

# GREENING THE PROFESSIONAL TRAINING OF FUTURE SPECIALISTS



*MONOGRAPH*  
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NATIONAL ACADEMY OF EDUCATIONAL SCIENCES OF UKRAINE

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**Institute of Vocational Education of the NAES of Ukraine**



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**Reviewers:**

**Zozulyak-Sluchyk R. V.**, Doctor of Pedagogical Sciences, Professor, Acting Head of the Department of Social Pedagogy and Social Work of Vasyl Stefanyk Precarpathian National University.

**Kruchek, V. A.**, Doctor of Pedagogical Sciences, Associate Professor Head of the Distance Professional Training Laboratory, Institute of Vocational Education NAES of Ukraine, Kyiv, Ukraine.

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The monograph is devoted to the study of the process of integrating environmental principles and practices into the system of professional education. The authors examine the theoretical and practical aspects of the environmental approach in the training of future specialists in various fields, in particular, the impact of environmental knowledge on the formation of professional skills that meet the requirements of sustainable development and environmental protection. Particular attention is paid to the methods and forms of introducing environmental aspects into curricula and pedagogical practice.

The monograph is intended for scientists, teachers, methodologists, heads of vocational education institutions, as well as all those involved in the integration of environmental principles into vocational education.

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# PREFACE

In the modern world, which is dynamically changing under the influence of economic, environmental, social and other factors, the vocational education system is of crucial importance for ensuring sustainable development of society. Of particular importance are the issues of transforming vocational education models, adapting the content and methods of education to new challenges and needs of the labor market, improving the quality, accessibility and possibilities of vocational training of future qualified specialists capable of acting effectively in conditions of war, post-war reconstruction and European integration of Ukraine.

The monograph presents the results of research in the field of vocational education in the context of the Sustainable Development Goals. The structure of the monograph includes three sections, each of which reveals a single understanding of the processes of transformation of vocational education.

The task of environmental education under modern conditions is now particularly relevant for the activities of the teacher, which is directly related to the greening of education, which occurs from the position of preserving human health and the environment; self-improvement, improving one's professional skills in the field of health preservation and nature protection. The state of environmental education largely depends on the level of formation of the relevant competence of the teacher and his professional readiness for the specified direction of pedagogical activity. That is, an important link in the implementation of the specified tasks is the teacher, who is directly responsible for the formation of the personality of the future specialist. This can be achieved, in particular, by developing and applying eco-oriented pedagogical technologies for the professional training of future specialists of vocational education institutions of various specializations.

To meet new and future needs for environmental («green»)

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skills, it is necessary to expand the opportunities for advanced training, on-the-job training and apprenticeship. Vocational education can facilitate learning through an interdisciplinary and multidisciplinary approach, which circular strategies require. The national or regional diversity of vocational schools specializing in various aspects of the circular economy will help to align training programs with local and corporate needs for "green skills". Increasing the attractiveness of vocational education and increasing the attractiveness of jobs in the circular economy should also be priorities.

The greening of education becomes a direct driver of the formation of environmental awareness of students, that is, a conscious attitude towards the environment by influencing all links of the educational process. At the same time, in practice, the implementation of such an approach cannot occur only through the introduction of subjects of an environmental focus or their fragmentary greening. Therefore, the need for both greening the entire complex of knowledge about the surrounding world and conscious, purposeful environmental activity becomes relevant.

The structure of the monograph includes sections that reflect the model of forming professional competence in future specialists, focused on sustainable development, the methodology for developing the ecological culture of future specialists of maritime and river transport in college; eco-oriented production technologies in the professional training of tilers, the formation of environmental competence of future bachelors of navigation and its pedagogical conditions; eco-oriented educational practices in the professional training of hospitality professionals in leading European countries; eco-oriented design technology in the training of future construction workers in the context of European integration.

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# CHAPTER 1

TRAINING FUTURE PROFESIONALS IN  
THE CONTEXT SUSTAINABLE  
DEVELOPMENT STRATEGY

# 1.1. FORMATION OF FUTURE SPECIALISTS' PROFESSIONAL COMPETENCE ORIENTED ON SUSTAINABLE DEVELOPMENT: FACTORS AND ALGORITHM OF MODEL DEVELOPMENT

## ФОРМУВАННЯ У МАЙБУТНІХ ФАХІВЦІВ ПРОФЕСІЙНОЇ КОМПЕТЕНТНОСТІ НА ЗАСАДАХ СТАЛОГО РОЗВИТКУ

**Наталя Кулаласва,**  
доктор педагогічних наук, професор,  
Київський національний університет  
імені Вадима Гетьмана;

**Ольга Гайдук,**  
кандидат педагогічних наук,  
науковий співробітник лабораторії  
технологій професійного навчання  
Інституту професійної освіти  
НАПН України  
<https://orcid.org/0000-0002-8613-1495>,  
[culture2016@ukr.net](mailto:culture2016@ukr.net)

**Natalia Kulalaieva,**  
Doctor of Pedagogic Sciences,  
Associate Professor, Vadym Hetman  
Kyiv National Economic University,  
Ukraine;

**Olha Haiduk,**  
PhD in Pedagogy, Research Officer of  
the Laboratory of Professional Education  
Technologies at the Institute of Vocation  
Educational of the NAES of Ukraine  
<https://orcid.org/0000-0002-8613-1495>,  
[culture2016@ukr.net](mailto:culture2016@ukr.net)

*The article substantiates the need to develop a model of future skilled workers' professional competence, oriented towards sustainable development, based on the results of the analysis of the factors of its formation.*

*The purpose of the publications is to structure and analyze the factors of the formation of future specialists' professional competence aimed at sustainable development, and to highlight the stages of development of its model on the example of professions related to the production of food products in Germany to adapt the specified experience to the system of domestic vocational education.*

*Обґрунтовано необхідність розроблення моделі професійної компетентності майбутніх кваліфікованих робітників, орієнтованої на сталий розвиток, за результатами аналізу чинників її формування.*

*Мета публікації полягає у структуруванні та аналізі чинників формування у майбутніх фахівців про- фесійної компетентності, орієнтованої на сталий розвиток, і висвітленні етапів розроблення його моделі на прикладі професій, пов'язаних із виробництвом продуктів харчування у ФРН для адаптації означеного досвіду до системи вітчизняної професійної освіти.*

**Ключові слова:** professional competence focused on sustainable development, sustainable development, education for sustainable development, factors, future professionals, professional competence formation model, food industry.

**Keywords:** професійна компетентність, орієнтована на сталий розвиток, сталий розвиток, освіта для сталого розвитку, чинники, майбутні фахівці, модель формування професійної компетентності.



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**Introduction.** The need for postwar reconstruction of our country, caused by the consequences of the fullscale invasion of the aggressor, requires quick and thoughtful actions, as well as a purposeful reconstruction policy. This is evidenced by data from the Kyiv School of Economics: on September 1, 2022, because of military operations in Ukraine, 5,270 large and medium sized private enterprises, 78,060 small private enterprises and Individual entrepreneurs, and 1,665 state enterprises were destroyed (KSE Institute, 2022).

In view of this, the question arises of introducing a system of measures for the construction of economic entities and the reconstruction of partially destroyed ones, their reequipping and the launch of new technological lines (Cabinet of Ministers of Ukraine, 2021). At the same time, it is necessary to consider the development trends of the modern resourceoriented economy, in particular the implementation of the Sustainable Development Goals (President of Ukraine, 2019). This means the introduction of modern, energyefficient and ecological technologies, the operation and maintenance of which will be provided by highly qualified workers with formed competence the ability to act professionally in accordance with the principles of sustainable development. So, the question arose, which consists in the development of a model of future skilled workers' professional competence associated with sustainable development, for which it is appropriate to analyze the factors of its formation.

**Sources.** It is worth noting that sustainable development is the central challenge of the 21st century. The scale and necessity of the global transformation of society are declared, first, in the Sustainable Development Goals of the UN (United Nations. Ukraine, 2022). Such changes require complex learning processes in the economy, politics and society at both global and local levels. In this context, education for sustainable development (ESD) aims to empower people to jointly shape a sustainable future. Among the main problems that the Sustainable Development Strategy aims to solve, the following ones are distinguished (Stern S. et al., 2021):

- consumption of limited resources;
- growth limits;
- entry of pollutants into the environment;
- participation in management and decisionmaking processes;

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– global fair distribution of resources between current and future generations.

The need for a comprehensive solution to the identified problems actualized two key directions ecological and socioeconomic, which were reflected in the ESD. This development was driven, on the one hand, by the so-called Brundtland Report of 1987 "Our Common Future" and on the other hand by Agenda 21, the final document of the 1992 Conference on Environment and Development in Rio de Janeiro (United Nations Conference on Environment & Development, 1992).

From a global perspective, the intentions of the 1992 Rio Conference to achieve changes towards sustainable development through active public awareness were considered unsuccessful ten years after the conference. Therefore, the United Nations decided to declare the World Decade of Education for Sustainable Development from 2005 to 2014 to give momentum to this topic. Next, the World Program of Action of UNESCO ESD (2015-2019) was developed, which is now being continued by the UNESCO program "ESD 2030" (2020-2030). The

latter examines the 2030 Agenda and 17 chapters of the UN Sustainable Development Goals (UNESCO. UNESDOC Digital Library, 2020).

**Results and discussion.** Since three spheres of sustainable development are distinguished – ecological, social and economic (De Haan G. et al., 2021), we consider it necessary to structure the factors of formation of future specialists' professional competence, oriented towards sustainable development, taking into account the specified spheres at the following levels: international, national, regional, industrial and institutional (enterprise institution vocational education).

At the international level, the factors of the environmental sphere include the following: an increase in the share of energy from renewable sources in the global energy balance; activation of international cooperation in the field of ecologically clean energy; ensuring preservation, restoration, and rational use of natural ecosystems; rational and efficient use of natural resources. Among the factors of the social sphere, we single out the following: elimination of poverty throughout the world; prevention of mortality; providing all population groups with sufficient food; promotion of accessible and quality education; increasing global macroeconomic stability. Factors of the economic sphere at this level are: full and productive employment and

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decent work for all; transition to the use of rational models of consumption and production.

At the national level, among the factors of the ecological sphere, the following ones have been identified: ensuring general access to energy supply; response to climate change; financial support for the preservation and rational use of biological diversity and ecosystems. Factors of the social sphere are: introduction of appropriate systems and measures of social protection for everybody; prevention and treatment of various diseases, support of mental health and wellbeing of the population; involvement of youth and adults in obtaining professional education for better employment; encouraging effective partnership between state and nongovernmental organizations and the private sector. Factors in the economic sphere of this level should include: promotion of productive activity, creation of decent jobs, entrepreneurship, creativity and innovative activity; a significant increase in the level of employment in industry and the share of industrial production in the gross domestic product.

At the regional level, among the factors of the environmental sphere, the following should be singled out: encouragement of investments in energy infrastructure and environmentally clean energy technologies; preservation and rational use of natural resources. Factors of the social sphere are: investing measures to eliminate poverty; sustainable food production; assistance in the development of vaccines and medicines; training on issues of sustainable development, human rights, gender equality and awareness of the value of cultural diversity; reducing the scale of corruption and bribery. The economic sphere is represented by the following factors: development of highquality, reliable and sustainable infrastructure; reducing the negative environmental impact of cities; qualitative planning of national and regional development.

At the industrial level, environmental factors included: increase in energy efficiency; informing employees of economic entities about the consequences of climate change. The social sphere is represented by the following factors: ensuring the proper functioning of food markets and their processing products; increased financing of health care measures; creation of effective, accountable and transparent institutions. Factors of the economic sphere are: encouraging the development of micro, small and mediumsized enterprises; research and innovation in the field of domestic technologies; prevention of waste generation, their reuse.

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We consider the institutional level as the formation of an educational and industrial environment in the conditions of a dual form of education. Conventionally, its components include the business entity – the customer of labor personnel, which provides professional and practical training of future specialists, and the professional education institution, which is responsible for their professional and theoretical training (Kulalaieva N. & Haiduk O., 2021). Environmental factors at this level include: introduction of energyefficient technologies; training of specialists knowledgeable in the field of ecological and energyefficient technologies. Factors of the social sphere are: training of specialists who have modern agricultural technologies; creation and improvement of educational institutions that take into account the interests of children, the special needs of the disabled and gender aspects, and the provision of a favorable educational environment. Among the factors of the economic sphere, the following should be singled out: assistance in ensuring reliable and safe working conditions for all employees; reduction of waste during the life cycle of the product; ensuring that future specialists acquire knowledge about sustainable development and a way of life in harmony with nature.

In this context, the following aspects can be noted: on the one hand, vocational education and training should have a clear program of sustainable development, and on the other hand, during recent years, this program has only slowly turned into means of regulation. The central system lever and a certain impetus in this direction in the leading EU country – Germany was the revision of the standard of the profession profile «Environmental protection» (from 2020 «Environmental protection and sustainable development»). The first effects of this momentum can already be seen in the updated training regulations and framework curricula, in particular the integration of the Regulation on the professional standard of the profession «Environmental protection and sustainable development» into the framework curriculum for the profession of electronics technician (De Haan G. et al., 2021).

Based on the competence model of the German educator Heinrich Roth (Roth H., 1971), the future specialists' professional competence, oriented towards sustainable development, can be understood as an integrative education based on key, general professional and professional competences acquired in a professional education

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institution taking into account the Sustainable Development Goals in the content of education and provides the ability to act in accordance with the principles of sustainable development, socially responsible and subjectively meaningful (Kastrup J. et al., 2021). In Fig. 1 the prerequisites for the formation of future specialists' professional competence focused on sustainable development are presented.

It is clear that the model of formation of future professionals' professional competence, oriented towards sustainable development, will depend on the profile of their professional training, i.e., the relevant industry.

Let's consider such a model on the example of competence focused on sustainable development in the production of food products, which was used as part of the scientific monitoring of pilot projects of the Federal Institute of Vocational Education and Training (BIBB).

First, this model, according to German colleagues (Kastrup J. et al., 2021), should be aimed at forming the responsibility of future experts in the food industry and the industry for sustainable nutrition. This is due to the fact that most trade and industrial companies that produce food products are often embedded in global production and sales chains. In view of this, the employees of this industry face an important task – to fully consider sustainable development in their work.

To fulfill their own responsibilities in the field of production and manufacture of ecologically clean food, they need comprehensive professional competences, which also include accepting responsibility outside their company. That is why sustainable development is structurally enshrined as a minimum standard in education in the Regulation on Vocational Education Standards «Environmental Protection and Sustainable Development» (Hauptausschuss des BIBB, 2020).

So, the algorithm for developing a model for the formation of future specialists' professional competence, focused on sustainable development, related to the production of food products, will consist of four stages.

First, it is necessary to determine the work processes that are the basis of the production of the relevant industry. Thus, for professions related to food production in Germany, two stages of processing can be distinguished: processing of agricultural raw materials and refining of raw materials (processing of raw materials and packaging). For some professionals, the field of application can be clearly defined (eg. baker or butcher), while for other professions (eg. food technologist) it is more

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varied. However, there are workflows common to all professions. They can be grouped into three subgroups: procurement and supply of raw materials; processing, storage and packaging; product development and marketing. However, the actions of food production workers are not determined exclusively by these work processes. In total, three levels of actions are distinguished: direct performance of work, which can be directly influenced by workers; the operational and organizational level of activity covering the entire company, on which the decisions of its management rely (business model); social and political frameworks, which include legal requirements that must be met in the production of food products, or trends in the food industry that affect the business area.

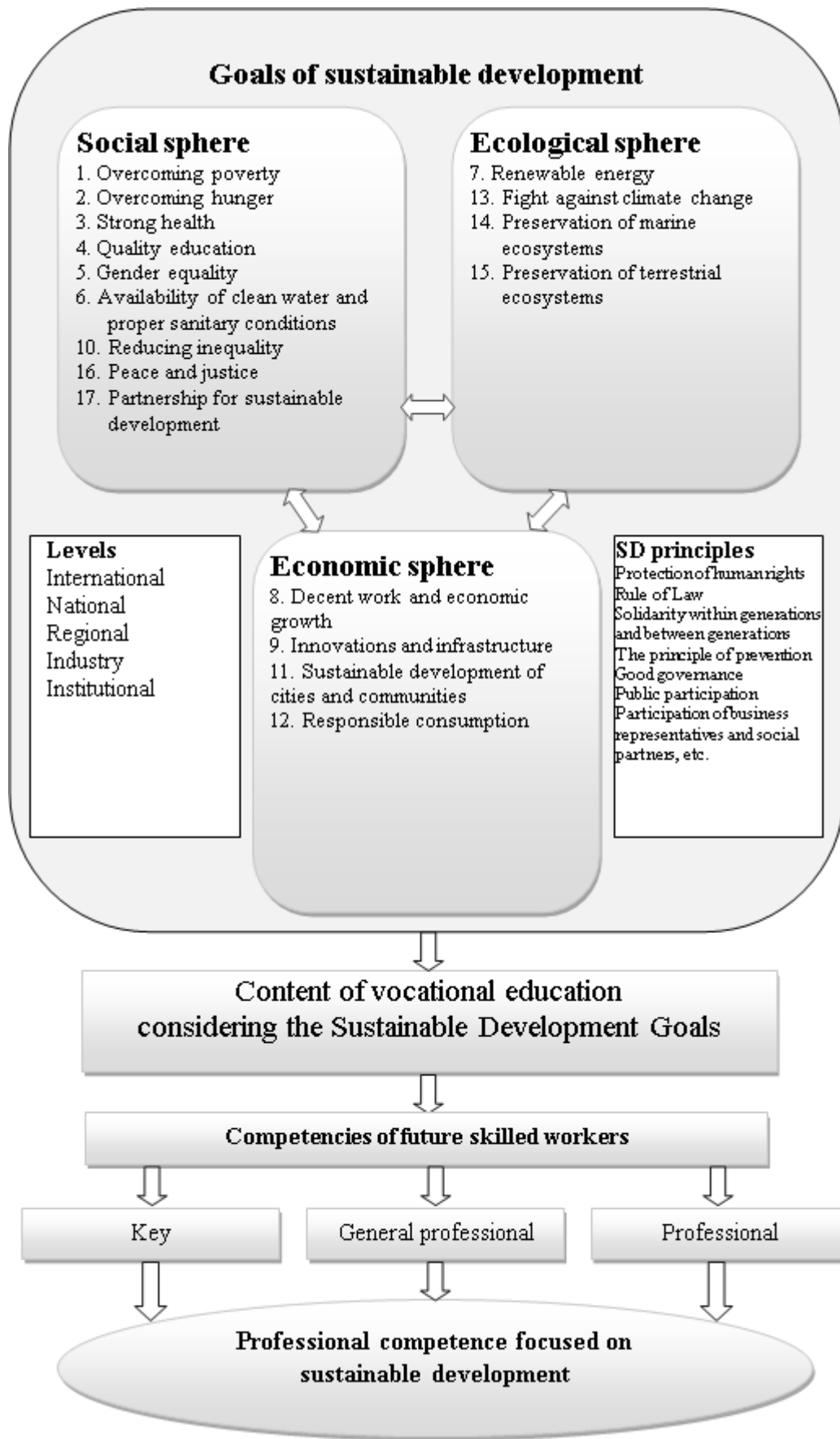
Secondly, aspects of the work related to sustainable development are clarified. With the help of research based on a thorough analysis of modern scientific literature, educational practices, the latest production technologies and the results of current test models, a collection of content focused on sustainable development is formed, which is relevant for all professions related to the production of food products.

Thirdly, the content of professional education is structured and selected for the competency matrix. As a result, a model is obtained for describing professional competencies focused on sustainable development in the production of food products (Table 1).

Fourth, the competence goals are formulated. Specific goals are formulated for each area of the competency matrix. For example, for the field of the Processing, Storage and Packaging matrix, the specific objectives (Improve raw materials and optimize work processes) are that acquirers use equipment and materials, such as raw materials, auxiliary materials and consumables, in a resourceconserving manner within the framework of processing raw materials, understand the particular importance of packaging loss, waste and pollution for sustainable development, and know strategies to prevent or transform them.

They are able to:

- choose and effectively use processes, machines and production systems;
- effectively and safely use various cleaning and disinfection measures;
- choose and apply foodsafe processes for preserving valuable ingredients during production, packaging and storage;



*Fig. 1. Prerequisites for the formation of future specialists' professional competence, oriented towards sustainable development*

- create maintenance plans for machines and systems to ensure their optimal service life and minimize unplanned downtime;
- classify packaging components, their various functions and critically consider their impact from the point of view of sustainable development;
- differentiate packaging options based on aspects of sustainable development and choose optimal ecological packaging;
- determine data on the energy efficiency of systems and processes in production, packaging and storage;
- develop concepts for improving energy efficiency and implement them.

*Table 1*

**A model for describing professional competence focused on sustainable development in the food industry**

Measure of competence		Competence of sustainable development as the ability		
		relevant sustainable actions (relevant sustainable activities)	socially responsible activity	activities that create sense (meaning) and identity
Level of activity				
Work-related workflows	Procurement and supply of raw materials	Selection and supply of raw materials as needed	Assessment of working conditions, production and supply chains at the initial stage	«From the barn to the table» to think
	Processing, storage and packaging	Processing of raw materials and optimization of own work processes	Production taking into account resources and climate	Promote sustainable development through food production
	Product development and marketing	Enhancement of product characteristics taking into account sustainable development	To support eating habits taking into account sustainable development	To preserve traditions and create trends
Production and organizational		Establish sustainability in the business model	Advocate for social and employee health issues	Use professional freedom of creativity
Socio-political		Understand the role of companies as subjects of sustainable development	Support the normative idea of sustainable development	Healthy life through healthy food



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In the specific objectives, which are at the sociopolitical level of action (Understand the role of companies as subjects of sustainable development), it is noted that students consider their company as a social system in which people work, create products and services for other people and, thus, always operate in a wider social context. They understand the associated social and environmental responsibility, as well as the factual, legal and moral obligations of transparency and reporting (eg. balance sheet and sustainability reporting obligations, corporate social responsibility, etc.). In addition, they are able to:

- critically evaluate entrepreneurial actions in the industry in accordance with economic, social and environmental consequences;
- understand political decisions affecting their work and company and position themselves accordingly;
- to be aware of the company's ability to take on social responsibility; recognize the responsibility of companies as multipliers of equal opportunities and freedom from discrimination;
- evaluate external costs and the price of a food product, derive external costs caused by own production in the value chain;
- characterize the shortcomings of monopolistic structures both for sustainable development and for social aspects of the market economy;
- evaluate the potential of corporate forms oriented towards public welfare and managed by employees for the relevant industry;
- identify specific advantages and problems of reporting on sustainable development and corporate social responsibility;
- evaluate the effectiveness of communication measures regarding sustainable development and formulate appropriate proposals;
- draw conclusions about own activities based on the requirements of sustainable development certificates.

**Conclusions.** Therefore, the need to build new economic entities and rebuild partially destroyed ones, their reequipment and the launch of modern technological lines, caused by the fullscale invasion of our country by an aggressor, requires taking into account the leading trends in the development of a resourceoriented economy, in particular the implementation of the Sustainable Development Goals. The structuring and analysis of the factors of the formation of future specialists' professional competence focused on sustainable development made it possible to determine the levels of their

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distribution according to the spheres of sustainable development (ecological, social and economic), namely: international, national, regional, industrial and institutional (enterprise professional education institution). The presentation of the prerequisites for the formation of future specialists' professional competence, focused on sustainable development, made it possible to understand it as an integrative education based on key, general professional and professional competences acquired by future specialists in a professional education institution, taking into account the Goals of sustainable development in the content of education and ensuring the ability to act in accordance with the principles of sustainable development (socially responsible and subjectively meaningful). The development of a model for the formation of future specialists' professional competence, focused on sustainable development, consists of four stages: determination of work processes, which are the basis of production in the relevant industry; clarification of aspects of work related to sustainable development; structuring and selection of the content of vocational education to the competence matrix; formulation of goals and content of competences. Highlighting the specified stages on the example of professions related to the production of food products in Germany will contribute to a better adaptation of the specified experience to the system of domestic vocational education.

### List of references

- Кабінет Міністрів України (2021, 03 березня). *Про затвердження Національної економічної стратегії на період до 2030 року* (№179). <https://www.kmu.gov.ua/npas/pro-zatverdzhennya-nacionalnoyi-eko-a179>
- Кулалаєва, Н., & Гайдук, О. (2021). Методична система професійної підготовки майбутніх кваліфікованих робітників з елементами дуальної форми навчання. *Професійна педагогіка*, 1(22), 96-103. <https://jrnls.ivet.edu.ua/index.php/1/issue/view/76>
- Організація Об'єднаних Націй. Україна. (2022). *Наша робота над досягненням Цілей сталого розвитку в Україні*. <https://ukraine.un.org/uk/sdgs>
- Президент України. (2019, 30 вересня). *Про Цілі сталого розвитку України на період до 2030 року (722/2019)* <https://www.president.gov.ua/documents/7222019-29825>
- De Haan, G., Holst, J., & Singer-Brodowski, M. (2021). Berufliche Bildung für nachhaltige Entwicklung (BBNE) Genese, Entwicklungsstand und mögliche Transformationspfade. *Zeitschrift des Bundesinstituts für Berufsbildung*. 3/2021(50), 10-14. <https://www.bwp-zeitschrift.de/dienst/veroeffentlichungen/de/bwp.php/de/bwp/show/17293>
- Hauptausschuss des BIBB (2020, 17 November). *Anwendung der Standardberufsbildpositionen in der Ausbildungspraxis*. [www.bibb.de/dokumente/pdf/HA172.pdf](http://www.bibb.de/dokumente/pdf/HA172.pdf)

---

Kastrup, J., Kuhlmeier, W., & Strotmann, Chr. (2021). Entwicklung nachhaltigkeitsbezogener Kompetenzen in der Ausbildung. Ein Strukturmodell für Lebensmittelhandwerk und – industrie. *Zeitschrift des Bundesinstituts für Berufs-bildung*, 3/2021(50), 10-14. <https://www.bwp-zeitschrift.de/de/bwp.php/de/publication/download/17284>

KSE Institute. (2022, 1 вересня). *Звіт про прямі збитки інфраструктури від руйнувань внаслідок військової агресії росії проти України станом на 1 вересня 2022 року*. [https://kse.ua/wp-content/uploads/2022/10/Sep22\\_FINAL\\_Sep1\\_Damages-Report.docx.pdf](https://kse.ua/wp-content/uploads/2022/10/Sep22_FINAL_Sep1_Damages-Report.docx.pdf)

Roth, H. (1971). *Pädagogische Anthropologie. Band II: Entwicklung und Erziehung*. Hannover: Hermann Schroedel Verlag.

Stern, S., Kohli A., Steinemann, M., Petry Chr., & De Rocchi, A. (2020). Nachhaltige Entwicklung in der Berufs- bildung. In *Orientierungshilfe Nachhaltige Entwicklung in der Berufsbildung. Bern, 15 Dezember*, (p. 9). Bern: Staats- secretariat für Bildung, Forschung und Innovation (SBFI). [https://www.sbf.admin.ch/dam/sbf/de/dokumente/2021/01/orientierungshilfe.pdf.download.pdf/orientierungshilfe-nachhaltige-entwicklung\\_d.pdf](https://www.sbf.admin.ch/dam/sbf/de/dokumente/2021/01/orientierungshilfe.pdf.download.pdf/orientierungshilfe-nachhaltige-entwicklung_d.pdf)

UNESCO. UNESDOC Digital Library (2020). Education for sustainable development: a roadmap. <https://unesdoc.unesco.org/ark:/48223/pf0000374802.locale=en>

United Nations Sustainable Development (1992). AGENDA 21. In *United Nations Conference on Environment & Development Rio de Janeiro, Brazil, 3 to 14 June 1992*. <https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf>

### Translated & Transliterated

Kabinet Ministriv Ukrainy. (2021). *Pro zatverdzhennia Natsionalnoi ekonomichnoi stratehii na period do 2030 roku [Cabinet of Ministers of Ukraine. On the approval of the National Economic Strategy for the period until 2030]. Postanova vid 03 bereznia 2021 r. № 179*. <https://www.kmu.gov.ua/npas/pro-zatverdzhennya-nacionalnoyi-eko-a179>, [in Ukrainian]

Kulalaieva, N., & Haiduk, O. (2021). Metodychna systema profesiinoi pidhotovky maibutnikh kvalifikovanykh robotnykiv z elementamy dualnoi formy navchannia [A methodical system of professional training for future skills workers with elements of dual education]. *Profesiina pedahohika [Professional Pedagogics]*, 1(22), 96-103. <https://jrnls.ivet.edu.ua/index.php/1/issue/view/76>, [in Ukrainian].

Orhanizatsiia Obiednanykh Natsii. Ukraina. (2022). *Nasha robota nad dosiahnenniam Tsilei staloho rozvytku v Ukraini [Our work on achieving the Sustainable Development Goals in Ukraine]*. <https://ukraine.un.org/uk/sdgs>, [in Ukrainian].

Prezydent Ukrainy. (2019, 30 veresnia). *Pro Tsili staloho rozvytku Ukrainy na period do 2030 roku [About the Sustainable Development Goals of Ukraine for the period until 2030] (722/2019)* <https://www.president.gov.ua/documents/7222019-29825>, [in Ukrainian].

De Haan, G., Holst, J., & Singer-Brodowski, M. (2021). Berufliche Bildung für nachhaltige Entwicklung (BBNE) Genese, Entwicklungsstand und mögliche Transformationspfade. *Zeitschrift des Bundesinstituts für Berufsbildung*. 3/2021(50), 10-14. <https://www.bwp-zeitschrift.de/dienst/veroeffentlichungen/de/bwp.php/de/bwp/show/17293> [in German].

Hauptausschuss des BIBB (2020, 17 November). *Anwendung der Standardberufsbildpositionen in der Ausbildungspraxis*. [www.bibb.de/dokumente/pdf/HA172.pdf](http://www.bibb.de/dokumente/pdf/HA172.pdf) [in German].

---

Kastrup, J., Kuhlmeier, W., & Strotmann, Chr. (2021). Entwicklung nachhaltigkeitsbezogener Kompetenzen in der Ausbildung. Ein Strukturmodell für Lebensmittelhandwerk und – industrie. *Zeitschrift des Bundesinstituts für Berufs- bildung*, 3/2021(50), 10-14. <https://www.bwp-zeitschrift.de/de/bwp.php/de/publication/download/17284> [in German].

KSE Institute. (2022, 1 вересня). *Звіт про прямі збитки інфраструктури від руйнувань внаслідок військової агресії росії проти України станом на 1 вересня 2022 року. [Report on direct damage to infrastructure from destruction as a result of Russia's military aggression against Ukraine as of September 1, 2022].* [https://kse.ua/wp-content/uploads/2022/10/Sep22\\_FINAL\\_Sep1\\_Damages-Report.docx.pdf](https://kse.ua/wp-content/uploads/2022/10/Sep22_FINAL_Sep1_Damages-Report.docx.pdf) [in English].

Roth, H. (1971). *Pädagogische Anthropologie. Band II: Entwicklung und Erziehung*. Hannover: Hermann Schroedel Verlag, [in German].

Stern, S., Kohli A., Steinemann, M., Petry Chr., & De Rocchi, A. (2020). Nachhaltige Entwicklung in der Berufs- bildung. In *Orientierungshilfe Nachhaltige Entwicklung in der Berufsbildung. Bern, 15 Dezember*, (p. 9). Bern: Staats- secretariat für Bildung, Forschung und Innovation (SBFI). [https://www.sbf.admin.ch/dam/sbf/de/dokumente/2021/01/orientierungshilfe.pdf.download.pdf/orientierungshilfe- nachhaltige-entwicklung\\_d.pdf](https://www.sbf.admin.ch/dam/sbf/de/dokumente/2021/01/orientierungshilfe.pdf.download.pdf/orientierungshilfe- nachhaltige-entwicklung_d.pdf) [in German].

UNESCO. UNESDOC Digital Library (2020). Education for sustainable development: a roadmap. <https://unesdoc.unesco.org/ark:/48223/pf0000374802.locale=en>

United Nations Sustainable Development (1992). AGENDA 21. In *United Nations Conference on Environment & Development Rio de Janerio, Brazil, 3 to 14 June 1992*. <https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf> [in English].

## 1.2. DEVELOPING THE ENVIRONMENTAL CULTURE OF FUTURE MARINE AND RIVER TRANSPORT SPECIALISTS IN THE COLLEGE

### РОЗВИТОК ЕКОЛОГІЧНОЇ КУЛЬТУРИ МАЙБУТНІХ ФАХІВЦІВ МОРСЬКОГО І РІЧКОВОГО ТРАНСПОРТУ В КОЛЕДЖІ

**Тетяна Рулевська**  
аспірант Інституту професійної освіти НАПН України  
<https://orcid.org/0000-0003-2831-9155>,  
[tanya.rulevskaya@gmail.com](mailto:tanya.rulevskaya@gmail.com)

**Tetiana Rulievskaya**  
Postgraduate Student of the Institute of Vocational Education of the National Academy of Educational Sciences of Ukraine  
<https://orcid.org/0000-0003-2831-9155>,  
[tanya.rulevskaya@gmail.com](mailto:tanya.rulevskaya@gmail.com)

*The relevance development of the ecological culture of future marine and river transport specialists in the colleges of Ukraine is determined by priority tasks of the post-war reconstruction state's economy and requirements of the renewed paradigm of domestic professional education; demands an urgent solution to the environmental problems caused by Russian Federation's war against Ukraine with involvement of all available technological, financial, scientific and legal resources; requires development of ecological culture and ecological worldview of the young generation for formation of responsibility and readiness of young professionals to participate in the protection and preservation environment.*

*Актуальність розвитку екологічної культури майбутніх фахівців морського та річкового транспорту в коледжах України визначається пріоритетними завданнями повоєнної відбудови економіки держави й вимогами оновленої парадигми вітчизняної професійної освіти; вимагає нагального розв'язання викликаних війною рф проти України екологічних проблем із залученням усіх наявних технологічних, фінансових, наукових і правових ресурсів; потребує розвитку екологічної культури й екологічного світогляду молодого покоління для формування відповідальності й готовності молодих фахівців брати участь у захисті та збереженні довкілля.*

**Ключові слова:** екологічна культура, коледж, методика, професійна підготовка, фахівець морського і річкового транспорту

**Keywords:** ecological culture, college, methodology, professional training, sea and river transport specialist.

**Introduction.** Today, when developing the development vectors of Ukrainian society, the most problematic issues are environmental protection, the rational use of natural resources, including water. For this purpose, modern educational science and practice are not limited to the biological aspect of the concept of the "ecological culture of future specialists", one of the leading components of which is a complex of ecological knowledge, that is, ideas about the consequences of irrational use of natural resources,

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pollution of the environment, rivers, lakes, etc. The attention of researchers is aimed at identifying the regular relations between society and nature, as well as the regulation of human behavior using norms and rules fixed in the public consciousness and reflecting sustainable development strategies. However, this does not always have a positive result, as it also depends on the formation of personal self-awareness and responsibility of students in college. Accordingly, it is necessary to form the ecological culture of future specialists, in our case sea and river transport.

**Sources.** The relevance of the problem of forming the ecological culture of future specialists is considered in numerous documents of the legal and regulatory framework: the Law of Ukraine "On Vocational Pre-Higher Education" (2019), the National Doctrine of the Development of Education of Ukraine in the 21st Century (2002), the National Strategy for the Development of Education in Ukraine for 2012-2021 years (2014), the Law of Ukraine "On Environmental Protection" (new version - 2018), the Law of Ukraine "On the Basic Principles (Strategy) of the State Environmental Policy of Ukraine for the Period Until 2030" (2019), Concepts of Environmental Education of Ukraine (2001) etc., in which aspects of the modernization of the existing professional pre-higher education system of Ukraine are outlined. These legislative acts became decisive in the development of environmental education in Ukraine, in particular in the conditions of martial law, because its conceptual provisions, goals, content and methods in the field of environmental protection and reasonable natural use of available resources were determined.

In pedagogical science and practice, there are many developments in which the issue of environmental education is raised, in particular, the formation of an environmental culture of college students. V. Baranovska, O. Bondar, V. Honcharuk, G. Gulyk, S. Ivanenko, O. Krayniuk, Yu. Koval, L. Kurniak, L. Luk actively studied this education as one of the directions of the formation of ecological culture. Yanova, S. Lutkovska, O. Mateyuk, V. Melash, V. Molodychenko, V. Ovcharuk, O. Plahotnik, O. Prutsakova, G. Pustovit, T. Sayenko, S. Sovgira, A. Stepaniuk, O. Stolyarenko, H. Tarasenko, O. Trotska, etc., however, certain issues of the raised problem remain insufficiently covered.

In connection with this, the problem of forming the environmental culture of future sea and river transport specialists has

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become relevant within professional higher education.

**The purpose of the article** is to justify and implement the method of developing the ecological culture of future sea and river transport specialists in the educational environment of the college.

**Research methods:** study of scientific sources, psychological-pedagogical and scientific-methodological literature, legislative acts and normative-legal documents - to find out the degree of development of the problem; generalization and systematization - to generalize the theoretical foundations of the researched problem, to clarify the content of the concepts: "ecological culture of the future sea and river transport specialist", to justify the methodology of its development; definitive analysis - to clarify the logical-semantic content of the basic research concepts "ecological culture", "methodology of developing the ecological culture of future sea and river transport specialists in the college".

**Results and discussion.** In the modern Ukrainian language, the term "methodology" means a set of "methods of learning something, as well as the science of learning methods. The methodology of a specific educational subject is a branch of pedagogical science that investigates the content of the educational subject and the nature of the educational process, which contributes to the acquisition by students of the necessary level of knowledge, abilities, and skills, the development of the thinking of future specialists, the formation of a worldview and the education of the qualities of a citizen of one's country" (Honcharenko, 2000).

Based on the study of the state of development of the problem and the logical generalization of the results of the theoretical analysis of legislative acts, regulatory and scientific literature, we have grounds to assert that the development of ecological culture (hereinafter referred to as DEC) is a complex multifunctional process, which involves the involvement of a future specialist in sea and river transport to the cultural experience of mankind about to with concerning an interaction with the environment (the natural world, urbanized, artificial and social environment), its socialization and inculturation as an individual, the formation of individual ecological culture, the result of which is the formation of a subject of ecologically appropriate behavior and nature conservation activities. Scientists emphasize the need to form ideas about the harmonization of relationships in the "man-nature" system, to review one's attitude to nature, which determines the nature of the goals of interaction with

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nature, its motives, the readiness to choose certain strategies of behavior; formation of a system of abilities, skills, and strategies of interaction with nature. We consider the position of scientists to be relevant, that environmental education should focus on the transition from specific educational and game situations to generalizations and analysis at a higher level and the development of a personal attitude to environmental problems (Morozova, Bondarchuk, & Varuk, 2017).

Therefore, the main task in environmental education is the formation of a suitable worldview, ecological consciousness, which is formed in the process of relevant activities, and if students of professional pre-higher education are involved in cleaning coastal areas, conducting research on determining the state of water resources, implementing environmental projects, etc., then such actions and their activity, in general will contribute to the awareness of the importance of their participation in nature conservation activities, i.e. they are not just taught respect for the environment, but the formation of ecological consciousness takes place (Herliand, 2019).

The DEC methodology developed and implemented in the practice of the colleges provided for the implementation of the following principles: social activity, subjectivity, dialogic, continuity, openness, systematicity, integrity, unity of consciousness and behavior, conformity to nature, humanization, and democratization of educational and environmental work.

Also, the implementation of the methodology for the development of the ecological culture of future sea and river transport specialists in the college required compliance with the pedagogical conditions identified by us.

In the implementation of the first condition - *the formation of positive motivation of future sea and river transport specialists to acquire ecological knowledge* - it was taken into account that the formation of the ecological culture of the younger generation begins at school. First of all, it is an emotional and sensory perception of nature, the formation of a consciously correct attitude towards the natural environment; learning about nature in all its diversity, colorfulness, development, interrelationships, studying the basics of collective and independent practical activities to support the objects of the surrounding natural landscape; complex systemic ecocentric perception and knowledge of the world, formation of initial ecological knowledge, abilities and skills in the complex system



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"nature - society - man" management, resource management (Kurnyak, 2015; Plahotnik, Holovatyuk, 2004). In our case, the learner who is awarded the qualification must be able to use and apply the tools, equipment and systems that ensure the safety of shipping and the protection of the environment (Standard, 2018). The content of the educational material was formed on the basis of the defined blocks of knowledge, abilities and skills related to professional-practical and fundamental training of students, in particular environmental and professional. The main source of training content in the developed methodology is: training programs for junior specialists in the field of training 070104 "Maritime and river transport", training programs for the disciplines "Fundamentals of ecology", "Life safety", "Occupational safety", training manuals, methodological instructions, through the program for the development of students' ecological culture for the entire period of study at the College of Sea and River Transport.

At the same time, the development of the ecological culture of future maritime and river transport specialists involved not only the acquisition of knowledge, skills and abilities. It is impossible without the mechanism of transformation of scientific knowledge into certain human relations, which, in turn, act as a motive and purpose of activity, a conscious correlation of social and personal relations. The motivation of future sea and river transport specialists to develop ecological culture is to create conditions for the manifestation of internal motivations, awareness of the need for further self-development. The complex of motives for environmental activity (motivation) is the foundation of the ecological culture of future water transport specialists, which must be identified in a timely manner and, if necessary, corrected. A conscious motive, as well as motivations for knowledge and self-development should be leading in the motivation of students' environmental activities. It is the stability of these motives over time, their interrelationship and compatibility with each other in different situations that determines the high level of development of ecological culture. The development of the environmental culture of college students take place during the direct implementation of environmental activities based on a combination of environmental knowledge, skills, and motivation to preserve the natural environment. The second pedagogical condition – *environment - talization of the content of the professional training of*

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*future sea and river transport specialists* - was realized in the process of clarifying the goals and objectives, principles and content of training for the formation of ecological thinking, building the pedagogical technology of the DEC. The results of the work show that the process of development of ecological culture is quite complex and is based on the principles of systematicity, continuity, interdisciplinary, connection of theory with practical activity

An important role in the development of the environmental culture of marine and river transport specialists is played by the use of innovative teaching methods, in particular interactive ones, which contribute to personal development, increase the quality of their professional training, the formation of environmental knowledge, skills and values, value orientations, beliefs that are integral part of future professional activity (Motorna, 2008).

In the implementation of the third pedagogical condition - *the use of interactive learning technologies in the mastery of environmental disciplines* - preference was given to methods of personal and individualized learning, technologies of collective learning methods, cooperation (teamwork, group work), Internet technologies (promotions for teachers and students, Internet newsletters, placement of useful materials on the official website of the college, creation of creative products on the Internet, individual consultations in online mode, correspondence (by e-mail), which contributed to increasing the effectiveness of the process of developing environmental culture among future specialists of sea and river transport in the conditions of the college

The methodology for the development of ecological culture has a multifaceted nature, uniting with a common goal - the development of future sea and river transport specialists a sense of the unity of man and nature, the formation of the need to preserve and further increase its wealth.

Within the framework of the research search, we identified three stages in the learning process: search-motivational, cognitive-active and reflective evaluative, which are shown in the table. 1.

For each stage of the methodology for the development of ecological culture, a certain goal and task were determined, the achievement of which was ensured by the use of appropriate forms and methods. For example, the implementation of the search and motivational stage involves students' awareness of the content of the courses "Fundamentals of Ecology" and "Ecology and Environmental Protection", which directly contribute to the

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development of ecological culture, "Life Safety", the special course "Ecological Culture of Sea and River Transport Specialist" and professional disciplines - practical cycle. At this stage, students learn basic ecological concepts, in particular the concept of the noosphere, environmental factors, and their interrelationship, the main processes of ensuring the safety and environmental friendliness of cargo transportation by sea and river transport, the formation of multifunctional port hubs, as well as the presence of modern, energy efficient and ecological "green » cargo fleet, the degree of influence of these processes on the surrounding natural environment, realize the essence of the idea of global unity, joint development of nature and society, establish a connection between environment and scientific and technological progress of society.

The main form of interaction of the participants of the educational process at the operational-cognitive stage is an end-to-end thematic combination of various forms (lecture discussion, analysis of the situation in the process, and discussion of projects of decisions regarding the preservation of the environment in the process of operating water transport and a business game), in which the main ways are outlined disclosure of the content and essence of the educational material and independent activity of students (Ponomarenko, 2020). This, in turn, determines their need for independent acquisition of both theoretical and practical knowledge. At this stage, training is aimed at mastering the main eco-technologies used in the operation of sea and river transport, the study of which is aimed at consolidating the skills and abilities to process various information, as well as increasing interest in independent work (Karpenko, 2019). Attention is focused on the rational use of nature and issues of a socioecological nature related to global problems, as well as special professional orientation environmental training is carried out, which must be integrated with the chosen professional activity. The variety of forms of development of ecological culture in the conditions of the college is provided by situations of subject-subject interaction, where communication is enriched through the world of feelings and thoughts of fellow students and the curator.

**Stages of development of ecological culture of future sea and river transport specialists in colleges**

Stages	Target instructions and tasks	Forms and methods
1	2	3
search and motivational	The formation of a moral and ethical attitude towards the natural environment, the results of human activity on the example of local and regional environmental problems; awareness of the dependence of human health on the state of the environment. Formation of ecological and value orientations. Acquiring integrative knowledge of ecology, mastering theoretical information and factual information about the state of water resources. Motivation of ecological behavior, which reflects the level of formation of ecological competence and ecological culture of future sea and river transport specialists.	Lecture with discussion elements; methods: "research search and design", "situational modeling", testing; performance of individual research and problem-solving tasks.
cognitive and active	Deepening of ecological knowledge, development of ecological erudition; assimilation of methods and directions of nature conservation activities. Education of environmental beliefs, desire and need for active environmental protection activities. Formation of a sense of responsibility for the state of the natural environment. Development of the ability to think ecologically using analysis, synthesis, abstraction, scientific forecasting, in particular to identify sources of threat; cognitive mobilization of mental resources based on understanding information about risks and dangers; environmental goal-setting, making environmentally appropriate decisions, taking into account and forecasting the consequences of the decisions made.	Business and simulation role-playing games, discussion method, project method, ecological and psychological training
reflective and evaluative	Formation of environmental beliefs, awareness of the need for environmental protection and ecologically safe nature use, striving to take an active position in matters of nature protection and rational nature use. Stimulation of independence, initiative, creative approach in solving environmental problems. Development of individual and personal qualities that ensure the active and integral inclusion of an individual in nature conservation activities; mastering the mechanisms of reflection, self-actualization and activation of the development of ecological culture, assessment of the development of ecocentric consciousness; formation of the ability to understand personal achievements, skills of system analysis and self-assessment of individual and personal qualities and results of preparation for nature conservation activities in the technosphere.	Environmental monitoring; the method of "ecological forecasting"; analysis of situations; discussion of alternative solutions

The development of ecological culture at the activity stage involved the use of game forms of learning and education. Ecological games are aimed at the development of various types of personal activity: physical, mental and intellectual (Fedoryk, & Moskalyk, 2009). The main goal of ecological games: to develop the need for communication with nature, to master the norms of ecologically competent behavior, to realize the multifaceted value of nature, to form the need for nature conservation activities, to feel a part of nature.

The DEC method can be more successfully practiced on the material of the course "Fundamentals of ecology and environmental protection", as well as in the use of programs of the integrated discipline "Policy of shipping companies in the field of safety and environmental protection" and the special course "Prevention of environmental pollution", organization of ecological and educational work teachers aimed at the development of the ecological culture of future sea and river transport specialists.

The environmental and development methodology of the DEK has a general didactic character and can be implemented in the process of studying courses in geography, chemistry, physics, "Biology and ecology", "Economic and social geography of the world", "Meteorology and oceanography", "Life safety", "Maintenance and repair of ship technical equipment", "Technologies of the use of working substances", etc. Each discipline may have its own specific characteristics, which enable a variety of application methods and technologies for the development of ecological culture within the above-mentioned courses, but all of them acquire a systematized character if they are coordinated in the teaching of the special course "Ecological culture of a sea and river transport specialist". Integrated socioecological courses act as a form of fixation of the content of socio-ecological knowledge, skills, experience of creative activity in the environment and emotional and valuable attitude towards it.

The methodology for the development of the ecological culture of future sea and river transport specialists through the implementation of pedagogical forms and methods with the aim of creating a favorable pedagogical environment and the formation of an ecologically oriented professional position was implemented by introducing the author's integrative educational and methodological complex into the educational practice of colleges. The integrative

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educational and methodological complex consisted of the Program "Development of ecological culture" (special course); improved program "Ecological basis of nature management"; integrated practice programs; production practice programs with in-depth coverage of environmental issues; programs of scientific and research work of students with ecological, industrial and ecological topics; methodological recommendations "Continuous development of environmental awareness of future sea and river transport specialists".

**Conclusions.** The DEC method of future sea and river transport specialists, developed and implemented in the educational practice of colleges, is aimed at the formation of a personality with an ecological outlook on compliance with the norms of ecologically competent behavior and the implementation of practical actions to protect one's own health, the natural environment, and involves the mastery of scientific knowledge (imagination, concepts, regularities), which reflect the philosophical, natural-scientific, legal and moral-ethical, socio-economic, technical and professional aspects of the development of ecological culture, which should take place on the basis of the synthesis of the forms and methods of the development of ecological culture developed in the theory and practice of ecological education, modern ecological ideas, a new attitude to nature and new strategies and technologies of interaction with nature.

Prospective scientific investigations include the study of the system of formation of the environmental culture of education seekers; further development of methods of formation of environmental culture of students of pre-higher and higher education institutions.

### List of references

- Гончаренко, С. (2000). Методика як наука. Шлях освіти, 1, 2-6.
- Карпенко, О. (2019). Екологічна грамотність і метод проектів. *Крок у науку: дослідження у галузі природничоматематичних дисциплін та методик їх навчання: Збірник тез доповідей Всеукраїнської науково-практичної конференції студентів, аспірантів і молодих учених (20 листопада 2020 року, м. Чернігів) (с. 80–81)*. Чернігів: НУЧК імені Т.Г. Шевченка.
- Курняк, Л. (2015). Екологічна культура: поняття та формування. *Збірник наукових праць Хмельницького інституту соціальних технологій Університету «Україна»*, 10, 48–51.
- Морозова, Л., Бондарчук, А., & Варук, Ю. (2017). Роль екологічних цінностей у формуванні екологічної культури особистості. *Young Scientist*, 11(51), 46–50.
- Моторна, Л. (2008). Педагогічні умови застосування освітніх технологій в процесі викладання природничонаукових дисциплін у технічних коледжах. In *Гуманізм та освіта: Збірник матеріалів ІХ Міжнар. наук.-практ. конф. (11-12 вересня*

2008 року, м. Вінниця) (с. 90–92). Вінниця: Вінницький національний технічний університет.

Плахотнік, О., & Головатюк, В. (2004). Інноваційні підходи до екологічної освіти молоді. *Наукові записки Ніжинського державного університету імені Миколи Гоголя. Серія : Психолого-педагогічні науки*, 3, 88–90.

Пономаренко, С. (2020). Екологічна культура як індикатор в галузі екологічної освіти. In *Інтеграція фундаментальних та прикладних досліджень в географічній, екологічній та хімічній освіті: матеріали VI Всеукр. наук.-практ. інтернет-конф.* (27 листопада 2020 року, м. Умань) (с. 108–111). Умань: Соцінський М. М.

Міністерство освіти і науки України (2018, 13 листопада). Про затвердження стандарту вищої освіти за спеціальністю 271 «Річковий та морський транспорт» для першого (бакалаврського) рівня вищої освіти <https://mon.gov.ua/storage/app/media/vishcha-osvita/2022/Standarty.Vyshchoyi.Osvity/Zatver-dzheni.Standarty/01/31/271-Richk.ta.morsk.transp-bak.31.01.22.pdf>

Сухомлинська, О. (2003). Випереджаючи час... (Василь Олександрович Сухомлинський – до 85-річчя від дня народження). *Рідна школа*, 9, 6–9

Федорик, М. & Москалик Г. (2009) *Основи екології: посібник*. Чернівці: ЧНУ.

Herliand, T. (2019). Professional training of future skilled workers in professional (vocational) education schools based on modular and competence approach. *Scientific herald of the Institute of vocational education and training of NAES of Ukraine. Professional Pedagogy*, 2(19), 18–23. <https://doi.org/10.32835 / 2223-5752.2019.19.18-23>

### Translated & Transliterated

Goncharenko, S. (2000). Metodika yak nauka [Methodology as science]. *Shlyah osviti*, 1, 2–6 [in Ukrainian]. Karpenko, O. (2019). *Ekologichna gramotnist i metod proektiv [Environmental literacy and project method]*. Zbirnik tez dopovidey «Krok u nauku: doslidzhennya u galuzi prirodnicHO-matematichnih distsiplin ta metodik yih navchannya» (s. 80–81) [in Ukrainian].

Kurnyak, L. (2015). Ekologichna kultura: ponyattya ta formuvannya. [Ecological culture: understanding that molding]. *Zbirnik naukovih prats Hmel'nitskogo Institutu sotsialnih tehnologiy Universitetu «Ukrayina»*, 10, 48–51 [in Ukrainian].

Morozova, L., Bondarchuk, A., & Varuk, Yu. (2017). Rol ekolohichnykh tsinnosti u formuvanni ekolohichnoi kultury osobystosti. [The role of ecological values in the formation of ecological culture of the individual]. *Young Scientist*, 11(51), 46-50 [in Ukrainian].

Motorna L. (2008). Pedahohichni umovy zastosuvannya osvitnikh tekhnolohii v protsesi vykladannia pryrodnychonaukovykh dystsyplin u tekhnichnykh koledzhakh. [Pedagogical conditions for the use of educational technologies in the process of teaching natural and scientific disciplines in technical colleges]. In *Humanizm ta osvita: Zbirnyk materi- aliv IKh Mizhnar. nauk.-prakt. konf.* (11-12 veresnia 2008 roku, m. Vinnytsia) (s. 90-92). Vinnytsia: Vinnytskyi natsion- alnyi tekhnichnyi universytet [in Ukrainian].

Plahotnik O. & Golovatyuk V. (2004). Innovatsiyni pidhodi do ekolohichnoyi osviti molodi [Innovative approach to the environmental enlightenment of young people]. *Naukovi zapiski Nizhynskogo derzhavnogo universitetu im. M. Gogolya. Seriya : Psihologo-pedagogichni nauki*, 3, 88–90 [in Ukrainian].

Ponomarenko, S. (2020). Ekolohichna kultura yak indykator v haluzi ekolohichnoi osvity. [Environmental culture as an indicator in the field of environmental education]. In *Intehratsiia fundamentalnykh ta prykladnykh doslidzhen v heohrafichnii, ekolohichnii ta khimichnii osviti: materialy VI Vseukr. nauk.-prakt. internet-konf.* (27 lystopada 2020 roku, m. Uman) (s. 108-111). Uman: Sochinskyi M. M.

Ministerstvo osviti i nauki Ukrayini (2018, 13 listopada). Pro zatverdzhennya standartu vischoyi osviti za spetsial- nistyu 271 «Richkoviy ta morskyy transport» dlya

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pershogo (bakalavrskogo) rivnya vischoyi osvity [About approval of the standard of higher education for the specialty 271 «Richkovy and maritime transport» for the first (bachelor's) level of higher education]. <https://mon.gov.ua/storage/app/media/vishcha-osvita/2022/Standarty.Vyshchoyi.Osvity/Zatver-dzheni.Standarty/01/31/271-Richk.ta.morsk.transp-bak.31.01.22.pdf> [in Ukrainian].

Suhomlinska, O. (2003). Viperedzhayuchi chas... (Vasil Oleksandrovich Suhomlinskiy – do 85-richchya vId dnya narodzhennya) [Ahead of time... (Vasyl Oleksandrovich Sukhomlynsky – to his 85th birthday)]. *Ridna shkola*, 9, 6–9 [in Ukrainian].

Fedoryk, M. & Moskalyk G. (2009). *Osnovi ekologii* [Fundamentals of ecology]. Chernivtsi: ChNU [in Ukrainian].

Herliand, T. (2019). Profesiina pidhotovka maibutnoho kvalifikovanykh robitnykiv u profesiinykh (profesiinotekhnichnykh) navchalnykh zakladakh na bazi na modulno-kompetentnisnomu pidkhodi [Professional training of future skilled workers in professional (vocational) education schools based on modular and competence approach]. *Scientific herald of the Institute of vocational education and training of NAES of Ukraine. Professional Pedagogy*, 2(19), 18-23. <https://doi.org/10.32835 / 2223-5752.2019.19.18-23> [in English].



## 1.3. ECO-ORIENTED TECHNOLOGIES IN THE PROFESSIONAL TRAINING OF TILERS

### ЕКООРІЄНТОВАНІ ТЕХНОЛОГІЇ У ПРОФЕСІЙНІЙ ПІДГОТОВЦІ ЛИЦЮВАЛЬНИКІВ-ПЛИТОЧНИКІВ

#### Світлана Заславська

кандидат технічних наук, доцент,  
науковий співробітник лабораторії  
технологій професійного навчання  
Інституту професійної освіти НАПН  
України

<https://orcid.org/0000-0001-8150-8428>,  
[zaslavskaya\\_binpo@ukr.net](mailto:zaslavskaya_binpo@ukr.net)

#### Svitlana Zaslavska

Candidate of Technical Sciences, Associate  
Professor, Researcher at the Laboratory of  
Technologies of Vocational Training, Institute  
of Vocational Education of the National  
Academy of Pedagogical Sciences of Ukraine

<https://orcid.org/0000-0001-8150-8428>,  
[zaslavskaya\\_binpo@ukr.net](mailto:zaslavskaya_binpo@ukr.net)

*The relevance of this article is dictated by the acuteness of the environmental pollution issue, especially from the construction sector, which presents a challenge both for Ukraine and globally. One of the solutions to this problem is the implementation of green building, which involves the use of environmentally friendly materials, innovative wastefree and low-waste technologies, alternative energy sources, waste recycling, etc. This necessitates new, ecologically oriented approaches in the training of qualified construction workers, particularly tile setters.*

*Актуальність статті обумовлюється гостротою проблеми забруднення навколишнього середовища, особливо з боку будівельного сектору, що постає як перед Україною, так і в глобальному вимірі. Одним із напрямів розв'язання цієї проблеми є впровадження зеленого будівництва, що передбачає використання екологічно чистих матеріалів, інноваційних безвідходних та маловідходних технологій, альтернативних джерел енергії, утилізацію відходів тощо. Це вимагає нових, екологічно орієнтованих підходів при підготовці кваліфікованих робітничих кадрів для будівельної галузі, зокрема лицювальників-плиточників.*

**Ключові слова:** екоорієнтована професійна підготовка, зелене будівництво, екоорієнтовані технології, екологічна сертифікація, екологічна компетентність, лицювальник-плиточник.

**Keywords:** eco-oriented professional training, green building, eco-oriented technologies, ecological certification, ecological competence, tiler.

**Introduction.** Before the modern world, particularly Ukraine, stand acute ecological problems, namely: environmental pollution, global warming, waste disposal, military actions, and the like. In this context, the importance of eco-oriented professional training is increasing, which connects students with the surrounding world, teaches them about the natural and artificial environment, increases awareness of problems affecting the

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environment, and also about actions that can be taken to preserve and improve it (Greenfield, 2022).

Construction sites themselves are a serious source of environmental pollution. Buildings account for 40% of global energy use and produce more than a third of global greenhouse gas emissions. These impacts are recognized and taken into account in the design and application of technologies that reduce the environmental impact of construction (Gibberd, 2020). Green technologies, such as solar energy, may seem expensive compared to traditional resources, but over the entire term of use, the consumer ultimately saves on electricity costs (HowStuffWorks.com., 2011).

As noted in the monograph by Jeremy Gibberd (2020), green construction technologies describe methods used in the built environment to affect the environment. Cost and benefit calculations, made in the assessment of a representative house in Hebei province (China) and verified by experts from the Royal Institute of Technology (Stockholm), showed that the benefits of additional investments associated with the application of green construction technologies exceed the corresponding additional costs, and the payback period is approximately 12 years, which is acceptable for residential projects (Chen, 2020, p. 32). As proven by research conducted at the Kyiv National University of Construction and Architecture, green structures are a promising energy-efficient technology that includes thermal insulation and cooling effects, allowing for automatic protection from excessive solar radiation in the warm season (with the conversion of solar energy into biomass, not heat) and, conversely, the maximum transmission of solar rays in the cold season. This reduces the load on air conditioning and heating systems (Tkachenko, 2022).

In 2016, Ukraine joined the World Council on "Green" Building to prepare "green standards in the regulatory and legal field" (Kulishenko, 2016). The construction sector accounts for 37% of global carbon emissions related to energy. It is expected that by 2050, nearly 70% of the world's population will live in cities, which will require a doubling of the construction fund (Investment Attraction Office, 2022). The negative impact of the construction sector is associated with the production and

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processing of construction materials, as well as the construction and operation of buildings. Therefore, green building practices are a critically important component of the global fight against climate change and environmental protection. The importance of this issue is indicated by the establishment in China of the specialized journal "Low-Carbon Materials and Green Construction" (Xiao, 2023). Recently, construction companies have focused on implementing sustainable development strategies, including green technologies. Thus, the construction sector needs a technological breakthrough and professional staff capable of implementing it.

**Objective:** Based on global and domestic experience in "green building," to research the issue of preparing tilers in Ukraine using eco-oriented production technologies, and to develop recommendations for improving the process of implementing these technologies in educational plans and programs.

**Methods:** Analysis of domestic and foreign sources on eco-oriented professional training and "green" construction, empirical research on the practice of applying ecotechnologies in the training of tilers in Ukraine.

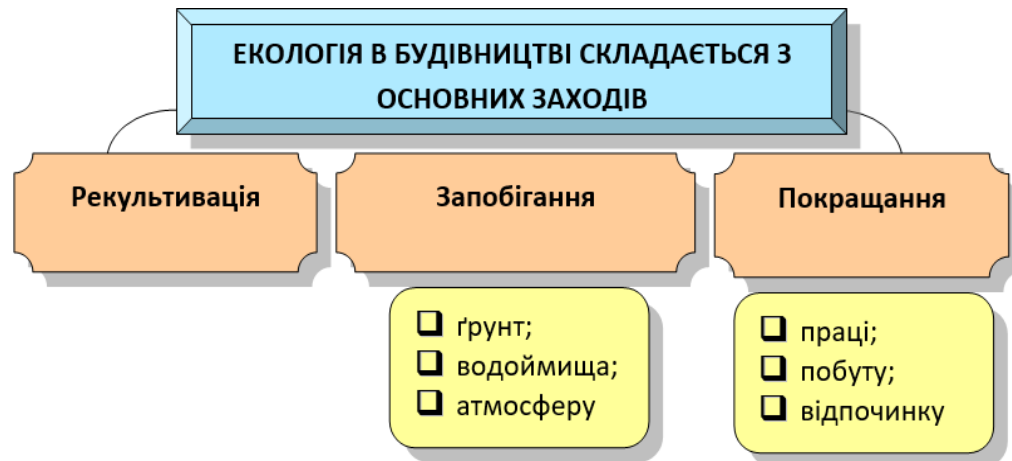
**Results and Discussion:** Analysis of the content of the current state standard of professional (vocational-technical) education SP(PT)O 7132.F43.33-2017 Tiler 3-7th grade shows that the educational program of the standard does not include "Ecology" as a separate topic, not to mention highlighting ecological issues in teaching individual technologies for performing cladding works. Also, ecological competence is not included in the list of key competencies of the mentioned standard. However, without appropriate ecological education, future tilers will not be able to work effectively in the field of "green building," which most corresponds to the ecological challenges of today.

Green building technology is a broad category that includes everything from energy-efficient appliances to geothermal heating: cool roof, green insulation, biodegradable materials, compacted earth brick, stormwater management, geothermal heating, solar energy, electrochromic smart glass, smart appliances, and zeroenergy home (HowStuffWorks.com., 2011).

The main aspects of "green building" include: environmental quality; architectural quality; indoor environment comfort; waste utilization; reduction of greenhouse gas emissions into the atmosphere; rational water use; increasing the share of renewable energy sources in the operation and maintenance of buildings; safety of life activities; and establishing harmony between nature and architecture.

In Figure 1, the main measures comprising ecology in construction are outlined. All listed measures should be anticipated at the pre-project development stage under specific local conditions. safety of life activities; and establishing harmony between nature and architecture.

Therefore, "green building" is an innovative and environmentally friendly manufacturing, based on the principles of sustainable development, reuse of raw materials, and conservation of natural resources. Its main goal is to reduce the consumption of energy and material resources throughout the entire life cycle of a building: from site selection, design, construction to operation, repair, and demolition (Dominant, n.d.).



*Fig 1. Ecology in Construction*

In Figure 1, the main measures comprising ecology in construction are outlined. All listed measures should be anticipated at the pre-project development stage under specific local conditions.

In the USA, "green" buildings on average reduce energy consumption by a quarter, and operation and maintenance costs by 10-20% compared to traditional buildings, thus increasing the potential longterm return on investment. According to the

International Finance Corporation, "green" buildings are at least 20% more energy efficient compared to traditional ones that do not have energy-efficient design (Investment Attraction Office, 2022). For example, in Italy (Milan), a "green" skyscraper in the form of a forest-house was even built (Fig.2). For this reason, energy-efficient structures are constructed with environmentally friendly materials, have high energy-saving rates, and use alternative energy sources – solar energy, air, and ground energy. Such buildings are safe, environmentally clean, and improve the condition of the surrounding environment. For example, environmentally friendly building materials include foam polystyrene insulation, cement-sand mixtures, and concrete made using cement, sand, gravel. Completely environmentally safe ceramic tile, which is distinguished by high strength, reliability, and durability, is also used (Bud-Info, 2019). All plants of the company "Henkel Bautechnik (Ukraine)" that produce Cere-sit adhesives are already certified with ISO 9001, EMAS/ISO14001, and OHSAS18001(9)(Henkel, 2015, p. 24). The certification of buildings is currently a timely issue.



*Fig. 2. Forest Building in Milan, Italy.*

Ecological certification of buildings has long been mandatory in developed countries, and the oldest and most widespread method of assessing environmental efficiency in Europe is BREEAM. This system has a 30-year history, and during this time, over 0.5 million buildings in 90 countries have been certified. BREEAM experts analyze buildings according to 10 key parameters, including energy efficiency, use of environmentally

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friendly building materials, waste management technologies, the building's environmental impact, safety for residents and visitors, and accessibility of transportation infrastructure. Importantly, buildings are assessed twice: at the design stage and at the commissioning stage. This virtually eliminates a "formal approach" or the possibility of a promising but unrealized project.

In Ukraine, however, the trend towards ecodevelopment is only emerging. Commercial real estate is gradually beginning to receive international ecological certificates, while residential complexes are still less active in this area (Mind, 2020). Ecological (green) construction is considered an innovative approach to sustainable territorial development. This is associated with the use of the latest technologies and equipment and the supply of environmentally friendly products that do not harm the environment.

In Japan, ecological problems are given priority attention. Every five years, the state conducts environmental research, and each prefecture has its environmental legislation and specific ecological programs. Japan's long-term goal is to reduce carbon dioxide emissions by 80% by 2050 compared to 2013. Additionally, the country is currently moving towards creating an ideal eco-city (Ecobusiness, 2020).

Maximizing a building's adherence to green construction standards is facilitated by ecotechnologies, which focus on using natural materials in construction and finishing (wood, glass, clay, straw, ceramics, etc.), high-quality thermal insulation achieved through the use of natural materials, building structure insulation, alternative energy sources, and efficient use of natural phenomena (e.g., using rainwater for technical needs); and waste utilization.

Post-war reconstruction of our state must occur based on European and global green courses, utilizing advanced ecological tools and new construction technologies. For Ukraine, green construction has significant potential, prospects for economic growth, and a path to sustainable development. Thus, it is evident that the tendency to apply eco-technologies in the construction sector will only strengthen in the near future. Consequently, the issue of "green construction" is one of the important research

directions. However, it should be noted that there is insufficient scientific exploration on this matter, especially in the field of specific construction works.

In recent years, we have conducted research on the development and application of ecological technologies in construction during finishing works. On average, such works constitute 14% of the estimated cost of construction and installation works, and in terms of labor intensity - 28% of total labor costs. On average, 46% of finishing works are performed by a tiler (Nikulina et al., 2007, p. 38). One of the important tasks in selecting technologies for facing and other finishing works is the impact of building materials on human health.

Some materials, despite their high quality, well-known brands, and excellent appearance, can undermine the health of house or office residents. They can subtly affect health, provoke chronic diseases, or cause allergic reactions. Below (Fig. 3), we present the main requirements of ecological construction in performing facing works.



*Fig. 3. Ecological requirements for the execution of facing works (developed by the author)*

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As evidenced by the aforementioned ecological requirements, it is crucial to insist that each worker conscientiously adheres to specific ecological norms and rules, that is, to develop their ecological competence through eco-oriented professional training. According to the insightful definition by L. Sauvé, a researcher from the Université du Québec à Montréal, environmental education is "an essential dimension of basic education, focused on the sphere of interaction that lies at the core of personal and social development – the sphere of relations with our environment, with our common 'home of life'" (Sauvé, 2002, p. 1).

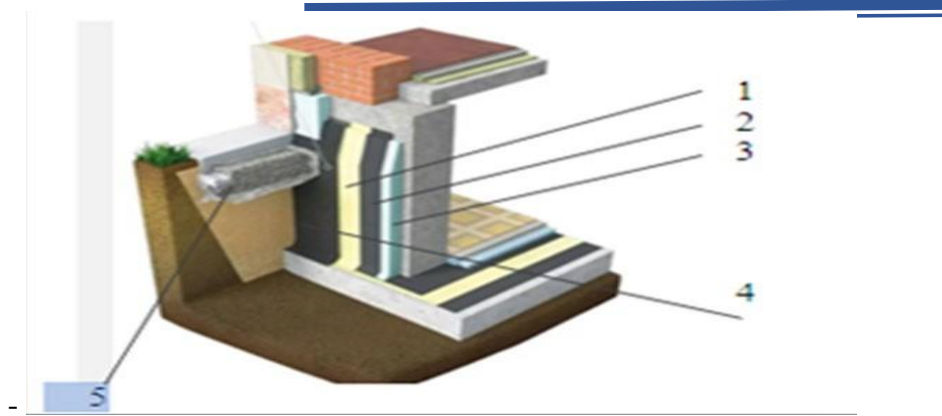
The task of environmental education is to seek ways to preserve the environment and manage its resources appropriately. With an adequate level of environmental education, vocational education learners not only gain knowledge about the environment but also become aware of their actions and responsibility for the surrounding environment.

They develop skills to solve various ecological problems. Therefore, environmental education is a powerful tool for responding to ecological challenges, achieving the goals of nature protection and conservation, and thus, sustainable development.

It is deemed advisable for teachers in vocational education institutions to more frequently include environmental education as an educational objective in their lesson plans. According to our research, ecologically clean materials for finishing works have been identified, which we recommend incorporating into the curriculum instead of outdated information.

Figure 4 illustrates the arrangement of flooring on the ground. For waterproofing, new ecologically clean membrane waterproofing materials, isolite and typar, are used instead of waterproofing with roofing felt and bitumen mastic, which contain carcinogenic substances. The technology of their application is simple and waste free.





*Fig. 4. Foundation of a private strip-type house (ground floor) 1 - waterproofing, 2 - protective geotextile, 3 - thermal insulation, 4 - Izolit, 5 – Typar*



*Fig. 5. Wall cladding with a laser level.*



*Fig. 6. Floor installation with a laser level.*

Eco-oriented technologies for tiling floors and walls with ceramic tiles involve the use of environmentally friendly materials from the company "KNAUF" - a leveling compound for base leveling, a deep-penetrating primer, and glue based on dry construction mixes. For cladding building facades, such environmentally friendly material as porcelain stoneware is used.

We consider it appropriate to include the aforementioned professional information in the curricula and training programs for future tile setters. To better assimilate the material, interactive teaching methods should be used: problem-solving, gaming, small group activities, etc.

We recommend the use of modern innovative web-quest technology, which enables become widespread in residential buildings, where the floor covering is made of white ceramic tiles, which helps to reduce the need for artificial lighting. Thus, the impact on both the environment and the health of the residents is minimized. The reduction of waste in construction is facilitated by the use of precise control and measuring instruments: a laser level,

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etc. (Fig. 5, 6). trainees in professional educational institutions to explore new green building technologies. All of the above will contribute to increasing the motivation of learners to assimilate educational material and ensure their professional competence in green building issues.

The Law of Ukraine adopted on February 28, 2019, "On the Basic Principles (Strategy) of the State Environmental Policy of Ukraine for the Period up to 2030," introduced a new aspect of vision for goals and strategic tasks in the field of environmental protection, based on identifying the causes of environmental problems in Ukraine and financial possibilities for their resolution. Our research has shown that "green" construction is one of the effective ways to solve these problems. Therefore, special attention should be paid to developing ecological competence in the training program for future builders.

**Conclusions.** In Ukraine, the process of applying "green" technologies is just beginning. In tiling works, environmentally friendly hydroinsulation membrane materials are used; powerful construction companies have emerged that conduct eco-certification of their products; the use of mastics and adhesives based on dry building mixes reduces construction waste and, consequently, soil pollution at the construction site; more precise laser control and measuring instruments are increasingly used in tiling works. Therefore, in the training of tile setters, attention should be paid to studying the latest production technologies, especially green ones. Hence, we consider it appropriate to recommend the revision of the State Standard of Professional (Vocational-Technical) Education SP(PT)O 7132.F43.33-2017 Tile Setter 3-7<sup>th</sup> grade, taking into account ecological requirements, and for teachers of vocational education institutions to pay special attention to developing ecological competence in future tile setters.

**Prospects for further research.** Development of methodological recommendations for the implementation in the educational process of vocational education institutions of a system of measures for ecological education and the application of modern green construction technologies and environmentally friendly building materials in the training of tile setters.

## List of references

- Буд-Інфо (2019, 30 вересня). *Екологічно чисті будівельні матеріали*. <https://bud-info.net.ua/materialy-dlya-budivnytstva-ta-remontu/ekolohichno-chysti-materialy-dlia-budivnytstva/>.
- Вектор ньюз (2016, 8 серпня). Кулішенко, А. «Зелене будівництво» в Україні. Однієї енергоефективності мало. <https://www.vectornews.net/exclusive/19131-zelene-budivnictvo-v-ukrayin-odnyeyi-energoefektivnost-zamalo.html>.
- Домінант (б. д.). Зелене будівництво і екотехнології. <https://dominant-wood.com.ua/ua/news/285-zelene-budivnitstvo-i-ekotehnologiyi>.
- Екодома – сайт про екологічні будинки. (2023, 15 червня). *Екологічно чисті будівельні матеріали*. <https://ecodoma.in.ua/ecologichnie-strojmateriali.html>.
- Mind (2020, 7 липня). Мехтієв, Р. Екологічне будівництво: як і навіщо проходить міжнародну сертифікацію. <https://mind.ua/openmind/20212905-ekologichne-budivnictvo-yak-i-navishcho-prohoditi-mizhnarodnu-ekosertifikaciy>.
- Нікуліна, А. С., Заславська, С. І., Ничкало, Н. Г., & Яценко, Л. В. (2007). *Малярні роботи (інтегрований курс модульного навчання): у 3-х частинах. Частина перша*. Київ: Вікторія, 2007, 288 с.
- Офіс залучення інвестицій (UkraineInvest) при Кабінеті Міністрів України. (2022, 31 травня). *Що таке зелене будівництво та чому це важливо?* <https://ukraineinvest.gov.ua/uk/news/31-05-22-2/>.
- Henkel (2015). Системи CeresitCerehetm. Сучасні та надійні рішення. <http://ceresit-pro.net/wp-content/uploads/2015/12/Suchasni-ta-nadiyni-rishennya.-Sistemi-uteplennya-Ceresit.pdf>.
- Ткаченко, Т. М. (2022, 31 травня). Перспективи зеленого будівництва у майбутньому відновленні України. *Децентралізація в Україні*. <https://decentralization.gov.ua/news/15011/20223005>.
- Ecobusiness. (2020, 23 березня). Як Японія вирішує екологічні проблеми <https://ecolog-ua.com/news/yak-yaponiya-vyrishuye-ekologichni-problemy>.
- Chen, J. (2020). *Evaluating the economic feasibility of the Passive House in China*. Stockholm: Royal Institute of Technology. <https://www.diva-portal.org/smash/get/diva2:1447885/FULLTEXT01.pdf>.
- HowStuffWorks.com. (2011, 21 March). Fenlon, W.10 Technologies Used in Green Construction. <https://home.howstuffworks.com/home-improvement/construction/green/10-technologies-used-in-green-construction.htm>.
- Gibberd, J. (2020). Green Building Technologies. In: Yang, P., ed. *Cases on Green Energy and Sustainable Development*. Hershey, PA: IGI Global, 2020. <https://doi.org/10.4018/978-1-5225-8559-6>.
- Greenfield E. (2022, September 26). Need and Importance of Environmental Education. *Sigma Earth*. <https://sigmaearth.com/need-and-importance-of-environmental-education/>
- Sauvé, L. (2002). Environmental education: possibilities and constraints. *Connect. UNESCO International Science, Technology & Environmental Education Newsletter*, 27(1-2):1-4.
- Xiao, X., Shah, S. P., & Xiao, J. (2023). Editorial: Low-carbon Materials and Green Construction. *Low-carbon Mater. Green Constr*, 1. <https://doi.org/10.1007/s44242-022-00009-9>.

---

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## Translated & Transliterated

Bud-Info. (2019, September 30). Ekolohichno chysti budivelni materialy [Environmentally friendly building materials]. <https://bud-info.net.ua/materialy-dlya-budivnytstva-ta-remontu/ekolohichno-chysti-materialy-dlia-budivnytstva/>, [in Ukrainian].

Vector News. (2016, August 8). Kulishenko, A. «Zelenebudivnytstvo» v Ukraini. Odnii ei enerhoefektyvnosti malo [“Green Construction” in Ukraine. Energy efficiency alone is not enough.]. <https://www.vectornews.net/exclusive/19131-zelenebudivnytstvo-v-ukrayin-odnyeyi-energoefektivnost-zamalo.html>, [in Ukrainian].

Dominant (n.d.). Zelenebudivnytstvo i ekotekhnolohii [Green construction and ecotechnologies]. <https://dominant-wood.com.ua/ua/news/285-zelene-budivnytstvo-i-ekotekhnolohiyi>, [in Ukrainian].

Ekodoma – sait pro ekolohichni budynky. (2023, June 15). Ekolohichno chysti budivelni materialy [Ecologically clean building materials.]. <https://ecodoma.in.ua/ecologichnie-strojmateriali.html>, [in Ukrainian].

Mind. (2020, July 7). Mekhtiev, R. Ekolohichne budivnytstvo: yak i navishcho prokhodyty mizhnarodnu sertyfikatsiiu [Ecological construction: how and why to pass international certification.]. <https://mind.ua/openmind/20212905-ekologichne-budivnytstvo-yak-i-navishcho-prohoditi-mizhnarodnu-ekosertifikatsiyu>, [in Ukrainian].

Nikulina, A. S., Zaslavska, S. I., Nychkalo, N. H., & Yatsenko, L. V. (2007). Maliarni roboty (intehrovanyi kurs modulnoho navchannia): u 3-kh chastynakh. Chastyna persha [Painting works (integrated course of modular training): in 3 parts. Part one]. Kyiv: Viktoriia, 288 pp., [in Ukrainian].

Investment Promotion Office (UkraineInvest) at the Cabinet of Ministers of Ukraine (2022, May 31). Shcho take zelene budivnytstvo ta chomu tse vazhlyvo? [What is green construction and why is it important?]. <https://ukraineinvest.gov.ua/uk/news/31-05-22-2/>, [in Ukrainian].

Henkel (2015). Systemy Ceresit Cerethetm. Suchasni ta nadiini rishennia [Ceresit Cerethetm Systems. Modern and reliable solutions], 176 pp. [http://ceresit\\_pro.net/wp-content/uploads/2015/12/Suchasni-ta-nadiyni-rishennya.-Sistemi-uteplennya-Ceresit.pdf](http://ceresit_pro.net/wp-content/uploads/2015/12/Suchasni-ta-nadiyni-rishennya.-Sistemi-uteplennya-Ceresit.pdf), [in Ukrainian].

Tkachenko, T. M. (2022, May 31). Perspektyvy zelenoho budivnytstva u maibutnomu vidnovlenni Ukrainy [Prospects for green construction in the future reconstruction of Ukraine]. Detsentralizatsiia v Ukraini [Decentralization in Ukraine]. <https://decentralization.gov.ua/news/15011/20223005>, [in Ukrainian].

Ecobusiness (2020, March 23). Yak Yaponiia vyrishuie ekolohichni problem [How Japan solves environmental problems]. <https://ecolog-ua.com/news/yak-yaponiya-vyrishuye-ekologichni-problemy>, [in Ukrainian].

Chen, J. (2020). Evaluating the economic feasibility of the Passive House in China. Stockholm: Royal Institute of Technology, 36 pp., [in English].

Fenlon, W. (2011, 21 March). 10 Technologies Used in Green Construction. HowStuffWorks.com. <https://home.howstuffworks.com/home-improvement/construction/green/10-technologies-used-in-green-construction.htm>, [in English].

Gibberd, J. (2020). Green Building Technologies. In: Yang, Peter, ed. Cases on Green Energy and Sustainable Development. Hershey, PA: IGI Global, 2020. <https://doi.org/10.4018/978-1-5225-8559-6>, [in English].

Greenfield E. (2022, September 26). Need and Importance of Environmental Education. Sigma Earth. <https://sigmaearth.com/need-and-importance-of-environmental-education/>, [in English].

Sauvé, L. (2002). Environmental education: possibilities and constraints.

Connect. UNESCO International Science, Technology & Environmental Education Newsletter, 27(1-2):1-4, [in English].

Xiao, X., Shah, S.P., & Xiao, J. Editorial: Low-carbon Materials and Green Construction. Low-carbon Mater. Green Constr. 1, 1 (2023). <https://doi.org/10.1007/s44242-022-00009-9>, [in English].

## 1.4. FORMATION OF ENVIRONMENTAL COMPETENCE OF THE FUTURE BACHELOR OF NAVIGATION

### ФОРМУВАННЯ ЕКОЛОГІЧНОЇ КОМПЕТЕНТНОСТІ МАЙБУТНІХ БАКАЛАВРІВ СУДНОВОДІННЯ

#### **Петро Лузан**

Доктор педагогічних наук, професор,  
головний науковий співробітник  
лабораторії науково-методичного  
супроводу підготовки фахівців у коледжах і  
технікумах Інституту професійної освіти  
НАПН України,

<https://orcid.org/0000-0002-8853-9275>,  
[petr.luzan@ukr.net](mailto:petr.luzan@ukr.net)

#### **Petro Luzan**

Doctor of Pedagogical Sciences, Professor,  
Chief Research Fellow at the Laboratory for  
Scientific and Methodological Support of  
Specialist Training in Colleges and Technical  
Schools of the Institute of Vocational Education  
of the National Academy of Educational  
Sciences of Ukraine

<https://orcid.org/0000-0002-8853-9275>,  
[petr.luzan@ukr.net](mailto:petr.luzan@ukr.net)

*The relevance is driven by the fact that the ecological crisis both globally and in Ukraine particularly, is characterized by a trend of increase. The war with the Russian Federation, which severely destroys the country's ecosystems, has become a challenge for domestic ecology. We now face significant losses of hundreds of species of animals and plants. This requires replenishment of organizations and institutions, including maritime and water transport, with specialists who have a thorough professional-ecological training. Meanwhile, maritime higher education institutions are still insufficiently focused on activating ecological education for students, on fostering ecologically aware seafarers with developed ecological thinking. The problem of targeted formation of ecological knowledge, skills, and consciousness among future navigation specialists is further actualized by the fact that pedagogical science has not yet substantiated detailed methodological approaches, effective principles, specific conditions, and rules for productive ecological training of future specialists in maritime and inland water transport, nor has it developed effective technologies and methodologies for systemic acquisition of professionally oriented ecological knowledge, skills, and abilities by marine education seekers.*

*Актуальність дослідження зумовлюється тим, що екологічна криза у світі та в Україні зокрема, характеризується тенденцією до зростання. Викликами для вітчизняної екології стала війна з РФ, що жорстко нищить екосистеми країни. Нині маємо суттєві втрати сотень видів тварин і рослин. Це потребує поповнення організацій і установ, зокрема морського і водного транспорту, фахівцями з ґрунтовною професійно-екологічною підготовкою. Натомість морські заклади вищої освіти поки-що недостатньо зорієнтовані на активізацію екологічної освіти студентів, на виховання екологічно свідомих, з розвинутим екологічним мисленням моряків. Проблему цілеспрямованого формування екологічних знань, екологічних умінь, екологічної свідомості майбутніх фахівців-судноводіїв актуалізує й те, що педагогічною наукою дотепер не обґрунтовано докладних методологічних підходів, дієвих принципів, конкретних умов і правил продуктивної екологічної підготовки майбутніх фахівців морського і внутрішнього водного транспорту, не розроблено результативних технологій і методик системного опанування здобувачами морської освіти професійно орієнтованими екологічними знаннями, уміннями, навичками.*

**Ключові слова:** екологічна освіта, екологічна компетентність, майбутні бакалаври судноводіння, екологічні знання, екологічний світогляд, морський транспорт, педагогічна система.

**Keywords:** ecological education, ecological competence, future navigation bachelors, ecological knowledge, ecological worldview, maritime transport, pedagogical system.

**Introduction.** We must acknowledge that the environmental crisis in the world is escalating, and in Ukraine, its dynamics are further intensified by military actions on land, as well as in marine and river waters. The war destroys domestic ecosystems, damages rare flora and fauna. More than 80 species of animals are on the verge of extinction: over 10 million individuals have already died due to shelling of zoos and shelters. The negative impact of naval vessels' hydrolocation systems causes the stranding of cetaceans. Significant leaks of fuel and lubricants and the entry of toxic compounds from ammunition and military equipment from sunken ships substantially worsen the ecology of the Azov and Black Seas, estuaries, and wetlands.

It is worth noting that, ultimately, water transport itself is a significant source of environmental and biosphere pollution. Primarily, this refers to pollution from waste generated during the operation of vessels and marine pollution through the discharge of oil, petroleum products, chemicals (ammonium nitrate, superphosphate, bauxite, etc.) during accidents involving barges, tankers, and other cargo ships. Specifically, marine environmental pollution occurs due to: the operation of diesel engines using high-sulfur fuel oil that pollutes the atmosphere with nitrogen oxides, carbon, and other carcinogens; toxic waste from commercial vessels (cruise industry) from burning garbage, including plastic; wastewater from medical facilities, general use areas that may contain harmful viruses, intestinal parasites, etc.; solid waste (glass, paper, ash, plastic, metal drink cans, etc.) that can become marine litter and pose a threat to all life; the discharge of insufficiently treated bilge water; collisions of marine mammals (e.g., whales) with vessels leading to their death and injuries; noise created by ships, disrupting the orientation, communication, and feeding of some marine species, etc. It is not difficult to see that a significant (and possibly decisive) role in marine environment pollution is

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played by human factors.

Thus, we must recognize that the ecologically safe operation of vessels directly depends on the professional-environmental training of maritime and water transport professionals future officers of the deck command. However, an analysis of the training practices of seafarers in higher education institutions, especially future bachelors of navigation, indicates that the problem of forming ecologically conscious, responsible, active defenders of nature is still insufficiently addressed in maritime universities and academies. Typically, acquiring ecological knowledge and skills by future bachelors of navigation involves studying in the second or third semester (Bairamova, 2020); National University "Odessa Maritime Academy"; Prospects of training and employment for seafarers) the discipline "Ecology and Environmental Protection," culminating in an examination (from 2 to 6 credits). Unfortunately, in some maritime higher education institutions, such an educational discipline is not included in the educational-professional programs for training bachelors of navigation at all.

Therefore, it can be concluded that in the educational environment of maritime higher education institutions, the development of ecological competence in future bachelors of ship navigation still receives insufficient attention. The problem of targeted formation of ecological knowledge, ecological skills, and ecological consciousness among future maritime professionals is further emphasized by the fact that pedagogical science has not yet substantiated detailed methodological approaches, effective principles, specific conditions, and rules for productive ecological training of future specialists in maritime and inland water transport, nor has it developed effective technologies and methods for systematic acquisition of professionally oriented ecological knowledge, skills, and abilities by maritime education seekers.

**Sources.** Regulations on the regulation of relations in the field of protection and conservation of natural resources, ensuring ecological safety, principles of environmental protection, use of plant and animal life are specified in the Laws of Ukraine "On Environmental Protection" (1991 with amendments 1993–2022), "On the Natural Reserve Fund of Ukraine" (1992 with amendments 1993–2022), "On Air Protection" (1992 with amendments 1995–2022), "On Radioactive Waste Management" (1995 with amendments 2000–2022), "On Waste" (1998 with amendments 2002–2022), "On Plant World" (1999 with



amendments 2009–2022), "On Animal World" (2002 with amendments 2009–2022), "On Environmental Impact Assessment" (2017 with amendments 2019–2022), among other normative legal documents. The content of virtually every analyzed official document includes the issues of the necessity to develop environmental culture among the population, formation of views, beliefs, and knowledge of people regarding the priority of ecological safety requirements, strict adherence to ecological standards, limits on the use of natural resources in industrial activities. At the same time, it emphasizes the importance of forming ecological competence in students of higher education institutions, preparing them to implement strategies for ecological safety and environmental protection. For example, Article 7 of the Law of Ukraine "On Environmental Protection" (1991) states: "Enhancing the environmental culture of society and professional training of specialists is ensured by general mandatory comprehensive education and training in environmental protection."

It is worth adding that, unfortunately, the bill "Strategy for Sustainable Development of Ukraine until 2030" (2018), which aims to "promote the transition of Ukraine to the principles of sustainable development, legislative and institutional provision of the public management system for sustainable development, improving the quality of life of the population and achieving economic, social, and ecological balance of development of Ukraine," has not yet been adopted. At the same time, the strategy and main directions for the development of Ukraine as a maritime state are declared in the Maritime Doctrine of Ukraine for the period until 2035, which defines: "Among the priority national interests at sea are meeting the needs of society, economy, and state in the use of sea resources, strengthening the position of Ukraine among the leading maritime states, as well as ensuring security by: preventing pollution of the marine environment, conducting effective ecological monitoring; achieving the condition of the marine environment in the territorial waters and the exclusive economic zone of Ukraine, which corresponds to the concept of 'good environmental condition' in the sense of the EU Framework Directive on Marine Strategy, and maintaining such a state in the long term" (Postanova Kabinetu Ministriv Ukrainy, 2009). The theoretical and methodological basis for addressing the

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issue of purposeful formation of ecological competence in future bachelor mariners has been defined by the works of scholars such as M. Bilyanska, V. Boholyubov, O. Vernik, S. Deryabo, I. Koreneva, V. Karamushka, L. Kurnyak, L. Lukyanova, O. Mateyuk, O. Palamarchuk, V. Panov, N. Pustovit, S. Rudyshyn, T. Saienko, Y. Shvalb, L. Rudenko, H. Filichuk, S. Shmaliy and others; the theoretical and methodological aspects of professional and ecological training of maritime and inland water transport specialists are highlighted in the works of L. Bazyl, O. Bayramova, O. Hurenkova, L. Herganova, O. Danylenko, V. Dobrovolska, Y. Yezhokina, V. Zhurian, M. Musorina, T. Rulevska, K. Tkachenko, and others. The scientific aspects of personality trait development, substantiated by these scholars, served as the basis for the justification and development of the system for purposeful formation of ecological competence in future bachelor mariners.

**The aim of the research:** to substantiate the pedagogical system for the purposeful formation of ecological competence in future bachelor mariners and to develop its conceptual model.

**Methods:** To achieve the aim of the study, theoretical (theoretical analysis of scientific works, studying the requirements of normative legal documents of ecological nature to determine the level of problem development and identify directions for scientific exploration; comparison – to study scientific approaches to solving the problem; analysis and synthesis – to clarify the features of ecological- professional training of bachelor mariners, substantiating the content of their ecological competence formation; modeling – for developing the structural and content model of the pedagogical system) and empirical (pedagogical observation, conversations, surveys – to determine the directions, stages, forms, technologies of forming ecological competence of future bachelor mariners) methods were used.

**Results and discussion.** Given that Ukraine is a leader in supplying maritime industry specialists to the global fleet (in 2018, 69,000 jobs (Bayramova, 2020), in 2023 – about 100,000), and a member of the International Maritime Organization (IMO), it is critical for solving the problem of professional and ecological training of bachelor mariners that students know and are able to apply the main norms and rules of international maritime safety and environmental protection. These provisions are highlighted in a number of Conventions adopted by the IMO, including: the International Convention for the Safety of Life at Sea (SOLH-

74/83); the International Maritime Dangerous Goods Code (IMDG-Code); the International Convention for the Prevention of Pollution from Ships (1973).

In turn, the standard of higher education (first (bachelor's) level of higher education; field of knowledge – "27 Transport", specialty – "271 River and Sea Transport"; implemented by the order of the Ministry of Education and Science of Ukraine dated 13.11.2018 No. 1239) (Ministry of Education and Science of Ukraine, 2010) defines that future bachelors of navigation must master the general professional competence "Ability to supervise and control the compliance with national and international legislation in the field of navigation and measures to ensure the protection of human life at sea, protection and conservation of the marine environment." For bachelors of the specialty "271 Maritime and Inland Water Transport", with the specialization "271.01 Navigation and management of sea vessels (Navigation)", the standard establishes that graduates must demonstrate learning outcomes directly related to the subject of our research, in particular:

- *RN22. Knowledge of methods, measures, and equipment for combating pollution from ships, as well as precautionary measures necessary to prevent pollution of the marine environment and fulfilling the obligations according to the International Convention for the Prevention of Pollution from Ships, as amended;*

- *RN23. Knowledge of international and domestic legal acts regarding the safety of human life at sea and the protection of the marine environment and ensuring their compliance.*

Thus, it is worth defining the essence of the concept of "ecological competence of a future bachelor of navigation". We note that as a result, and at the same time as an indicator of the quality of ecological education, Dzham (2016, p. 105) considers ecological competence, positioning this component of life competence of a person with her ability to make decisions and act in the interests of sustainability and environmental conservation. The scholar is convinced, and we support her position, that "The formation of ecological competence of citizens is one of the most important tasks of education for sustainable development. Ecological competence enables a modern individual to responsibly resolve life situations, subordinating the satisfaction of their needs to the principles of sustainable development. Therefore, ecological

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education requires special attention. Since balance is the result of harmonizing economic and social development of society and environmental conservation, one of the important trends in the ecological component is the formation in a citizen the ability to make decisions and act in the interests of sustainability and conservation of the environment." As the ability of an individual to actualize the acquired ecological knowledge and experience in real-life environmental situations for making environmentally appropriate decisions is considered ecological competence by Naidonova & Furdui (2018, p. 124). We value the well-founded approaches of these scholars in research, which include: 1) creating conditions for understanding the essence of norms and rules of environmentally appropriate behavior and mastering them; 2) fostering the formation of ecological convictions; 3) developing appropriate emotions related to nature and its ecological state; 4) developing the ability to make responsible decisions in specific ecological life situations; 5) self-education of the student's personality.

Lobodynska & Mahazynshchykova (2018, p. 168) demonstrate that ecological competence must be acquired by every specialist with higher education; in the conditions of a planetary crisis, this key competence is necessary for every modern person. It is worth agreeing with the scholars' interpretation of ecological competence as the ability of a specialist to interact harmonically with the environment and society "... in all spheres of their life activity." The above statement convinces that future bachelors of navigation must thoroughly master ecological competence, which, following Zhurian (2022), we understand as a complex, integrative personality trait that reflects the motives of ecological activity, possession of ecological knowledge, and naturally-purposeful types of activity, volitional qualities, and values of the personality with an active stance in the field of environmental protection, rational use, and reproduction of natural resources, and provides the ability to perform environmental professional activities in the field of maritime and inland water transport.

The acquisition of knowledge about environmental problems and ways to solve them, the purposeful formation of needs, motives, and habits of environmental activity, the development of ecological thinking, and ecological awareness of future mariners are carried out in the process of ecological education. In this regard, as Bayramova (2020) points out, two approaches to professional-

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ecological training of future bachelors of navigation are implemented in educational practice: multidisciplinary (using the ecological potential of each discipline in the curriculum, giving an ecological orientation to each component of the educational-professional program) and intradisciplinary (a separate educational component of the curriculum provides for a discipline of ecological content). Here, it is worth listening to Saienko's (2008) suggestion to focus on a combined model of ecological training of specialists in higher education, which combines students' study of the subject "Ecology and environmental protection" with the ecologization of professional-practical disciplines and all types of practice. Our position aligns with the definition of ecological education by Lukianova (2006), who is convinced that this is a new sense and purpose of the modern educational process, a unique means of preserving and developing the environment and continuing human civilization, a process that is in constant development and, what is extremely important, is the result of reorientation and coordination of various disciplines. Moreover, it is important to consider that the effectiveness of ecological-professional training of seafarers significantly depends on the quality of students' study of environmentally-oriented disciplines ("Occupational Safety," "Life Safety," "Labor Protection in the Industry" etc.).

Ecological education of future bachelors in navigation is a leading direction in acquiring classical ecological knowledge by students, and the greening of the rest of the educational program components enables productive formation of students' perceptions of the "nature-human-society" system. In this case, we do not distinguish ecological education of students (ecological holidays, ecological excursions, debates on ecological topics, ecological trails, etc.) as a separate direction, considering the close integration of processes of education, upbringing, and personal development.

At the same time, it is equally important to involve students in practical activities related to environmental protection, develop robust skills and habits of environmentally friendly behavior, teach future mariners to anticipate the consequences of their actions on nature, and develop personal responsibility for the environmental condition. Rulyevska (2021) voices consonant thoughts in this regard, stating that students' participation in ecological activities (clearing and maintenance of the territory around drinking water sources, landscaping educational institution territories, cleaning

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water bodies from waste, etc.) ensures the effective combination of ecological knowledge and practical skills, fostering habits of safe ecological behavior. In turn, Bayramova (2020) argues that the formation of ecological awareness, development of ecological ethics, and skills of eco-safe behavior in future mariners should be carried out not only through nature conservation activities but also through experimental, ecological-educational activities, and so forth. This includes students' participation in ecological clubs, groups, ecological agitprop brigades, ecological expeditions, volunteer eco-events, and execution of ecological projects by future mariners.

Along with the formal component of ecological education of mariners, this informal component is also aimed at achieving the primary goal to ensure high levels of professional-ecological training for future bachelors of navigation, capable of systematically analyzing and competently resolving various ecological situations, and qualified to carry out measures to prevent and eliminate pollution of the environment and the biosphere during vessel operation.

Therefore, we conclude that the ecological competence of future bachelors in navigation is a complex scientific object and requires a systemic approach in its study, and the process of targeted formation of this integrative characteristic of the personality should be considered as a pedagogical system. Recall that the pedagogical system must possess certain characteristics (Luzan, & Pasichnyk, 2023, p. 399-400): the presence of components, parts; diversity each system component has certain unique properties that distinguish it from other components; the presence of structure certain elements, connections, and relationships among them; the presence of integrative, general properties, qualities that no single component possesses; identifiability any component can be conditionally or actually distinguished from the construct; hierarchy; the presence of functional characteristics of the system as a whole and its individual components; the purposiveness of the system; every system is created to achieve a specific goal, so the functions of its components must correspond to the purpose and functions of the whole system; and the inherent communicative properties, which are manifested in two forms in interaction with the external environment and in interaction of this system with systems of a lower or higher order, and others.

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Using the recently outlined features and characteristics of the system, the study justifies a hierarchical structure of dialectically interconnected elements (goal, main determinants, tasks, principles, stages, content, methods, forms, tools, diagnostics, expected result). In light of the principle of conceptual minimalism combined with the maximum informativeness of the subject of modeling (Lodatko, 2022), we have developed a conceptual model of the system for forming the ecological competence of future bachelor mariners, the visualization of which is presented in Table 1. As evident from the ideal construct shown in the table, the main determinants (formative and non-formative components of ecological education for future mariners) are directed towards achieving the primary goal of the studied process systematic, purpose-driven formation of ecological competence of future bachelor mariners.

The aim of implementing a system for developing ecological competence in future mariners is specified by interconnected tasks of both structurants of ecological education, in particular: (1) to form classical ecological knowledge and skills of students, to develop ecological awareness of mariners regarding the resolution of ecological situations during vessel operation; (2) for future mariners to master the experience of performing environmental protection, ecological education, and other activities, development of ecological thinking, ecological worldview, and ecological ethics of students. For the execution of the forecasted tasks, the conceptual model identifies methodological approaches, main principles, content, methods, forms, and means of forming ecological competence of future mariners.

Table 1

## Conceptual Model of the System for Developing Ecological Competence in Future Bachelor's of Ship Navigation

<b>Purpose</b>	<b>Systematic, targeted development of ecological competence in future bachelor's of ship navigation</b>	
<b>Determinants (Directions)</b>	Formal component of ecological education for seafarers	Informal Component of Maritime Environmental Education
<b>Main Tasks</b>	To form classical ecological knowledge and skills in students, develop ecological awareness of seafarers regarding the resolution of ecological situations during the operation of ships	Future seafarers' mastery of environmental conservation, eco-educational activities, and others, development of ecological thinking, worldview, and students' ecological ethics.
<b>Methodological Approaches</b>	Systemic, culturological, competence-based, technological	Activity-based, person-oriented, humanistic
<b>Fundamental Principles</b>	Systematicity, integrativity, scientific basis, interdisciplinarity	Nature correspondence, continuity, ecological responsibility, goodness
<b>Content</b>	Content of the course "Ecology and Environmental Protection" and environmentally oriented disciplines, ecologization of the content of other educational components of the program	Practical environmental conservation actions, research on ecological problems related to water pollution, eco-educational activities, ecological design, and so forth.
<b>Methods</b>	Explanatory-illustrative, reproductive, problem-informational, heuristic, research, gaming, simulation, simulation-gaming, etc.	Practical demonstration, execution of actions, operations, persuasion, suggestion, example, exercises, training, observation, experiments, design, research methods, and others.
<b>Forms</b>	Lectures, seminars, practical classes, design, forms of Internet self-education, participation in olympiads, conferences, ecological contests, etc.	Ecological clubs, teams, "eco-trails," ecological expeditions, volunteer eco-events, ecological events (cleaning of water bodies, ), ecological festivals, ecological internet excursions, and so on.
<b>Means</b>	Natural objects, subject-spatial representations of objects: machines, mechanisms, ship systems, ship models, demonstration stands, etc.; educational, methodological, ecological literature, scientific-reference publications; electronic educational resources	
<b>Diagnostics</b>	Criteria, indicators, and levels of ecological competence formation in future bachelor's of ship navigation	
<b>Expected Outcome</b>	Sufficient levels of ecological competence formation in future bachelor's of ship navigation	



**Conclusion.** The justified model is a theoretical construct that reflects the conceptual foundations of systemic formation of ecological competence in future bachelor's degree holders in ship navigation. The provisions laid down in this ideal object regarding the formation of the studied integrative characteristic of personality combine the possibilities of intra-disciplinary and interdisciplinary directions of ecological education for students with the acquisition of experience in environmental protection, ecological education, and other activities by future mariners. The implementation of the developed educational system in a higher education institution will significantly enhance the level of ecological knowledge, ecological thinking, ecological consciousness, and ecologically safe behavior of future bachelors in ship navigation.

### List of references

Байрамова, О.В. (2020). Екологічна освіта моряків як умова забезпечення сталого розвитку людства. In *Actual problems of natural sciences: modern scientific discussions: Collective monograph*. Riga: Izdevniecība "Baltija Publishing". <https://doi.org/10.30525/978-9934-588-45-7.1>

Закон України «Про охорону навколишнього природного середовища» (1991, 25 червня). <https://zakon.rada.gov.ua/laws/show/1264-12>

Проект закону України «Про Стратегію сталого розвитку України до 2030 року». (2018, 07 серпня). <https://ips.ligazakon.net/document/JH6YF00A>

Постанова Кабінету Міністрів України «Про затвердження Морської доктрини України на період до 2035 року» (2009, 07 жовтня). <https://zakon.rada.gov.ua/laws/show/1307-2009-%D0%BF#Text>

Міжнародна конвенція по запобіганню забрудненню з суден (1973). <https://ips.ligazakon.net/document/MU73027?an=5481>

International Convention for the Prevention of Pollution from Ships (1973). [https://www.imo.org/en/about/Conventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-\(MARPOL\).aspx](https://www.imo.org/en/about/Conventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-(MARPOL).aspx)

Міністерство освіти і науки України. (2010, 01 жовтня). Стандарт вищої освіти України першого (бакалаврського) рівня освіти ступеня вищої освіти – бакалавр, галузі знань – 27 Транспорт, спеціальності – 271 Річковий та морський транспорт. <https://mon.gov.ua/storage/app/media/vishcha-osvita/2022/Standarty.Vyshchoyi.Osvity/Zatverdzeni.Standarty/01/31/271-Richk.ta.morsk.transp- bak.31.01.22.pdf>

Джам, О.А. (2016). Екологічна компетентність як показник якості екологічної освіти та екологічної безпеки у системі принципів і стратегій сталого розвитку. *Вісник Харківського національного університету імені В. Н. Каразіна. Серія : Екологія*. 14, 102–105.

Найдьонова, Г.Г., & Фурдуй Я.О. (2018). Формування екологічної компетентності студентської молоді. *Наукові записки Центральноукраїнського державного педагогічного університету імені Володимира Винниченка. Сер. : Педагогічні науки*, 161, 124–129.

Лободинська, О.М. & Магазинщикова, І.П. (2018). Роль екологічних практик у формуванні екологічної компетентності фахівця з вищою освітою. *Науковий вісник НЛТУ України*, 28(2), 167–171.

Журян, В.В. (2022). Феномен екологічної компетентності у підготовці майбутніх судноводіїв.

*Педагогічна освіта: теорія і практика*, 32 (1), 245–258.

Саєнко, Т.В. (2008). Освіта екобезпечного інформаційного суспільства: проблеми і перспективи: монографія. Київ : Освіта України.

Лук'янова, Л.Б. (2006). Теорія і практика екологічної освіти у професійно-технічних навчальних закладах: автореферат. Доктор наук. Київ: Інститут педагогічної освіти і освіти дорослих НАПН України.

Рулевська, Т. (2021). Педагогічні умови розвитку екологічної культури майбутніх фахівців морського і річкового транспорту у коледжах. *Professional Pedagogics*, 2(23), 87–94. <https://doi.org/10.32835/2707-3092.2021.23.87-94>

Лузан, П.Г., & Пасічник, І.П. (2023). Розвиток екологічної культури майбутніх фахівців морського транспорту: системний підхід. *Педагогічні науки: теорія, історія, інноваційні технології*. 4 (128), 393–406.

Лодатко, Є.О. (2022). *Педагогічне моделювання: монографія*. Тернопіль, Навчальна книга «Богдан».

Національний університет «Одеська морська академія». Офіційний портал. <http://www.onma.edu.ua/>

Перспективи підготовки і працевлаштування моряків. Інтернет-портал «Порти України». <https://ports.com.ua/articles/perspektivy-podgotovki-i-trudoustroystva-moryakov>.

### Translated & Transliterated

Bayramova, O.V. (2020). Ekolohichna osvita moriakiv yak umova zabezpechennia staloho rozvytku liudstva. [Environmental education of sailors as a condition for ensuring the sustainable development of mankind] In Actual problems of natural sciences: modern scientific discussions : Collective monograph. Riga: Izdevniecība "Baltija Publishing". <https://doi.org/10.30525/978-9934-588-45-7.1>, [in Ukrainian].

Zakon Ukrainy «Pro okhoronu navkolyshnoho pryrodnoho seredovyscha» [Law of Ukraine "On Environmental Protection"] (1991). <https://zakon.rada.gov.ua/laws/show/1264-12>, [in Ukrainian].

*Proiekt zakonu Ukrainy «Pro Stratehiiu staloho rozvytku Ukrainy do 2030 roku»*. [Draft law of Ukraine

«About the Strategy of Sustainable Development of Ukraine until 2030»]. (2018, August 7). <https://ips.ligazakon.net/document/JH6YF00A>, [in Ukrainian].

*Postanova Kabinetu Ministriv Ukrainy «Pro zatverdzhennia Morskoj doktryny Ukrainy na period do 2035 roku»* [. Resolution of the Cabinet of Ministers of Ukraine «On the approval of the Maritime Doctrine of Ukraine for the period until 2035»] (2009, October 7). <https://zakon.rada.gov.ua/laws/show/1307-2009-%D0%BF#Text>, [in Ukrainian].

Mizhnarodna konventsiiia po zapobihanniu zabrudnenniu z suden [International Convention for the Prevention of Pollution from Ships] (1973). <https://ips.ligazakon.net/document/MU73027?an=5481>, [in Ukrainian].

Ministerstvo osvity i nauky Ukrainy. (2010, October 1). Standart vyshchoi osvity Ukrainy pershoho (bakalavrskoho) rivnia osvity stupenia vyshchoi osvity – bakalavr, haluzi znan – 27 Transport, spetsialnosti – 271 Richkovyi ta morskyi transport [The standard of higher education of Ukraine of the first (bachelor's) level of education - bachelor's degree, fields of knowledge - 27 Transport, specialties - 271 River and sea transport.]. <https://mon.gov.ua/storage/app/media/vishcha-osvita/2022/Standarty.Vyshchoyi.Osvity/Zatverdzeni.Standarty/01/31/271-Richk.ta.morsk.transp- bak.31.01.22.pdf>, [in Ukrainian].

Dzham, O.A. (2016). Ekolohichna kompetentnist yak pokaznyk yakosti ekolohichnoi osvity ta ekolohichnoi bezpeky u systemi pryntsyviv i stratehii staloho rozvytku [Environmental competence as an indicator of the quality of environmental education and environmental safety in the system of principles and strategies of sustainable development].

*Visnyk Kharkivskoho natsionalnoho universytetu imeni V. N. Karazina. Seriiia : Ekolohiia [Bulletin of Kharkiv National University named after V. N. Karazin. Series: Ecology]*, 14, 102–105, [in Ukrainian].

Naidonova, H.H., & Furdui Ya.O. (2018). Formuvannia ekolohichnoi kompetentnosti studentskoi molodi [Formation of environmental competence of student youth]. *Naukovi zapysky Tsentralnoukrainskoho derzhavnogo pedahohichnoho universytetu imeni Volodymyra Vynnychenka. Ser. : Pedahohichni nauky [Scientific notes of the Central Ukrainian State Pedagogical University named after Volodymyr Vinnichenko. Ser. : Pedagogical sciences]*, 161, 124–129, [in Ukrainian].

Lobodynska, O.M., & Mahazynshchykova, I.P. (2018). Rol ekolohichnykh praktyk u formuvanni ekolohichnoi kompetentnosti fakhivtsia z vyshchoiu osvitoiu [The role of environmental practices in the formation of environmental competence of a specialist with higher education]. *Naukovi visnyk NLTU Ukrainy [Scientific bulletin of NLTU of Ukraine]*, 28(2), 167–171, [in Ukrainian].

Zhurian, V.V. (2022). Fenomen ekolohichnoi kompetentnosti u pidhotovtsi maibutnikh sudnovodiiv [The phenomenon of environmental competence in the training of future shipmasters]. *Pedahohichna osvita: teoriia i praktyka [Pedagogical education: theory and practice]*, 32 (1), 245–258, [in Ukrainian].

Saienko, T.V. (2008). *Osvita ekobezpechnoho informatsiinoho suspilstva: problemy i perspektyvy: monohrafiia*. Kyiv: Osvita Ukrainy [Education of an environmentally safe information society: problems and prospects: monograph. Kyiv: Education of Ukraine], [in Ukrainian].

Lukianova, L.B. (2006). *Teoriia i praktyka ekolohichnoi osvity u profesiino-tekhnichnykh navchalnykh zakladakh: avtoreferat*. Doktor nauk. Kyiv, Instytut pedahohichnoi osvity i osvity doroslykh NAPN Ukrainy [Theory and practice of environmental education in vocational and technical educational institutions: abstract. PHD. Kyiv, Institute of Pedagogical Education and Adult Education of the National Academy of Sciences of Ukraine], [in Ukrainian].

Rulevska, T. (2021). Pedahohichni umovy rozvytku ekolohichnoi kultury maibutnikh fakhivtsiv morskoho i richkovoho transportu u koledzhakh [Pedagogical conditions for the development of ecological culture of future maritime and river transport specialists in colleges]. *Professional Pedagogics*, 2(23), 87–94. <https://doi.org/10.32835/2707-3092.2021.23.87-94>, [in Ukrainian].

Luzan, P.H., & Pasichnyk, I.P. (2023). Rozvytok ekolohichnoi kultury maibutnikh fakhivtsiv morskoho transportu: systemnyi pidkhid [Development of environmental culture of future maritime transport specialists: a systematic approach]. *Pedahohichni nauky: teoriia, istoriia, innovatsiini tekhnologii [Pedagogical sciences: theory, history, innovative technologies]*, 4 (128), 393–406, [in Ukrainian].

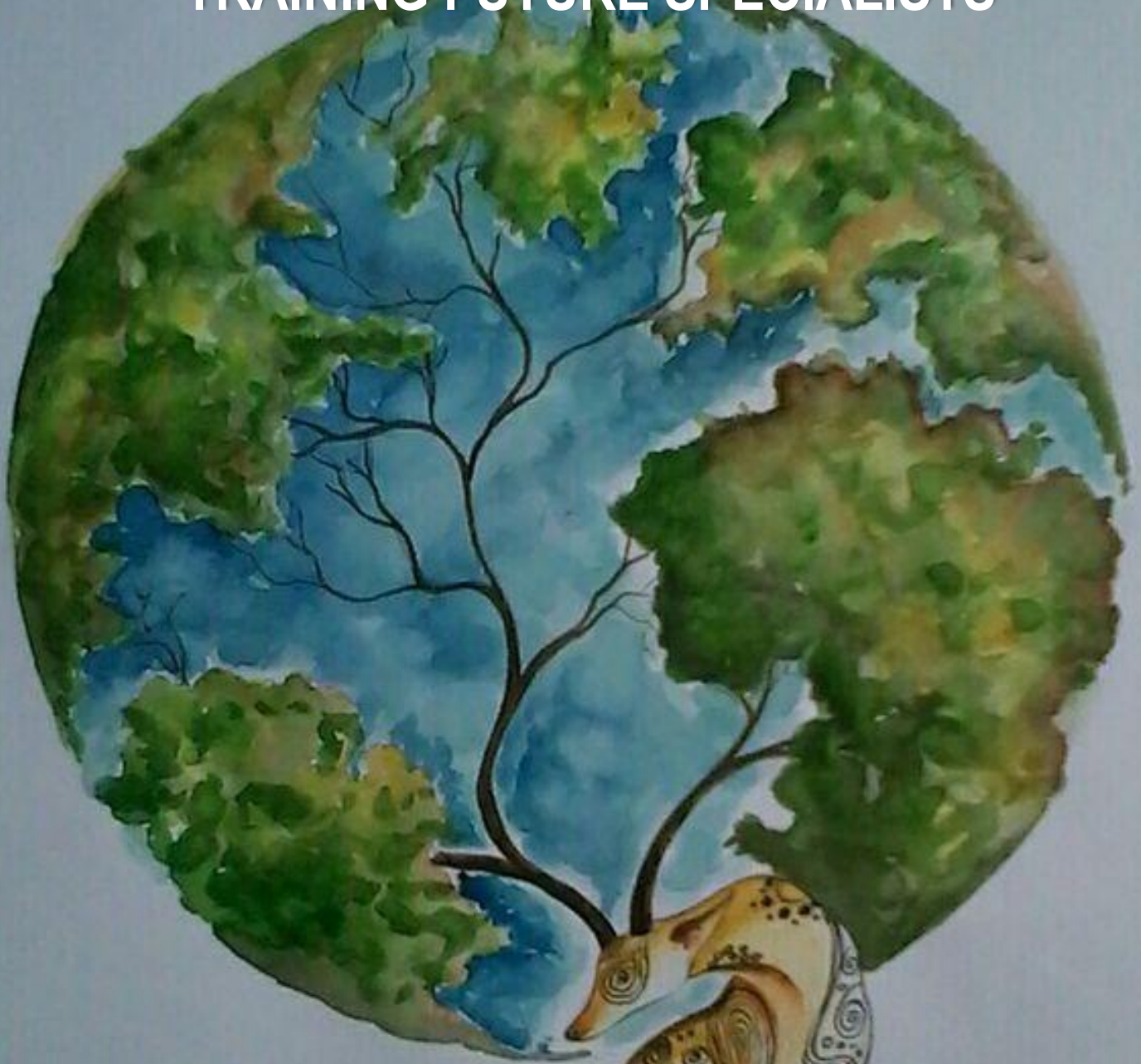
Lodatko, Ye.O. (2022). Pedahohichne modeliuвання: monohrafiia. [Pedagogical modeling: monograph]. Ternopil, Navchalna knyha "Bohdan", [in Ukrainian]

Natsionalnyi universytet «Odeska morska akademiia». Ofitsiinyi portal [Odesa Maritime Academy National University. Official portal]. <http://www.onma.edu.ua/>, [in Ukrainian].

Perspektyvy pidhotovky i pratsevlashtuvannia moriakiv. Internet-portal «Porty Ukrainy» [Prospects for training and employment of sailors. Internet portal "Ports of Ukraine"]. <https://ports.com.ua/articles/perspektyvy-podgotovki-i-trudoustroystva-moryakov>, [in Ukrainian].

# CHAPTER 2

ENVIRONMENTAL COMPONENT OF  
TRAINING FUTURE SPECIALISTS



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## 2.1. ECOLOGICAL COMPETENCE OF SHIP OPERATORS IN THE CONTEXT OF SUSTAINABLE DEVELOPMENT

### ЕКОЛОГІЧНА КОМПЕТЕНТНІСТЬ СУДНОВОДІЇВ В УМОВАХ СТАЛОГО РОЗВИТКУ

**Тетяна Герлянд**

Доктор педагогічних наук, старший науковий співробітник, завідувач лабораторії технологій професійного навчання Інституту професійної освіти НАПН України, <https://orcid.org/0000-0002-7991-0431>, [Alfina\\_G@ukr.net](mailto:Alfina_G@ukr.net)

**Tetiana Gerliand**

Doctor of Pedagogical Sciences, Senior Research Associate, Head of the Laboratory of Professional Training Technologies, Institute of Vocational Education of the National Academy of Educational Sciences of Ukraine, Kyiv <https://orcid.org/0000-0002-7991-0431>, [Alfina\\_G@ukr.net](mailto:Alfina_G@ukr.net)

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*Under current conditions, the problem of ship navigation gains particular relevance – the formation of ecological competence of ship operators in the context of sustainable development, the study of important aspects of the interaction of vessels and the surrounding environment, particularly their impact on water resources, water pollution, emissions of harmful substances, and other ecological aspects.*

*За сучасних умов особливої актуальності набуває проблема в сфері судноплавства – сформованості екологічної компетентності судноводіїв у контексті сталого розвитку, дослідження важливих аспектів взаємодії суден та навколишнього середовища, зокрема їх вплив на водні ресурси, забруднення водойм, викиди шкідливих речовин та інші екологічні аспекти.*

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**Ключові слова:** сталий розвиток, екологічна компетентність, судноводії, майбутні фахівці, заклади освіти, екологія.

**Keywords:** sustainable development, ecological competence, ship operators, future professionals, educational institutions, ecology

**Introduction.** Ecological competence of ship navigators is a critical component of modern maritime management, particularly in the context of sustainable development. Key aspects of this competence include understanding the ecological impacts of shipping, compliance with natural resource conservation requirements, and efficient energy use, as well as participation in ecological safety measures. One of the crucial qualities of future navigators is the development of ecological competence, which enables professionals to solve production-related problems associated with ecological and occupational safety without

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harming the environment.

Since the mid-1980s, ecological education has become part of the educational curriculum, yet studies indicate no positive effect (Safranov et al., 2017). The main reason is that while learners accumulate ecological information and knowledge, ecological culture does not develop. The educational process in Ukraine at the time required significant improvement to enhance effectiveness and integration. Such improvement is only possible through a deep philosophical and psycho-pedagogical understanding of the issue, considering the socio-cultural functions of ecology in society, the comprehensive structure of ecological knowledge, the current level of ecological science, traditions, customs, and history, the experience of the Ukrainian people in this field, and the specifics of the ecological-economic situation in the country. Therefore, the formation of ecological competence in future navigators under current conditions in Ukraine is an important quality, especially in the context of modern challenges related to environmental conservation and sustainable development, focusing on acquiring sustainable development skills and preparing for effective communication and ecological competence development.

**Sources.** The issue of developing ecological competence in future professionals of various specializations has been the subject of research by G. Galiyev, A. Glazachov, O. Gurenkova, L. Lukyanova, O. Litvinov, N. Oliynyk, L. Popenko, N. Pustovit, M. Tytarenko, T. Marchenko, and others. As T. Kharchenko notes, "a holistic solution to the problem of forming the ecological competence of a future navigator requires a comprehensive approach. Additionally, for effective formation of navigators' ecological competence, it is essential to consider factors such as the use of modern teaching and upbringing methods that foster the development of ecological awareness and motivation for environmentally safe activities and ensuring the accessibility of educational programs for all navigators, regardless of their age, experience, and education level" (Kharchenko et al., 2020).

**The aim** of this article: to identify the role of ecological competence of ship navigators in the context of sustainable development.

**Methods:** theoretical: analysis, synthesis, generalization of scientific works on the problem of ecological competence of future

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professionals in the maritime field and official documents - to define the theoretical and methodological foundations of the phenomenon; study and generalization of the existing state of the problem for the selection of pedagogical tools - for the development of navigators' ecological competence; comparison - to identify various approaches to solving the studied problem; modeling - to substantiate the structural elements of the model for the development of navigators' ecological competence.

**Results and Discussion.** In contemporary conditions, where sustainable development has become a prioritized direction of global policy, the ecological competence of mariners is a key factor in ensuring environmentally safe navigation, and ecological education in the maritime industry is an important tool for developing the ecological competence of mariners. It contributes to the development of their ecological awareness, understanding of ecological issues related to maritime transport, and knowledge about the principles of rational use of natural resources and environmentally safe operation of vessels. Training citizens with a high level of ecological knowledge, awareness, and culture based on new criteria for evaluating the relationship between society and nature should become one of the main levers in solving the extremely acute ecological and socioeconomic problems of modern Ukraine (Tolochko et al., 2017).

According to the Concept of Ecological Education in Ukraine, all its achievements are aimed at acquiring fundamental ecological knowledge and methodology, as well as professional ecological training, greening of specialized disciplines, and ecological upbringing. This will ensure the formation of integrated ecological knowledge and thinking necessary for making substantiated management decisions at the level of enterprises, industries, regions, and the country as a whole (Concept, 2001).

Analyzing the state educational programs in ecology, an orientation towards the formation of rational use of natural resources among cadets of maritime institutions was identified, the quantity and quality of which are diminishing each year. In July 2019, the Cabinet of Ministers of Ukraine adopted a new Regulation on the interaction between the Administration of Marine Ports of Ukraine (AMPU) and the State Environmental Inspection of Ukraine (SEIU) in case of pollution of the marine waters of Ukraine from vessels within marine ports. This will facilitate the fight against large-scale corrupt schemes in the system of ecological control in Ukrainian marine ports, which

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lead to significant expenses for ship owners and damage the international reputation of Ukraine as a maritime state.

Our study found that safe and high-quality maritime transportation has always been a priority of the European Union, alongside environmental protection and fair competition in the market (Tunytsia et al., 2015). The list of legislative initiatives in this area is quite long and frequently updated. Specifically, the ISM Code is considered as one of the three "pillars" of the infrastructure created to eradicate substandard shipping. The other two are the activities of the flag states and the control by the port states (Padgett, 2016). The International Convention for the Prevention of Pollution from Ships (MARPOL) is the principal one covering the prevention of pollution of the marine environment from ships due to operation or accidents.

It should be noted that the impact of the maritime sector on the environment has prompted international and regional organizations to introduce strict rules and guidelines aimed at mitigating this impact. For example, the MARPOL Convention was adopted on November 2, 1973. The 1978 Protocol was adopted in response to a wave of tanker accidents in 1976-1977. The convention addresses pollution by oil from ships, harmful liquid substances carried in bulk, packaged form, sewage, garbage, and air pollution prevention from ships. The European Union supports all voluntary initiatives of its members, especially shipping companies, aimed at improving safety and quality. Many companies within the Community have also implemented ISO 9002 quality standards. Specifically, Occupational Safety and Environmental Certification (SEP) has been offered to the maritime sector since 1990. To date, more than fifty companies have voluntarily implemented SEP (Absalyamova et al., 2017).

Maritime instructors must demonstrate their readiness for effective interdisciplinary cooperation with instructors and lecturers of relevant disciplines. Additionally, they can involve maritime experts (graduates of MET institutions, maritime officers) in the educational process itself.

Another important aspect to consider is the need for adequate educational resources to incorporate "green" skills into maritime education, which includes ecological competence. These could be cases for analysis, professionally-oriented projects for cadets, and authentic documentation. The primary task is the selection and adaptation of educational resources and the use of the opportunity to study disciplines. The accompanying tasks must be carefully developed; they serve as an effective tool for awakening interest and motivating future



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ship operators to participate in discussions. Future ship operators recognize the potential danger that shipping poses to the marine environment, hence the crew requires "green" skills, which are actually used on a daily basis to ensure proper ship operation.

Recognizing the need to implement "green" skills content in the educational process, researchers in environmental issues focus attention on various aspects of ecological issues that concern the role of instructors in this process (Kudryavtseva, etc., 2022). "Green" skills are understood as skills related to reducing the impact on the environment and supporting economic restructuring to achieve a cleaner, climate-resilient, and efficient economy that maintains ecological stability and provides decent working conditions. It is believed that their structure consists of three dimensions: knowledge, skills, and attitudes. "Green" skills support sustainable development of the economy, society, and the environment through activities in education and the economy.

Given the information provided, it is clear that the formation of ecological competence is important for the development of modern professionals, as it contributes to the creation of a sustainable and environmentally responsible society. By conducting an analytical review and summarizing the essential characteristics of the above definitions, it can be concluded that ecological competence is defined by the following key characteristics:

- knowledge about environmental problems: future marine professionals should understand the basic principles of ecosystem functioning, the processes of human impact on the natural environment, and the causes of environmental problems;

- ability to use environmentally friendly technologies: mariners must be able to apply modern technologies and methods aimed at reducing the negative impact of human activity on the environment;

- conscious consumption. It is important to educate future marine professionals in a conscious attitude towards natural resources, understanding the principles of sustainable consumption, and responsible use of resources;

- ability to make decisions in ecological situations. Future marine professionals should be able to consider ecological aspects in professional problem solving and make decisions aimed at preserving nature;

- cooperation in a global context. In a world where environmental problems have a global character, it is important for professionals to be

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able to cooperate internationally, adhering to ecological standards and agreements;

- active participation in ecological initiatives. Future mariners should be prepared to participate in projects and initiatives aimed at improving the environmental condition and preserving biodiversity.

- As noted, under current conditions, where sustainable development has become one of the priority directions of global policy, and the ecological competence of mariners is a key factor in ensuring environmentally safe navigation.

- Let's define what the concept of "ecological competence" includes. It is a complex of knowledge, skills, and abilities necessary for the performance of professional duties with consideration for environmental protection requirements. Analyzing numerous scientific studies on this issue, it can be stated that it includes the following components:

- ecological knowledge, defined as understanding the ecological problems associated with maritime transport, as well as knowledge of the principles of rational use of natural resources and environmentally safe operation of ships;

- ecological skills, which can be defined as the ability to apply ecological knowledge in practice, particularly in areas such as: ship management considering environmental protection requirements; prevention of environmental pollution during ship operation; response to ecological emergencies;

- ecological skills: the ability to make ecologically reasoned decisions in various situations.

Thus, it can be concluded that the formation of ecological competence in mariners is a task facing all participants in the maritime industry. It is carried out within the framework of training mariners in educational institutions, as well as through the enhancement of qualifications and retraining in courses and seminars.

Maritime education traditionally focuses on providing cadets with the technical and operational skills necessary for navigation and ship management. These skills include navigation, ship management, cargo handling, and emergency response. Although this traditional approach remains crucial, there is an increasing realization of the need to integrate environmental education into maritime training programs. Researchers advocate for a comprehensive educational approach in maritime education, which includes aspects of sustainable development, because maritime education is of great importance for the formation of ecological competence, awareness, and management

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among future mariners, in particular:

- Future mariners encounter various environmental problems, such as marine pollution, emissions of harmful substances, and the impact of climate change on the marine environment. Training on these issues helps prepare cadets for effective management of such challenges;

- Understanding environmental aspects is crucial for the safety of navigation. For example, training about the impact of weather conditions on marine events and knowledge of ecological systems allows future mariners to be prepared for various situations at sea;

- International standards and duties require maritime professionals to comply with environmental norms and procedures. Environmental awareness is important for fulfilling these duties and adhering to standards;

- Given the growing attention to sustainable development, future mariners must understand the principles and practices that contribute to the conservation of marine resources and the reduction of human impact on the marine environment;

- Cadets should learn to effectively respond to environmental disasters and take necessary measures to prevent further pollution and restore the natural environment (Hurenkova, 2009).

Ensuring a high level of ecological awareness and management in maritime education helps form responsible and competent professionals capable of working effectively in the conditions of the contemporary marine environment.

**Conclusions.** It has been established that the maritime sector in the modern world faces various challenges related to environmental aspects and the need for sustainable development. One of the key strategies for addressing these problems is the integration of environmental education into the training of future mariners, aimed at highlighting the importance of the role of education in promoting sustainable practices in the maritime sector. It has been determined that the integration of environmental education into the training of future mariners is important for forming ecologically competent and sustainability-oriented professionals. Education thus serves as a catalyst for the development of sustainable thinking and practices in the maritime sector, contributing to ensuring ecological safety and sustainable development in this strategically important industry. The integration of environmental education becomes a key element in preparing future generations of mariners for effective resolution of

### List of references

Сафранов, Т., Лукашов, Д., Шелест, З., Владимірова, О., & Чугай, А. (2017). Стандарти вищої екологічної освіти в Україні: сучасний стан та проблеми впровадження. *Вісник Харківського національного університету імені В. Н. Каразіна. Серія «Екологія»*, 16, 141-149.

Марченко, Т., Хацька, Л., Сагайдак, Дж., & Чубук, Л. (2020). Екологізація системи освіти в Україні в сучасному контексті. *Journal of Environmental Management & Tourism*, 11(43), 704-713.

Толочко, С., & Шкодин, А. (2017). Формування екологічної компетентності студентів агротехнічних спеціальностей ВНЗ. *Екологічні науки*, 18-19, 165-172.

*Рішення Колегії Міністерства освіти і науки України «Про концепцію екологічної освіти в Україні»* (2001, 20 грудня). <https://zakon.rada.gov.ua/rada/show/v6-19290-01#Text>

Туниця, Ю., Адамовський, М., Борис, М., Раєвський, С., & Магазинщикова, І. (2015). Екологізація освіти як ключовий фактор підготовки фахівців для сталого розвитку. *Науковий вісник Національного лісотехнічного університету України*, 25, 348-355.

Padgett, D. (2016). *Qualitative Methods in Social Work Research*. Sage publications. 2nd ed. Thousand Oaks, CA: Sage Publications.

Абсалямова, Я., & Лук'янова, В. (2017). Формування екологічної компетентності майбутніх фахівців засобами соціально-гуманітарних дисциплін. *Scientific Letters of Academic Society of Michal Baludansky*, 2, 6-7.

Kudryavtseva, V., Barsuk, S., & Frolova, O. (2022). Enhancing Green Skills in Maritime English Course. *22nd Annual General Assembly, IAMU AGA 2022 – Proceedings of the International Association of Maritime Universities, IAMU Conference, Batumi, Georgia*, 29-34.

Гуренкова, О. (2009). *Формування екологічної компетентності майбутніх фахівців водного транспорту в умовах кредитно-модульної системи навчання*: автореф. дис. (канд. пед. наук). Київ: Інститут проблем виховання АПН України.

### Translated & Transliterated

Safranov, T., Lukashov, D., Shelest, Z., Vladymyrova O., & Chuhai, A. (2017). Standarty vyshchoi ekolohichnoi osvity v Ukraini: suchasnyi stan ta problemy vprovadzhennia. [Standards of higher environmental education in Ukraine: current state and problems of implementation]. *Visnyk Kharkivskoho natsionalnoho universytetu imeni V. N. Karazina. Seriiia «Ekolohiia» [Bulletin of Kharkiv National University named after V.*

*N. Karazin. «Ecology» series*], 16, 141-149, [in Ukrainian].

Marchenko, T., Khatska, L., Sahaidak, Dzh., & Chubuk, L. (2020). Ekolohizatsiia systemy osvity v Ukraini v suchasnomu konteksti [Greening of the education system in Ukraine in the modern context]. *Journal of Environmental Management & Tourism*, 11(43), 704-713, [in Ukrainian].

Tolochko, C., & Shkodyn, A. (2017). Formuvannia ekolohichnoi kompetentnosti studentiv ahrotekhnichnykh spetsialnostei VNZ [Formation of environmental competence of students of agrotechnical specialties of universities]. *Ekolohichni nauky [Environmental sciences]*, 18-19, 165-172, [in Ukrainian].

*Rishennia Kolehii Ministerstva osvity i nauky Ukrainy «Pro kontseptsiuu ekolohichnoi osvity v Ukraini» [Decision of the Board of the Ministry of Education and Science of Ukraine «About the concept of environmental education in Ukraine»]* (2001, 20 hruden). <https://zakon.rada.gov.ua/rada/show/v6-19290-01#Text> , [in Ukrainian].

Tunytzia, Yu., Adamovskyi, M., Borys, M., Raievskyi, S., & Mahazynshchykova, I. (2015). Ekolohizatsiia osvity yak kliuchovyi faktor pidhotovky fakhivtsiv dlia staloho rozvytku

[Environmentalization of education as a key factor in training specialists for sustainable development]. *Naukovyi visnyk Natsionalnoho lisotekhnichnoho universytetu Ukrainy [Scientific bulletin of the National Forestry University of Ukraine]*, 25, 348-355, [in Ukrainian].

Padgett, D. (2016). *Qualitative Methods in Social Work Research*. Sage publications. 2nd ed. Thousand Oaks, CA: Sage Publications [in English].

Absaliyeva, Ya., & Lukianova, V. (2017). Formuvannya ekolohichnoi kompetentnosti maibutnikh fakhivtsiv zasobamy sotsialno-humanitarnykh dystsyplin [Formation of environmental competence of future specialists by means of social and humanitarian disciplines]. *Scientific Letters of Academic Society of Michal Baludansky*, 2, 6-7, [in Ukrainian].

Kudryavtseva, V., Barsuk, S., & Frolova, O. (2022). Enhancing Green Skills in Maritime English Course. *22nd Annual General Assembly, IAMU AGA 2022 – Proceedings of the International Association of Maritime Universities, IAMU Conference, Batumi, Georgia*, 29-34, [in English].

Hurenkova, O. (2009). *Formuvannya ekolohichnoi kompetentnosti maibutnikh fakhivtsiv vodnoho transportu v umovakh kredytno-modulnoi systemy navchannia [Formation of environmental competence of future water transport specialists in the conditions of the credit-module system of education]: avtoref. dys. (kand. ped. nauk) [author's abstract. thesis (candidate of pedagogic sciences)]*. Kyiv: Instytut problem vykhovannia APN Ukrainy, [in Ukrainian].

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## 2.2. ECO-ORIENTED EDUCATIONAL PRACTICES IN THE PROFESSIONAL TRAINING OF HOSPITALITY SPECIALISTS IN LEADING EUROPEAN COUNTRIES

### ЕКООРІЄНТОВАНІ ОСВІТНІ ПРАКТИКИ У ПРОФЕСІЙНІЙ ПІДГОТОВЦІ ФАХІВЦІВ ГАЛУЗІ ГОСТИННОСТІ У ПРОВІДНИХ ЄВРОПЕЙСЬКИХ КРАЇНАХ

**Ірина Дрозіч**

кандидат педагогічних наук,  
науковий співробітник лабораторії  
технологій професійного навчання  
Інституту професійної освіти НАПН  
України,

<https://orcid.org/0000-0002-8881-9314>,  
[irina.drozich@ukr.net](mailto:irina.drozich@ukr.net)

**Iryna Drozich**

Candidate of Pedagogical Sciences,  
Research Fellow at the Laboratory of  
Professional Training Technologies of  
the Institute of Vocational Education  
and Training of NAES of Ukraine  
Institute of Vocational Education of the  
NAES of Ukraine,

<https://orcid.org/0000-0002-8881-9314>,  
[irina.drozich@ukr.net](mailto:irina.drozich@ukr.net)

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*The relevance of the research is determined by the orientation of the modern hospitality industry towards sustainable development and its significant impact on the environment due to excessive consumption of resources, waste production, and CO<sub>2</sub> emissions. This determines several important trends: in EU countries, consumers increasingly choose environmentally friendly products and services; in leading European countries, the training of hospitality industry specialists includes eco-oriented educational practices on energy conservation, waste management, and resource provision; environmental education enables future specialists to understand this impact and master methods of environmentalization; the environmental competence and culture of hospitality industry specialists determine the competitiveness of their enterprises; the introduction of eco-oriented practices promotes innovations in the hospitality industry, improves the quality of services, and reduces energy and material costs; the European experience of training hospitality industry specialists is open to the Ukrainian system of vocational (vocational-technical) education and requires thorough study.*

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*Актуальність дослідження визначається орієнтацією сучасної галузі гостинності (hospitality industry) на сталий розвиток та її значним впливом на навколишнє середовище через надмірне споживання ресурсів, виробництво відходів і викиди CO<sub>2</sub>, що визначає низку важливих тенденцій: у країнах ЄС споживачі все більше обирають екологічно чисті продукти і послуги; у провідних європейських країнах підготовка фахівців галузі гостинності охоплює екоорієнтовані освітні практики з енергозбереження, управління відходами та ресурсозабезпечення; екологічна освіта дає змогу майбутнім фахівцям усвідомити цей вплив і опанувати методи екологізації; екологічна компетентність і культура фахівців галузі гостинності визначає конкурентоспроможність їхніх підприємств; запровадження екоорієнтованих практик сприяє інноваціям у галузі гостинності, покращує якість послуг, зменшує витрати на енергію та матеріали; європейський досвід підготовки фахівців галузі гостинності є відкритим для української системи професійної (професійно-технічної) освіти і потребує ґрунтовного вивчення.*

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**Ключові слова:** галузь гостинності, фахівець гостинності, освітні практики, орієнтованість, країни Європейського Союзу

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**Keywords:** social partnership, vocational (vocational-technical) education, employers, students, educational process, labor market, development directions.

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**Introduction.** The hospitality industry reflects rapid and qualitative shifts in the goalsetting vector, particularly the strengthening of environmental responsibility and the growing demand for sustainable practices and measures to prevent environmental pollution. In leading European countries, state policy is currently focused on fostering consumer environmental awareness, which has correspondingly influenced the concept of professional training for hospitality specialists and has given impetus to the development of eco-oriented education.

In the educational context, this process involves the implementation of eco-oriented practices in professional training, specifically in the comprehensive familiarization of future hospitality specialists with effective sustainable development strategies. These educational practices are characterized by a broad thematic spectrum, ranging from water and energy conservation to waste management and resource provisioning. They allow future specialists to thoroughly analyze successful eco-oriented initiatives and outline their own paths for practical implementation.

At the same time, it is essential to emphasize the practical significance of eco-oriented educational practices, as they provide future hospitality specialists with necessary eco-oriented skills and competencies and form their professional experience in utilizing greening mechanisms according to the requirements of the time. For example, such practices may include studying the experiences of international hotel chains and restaurants in reducing carbon emissions or adhering to zero waste strategies. These examples testify to the conceptual relevance and timeliness of eco-oriented professional training for hospitality specialists in leading European countries.

Thus, a detailed study of the experiences of leading European countries in applying eco-oriented educational practices will highlight the specific features of professional training for future hospitality specialists in light of today's environmental challenges. Meanwhile, Ukrainian specialists can leverage the positive aspects of this experience to improve the professional training of hospitality specialists within the domestic professional (vocational-technical) education system.

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**Sources.** Recently, the problem of implementing eco-oriented practices in the professional training of hospitality specialists has been the focus of many studies in both domestic and international scientific discourse. Legrand et al. (2023) analyzed pressing issues related to sustainable development and the hospitality industry. Their research predominantly addresses sustainable tourism and hospitality management. Salem et al. (2019) substantiated sustainable development practices in the hospitality industry and the effectiveness of fostering eco-oriented behavior. Font (2002) revealed the importance of corporate social responsibility. Pantelidis (2014) examined the state of development of environmental responsibility among future hospitality specialists. Ahuja et al. (2023) studied the effectiveness of eco-oriented educational practices in the context of improving eco-oriented skills and competencies among future hospitality specialists. Cavagnaro & Curiel (2022) identified the influence vector of eco-oriented practices on sustainability education. In particular, they emphasize the importance of experiential learning and real-life examples in forming eco-oriented behavior among future hospitality specialists.

According to O. Haiduk et al. (2022), "ways to harmonize the relationship between humans and nature (the environment) occur primarily through the transfer of necessary environmental experience, knowledge, and skills in environmental conservation through educational means" (p. 5). Thus, eco-oriented pedagogical technologies serve as an effective tool for addressing new environmental challenges of civilization by qualitatively updating the content of professional (vocational-technical) education in Ukraine, particularly in the professional training of hospitality specialists.

Simultaneously, as noted by A. Kalenskyi (2023, p. 25), "the preparation of cases is a labor-intensive process that occurs with the help of creativity, so the preparation of cases requires financial and time resources and significant intellectual costs; this method requires significant investment of intellectual creative labor not only in the creation of the case but also in working with it." Thus, the aforementioned scholars significantly expanded the strategic approach to integrating eco-oriented practices into the professional training of hospitality industry specialists, in particular, they identified and substantiated the possible challenges and opportunities of the studied process. However, the raised problem of studying the potential of



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leading European countries in promoting eco-oriented educational practices in professional education requires more detailed study.

Therefore, **the purpose of the article** is to study the experience of leading European countries regarding the use of eco-oriented educational practices in the professional training of hospitality industry specialists and to present appropriate recommendations for the system of professional (vocational-technical) education in Ukraine.

**Research methods:** To achieve the outlined purpose of the article, the following methods were used: analysis and synthesis – to outline the conceptual basis of the research; the search method – to formulate general conclusions; the prognostic method – to substantiate ways of using the innovative ideas of the experience of leading European countries in the professional training of hospitality industry specialists in Ukraine.

**Results and discussion.** The Green Key Programme – Denmark. Denmark's leadership in sustainable development is largely demonstrated by the international eco-certification program for hotels, "Green Key" (Green Key – Green Dreams, 2024). In Denmark, Green Key standards are organically integrated into the content of educational programs in the hospitality industry. Students are introduced to the basic principles of energy saving, waste management, and resource provisioning. For example, at the Copenhagen Hospitality College, the training modules are based on eco-oriented practices, allowing future hospitality industry specialists to minimize their ecological footprint in daily activities (Copenhagen Hospitality College, 2024). Graduates are able to effectively apply Green Key standards in practice, making them in demand among environmentally conscious employers. The Green Key program has led to a significant reduction in energy consumption and waste generation in participating establishments.

Eco-Lighthouse Certification – Norway. In Norway, the Eco-Lighthouse certification serves as a vivid example of eco-oriented education (Eco-Lighthouse, 2024). It is a recognized standard of environmental management and is implemented in various industries, including the hospitality industry. For instance, the Norwegian School of Hotel Management integrates Eco-Lighthouse principles into its educational programs (The University of Stavanger, 2024). The training includes seminars and practical sessions on sustainable

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practices such as efficient resource use, pollution reduction, and biodiversity promotion. Hospitality professionals educated under this program are competent in achieving and maintaining Eco-Lighthouse certification for their employers. This has led to the wider adoption of sustainable practices in the hospitality industry in the country.

The Association of Eco-Oriented Restaurants (The Sustainable Restaurant Association – SRA) – United Kingdom. The Association of Eco-Oriented Restaurants (SRA) in the United Kingdom is foundational for sustainable development in the public catering sector. Its certification encompasses a wide range of ecological aspects, from resource provision to waste management (The Sustainable Restaurant Association, 2024). British educational institutions successfully integrate the Association's guidelines into hospitality programs, such as at the University of West London. Students participate in projects that include auditing and enhancing the eco-orientation of local restaurants, gaining practical experience in implementing eco-friendly practices (The University of West London, 2024). They also acquire skills in fostering a culture of sustainable development in the hospitality sector, particularly by assisting restaurants in obtaining the Association's certification. In turn, this increases the number of eco-oriented restaurants and reduces the overall environmental impact of the public catering sector.

The European Sustainable Hospitality Club (The European Sustainable Hospitality Club – ESHC) – Spain. The European Sustainable Hospitality Club (2024) is a network promoting sustainable development in the hospitality sector across European countries, with significant involvement from Spain (The European Sustainable Hospitality Club, 2024). Spanish educational institutions, such as the Escuela Superior de Hostelería de Sevilla (The Escuela Superior de Hostelería de Sevilla, 2024), actively collaborate with ESHC and implement sustainable development principles in their curricula. These programs cover a wide range of topics, including sustainable architecture, renewable energy use, and sustainable tourism practices. Graduates of such programs contribute to the growth of environmentally friendly businesses in the hospitality sector within the country. The influence of ESHC has stimulated innovations in ecological construction and the promotion of sustainable tourism.

It is worth noting that the current eco-oriented professional

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training of hospitality specialists in the aforementioned leading European countries faces some challenges, such as:

1. Lack of standardization. A significant challenge is the absence of unified European standards for eco-oriented practices within the professional training of hospitality specialists. This inconsistency complicates the implementation and monitoring of measures aimed at achieving sustainable development goals.

2. High implementation costs. The financial burden associated with implementing and maintaining eco-oriented practices can be prohibitively high for some educational institutions. These costs include investments in sustainable technologies.

3. Variability in awareness and acceptance. The level of awareness and acceptance of eco-oriented practices varies across European countries, which may hinder the widespread adoption of sustainable practices.

At the same time, leading European countries offer excellent opportunities for the development of eco-oriented educational practices in the hospitality sector:

1. Financial support. European governments provide funding and support for sustainable development initiatives. This financial assistance enables educational institutions to overcome economic barriers to implementing eco-oriented practices.

2. Growing consumer demand. There is a growing demand for eco-orientation in the hospitality sector. This demand can stimulate the adoption of eco-oriented educational practices as businesses strive to meet consumer preferences.

3. Potential for innovation. The hospitality sector has significant potential for innovation in sustainable technologies and practices. This potential can lead to the development of new, more efficient methods of reducing environmental impact. Thus, eco-oriented training of hospitality specialists in leading European countries is the key to achieving environmental goals and maintaining competitiveness in a market increasingly driven by sustainable development principles. The examples of Denmark, Norway, the United Kingdom, and Spain demonstrate that despite existing challenges, the benefits of integrating eco-oriented practices into the professional training of future hospitality specialists are

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significant. They provide future specialists with eco-oriented skills and competencies necessary for adhering to modern environmental standards, thereby positioning these countries as leaders in sustainable development.

**Conclusions.** Based on the study of the professional training experience of hospitality specialists in leading European countries (Denmark, Norway, Spain, the United Kingdom), recommendations have been formulated for improving the professional training of such specialists in Ukraine by implementing a range of successful eco-oriented educational practices.

1. Adoption of the positive experience of leading European countries:

✓ Integration of the "Green Key" program. It is recommended to collaborate with relevant stakeholders regarding the integration of principles from effective eco-oriented programs, such as "Green Key", into the educational programs for training hospitality specialists in Ukrainian vocational education institutions.

✓ Certification model "Eco-Lighthouse". It is important to thoroughly study and adapt the "Eco-Lighthouse" certification model to develop similar standards that can be applied in Ukrainian vocational education institutions.

2. Development of eco-oriented educational programs:

✓ Modules built on sustainable practices. It is essential to introduce modules on energy saving, waste management, resource provision, and environmental management into the educational programs for training hospitality specialists in Ukrainian vocational education institutions.

✓ Practical training. Special attention should be given to practical classes where students can apply eco-oriented practices in real hospitality settings.

3. Cooperation and partnership:

✓ Cooperation between the hospitality industry and the education sector. Developing partnerships between educational institutions that implement training programs for hospitality specialists and representatives of this industry is crucial for ensuring compliance with industry needs and standards.

✓ European partnerships. It is important to explore opportunities for cooperation with European institutions or organizations, such as the

European Sustainable Hospitality Club (ESHC), for the exchange of best practices and knowledge.

4. Overcoming challenges:

✓ Promotion of standardization. It is vital to work on establishing unified standards for eco-oriented educational practices in the hospitality industry in Ukraine, particularly through cooperation with leading European countries.

5. Innovations and projects:

✓ Encouragement of innovations. Innovation and sustainable development in the hospitality industry in Ukraine should be integrated through grants. Pilot projects. It is recommended to support pilot projects to test and implement new eco-oriented initiatives in Ukrainian hospitality settings.

6. Consumer engagement:

✓ Response to consumer demand. It is essential to respond to the growing consumer demand for eco-orientation in the hospitality industry by integrating eco-oriented practices into the educational programs of vocational education institutions training future hospitality specialists.

7. Systematic improvement:

✓ Monitoring and evaluation. It is important to implement mechanisms for monitoring and evaluating the effectiveness of eco-oriented educational programs in the context of professional training for hospitality specialists.

The prospects for further research lie in studying ways to implement eco-oriented educational practices in the professional training of hospitality specialists in leading Asian countries.

### List of references

Ahuja, S., Gavin, M., Grabowski, S., Hassanli, N., Hergesell, A., Jarvis, W. ... & Weatherall, R. (2023). Collectively creating conditions that nurture: The bushland as metaphor for the academic ecosystem. In A. Bristow, O. Ratle & S. Robinson (Eds.), *Doing Academic Careers Differently: Portraits of Academic Life* (pp. 198–217). Taylor & Francis. <https://www.taylorfrancis.com/chapters/edit/10.4324/9781003267553-13/collectively-creating-conditions-nurture-sumati-ahuja-mihajla-gavin-simone-grabowski-najmeh-hassanli-anja-hergesell-walter-jarvis-pavlina-jasovska-ece-kaya-alice-klettner-helena-liu-jennie-small-christopher-walker-ruth-weatherall>

Cavagnaro, E., & Curiel, G. H. (2022). *The three levels of sustainability*. Taylor & Francis. <https://doi.org/10.4324/9781003155614>

Copenhagen Hospitality College. (2024). *Kurser og teambuilding* [Courses and team building]. <https://hrs.dk/kurser-og-teambuilding>

- Eco-lighthouse. (2024). *The certification scheme*. <https://eco-lighthouse.org/certification-scheme/> Escuela de Hostelería de Sevilla [Seville Hospitality School]. (2024). *Technical training*. <https://www.esh.es/en/technical-training/>
- Font, X. (2002). Environmental certification in tourism and hospitality: progress, process and prospects. *Tourism Management*, 23, 197–205. [https://www.academia.edu/download/51294930/s0261-5177\\_2801\\_2900084-x20170110-15693-1c3yhbd.pdf](https://www.academia.edu/download/51294930/s0261-5177_2801_2900084-x20170110-15693-1c3yhbd.pdf)
- Green Key – Green Dreams. (2024). *About Green Key*. <https://www.greenkey.dk/en/about-green-key/> Legrand, W., Kuokkanen, H., & Day, J., & (2023). *Critical questions in sustainability and hospitality*. Taylor & Francis. <https://doi.org/10.4324/9781003218425>
- Pantelidis, I. S. (2014). *The Routledge handbook of hospitality management*. Taylor & Francis. <https://doi.org/10.4324/9781315814353>
- Salem, R., Bahadori-Jahromi, A., Mylona, A., Godfrey, P., & Cook, D. (2019). Investigating the potential impact of energy-efficient measures for retrofitting existing UK hotels to reach the nearly zero energy building (nZEB) standard. *Energy Efficiency*, 12, 1577–1594. <https://doi.org/10.1007/s12053-019-09801-2>
- The European Sustainable Hospitality Club. (2024). *Operational and strategy support for hotels*. <https://www.eshclub.com/>
- The Sustainable Restaurant Association. (2024). *Accelerating a sustainable future for the hospitality industry*. <https://thesra.org/>
- The University of Stavanger. (2024). *The Norwegian School of Hotel Management*. <https://www.uis.no/en/about-uis/the-norwegian-school-of-hotel-management>
- The University of West London. (2024). *Study*. <https://www.uwl.ac.uk/courses>
- Гайдук, О. В., Герлянд, Т. М., Каленський, А. А., & Пятничук, Т. В. (2022). *Розроблення і застосування екоорієнтованих педагогічних технологій для професійної підготовки майбутніх кваліфікованих робітників будівельної, аграрної галузей та сфери ресторанного господарства*. ІПО НАПН України. [https://lib.iitta.gov.ua/733669/1/Метод%20посібн\\_Екоорієнтовані%20технології.pdf](https://lib.iitta.gov.ua/733669/1/Метод%20посібн_Екоорієнтовані%20технології.pdf)
- Каленський, А. А. (2023). Кейс-методи в екоорієнтованій професійній підготовці кваліфікованого робітника за професією «Кухар». *Вісник Глухівського національного педагогічного університету імені Олександра Довженка*. Серія: Педагогічні науки, 52,23–27. <https://journals.indexcopernicus.com/api/file/viewById/1763413>

### Translated & Transliterated

- Ahuja, S., Gavin, M., Grabowski, S., Hassanli, N., Hergesell, A., Jarvis, W. ... & Weatherall, R. (2023). Collectively creating conditions that nurture: The bushland as metaphor for the academic ecosystem. In A. Bristow, O. Ratle & S. Robinson (Eds.), *Doing Academic Careers Differently: Portraits of Academic Life* (pp. 198–217). Taylor & Francis. <https://www.taylorfrancis.com/chapters/edit/10.4324/9781003267553-13/collectively-creating-conditions-nurture-sumati-ahuja-mihajla-gavin-simone-grabowski-najmeh-hassanli-anja-hergesell-walter-jarvis-pavlina-jasovska-ece-kaya-alice-klettner-helena-liu-jennie-small-christopher-walker-ruth-weatherall>, [in English].
- Cavagnaro, E., & Curiel, G. H. (2022). *The three levels of sustainability*. Taylor & Francis. <https://doi.org/10.4324/9781003155614>, [in English].
- Copenhagen Hospitality College. (2024). *Kurser og teambuilding* [Courses and team building]. <https://hrs.dk/kurser-og-teambuilding>, [in English].
- Eco-lighthouse. (2024). *The certification scheme*. <https://eco-lighthouse.org/certification-scheme/>, [in English].
- Escuela de Hostelería de Sevilla [Seville Hospitality School]. (2024). *Technical training*. <https://www.esh.es/en/technical-training/>, [in English].
- Font, X. (2002). Environmental certification in tourism and hospitality: progress, process

and prospects. *Tourism Management*, 23, 197–205. [https://www.academia.edu/download/51294930/s0261-5177\\_2801\\_2900084-x20170110-15693-1c3yhbd.pdf](https://www.academia.edu/download/51294930/s0261-5177_2801_2900084-x20170110-15693-1c3yhbd.pdf), [in English].

Green Key – Green Dreams. (2024). *About Green Key*. <https://www.greenkey.dk/en/about-green-key/>, [in English].

Haiduk, O. V., Herliand, T. M., Kalenskyi, A. A., & Piatnychuk, T. V. (2022). *Rozroblennia i zastosuvannia ekoorientovanykh pedahohichnykh tekhnolohii dlia profesiinoi pidhotovky maibutnykh kvalifikovanykh robitnykiv budivelnoi, ahrarnoi haluzei ta sfery restorannoho hospodarstva [Developing and applying eco-oriented pedagogical technologies for the professional training of future skilled workers in the construction, agricultural and restaurant industries]*. The Institute of VET of the NAES of Ukraine. [https://lib.iitta.gov.ua/733669/1/Метод%20посібн\\_Екоорієнтовані%20технології.pdf](https://lib.iitta.gov.ua/733669/1/Метод%20посібн_Екоорієнтовані%20технології.pdf), [in Ukrainian].

Kalenskyi, A. A. (2023). Keis-metody v ekoorientovanii profesiinii pidhotovtsi kvalifikovanoho robitnyka za profesiieiu “Kukhar” [Eco-oriented professional training of a skilled worker in the profession of “Chef”]. *Visnyk Hlukhivskoho natsionalnogo pedahohichnogo universytetu imeni Oleksandra Dovzhenka. Seriya: Pedahohichni nauky [Oleksandr Dovzhenko Hlukhiv National Pedagogical University Bulletin. Series: Pedagogical Sciences]*, 52, 23–27. <https://journals.indexcopernicus.com/api/file/viewByFileId/1763413>, [in Ukrainian].

Legrand, W., Kuokkanen, H., & Day, J., & (2023). *Critical questions in sustainability and hospitality*.

Taylor & Francis. <https://doi.org/10.4324/9781003218425>, [in English].

Pantelidis, I. S. (2014). *The Routledge handbook of hospitality management*. Taylor & Francis. <https://doi.org/10.4324/9781315814353>, [in English].

Salem, R., Bahadori-Jahromi, A., Mylona, A., Godfrey, P., & Cook, D. (2019). Investigating the potential impact of energy-efficient measures for retrofitting existing UK hotels to reach the nearly zero energy building (nZEB) standard. *Energy Efficiency*, 12, 1577–1594. <https://doi.org/10.1007/s12053-019-09801-2>, [in English]. The European Sustainable Hospitality Club. (2024). *Operational and strategy support for hotels*. <https://www.eshclub.com/>, [in English].

The Sustainable Restaurant Association. (2024). *Accelerating a sustainable future for the hospitality industry*. <https://thesra.org/>, [in English].

The University of Stavanger. (2024). *The Norwegian School of Hotel Management*. <https://www.uis.no/en/about-uis/the-norwegian-school-of-hotel-management>, [in English].

The University of West London. (2024). *Study*. <https://www.uwl.ac.uk/courses>, [in English].

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## 2.3. PEDAGOGICAL CONDITIONS FOR THE DEVELOPMENT OF ECOLOGICAL CULTURE OF FUTURE SPECIALISTS OF MARITIME AND RIVER TRANSPORT IN COLLEGES

### ПЕДАГОГІЧНІ УМОВИ РОЗВИТКУ ЕКОЛОГІЧНОЇ КУЛЬТУРИ МАЙБУТНІХ ФАХІВЦІВ МОРСЬКОГО І РІЧКОВОГО ТРАНСПОРТУ У КОЛЕДЖАХ

Тетяна Рулевська  
аспірант Інституту професійної  
освіти НАПН України  
<https://orcid.org/0000-0003-2831-9155> [tanya.rulevskaya@gmail.com](mailto:tanya.rulevskaya@gmail.com)

Tetiana Rulievska  
Postgraduate Student of the Institute  
of Vocational Education of the NAES  
of Ukraine  
<https://orcid.org/0000-0003-2831-9155>  
[tanya.rulevskaya@gmail.com](mailto:tanya.rulevskaya@gmail.com)

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*Conclusions it is substantiated that the effectiveness of the development of environmental culture of future specialists in maritime and river transport in colleges will increase due to the formation of positive motivation to acquire environmental knowledge; holistic greening of the content of vocational training; application of innovative technologies, in particular cooperative learning; providing environmentally-oriented educational and methodological support for the training of future specialists in maritime and river transport in colleges.*

*Обґрунтовано, що ефективність розвитку екологічної культури майбутніх фахівців морського і річкового транспорту у коледжах буде зростати завдяки формуванню позитивної мотивації до набуття екологічних знань; цілісної екологізації змісту професійного навчання; застосуванню інноваційних технологій, зокрема кооперативного навчання; забезпеченню еколого-орієнтованого навчально-методичного супроводу професійної підготовки майбутніх фахівців морського і річкового транспорту у коледжах.*

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**Ключові слова:** професійна освіта, екологічна культура; морський і річковий транспорт, педагогічні умови, професійне навчання, інновації

**Keywords:** professional education, ecological culture; sea and river transport, pedagogical conditions, professional training, innovations.

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**Introduction.** Environmental issues are a priority in the public policy of each country. Now, the level of environmental pollution is constantly growing, natural disasters caused by climate change irreparable harm on human life and society as a whole. Some United Nations reports developed by the Intergovernmental Panel on Biodiversity and Ecosystems (IP BES) have highlighted the impact of human activities on the environment. Considering the topic of our study, we will focus on the following: as of 2014, only 3% of the



world's oceans are free from human influence; over the last 300 years, the number of wetlands has decreased by 87%; compared to 1980, the level of plastic pollution has increased 10 times; yearly 300-400 million tons of heavy metals, solvents, toxic materials, etc. are dumped into the water bodies of the planet (BBC News, 2019).

These and other facts indicate the need for the formation and development of ecological culture of specialists in almost all sectors of the economy, because without a conscious attitude to nature and the rational use of natural resources it is impossible to build a civilized society. An important place among the diversity of natural resources is occupied by water resources. As you know, the World Ocean occupies 2/3 of the Earth's surface, in Ukraine water bodies occupy 4% of its territory (Ukraine National Library named after Vernadsky V. I., 2021). This means that the need for highly qualified specialists in maritime and river transport is unquestionable, and the development of their ecological culture is one of the urgent pedagogical problems.

**Sources.** In Ukraine, the legal framework in the field of nature management and environmental protection is regulated by a number of legislative documents. The dominant role among them is played by the Law of Ukraine "On Environmental Protection" (1991), which defines the "legal, economic and social foundations of the organization of environmental protection in the interests of present and future generations" and ensures the implementation of ecological policy in Ukraine aimed at preserving a safe environment for the existence of animate and inanimate nature, protection of life and health from the negative impact of environmental pollution, achieving harmonious interaction of society and nature, protection, rational use and reproduction of natural resources (Verkhovna Rada of Ukraine. Legislation of Ukraine, 1991). Important documents on nature management and environmental protection are also: the Laws of Ukraine «On atmospheric air protection» (1992), «On basic principles (strategy) of state environmental policy of Ukraine until 2030» (2019), «On strategic environmental assessment» (2018), Water Code of Ukraine (1995), etc.

In addition, the problem of rational nature management, formation and development of ecological culture is the subject of research by many scientists, namely: M. Bilyanskaya, S. Boychenko, N. Velychko, L. Lukyanova, V. Lyubarets, O. Mudraka,

V. Onoprienko, O. Osipenko, T. Sayenko, A. Slepchenko, Y. Shapran and others. It should be noted that the works of domestic

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researchers highlighted some theoretical and applied aspects of environmental education of future water transport specialists, namely: environmental education in maritime higher education institutions (Bayramova, 2017), environmental education of cadets of maritime educational institutions (Dulya, 2016), environmental competence of future water transport specialists (Gurenkova, 2011), which indicates the need for further research.

**The article aims** is to substantiate the pedagogical conditions for the development of environmental culture of future specialists in maritime and river transport in colleges.

**Methods.** To achieve this goal we used theoretical and empirical research methods, namely: theoretical – analysis, synthesis, deduction, comparison, generalization – to analyze scientific sources on the research problem; empirical – surveys (oral and written), as well as the method of independent expert assessments – to determine the pedagogical conditions for the development of environmental culture of future specialists in maritime and river transport in colleges.

**Results and discussion.** The analysis of scientific sources showed that in modern science there is currently no single approach to the definition of

«pedagogical conditions». On the one hand, according to scholars, these are «necessary circumstances, features of reality that enable the realization, creation, formation of something or contribute to something» (Great explanatory dictionary of the modern ukrainian language, 2001, p. 1295), on the other hand, - a set of external and internal environmental factors that are likely to affect the development of a particular mental phenomenon (Maslak, 2010). Considering the research of E. Khrykov (2013, p. 13), who notes that «conditions are created by teachers, and factors exist objectively, regardless of activity», we will adhere to the position that pedagogical conditions are circumstances that determine a certain direction in the development of the pedagogical process.

To determine the pedagogical conditions for the development of the environmental culture of future specialists in maritime and river transport in colleges, the method of independent expert assessments was used, the essence of which is indirect observation and questioning with the involvement of competent specialists to assess the phenomena (Sysoieva and Krystopchuk, 2013), in our case, lecturers of water transport colleges, researchers of the Institute of VET of the NAES of Ukraine, as well as stakeholders who interested in high-quality training of maritime and river transport specialists. The experts were asked to

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assess the significance of the specified pedagogical conditions by their rating. Based on the results of an expert assessment and taking into account the results of the analysis of scientific sources on the definition of the concept of «pedagogical conditions», we have determined the following pedagogical conditions for the development of the ecological culture of future specialists in maritime and river transport in colleges: the formation of positive motivation to acquire ecological knowledge; holistic greening of the content of vocational training; application of innovative technologies, in particular, cooperative learning; providing ecologically-oriented educational and methodological support for the professional training of future specialists in maritime and river transport in colleges.

As you can see, the first pedagogical condition is *the formation of positive motivation to acquire ecological knowledge*. It is well known that motivation plays a crucial role in any activity. A number of scientists consider motivation as «a set of psychological processes that guide human behavior» (Stoliarenko, 2012, pp. 106–107). There are many criteria by which motivation methods are classified. Among all types of motivation, in our opinion, it is worth distinguishing between internal and external motivation, positive and negative. If we talk about the development of ecological culture of future maritime and river transport specialists, this process is holistic, it includes student learning activities, extracurricular activities and personal life (being at home, in the dormitory, with friends, parents, etc.).

Related to the concept of "motivation" is "motive". Psychologists say that motives are primarily related to needs, in particular, needs are the lack of something, motivation - awareness of needs, motives - the reasoning for a certain decision. The hierarchical system of human needs is reflected in the pyramid of A. Maslow (1943), the primary levels of which are the physiological level and the level of security. It should be noted that the awareness of careful attitude to natural resources, environmental protection is primarily associated with these levels. After all, the consequences of human activities, including professional, affect the level of satisfaction of physiological needs, and determine a safe life of present and future generations.

As noted above, motivation is divided into internal and external. External motivation is related to external circumstances, incentives, internal – comes from the person himself. For the development of the ecological culture of future specialists in maritime and river transport in colleges, both types of motivation are effective and at the same

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time interconnected. Of course, college teachers have a significant impact on the development of students' environmental culture. The level of awareness, the responsibility of future sea and river transport specialists for their own future and the future of next generations depends on the correct organization, the process of formation and further development of ecological culture. Thus, we can state that external motives have a direct impact on the formation of internal one. We have already noted that the development of ecological culture of students of the marine and river fleet colleges largely occurs during the classes. The educational lesson has its goal, which is triune and at the same time contains the following components: educational, developmental and upbringing. As practice shows, each of these components, in accordance with the theme of the lesson, can and should be aimed at developing the environmental culture of students.

The main principle of modern pedagogy is its humanism. In this aspect, it should be noted that the acquisition of environmental knowledge should take place only under the influence of call motives. However, the awareness of the catastrophic consequences of neglect of the environment, the technogenic impact on the ecosystem should also be one of the motives for the development of the ecological culture of future specialists in maritime and river transport.

The second pedagogical condition is *the holistic greening of the content of vocational training*. The Concept of Secondary School Reform identifies 10 key competencies of the New Ukrainian school, among which are ecological literacy and a healthy life, including «the ability to reasonably and rationally use natural resources within the framework of sustainable development, awareness of the role of the environment for human life and health» (Conceptual principles of Secondary School Reform, 2016, p.12). The educational process, as we know, to combine the process of learning, education and development. These areas are reflected in the purpose of each lesson. Today, the philosophy of education is based on the formation of value relations and judgments, education of responsibility for the welfare of the country and all mankind. In this sense, it is important to implement the cross-cutting content line «Ecological safety and sustainable development», which assumes «the formation of students' social activity, responsibility and environmental consciousness, as a result of which they will carefully and responsibly treat the environment, recognizing the importance of sustainable development for the environmental conservation and development of society» (Ministry of education and science. Cross-cutting content lines, 2018). Official

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documents state that cross-cutting lines are cross-curricular, socially significant topics aimed at the formation and development of social and personal values. The implementation of such lines should be a priority of every employee of the educational institution. Ensuring the implementation of the content line «Ecological safety and sustainable development» can be done by solving problems of environmental content, selection of texts of environmental orientation in the study of philological disciplines, thematic extracurricular activities etc.

One of the general competencies defined by the standard of higher education in specialty N 271 «River and sea transport» for the first (bachelor's) level of higher education – «the ability to preserve and increase moral, cultural, scientific values and achievements of society based on an understanding of the history and patterns of development of the subject area, its place in the general system of knowledge about nature and society and in the development of society, techniques and technologies, to use different types and forms of physical activity for active recreation and maintaining healthy lifestyle» (2018, p.8). The natural environment, water resources, the atmosphere are values that require enrichment and multiplication. Therefore, the educational process of future specialists in maritime and river transport in colleges should be directed towards the greening of the content of vocational training.

Regarding to use of *innovative technologies, in particular, the cooperative learning*, as the third pedagogical condition, it should be noted that the implementation of innovative technologies is an effective factor in improving the quality of the educational process, as well as one of the motives for the formation of relevant competencies. Innovations in education are related with novelty. They replaced traditional technologies, which are based on the reproduction of acquired knowledge and methods of activity according to the algorithm provided by the teacher. Experience has shown that such teaching method is not effective, and it is difficult for graduates to apply the acquired knowledge and skills in practical (life and professional) situations. It is worth noting that the competence approach in education, on which modern learning is based, is already an innovation.

An innovative technology that has found wide application in the modern educational process is cooperative learning, which is understood as learning in small groups with simultaneous research, discussion of a specific problem, search for ways to solve it with contemporaneously argumentation of decisionmaking. American

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researchers D. Johnson and

R. Johnson (1999) identify 5 criteria for cooperative learning. These are positive dependence, direct support, responsibility, social competence, own assessment. It is not enough to form ecological consciousness on a personal level, it is important to consider the problems of ecology through the prism of interpersonal relations with the possibility of joint discussion, coverage of all aspects of this topic. Therefore, the use of innovative technologies, in particular cooperative learning, is defined as one of the pedagogical conditions for the development of ecological culture of future specialists in maritime and river transport in colleges.

The next pedagogical condition is *the provision of ecologically-oriented educational and methodical maintenance for the preparation of future specialists in maritime and river transport in colleges*. Educational and methodical maintenance for the professional training of future specialists in maritime and river transport combines educational and methodical maintenance for all participants in the educational process and is aimed at creating conditions for the implementation of the requirements of state standards of higher education for the successful training of water transport specialists through the provision of education applicants with a complete package of educational and methodical materials of the appropriate directions. Unlike students who are the subject of educational support, methodical support is primarily aimed at pedagogical staff of the educational institution. The quality of the educational process largely depends on the dynamics of professional development of teachers. The teacher's professional development should primarily be aimed at constant updating of knowledge and skills of pedagogical activity (development not only of ecological culture, but also a legal (Radkevych, 2020), digital (Bazeliuk, 2020; Yershov, 2019), self-educational (Rezvan and Kyrianova, 2020) etc. An important role in this process is played by the methodological maintenance provided by the methodologist of the educational institution and includes collective and individual forms of work with teachers (Kovalchuk and Maslich, 2020, p. 31). Ecologically-oriented educational and methodical maintenance involves the creation and further use in the educational process of educational and methodical materials of ecological orientation. It should be noted here that this pedagogical condition - the provision of ecologically-oriented educational and methodical maintenance involves the creation and further use in the educational process of educational and for the professional training of future specialists in

maritime and river transport in colleges - is closely related to the second condition – the holistic ecologization of the content of vocational education. It is impossible to ensure the greening of the vocational training content without the development of appropriate educational and methodological providing, and, consequently, proper ecologically-oriented educational and methodical maintenance. **Conclusions.** Ecological education is an important component of professional training of specialists in any field. The development of ecological culture plays a special role in the training of future specialists in maritime and river transport. The effectiveness of the development of ecological culture of future specialists in maritime and river transport in colleges will depend on the implementation of the following pedagogical conditions: the formation of positive motivation to acquire ecological knowledge; holistic greening of the content of vocational education; application of innovative technologies, in particular cooperative learning; providing ecologically-oriented educational and methodical maintenance for the training of future maritime and river transport specialists in colleges. However, the result of the implementation of these pedagogical conditions - the development of ecological culture of future maritime and river transport specialists in colleges - depends on the qualitative interaction of all participants in the educational process.

We see prospects for further research in the development, testing and implementation of methods the development an ecological culture of future maritime and river transport specialists in colleges.

### List of references

Байрамова, О., 2017. Екологічна освіта в морських вищих навчальних закладах: теоретичний аспект. *Science and Education a New Dimension. Humanities and Social Sciences*, 20 (120), p. 45-48.

Бусел, В.Т., ред., 2001. *Великий тлумачний словник сучасної української мови*. Ірпінь: ВТФ Перун. Верховна Рада України. Законодавство, 2020. *Про охорону навколишнього природного середовища : Закон України від 25.06.91 № 1264-XII*. [online] (Останнє оновлення 01 Січень 2021) Доступно: <https://zakon.rada.gov.ua/laws/show/1264-12#Text> [Дата звернення 23 Липень 2021].

Гуренкова, О., 2011. Компонентно-критеріальна структура екологічної компетентності майбутніх фахівців водного транспорту. *Освіта дорослих: теорія, досвід, перспективи*, 3(1), с. 125-131.

Дуля, А. В., 2016. Екологічне виховання курсантів морських навчальних закладів. *Таврійський вісник освіти*, 1, с. 81-84.

Ковальчук, В.І., Масліч, С.В., 2020. Створення середовища професійного розвитку педагогічних працівників закладу професійної (професійно-технічної) освіти. *Вісник Глухівського національного педагогічного університету імені Олександра*

*Довженка*, 43, с. 29-37. DOI: [10.31376/2410-0897-2020-2-43-29-37](https://doi.org/10.31376/2410-0897-2020-2-43-29-37) [Дата звернення 26 Липень 2021].

Кулалаева, Н. В., Радкевич, В. А. і Леу, С. А., 2015. Экологическое образование преподавателей профессионально-технических учебных заведений в Украине. В: Международная научно-практическая конференция

«Тенденции и перспективы создания региональных систем дополнительного образования взрослых». Витебск: УО «ВГТУ», с. 143-146.

Маслак, Л.П., 2010. *Педагогічні умови формування культурологічної компетентності майбутніх офіцерів радіоінженерних спеціальностей*. Кандидат наук, Житомирський державний університет імені Івана Франка.

Міністерство освіти і науки України, 2017. *Наскрізні змістові лінії*. [online] Доступно: <https://mon.gov.ua/ua/osvita/zagalna-serednya-osvita/navchalni-programi/naskrizni-zmistovi-liniyi> [Дата звернення 26 Липень 2021].

Міністерство освіти і науки України, 2018. *Про затвердження стандарту вищої освіти за спеціальністю 271 «Річковий та морський транспорт» для першого (бакалаврського) рівня вищої освіти : наказ Міністерства освіти і науки України від 13.11.2018 № 1239*. [online] Доступно: <https://mon.gov.ua/storage/app/media/vishcha-osvita/zatverdzeni%20standarty/12/21/271-richkoviy-ta-morskiy-transport-bakalavr.pdf> [Дата звернення 26 Липень 2021].

Міністерство освіти і науки України. *Нова українська школа*, 2016. *Концептуальні засади реформування середньої школи*. [online] Доступно: <https://mon.gov.ua/storage/app/media/zagalna%20serednya/nova-ukrainska-shkola-compressed.pdf> [Дата звернення 26 Липень 2021].

Національна бібліотека України імені В.І. Вернадського, 2021. *Водні ресурси України*. [online] (Останнє оновлення 22 Березень 2021) Доступно: <http://www.nbu.gov.ua/node/3972> [Дата звернення 22 Липень 2021].

Радкевич, О.П., 2020. Теоретичні і методичні основи розвитку правової культури педагогічних працівників закладів професійної освіти. Доктора наук. Глухівський НПУ ім. О. Довженка.

Резван, О., Кир'янова, О., 2020. Самоосвітня компетентність як результат свідомого підвищення кваліфікації викладача вищої школи. *Інноваційна педагогіка*, 27, с.149-152. <https://doi.org/10.32843/2663-6085/2020/27.30>

Сисоєва, С.О. та Кристопчук, Т.Є., 2013. *Методологія науково-педагогічних досліджень* : підр. Рівне: Волинські обереги.

Столяренко О.Б., 2012. *Психологія особистості* : навч. посіб. Київ: Центр учбової літератури. Хриков, Є.М., 2011. Педагогічні умови в структурі наукового знання. *Шлях освіти*, 2, с. 11-15. BBC NEWS, 2019. *Екологічна катастрофа: головні загрози нашій планеті у п'яти графіках*. [online] (Останнє оновлення 08 Травень 2019) Доступно: <https://www.bbc.com/ukrainian/features-48169628> [Дата звернення 22 Липень 2021].

Bazeliuk, O., 2020. Organizational and pedagogical conditions of development of digital culture of pedagogical employees. *Professional Pedagogics*, 2(21), p. 21-28. <https://doi.org/10.32835/2707-3092.2020.21.21-28>.

Johnson, D. and Johnson, R., 1999 *Learning together and alone: cooperative, competitive, and individualistic learning*. Boston: Allyn and Bacon.

Maslow, A., 1943. A Theory of Human Motivation. *A Theory of Human Motivation*, 50 (4), p. 370-396.

Yershov, M.-O., 2019. Digitalisation of professional (vocational) and pre-high tertiary education: problems and prospects. *Professional Pedagogics*, 18, p.67-74. <https://doi.org/10.32835/2223-5752.2019.18.67-74>

## Translated & Transliterated

Bairamova, O., 2017. Ekolohichna osvita v morskykh vshchychkh navchalnykh zakladakh: teoretychnyi aspekt [Ecological education in maritime higher educational



institutions: theoretical aspect]. *Science and Education a New Dimension. Humanities and Social*, 20 (120), r. 45-48.

Busel, V.T., red., 2001. *Velykyi tlumachnyi slovnyk suchasnoi ukrainskoi movy*. Irpin: VTF Perun, [in Ukrainian].

Verkhovna Rada Ukrainy. Zakonodavstvo [Verkhovna Rada of Ukraine. Legislation], 2020. *Pro okhoronu navkolyshnoho pryrodnoho seredovyshcha: Zakon Ukrainy vid 25.06.91 № 1264-XII*. [On environmental protection: Law of Ukraine of June, 25, 1991], [online] (Ostannie onovlennia 01 Sichen 2021) Dostupno: <<https://zakon.rada.gov.ua/laws/show/1264-12#Text>> [Data zvernennia 23 Lypen 2021], [in Ukrainian].

Hurenkova, O., 2011. Komponentno-kryterialna struktura ekolohichnoi kompetentnosti maibutnikh fakhivtsiv vodnoho transportu [Component-criterion structure of ecological competence of future water transport specialists]. *Osvita doroslykh: teoriia, dosvid, perspektyvy* [Adult education: theory, experience, prospects], 3(1), s. 125-131.

Dulia, A. V., 2016. Ekolohichne vykhovannia kursantiv morskykh navchalnykh zakladiv [Ecological education of cadets of maritime educational institutions]. *Tavriiskyi visnyk osvity* [Taurian Bulletin of Education], 1, s. 81-84.

Kovalchuk, V.I. ta Maslich, S.V., 2020. Stvorennia seredovyshcha profesiinoho rozvytku pedahohichnykh pratsivnykiv zakladu profesiinoi (profesiino-tekhnichnoi) osvity [Creating of the environment of professional development of pedagogical workers of the vocational education]. *Visnyk Hlukhivskoho natsionalnoho pedahohichnoho universytetu imeni Oleksandra Dovzhenka* [Bulletin of the Hlukhiv National Pedagogical University named after Oleksandr Dovzhenko], 43, s. 29-37. DOI: [10.31376/2410-0897-2020-2-43-29-37](https://doi.org/10.31376/2410-0897-2020-2-43-29-37) [Data zvernennia 26 Lypen 2021], [in Ukrainian].

Kulalaeva, N. V., Radkevich, V. A. i Leu, S. A., 2015. Ekologicheskoe obrazovanie prepodavately professionalno-tehnicheskikh uchebnykh zavedeniy v Ukraine [Ecological education of teachers of vocational schools in Ukraine.]. V: *Mezhdunarodnaya nauchno-prakticheskaya konferentsiya «Tendentsii i perspektyvy stozdaniya regionalnykh sistem dopolnitelnogo obrazovaniya vzroslykh»* [International scientific-practical conference «Trends and prospects for the creation of regional systems of additional education for adults»]. Vitebsk: UO «VGTU», s. 143-146, [in Russian].

Maslak, L.P., 2010. *Pedahohichni umovy formuvannia kulturolohichnoi kompetentnosti maibutnikh ofitseriv radioinzhenernykh spetsialnostei* [Pedagogical conditions for the formation of culturological competence of future officers of radio engineering specialties]. Kandydat nauk, Zhytomyrskiy derzhavnyi universytet imeni Ivana Franka [Zhytomyr State University named after Ivan Franko], [in Ukrainian].

Ministerstvo osvity i nauky Ukrainy [Ministry of education and science of Ukraine], 2017. *Naskrizni zmistovi linii* [Through lines of meaning]. [online] Dostupno: <<https://mon.gov.ua/ua/osvita/zagalna-serednya-osvita/navchalni-programi/naskrizni-zmistovi-liniyi>> [Data zvernennia 26 Lypen 2021], [in Ukrainian].

Ministerstvo osvity i nauky Ukrainy [Ministry of education and science of Ukraine], 2018. *Pro zatverdzhennia standartu vyshchoi osvity za spetsialnistiu 271 «Richkovyi ta morskyi transport» dlia pershoho (bakalavrskoho) rivnia vyshchoi osvity : nakaz Ministerstva osvity i nauky Ukrainy vid 13.11.2018 № 1239*. [About approval on standard of higher education by specialty 271 «River and maritime transport» for the first (bachelor's) level of higher education: order of the Ministry of education and science of Ukraine from 13.11.2018 № 1239]. [online] Dostupno: <<https://mon.gov.ua/storage/app/media/vishcha-osvita/zatverdzeni%20standarty/12/21/271-richkoviy-ta-morskiy-transport-bakalavr.pdf>> [Data zvernennia 26 Lypen 2021], [in Ukrainian].

Ministerstvo osvity i nauky Ukrainy. Nova ukrainska shkola [Ministry of education and science of Ukraine. New Ukrainian school], 2016. *Kontseptualni zasady reformuvannia serednoi shkoly* [Conceptual principles of secondary school reform]. [online] Dostupno: <<https://mon.gov.ua/storage/app/media/zagalna%20serednya/nova-ukrainska-shkola-compressed.pdf>> [Data zvernennia 26 Lypen 2021], [in Ukrainian].

Natsionalna biblioteka Ukrainy imeni V.I. Vernadskoho [National library of Ukraine

---

named V.I. Vernadskiy], 2021. *Vodni resursy Ukrainy* [Water resources of Ukraine]. [online] (Ostannie onovlennia 22 Berezen 2021) Dostupno: <<http://www.nbu.gov.ua/node/3972>> [Data zvernennia 22 Lypen 2021], [in Ukrainian].

Radkevych, O.P., 2020. *Teoretychni i metodychni osnovy rozvytku pravovoi kultury pedahohichnykh pratsivnykiv zakladiv profesiinoi osvity* [Theoretical and methodical principles of developing legal culture in teaching staff from professional education schools]: avtoref. Doktora nauk. Hlukhivskiy NPU im. O. Dovzhenka [Oleksandr Dovzhenko Hlukhiv national pedagogical university, Hlukhiv], [in Ukrainian].

Rezvan, O., Kyrianova, O., 2020. Samoosvitnia kompetentnist yak rezultat svidomoho pidvyshchennia kvalifikatsii vykladacha vyshchoi shkoly [Self-educational competence as a result of a conscious upgrading skills for a teacher of a higher educational institution].

*Innovatsiina pedahohika* [Innovative pedagogy], 27, s.149-152.  
<https://doi.org/10.32843/2663-6085/2020/27.30>, [in Ukrainian].

Sysoieva, S.O. ta Krystopchuk, T.Ie., 2013. *Metodolohiia naukovo-pedahohichnykh doslidzhen* : pidr. [Methodology of scientific and pedagogical research: textbook]. Rivne: Volynski oberehy, [in Ukrainian].

Stoliarenko O.B., 2012. *Psykhologhiia osobystosti* : navch. posib. [Psychology of personality: training manual]. Kyiv: Tsentr uchbovoi literatury [Educational literature center], [in Ukrainian].

Khrykov, Ye.M., 2011. Pedahohichni umovy v strukturii naukovooho znannia [Pedagogical conditions in the structure of scientific knowledge]. *Shliakh osvity* [The path of education], 2, s. 11-15, [in Ukrainian].

BBC NEWS, 2019. *Ekolohichna katastrofa: holovni zahrozy nashii planeti u piaty hrafikakh* [Ecological catastrophe: the main threats of our planet in five graphs]. [online] (Ostannie onovlennia 08 Traven 2019) Dostupno: <<https://www.bbc.com/ukrainian/features-48169628>> [Data zvernennia 22 Lypen 2021], [in Ukrainian].

Bazeliuk, O., 2020. Organizational and pedagogical conditions of development of digital culture of pedagogical employees. *Professional Pedagogics*, 2(21), p. 21-28.  
<https://doi.org/10.32835/2707-3092.2020.21.21-28>, [in English].

Johnson, D. and Johnson, R., 1999 *Learning together and alone: cooperative, competitive, and individualistic learning*. Boston: Allyn and Bacon, [in English].

Maslow, A., 1943. A Theory of Human Motivation. *A Theory of Human Motivation*, 50 (4), p. 370–396, [in English].

Yershov, M.-O., 2019. Digitalisation of professional (vocational) and pre-high tertiary education: problems and prospects. *Professional Pedagogics*, 18, p.67-74.  
<https://doi.org/10.32835/2223-5752.2019.18.67-74>, [in English].

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## 2.4. TRENDS IN THE DEVELOPMENT OF PUBLIC-PRIVATE PARTNERSHIP IN THE EUROPEAN UNION COUNTRIES

### ECO-ORIENTED PROJECT TECHNOLOGY IN TRAINING OF FUTURE CONSTRUCTION INDUSTRY WORKERS

**Тетяна Пятничук**  
кандидат педагогічних наук,  
старший науковий співробітник  
лабораторії технологій  
професійного навчання Інституту  
професійної освіти  
НАПН України,  
<http://orcid.org/0000-0002-5607-2949>,  
[ptv2613@ukr.net](mailto:ptv2613@ukr.net)

**Tetiana Pyatnichuk**  
Candidate of Pedagogical Sciences,  
Senior Research Fellow laboratories  
of Vocational training technologies  
Institute of Vocational Education of  
the NAES of Ukraine,  
<http://orcid.org/0000-0002-5607-2949>,  
[ptv2613@ukr.net](mailto:ptv2613@ukr.net)

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*Taking into account the need for innovative development of modern professional education in Ukraine, the article substantiates the expediency of teachers using the experience of educators and scientists from EU countries, in particular project-based learning technologies for the formation of professional competence of construction workers. At the same time, the problem of the harmful influence of the construction industry on people and the environment is becoming relevant in the professional training of construction workers, which requires the introduction of eco-oriented technology of project training into the educational process for the ecologically oriented education of future workers and the formation of environmental self-awareness.*

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*Ураховуючи необхідність інноваційного розвитку сучасної професійної освіти України, у статті обґрунтовано доцільність використання педагогами досвіду освітян і науковців країн ЄС, зокрема технології проєктного навчання для формування професійної компетентності робітників будівельного профілю; водночас актуальним у професійній підготовці будівельників постає проблема шкідливого впливу будівельної галузі на людину та навколишнє середовище, яка потребує упровадження в навчальний процес екоорієнтованої технології проєктного навчання для екологічно спрямованого виховання майбутніх робітників та формування екологічної самосвідомості.*

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**Ключові слова:** євроінтеграція, екоорієнтована технологія проєктного навчання, робітники будівельної галузі, професійна компетентність

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**Keywords:** European integration, eco-oriented project learning technology, workers in the construction industry, professional competence

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**Introduction.** Today for Ukraine, according to V.G. Kremen (2015, p. 1), «cooperation with the countries of the European Union in the field of vocational education and training is urgent and necessary. Thanks to the use of the EU experience, the development of national vocational education becomes innovative, the need of specialists in advanced training during their working life, which meets the requirements of the modern European labor market, is growing; the national system of competencies and qualifications is being improved».

Given Ukraine's strategic focus on association with the European Union, in the Strategy for the Development of Vocational (Vocational and Technical) Education for the period up to 2023, the Ministry of Education and Science of Ukraine provides for «building the capacity of vocational (vocational and technical) education institutions to establish international relations, participate in international programs and projects to develop innovations, study and exchange experience and successful practices» (21.12.2020 № 12/2-3), aimed at European integration, the reforms of the Ministry of Education and Science of Ukraine are «Best skills for modern Ukraine». At the same time, the professional training of future workers in the construction industry should be based on the requirements of the legislation of Ukraine «to introduce environmentally friendly practices for the management of chemicals and all waste throughout their life cycle in accordance with agreed international principles, to significantly reduce the release of these substances into the air, water and soil in order to minimize their negative impact on human health and the environment» (Law of Ukraine, 2018).

Thus, the eco-oriented technology of projectbased learning is designed to ensure the formation of professional competence of future builders and their environmental education.

**Sources.** The peculiarities of the introduction of project technologies in the educational process, theoretical and conceptual provisions were considered by Ukrainian scientists M. Elkin, I. Yermakov, O. Kobernyk, G. Romanova, S. Sysoieva,

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foreign - J. Dewey, J. Johnson, J. Pitt, W. Kilpatrick, E. Collings, D. Fried, A. Flitner, D. Hopkins and others. W. Kilpatrick was the first to introduce the concept of «project method», scientifically described it, he considered a project any activity with a high degree of independence of a group of students united at a certain moment by a common interest. According to J. Dewey (2003, p. 20), «the project method always involves solving a specific problem, which involves, on the one hand, the use of various methods, teaching aids, and on the other - the integration of knowledge, skills from various fields of science, engineering, technology, creativity» The results of research by scientists prove the effectiveness of using projectbased learning technology in the formation of students' professional competence, intensification of learning activities, and development of students' independence.

The need to green the professional training of future workers is emphasized in the works of L. Lukianova (2016). The problems of the formation of ecological culture were solved by scientists V. Boreiko, A. Yermolenko, V. Kryshchenko, L. Lukyanova, V. Logvinenko, S. Ryzhkov, O. Saltovsky, G. Filipchuk and others.

**The purpose** of the article is to substantiate the necessity and expediency of using eco-oriented project-based learning technology for the formation of professional competence of construction industry workers in the context of Ukraine's European integration.

**Research methods:** theoretical – analysis of scientific works, regulatory documents, educational and methodological literature; comparison, systematization and generalization of data; empirical – observation, modeling of educational situations, conversation, survey.

**Results and discussion.** According to scientists, the economic efficiency of vocational education can be dramatically increased by the introduction of new «effective technologies of training and education of future skilled workers, based on competence-based, personality-oriented approaches, systems of

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external and internal assessment and monitoring of the quality of vocational education and training» (Kremen, 2015, p. 11).

One of the modern effective pedagogical technologies is project-based. According to the Encyclopedia of Education (2021), a project (from Latin *projectus* – thrown forward) is a plan, idea, image, embodied in the form of a description; justification, calculations, drawings that reveal the essence of the plan and the possibility of its practical implementation. Design is «the creation of a project – a prototype of a proposed or possible object» (2021, p. 870). According to P. Luzan (2014), a training project is «a complex of search, calculation, research, graphic and other types of work performed by students independently with the organizational and advisory support of the teacher for the purpose of practical or theoretical problem solving». N. Kulalaeva (2017, p. 23) notes that educational project activity is «stimulating students' interest in certain problems, which involves mastering a certain amount of knowledge in order to solve these problems through project activities, the use of critical thinking, the ability to practically use the knowledge gained».

In the professional training of future workers in the construction industry, project-based learning technology involves the process of designing by students – the formation of an idea, building a plan, performing current or diploma creative work. The ecological direction of this technology requires the project to address the issues of environmental protection, natural resources, taking into account possible damage from construction work; taking into account the requirements of today's legislation of Ukraine, which aims to «create a modern infrastructure for the collection, sorting, processing and disposal of waste, including hazardous industrial and electronic waste as secondary raw materials, attracting investment in waste management and by 2030 to reduce the amount of production and consumption waste by 20%» (Law of Ukraine, 2018).

According to L. Lukianova (2016, p. 109), the ecologization of the educational process «should provide the ability to choose from a number of possible options for professional activity the

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most optimal in terms of preserving the environment and human health». Ecologization of professional education «consists in saturation of ideas, concepts, principles of ecology of all disciplines, especially professionally oriented, which creates the basis for training environmentally competent specialists of various profiles. It is necessary to realize that greening causes qualitative changes that arise in all spheres of life under the influence of the current environmental situation and are aimed at optimizing the impact of society on nature» (Lukianova, 2016, p. 110).

The purpose of the introduction of eco-oriented project-based learning technology in the professional training of future construction workers is to develop the ability of students to understand the possible negative consequences of their work and apply the acquired knowledge and skills in environmentally appropriate professional activities.

The project activity of students of construction professions should achieve the set goals:

- formation of the ability to find, analyze, select the necessary information on the implementation of construction work, taking into account possible environmental problems;
- ability to plan your work and perform it in accordance with it;
- ability to show initiative, enthusiasm, develop critical thinking and creativity;
- ability to draw up the results of work, present it in different audiences-group, subject weeks, exhibitions, etc.

According to scientists (Goloborodko, & Gnedashev, 2005, p. 87), in the process of implementing educational projects, students achieve certain mental and practical skills: understanding of the task, the essence of the educational task; planning of its final result, individual actions; implementation of the design algorithm; making adjustments to previously made decisions; constructive discussion of the results and problems of each stage of design; drawing up the necessary calculations; expressing their own thoughts, constructive solutions with the help of

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drawings, diagrams, sketches, products; independent search and finding the necessary information; evaluation of the results of achievement planned goal; understanding the criteria for evaluating projects and defending them.

At the same time, we must determine that the project technology should be combined with other technologies, and the process of developing project technology is a purposeful, socially significant, pedagogically appropriate, practically implemented innovative activity of the teacher to design and ensure the functioning of the educational and developmental environment in which the project activities of students will be carried out (Osmolovsky, & Vasilenko, 2000).

According to scientists, the following types of projects are effective and appropriate in educational activities: informational, practice-oriented, research, role-playing, creative (Luzan, 2014; Romanova, 2014; Sysoieva, 2011). Thus, the options for students to implement eco-oriented projects in the professional training of construction workers can be different.

*An information eco-oriented project* involves students performing tasks to collect and process information. Thus, a project on the topic «Technology of high-quality plastering» of the subject «technology of plastering works» may have the following areas of work of students «history of humanity's use of plaster from natural materials», «ways of waste disposal», «environmental consequences of careless use of building materials», etc. Tasks in these areas on part of the information project can be individual – they develop independence, improve search, analytical skills.

Working in a group of 2-4 people teaches to distribute roles, to work in a team, to be responsible for joint results. To develop confidence, independence, creativity of students, the results of the work (report, abstract, video, etc.), conclusions, proposals developed by them during the implementation of the eco-oriented information project should be presented to a wide audience at lessons for classmates, during subject weeks, exhibitions, round tables, etc.



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*A practice-oriented project* in the professional training of builders should increase the motivation of students to improve their professional skills and form environmentally appropriate behavior in their professional activities:

a) in professional and theoretical training: projects «Determination of possible damage to the environment from the use of natural materials (water, sand, clay, etc.)»; «Ways to minimize the impact of the construction industry on the environment» when students master the topics «Characteristics of sands, gravel, crushed stone. Harmful impurities in sand», «Preparation, transportation, quality control of mortar mixtures», «Technology of high-quality plastering» in the subjects «material science», «technology of plastering (painting, facing, etc.) works», conducting binary lessons together with teaching the subject «basics of ecology», «biology», «chemistry», etc;

b) in professional and practical training (in the lessons of industrial training and practice) in the performance of complex works, in particular the implementation of their own practical projects on the problems of saving building materials, environmentally sound waste management on the topics of «plastering surfaces with simple, improved, high-quality plaster», «plastering pillars, pilasters and columns of constant section smooth and with cannel», etc;

c) independent home project-tasks on the implementation of layouts, models for subject weeks, exhibitions of technical creativity, the work of the admission committee;

*Eco-oriented research project* – involves the study of environmental problems related to the production of building materials and the execution of construction works on the site and taking into account scientific rules, in particular: studying the properties of established and modern building materials and developing proposals for the possibilities of their use, determining the features and advantages, ecological projects on the history of the history of the origin and development of construction production «portland cements of antiquity and modernity»,

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«mortar mixtures for winter works»; «equipment of surfaces with decorative colored plasters», «construction technologies of antiquity», etc.

*Eco-oriented role-playing project* – business games, simulation games are indispensable in the course of any project for students, given that a certain part of their work is carried out in teams, links «performing plastering work using mechanization», «pulling straight architectural details with a template», etc.

*Eco-oriented creative project* – provides for the most independent practical implementation of their own ideas: creating their own samples for finishing surfaces of various subjects; performing real tasks; performing creative work for phased and state qualification certification. The implementation of creative projects by students ensures the development of their independence, self-confidence, ability to apply the acquired knowledge in practice, improvement of professional knowledge and skills.

According to scientists (Romanov (Ed.), 2019), the advantages of students' performance are: recognition of students' achievements, which makes future specialists realize their own dignity, confidence and self-confidence; purposeful independent activity of students, the results of which have cognitive, practical and personal significance; formation of a set of skills in students participating in creative projects: search, research, management, planning, reflective, communicative, presentation and teamwork; development of professionally important qualities in future specialists: dedication, diligence, responsibility, organization, sociability, ingenuity, creativity, adaptability, confidence, etc.

The spread of the use of eco-oriented project-based learning technology in the professional training of construction industry workers is due to the need to teach them to independently acquire knowledge of the environmental problems that the construction industry can create:

– the need to teach them to independently acquire knowledge on environmental problems that the construction industry can

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create and use them in professional activities;

- the relevance of developing students' ability to perform different social roles (leader, performer, mediator, etc.), communication skills and ability to work in groups, overcome conflict situations, produce joint results, draw conclusions;

- the need to develop the ability to use research methods: to collect the necessary information, analyze it from different points of view, put forward hypotheses, summarize the results.

For future workers in the construction industry, the development of eco-oriented projects has features:

- the project has one topic, and students perform separate partial tasks, or is implemented by different groups of students on the initiative and their vision;

- the topic of the project activity of students is pre-planned by the teacher, but provides flexibility and multidirectionality in the course of development all project options, approaches to design using various materials, tools, devices, methods of action are subject to consideration and discussion;

- students' work on project activities should be practically oriented to construction production and have a research character;

- the results of work on the project should be significant for students regardless of the possibilities of application in the construction industry, with the main goal of developing students' creative thinking, understanding of responsibility for the consequences of their own professional activities.

The implementation of any eco-oriented project involves the following stages: preparatory (organizational), educational (search and research), actual design (technological), final (presentation).

At the preparatory stage, students together with the teacher determine: the feasibility of implementing an eco-oriented project on a particular topic, the tasks of future work, the expected result; at the educational stage, information is obtained, new knowledge and skills are acquired on the topic, graphic and technological documents are prepared; at the technological stage, students analyze the information received on environmental problems of

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the construction industry, prepare conclusions on the possibilities of improving production technology, proposals for improving the use of natural materials, and prepare proposals for improving the use of natural materials.

Scientists have developed the following algorithm of students' work on the project (Kulalaeva (Ed.), 2019, p. 22-23):

- initiation (motivation-oriented): identification of the problem to be solved in the project, its discussion; familiarization with the task, rules, stages of work;

- planning (prognostic and planning), project development: creating project teams; generating project ideas; discussing and defining the topic, formulating the goal, objectives, as well as the possible result (product) of the project;

- implementation (organizational and executive): final determination of the result (product) of project work and criteria for its evaluation; construction of a technological map of the project; distribution of individual tasks; determination of own capabilities, means and resources, methods of collecting materials, methods of information analysis, its processing; independent work of students on the creation of the product itself (search work in the team and implementation of operations on the main tasks of the project, preparation of theoretical and practical materials to be used during the presentation of the project, etc.); monitoring (evaluative-reflective): consistent discussion of the results obtained (self-assessment of activities); clarification of the methods and forms of project presentation; design of the project in the chosen form; development of a methodological passport and creation of a project portfolio;

- presentation (presentational-implementation): presentation and defense of the project; participation in the discussion; defending one's position; self-, mutual and expert evaluation of students' project activities; formulation of conclusions; discussion in the student group of the results of project activities; supplementing the portfolio (description of one's role, materials used, one's impressions of teamwork and the role performed); implementation of project results by students.

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The results of students' work during the implementation of eco-oriented educational projects require evaluation (Romanova, 2014; Luzan, 2014):

– by teachers: to determine the level of acquired cognitive and practical achievements; appropriateness of research methods and processing of results; activity of participants; level of relationships and mutual assistance; answers to questions, arguments; design of project results;

– self-assessment: provides for an objective assessment by students of their own strengths and capabilities, an objective and critical attitude to themselves and the results of their own activities, changes in motivation in learning: the growth of professional values, interests, needs. At the same time, student self-assessment allows the teacher to get information about difficulties at different stages of the project;

– expert (external) evaluation: experts can be teachers, classmates, students of parallel groups and senior courses, representatives of organizations-customers of personnel, etc.

**Conclusions.** The implementation of eco-oriented educational projects by students – future builders forms professional competence, develops their ability to independently search for information, analyze, draw conclusions and make decisions, present the results; increases students' interest in the profession; forms an environmental culture, responsible attitude to the environmental results of professional activity; makes it possible for the student to become a direct participant in training, interested in the results of the project.

### List of references

Аніщенко, В. М., Артюшина, М. В., Герлянд, Т. М., Кулалаєва, Н. В., Романова, Г. М., Шимановський, М. М., & Пятничук, Т. В. (2019). *Теорія і практика проєктного навчання у професійно-технічних навчальних закладах: монографія*. (Н. В. Кулалаєва (Ред.)). Житомир: Полісся.

Глуценко, О. В., Романов, Л. А., Пащенко, Т. М., Пятничук, Т. В., & Шимановський, М. М. (2019). *Проєктні технології навчання учнів професійних (професійно-технічних) навчальних закладів: довідник*. (Л. А. Романов (Ред.)). Житомир: Полісся.

---

Голобородько, В. В., & Гнедашев, В. М. (2005). *Наукова робота учнів: програма організації науково-дослідної діяльності учнів*. Київ: Основа.

Кремень, В. Г. (Ред.) (2021). *Енциклопедія освіти*. АПН України. 2-е видання, доповнене та перероблене. Київ: Юрінком Інтер.

Дьюї, Д. (2003). *Досвід і освіта*: [пер. з англ. Марії Василечко]. Львів: Кальварія.

Закон України «Про Стратегію сталого розвитку України до 2030 року» (2018, Серпень 07). <https://ips.ligazakon.net/document/JH6YF00A?an=393>.

Кулалаєва, Н. В. (2017). Формування культури екологічної безпеки майбутніх фахівців будівельного профілю через проєктне навчання. *Збірник наукових праць НУК*, 3.

Кремень, В. Г. (2015). Професійний розвиток особистості – ключове завдання в умовах євроінтеграції. In В. Г. Кремень, М. Ф. Дмитриченко, Н. Г. Ничкало (Ред.), *Концептуальні засади професійного розвитку особистості в умовах євроінтеграційних процесів: зб. наук. статей* (с. 9-11). Київ: НТУ.

Лузан, П. Г., Манько, В. М., Нестерова, Л. В., & Романова, Г. М. (2014). *Теорія і практика впровадження інноваційних технологій навчання у професійну підготовку кваліфікованих робітників: монографія*. Київ: Поліграфсервіс.

Лук'янова, Л. Б. (2016). *Основи екології, методика екологізації фахових дисциплін: навчально-методичний посібник для викладачів*. (вид. 2-ге змінене і доповнене). ДСК–Центр.

Осмоловський, А., & Василенко, Л. (2000). Від навчального проєкту до соціальної самореалізації особистості. *Шлях освіти*, 2, 34-37.

Романова, Г. М. (2014). Проєктування технологій професійного навчання майбутніх кваліфікованих робітників. *Професійно-технічна освіта*, 1, 11-15.

Сисоєва, С. О. (2011). *Інтерактивні технології навчання дорослих: навчально-методичний посібник*. ВД «ЕКМО».

МОН України. (2020). *Стратегія розвитку професійної (професійно-технічної) освіти на період до 2023 року: рішення колегії МОН України, № 12/2-3*. <https://mon.gov.ua/storage/app/media/kolegiya-ministerstva/2020/12/.pdf>

## Translated & Transliterated

Anishchenko, V. M., Artiushyna, M. V., Herliand, T.M., Kulalaieva, N. V., Romanova, H. M., Shymanovskyi, M. M., & Piatnychuk, T. V. (2019). *Teoriia i praktyka proiektnoho navchannia u profesiino-tekhnichnykh navchalnykh zakladakh: Monohrafiia [Theory and practice of project-based learning in vocational and technical educational institutions]*. Zhytomyr: Polissia, [in Ukrainian].

Hlushchenko, O. V., Romanov, L. A., Pashchenko, T. M., Piatnychuk, T. V., & Shymanovskyi, M. M. (2019). *Proiektni tekhnolohii navchannia uchniv profesiinykh (profesiino-tekhnichnykh) navchalnykh zakladiv : dovidnyk [Design technologies of training students of professional (vocational and technical) educational institutions: a guide]*. (L. A. Romanov, red.). Zhytomyr: Polissia, [in Ukrainian].

Holoborodko, V. V., & Hniedashev, V. M. (2005). *Naukova robota uchniv: prohrama orhanizatsii naukovodoslidnoi diialnosti uchniv [Scientific work of students: the program for organizing scientific research activities of students]*. Kyiv: Osнова, [in Ukrainian].

---

Kremen, V. H. (Red.). (2021). *Entsyklopediia osvity [Encyclopedia of Education]*. Druhe vydannia, dopovnene ta pereroblene. Kyiv: Yurinkom Inter.

Diui, D. (2003). *Dosvid i osvita [Experience and education]*: [per. z anhl. Marii Vasylechko]. Lviv: Kalvariia, [in Ukrainian].

Zakon Ukrainy «Pro Stratehiiu staloho rozvytku Ukrainy do 2030 roku» [Law of Ukraine «On the Strategy of Sustainable Development of Ukraine until 2030»] (2018, Serpen 07). <https://ips.ligazakon.net/document/JH6YF00A?an=393>, [in Ukrainian].

Kulalaieva, N. V. (2017). Formuvannia kultury ekolohichnoi bezpeky maibutnikh fakhivtsiv budivelnogo profilu cherez proiektne navchannia [Formation of the culture of environmental safety of future specialists of the construction profile through project training]. *Zbirnyk naukovykh prats NUK*, 3, [in Ukrainian].

Kremen, V H. (2015). Profesiinyi rozvytok osobystosti – kliuchove zavdannia v umovakh yevrointehratsii [Professional development of the individual is a key task in the conditions of European integration]. In V. H. Kremen, M. F. Dmytrychenko, N. H. Nychkalo (Reds.), *Kontseptualni zasady profesiinoho rozvytku osobystosti v umovakh yevrointehratsiinykh protsesiv: zbirnyk naukovykh statei [Conceptual principles of professional development of the individual in the conditions of European integration processes: coll. of science articles]* (s. 9-11). Kyiv: NTU, [in Ukrainian].

Luzan, P. H., Manko, V. M., Nesterova, L. V., & Romanova, H. M. (2014). *Teoriia i praktyka vprovadzhenia innovatsiinykh tekhnolohii navchannia u profesiinu pidhotovku kvalifikovanykh robitnykiv: monohrafiia [Theory and practice of introducing innovative learning technologies into professional training of skilled workers: monograph]*. Kyiv: Polihrafservis, [in Ukrainian].

Lukianova, L. B. (2016). *Osnovy ekolohii, metodyka ekolohizatsii fakhovykh dystsyplin: Navchalno-metodychnyi posibnyk dlia vykladachiv. (vyd. 2-he zminene i dopovnene) [Fundamentals of ecology, methods of greening professional disciplines: A textbook for teachers]*. DSK – Tsent, [in Ukrainian].

Osmolovskyi, A., & Vasylenko, L. (2000). Vid navchalnogo proiektu do sotsialnoi samorealizatsii osobystosti [From the educational projekt to the social self-realization of the individual]. *Shliakh osvity [The way of education]*, 2, 34-37, [in Ukrainian].

Romanova, H. M. (2014). Proiektuvannia tekhnolohii profesiinoho navchannia maibutnikh kvalifikovanykh robitnykiv [Designing technologies for professional training of future skilled workers]. *Profesiino-tekhnichna osvita*, 1, 11-15, [in Ukrainian].

Sysoieva, S. O. (2011). *Interaktyvni tekhnolohii navchannia doroslykh: navchalno-metodychnyi posibnyk [Interactive technologies of adult learning: a textbook]*. VD «EKMO», [in Ukrainian].

*Stratehiia rozvytku profesiinoyi (profesiino-tekhnichnoi) osvity na period do 2023 roku. Rishennia kolehii MON Ukrainy № 12/2-3 [Strategy for the development of professional (vocational and technical) education for the period until 2023]* (2020). <https://mon.gov.ua/storage/app/media/kolegiya-ministerstva/2020/12/.pdf>, [in Ukrainian].

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## 2.5. APPLICATION OF ECO-ORIENTED PROBLEM LEARNING TECHNOLOGY IN PREPARATION OF FUTURE WORKERS

### ЗАСТОСУВАННЯ ЕКООРІЄНТОВАНОЇ ТЕХНОЛОГІЇ ПРОБЛЕМНОГО НАВЧАННЯ У ПІДГОТОВЦІ МАЙБУТНІХ РОБІТНИКІВ

**Тетяна Пятничук**

кандидат педагогічних наук,  
старший науковий співробітник  
лабораторії технологій  
професійного навчання  
Інституту професійної освіти  
НАПН України

<https://orcid.org/0000-0002-5607-2949>, [ptv2613@ukr.net](mailto:ptv2613@ukr.net)

**Tetyana Pyatnichuk**

Candidate of Pedagogical Sciences,  
Senior Research Fellow Laboratories  
of Vocational Training Technologies  
Institute of Vocational Education of the  
National Academy of NAES of  
Ukraine

<https://orcid.org/0000-0002-5607-2949>, [ptv2613@ukr.net](mailto:ptv2613@ukr.net)

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*Given that the construction industry has a significant impact on the environment in the production of building materials, construction work on the construction of buildings and structures, the article substantiates the feasibility of environmental education and training of future workers and the use of problem-based training in training workers.*

*Обґрунтовано доцільність використання педагогами досвіду освітян і науковців країн ЄС, зокрема технології проєктного навчання для формування професійної компетентності робітників будівельного профілю; водночас актуальним у професійній підготовці будівельників постає проблема шкідливого впливу будівельної галузі на людину та навколишнє середовище, яка потребує упровадження в навчальний процес екоорієнтованої технології проєктного навчання для екологічно спрямованого виховання майбутніх робітників та формування екологічної самосвідомості*

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**Ключові слова:** євроінтеграція, екоорієнтована технологія проєктного навчання, робітники будівельної галузі, професійна компетентність

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**Keywords:** greening of education, vocational training, technology of problem-based learning, construction workers, software and software

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**Problem statement.** In the professional training of workers, it must be remembered that the construction industry belongs to the second category of planned activities and objects that may have a significant impact on the environment and are subject to



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environmental impact assessment and include: the production of cement or cement clinker; lime production; production of ceramic products by burning, in particular roofing tiles, bricks, fire-resistant bricks, ceramic tiles, stone ceramics or porcelain products (Law of Ukraine, 2017).

In order to prevent a negative impact on the environment, building codes in Ukraine provide that construction projects should not emit pollutants in quantities that can harm human health due to air, soil and water pollution. Sources of pollution can be construction products and engineering equipment of construction projects. The environmental impact of building products must be considered at every stage from the extraction of raw materials, the manufacture and use of products to the reuse of waste or recycling. The impact of construction projects can be controlled by limiting: the spread of impurities into the atmosphere, soil, water; type of gaseous pollutants; use of materials and equipment that emit pollutants; pollution dispersion conditions (DBN, 2008, gg. 5.3.6.1-4).

Today, environmental education is of particular importance. According to scientists (Zaverukha, 2006, p. 215), «ecological education and upbringing should focus on the active interaction of man with nature, built on a scientific basis, on the perception of man as part of nature. Environmental knowledge, supplemented by value orientations, is the basis of ecological culture and ecological thinking».

**Sources of research.** American teacher J. Dewey (1859-1952) developed the concept of problem-based learning, arguing that thinking is a solution to problems, and the educational process should be built according to the scheme of thinking: the emergence of a problem situation – data analysis - putting forward a hypothesis – testing it. The technology of problem learning is

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developed in the works of Danilchenko I. G, Manko V.A., Pometun O.I. Sysoeva S. and others.

The introduction of problem learning technology into the learning process most fully meets the tasks of forming an ecological culture and ecological thinking, ecological education of students. The need for greening vocational education is justified in the works of L. Lukyanova.

The formation of the ecological culture of future specialists was considered by V. Boreyko, A. Ermolenko, V. Krysachenko, L. Lukyanova, V. Logvinenko, S. Ryzhkov, O. Saltovsky G. Filipchuk and others

**Research methods:** theoretical - analysis of scientific papers, normative documents, educational and methodological literature; comparison, systematization and generalization of data; empirical - observations, modeling of educational situations, conversation, surveys.

**The article** is aimed at substantiating the necessity and expediency of using eco-oriented technology of problem training in the professional training of workers in the construction industry.

**Results and discussion.** The views of most scientists and teachers regarding environmental education and upbringing coincide in the fact that its tasks are «the formation of knowledge about the patterns of interconnections of natural phenomena, the unity of living and inanimate nature, about the interaction of man, society and nature; education of motives, needs and skills of environmentally expedient behavior and activity, healthy lifestyle, desire for active environmental protection; development of intellectual and emotional spheres of the psyche of students on the basis of causal analysis of environmental situations, emotional experience in relation to nature» (Zaverukha, 2006, p. 212).

It should be noted that the construction industry consumes

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natural resources (water, sand, clay, natural stone, etc.), produces harmful waste, pollutes the air, soils, etc. Consequently, the greening of professional education of qualified workers in the construction industry should be aimed at saturating the ideas, concepts, principles of ecology of all subjects of professional-theoretical and professional-practical training and create the basis for the training of environmentally competent specialists. According to the definition of L. Lukyanova (2016, p.110), «professional training of specialists capable of working in market conditions, making independent decisions, evaluating them from the point of view of expediency, is possible on the basis of the implementation of ideas and principles of greening professional activities; it is necessary to realize that greening causes qualitative changes that arise in all spheres of life under the influence of the modern ecological situation and are aimed at optimizing the impact of society on nature».

At the same time, we must note that the «greening of education» is due to social needs and provides «an environmental education system, strengthens its ecological and worldview orientations» (Lukyanova, 2016, p. 108). We share the opinion of the scientist that «the greening of education is aimed at educating humanity that understands the laws of development and the existence of the natural environment; responsible for causing any damage to the environment; determines qualitative changes aimed at optimizing the impact of society on nature. The greening of education is a fundamental solution to the problems of environmental education in the specified, special sense of the word and a guide in changing approaches to teaching all other disciplines» (Lukyanova, 2016, p. 109).

The dialectical relationship between behavior and individual values is based on an understanding of behavior not only as an

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external manifestation of the inner world of a person, but also as a means of forming his beliefs. The principle provides for "the widest possible involvement of schoolchildren in feasible participation in solving environmental problems" (Pustovit, 2014, p. 18).

It should be noted that the formation of environmental culture and environmental thinking of workers in the construction industry in the process of professional training is provided by interactive training technologies. According to the definition of N. Volkova (2018, p. 13-14), «interactive learning is a special form of organization of cognitive activity, which involves the creation of comfortable learning conditions in which the student feels his academic performance and intellectual capacity, and interactive learning technologies are a set of methods, tools and forms of training organization, providing an active nature of interaction between participants in the educational process on the basis of cooperation and co-creation and aimed at achieving the set didactic goals». According to V. Yagupov (2003, p. 352), interactive learning is «a set of techniques and methods of psychological and pedagogical influence on applicants for education, which, in comparison with traditional teaching methods, are aimed at developing their creative independent thinking, activating cognitive activity, forming creative skills and skills of non-standard solution of certain professional problems and improving the culture of professional communication».

In the Encyclopedia of Education (2021, p. 89), it is determined that with the introduction of interactive technologies, «from the point of view of the development of the individual during the learning period, its worldview expands, connections are established between new knowledge and those already assimilated, cognitive processes are actualized, personal characteristics are

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formed, the ability to establish interpersonal relations in the team develops. the result of learning is seen in learning activities that are motivated, carried out independently or under supervision, involves control and self-esteem on a reflexive basis».

Learning technology, as defined by S. Goncharenko (2011, p. 331), is, "in the general sense, a systematic method of creating, applying and determining the entire process of learning and assimilating knowledge, taking into account human and technical resources and their interaction, which aims to optimize education."

For the professional training of workers in the construction industry, the technology that scientists use is effective (Vakhrusheva, 2007; Pometun, 2008; Sysoeva, 2011) is defined as a technology of problem learning - this is «a specially created system of specific techniques and methods that contribute to the fact that the student independently acquires knowledge and learns to apply it independently in solving new cognitive and practical problems, and does not receive knowledge in a finished form or solve problems on a sample. Problematicity is an integral feature of the pedagogical process».

By definition, V. Manko (2006, p. 103) problem learning is a type of «developmental learning, which combines the systematic independent search activities of students with the assimilation of readymade conclusions of science». I. Danilchenko (2003, p.172) considers problematic the lesson in which «the teacher purposefully creates situations for the search activities of students in obtaining and consolidating knowledge». According to S. Sysoeva (2011, p. 200), the technology of problem learning is «a specially created system of specific techniques and methods that contribute to the fact that the student independently acquires knowledge and learns to apply it independently in solving new cognitive and practical problems, and does not receive knowledge

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in finished form or solve problems according to the model».

According to V. Manko (2006), the creation of a problem situation is possible in various ways:

- encouraging students to a theoretical explanation of phenomena, facts, external inconsistency between them. This leads to the assimilation of new knowledge through search activities;

- use of the contradiction between the studied facts and available knowledge;

- explanation of facts based on a known theory;

- building a hypothesis based on a known theory, and then testing it;

- finding a rational solution path when conditions are set and the final goal;

- finding an independent solution under given conditions.

This is already a creative task, for the solution of which there is often not enough occupation, it is necessary to use additional literature, reference books, etc.;

- the use of the principle of historicism (Manko, 2006, p.105).

By definition, S. Sysoeva (2011, p. 203) in pedagogical practice «distinguish three methods of problem learning, characterized by their systems of teacher and student actions: actually problematic; partially search; research, and the teacher's task with problem-based learning is the purposeful formation of personal motivation, that is, the student's attitude to the educational process as something attractive and necessary».

Consider an example of the use of eco-oriented technology of problem learning when students master the topic «portland cement, its composition, method of production» on the subject of «material science» (for the professions «bricklayer», «plasterer», «concrete worker», «tiler», etc.).

Applying a problematic method, the teacher can use

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problematic questions: what can be explained?, can be considered evidence?, can it be argued that?, what would change if?, is there a relationship between?, what conditions are necessary for?, how can this affect?.

With a partially search method, students on the instructions of the teacher can partially solve educational problems. In particular, the teacher in the explanation provides information that the most typical raw materials for the production of Portland cement are limestones and clays, which, after preparation, are fired in furnaces for crystallization. Students are given the task: «to determine what waste of various industries can be used as a scorched material for the manufacture of cement», «to determine the harm to the environment from the extraction of limestone, clay and what measures to reduce it», «to determine the benefits of using waste from metallurgical industries for the environment», etc.

Using a research method, the teacher formulates a problem for students, in particular, at first it may be the following information: «every year humanity extracts more than 3.5 billion tons of coal from the bowels of the earth, uses about 10 million tons of oil and its products daily» (Belyavsky, 2005, p. 18). Students are invited to independently choose the directions of finding ways to reduce the use of natural materials for the production of building materials, to think about how to use production waste, to conduct a study of the experience of the countries of the world in the use of mineral resources and their conservation, to fix the facts, compare, draw conclusions. The research method allows you to more closely connect learning with life and professional activity.

The structure of the lesson using eco-oriented problem learning technology involves the following elements:

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- updating the existing knowledge of students on the topic of the lesson, or on the previous topic;
  - formulation of the lesson topic and provision of initial information;
  - statement of the educational problem and problem problem;
  - mental search by students (possibly together with the teacher) for different ways to solve the problem: making assumptions, hypotheses, analyzing situations from practice, assuming the results of the introduction of various proposals;
  - summing up the work.

Problematic, partially exploratory, research methods of eco-oriented technology of problem learning make it possible for future builders to develop abilities:

- identification of real and possible environmental problems in connection with the activities of the construction industry in the production of building materials and the actual construction of buildings and structures;
- thinking about the consequences of negligent attitude to the use of subsoil;
- search for opportunities for the use of secondary raw materials and waste from other industries;
- search for possible new problems of the consequences of the construction industry;
- analysis of the life situations they have seen on environmental pollution during construction (air, water pollution, dumping of waste and parts, etc.);
- the ability to find original ways of environmentally safe construction work;
- formation of individual values, beliefs on environmental problems of our time.

It should be noted that the problematic nature of classes



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depends on the totality of methods and organizational forms inherent in problem-based training, and the systematic use of these forms and methods is appropriate in the eco-oriented professional training of workers in the construction industry. By definition of scientists (Danilchenko, 2003; Sysoeva, 2011) the main concepts of this didactic technology are:

- the problem situation is a complication realized by the subject, the ways of overcoming which require the search for new knowledge, new ways of acting.

- the educational problem is a problem situation accepted by the subject for solution on the basis of already existing means (knowledge, skills, search experience).

- problem problem - is a learning problem that is solved under given conditions or parameters.

**Conclusions.** Thus, the use of eco-oriented pedagogical technology of problem-based learning in the vocational training of construction workers contributes to improving environmental education and upbringing of students, understanding the laws of development and existence of the natural environment, developing a sense of responsibility for causing any harm to the environment.

### List of references

Білявський, Г. О., Фурдуй, Р С., Костіков. І. Ю. (2005). *Основи екології: підручник. (2-е вид.)*. Либідь.

Волкова, Н. П. (2018). *Інтерактивні технології навчання у вищій школі: навч.-метод. посіб.* Дніпро: Університет ім. Альфреда Нобеля.

Вахрушева, Т.Ю. (2007). Інтерактивні технології навчання як засіб активізації навчально-пізнавальної діяльності. *Нові технології навчання*. Вип. 47, с.64-69.

Гончаренко, С. У. (2011). *Український педагогічний енциклопедичний словник*. (вид. 2-ге, доп. й вип). Рівне: Волинські обереги.

Данильченко, І. Г. (2003). Проблемне навчання в системі інновацій сучасної літературної освіти. *Вісник Глухів*, Вип.3, с.171-174.

ДБН В.1.2-8-2008 «Основні вимоги до будівель і споруд: безпека життя і здоров'я людини та захист навколишнього природного середовища»

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<http://kbu.org.ua/assets/app/documents/dbn2/>.

Енциклопедія освіти / АПН України ; голов. ред. В. Г. Кремень. Друге видання, доповнене та перероблене. Київ : Юрінком Інтер, 2021. 1143 с.

Заверуха, Н. М., Серебряков, В. В., Скиба, Ю. А. (2006). *Основи екології: навч. посібн.* Каравела.

Закон України «Про оцінку впливу на довкілля» № 2059-VIII (2017). <https://zakon.rada.gov.ua/laws/show/2059-19#Text>.

Лук'янова, Л. Б. (2016). *Основи екології, методика екологізації фахових дисциплін: Навчально-методичний посібник для викладачів.* (вид. 2-ге змінене і доповнене). ТОВ «ДСК – Центр».

Манько, В. А. (2006). Проблемне навчання як актуальна науково-педагогічна проблема. *Засоби навчальної та науково-дослідної роботи.* Вип. 25. С. 102–106.

Пометун, О. І., Побірченко, Н. С (2008). *Інтерактивні технології: теорія та методика: посібник.* [https://dspace.udpu.edu.ua/jspui/bitstream/6789/377/1/interakt\\_tehn\\_teor\\_met.pdf](https://dspace.udpu.edu.ua/jspui/bitstream/6789/377/1/interakt_tehn_teor_met.pdf).

Сисоєва, С. О. (2011). *Інтерактивні технології навчання дорослих: навчально-методичний посібник.* ВД «ЕКМО».

Пустовіт, Н. А., Колонькова, О. О., Пруцакова, О. Л. (2014). *Формування екологічно доцільної поведінки школярів : [навч.- метод. посібник].* Імекс-ЛТД.

Ягупов, В. В. (2003). *Педагогіка: [навч. посіб.].* Либідь.

## **Translated & Transliterated**

Biliavskiy, H. O., Furdui, R. S., Kostikov, I. Yu. (2005). *Osnovy ekolohii: pidruchnyk.* (2-e vyd.). Lybid.

Volkova, N. P. (2018). *Interaktyvni tekhnolohii navchannia u vyshchii shkoli: navch.-metod. posib.* Dnipro: Universytet im. Alfreda Nobelia.

Vakhrusheva, T. Iu. (2007). *Interaktyvni tekhnolohii navchannia yak zasib aktyvizatsii navchalno-piznavalnoi diialnosti.* Novi tekhnolohii navchannia. Vyp. 47, s.64-69.

Honcharenko, S. U. (2011). *Ukrainskyi pedahohichni entsyklopedychnyi slovnyk.* (vyd. 2-he, dop. y vyp). Rivne: Volynski oberehy.

Danylchenko, I. H. (2003). *Problemne navchannia v systemi innovatsii suchasnoi literaturnoi osvity.* Visnyk. Hlukhiv, Vyp.3, s.171-174.

DBN V.1.2-8-2008 «Osnovni vymohy do budivel i sporud: bezpeka zhyttia i zdorovia liudyny ta zakhyst navkolysnogo pryrodnoho seredovyscha» <http://kbu.org.ua/assets/app/documents/dbn2/>.

Entsyklopediia osvity / APN Ukrainy ; holov. red. V. H. Kremen. Druhe vydannia, dopovnene ta pereroblene. Kyiv : Yurinkom Inter, 2021. 1143 s.

Zaverukha, N. M., Serebriakov, V. V., Skyba, Yu. A. (2006). *Osnovy ekolohii: navch. posibn.* Karavela.

Закон України «Про оцінку впливу на довкілля» № 2059-VIII (2017). <https://zakon.rada.gov.ua/laws/show/2059-19#Text>.

Lukianova, L. B. (2016). *Osnovy ekolohii, metodyka ekolohizatsii fakhovykh dystsyplin: Navchalno-metodychnyi posibnyk dlia vykladachiv.* (vyd. 2-he zminene i dopovnene). TOV «DSK – Tsentr».

---

Manko, V. A. (2006). Problemne navchannia yak aktualna naukovo-pedahohichna problema. Zasoby navchalnoi ta naukovo-doslidnoi roboty. Vyp. 25. S. 102–106.

Pometun, O. I., Pobirchenko, N. S (2008). Interaktyvni tekhnolohii: teoriia ta metodyka: posibnyk. [https://dspace.udpu.edu.ua/jspui/bitstream/6789/377/1/interakt\\_tehn\\_teor\\_met.pdf](https://dspace.udpu.edu.ua/jspui/bitstream/6789/377/1/interakt_tehn_teor_met.pdf).

Sysoieva, S. O. (2011). Interaktyvni tekhnolohii navchannia doroslykh: navchalno-metodychnyi posibnyk. VD «EKMO».

Pustovit, N. A., Kolonkova, O. O., Prutsakova, O. L. (2014). Formuvannia ekolohichno dotsilnoi povedinky shkoliariv : [nauk.- metod. posibnyk]. Imeks-LTD.

Yahupov, V. V. (2003). Pedahohika: [navch. posib.]. Lybid.

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## AFTERWORD

Ecology in recent decades is one of the most important components of domestic pedagogical science, the deep meaning and main goal of which is to involve people in environmental conservation. In building the prospects for the development of society, the most problematic issues are always the issues of environmental protection, rational use of natural resources, protection of environmental rights. This issue is relevant, first of all, for future qualified specialists, who are the main translators of labor values in society, and especially as an integral part of their professional skills as a specialist - a graduate of a VET schools, one of the components of which is environmental knowledge, that is, an idea of the consequences of irrational use of natural resources, environmental pollution, etc., which reflect the strategies of interaction of the individual with the natural environment.

However, this process does not always have a positive result, since it also depends on the formation of personal self-awareness, the development of the education system, when there is a need to update the organization of ecological education. It is well known that one of the main directions of modernization of vocational education in Ukraine is changing the methods and forms of organizing training, using various technologies that ensure the achievement of educational standards by future qualified workers and form new qualities (key competencies) in both graduates and teachers. At the present stage, attempts to improve the educational process in this aspect are expressed in the development and implementation of new eco-oriented pedagogical technologies. They are understood as ways to increase the effectiveness of training, that is, such a design of the educational process that has a clearly specified result.

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The effectiveness of environmental education is largely determined by the readiness of teachers for professional activity, which means the ability to solve professional tasks and problems that arise in real conditions of the educational process. In view of this, a special role is assigned to the use of eco-oriented technologies in the educational process and increasing the professionalism of teachers on the basis of their mastery of these technologies. The professional competence of teachers, in turn, is based on the synthesis of acquired environmental, pedagogical and methodological knowledge, skills, and abilities necessary to solve professional tasks.

Further study is currently required of the theoretical and methodological principles for developing the readiness of teachers of vocational education institutions to use eco-oriented pedagogical technologies, and the study of the experience of their use in vocational education and training institutions in the countries of the European Union.

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## REFERENCES

- Абсалямова, Я., & Лук'янова, В. (2017). Формування екологічної компетентності майбутніх фахівців засобами соціально-гуманітарних дисциплін. *Scientific Letters of Academic Society of Michal Baludansky*, 2, 6-7.
- Аніщенко, В. М., Артюшина, М. В., Герлянд, Т. М., Кулалаєва, Н. В., Романова, Г. М., Шимановський, М. М., & Пятничук, Т. В. (2019). *Теорія і практика проектного навчання у професійно-технічних навчальних закладах: монографія*. (Н. В. Кулалаєва (Ред.)). Житомир: Полісся.
- Байрамова, О., 2017. Екологічна освіта в морських вищих навчальних закладах: теоретичний аспект. *Science and Education a New Dimension. Humanities and Social Sciences*, 20 (120), p. 45-48.
- Байрамова, О.В. (2020). Екологічна освіта моряків як умова забезпечення сталого розвитку людства. In *Actual problems of natural sciences: modern scientific discussions: Collective monograph*. Riga: Izdevniecība "Baltija Publishing". <https://doi.org/10.30525/978-9934-588-45-7.1>
- Білявський, Г. О., Фурдуй, Р. С., Костіков. І. Ю. (2005). *Основи екології: підручник*. (2-е вид.). Либідь.
- Буд-Інфо (2019, 30 вересня). *Екологічно чисті будівельні матеріали*. <https://bud-info.net.ua/materialy-dlya-budivnytstva-ta-remontu/ekolohichno-chysti-materialy-dlia-budivnytstva/>.
- Бусел, В.Т., ред., 2001. *Великий тлумачний словник сучасної української мови*. Ірпінь: ВТФ Перун. Верховна Рада України. Законодавство, 2020. *Про охорону навколишнього природного середовища : Закон України від 25.06.91 № 1264-XII*. [online] (Останнє оновлення 01 Січень 2021) Доступно: <<https://zakon.rada.gov.ua/laws/show/1264-12#Text>> [Дата звернення 23 Липень 2021].
- Вахрушева, Т.Ю. (2007). Інтерактивні технології навчання як засіб активізації навчально-пізнавальної діяльності. *Нові технології навчання*. Вип. 47, с.64-69.
- Вектор ньюз (2016, 8 серпня). Кулішенко, А. «Зелене будівництво» в Україні. Однієї енергоефективності мало. <https://www.vectornews.net/exclusive/19131-zelene-budvnictvo-v-ukrayin-odnyeyi-energoefektivnost-zamalo.html>.
- Волкова, Н. П. (2018). *Інтерактивні технології навчання у вищій школі: навч.-метод. посіб.* Дніпро: Університет ім. Альфреда Нобеля.
- Гайдук, О. В., Герлянд, Т. М., Каленський, А. А., & Пятничук, Т. В. (2022). *Розроблення і застосування екоорієнтованих педагогічних технологій для професійної підготовки майбутніх кваліфікованих робітників будівельної, аграрної галузей та сфери ресторанного господарства*. ІПО НАПН України. [https://lib.iitta.gov.ua/733669/1/Метод%20посібн\\_Екоорієнтовані%20технології.pdf](https://lib.iitta.gov.ua/733669/1/Метод%20посібн_Екоорієнтовані%20технології.pdf)

- 
- Глущенко, О. В., Романов, Л. А., Пащенко, Т. М., Пятничук, Т. В., & Шимановський, М. М. (2019). *Проектні технології навчання учнів професійних (професійно-технічних) навчальних закладів: довідник*. (Л. А. Романов (Ред.)). Житомир: Полісся.
- Голобородько, В. В., & Гнедашев, В. М. (2005). *Наукова робота учнів: програма організації науково-дослідної діяльності учнів*. Київ: Основа.
- Гончаренко, С. (2000). Методика як наука. Шлях освіти, 1, 2-6.
- Гончаренко, С. У. (2011). *Український педагогічний енциклопедичний словник*. (вид. 2-ге, доп. й вип). Рівне: Волинські обереги.
- Гуренкова, О. (2009). *Формування екологічної компетентності майбутніх фахівців водного транспорту в умовах кредитно-модульної системи навчання: автореф. дис. (канд. пед. наук)*. Київ: Інститут проблем виховання АПН України.
- Гуренкова, О., 2011. Компонентно-критеріальна структура екологічної компетентності майбутніх фахівців водного транспорту. *Освіта дорослих: теорія, досвід, перспективи*, 3(1), с. 125-131.
- Данильченко, І. Г. (2003). Проблемне навчання в системі інновацій сучасної літературної освіти. *Вісник Глухів*, Вип.3, с.171-174.
- ДБН В.1.2-8-2008 «Основні вимоги до будівель і споруд: безпека життя і здоров'я людини та захист навколишнього природного середовища» <http://kbu.org.ua/assets/app/documents/dbn2/>.
- Джам, О.А. (2016). Екологічна компетентність як показник якості екологічної освіти та екологічної безпеки у системі принципів і стратегій сталого розвитку. *Вісник Харківського національного університету імені В. Н. Каразіна. Серія : Екологія*. 14, 102–105.
- Домінант (б. д.). Зелене будівництво і екотехнології. <https://dominant-wood.com.ua/ua/news/285-zelene-budivnitstvo-i-ekotehnologiyi>.
- Дуля, А. В., 2016. Екологічне виховання курсантів морських навчальних закладів. *Таврійський вісник освіти*, 1, с. 81-84.
- Дьюї, Д. (2003). *Досвід і освіта*: [пер. з англ. Марії Василечко]. Львів: Кальварія.
- Екододма – сайт про екологічні будинки. (2023, 15 червня). *Екологічно чисті будівельні матеріали*. <https://ecodoma.in.ua/ecologichnie-strojmateriali.html>.
- Енциклопедія освіти / АПН України ; голов. ред. В. Г. Кремень. Друге видання, доповнене та перероблене. Київ : Юрінком Інтер, 2021. 1143 с.
- Журиян, В.В. (2022). Феномен екологічної компетентності у підготовці майбутніх судноводіїв. *Педагогічна освіта: теорія і практика*, 32 (1), 245–258.
- Заверуха, Н. М., Серебряков, В. В., Скиба, Ю. А. (2006). *Основи екології: навч. посібн.* Каравела.
- Закон України «Про охорону навколишнього природного середовища» (1991, 25 червня). <https://zakon.rada.gov.ua/laws/show/1264-12>
- Закон України «Про оцінку впливу на довкілля» № 2059-VIII (2017). <https://zakon.rada.gov.ua/laws/show/2059-19#Text>.
- Закон України «Про Стратегію сталого розвитку України до 2030 року» (2018, Серпень 07). <https://ips.ligazakon.net/document/JH6YF00A?an=393>.

- 
- Кабінет Міністрів України (2021, 03 березня). *Про затвердження Національної економічної стратегії на період до 2030 року* (№179). <https://www.kmu.gov.ua/npas/pro-zatverdzhennya-nacionalnoyi-eko-a179>
- Каленський, А. А. (2023). Кейс-методи в екоорієнтованій професійній підготовці кваліфікованого робітника за професією «Кухар». *Вісник Глухівського національного педагогічного університету імені Олександра Довженка*. Серія: Педагогічні науки, 52, 23–27. <https://journals.indexcopernicus.com/api/file/viewByFileId/1763413>
- Карпенко, О. (2019). Екологічна грамотність і метод проектів. Крок у науку: дослідження у галузі природничо-математичних дисциплін та методик їх навчання: Збірник тез доповідей Всеукраїнської науково-практичної конференції студентів, аспірантів і молодих учених (20 листопада 2020 року, м. Чернігів) (с. 80–81). Чернігів: НУЧК імені Т.Г. Шевченка.
- Ковальчук, В.І. та Масліч, С.В., 2020. Створення середовища професійного розвитку педагогічних працівників закладу професійної (професійно-технічної) освіти. *Вісник Глухівського національного педагогічного університету імені Олександра Довженка*, 43, с. 29-37. DOI: 10.31376/2410-0897-2020-2-43-29-37 [Дата звернення 26 Липень 2021].
- Кремень, В.Г. (2015). Професійний розвиток особистості – ключове завдання в умовах євроінтеграції. In В. Г. Кремень, М. Ф. Дмитриченко, Н. Г. Ничкало (Ред.), *Концептуальні засади професійного розвитку особистості в умовах євроінтеграційних процесів: зб. наук. статей* (с. 9-11). Київ: НТУ.
- Кремень, В.Г. (Ред.) (2021). *Енциклопедія освіти*. АПН України. 2-е видання, доповнене та перероблене. Київ: Юрінком Інтер.
- Кулалаєва, Н. В., Радкевич, В. А. і Леу, С. А., (2015). Экологическое образование преподавателей профессионально-технических учебных заведений в Украине. В: *Международная научно-практическая конференция*
- Кулалаєва, Н. В. (2017). Формування культури екологічної безпеки майбутніх фахівців будівельного профілю через проєктне навчання. *Збірник наукових праць НУК*, 3.
- Кулалаєва, Н., & Гайдук, О. (2021). Методична система професійної підготовки майбутніх кваліфікованих робітників з елементами дуальної форми навчання. *Професійна педагогіка*, 1(22), 96-103. <https://jrnls.ivet.edu.ua/index.php/1/issue/view/76>
- Курняк, Л. (2015). Екологічна культура: поняття та формування. Збірник наукових праць Хмельницького інституту соціальних технологій Університету «Україна», 10, 48–51.
- Лободинська, О.М. & Магазинщикова, І.П. (2018). Роль екологічних практик у формуванні екологічної компетентності фахівця з вищою освітою. *Науковий вісник НЛТУ України*, 28(2), 167–171.
- Лодатко, Є.О. (2022). *Педагогічне моделювання: монографія*. Тернопіль, Навчальна книга «Богдан».
- Лузан, П. Г., Манько, В. М., Нестерова, Л. В, & Романова, Г. М. (2014). *Теорія і практика впровадження інноваційних технологій навчання у професійну підготовку кваліфікованих робітників: монографія*. Київ: Поліграфсервіс.
- Лузан, П.Г., & Пасічник, І.П. (2023). Розвиток екологічної культури майбутніх фахівців морського транспорту: системний підхід. *Педагогічні науки: теорія, історія, інноваційні технології*. 4 (128), 393–406.



- 
- Лук'янова, Л. Б. (2016). *Основи екології, методика екологізації фахових дисциплін: навчально-методичний посібник для викладачів*. (вид. 2-ге змінене і доповнене). ДСК–Центр.
- Лук'янова, Л.Б. (2006). Теорія і практика екологічної освіти у професійно-технічних навчальних закладах: автореферат. Доктор наук. Київ: Інститут педагогічної освіти і освіти дорослих НАПН України.
- Манько, В. А. (2006). Проблемне навчання як актуальна науково-педагогічна проблема. *Засоби навчальної та науково-дослідної роботи*. Вип. 25. С. 102–106.
- Марченко, Т., Хацька, Л., Сагайдак, Дж., & Чубук, Л. (2020). Екологізація системи освіти в Україні в сучасному контексті. *Journal of Environmental Management & Tourism*, 11(43), 704-713.
- Маслак, Л.П., 2010. *Педагогічні умови формування культурологічної компетентності майбутніх офіцерів радіоінженерних спеціальностей*. Кандидат наук, Житомирський державний університет імені Івана Франка.
- Міжнародна конвенція по запобіганню забрудненню з суден (1973).  
[https://ips.ligazakon.net/document/MU73027?an=5481International Convention for the Prevention of Pollution from Ships \(1973\)](https://ips.ligazakon.net/document/MU73027?an=5481International%20Convention%20for%20the%20Prevention%20of%20Pollution%20from%20Ships%20(1973)).  
[https://www.imo.org/en/about/Conventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-\(MARPOL\).aspx](https://www.imo.org/en/about/Conventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-(MARPOL).aspx)
- Міністерство освіти і науки України, 2017. *Наскрізні змістові лінії*. [online] Доступно: <<https://mon.gov.ua/ua/osvita/zagalna-serednya-osvita/navchalni-programi/naskrizni-zmistovi-linii>> [Дата звернення 26 Липень 2021].
- Міністерство освіти і науки України, 2018. *Про затвердження стандарту вищої освіти за спеціальністю*
- Міністерство освіти і науки України. (2010, 01 жовтня). Стандарт вищої освіти України першого (бакалаврського) рівня освіти ступеня вищої освіти – бакалавр, галузі знань – 27 Транспорт, спеціальності – 271 Річковий та морський транспорт. <https://mon.gov.ua/storage/app/media/vishcha-osvita/2022/Standarty.Vyshchovi.Osvity/Zatverdzeni.Standarty/01/31/271-Richk.ta.morsk.transp-bak.31.01.22.pdf>
- Міністерство освіти і науки України. Нова українська школа, 2016. *Концептуальні засади реформування середньої школи*. [online] Доступно: <<https://mon.gov.ua/storage/app/media/zagalna%20serednya/nova-ukrainska-shkola-compressed.pdf>> [Дата звернення 26 Липень 2021].
- МОН України. (2020). *Стратегія розвитку професійної (професійно-технічної) освіти на період до 2023 року: рішення колегії МОН України, № 12/2-3*. <https://mon.gov.ua/storage/app/media/kolegiya-ministerstva/2020/12/.pdf>
- Морозова, Л., Бондарчук, А., & Варук, Ю. (2017). Роль екологічних цінностей у формуванні екологічної культури особистості. *Young Scientist*, 11(51), 46–50.
- Моторна, Л. (2008). Педагогічні умови застосування освітніх технологій в процесі викладання природничо-наукових дисциплін у технічних коледжах. In *Гуманізм та освіта: Збірник матеріалів ІХ Міжнар. наук.-практ. конф. (11-12 вересня 2008 року, м. Вінниця)* (с. 90–92). Вінниця: Вінницький національний технічний університет.

- 
- Найдьонова, Г.Г., & Фурдуй Я.О. (2018). Формування екологічної компетентності студентської молоді. *Наукові записки Центральноукраїнського державного педагогічного університету імені Володимира Винниченка. Сер. : Педагогічні науки*, 161, 124–129.
- Національна бібліотека України імені В.І. Вернадського, 2021. *Водні ресурси України*. [online] (Останнє оновлення 22 Березень 2021) Доступно: <<http://www.nbu.gov.ua/node/3972>> [Дата звернення 22 Липень 2021].
- Національний університет «Одеська морська академія». Офіційний портал. <http://www.onma.edu.ua/>
- Нікуліна, А. С., Заславська, С. І., Ничкало, Н. Г., & Яценко, Л. В. (2007). *Малярні роботи (інтегрований курс модульного навчання): у 3-х частинах. Частина перша*. Київ: Вікторія, 2007, 288 с.
- Організація Об'єднаних Націй. Україна. (2022). *Наша робота над досягненням Цілей сталого розвитку в Україні*. <https://ukraine.un.org/uk/sdgs>
- Осмоловський, А., & Василенко, Л. (2000). Від навчального проєкту до соціальної самореалізації особистості. *Шлях освіти*. 2, 34-37.
- Офіс залучення інвестицій (UkraineInvest) при Кабінеті Міністрів України. (2022, 31 травня).
- Перспективи підготовки і працевлаштування моряків. Інтернет-портал «Порти України». <https://ports.com.ua/articles/perspektivy-podgotovki-i-trudoustroystva-moryakov>.
- Плахотнік, О., & Головатюк, В. (2004). Інноваційні підходи до екологічної освіти молоді. *Наукові записки Ніжинського державного університету імені Миколи Гоголя. Серія : Психолого-педагогічні науки*, 3, 88–90.
- Пометун, О. І., Побірченко, Н. С (2008). *Інтерактивні технології: теорія та методика: посібник*. [https://dspace.udpu.edu.ua/jspui/bitstream/6789/377/1/interakt\\_tehn\\_teor\\_met.pdf](https://dspace.udpu.edu.ua/jspui/bitstream/6789/377/1/interakt_tehn_teor_met.pdf).
- Пономаренко, С. (2020). Екологічна культура як індикатор в галузі екологічної освіти. In *Інтеграція фундаментальних та прикладних досліджень в географічній, екологічній та хімічній освіті: матеріали VI Всеукр. наук.-практ. інтернет-конф. (27 листопада 2020 року, м. Умань) (с. 108–111)*. Умань: Сочінський М. М.
- Постанова Кабінету Міністрів України «Про затвердження Морської доктрини України на період до 2035 року»* (2009, 07 жовтня). <https://zakon.rada.gov.ua/laws/show/1307-2009-%D0%BF#Text>
- Президент України. (2019, 30 вересня). *Про Цілі сталого розвитку України на період до 2030 року (722/2019)* <https://www.president.gov.ua/documents/7222019-29825>
- Пустовіт, Н. А., Колонькова, О. О., Пруцакова, О. Л. (2014). *Формування екологічно доцільної поведінки школярів : [наук.-метод. посібник]*. Імекс-ЛТД.
- Радкевич, О.П., 2020. Теоретичні і методичні основи розвитку правової культури педагогічних працівників закладів професійної освіти. Доктора наук. Глухівський НПУ ім. О. Довженка.

- Резван, О., Кир'янова, О., 2020. Самоосвітня компетентність як результат свідомого підвищення кваліфікації викладача вищої школи. *Інноваційна педагогіка*, 27, с.149-152. <https://doi.org/10.32843/2663-6085/2020/27.30>
- Рішення Колегії Міністерства освіти і науки України «Про концепцію екологічної освіти в Україні» (2001, 20 грудня). <https://zakon.rada.gov.ua/rada/show/v6-19290-01#Text>
- «Річковий та морський транспорт» для першого (бакалаврського) рівня вищої освіти : наказ Міністерства освіти і науки України від 13.11.2018 № 1239. [online] Доступно: <<https://mon.gov.ua/storage/app/media/vishcha-osvita/zatverdzeni%20standarty/12/21/271-richkoviy-ta-morskiy-transport-bakalavr.pdf>> [Дата звернення 26 Липень 2021].
- Романова, Г. М. (2014). Проектування технологій професійного навчання майбутніх кваліфікованих робітників. *Професійно-технічна освіта*, 1, 11-15.
- Рулевська, Т. (2021). Педагогічні умови розвитку екологічної культури майбутніх фахівців морського і річкового транспорту у коледжах. *Professional Pedagogics*, 2(23), 87–94. <https://doi.org/10.32835/2707-3092.2021.23.87-94>
- Сасенко, Т.В. (2008). Освіта екобезпечного інформаційного суспільства: проблеми і перспективи: монографія. Київ : Освіта України.
- Сафранов, Т., Лукашов, Д., Шелест, З., Владимірова, О., & Чугай, А. (2017). Стандарти вищої екологічної освіти в Україні: сучасний стан та проблеми впровадження. *Вісник Харківського національного університету імені В. Н. Каразіна. Серія «Екологія»*, 16, 141-149.
- Сисоєва, С. О. (2011). *Інтерактивні технології навчання дорослих: навчально-методичний посібник*. ВД «ЕКМО».
- Сисоєва, С.О. та Кристопчук, Т.Є., 2013. *Методологія науково-педагогічних досліджень* : підр. Рівне: Волинські обереги.
- Столярченко О.Б., 2012. *Психологія особистості* : навч. посіб. Київ: Центр учбової літератури. Хриков, Є.М., 2011. Педагогічні умови в структурі наукового знання. *Шлях освіти*, 2, с. 11-15. BBC NEWS, 2019. *Екологічна катастрофа: головні загрози нашій планеті у п'яти графіках*. [online] (Останнє оновлення 08 Травень 2019) Доступно: <<https://www.bbc.com/ukrainian/features-48169628>> [Дата звернення 22 Липень 2021].
- «Тенденции и перспективы создания региональных систем дополнительного образования взрослых». Витебск: УО «ВГТУ», с. 143-146.
- Ткаченко, Т. М. (2022, 31 травня). Перспективи зеленого будівництва у майбутньому відновленні України. *Децентралізація в Україні*. <https://decentralization.gov.ua/news/15011/20223005>.
- Толочко, С., & Шкодин, А. (2017). Формування екологічної компетентності студентів агротехнічних спеціальностей ВНЗ. *Екологічні науки*, 18-19, 165-172.
- Туниця, Ю., Адамовський, М., Борис, М., Раєвський, С., & Магазинщикова, І. (2015). Екологізація освіти як ключовий фактор підготовки фахівців для сталого розвитку. *Науковий вісник Національного лісотехнічного університету України*, 25, 348-355.
- Що таке зелене будівництво та чому це важливо? <https://ukraineinvest.gov.ua/uk/news/31-05-22-2/>. Henkel (2015). Системи CeresitCerethetm. Сучасні та надійні рішення. <http://ceresit-pro.net/wp->

---

[content/uploads/2015/12/Suchasni-ta-nadiyni-rishennya.-Sistemi-uteplennya-Ceresit.pdf](#).

Ягупов, В. В. (2003). *Педагогіка: [навч. посіб.]*. Либідь.

- Ahuja, S., Gavin, M., Grabowski, S., Hassanli, N., Hergesell, A., Jarvis, W. ... & Weatherall, R. (2023). Collectively creating conditions that nurture: The bushland as metaphor for the academic ecosystem. In A. Bristow, O. Ratle & S. Robinson (Eds.), *Doing Academic Careers Differently: Portraits of Academic Life* (pp. 198-217). Taylor & Francis. <https://www.taylorfrancis.com/chapters/edit/10.4324/9781003267553-13/collectively-creating-conditions-nurture-sumati-ahuja-mihajla-gavin-simone-grabowski-najmeh-hassanli-anja-hergesell-walter-jarvis-pavlina-jasovska-ece-kaya-alice-klettner-helena-liu-jennie-small-christopher-walker-ruth-weatherall>
- Bazeliuk, O., 2020. Organizational and pedagogical conditions of development of digital culture of pedagogical employees. *Professional Pedagogics*, 2(21), p. 21-28. <https://doi.org/10.32835/2707-3092.2020.21.21-28>.
- Cavagnaro, E., & Curiel, G. H. (2022). *The three levels of sustainability*. Taylor & Francis. <https://doi.org/10.4324/9781003155614>
- Chen, J. (2020). *Evaluating the economic feasibility of the Passive House in China*. Stockholm: Royal Institute of Technology. <https://www.diva-portal.org/smash/get/diva2:1447885/FULLTEXT01.pdf>. *HowStuffWorks.com*. (2011, 21 March). Fenlon, W. 10 Technologies Used in Green Construction. <https://home.howstuffworks.com/home-improvement/construction/green/10-technologies-used-in-green-construction.htm>.
- Copenhagen Hospitality College. (2024). *Kurser og teambuilding* [Courses and team building]. <https://hrs.dk/kurser-og-teambuilding>
- De Haan, G., Holst, J., & Singer-Brodowski, M. (2021). Berufliche Bildung für nachhaltige Entwicklung (BBNE) Genese, Entwicklungsstand und mögliche Transformationspfade. *Zeitschrift des Bundesinstituts für Berufsbildung*. 3/2021(50), 10-14. <https://www.bwp-zeitschrift.de/dienst/veroeffentlichungen/de/bwp.php/de/bwp/show/17293>
- Ecobusiness. (2020, 23 березня). Як Японія вирішує екологічні проблеми <https://ecolog-ua.com/news/yak-yaponiya-vyrishuye-ekologichni-problemy>.
- Eco-lighthouse. (2024). *The certification scheme*. <https://eco-lighthouse.org/certification-scheme/> Escuela de Hostelería de Sevilla [Seville Hospitality School]. (2024). *Technical training*. <https://www.esh.es/en/technical-training/>
- Font, X. (2002). Environmental certification in tourism and hospitality: progress, process and prospects. *Tourism Management*, 23, 197-205. [https://www.academia.edu/download/51294930/s0261-5177\\_2801\\_2900084-x20170110-15693-1c3yhbd.pdf](https://www.academia.edu/download/51294930/s0261-5177_2801_2900084-x20170110-15693-1c3yhbd.pdf)
- Gibberd, J. (2020). Green Building Technologies. In: Yang, P., ed. *Cases on Green Energy and Sustainable Development*. Hershey, PA: IGI Global, 2020. <https://doi.org/10.4018/978-1-5225-8559-6>.
- Green Key & Green Dreams. (2024). *About Green Key*. <https://www.greenkey.dk/en/about-green-key/> Legrand, W., Kuokkanen, H., & Day, J., & (2023). *Critical questions in sustainability and hospitality*.
- Greenfield E. (2022, September 26). Need and Importance of Environmental Education. *Sigma Earth*. <https://sigmaearth.com/need-and-importance-of-environmental-education/>

- 
- Hauptausschuss des BIBB (2020, 17 November). *Anwendung der Standardberufsbildpositionen in der Ausbildungspraxis*. [www.bibb.de/dokumente/pdf/HA172.pdf](http://www.bibb.de/dokumente/pdf/HA172.pdf)  
<https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf>
- Johnson, D. and Johnson, R., 1999 *Learning together and alone: cooperative, competitive, and individualistic learning*. Boston: Allyn and Bacon.
- Kastrup, J., Kuhlmeier, W., & Strotmann, Chr. (2021). Entwicklung nachhaltigkeitsbezogener Kompetenzen in der Ausbildung. Ein Strukturmodell für Lebensmittelhandwerk und – industrie. *Zeitschrift des Bundesinstituts für Berufsbildung*, 3/2021(50), 10-14. <https://www.bwp-zeitschrift.de/de/bwp.php/de/publication/download/17284>
- KSE Institute. (2022, 1 вересня). *Звіт про прямі збитки інфраструктури від руйнувань внаслідок військової агресії росії проти України станом на 1 вересня 2022 року*. [https://kse.ua/wp-content/uploads/2022/10/Sep22\\_FINAL\\_Sep1\\_Damages-Report.docx.pdf](https://kse.ua/wp-content/uploads/2022/10/Sep22_FINAL_Sep1_Damages-Report.docx.pdf)
- Kudryavtseva, V., Barsuk, S., & Frolova, O. (2022). Enhancing Green Skills in Maritime English Course. *22nd Annual General Assembly, IAMU AGA 2022 – Proceedings of the International Association of Maritime Universities, IAMU Conference*, Batumi, Georgia, 29-34.
- Maslow, A., 1943. A Theory of Human Motivation. *A Theory of Human Motivation*, 50 (4), p. 370–396.
- Mind (2020, 7 липня). *Мехтієв, Р. Екологічне будівництво: як і навіщо проходити міжнародну сертифікацію*. <https://mind.ua/openmind/20212905-ekologichne-budivnictvo-yak-i-navishcho-prohoditi-mizhnarodnu-ekosertifikaciy>.
- Padgett, D. (2016). *Qualitative Methods in Social Work Research*. Sage publications. 2nd ed. Thousand Oaks, CA: Sage Publications.
- Pantelidis, I. S. (2014). *The Routledge handbook of hospitality management*. Taylor & Francis. <https://doi.org/10.4324/9781315814353>
- Roth, H. (1971). *Pädagogische Anthropologie. Band II: Entwicklung und Erziehung*. Hannover: Hermann Schroedel Verlag.
- Salem, R., Bahadori-Jahromi, A., Mylona, A., Godfrey, P., & Cook, D. (2019). Investigating the potential impact of energy-efficient measures for retrofitting existing UK hotels to reach the nearly zero energy building (nZEB) standard. *Energy Efficiency*, 12, 1577–1594. <https://doi.org/10.1007/s12053-019-09801-2>
- Sauvé, L. (2002). Environmental education: possibilities and constraints. *Connect. UNESCO International Science, Technology & Environmental Education Newsletter*, 27(1-2):1-4.
- Stern, S., Kohli A., Steinemann, M., Petry Chr., & De Rocchi, A. (2020). Nachhaltige Entwicklung in der Berufsbildung. In *Orientierungshilfe Nachhaltige Entwicklung in der Berufsbildung*. Bern, 15 Dezember, (p. 9). Bern: Staatssecretariat für Bildung, Forschung und Innovation (SBFI). [https://www.sbfi.admin.ch/dam/sbfi/de/dokumente/2021/01/orientierungshilfe.pdf.download.pdf/orientierungshilfe-nachhaltige-entwicklung\\_d.pdf](https://www.sbfi.admin.ch/dam/sbfi/de/dokumente/2021/01/orientierungshilfe.pdf.download.pdf/orientierungshilfe-nachhaltige-entwicklung_d.pdf)
- Taylor & Francis. <https://doi.org/10.4324/9781003218425>
- The European Sustainable Hospitality Club. (2024). *Operational and strategy support for hotels*. <https://www.eshclub.com/> The Sustainable Restaurant Association. (2024). *Accelerating a sustainable future for the hospitality industry*. <https://thesra.org/>

- 
- The University of Stavanger. (2024). *The Norwegian School of Hotel Management*. <https://www.uis.no/en/about-uis/the-norwegian-school-of-hotel-management>
- The University of West London. (2024). *Study*. <https://www.uwl.ac.uk/courses>
- UNESCO. UNESDOC Digital Library (2020). Education for sustainable development: a roadmap. <https://unesdoc.unesco.org/ark:/48223/pf0000374802.locale=en>
- United Nations Sustainable Development (1992). AGENDA 21. In *United Nations Conference on Environment & Development Rio de Janeiro, Brazil, 3 to 14 June 1992*.
- Xiao, X., Shah, S. P., & Xiao, J. (2023). Editorial: Low-carbon Materials and Green Construction. *Low-carbon Mater. Green Constr*, 1. <https://doi.org/10.1007/s44242-022-00009-9>.
- Yershov, M.-O., 2019. Digitalisation of professional (vocational) and pre-high tertiary education: problems and prospects. *Professional Pedagogics*, 18, p.67-74. <https://doi.org/10.32835/2223-5752.2019.18.67-74>

## Translated & Transliterated

- Absaliyeva, Ya., & Lukianova, V. (2017). Formuvannya ekolohichnoi kompetentnosti maibutnikh fakhivtsiv zasobamy sotsialno-humanitarnykh dystsyplin [Formation of environmental competence of future specialists by means of social and humanitarian disciplines]. *Scientific Letters of Academic Society of Michal Baludansky*, 2, 6-7, [in Ukrainian].
- Ahuja, S., Gavin, M., Grabowski, S., Hassanli, N., Hergesell, A., Jarvis, W. ... & Weatherall, R. (2023). Collectively creating conditions that nurture: The bushland as metaphor for the academic ecosystem. In A. Bristow, O. Ratle & S. Robinson (Eds.), *Doing Academic Careers Differently: Portraits of Academic Life* (pp. 198-217). Taylor & Francis. <https://www.taylorfrancis.com/chapters/edit/10.4324/9781003267553-13/collectively-creating-conditions-nurture-sumati-ahuja-mihajla-gavin-simone-grabowski-najmeh-hassanli-anja-hergesell-walter-jarvis-pavlina-jasovska-ece-kaya-alice-klettner-helena-liu-jennie-small-christopher-walker-ruth-weatherall>, [in English].
- Anishchenko, V. M., Artiushyna, M. V., Herliand, T.M., Kulalaieva, N. V., Romanova, H. M., Shymanovskyi, M. M., & Piatnychuk, T. V. (2019). *Teoriia i praktyka proiektnoho navchannia u profesiino-tekhnichnykh navchalnykh zakladakh: Monohrafiia [Theory and practice of project-based learning in vocational and technical educational institutions]*. Zhytomyr: Polissia, [in Ukrainian].
- Bairamova, O., 2017. Ekolohichna osvita v morskykh vyshchykh navchalnykh zakladakh: teoretychnyi aspekt [Ecological education in maritime higher educational institutions: theoretical aspect]. *Science and Education a New Dimension. Humanities and Social*, 20 (120), r. 45-48.
- Bayramova, O.V. (2020). Ekolohichna osvita moriakiv yak umova zabezpechennia staloho rozvytku liudstva. [Environmental education of sailors as a condition for ensuring the sustainable development of mankind] In Actual problems of natural sciences: modern scientific discussions : Collective monograph. Riga: Izdavnictva "Baltija Publishing". <https://doi.org/10.30525/978-9934-588-45-7.1>, [in Ukrainian].

- Bazeliuk, O., 2020. Organizational and pedagogical conditions of development of digital culture of pedagogical employees. *Professional Pedagogics*, 2(21), p. 21-28. <https://doi.org/10.32835/2707-3092.2020.21.21-28>, [in English].
- BBC NEWS, 2019. *Ekolohichna katastrofa: holovni zahrozy nashii planeti u piaty hrafikakh* [Ecological catastrophe: the main threats of our planet in five graphs]. [online] (Ostannie onovlennia 08 Traven 2019) Dostupno: <<https://www.bbc.com/ukrainian/features-48169628>> [Data zvernennia 22 Lypen 2021], [in Ukrainian].
- Biliavskiy, H. O., Furdui, R. S., Kostikov, I. Yu. (2005). *Osnovy ekolohii: pidruchnyk*. (2-e vyd.). Lybid.
- Bud-Info. (2019, September 30). *Ekolohichno chysti budivelni materialy* [Environmentally friendly building materials]. <https://bud-info.net.ua/materialy-dlya-budivnytstva-ta-remontu/ekolohichno-chysti-materialy-dlia-budivnytstva/>, [in Ukrainian].
- Busel, V.T., red., 2001. *Velykyi tlumachnyi slovnyk suchasnoi ukrainskoi movy*. Irpin: VTF Perun, [in Ukrainian].
- Cavagnaro, E., & Curiel, G. H. (2022). *The three levels of sustainability*. Taylor & Francis. <https://doi.org/10.4324/9781003155614>, [in English].
- Chen, J. (2020). *Evaluating the economic feasibility of the Passive House in China*. Stockholm: Royal Institute of Technology, 36 pp., [in English].
- Copenhagen Hospitality College. (2024). *Kurser og teambuilding* [Courses and team building]. <https://hrs.dk/kurser-og-teambuilding>, [in English].
- Danylchenko, I. H. (2003). *Problemne navchannia v systemi innovatsii suchasnoi literaturnoi osvity*. Visnyk. Hlukhiv, Vyp.3, s.171-174.
- DBN V.1.2-8-2008 «Osnovni vymohy do budivel i sporud: bezpeka zhyttia i zdorovia liudyny ta zakhyst navkolyshnoho pryrodnoho seredovyscha» <http://kbu.org.ua/assets/app/documents/dbn2/>.
- De Haan, G., Holst, J., & Singer-Brodowski, M. (2021). Berufliche Bildung für nachhaltige Entwicklung (BBNE) Genese, Entwicklungsstand und mögliche Transformationspfade. *Zeitschrift des Bundesinstituts für Berufsbildung*. 3/2021(50), 10-14. <https://www.bwp-zeitschrift.de/dienst/veroeffentlichungen/de/bwp.php/de/bwp/show/17293> [in German].
- Diui, D. (2003). *Dosvid i osvita [Experience and education]: [per. z anhl. Marii Vasylechko]*. Lviv: Kalvariia, [in Ukrainian].
- Dominant (n.d.). *Zelenebudivnytstvo i ekotehnolohii* [Green construction and ecotechnologies]. <https://dominant-wood.com.ua/ua/news/285-zelenebudivnytstvo-i-ekotehnologiyi>, [in Ukrainian].
- Dulia, A. V., 2016. *Ekolohichne vykhovannia kursantiv morskyykh navchalnykh zakladiv* [Ecological education of cadets of maritime educational institutions]. *Tavriiskyi visnyk osvity [Taurian Bulletin of Education]*, 1, s. 81-84.
- Dzham, O.A. (2016). *Ekolohichna kompetentnist yak pokaznyk yakosti ekolohichnoi osvity ta ekolohichnoi bezpeky u systemi pryntsyviv i stratehii staloho rozvytku* [Environmental competence as an indicator of the quality of environmental education and environmental safety in the system of principles and strategies of sustainable development]. *Visnyk Kharkivskoho natsionalnoho universytetu imeni*

- V. N. Karazina. *Seriia : Ekolohiia [Bulletin of Kharkiv National University named after V. N. Karazin. Series: Ecology]*, 14, 102–105, [in Ukrainian].
- Ecobusiness (2020, March 23). Yak Yaponiia vyrishuie ekolohichni problem [How Japan solves environmental problems]. <https://ecolog-ua.com/news/yak-yaponiya-vyrishuye-ekologichni-problemy>, [in Ukrainian].
- Eco-lighthouse. (2024). *The certification scheme*. <https://eco-lighthouse.org/certification-scheme/>, [in English].
- Ekodoma – sait pro ekolohichni budynky. (2023, June 15). Ekolohichnochysti budivelni materialy [Ecologically clean building materials.]. <https://ecodoma.in.ua/ecologichnie-strojmateriali.html>, [in Ukrainian].
- Entsyklopediia osvity / APN Ukrainy ; holov. red. V. H. Kremen. Druhe vydannia, dopovnene ta pereroblene. Kyiv : Yurinkom Inter, 2021. 1143 s.
- Escuela de Hostelería de Sevilla [Seville Hospitality School]. (2024). *Technical training*. <https://www.esh.es/en/technical-training/>, [in English].
- Fedoryk, M. & Moskalyk G. (2009). Osnovi ekolohiyi [Fundamentals of ecology]. Chernivtsi: ChNU [in Ukrainian].
- Fenlon, W. (2011, 21 March). 10 Technologies Used in Green Construction. HowStuffWorks.com. <https://home.howstuffworks.com/home-improvement/construction/green/10-technologies-used-in-green-construction.htm>, [in English].
- Font, X. (2002). Environmental certification in tourism and hospitality: progress, process and prospects. *Tourism Management*, 23, 197–205. [https://www.academia.edu/download/51294930/s0261-5177\\_2801\\_2900084-x20170110-15693-1c3yhbd.pdf](https://www.academia.edu/download/51294930/s0261-5177_2801_2900084-x20170110-15693-1c3yhbd.pdf), [in English].
- Goncharenko, S. (2000). Metodika yak nauka [Methodology as science]. Shlyah osviti, 1, 2–6 [in Ukrainian]. Karpenko, O. (2019). Ekologichna gramotnist i metod proektiv [Environmental literacy and project method]. Zbirnik tez dopovidey «Krok u nauku: doslidzhennya u galuzi prirodnicho-matematichnih distsiplin ta metodik yih navchannya» (s. 80–81) [in Ukrainian].
- Green Key □ Green Dreams. (2024). *About Green Key*. <https://www.greenkey.dk/en/about-green-key/>, [in English].
- Haiduk, O. V., Herliand, T. M., Kalenskyi, A. A., & Piatnychuk, T. V. (2022). *Rozroblennia i zastosuvannia ekoorientovanykh pedahohichnykh tekhnolohii dlia profesiinoi pidhotovky maibutnikh kvalifikovanykh robotnykiv budivelnoi, ahrarnoi haluzei ta sfery restorannoho hospodarstva [Developing and applying eco-oriented pedagogical technologies for t professional training of future skilled workers in the construction, agricultural and restaurant industries]*. The Institute of VET of the NAES of Ukraine. [https://lib.iitta.gov.ua/733669/1/Метод%20посібн\\_Екоорієнтовані%20технолорії.pdf](https://lib.iitta.gov.ua/733669/1/Метод%20посібн_Екоорієнтовані%20технолорії.pdf), [in Ukrainian].
- Hauptausschuss des BIBB (2020, 17 November). *Anwendung der Standardberufsbildpositionen in der Ausbildungspraxis*. [www.bibb.de/dokumente/pdf/HA172.pdf](http://www.bibb.de/dokumente/pdf/HA172.pdf) [in German].
- Henkel (2015). Systemy Ceresit Cerethetm. Suchasni ta nadiini rishennia [Ceresit Cerethetm Systems. Modern and reliable solutions], 176 pp. <http://ceresit-pro.net/wp-content/uploads/2015/12/Suchasni-ta-nadiyni-rishennya.-Sistemi-uteplennya-Ceresit.pdf>, [in Ukrainian].



- 
- Herliand, T. (2019). Profesiina pidhotovka maibutnoho kvalifikovanykh robotnykiv u profesiinykh (profesiino-tekhnichnykh) navchalnykh zakladakh na bazi na modulno-kompetentnisnomu pidkhodi [Professional training of future skilled workers in professional (vocational) education schools based on modular and competence approach]. *Scientific herald of the Institute of vocational education and training of NAES of Ukraine. Professional Pedagogy*, 2(19), 18-23. <https://doi.org/10.32835/2223-5752.2019.19.18-23> [in English].
- Hlushchenko, O. V., Romanov, L. A., Pashchenko, T. M., Piatnychuk, T. V., & Shymanovskyi, M. M. (2019). *Proiektni tekhnolohii navchannia uchniv profesiinykh (profesiino-tekhnichnykh) navchalnykh zakladiv : dovidnyk [Design technologies of training students of professional (vocational and technical) educational institutions: a guide]*. (L. A. Romanov, red.). Zhytomyr: Polissia, [in Ukrainian].
- Holoborodko, V. V., & Hniedashev, V. M. (2005). *Naukova robota uchniv: prohrama orhanizatsii naukovo- doslidnoi diialnosti uchniv [Scientific work of students: the program for organizing scientific research activities of students]*. Kyiv: Osnova, [in Ukrainian].
- Honcharenko, S. U. (2011). *Ukrainskyi pedahohichnyi entsyklopedychnyi slovnyk*. (vyd. 2-he, dop. y vyp). Rivne: Volynski oberehy. <https://sustainabledevelopment.un.org/content/documents/Agenda21.pdf> [in English]
- Hurenkova, O. (2009). *Formuvannia ekolohichnoi kompetentnosti maibutnikh fakhivtsiv vodnoho transportu v umovakh kredytno-modulnoi systemy navchannia [Formation of environmental competence of future water transport specialists in the conditions of the credit-module system of education]: avtoref. dys. (kand. ped. nauk) [author's abstract. thesis (candidate of pedagogic sciences)]*. Kyiv: Instytut problem vykhovannia APN Ukrainy, [in Ukrainian].
- Hurenkova, O., 2011. Komponentno-kryterialna struktura ekolohichnoi kompetentnosti maibutnikh fakhivtsiv vodnoho transportu [Component-criterion structure of ecological competence of future water transport specialists]. *Osvita doroslykh: teoriia, dosvid, perspektyvy [Adult education: theory, experience, prospects]*, 3(1), s. 125-131.
- Investment Promotion Office (UkraineInvest) at the Cabinet of Ministers of Ukraine (2022, May 31). Shcho take zelene budivnytstvo ta chomu tse vazhlyvo? [What is green construction and why is it important?]. <https://ukraineinvest.gov.ua/uk/news/31-05-22-2/>, [in Ukrainian].
- Johnson, D. and Johnson, R., 1999 *Learning together and alone: cooperative, competitive, and individualistic learning*. Boston: Allyn and Bacon, [in English].
- Kabinet Ministriv Ukrainy. (2021). *Pro zatverdzhennia Natsionalnoi ekonomichnoi stratehii na period do 2030 roku [Cabinet of Ministers of Ukraine. On the approval of the National Economic Strategy for the period until 2030]. Postanova vid 03 bereznia 2021 r. № 179*. <https://www.kmu.gov.ua/npas/pro-zatverdzhennya-nacionalnoyi-eko-a179>, [in Ukrainian]
- Kalenskyi, A. A. (2023). Keis-metody v ekoorientovanii profesiinii pidhotovtsi kvalifikovanoho robotnyka za profesiieiu “Kukhar” [Eco-oriented professional training of a skilled worker in the profession of “Chef”]. *Visnyk Hlukhivskoho natsionalnoho pedahohichnoho universytetu imeni Oleksandra Dovzhenka. Serii: Pedahohichni nauky [Oleksandr Dovzhenko Hlukhiv National Pedagogical University Bulletin. Series: Pedagogical Sciences]*, 52, 23-27.

- 
- <https://journals.indexcopernicus.com/api/file/viewByFileId/1763413>, [in Ukrainian].
- Kastrup, J., Kuhlmeier, W., & Strotmann, Chr. (2021). Entwicklung nachhaltigkeitsbezogener Kompetenzen in der Ausbildung. Ein Strukturmodell für Lebensmittelhandwerk und – industrie. *Zeitschrift des Bundesinstituts für Berufs- bildung*, 3/2021(50), 10-14. <https://www.bwp-zeitschrift.de/de/bwp.php/de/publication/download/17284> [in German].
- Khrykov, Ye.M., 2011. Pedagogichni umovy v strukturі naukovoho znannia [Pedagogical conditions in the structure of scientific knowledge]. *Shliakh osvity [The path of education]*, 2, s. 11-15, [in Ukrainian].
- Kovalchuk, V.I. ta Maslich, S.V., 2020. Stvorennia seredovyscha profesiinoho rozvytku pedagogichnykh pratsivnykiv zakladu profesiinoi (profesiino-tehnichnoi) osvity [Creating of the environment of professional development of pedagogical workers of the vocational education]. *Visnyk Hlukhivskoho natsionalnoho pedagogichnoho universytetu imeni Oleksandra Dovzhenka [Bulletin of the Hlukhiv National Pedagogical University named after Oleksandr Dovzhenko]*, 43, s. 29-37. DOI: 10.31376/2410-0897-2020-2-43-29-37 [Data zvernennia 26 Lypen 2021], [in Ukrainian].
- Kremen, V H. (2015). Profesiinyi rozvytok osobystosti – kliuchove zavdannia v umovakh yevrointehratsii [Professional development of the individual is a key task in the conditions of European integration]. In V. H. Kremen, M. F. Dmytrychenko, N. H. Nychkalo (Reds.), *Kontseptualni zasady profesiinoho rozvytku osobystosti v umovakh yevrointehratsiinykh protsesiv: zbirnyk naukovykh statei [Conceptual principles of professional development of the individual in the conditions of European integration processes: coll. of science articles]* (s. 9-11). Kyiv: NTU, [in Ukrainian].
- Kremen, V. H. (Red.). (2021). *Entsyklopediia osvity [Encyclopedia of Education]*. Druhe vydannia, dopovnene ta pereroblene. Kyiv: Yurinkom Inter.
- KSE Institute. (2022, 1 вересня). *Звіт про прямі збитки інфраструктури від руйнувань внаслідок військової агресії росії проти України станом на 1 вересня 2022 року. [Report on direct damage to infrastructure from destruction as a result of Russia's military aggression against Ukraine as of September 1, 2022]*. [https://kse.ua/wp-content/uploads/2022/10/Sep22\\_FINAL\\_Sep1\\_Damages-Report.docx.pdf](https://kse.ua/wp-content/uploads/2022/10/Sep22_FINAL_Sep1_Damages-Report.docx.pdf) [in English].
- Kudryavtseva, V., Barsuk, S., & Frolova, O. (2022). Enhancing Green Skills in Maritime English Course. *22nd Annual General Assembly, IAMU AGA 2022 – Proceedings of the International Association of Maritime Universities, IAMU Conference, Batumi, Georgia, 29-34*, [in English].
- Kulalaeva, N. V., Radkevich, V. A. i Leu, S. A., 2015. Ekologicheskoe obrazovanie prepodavateley professionalno-tehnicheskikh uchebnykh zavedeniy v Ukraine [Ecological education of teachers of vocational schools in Ukraine.]. V: *Mezhdunarodnaya nauchno-prakticheskaya konferentsiya «Tendentsii i perspektivyi sozdaniya regionalnykh sistem dopolnitelnogo obrazovaniya vzroslykh» [International scientific-practical conference «Trends and prospects for the creation of regional systems of additional education for adults»]*. Vitebsk: UO «VGTU», s. 143-146, [in Russian].

- 
- Kulalaieva, N. V. (2017). Formuvannia kultury ekolohichnoi bezpeky maibutnikh fakhivtsiv budivelnogo profilu cherez proiektne navchannia [Formation of the culture of environmental safety of future specialists of the construction profile through project training]. *Zbirnyk naukovykh prats NUK*, 3, [in Ukrainian].
- Kulalaieva, N., & Haiduk, O. (2021). Metodychna systema profesiinoi pidhotovky maibutnikh kvalifikovanykh robitnykiv z elementamy dualnoi formy navchannia [A methodical system of professional training for future skills workers with elements of dual education]. *Profesiina pedahohika [Professional Pedagogics]*, 1(22), 96-103. <https://jrnls.ivet.edu.ua/index.php/1/issue/view/76>, [in Ukrainian].
- Kurnyak, L. (2015). Ekologichna kultura: ponyattya ta formuvannya. [Ecological culture: understanding that molding]. *Zbirnik naukovih prats Hmel'nitskogo Institutu sotsialnih tehnologiy Universitetu «Ukrayina»*, 10, 48–51 [in Ukrainian].
- Legrand, W., Kuokkanen, H., & Day, J., & (2023). *Critical questions in sustainability and hospitality*. Taylor & Francis. <https://doi.org/10.4324/9781003218425>, [in English].
- Lobodynska, O.M., & Mahazynshchykova, I.P. (2018). Rol ekolohichnykh praktyk u formuvanni ekolohichnoi kompetentnosti fakhivtsia z vyshchoiu osvitoiu [The role of environmental practices in the formation of environmental competence of a specialist with higher education]. *Naukovyi visnyk NLTU Ukrainy [Scientific bulletin of NLTU of Ukraine]*, 28(2), 167–171, [in Ukrainian].
- Lodatko, Ye.O. (2022). Pedahohichne modeliuvannia: monohrafiia. [Pedagogical modeling: monograph]. Ternopil, Navchalna knyha "Bohdan", [in Ukrainian]
- Lukianova, L. B. (2016). *Osnovy ekolohii, metodyka ekolohizatsii fakhovykh dystsyplin: Navchalno-metodychnyi posibnyk dlia vykladachiv. (vyd. 2-he zminene i dopovnene) [Fundamentals of ecology, methods of greening professional disciplines: A textbook for teachers]*. DSK – Tsentr, [in Ukrainian].
- Lukianova, L.B. (2006). *Teoriia i praktyka ekolohichnoi osvity u profesiino-tekhnichnykh navchalnykh zakladakh: avtoreferat*. Doktor nauk. Kyiv, Instytut pedahohichnoi osvity i osvity doroslykh NAPN Ukrainy [Theory and practice of environmental education in vocational and technical educational institutions: abstract. PHD. Kyiv, Institute of Pedagogical Education and Adult Education of the National Academy of Sciences of Ukraine], [in Ukrainian].
- Lukianova, L. B. (2016). *Osnovy ekolohii, metodyka ekolohizatsii fakhovykh dystsyplin: Navchalno-metodychnyi posibnyk dlia vykladachiv. (vyd. 2-he zminene i dopovnene)*. TOV «DSK – Tsentr».
- Luzan, P. H., Manko, V. M., Nesterova, L. V., & Romanova, H. M. (2014). *Teoriia i praktyka vprovadzhennia innovatsiinykh tekhnolohii navchannia u profesiinu pidhotovku kvalifikovanykh robitnykiv: monohrafiia [Theory and practice of introducing innovative learning technologies into professional training of skilled workers: monograph]*. Kyiv: Polihrafservis, [in Ukrainian].
- Luzan, P.H., & Pasichnyk, I.P. (2023). Rozvytok ekolohichnoi kultury maibutnikh fakhivtsiv morskoho transportu: systemnyi pidkhid [Development of environmental culture of future maritime transport specialists: a systematic approach]. *Pedahohichni nauky: teoriia, istoriia, innovatsiini tekhnolohii [Pedagogical sciences: theory, history, innovative technologies]*, 4 (128), 393–406, [in Ukrainian].
- Manko, V. A. (2006). Problemne navchannia yak aktualna naukovo-pedahohichna problema. Zasoby navchalnoi ta naukovo-doslidnoi roboty. Vyp. 25. S. 102–106.

- 
- Marchenko, T., Khatska, L., Sahaidak, Dzh., & Chubuk, L. (2020). Ekolohizatsiia systemy osvity v Ukraini v suchasnomu konteksti [Greening of the education system in Ukraine in the modern context]. *Journal of Environmental Management & Tourism*, 11(43), 704-713, [in Ukrainian].
- Maslak, L.P., 2010. *Pedahohichni umovy formuvannia kulturolohichnoi kompetentnosti maibutnikh ofitseriv radioinzhenernykh spetsialnostei* [Pedagogical conditions for the formation of culturological competence of future officers of radio engineering specialties]. Kandydat nauk, Zhytomyrskyi derzhavnyi universytet imeni Ivana Franka [Zhytomyr State University named after Ivan Franko], [in Ukrainian].
- Maslow, A., 1943. A Theory of Human Motivation. *A Theory of Human Motivation*, 50 (4), p. 370–396, [in English].
- Mind. (2020, July7). Mekhtiiev, R. Ekolohichne budivnytstvo: yak i navishcho prokhodyty mizhnarodnu sertyfikatsiiu [Ecological construction: how and why to pass international certification.]. <https://mind.ua/openmind/20212905-ekologichne-budivnictvo-yak-i-navishcho-prohoditi-mizhnarodnu-ekosertifikaciy>, [in Ukrainian].
- Ministerstvo osvity i nauky Ukrayini (2018, 13 listopada). Pro zatverdzhennya standartu vischoyi osvity za spetsialnistyu 271 «Richkoviy ta morskiiy transport» dlya pershogo (bakalavrskogo) rivnya vischoyi osvity [About approval of the standard of higher education for the specialty 271 «Richkoviy and maritime transport» for the first (bachelor's) level of higher education]. <https://mon.gov.ua/storage/app/media/vishcha-osvita/2022/Standarty.Vyshchoyi.Osvity/Zatverdzeni.Standarty/01/31/271-Richk.ta.morsk.transp-bak.31.01.22.pdf> [in Ukrainian].
- Ministerstvo osvity i nauky Ukrainy [Ministry of education and science of Ukraine], 2017. *Naskrizni zmistovi linii* [Through lines of meaning]. [online] Dostupno: <<https://mon.gov.ua/ua/osvita/zagalna-serednya-osvita/navchalni-programi/naskrizni-zmistovi-liniyi>> [Data zvernennia 26 Lypen 2021], [in Ukrainian].
- Ministerstvo osvity i nauky Ukrainy [Ministry of education and science of Ukraine], 2018. *Pro zatverdzhennia standartu vyshchoi osvity za spetsialnistiu 271 «Richkoviy ta morskiiy transport» dlia pershoho (bakalavrskoho) rivnia vyshchoi osvity : nakaz Ministerstva osvity i nauky Ukrainy vid 13.11.2018 № 1239*. [About approval on standard of higher education by specialty 271 «River and maritime transport» for the first (bachelor's) level of higher education: order of the Ministry of education and science of Ukraine from 13.11.2018 № 1239]. [online] Dostupno: <<https://mon.gov.ua/storage/app/media/vishcha-osvita/zatverdzeni%20standarty/12/21/271-richkoviy-ta-morskiiy-transport-bakalavr.pdf>> [Data zvernennia 26 Lypen 2021], [in Ukrainian].
- Ministerstvo osvity i nauky Ukrainy. (2010, October 1). Standart vyshchoi osvity Ukrainy pershoho (bakalavrskoho) rivnia osvity stupenia vyshchoi osvity – bakalavr, haluzi znan – 27 Transport, spetsialnosti – 271 Richkoviy ta morskiiy transport [The standard of higher education of Ukraine of the first (bachelor's) level of education - bachelor's degree, fields of knowledge - 27 Transport, specialties - 271 River and sea transport.]. <https://mon.gov.ua/storage/app/media/vishcha-osvita/2022/Standarty.Vyshchoyi.Osvity/Zatverdzeni.Standarty/01/31/271-Richk.ta.morsk.transp-bak.31.01.22.pdf>, [in Ukrainian].

- 
- Ministerstvo osvity i nauky Ukrainy. Nova ukrainska shkola [Ministry of education and science of Ukraine. New Ukrainian school], 2016. *Kontseptualni zasady reformuvannia serednoi shkoly [Conceptual principles of secondary school reform]*. [online] Dostupno: <<https://mon.gov.ua/storage/app/media/zagalna%20serednya/nova-ukrainska-shkola-compressed.pdf>> [Data zvernennia 26 Lypen 2021], [in Ukrainian].
- Mizhnarodna konventsia po zapobihanniu zabrudnenniu z suden [International Convention for the Prevention of Pollution from Ships] (1973). <https://ips.ligazakon.net/document/MU73027?an=5481>, [in Ukrainian].
- Morozova, L., Bondarchuk, A., & Varuk, Yu. (2017). Rol ekolohichnykh tsinnosti u formuvanni ekolohichnoi kultury osobystosti. [The role of ecological values in the formation of ecological culture of the individual]. *Young Scientist*, 11(51), 46-50 [in Ukrainian].
- Motorna L. (2008). Pedahohichni umovy zastosuvannia osvitnikh tekhnolohii v protsesi vykladannia pryrodnycho-naukovykh dystsyplin u tekhnichnykh koledzhakh. [Pedagogical conditions for the use of educational technologies in the process of teaching natural and scientific disciplines in technical colleges]. In *Humanizm ta osvita: Zbirnyk materi- aliv IKh Mizhnar. nauk.-prakt. konf. (11-12 veresnia 2008 roku, m. Vinnytsia) (s. 90-92)*. Vinnytsia: Vinnytskyi natsionalnyi tekhnichniy universytet [in Ukrainian].
- N. Karazin. «*Ecology» series*], 16, 141-149, [in Ukrainian].
- Naidonova, H.H., & Furdui Ya.O. (2018). Formuvannia ekolohichnoi kompetentnosti studentskoi molodi [Formation of environmental competence of student youth]. *Naukovi zapysky Tsentralnoukrainskoho derzhavnoho pedahohichnoho universytetu imeni Volodymyra Vynnychenka. Ser. : Pedahohichni nauky [Scientific notes of the Central Ukrainian State Pedagogical University named after Volodymyr Vinnichenko. Ser. : Pedagogical sciences]*, 161, 124–129, [in Ukrainian].
- Natsionalna biblioteka Ukrainy imeni V.I. Vernadskoho [National library of Ukraine named V.I. Vernadskiy], 2021. *Vodni resursy Ukrainy [Water resources of Ukraine]*. [online] (Ostannie onovlennia 22 Berezen 2021) Dostupno: <<http://www.nbu.gov.ua/node/3972>> [Data zvernennia 22 Lypen 2021], [in Ukrainian].
- Natsionalnyi universytet «Odeska morskha akademiia». Ofitsiinyi portal [Odesa Maritime Academy National University. Official portal]. <http://www.onma.edu.ua/>, [in Ukrainian].
- Nikulina, A. S., Zaslavska, S. I., Nychkalo, N. H., & Yatsenko, L. V. (2007). Maliarni roboty (intehrovanyi kurs modulnoho navchannia): u 3-kh chastynakh. Chastyna persha [Painting works (integrated course of modular training): in 3 parts. Part one]. Kyiv: Viktoriia, 288 pp., [in Ukrainian].
- Orhanizatsiia Obiednanykh Natsii. Ukraina. (2022). *Nasha robota nad dosiahnenniam Tsilei staloho rozvytku v Ukraini [Our work on achieving the Sustainable Development Goals in Ukraine]*. <https://ukraine.un.org/uk/sdgs>, [in Ukrainian].
- Osmolovskyi, A., & Vasylenko, L. (2000). Vid navchalnoho proiektu do sotsialnoi samorealizatsii osobystosti [From the educational projekt to the social self-realization of the individual]. *Shliakh osvity [The way of education]*, 2, 34-37, [in Ukrainian].

- 
- Padgett, D. (2016). *Qualitative Methods in Social Work Research*. Sage publications. 2nd ed. Thousand Oaks, CA: Sage Publications [in English].
- Pantelidis, I. S. (2014). *The Routledge handbook of hospitality management*. Taylor & Francis. <https://doi.org/10.4324/9781315814353>, [in English].
- Salem, R., Bahadori-Jahromi, A., Mylona, A., Godfrey, P., & Cook, D. (2019). Investigating the potential impact of energy-efficient measures for retrofitting existing UK hotels to reach the nearly zero energy building (nZEB) standard. *Energy Efficiency*, 12, 1577–1594. <https://doi.org/10.1007/s12053-019-09801-2>, [in English].
- The European Sustainable Hospitality Club. (2024). *Operational and strategy support for hotels*. <https://www.eshclub.com/>, [in English].
- Perspektyvy pidhotovky i pratsevlashtuvannia moriakiv. Internet-portal «Porty Ukrainy» [Prospects for training and employment of sailors. Internet portal "Ports of Ukraine"]. <https://ports.com.ua/articles/perspektivy-podgotovki-i-trudoustroystva-moryakov>, [in Ukrainian].
- Plahotnik O. & Golovatyuk V. (2004). Innovatsiyni pidhodi do ekologichnoyi osvity molodi [Innovative approach to the environmental enlightenment of young people]. *Naukovi zapiski Nizhynskogo derzhavnogo universitetu im. M. Gogolya. Seriya : Psihologo-pedagogichni nauki*, 3, 88–90 [in Ukrainian].
- Pometun, O. I., Pobirchenko, N. S (2008). *Interaktyvni tekhnolohii: teoriia ta metodyka: posibnyk*. [https://dspace.udpu.edu.ua/jspui/bitstream/6789/377/1/interakt\\_tehn\\_teor\\_met.pdf](https://dspace.udpu.edu.ua/jspui/bitstream/6789/377/1/interakt_tehn_teor_met.pdf).
- Ponomarenko, S. (2020). Ekolohichna kultura yak indykator v haluzi ekolohichnoi osvity. [Environmental culture as an indicator in the field of environmental education]. In *Intehratsiia fundamentalnykh ta prykladnykh doslidzhen v heohrafichnii, ekolohichnii ta khimichnii osviti: materialy VI Vseukr. nauk.-prakt. internet-konf. (27 lystopada 2020 roku, m. Uman) (s. 108-111)*. Uman: Sochynskyi M. M.
- Postanova Kabinetu Ministriv Ukrainy «Pro zatverdzhennia Morskoï doktryny Ukrainy na period do 2035 roku» [Resolution of the Cabinet of Ministers of Ukraine «On the approval of the Maritime Doctrine of Ukraine for the period until 2035»]* (2009, October 7). <https://zakon.rada.gov.ua/laws/show/1307-2009-%D0%BF#Text>, [in Ukrainian].
- Prezydent Ukrainy. (2019, 30 veresnia). *Pro Tsili staloho rozvytku Ukrainy na period do 2030 roku [About the Sustainable Development Goals of Ukraine for the period until 2030]* (722/2019) <https://www.president.gov.ua/documents/7222019-29825>, [in Ukrainian].
- Pustovit, N. A., Kolonkova, O. O., Prutsakova, O. L. (2014). *Formuvannia ekolohichno dotsilnoi povedinky shkoliariv : [nauk.- metod. posibnyk]*. Imeks-LTD.
- Radkevych, O.P., 2020. *Teoretychni i metodychni osnovy rozvytku pravovoi kultury pedahohichnykh pratsivnykiv zakladiv profesiinoi osvity [Theoretical and methodical principles of developing legal culture in teaching staff from professional education schools]: avtoref. Doktora nauk*. Hlukhivskyi NPU im. O. Dovzhenka [Oleksandr Dovzhenko Hlukhiv national pedagogical university, Hlukhiv], [in Ukrainian].
- Rezvan, O., Kyrianova, O., 2020. *Samoosvitnia kompetentnist yak rezultat svidomoho pidvyshchennia kvalifikatsii vykladacha vyshchoi shkoly [Self-educational*

- competence as a result of a conscious upgrading skills for a teacher of a higher educational institution]. *Innovatsiina pedahohika [Innovative pedagogy]*, 27, s.149-152. <https://doi.org/10.32843/2663-6085/2020/27.30>, [in Ukrainian].
- Rishennia Kolehii Ministerstva osvity i nauky Ukrainy «Pro kontseptsiiu ekolohichnoi osvity v Ukraini» [Decision of the Board of the Ministry of Education and Science of Ukraine «About the concept of environmental education in Ukraine»] (2001, 20 hruden). <https://zakon.rada.gov.ua/rada/show/v6-19290-01#Text>, [in Ukrainian].
- Romanova, H. M. (2014). Proiektuvannia tekhnolohii profesiinoho navchannia maibutnikh kvalifikovanykh robitnykiv [Designing technologies for professional training of future skilled workers]. *Profesiino-tekhnichna osvita*, 1, 11-15, [in Ukrainian].
- Roth, H. (1971). Pädagogische Anthropologie. *Band II: Entwicklung und Erziehung*. Hannover: Hermann Schroedel Verlag, [in German].
- Rulevska, T. (2021). Pedahohichni umovy rozvytku ekolohichnoi kultury maibutnikh fakhivtsiv morskoho i richkovoho transportu u koledzhakh [Pedagogical conditions for the development of ecological culture of future maritime and river transport specialists in colleges]. *Professional Pedagogics*, 2(23), 87–94. <https://doi.org/10.32835/2707-3092.2021.23.87-94>, [in Ukrainian].
- Safranov, T., Lukashov, D., Shelest, Z., Vladymyrova O., & Chuhai, A. (2017). Standarty vyshchoi ekolohichnoi osvity v Ukraini: suchasnyi stan ta problemy vprovadzhennia. [Standards of higher environmental education in Ukraine: current state and problems of implementation]. *Visnyk Kharkivskoho natsionalnoho universytetu imeni V. N. Karazina. Seriiia «Ekolohiia» [Bulletin of Kharkiv National University named after V.*
- Saienko, T.V. (2008). *Osvita ekobezpechnoho informatsiinoho suspilstva: problemy i perspektyvy: monohrafiia*. Kyiv: Osvita Ukrainy [Education of an environmentally safe information society: problems and prospects: monograph. Kyiv: Education of Ukraine], [in Ukrainian].
- Stern, S., Kohli A., Steinemann, M., Petry Chr., & De Rocchi, A. (2020). Nachhaltige Entwicklung in der Berufs-bildung. In *Orientierungshilfe Nachhaltige Entwicklung in der Berufsbildung*. Bern, 15 Dezember, (p. 9). Bern: Staatssecretariat für Bildung, Forschung und Innovation (SBFI). [https://www.sbf.admin.ch/dam/sbf/de/dokumente/2021/01/orientierungshilfe.pdf/download.pdf/orientierungshilfe-nachhaltige-entwicklung\\_d.pdf](https://www.sbf.admin.ch/dam/sbf/de/dokumente/2021/01/orientierungshilfe.pdf/download.pdf/orientierungshilfe-nachhaltige-entwicklung_d.pdf) [in German].
- Stoliarenko O.B., 2012. *Psykholohiia osobystosti : navch. posib. [Psychology of personality: training manual]*. Kyiv: Tsentr uchbovoi literatury [Educational literature center], [in Ukrainian].
- Stratehiia rozvytku profesiinoyi (profesiino-tekhnichnoy) osvity na period do 2023 roku. Rishennia kolehii MON Ukrainy № 12/2-3 [Strategy for the development of professional (vocational and technical) education for the period until 2023]* (2020). <https://mon.gov.ua/storage/app/media/kolegiya-ministerstva/2020/12/.pdf>, [in Ukrainian].
- Suhomlinska, O. (2003). Viperedzhayuchi chas... (Vasil Oleksandrovich Suhomlinskiy – do 85-richchya vId dnya narodzhennya) [Ahead of time... (Vasyl Oleksandrovich Sukhomlinsky – to his 85th birthday)]. *Ridna shkola*, 9, 6–9 [in Ukrainian].
- Sysoieva, S. O. (2011). *Interaktyvni tekhnolohii navchannia doroslykh: navchalno-metodychnyi posibnyk [Interactive technologies of adult learning: a textbook]*. VD «EKMO», [in Ukrainian].

- 
- Sysoieva, S.O. ta Krystopchuk, T.Ie., 2013. *Metodolohiia naukovo-pedahohichnykh doslidzhen* : pidr. [Methodology of scientific and pedagogical research: textbook]. Rivne: Volynski oberehy, [in Ukrainian].
- The Sustainable Restaurant Association. (2024). *Accelerating a sustainable future for the hospitality industry*. <https://thesra.org/>, [in English].
- The University of Stavanger. (2024). *The Norwegian School of Hotel Management*. <https://www.uis.no/en/about-uis/the-norwegian-school-of-hotel-management>, [in English].
- The University of West London. (2024). *Study*. <https://www.uwl.ac.uk/courses>, [in English].
- Tkachenko, T. M. (2022, May 31). Perspektivy zelenoho budivnytstva u maibutnomu vidnovlenni Ukrainy [Prospects for green construction in the future reconstruction of Ukraine]. *Detsentralizatsiia v Ukraini* [Decentralization in Ukraine]. <https://decentralization.gov.ua/news/15011/20223005>, [in Ukrainian].
- Tolochko, C., & Shkodyn, A. (2017). Formuvannia ekolohichnoi kompetentnosti studentiv ahrotekhnichnykh spetsialnostei VNZ [Formation of environmental competence of students of agrotechnical specialties of universities]. *Ekolohichni nauky* [Environmental sciences], 18-19, 165-172, [in Ukrainian].
- Tunytsia, Yu., Adamovskyi, M., Borys, M., Raievskyi, S., & Mahazynshchukova, I. (2015). Ekolohizatsiia osvity yak kliuchovy faktor pidhotovky fakhivtsiv dlia staloho rozvytku [Environmentalization of education as a key factor in training specialists for sustainable development]. *Naukovyi visnyk Natsionalnoho lisotekhnichnoho universytetu Ukrainy* [Scientific bulletin of the National Forestry University of Ukraine], 25, 348-355, [in Ukrainian].
- UNESCO. UNESDOC Digital Library (2020). Education for sustainable development: a roadmap. <https://unesdoc.unesco.org/ark:/48223/pf0000374802.locale=en>
- United Nations Sustainable Development (1992). AGENDA 21. In *United Nations Conference on Environment & Development Rio de Janeiro, Brazil, 3 to 14 June 1992*.
- Vakhrusheva, T. Iu. (2007). Interaktyvni tekhnolohii navchannia yak zasib aktyvizatsii navchalno-piznavalnoi diialnosti. *Novi tekhnolohii navchannia*. Vyp. 47, s.64-69.
- Vector News. (2016, August8). Kulishenko, A. «Zelenebudivnytstvo» v Ukraini. Odniei en- erhoefektyvnosti malo [“Green Construction” in Ukraine. Energy efficiency alone is not enough.]. <https://www.vectornews.net/exclusive/19131-zelene-budvniectvo-v-ukrayin-odnyeyi-energoefek-tivnost-zamalo.html>, [in Ukrainian].
- Verkhovna Rada Ukrainy. Zakonodavstvo [Verkhovna Rada of Ukraine. Legislation], 2020. *Pro okhoronu navkolyshnoho pryrodnoho seredovyscha: Zakon Ukrainy vid 25.06.91 № 1264-XII*. [On environmental protection: Law of Ukraine of June, 25, 1991], [online] (Ostannie onovlennia 01 Sichen 2021) Dostupno: <<https://zakon.rada.gov.ua/laws/show/1264-12#Text>> [Data zvernennia 23 Lypen 2021], [in Ukrainian].
- Volkova, N. P. (2018). *Interaktyvni tekhnolohii navchannia u vysshchii shkoli: navch.-metod. posib*. Dnipro: Universytet im. Alfreda Nobelja.
- Yahupov, V. V. (2003). *Pedahohika: [navch. posib.]*. Lybid.
- Yershov, M.-O., 2019. Digitalisation of professional (vocational) and pre-high tertiary



- 
- education: problems and prospects. *Professional Pedagogics*, 18, p.67-74. <https://doi.org/10.32835/2223-5752.2019.18.67-74>, [in English].
- Zakon Ukrainy «Pro okhoronu navkolyshnoho pryrodnoho seredovyscha» [Law of Ukraine "On Environmental Protection"] (1991). <https://zakon.rada.gov.ua/laws/show/1264-12>, [in Ukrainian].
- Zakon Ukrainy «Pro otsinku vplyvu na dovkillia» № 2059-VIII (2017). <https://zakon.rada.gov.ua/laws/show/2059-19#Text>.
- Zakon Ukrainy «Pro Stratehiiu staloho rozvytku Ukrainy do 2030 roku» [Law of Ukraine «On the Strategy of Sustainable Development of Ukraine until 2030»] (2018, Serpen 07). <https://ips.ligazakon.net/document/JH6YF00A?an=393>, [in Ukrainian].
- Zaverukha, N. M., Serebriakov, V. V., Skyba, Yu. A. (2006). *Osnovy ekolohii: navch. posibn.* Karavela.
- Zhurian, V.V. (2022). Fenomen ekolohichnoi kompetentnosti u pidhotovtsi maibutnikh sudnovodiiv [The phenomenon of environmental competence in the training of future shipmasters]. *Pedahohichna osvita: teoriia i praktyka [Pedagogical education: theory and practice]*, 32 (1), 245–258, [in Ukrainian].

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## Scholarly Publication

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### Scientific Editors

**Tetiana Gerliand,**

Doctor of Pedagogical Sciences, Senior Researcher,  
Head of the Laboratory of Vocational Training Technologies  
of the Institute of Vocational Education of the National Academy of Educational Sciences of Ukraine

**Andrii Kalenskyi,**

Doctor of Pedagogical Sciences, Professor,  
Leading Researcher at the Laboratory of Vocational Training Technologies of the  
Institute of Vocational Education of the National Academy of Educational Sciences of Ukraine

### Authors

Natalia KULALAIEVA & Olha HAIDUK (1.1), Tatianna RULIEVSKA (1.2, 2.3), Svitlana ZASLAVSKA (1.3),  
Petro LUZAN (1.4), Tetiana GERLIAND (2.1), Irina DROZICH (2.2), Tatianna PYATNICHUK (2.4, 2.5),

## Greening the professional training of future specialists *Monograph*

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Екологізація професійної підготовки майбутніх спеціалістів: монографія

Монографія присвячена дослідженню процесу інтеграції екологічних принципів і практик у системі професійної освіти. Авторами обгрунтовано теоретичні та практичні аспекти екологічного підходу у підготовці майбутніх фахівців різних галузей, зокрема, вплив екологічних знань на формування професійних навичок, що відповідають вимогам сталого розвитку та охорони навколишнього середовища. Особливу увагу приділено методам і формам впровадження екологічних аспектів у навчальні програми та педагогічну практику. Видання адресоване науковцям, викладачам, методистам, керівникам закладів професійної освіти, а також усім, хто причетний до інтеграції екологічних знань у професійну освіту.

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### Technical editor

Markova Viktoriia, Librarian of the Institute of Vocational Education of the  
National Academy of Educational of Ukraine.

### Literary editor

Pyatnychuk Tetiana, Candidate of Pedagogical sciences, Senior Researcher of the  
Laboratory of Vocational Training Technologies of the  
Institute of Vocational Education of the National Academy of Educational Sciences of Ukraine

### Bibliographic Editor

Victoria Markova

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