увага приділена впровадженню сучасних технологій (VR, ШІ) в освітню практику, що сприяє створенню динамічного середовища, персоналізації навчання й розвитку ключових компетенцій (критичне мислення, технологічна грамотність). Технології розглядаються як чинник формування конкурентоспроможного фахівця та розвитку інноваційного суспільства. На прикладі КНУБА показано механізми інтеграції освіти, науки й бізнесу. У контексті проаналізованих викликів визначено механізми досягнення синергії між вищою освітою та ринком праці, зокрема через формування в студентів здатності розробляти інноваційні наукові проєкти, упроваджувати їх та управляти ними; уміння використовувати сучасні методи моделювання та прогнозування з використанням новітніх прикладних програм, комп'ютерних систем і мереж, програмних продуктів при створенні нових знань, генерувати ідеї щодо практичного впровадження наукових результатів. Розкрито потенціал штучного інтелекту у вищій освіті як інструмента індивідуалізації навчальних програм і підвищення ефективності підготовки кваліфікованого персоналу для високотехнологічних галузей.

Ключові слова: вища освіта, бізнес, інтеграція, ринок праці, глобалізаційні трансформації, штучний інтелект (ШІ), конкурентоспроможний фахівець.

Modern higher education operates within the context of global transformational processes that significantly alter the requirements for specialists and the educational process itself. A key challenge for contemporary higher education is the imperative to achieve synergy between universities and the dynamic evolution of the labor market. Traditional education was largely instrumental, oriented toward the acquisition of general knowledge about the world. However, the current reality demands a radical revision of the subject matter of educational activity to ensure a rapid response to business needs for highly qualified personnel capable of innovative scientific and technical activity, interdisciplinary thinking, and creativity. Consequently, there is a pressing task

to identify and implement effective mechanisms for multi-vector cooperation between education and business, as well as to leverage the potential of AI for the personalization and enhancement of learning efficiency.

The analysis of numerous publications investigating the synergy between higher education and the labor market under globalization transformations indicates sustained scholarly interest in this field. Previous studies emphasize mechanisms for university cooperation with employers, the formation of graduate competencies, and the adaptation of educational systems to global challenges such as migration, digital transformation, and the knowledge economy.

Babin and Likova (2010), in their work on the development strategy of university education in Ukraine within the context of the European Higher Education Area (EHEA) through 2020, highlight the necessity of integrating education with the labor market through a competence-based approach, mobility, and the recognition of qualifications. The authors focus on globalization transformations, such as increased migration and cultural exchanges, which require the cultivation of democratic values and intercultural dialogue within universities. They propose mechanisms for cooperation with business, including joint programs and an orientation toward employer needs, to enhance the competitiveness of specialists.

In a similar vein, the authors of the Rome Ministerial Communiqué (2020) emphasize the construction of an inclusive, innovative, and interconnected EHEA by 2030. The document underscores synergy with the labor market by strengthening the social dimension of education and investing in digital technologies and sustainable development aligned with the UN Sustainable Development Goals (SDGs). Globalization is viewed here as a factor necessitating mobility, qualification recognition, and integration with business to overcome crises, such as the pandemic, with an emphasis on digital transformation and the green economy.

Davey et al. (2018), in a report on the state of university-business cooperation in Europe, analyze integration mechanisms such as collaborative research, internships, and technology transfer. The authors identify barriers (bureaucracy, lack of motivation) and success factors (flexibility, mutual interests), highlighting the impact on the labor market: such synergy improves graduate employability and stimulates innovation in a globalized economy. The report, based on surveys from over 30 countries, demonstrates that robust cooperation enhances Europe's overall competitiveness.

Mielkov et al. (2024), in their monograph on university development, focus on the theoretical foundations of the synergy between social and institutional transformations in higher education, science, and the economy. The authors propose models for competence-based education, business partnerships, and innovation centers to adapt to globalization, focusing on graduate employment and economic growth through knowledge transfer.

Previous research (Babin, Dubaseniuk, Cherep, Mielkov, Davey, et al.) demonstrates that synergy between higher education and the labor market is achieved through multi-vector cooperation, the implementation of technology, and the consideration of globalization challenges. They identify gaps, such as bureaucracy and the digital divide, while proposing effective integration mechanisms.

The aim of the article is to investigate the key aspects of synergy between higher education and the labor market in the context of globalization transformation, with an emphasis on multiculturalism, the integration of the education system and business, and the implementation of modern technologies to cultivate a competitive and innovation-oriented specialist.

Research methods. To provide a comprehensive study of the topic, methods such as analysis and synthesis were employed to identify key aspects of synergy between higher education and the labor market, the challenges of globalization transformation, and effective mechanisms for cooperation between education and business.

Philosophical-anthropological and existential-anthropological analyses were used to examine educational transformation within the global socio-cultural dimension. This approach allowed for emphasizing the significance of each individual and the necessity for a radical revision of the focus of educational activity (moving from an instrumental nature toward personality development). A systemic approach made it possible to identify and justify the mechanism for achieving synergy between higher education

and the labor market, treating them as a holistic system that responds to business needs.

Multiculturalism (polyculturalism) stands as one of the defining characteristics of modern education. Contemporary universities serve as the foundation for cultivating democratic values, tolerance, and intercultural dialogue, which are essential prerequisites for the formation of a sustainable society. The emphasis is increasingly placed on education as a primary instrument for personality development.

Currently, the evolution of educational discourse is shaped by three pivotal factors of modern civilization:

Increased migration movements toward highly developed industrial nations;

The definition of human and ethnic minority rights, alongside their striving for the consolidation of democracy in their respective countries;

The process of globalization, which intensifies interconnections and contacts between individuals.

Globalization acts as an objective condition for the convergence of various cultures and the establishment of cultural uniformity within a multicultural society, significantly impacting educational processes.

Consequently, it is imperative to account for the phenomenon of multiculturalism inherent to Europe and to ground educational strategies in the diversity of didactic solutions that have historically evolved within European pedagogy. The concept of multicultural education is a direct response to the demands of reality, reflecting the need to prepare young people for life in a pluralistic society.

A crucial element in cultural exchange is the subjective factor: the role of each unique individual. The participation of the personality in culture is paramount, a notion affirmed by Western European philosophical-anthropological and existential-anthropological paradigms.

This shift manifests through a change in the very subject matter of education within the global socio-cultural dimension. Traditional education was, to a greater or lesser extent, "outward-facing", aiming for the mastery of knowledge about the surrounding world-thus possessing an instrumental nature. This nature remained largely unchanged even when "personality development" was declared the goal, as the tools used for this development remained static. In the current environment, a significant number of educational philosophers advocate for a radical revision of the subject of educational activity.

Modern education, structured in accordance with European standards, must facilitate the development of a democratic culture and the formation of competencies necessary for living within the European community, including political, legal, and socio-economic knowledge. The priorities of pan-European education lie in providing the younger generation with knowledge of a shared European heritage and the practical skills to adapt to living and studying in different European countries-being mobile, socially capable, and adept at communication and the protection of their rights.

The relentless transformational processes in modern education are characterized by the fact that education is ceasing to be merely a means of vocational training; instead, it is becoming a mandatory stage in personality development. One of the priority tasks of the educational process today is the preparation of a specialist capable of navigating and functioning effectively within the conditions of the modern global world.

Integration of Education and Business. The integration of education and business systems involves the creation of multi-vector cooperation between universities and enterprises. Effective forms of such interaction include internships, academic mobility, collaborative research partnerships, grant funding, and the creation of startups. Modern universities are at the forefront of developing competencies in specialists that meet the current demands of employers. Among these, interdisciplinary thinking and creativity are particularly emphasized.

This integration is intrinsically linked to the development of the knowledge economy, the efficient use of intellectual resources, and the formation of an innovative environment. The business sector requires highly qualified personnel capable of enhancing commercial success.

Within the higher education system, there is an established practice of interaction between higher education institutions (HEIs) and the business world. Universities are progressively moving toward closer cooperation to enhance students' practical knowledge and integrate the interests of the educational sector, business, and other branches of the economy.

It should be noted that universities serve as hubs for both scientific research and the training of high-level professionals. Research universities exemplify the successful combination of these functions, creating an environment where students are integrated into scientific activities while faculty members actively engage in research, bringing the latest knowledge into the educational process.

Case Study: Kyiv National University of Construction and Architecture (KNUBA)

As an example, consider the Kyiv National University of Construction and Architecture (KNUBA), the leading HEI in the fields of construction, architecture, and urban management in Ukraine. Innovative development at KNUBA encompasses the educational process, scientific activity, and their integration with the economic sector.

The University and the Association of Robotics and Automated Systems Market Participants signed an agreement to launch the "RoboLab" project – the creation and operation of a modern robotics laboratory based at KNUBA. This is a pilot project intended for scaling to other universities nationwide. Combining the efforts of the university's scientific community and the association's expert environment is expected to deliver the results required by the state: the preparation of a new generation of specialists with up-to-date engineering competencies demanded by the market. KNUBA won the final selection stage to host the first pilot RoboLab laboratory within the project framework. The project was launched by the Ministry of Digital Transformation and the Association of Robotics and Automated Systems, in partnership with the Ministry of Education and Science of Ukraine, with support from the Ukraine-Moldova American Enterprise Fund and technology companies Ajax Systems and Deus Robotics (Kyivskyi natsionalnyi universytet budivnytstva i arkhitektury, n.d.).

Furthermore, KNUBA and the Hon. Prof. M. S. Bokarius National Scientific Center "Institute of Forensic Expertise" signed a memorandum of cooperation. The key areas of this collaboration include:

- Cooperation in the forensic examination of buildings and structures;
- Development of fortification structures, particularly for frontline regions;
- Training and professional development for institute employees via full-time, online, and blended courses;
- Scientific conferences, exchange of expert experience, and student internships;
- Scientific interaction at the level of specialized councils, peer review, and academic opposition of research works;
- Analysis and testing of construction materials in KNUBA's modern laboratory;
- Organization of international conferences on recovery and reconstruction issues (Kyivskyi natsionalnyi universytet budivnytstva i arkhitektury, n.d.).

Business companies actively participate in career orientation, provide workplaces for internships, allocate grants, support startup development, and assist in employment. The business sector is interested in employees who possess specific knowledge and skills. Consequently, it is necessary to foster motivation for professional activity and psychological readiness to work in a competitive environment.

University graduates must possess specific competencies: the ability to generate new ideas, solve complex problems across various fields, and conduct independent scientific research characterized by originality as well as theoretical and practical significance. Furthermore, there is a high demand for the competency to successfully engage in innovative scientific and technical activities based on interpersonal relationships, facilitating maximum self-expression through tolerance, psychological compatibility, and professional ethics.

At the same time, employers emphasize certain facets of collaboration with universities: institutional flexibility, the presence of shared interests and motivation, financial resources, the interest of universities in practical knowledge, the reduction of administrative bureaucracy, and a commitment to research and development (R&D). Employers cooperate with universities in areas such as student and faculty mobility, internships, and practical training. The economic and social efficiency of the educational system serves as a fundamental prerequisite for such business partnerships.

Developing a Competitive Specialist for the Labor Market. The integration of modern technologies – such as virtual reality (VR), artificial intelligence (AI), and other innovative tools – into the higher education process is a pivotal factor in ensuring synergy between academia and the labor market. Creating a dynamic, interactive environment revitalizes the learning

process and purposefully develops key competencies necessary for success amidst rapid technological shifts in the global market.

The utilization of VR, AI, and other innovative means allows for a revision of educational methodologies and enhances student motivation. New technologies enable personalized learning, accounting for students' individual characteristics, interests, and learning pace. The implementation of cutting-edge technologies in university curricula is directly aimed at training qualified personnel who possess modern skills and are prepared for the challenges of high-tech industries.

Effective technology implementation in the educational process requires professional training for educators and a shift in instructional methodologies. The development of online education and distance learning is an integral part of evolutionary changes in the educational system, ensuring global access to knowledge. Technology use in education fosters the development of critical competencies such as critical thinking, communication skills, and technological literacy.

One crucial aspect is ensuring the accessibility of technology across all social strata to avoid the digital divide and provide equal learning opportunities. Current technological shifts in education promote the growth of a global community and prepare students for modern challenges. Technology allows students to access educational resources from anywhere in the world, expanding their opportunities to explore diverse topics and cultures. Online platforms and virtual classrooms enable participation even from remote areas, providing flexibility and accessibility.

The implementation of new technologies into the educational environment contributes to the creation of an innovative, competitive society with a highly developed economy through several key mechanisms:

- **Technological Literacy:** Educating the population in modern technologies prepares them to effectively use tools that increase productivity and drive innovative development.
- **Qualified Personnel:** Using technology in training helps prepare skilled staff who possess contemporary skills and are ready for high-tech sector challenges.
- **Stimulating R&D:** Technological integration stimulates scientific research and development, expanding opportunities for innovation across various fields.
- **Global Knowledge Exchange:** Virtual classrooms and online platforms allow for education from any point in the world, expanding the geography of educational access and facilitating global knowledge exchange.
- **Entrepreneurial Mindset:** An educational process that actively utilizes technology fosters entrepreneurial thinking and encourages the emergence of new ideas and innovations.

Overall, the integration of new technologies into the educational process is a critical factor in developing an innovative and competitive society, facilitating progress in an era of rapid technological change.

One of the modern components of technological change in the educational system is the implementation of Artificial Intelligence (AI). Consider several aspects of utilizing artificial intelligence in education (Chervona et al., 2023):

- Personalization: AI systems can analyze data on each student's learning, taking into account their individual characteristics, learning pace, and specific needs. Based on this analysis, individualized learning programs are created for each student.
- Automated Assessment: AI systems can automate the processes of grading assignments, tests, and tasks. They can also generate detailed student progress reports and recommendations for further study.
- Adaptive Recommendations: AI systems can analyze academic progress and student interests to recommend additional materials, courses, or self-study tasks.
- Big Data Analytics: AI can analyze vast amounts of data to identify trends and improve the overall efficiency of educational curricula.
- Emotion and Recognition Technology: AI can utilize facial and emotion recognition technologies to study student reactions to educational material. This allows for the adaptation of teaching methods based on emotional states and engagement levels.
- Textual Analysis: AI tools can analyze students' written work to identify writing styles, grammatical errors, and levels of complexity.

These examples demonstrate how artificial intelligence helps transform traditional education, making it more individualized, accessible, and effective.

The overall impact of new technologies on the educational system manifests in changing approaches to learning and the instructional process.

These technologies facilitate synergy between higher education and the labor market. The implementation of new technologies requires the adaptation of both faculty and students to constant change, as well as addressing issues regarding technological access and efficiency. The development of digital literacy is becoming a key element of modern education, as it enables the effective use of information resources and tools. Thus, the introduction of new technologies in the educational system opens new opportunities for improving the quality of training for future specialists.

Modern higher education in the context of globalization transcends its instrumental function, evolving into a mandatory stage of personality development. Consequently, educational discourse is influenced by the phenomenon of multiculturalism, which involves the formation of democratic values, tolerance, and intercultural dialogue. The goal of the educational process is to prepare specialists capable of navigating and working effectively within the modern global world.

Achieving synergy between universities and the labor market is realized through multi-vector cooperation and the integration of education and business systems. The primary effective forms of such interaction include internships, collaborative research, grant funding, and the creation of startups. Universities serve as pivotal hubs for fostering competencies that meet employer requirements, particularly interdisciplinary thinking and creativity.

The implementation of modern technologies (VR, AI) is a critical aspect of ensuring this synergy, as it contributes to the creation of a dynamic and interactive environment. AI systems allow for the personalization of learning, accounting for the individual characteristics, pace, and needs of students. This makes traditional education more individualized, accessible, and efficient while increasing the effectiveness of training qualified personnel. Furthermore, technologies stimulate scientific research and development, contributing to the advancement of an innovative society.

The result of this interaction is the emergence of competitive graduates who possess the ability to design innovative scientific projects, utilize modern modeling and forecasting methods, generate ideas for the practical implementation of scientific results, and successfully engage in innovative scientific and technical activities.

The mechanisms for integrating education, science, and business can be successfully implemented, as evidenced by the case of the Kyiv National University of Construction and Architecture (KNUBA). The development of digital literacy remains a core element, opening new horizons for improving educational quality and the preparation of future specialists.

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