

4.4. EDUCATIONAL GOALS AND OUTCOMES OF VOCATIONAL-PRACTICAL TRAINING OF CONSTRUCTION SPECIALISTS WITHIN THE INTERNAL QUALITY ASSURANCE SYSTEM OF EDUCATION

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This section explores the educational objectives and expected outcomes of vocational-practical training for future construction specialists in the context of global risks, sustainable development, and Industry 5.0 requirements. The study emphasizes the strategic role of professional education in ensuring socio-economic resilience, infrastructure recovery, and technological adaptability. It highlights the integration of ESG principles (environment, social responsibility, governance) and the Sustainable Development Goals into the training process, focusing on ecological culture, digital literacy, social responsibility, and professional competencies such as energy efficiency, innovation, and safety standards. The research draws on the scientific contributions of the Institute of Vocational Education of the National Academy of Educational Sciences of Ukraine, which has developed eco-oriented pedagogical technologies, case-based learning approaches, and energy-efficient competence models for construction professions. The article emphasizes that professional and practical training should combine theoretical knowledge with applied skills, promoting professional independence, critical thinking, and readiness to work in the conditions of modern technological and socio-economic transformations. This approach ensures the preparation of highly qualified specialists capable of contributing to sustainable reconstruction and international integration of Ukraine's education system.

Keywords: vocational education, construction industry, sustainable development, Industry 5.0, professional competencies, quality assurance

Education constitutes the foundation of social progress and personal self-development, grounded in the acquisition of socially significant experience embodied in knowledge, skills, abilities, and spiritual value orientations. In defining the objectives and forecasting the outcomes of vocational and practical training for future specialists in the construction industry under conditions of acute global contradictions and contemporary challenges, it is essential to align with the urgent socio-economic needs of the country, the priorities of Industry 5.0, and the goals of the Sustainable Development Concept. This framework presupposes a balance between meeting the current needs of humanity and safeguarding the interests of future generations, particularly the universal demand for a safe and healthy environment, the maintenance of well-being, and the assurance of social justice across all spheres of human existence. The creation of conditions for the successful

advancement of Industry 5.0 and the achievement of sustainable development goals entails the social responsibility of every individual to contribute to a better future and global cultural progress, based on the principles of social justice and responsible environmental stewardship.

In recent years of the twenty-first century, global development has been marked by critical challenges triggered by kinetic wars, the deployment of economic instruments as weapons for strategic advantage, and increasing fragmentation within societies. At the same time, long-term challenges – from technological acceleration to environmental degradation – continue to generate side effects across all global ecosystems; the rules and institutions that have long sustained global stability and order are increasingly reaching dead ends or proving ineffective in managing these processes.

The Global Risks Report 2026 presents research on risks in the immediate or near-term (World Economic Forum, 2026b), the short- and medium-term (up to 2028), and the long-term (up to 2036), emphasizing that global risks are expanding in scale, interconnectedness, and speed. The core trend identified for 2026 is competition, wherein mechanisms of cooperation are collapsing, governments are retreating from multilateral structures, and stability is being undermined. Confrontation replaces collaboration, while trust – as the foundation of cooperation – loses its value. Experts note that the established world order, based on the primacy of international law, is disintegrating.

The multivector system of international interaction is under pressure, characterized by declining trust, reduced transparency and respect for the rule of law, and rising protectionism, which threatens established international relations, trade, and investment, while amplifying risks of confrontation and conflict. At the 56th World Economic Forum in Davos (3DP4ME, 2026), held under the motto “A Spirit of Dialogue”, influential leaders from various countries delivered significant speeches addressing the end of the rules-based world order. Notably, Canadian Prime Minister Mark Carney described the current reality as a “fracture of the global legal order,” stressing that a harsh reality is emerging in which the strong act as they are able, while the weak must endure what is imposed upon them (World Economic Forum, 2026a).

Among the ten greatest risks threatening humanity in the near future, global experts have identified: 1) extreme weather events; 2) loss of biodiversity and ecosystem collapse; 3) critical changes in Earth systems; 4) disinformation and misinformation; 5) adverse consequences of artificial intelligence technologies; 6) scarcity of natural resources; 7) social inequality; 8) cybersecurity threats; 9) social polarization; and 10) environmental pollution (World Economic Forum, 2026b, p. 19).

The education system serves as a powerful lever of state policy, enabling influence over the formation of intellectual and labor potential at the global, national, and societal levels. The content of educational programs and the quality of vocational and practical

training directly determine the trajectory of development and the living conditions of future generations. Training specialists in the construction industry under conditions of global risks and disruptions acquires strategic importance, given the necessity of ensuring socio-economic resilience, mitigating the consequences of climate change, war-related destruction, and economic crises, as well as addressing the urgent need for infrastructure recovery, maintenance of order, and technological adaptability.

The development of the construction sector requires the vocational education system not only to provide high-quality theoretical training but also to ensure effective organization of vocational and practical learning that fosters the competencies necessary for work in the context of contemporary technological and socio-economic transformations of Industry 5.0. The relevance of the issue of vocational and practical training for construction specialists is determined by the demand for highly qualified personnel capable of integrating technological innovations, principles of sustainable development, and occupational safety standards into production processes.

At the Institute of Vocational Education of the National Academy of Pedagogical Sciences of Ukraine, headed by Academician Radkevych, targeted scientific research has been conducted for many years on various aspects of vocational training for future specialists, particularly in the construction sector of the country. The significant scholarly contributions of the Institute's staff are reflected in works devoted to: the standardization of professional training of junior specialists in the construction industry (Luzan et al., 2020); the development and application of eco-oriented pedagogical technologies for vocational training of future skilled workers in the construction industry (Haiduk et al., 2022, pp. 29–83); the peculiarities of applying case-based technology in the vocational training of future skilled construction workers (Piatnychuk et al., 2024); and the formation of energy-efficient competence among future skilled workers in the construction industry (Herliand et al., 2025), among others.

Under the conditions of severe global challenges, the consistent adherence to the goals of the Sustainable Development Concept within the vocational education system is of paramount importance. This concept is grounded in the necessity of establishing a balance between meeting the current needs of humanity and safeguarding the interests of future generations, particularly their demand for a safe and healthy environment. The purpose of implementing the Concept is to protect the environment, ensure social justice, eliminate racial and national discrimination, and improve the standard of living of the population.

An essential prerequisite for the introduction of sustainable development principles is compliance with ESG criteria (E – environment, S – social responsibility, and G – governance), which facilitate the involvement of diverse institutions in addressing ecological, social, and governance-related challenges. The fundamental

principles of the Sustainable Development Concept provide humanity with a real opportunity to secure stable and long-term development that meets the needs of present generations while ensuring future generations the ability to satisfy their own needs.

Restrictions on the use of natural resources must be relative and determined by the level of technological progress, social organization, and the biosphere's capacity for self-renewal. It is critically important to guarantee the satisfaction of basic human needs and to create conditions for realizing aspirations toward a dignified life. Without this, sustainable development is impossible, as poverty remains one of the primary causes of ecological and social crises. Equally important is the necessity of harmonizing the lifestyles of those who consume excessive material and financial resources with the ecological capacities of the planet, particularly in the sphere of energy consumption. The pace and scale of population growth must correspond to the evolving productive potential of the global ecosystem of the Earth.

In order to safeguard Ukraine's national interests regarding the sustainable development of the state, the economy, and civil society, the Presidential Decree "On the Sustainable Development Goals of Ukraine until 2030" established the commitment to adhere to these goals throughout the designated period. According to the Decree, the Sustainable Development Goals of Ukraine until 2030 are to serve as benchmarks for the development of forecasting and programmatic documents, as well as draft regulatory and legal acts, with the aim of ensuring the balance of economic, social, and environmental dimensions of Ukraine's sustainable development (President of Ukraine, 2019).

In line with the regulatory requirements governing the organization of the educational process, the system of vocational and practical training must integrate sustainable development imperatives into the processes of national recovery and modernization. This integration is achieved through the combination of educational, practical, and institutional mechanisms that foster the formation of competencies for an innovative economy, the guarantee of social justice, and international integration.

Accordingly, vocational and practical training of future construction specialists should be oriented toward the development of professional competencies, skills, and abilities necessary for the independent execution of production tasks, the safe operation of equipment, and the enhancement of labor productivity. The main objectives of such training include:

1. Acquisition of professional skills and abilities aimed at mastering typical operations, techniques, and tools required for a specific profession at the appropriate qualification level;

2. Industrial training and adaptation, including the development of the ability to work under real production conditions, make optimal decisions, and analyze technological processes;

3. Development of professional autonomy, training in the creative application of knowledge, decision-making when working with new equipment, and diagnosing malfunctions;

4. Formation of professionally significant qualities, technical, analytical, and critical thinking;

5. Development of skills that ensure improved quality and productivity of production – effective work, reduced energy consumption, and enhanced product quality; ensuring occupational safety, studying and strictly adhering to labor protection and safety regulations, and preventing industrial violations.

The system of vocational and practical training can integrate the requirements of sustainable development into the processes of national recovery and modernization through the combination of educational, practical, and institutional mechanisms that ensure the acquisition of competencies for building an innovative economy, promoting social justice, and safeguarding environmental security. In particular, in preparing the country's human capital capable of implementing the Sustainable Development Goals in practice, relevant general and professional competencies may be formed:

1. General (basic) competencies.

- Environmental culture and resource conservation – the ability to work with technologies that minimize negative environmental impacts.

- Digital literacy – the use of modern digital tools for effective and innovative activity.

- Social responsibility – awareness of the role of professional activity in the development of society and communities.

- Legal culture – knowledge of labor legislation, human rights, and the principles of justice and transparency.

2. Socio-emotional competencies.

- Emotional intelligence – the ability to cooperate, empathize, and constructively resolve conflicts.

- Leadership and teamwork – the ability to organize collective activities and take responsibility for results.

- Inclusiveness and gender equality – readiness to work in diverse teams and respect the rights and opportunities of all individuals.

3. Professional competencies.

- Innovation and entrepreneurship – the ability to generate new ideas, create start-ups, and implement innovations in production.
- Green technologies and energy efficiency – skills in working with renewable energy sources, circular economy practices, and ecological standards.
- STEM competencies – integration of knowledge in science, technology, engineering, and mathematics to address contemporary challenges.
- International communication – proficiency in foreign languages and intercultural interaction skills for participation in global projects.

4. Strategic competencies.

- Change management – the ability to adapt to new conditions, technologies, and socio-economic challenges.
- Sustainable development as strategic thinking – integration of sustainable development principles into professional decisions and practices.
- Civic engagement – participation in social initiatives, volunteer activities, and community projects.

Within the general and professional competencies of future specialists in professions such as 7122 “Bricklayer”, 7133 “Plasterer”, 7132 “Tiler”, and 7214 “Reinforcement worker (construction, installation, and repair works)”, the approved educational standards specifically identify: communicative competence; mathematical competence; digital competence; personal, social, and learning competence; civic and legal competence; entrepreneurial competence; energy-efficient and ecological competence; and cultural competence (Ministry of Education and Science of Ukraine, 2023b; 2024c).

Among the goals and objectives of sustainable global development defined by the United Nations General Assembly in the Resolution “Transforming our world: The 2030 Agenda for Sustainable Development” (United Nations Development Programme, 2018), a central priority is the provision of inclusive and equitable quality education and the promotion of lifelong learning opportunities for all people worldwide. The tasks identified for achieving this goal include:

- Ensuring free, equitable, and quality primary and secondary education leading to desirable and effective learning outcomes;
- Guaranteeing equal opportunities for early childhood development and preschool education, preparing young children adequately for primary education;

- Promoting gender equality and accessibility to quality vocational and higher education;
- Eliminating all forms of inequality in access to education by ensuring equal opportunities for vulnerable groups, including persons with disabilities, representatives of diverse nations and ethnicities, and children in vulnerable situations, to education and vocational training;
- Developing and expanding educational institutions that address the diverse needs of learners, the specific requirements of persons with disabilities, and gender aspects, while ensuring free, effective, and safe learning environments free from violence and social barriers;
- Increasing worldwide scholarship opportunities for education, including higher and vocational education, training in information and communication technologies, technical, engineering, and research programs across different countries;
- Expanding the number of professionals equipped with in-demand competencies, including vocational skills and abilities, to facilitate successful employment, career development, and entrepreneurial activity;
- Increasing the number of qualified teachers, particularly through international cooperation in the training of pedagogical and academic staff;
- Ensuring that all learners acquire the knowledge and skills necessary to promote sustainable socio-economic development, including through the study of sustainable development and sustainable lifestyles, human rights, gender equality, the promotion of a culture of peace and security, global citizenship, and awareness of the value of cultural diversity and contributions to sustainable social progress.

International practice (European Association for Quality Assurance in Higher Education et al., 2015, pp. 9–25), among the requirements for ensuring the quality of education in a country, emphasizes the necessity of both internal and external systems of quality assurance. The internal system of quality assurance is implemented directly within educational institutions and involves the proper organization of educational management and the effective delivery of the educational process. The external system of quality assurance, in turn, provides external oversight of educational institutions, monitoring their compliance with state requirements in educational training and the effectiveness of the organization of the learning process.

At the core of the internal quality assurance system lies the institution's policy on quality, which entails the creation and maintenance of a quality system with the involvement of all participants in the educational process and external stakeholders. Other

key components of the internal system include educational programs that must comply with state standards for specific specialties and levels of education, while also meeting learners' needs and labor market demands. The implementation of educational programs should be carried out under conditions of student-centered learning, teaching, and assessment, which aim to account for the individual characteristics, needs, and expectations of learners. Recognition of achievements, acknowledgment of students' educational outcomes, and fair assessment of their activities within the institution – taking into account results from all forms of curricular and extracurricular work, such as participation in creative competitions, sports events, and scientific research – also serve as indicators of the internal quality assurance system.

Additional important components ensuring the quality of the educational process within institutions include:

- Teaching staff, whose qualifications and professional specialization must correspond to the requirements of the educational program, and whose activities should be based on professionalism, humanistic and democratic values, innovation, and effective teaching methods;
- Learning resources and student support, which require the availability of adequate material and technical resources, such as libraries, educational equipment, and IT infrastructure, as well as comprehensive psychological and pedagogical support, including counseling, facilitation, tutoring, and mentorship;
- Information management, aimed at collecting and analyzing diverse indicators of educational activity within the institution to maintain and develop the internal quality assurance system;
- Transparency of information, meaning the clear presentation of objective and up-to-date information on publicly accessible platforms regarding the institution's activities, including the list of specialties and educational programs offered, the objectives and expected learning outcomes of these programs, admission requirements, the organization of the educational process, specific features of teaching, learning, and assessment of students' knowledge, as well as information on graduates' employment opportunities.

The effectiveness of organizing the educational process within an institution is ensured through ongoing monitoring and periodic review of programs, which involves the improvement and updating of the structure and content of educational components used in learner training, with the participation of both internal and external stakeholders. Continuous monitoring provides for the revision of program content in accordance with

the development of contemporary research in a given field, the current needs of society, and the demands of learners and employers.

The structural composition of the internal quality assurance system is completed by cyclical external quality assurance, that is, the regular implementation of external independent evaluation of the quality of educational activities by state and public bodies responsible for monitoring education quality. This process confirms the effectiveness of the internal quality assurance system and certifies the compliance of such activities with state standards and requirements.

Given that one of the priority tasks of the State Targeted Social Program for the Development of Vocational (Vocational-Technical) Education for 2022–2027 (Verkhovna Rada of Ukraine, 2021c) is the improvement of the vocational education system in line with international standards and practices, as well as current and prospective labor market needs, the key components of ensuring the quality of vocational training during this period include:

- Updating the content of vocational education, developing and approving new vocational education standards for specific professions, introducing innovative teaching technologies into the educational process, and providing learners with modern textbooks (including electronic versions);
- Implementing effective mechanisms to ensure that learners undergo industrial training and practical placements in accordance with the requirements of professional competencies and vocational standards;
- Improving career guidance for school youth and professional counseling for learners in vocational (vocational-technical) education;
- Promoting the implementation of international projects in the field of vocational education, among others.

Conclusions. Practical experience demonstrates that education is a key aspect of the global comprehensive frameworks defining the goals of sustainable development. Education serves as the foundation of all efforts related both to adaptation to ongoing changes and to the prospects of transforming the world and the environment. High-quality vocational education constitutes the necessary basis for lifelong learning in a complex and rapidly changing world. Contemporary challenges, which shape ecological, social, and governance criteria of activity, generate new requirements for educational objectives and learning outcomes.

European integration processes and the adaptation of Ukraine's education system to the standards of the European Higher Education Area highlight the importance of

internal quality assurance, which functions as a key mechanism for enhancing the competitiveness of future specialists. The quality of education, particularly vocational education, is a crucial factor determining the progressive development of the national economy, the advancement of public welfare, the cultural sphere, and societal prosperity. Modern requirements for quality education converge around its central purpose, “Learning to Be,” formulated in 1972 by a UNESCO expert group led by E. Faure in the report “Learning to Be: The World of Education Today and Tomorrow” (UNESCO, 2015). This purpose combines the personal mission of education with its orientation toward ensuring the well-being and dignified existence of humanity, both now and in the future. The right to quality education is the right to relevant, socially demanded, and substantively meaningful learning. The requirements for education quality vary across diverse cultures and communities; therefore, quality is defined by what is recognized within a given culture and society as essential for a dignified life.

Vocational and practical training of future specialists in the construction industry under current global challenges acquires strategic significance for ensuring socio-economic resilience and infrastructure recovery. The educational process must integrate the principles of sustainable development and ESG criteria, fostering ecological culture, social responsibility, and legal awareness among learners. A competency-based approach is essential, encompassing the development of general, socio-emotional, professional, and strategic competencies required for work in the context of Industry 5.0 and international integration.

The scientific and methodological achievements of the Institute of Vocational Education of the National Academy of Pedagogical Sciences of Ukraine – particularly the implementation of eco-oriented technologies, case methods, and energy-efficiency models – provide a solid foundation for the modernization of vocational education. The combination of theoretical knowledge with industrial training ensures the development of professional autonomy, critical thinking, and safe work practices, which are indispensable for contemporary production processes.

Thus, the system of vocational and practical training in the construction sector should be regarded as a key instrument for achieving sustainable development goals, rebuilding the economy, and integrating Ukraine into the European Higher Education Area. It must ensure the preparation of highly qualified personnel capable not only of effectively performing production tasks but also of participating in global projects, thereby contributing to sustainable development and the cultural progress of society.