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BUILDING UP KNOWLEDGE ON SUSTAINABLE DEVELOPMENT AT HIGHER EDUCATION INSTITUTIONS

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ОСВІТА ДЛЯ СТАЛОГО РОЗВИТКУ У ВИЩИХ НАВЧАЛЬНИХ ЗАКЛАДАХ

Purpose. This article aims to describe theoretical and methodological approaches and provide practical recommendations for implementing principles of sustainable development into the education process at universities for non-environmental study programmes.

Methodology. Conclusions and recommendations in this article were made based on the contemporary scientific views regarding the tasks of the university education system to promote ideas of sustainable development among the society. They considered the main principles behind the reform of the higher education system in Ukraine and were supported by an analysis of results of the international project on ‘greening’ university curricula conducted at the National Mining University.

Findings. This article specified the mission and aim of the higher education in promoting ideas and principles of sustainable development. The authors contrasted the processes of education in environment-related study programmes and ‘ecologisation’ of the non-environmental study programmes. It was revealed that the process of ecologisation of the university education is related to a significant extent to the process of ‘greening’ the curricula of non-environmental study programmes. This article gave a definition for the ‘green’ curriculum, analysed the main approaches towards ecologisation of university curricula and evaluated the potential of each of them in the context of Ukraine. The authors identified the barriers to the complete realisation of the multidisciplinary principle and transition to the interdisciplinary ecologisation of the study programmes’ curricula. Finally, directions for the development and a set of measures for the systematic transition to the ‘green’ model of higher education were suggested.

Originality. In this article, forms and methods for ‘greening’ the curriculum of non-environmental study programmes at institutions of higher education were scientifically reasoned. The suggested approach was based on such principles as development of the interdisciplinary basis for curricula, integration of formal and informal forms of education, participatory approach towards management of the education process.

Practical value. Realisation of the conclusions and recommendations would contribute towards approximation of the quality of the university education in Ukraine towards the requirements of European and international standards in this field.

Keywords: *sustainable development, university education, higher education, ‘green’ curriculum, international cooperation*

Problem statement. Under the umbrella of the United Nations Decade of Education for Sustainable Development (2005–2014), UNESCO appealed to the countries and the international community to fully implement the great role of higher education in providing support to sustainable development.

This means that, university curricula in terms of their objectives and content should include transdisciplinary understandings of social, economic and environmental sustainability, and it should impose such approaches to teaching, learning and assessment [1]. Universities should meet the required quality standards of higher education in the current context of sustainable development. Given the

global scope of problem, universities should work closely together and use each other’s knowledge and expertise to clearly identify priorities in transition to a new model of education.

Identification of an unsolved problem. European countries and other countries of the world are actively involved in the creation of a new educational paradigm – Higher Education for Sustainable Development (hereinafter referred to as HESD) and have accumulated a high potential in this area. In general, a growing number of institutions of higher learning are establishing degree programmes or schools devoted to the study of sustainability or sustainable development. In the newly independent countries, initiatives on HESD are mainly of declarative character; in universities so far there are little new educational technologies, including technologies of ‘open education’, interactive

forms of learning, planning, and other methods that promote active learning and formative professional skills in the format of sustainable development [2].

Analysis of the recent research in the field of regional governance showed a growing interest in higher education issues in the context of sustainable development. Although for the last time in Ukraine attempts to improve the quality of the national educational system were made, there is still much work to bring it into conformity with European standards and principles.

According to numerous publications, in today's globalised world, sustainable development requires specific knowledge, skills and values with which to address a wide range of challenges relative to the sustainable development (sustainable use of natural resources, adaptation to climate change, improving social protection and reducing poverty) [2–3]. The majority of authors agree with the need in deep reforming the national system of higher education and point out that promotion of general humanistic priorities and values should become one of the major tasks of the modern universities [4].

Identification of the unsolved part of the general problem. Despite numerous discussions on HESD at international, regional and local levels, there remains the need to examine this issue in greater detail as it pertains to the specific conditions of Ukraine. This research should cover analysis of methodology used for introducing knowledge of sustainable development in the learning process of the non-environmental professions, in particular managers, marketing specialists, etc.

Formulation of the research aim and objectives. The main aim of this research is to determine the key actions for the reformation of education process at universities in support of implementation of the sustainable development policy. To achieve the main aim, the following specific objectives have been formulated: 1) to analyse the experience and best practices in the fields of HESD; 2) to identify the principles and forms for greening the university curriculum for students of economics.

Research methodology. The main conclusions in the article were developed through the content analysis of scientific works on education for sustainable development in countries in transition, and through the analysis of results of the international project Greening of the University Curricula, which is carried out on the basis of the National Mining University (hereinafter referred to as NMU). Furthermore, the authors utilised the findings of their own previous research in the field of higher education for sustainable development.

Presentation of the research results. Beginning of the third millennium is often referred to as the post-industrial time, where science and knowledge are becoming the main productive forces, and society is looking for integrated management approaches to solve global problems caused by industrialisation and urbanisation [4]. Ukraine can be characterised by the highest in Europe levels of disturbed and ploughed lands, deforestation, and use of freshwater resources; the anthropogenic pressure on the environment exceeds several times the similar indices in the EU member states [6]. In many regions, irrational and inefficient man-

agement has reached such an extent, that the limits of the environment's recovery capacity are being reached and the environmental balance can no longer be maintained. These factors emphasise the necessity for making economic development more environmentally sustainable.

Sustainable development is today universally recognised as a goal of the global community and as a principle of management at all levels and in all fields of activity. Without dwelling on the analysis of numerous interpretations of the concept 'sustainable development', this approach generally understood as a balanced management of social and economic development, while preserving natural resources and securing quality of the environment for current and future generations. A key advantage of the sustainable development approach is that, through its economic, environmental and social dimensions, development challenges are understood in all their complexity [6].

Accordingly, the main goal of the management of sustainable development (hereinafter referred to as "sustainable management") is to identify challenges and obstacles that hinder the transition towards sustainable patterns of production and consumption, and to develop well-balanced decisions in the professional field [7]. To address interconnected problem of economic growth and environmental sustainability, which are particularly acute for Ukraine, it is necessary to introduce the sustainable management principles in all areas of activity. Managers, marketing specialists and other management positions have to manage systems so that they are able to support and sustain their sustainability; they can all use sustainable management to improve productivity among other things.

In this regard, numerous international declarations point to HESD as the method of strategic integration the principles, values, understanding, knowledge and practical skills of sustainable development. Therefore, higher education is facing new challenges related mainly to the objectives of training in the context of sustainable development.

However, as the United Nations Decade of Education for Sustainable Development – DESD (2005–2014) has recognised, education is too frequently interpreted as an activity, which takes place within the formal education system, there is a need to emphasise more the importance of HESD [1].

In this connection, it should be emphasised that HESD concept is poorly known and open to many interpretations in Ukraine. In particular, development of environmental education is often taken as the 'greening' of education in general [2]. Recently, there has even been the addition of new programmes in some universities offering Bachelors and Masters in Environmental Management.

However, environmental education is a teaching/learning process aimed at acquisition, systematisation of knowledge about the environment, development of skills and habits of nature conservation, and development of common environmental culture. Universities should not only provide professional training and qualification of specialists on environmental management, but also create and facilitate environments for students and staff to develop their understanding to sustainable development instruments in the full spectrum of professions.

Recent international forums on education for sustainable development (UNESCO World Conference on Education for Sustainable Development, 10–12 November 2014 in Aichi-Nagoya, Japan; World Education Forum, 19–22 May 2015, Incheon, Republic of Korea) emphasised that the overall goal for the period should be to further develop the HESD model by promoting the integration of knowledge about sustainable development into educational programmes.

The essence of ‘greening’ of higher education is largely associated with the task of ecologisation of study programmes of different non-environmental profiles. ‘Green’ curriculum implements large-scale penetration of ideas, concepts, principles, and knowledge management practices of sustainable development through the implementation of specific modules in the basic training programs for different specialties.

Yet implementation of the principles of sustainable development into higher education curriculum is ambiguous and rather complicated process, especially when training managerial staff in the context of transition economy. Publications review and study of national experience in CIS countries show that the problem of integration of content-modules in the curricula of non-environmental study programmes is related to the correct selection of targets, volume, development dynamics and evaluation of innovative education quality.

Analysis of the accumulated theoretical materials and experiential practice of different educational universities in sustainable development has revealed three main approaches to ecologisation of basic non-environmental study programmes, which are disciplinary, multidisciplinary and interdisciplinary [2–4].

Disciplinary approach is realised by introducing one or more disciplines focused on environment into the curriculum of non-environmental study programmes. It could be seen that the issues of sustainable development are included in the curriculum, but they are not integrated in the specialised disciplines, and do not provide a link between specialisation and sustainable development.

A multidisciplinary approach foresees integration of themes (or blocks) on sustainable development into specialised disciplines in accordance with core curriculum. This approach provides a link between future profession and the problem of sustainable development in the context of professional functions performed.

Interdisciplinary approach implies introduction of new disciplines or modules of ecological orientation with concurrent ecologisation of specialised disciplines.

Thus, the development of ‘green’ curriculum is not identical to environmental education. Sustainable development is a horizontal objective that should be reflected throughout all study programmes as well as in the process of its practical implementation. The aim of HESD is to provide an understanding of the balance between economic objectives, social needs and environmental responsibility at all levels of professional decision-making.

From this perspective, universities must implement methodological shift from traditional knowledge and skills transfer necessary for professional activity, to the formation

of environmental values within the specialists’ training to perform professional tasks in an environmentally friendly manner, and the ability to prevent the impact of managerial decisions on natural ecosystems and social structures. To provide students with the values, knowledge and skills to manage sustainability, education must strive to interdisciplinary model based on the integration of analytical tools from different disciplines.

In this regard, there is a need to study the ways and forms of ‘greening’ of curricula in higher educational institutions.

Questioning teachers in the NMU confirmed that there is often a limited approach to understanding of the reform of education for sustainable development. In particular, opportunities for learning about sustainability are often thought to occur only in formal settings – facilitated by lecturers in a classroom. However, the experience of advanced countries (Great Britain, Sweden, Germany, USA and other countries) shows that HESD is a progressive way to improve the quality of higher professional education through encouraging discussions and exchange of information on innovative practices in all forms of formal and informal training [3, 8].

Learning about sustainability can take place in various forms or procedures, in which future professionals are studying the ways of seeing and interacting with the world around them.

Our study of the practices of 20 Top Ukrainian universities showed that various university curricula are mainly based on the disciplinary approach and less often on the multidisciplinary one. Moreover, there is a number of barriers and challenges that hinder the full enjoyment of multidisciplinary approach and the transition to an interdisciplinary level. The problem is aggravated by the lack of teachers’ knowledge in the field of environmental management methods as well as insufficient use of modern technologies of interactive teaching/learning.

It is necessary to emphasise that even countries with developed educational system were making every effort towards reforming the training of future managers and other professionals to provide them with the required level of erudition in sustainability and to form their skills to support sustainable development [5].

The NMU has accumulated certain experience in the development of the principal approaches to implementing sustainable development ideas while training economics specialists. The University carried out two interrelated directions of activities: an adaptation of compulsory training curricula and development of optional forms of environmental knowledge accumulation.

With regard to the first direction, it is implemented for managers by introducing ‘Environmental management’ as a special educational discipline (i.e. module). For marketing study programme, special multidisciplinary modules on Sustainable Development were included in the core curricula, such as ‘Marketing of industrial enterprises’ and ‘Marketing of high-tech markets’. Special workshops are designed to provide link between the specialisation and the issue of sustainable development.

Academic resources pay little attention to the study of optional training tools designed to support innovation in

formal education. Nevertheless, the University experience has demonstrated their necessity and high efficiency.

First of all, they should include academic exchange of students. For many years the NMU has been practicing training managers and marketing specialists at the Brandenburg University of Technology Cottbus-Sebftenberg (hereinafter – BTU) at the Faculty of Environmental Sciences and Process Engineering. The results of the semester abroad training at the BTU of bachelor students from the NMU proved that students quickly adapt to the problem and actively explore European methods of ecologisation of business activities.

Summer schools represent the second important way of integrating the principles of sustainability into the training process of economics students. According to the joint experience of the NMU and BTU, Joint International Summer Schools are a powerful tool of raising awareness and accumulating knowledge on various aspects of sustainable development.

High efficiency of these summer schools was proved during students' opinion polls. Students mentioned the following important effects: the deep immersion into the new issues, interactive learning methods helped to understand professional tasks in the context of implementing sustainable development ideas into different management levels. The importance of scientific conferences contributing to the development of interdisciplinary approach to training non-environmental specialism students should not be underestimated.

Nevertheless, it should be admitted that the progress in the field of ecologisation of curriculum for non-environmental study programmes is not as fast as it should have been. The study found out the following constraining factors:

- The absence of course books, methodological booklets and other materials for interdisciplinary sustainable education of students with a non-environmental specialisation.

- The absence of analytical and methodological materials on using specific tools of sustainable development in specific area of activity.

- Weak research base in higher education today does not allow students to engage in research activities.

- There is little scientific expertise available in the sphere of sustainable management.

Research conclusions and outlook. Summing up the results of the study of experience in the field of higher education for sustainable development, it should be noted that the overall goal for modern period should be to further develop the model of higher education by promoting the integration of knowledge about sustainable development into educational programmes.

The essence of reforms in the field of higher education is largely associated with the task of 'greening' of study programmes of different non-environmental profiles.

'Green' curriculum implements large-scale penetration of ideas, concepts, principles, and knowledge management practices of sustainable development through the implementation of specific modules in the basic study programs for different specialisations.

The choice of methodological framework deals with: 1) substantiation of the main objectives of sustainable development in the field of training specialists; 2) specification of the general and specific tasks of sustainable development related to the profession / specialisation; 3) the choice of the sustainable development tools related to profession / specialisation / specialisation areas; 4) development of the ways of adjusting different academic curricula to sustainable development tasks; 5) choosing the forms of additional (optional) education and accumulation of knowledge on certain aspects of sustainable development; 6) defining the criteria for assessing progress towards 'greening' curriculum realisation.

Studies also have shown that there are certain difficulties in integrating content modules into the curriculum of non-environmental study programmes in Ukraine; given them, it is necessary: to develop the course books, methodological booklets and other materials for interdisciplinary sustainable education of students with non-environmental specialisation; to develop the analytical and methodological materials on using specific tools of sustainable development in specific area of activity; to initiate different forms of participation of students in the scientific research on sustainable development.

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Мета. Обґрунтування теоретико-методичних підходів та практичних рекомендацій з імплементації принципів сталого розвитку у процес вищої освіти неекологічних спеціальностей.

Методика. Висновки та пропозиції розроблені на основі сучасних наукових поглядів на завдання системи вищої освіти для цілей сталого розвитку суспільства, ураховують основні принципи реформування системи вищої освіти в Україні, спираються на узагальнення та аналіз результатів міжнародного проекту з „озеленення“ навчальних програм в університетах, що здійснюється на базі ДВНЗ „Національний гірничий університет“.

Результати. Уточнена місія та завдання вищої освіти в інтересах сталого розвитку суспільства, зіставлені процеси вищої екологічної освіти та екологізації професійної вищої освіти; показано, що суть „екологізації“ вищої освіти значною мірою пов'язана з процесом „озеленення“ навчальних програм неекологічних профілів. Дано визначення „зеленої“ навчальної програми; проаналізовані особливості основних підходів до екологізації навчальних програм, оцінені можливості кожного з них в умовах України. З'ясовані бар'єри, що перешкоджають повній реалізації мультидисциплінарного принципу та переходу на міждисциплінарний рівень екологізації навчальних програм. Запропоновані напрями розвитку та комплекс заходів для системного переходу на „зелену“ модель вищої освіти.

Наукова новизна. Науково обґрунтовані форми та методи „озеленення“ освітніх програм для неекологічних спеціальностей у вищих навчальних закладах. Запропонований підхід ґрунтується на таких принципах, як: розвиток міждисциплінарної основи програми навчання; інтеграція формальних і неформальних форм навчання; партисипативність управління процесом навчання.

Практична значимість. Впровадження висновків і рекомендацій сприятиме наближенню якості української вищої освіти до вимог європейських і світових стандартів у цій галузі.

Ключові слова: сталий розвиток, вища освіта, „зелені“ навчальні програми, міжнародне співробітництво

Цель. Обоснование теоретико-методических подходов и практических рекомендаций по имплементации принципов устойчивого развития в процесс высшего образования неэкологических специальностей.

Методика. Выводы и предложения разработаны на основе современных научных взглядов на задачи системы высшего образования для целей устойчивого развития общества, учитывают основные принципы реформирования системы высшего образования в Украине, опираются на обобщение и анализ результатов международного проекта по „озеленению“ учебных программ в университетах, который осуществляется на базе ГВУЗ „Национальный горный университет“.

Результаты. Уточнена миссия и задачи высшего образования в интересах устойчивого развития общества, сопоставлены процессы высшего экологического образования и экологизации профессионального высшего образования; показано, что суть „экологизации“ высшего образования в значительной степени связана с процессом „озеленения“ учебных программ неэкологических профилей. Дано определение „зеленой“ учебной программы; проанализированы особенности основных подходов к экологизации учебных программы, оценены возможности каждого из них в условиях Украины. Выявлены барьеры, которые препятствуют полной реализации мультидисциплинарного принципа и переходу на междисциплинарный уровень экологизации учебных программ. Предложены направления развития и комплекс мер для системного перехода на „зеленую“ модель высшего образования.

Научная новизна. Научно обоснованы формы и методы „озеленения“ образовательных программ для неэкологических специальностей в высших учебных заведениях. Предложенный подход основывается на таких принципах, как: развитие междисциплинарной основы программы обучения; интеграция формальных и неформальных форм обучения; партисипативность управления процессом обучения.

Практическая значимость. Реализация выводов и рекомендаций будет способствовать приближению качества украинского высшего образования к требованиям европейских и мировых стандартов в этой области.

Ключевые слова: устойчивое развитие, высшее образование, „зеленые“ учебные программы, международное сотрудничество

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