FUTURE PROSPECTS FOR THE DEVELOPMENT OF PRO-ENVIRONMENTAL HIGHER EDUCATION

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Abstract: Based on an in-depth analysis of global environmental problems, the world's leading ecologists argue that no scientific and technological innovations or ecological and social reforms can ensure sustainable, environmentally balanced development of humanity. The successful solution of complex environmental problems requires a transition to a new ideology of life, ecologization of the economy and production, and the creation of a pro-environmental civilization. A vital role in this process is the formation of high ecological culture and the expansion of environmental education in the context of sustainable development. Furthermore, the thinking of specialists in different professions should become more ecological, so today, the environmental imperative and paradigm should become the guiding principle in training specialists in all spheres of activity. This article aims to analyze the possible prospects for further development of pro-environmental higher education. While writing this article, analytical methods were used to study scientific literature on the development of pro-environmental higher education. In addition, an online survey of the academic staff of higher education institutions was applied to find out practical aspects of the problem ecologization of higher education. The results of the study identified the problems and further promising directions for higher education's ecologization.

Keywords: pro-environmental higher education, ecological education, integration of education, environmental education centers, ecologization of the educational process.

1 Introduction

The current environmental situation facilitates a rapid change in human thinking in general and each person in particular, the formation of environmental awareness and culture. As a result, environmental education is becoming a new priority of the educational process worldwide. The experience of EU countries shows that it is possible to improve the environment by forming the principles of the country's environmental policy, high ecological culture, and active human position in ecological protection. At the same time, a high level of ecological culture is impossible without environmental education, which should be built on the complexity and continuity of the educational process' ecologization.

Participation in environmental activities contributes to the formation of ecological awareness of the younger generation, fostering in them a caring attitude towards the environment and solving the problem of waste management. Furthermore, participation in environmental activities contributes to the deepening of environmental consciousness, the desire for direct involvement in solving environmental issues of the region and the country, and raising awareness of different population groups.

The role of pro-environmental higher education in overcoming the environmental crisis and development of society is very high because only it can create conditions for the formation of a top elite, which will be able to realize the powerful internal opportunities for the benefit of its people, the European and world community.

2 Literature review

The UNECE Strategy on Education for Sustainable Development notes that the critical element of its implementation should be national action plans, taking into account the current environmental situation in the country and provisions of UN documents on the performance of educational programs for sustainable development.

The basis for efficient implementation of environmental education strategy is the institutional development of a three-stage environmental education sector: preschool (nursery) and junior school = high school – higher education.

The qualitatively new training of teachers, based on knowledge, acquired skills, and abilities, can reconstruct the educational process toward its ecologization is especially relevant. It is intended for reformatting the learning process from knowledge transfer to problem analysis in the development of possible solutions.

Ecological education is characterized by the formation of young people's organizational abilities. For example, when carrying out environmental activities, aspiration for the independent solution of concrete ecological problems with the practical result. Therefore, it is necessary to involve students in environmental education. For this age group, it is essential to carry out informational and educational activities. In the form of conversations with the help of presentations and films made by young people, students make visible environmental problems and the need to protect the environment. In the form of education, students try to justify ways to solve a particular environmental issue. The ecological education process can consist of emotional, cognitive, and behavioral elements with different levels of perception of the material for each age group and their harmonious combination (Mandryk, Malovanyi & Orfanova, 2019).

According to R. Locatelli, the ecologization of education should meet the ecological requirements of curricula in all subject areas. It should become a critical factor in creating a new paradigm for radical reform of the education system. It is the only way to educate a unique, environmentally and economically minded person who can ensure the sustainable development of society in harmony with nature (Locatelli, 2018).

Environmental education and upbringing aim to develop a personality with an ecocentric mindset and morality and a high level of ecological culture. Therefore, the importance of environmental education and training is of a personal nature, focused on the value of nature, the formation of knowledge of essential ecological regulations, understanding of the basics of ecology as a science, its structure, significance, and connections with other sciences, the peculiarities of human technological impact on the biosphere (Dlouhá, Henderson, Kapitulčinová & Mader, 2017).

Nowadays, all world countries should pay great attention to the development of pro-environmental higher education, which will bring up a new generation of specialists with modern skills in ecological thinking. And this, in turn, will give a powerful impetus to the economic, technical, national, spiritual, and, consequently, an environmental revival of the countries of the world (Aleixo & Leal, 2018).

Raising an experienced, creative person cannot do without philosophical knowledge, the formation of a scientific worldview, spirituality, ecological culture, and orientation to

nature's sense of life values. Therefore, in addition to specialized knowledge, every specialist must also have a philosophical mindset. "It is important for progressive education that it needs a philosophical approach to constructing the educational process based on the experience of effective treatment of nature" (McCowan, 2019).

Only under such conditions education will be balanced, humanistic, and ecological because the philosophy of schooling systematically affects the personality, forming its life and value orientations, forming the image of the modern person.

In modern education, ecological knowledge is an essential aspect of forming life and value orientations, and, as M. Versteijlen, P. Salgado, J. Groesbeek, and A. Counotte, ecological competence emerges in a deformed environment. Therefore, the environmental education and upbringing system must effectively educate the ecological consciousness of our contemporaries (Versteijlen, Salgado, Groesbeek & Counotte, 2017). At the same time, we can emphasize that environmental education is not just a part of the general educational process but an integral and one of its most essential parts.

Ecological education in higher educational institutions aims to teach young specialists to solve complex environmental problems independently and creatively within their industrial activity to avoid damaging the environment and form an active life position, which encourages the specialist to ecovitalistic approach.

The process of an ecological education is naturally closely intertwined with the process of cognition, so we can talk about their structural similarity. As a result, environmental knowledge acquired through education is transformed into ecological beliefs. Consequently, the understanding that the student receives during the study of ecological disciplines forms his worldview, which becomes the basis for the formation of environmental culture and determines the behavior of the specialist in the future (Rivera-Torres & Garcés-Ayerbe, 2018).

It is important to note that ecologization of education includes the awareness of civil liberties as protection against environmental risks, the right to a clean and safe environment, participation in decision-making processes, mandatory compliance with environmental legislation and norms of behavior in everyday life, the formation of skills to protect their environmental rights and so on (Francisco, Jorge, Oswaldo, Buitrago, Javier, & Escobar, 2021).

3 Aims

According to higher education scientists and teachers, this research aims to determine the tasks of environmental education, problems, and promising directions of its development.

4 Materials and methods

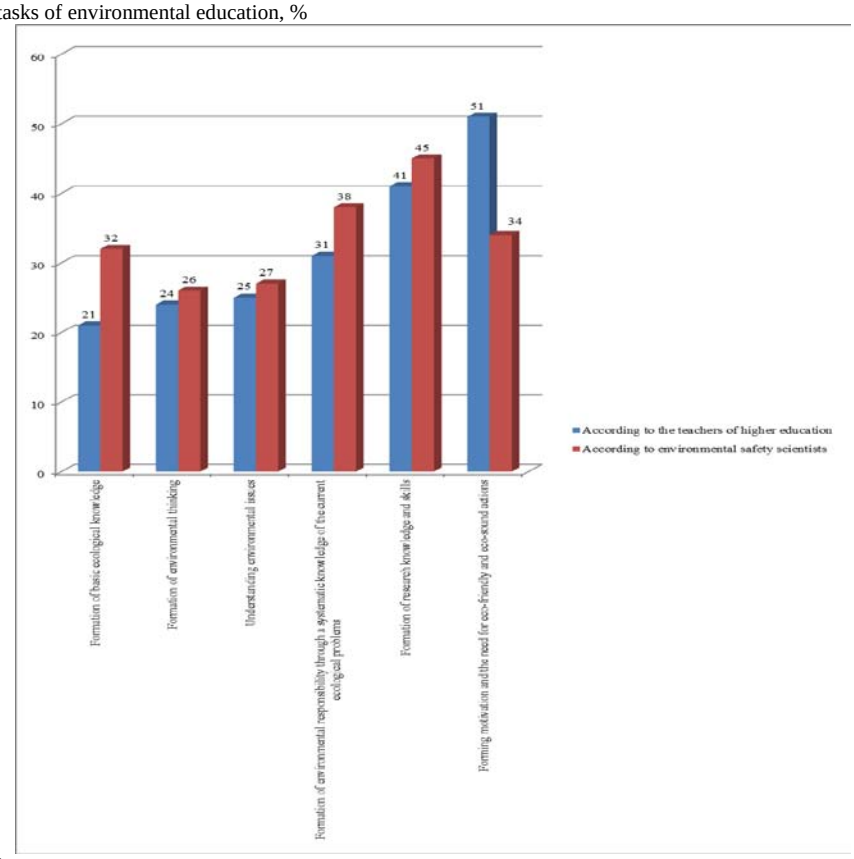
The online survey of 46 teachers and 37 scientists engaged in teaching and research activities in higher education institutions of Ukraine, namely the State Ecological Academy of Postgraduate Education and Management, Odesa State Ecological University, National University of Kyiv-Mohyla Academy, National Academy of Public Administration was conducted to find out the opinion of scientists-practitioners on promising directions of the higher education's ecologization process in 2021.

While summarizing the survey results, we calculated the average value of each answer option weighting.

5 Results

It is crucial to clarify the goals of the ecologization process of higher education to understand the possible directions of further development of pro-environmental higher education (Figure 1).

Figure 1: The main tasks of environmental education, %

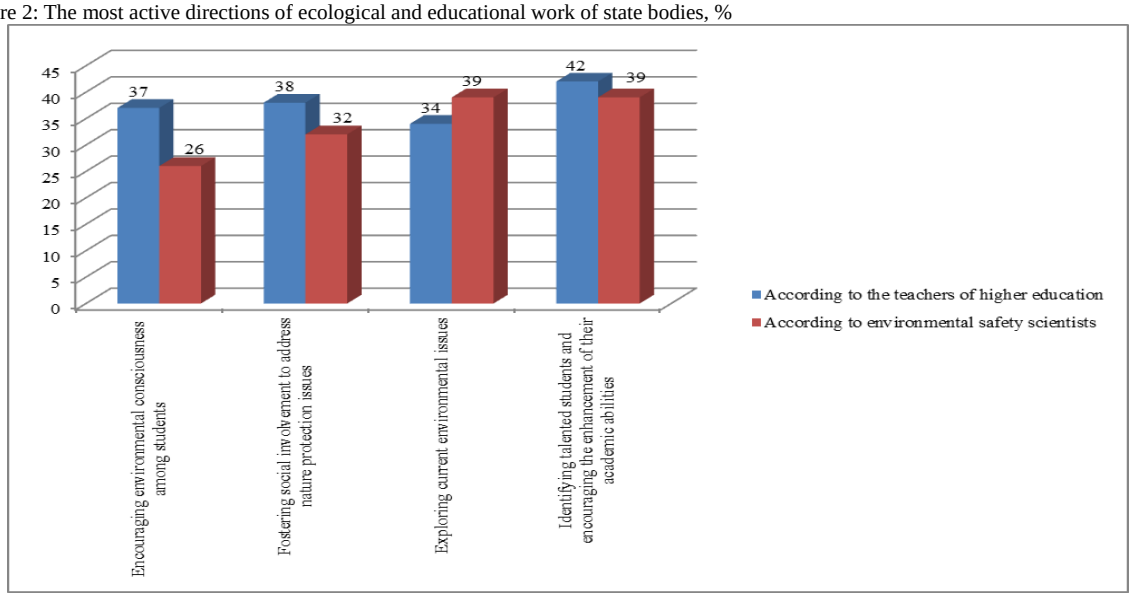


Source: authors' elaboration.

According to Figure 1, the main goals of environmental education are:

- formation of basic ecological knowledge of education applicants;
- development of environmental thinking;
- understanding of ecological problems on different levels (global, national, regional, branch);
- formation of environmental responsibility based on systematic knowledge of modern environmental problems and ways of implementing sustainable development concepts, modern civilization, and the environment
- formation of knowledge and skills of research character, providing a creative approach to solving environmental problems;
- formation of motivation and need in environmentally friendly and sound actions, the building of awareness of the necessity to make decisions on environmental issues, and the ability to give complex (legal, economic, moral, etc.) assessments of ecological situations.

Figure 2: The most active directions of ecological and educational work of state bodies, %

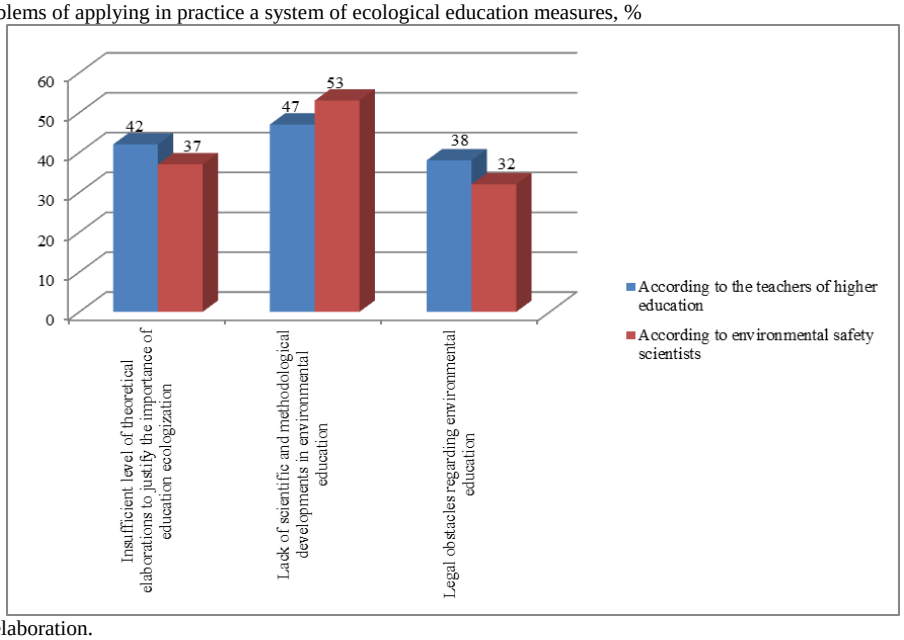


Source: authors' elaboration.

According to the respondents, the most active directions of environmental education work of the state bodies over the last 5 years are (Figure 2):

- promoting students' environmental thinking;
- fostering social activity to solve the nature preservation problems;
- studying of actual ecological problems by education seekers;
- identifying talented students and encouraging the development of their academic abilities.

Figure 3: The problems of applying in practice a system of ecological education measures, %



Source: authors' elaboration.

According to the survey participants, there are some methodological issues in the practical application of the measures on education's ecologization (Figure 3).

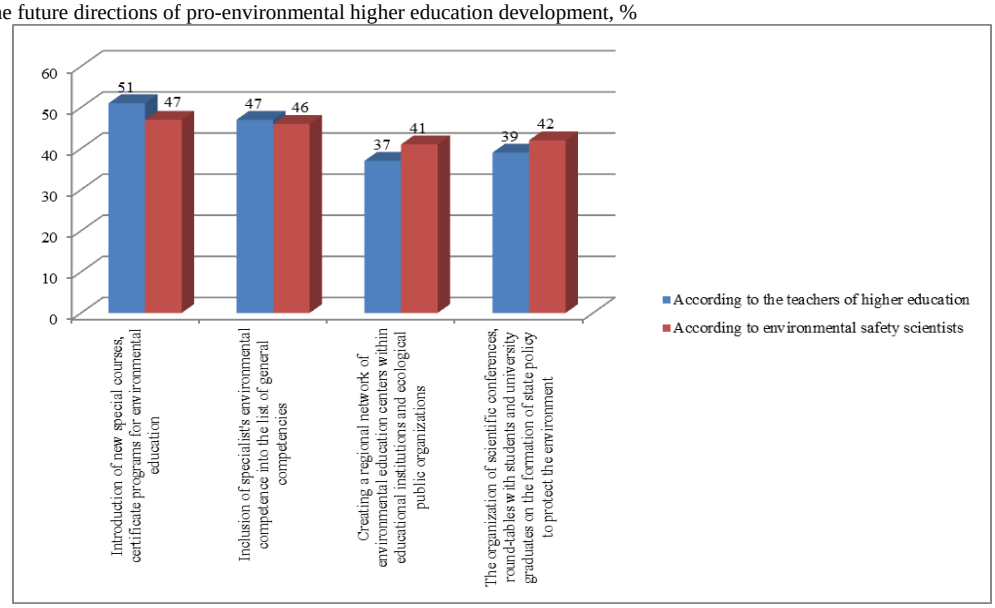
As noted by the survey participants, the most significant problems of higher education's ecologization at the moment is the insufficient level of theoretical developments to justify the importance of education's ecologization, the lack of scientific

and methodological developments for ecologization of education, and legal obstacles in its implementation.

Taking into account the existing experience and the results of the theoretical work of the study participants, in their opinion, the promising directions of development of pro-environmental higher education are (Figure 4):

- introduction of new pedagogical special courses, certificates, and research programs for bachelors and masters;
- inclusion of environmental competence of a specialist into the list of general competencies when developing methodological recommendations of higher education standards;
- establishing a network of regional environmental education centers based on educational institutions and ecological public organizations;
- organizing scientific conferences, round-tables with students, graduates, and university entrants on alternative energy sources, domestic waste management, ensuring the formation of state policy in the sphere of environmental protection, etc.

Figure 4: The future directions of pro-environmental higher education development, %



Source: authors' elaboration.

6 Discussion

The performed analysis of scientific literature and practical results of the conducted research proved that public awareness of the need for sustainable environmental development of the economy remains low for various reasons, including the fact that the introduction of ecologization in the modern education system, including in higher education institutions, remains limited. Only some successful educational projects of public organizations that have no systematic and large-scale character are an exception. It is evident that the development of education for sustainable development requires the development of new pedagogical models, new pedagogical culture, new pedagogical content of ecologization (Godemann, Bebbington, Herzig & Moon, 2021).

Environmental education's main task should be to form ecological culture through formal and informal education of all population strata, particularly managers of different ranks and businessmen. The governments should give environmental education status of a strategic, large-scale, priority sphere with expanded and updated content, forms, and learning methods in the information society. At the present stage of educational reform, it is necessary to adopt a new position on environmental education as a tool of personality socialization, its adaptation to life in conditions of civil information society development (Valero-Gilab, Leyva-de laHizc, Rivera-Torresd & Garcés-Ayerbe, 2021).

Modern realities are characterized by a crisis of global environmental culture caused by the low level of ecological education and awareness of most people. In such conditions, it is necessary to look for ways to solve environmental problems of society through environmental education. First, however, it is required to consider that the educational process forms philosophical aspects of ecological knowledge, as education largely determines the future of society and its development and gives the ability needed to understand and solve urgent global problems (Aguilera, Aragón-Correa, Marano & Tashman, 2021).

It should be noted that environmental education is at the center of discussions today, so there are many approaches to building development concepts, which can be divided into the following directions:

- environmental education as part of the overall educational process, with the development of the educational concept related to the environment throughout the educational sector and based on the development of a new philosophy of education;
- eco-pedagogics as an independent field of education formed based on a specially developed methodological platform allowing to formulate aims and tasks of this field, develop conceptual and categorical apparatus, methodical and didactic tools, determine target groups, etc. This approach implies spreading the principles of environmental education to other spheres of education to make them more environmentally friendly;
- building a set of relatively autonomous educational paradigms based on different philosophical, cultural, and pedagogical traditions, focused on specific target groups or on solving particular problems of nature preservation and environmental improvement (Francis, Jorge, Oswaldo, Buitrago, Javier, & Escobar, 2021) (Sachs, Schmidt-Traub, Mazzucato, Messner, Nakicenovic & Rockström, 2019).

In addition to these approaches to the environmental education concept, it is necessary to refer to the ecovitalistic method. Its essence is to see the absolute value of life as an essential factor of human action in extreme situations. In this connection, the ecological imperative requires a careful attitude to nature. It is also transformed into new scientific-theoretical knowledge, the

essence of which is to preserve the principles of human life activity and its responsibility to realize meaningful moral attitudes of human existence in the world. The ecovitalistic approach is based on the principles of the absolute value of life and focuses on discovering significant moral precepts concerning nature (Hess and Maki, 2019).

In general, the ecologization of education is a continuous, sequential, step-by-step design process involving all those engaged in the educational process.

The task of ecologizing learning activities is defined by educators' and co-educators' understanding of humans and nature's organic unity and interdependence. In addition, the ultimate job of higher education's ecologization should be the transformation of social consciousness and economic structure by integrating ecological thought in different fields of knowledge, building new models of production and consumption, and forming a new management system. Achieving this goal will be environmentally constructive for the current economy, that is, its real reform per the goals of sustainable development (Aldieri, Carlucci, Vinci & Yigitcanlar, 2019).

The conducted study of normative and scientific literature on the research topic proved that the ecologization of higher education could be carried out by implementing a set of pedagogical, scientific, organizational, legal, and other activities at the national and local levels (Lynch-Alexander, 2017).

The study of the current state of higher education's ecologization and scientists' opinions on the issues of universities' ecological direction allowed us to identify the most rational perspective directions of pro-environmental education development in higher school:

- introduction of new pedagogical special courses, certificates, and doctoral programs in the sphere of pro-environmental education;
- inclusion of ecological competence of specialists in the list of general competencies when developing methods and methodological recommendations for setting standards of higher education;
- transfer to a new level the development and publication of pedagogical and methodological literature on environmental law for improving ecological education of the population, public organizations, legal workers, as well as students and post-graduates;
- organization of new or ongoing training courses for specialists in public administration, scientific-pedagogical staff of universities;
- the teaching of natural sciences and environmental law depending on the profile of training;
- creation of a network of regional environmental education centers based on educational institutions and ecological public organizations;
- continuous monitoring of domestic and foreign literature on ecologization of schooling and its scientific analysis;
- intensifying holding of scientific conferences, round tables with students and applicants of higher educational institutions on the use of alternative energy sources, handling domestic waste, ensuring the formation of state policy in environmental protection, etc. (Skrypnyk, Shevchenko & Zamoroka, 2021), (Budihardjo, Bimastyaji, Soraya, Indah & Fadel, 2021), (Chankseliani & McCowan, 2021).

The implementation of these promising directions in the higher education development should provide the formation of holistic ecological knowledge and thinking, which is necessary for making critical pro-environmental decisions at the corporate, industry, regional, and state levels (Findler, Schönherr, Lozano, Reider & Martinuzzi, 2019).

It should be noted that, according to scientists, the ecologization of higher education should be based on such principles as comprehensiveness, continuity of the educational process, an extension of ecological education, and training to all strata of the population taking into account individual interests, incentives, and professional categories, comprehensiveness of environmental education and training, continuity of ecological education in educational institutions system of all levels, including staff preparation and retraining (Unterhalter, Allais, Howell, McCowan, Morley, Ibrahim & Oketch, 2018).

7 Conclusions

As a result, the study proved that, at the moment, there are problems of insufficient theoretical and methodological support and practical developments in the process of ecologization of the educational sphere. The development of pro-environmental higher education is a necessary process that promotes awareness of environmental protection and the formation of the ecological position of the population. However, analysis of the current state of formal ecological education shows an insufficient realization of its structure and content. Moreover, it is necessary to increase the environmental education level of higher education institutions' graduates to form an active civil position in solving environmental protection problems and sustainable economic development.

Ecological education should be a long-term interdisciplinary process that considers significant environmental problems, allows young people to apply their knowledge, and helps education aspirants study the nature of environment functioning in general. In this regard, special attention should be paid to the issue of training professionals receiving higher education to help them acquire an environmental worldview and an awareness of their professional decision-making responsibilities in their future professional endeavors.

Literature:

1. Aguilera, R., Aragón-Correa, J., Marano, V. & Tashman, P. (2021). The corporate governance of environmental sustainability: a review and proposal for more integrated research. *Journal of Management* Vol. 47 No. 6, 1468–1497 DOI: 10.1177/0149206321991212 Retrieved from: https://journals.sagepub.com/doi/pdf/10.1177/0149206321991212.
2. Aldieri, L., Carlucci, F., Vinci, C. P., & Yigitcanlar, T. (2019). Environmental innovation, knowledge spillovers and policy implications: A systematic review of the economic effects literature. *Journal of Cleaner Production*, 239. https://doi.org/10.1016/j.jclepro.2019.118051.
3. Aleixo, M. & Leal, S. (2018). Conceptualization of sustainable higher education institutions, roles, barriers, and challenges for sustainability : An exploratory study in Portugal. *Journal of Cleaner Production*, 172, 1664–1673. https://doi.org/10.1016/j.jclepro.2016.11.010.
4. Budihardjo, M., Bimastyaji, S., Soraya, A., Indah, F. & Fadel, I. (2021). Towards Sustainability in Higher-Education Institutions: Analysis of Contributing Factors and Appropriate Strategies. 13. https://doi.org/10.3390/su13126562.
5. Chankseliani, M. & McCowan, T. (2021). Higher Education volume 81, pages 1–8 Retrieved from: https://link.springer.com/content/pdf/10.1007/s10734-020-00652-w.pdf.
6. Dlouhá, J., Henderson, L., Kapitulčinová, D. & Mader, C. (2017). Sustainability-oriented higher education networks: Characteristics and achievements in the context of the UN DESD. July 2017. *Journal of Cleaner Production.* DOI: 10.1016/j.jclepro.2017.07.239 Retrieved from: https://www.researchgate.net/publication/318805084_Sustainability-oriented_higher_education_networks_Characteristics_and_achievements_in_the_context_of_the_UN_DESD.
7. Valero-Gilab, J., Leyva-de la Hizc, D., Rivera-Torresd, P. & Garcés-Ayerbe, C. (2021). Educating for the future: How higher education in environmental management effects pro-environmental behavior *Journal of Cleaner Production*, Vol. 321, 25 October 2021, 128972 https://doi.org/10.1016/j.jclepro.2021.128972.
8 Findler, F., Schönherr., F., Lozano, T., Reider, D. & Martinuzzi, A. (2019). The impacts of higher education

institutions on sustainable development: A review and conceptualization. *International Journal of Sustainability in Higher Education.* January 2019, 20 (4). DOI: 10.1108/IJSHE-07-2017-0114 Retrieved from: https://www.researchgate.net/publication/330091766_The_impacts_of_higher_education_institutions_on_sustainable_development_A_review_and_conceptualization.
9. Francis, L., Jorge, M., Oswaldo, M., Buitrago, S., Javier, J. & Escobar, V. (2021). Environmental Sustainability in Higher Education: Mapping the Field. Revista Electronica de Investigacion Educativa DOI: 10.24320/redie.2021.23.e09.4053 Retrieved from: https://www.researchgate.net/publication/352023648_Environmental_Sustainability_in_Higher_Education_Mapping_the_Field.
10. Godemann, J., Bebbington, J., Herzig, C. & Moon, J. (2021). Higher Education and Sustainable Development Exploring Possibilities for Organizational Change. *Accounting Auditing & Accountability Journal*, 27 (2), 218–233 DOI: 10.1108/AAAJ-12-2013-1553 Retrieved from: https://www.researchgate.net/publication/259573757_Higher_Education_and_Sustainable_Development_Exploring_Possibilities_for_Organisational_Change Higher education and the Sustainable Development Goals.
11. Hess, D., & Maki. A. (2019). Climate change belief, sustainability education, and political values: assessing the need for higher-education curriculum reform *J. Clean. Prod*., 228 pp. 1157–1166 Retrieved from: https://www.sciencedirect.com/science/article/abs/pii/S0959652619313824.
12. Locatelli, R. (2018). Education as a public and common good: reframing the governance of education in a changing context – UNESCO *Digital Library.* UNESCO. Retrieved from: https://unesdoc.unesco.org/ark:/48223/ pf0000261614.
13. Lynch-Alexander, E. (2017). Defying the definition of insanity: assessing the robust nature of university outreach in the community using Carnegie community engagement classification and lynch outreach assessment model (LOAM). *Journal of Academic Administration in Higher Education*, Vol. 13 No. 1, pp. 19–24. Retrieved from: https://www.emerald.com/insight/content/doi/10.1108/IJSHE-07-2017-0114/full/html.
14. Mandryk, O., Malovanyi, M. & Orfanova, M. (2019). Ekolohichna osvita dlia staloho rozvytku. Ekolohichna bezpeka ta zbalansovane resursokorystuvannia [Environmental education for sustainable development. Environmental safety and balanced resource use,], Naukovo-tekhnichnyi zhurnal № 1 (19) 2019 DOI: 10.31471/2415-3184-2019-1(19)-130-139. Retrieved from:http://elar.nung.edu.ua/bitstream/123456789/7387/1/7178p.pdf [in Ukrainian].
15. McCowan, T. (2019). Higher Education for and beyond the Sustainable Development Goals. *Palgrave Macmillan* Retrieved from: https://link.springer.com/article/10.1007/s10734-020-00652-w#citeas.
16. Rivera-Torres, P., Garcés-Ayerbe, C. (2018). Development of pro-environmental conduct in individuals and its determinants. REIS, 163, pp. 59–78 Retrieved from: https://www.ingentaconnect.com/contentone/cis/reis/2018/00000163/00000163/art00004.
17. Sachs, J., Schmidt-Traub, G., Mazzucato, M., Messner, D., Nakicenovic, N., & Rockström, J. (2019). Six Transformations to achieve the Sustainable Development Goals. *Nature Sustainability*. https://doi. org/10.1038/s41893-019-0352-9.
18. Skrypnyk, S., Shevchenko, S. & Zamoroka, A. (2021). Naukovo-metodychni zasady vprovadzhennia metodiv ekolohichnoi osvity i vykhovannia v protsesi navchannia biolohii [Scientific and methodological principles of implementation of methods of ecological education and upbringing in the process of teaching biology]. Zbirnyk naukovykh prats Natsionalnoi akademii Derzhavnoi prykordonnoi sluzhby Ukrainy Seriia pedahohichni nauky 23 (4): 307–326. DOI: 10.32453/pedzbirnyk.v23i4.591 Retrieved from: https://www.researchgate.net/publication/350465801_NAUKOVO-METODICNI_ZASADI_VPROVADZENNA_METODIV_EKOLOGICNOI_OSVITI_I_VIHOVANNA_V_PROCESI_NAVCANNA_BIOLOGII [in Ukrainian]
19. Unterhalter, E., Allais, S., Howell, C., McCowan, T., Morley, L., Ibrahim, O., & Oketch, M. (2018). Conceptualizing Higher Education and the Public Good in Ghana, Kenya, Nigeria, and South Africa. Presented at the CIES 2018 *Annual Conference, Mexico City, Mexico.* Retrieved from: https://discovery.ucl.ac.uk/id/eprint/10050089/.
20. Versteijlen, M., Salgado, P., Groesbeek, J. & Counotte, A. (2017). Pros and cons of online education as a measure to reduce carbon emissions in higher education in The Netherlands, *Current Opinion in Environmental Sustainability*, Vol. 28, pp. 80–89. Retrieved from:https://www.researchgate.net/publication/322336985_Pros_and_cons_of_online_education_as_a_measure_to_reduce_carbon_emissions_in_higher_education_in_the_Netherlands

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