
Noosphere Concept Implementation in Methodology of Modern Ecologically Oriented Higher Education: Theoretical Aspect

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Abstract

The relevance of the study is due to the fact that the development of human civilization has reached a stage of a qualitatively new state of global economic, political and social processes caused by the threat of local and global environmental disasters, the cause of which lies in the negative consequences of the existing ill-considered nature management and development of the techno-sphere on the basis of the worldview of the industrial revolution and the consumer society. The third Millennium should be the Millennium of the entry of the biosphere and human civilization into the noosphere to ensure the conditions for their preservation and further development on the principles of ecological and cultural consistency. Moreover, the most important role in the success of this process is the modernization of the system of higher education based on the noosphere concept. Purpose of the study: this article is aimed at theoretical analysis of the features of the noosphere concept implementation in the methodology of modern environmentally oriented higher education. The study results: it is established that the modern ecologically oriented higher education from the point of view of the noosphere concept is a natural, socially and culturally oriented system of obtaining, accumulation, transferring and updating of knowledge, skills and abilities of interaction in the system man – society – environment. Its content should integrate knowledge from various scientific fields: philosophy, ecology, psychology, biology, physiology, history and cultural studies. The methodology of such education should be based on the principles of greening, systematization, harmonization, humanization, instrumentality, personal orientation, and advanced development, simplicity of knowledge, efficiency and potential intellectual security. Practical significance: the Materials of the article are of theoretical and practical value for the development of educational and methodical complexes in various disciplines of higher education, taking into account the noosphere concept, teachers' training and retraining programs, as well as programs aimed at the formation of new environmentally appropriate worldview and value-based attitudes among the contemporary youth.

Keywords: noosphere concept, noosphere, ecologically oriented higher education, methodology, content, principles, and students

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INTRODUCTION

The current system of higher professional education is focused on the formation of a competent specialist, competitive in the conditions of market regulation of the labor market. Unfortunately, the least popular was the educational function of higher education, the purpose of which was to form the personality of future professionals, their moral and ethical attitudes, value orientations and cultural foundations of their lives and

professional activities. In modern conditions, when the human community is on the edge of a global environmental crisis caused by environmentally incongruous nature management, the development of techniques and technologies, causing significant and sometimes irreparable harm to the biosphere of the planet and threatening the death of the entire civilization, the system of higher education should be modernized on the basis of new worldview principles

focused on the harmonious interaction of man and nature, on environmentally safe methods of production and preserving the biosphere of human activity.

Currently, in the development of civilization, there are some points that can become prerequisites for the transition of the biosphere to the noosphere. The first point is the increasing unification of humanity, which, on the one hand, is determined by the processes of globalization of socio-economic and cultural life, and on the other – the ability of a person to survive in any territory of the planet. The second point is the availability of unhindered communication, exchange of information, energy and matter almost all over the planet and partly in space. The third point is related to the discovery and development of new sources of energy that expand the capabilities of humanity. The fourth point is determined by the growth of the average welfare of the world's population, its education and professionalism. Fifth is the increasing erasure of national, racial and religious boundaries of communication, interaction and co-existence (Pogrebnoy and Khristaforov 2016).

The noosphere concept at the present stage of development of human civilization has become the basis of environmentally oriented change in approaches to the interaction of man and nature and environmentally oriented modernization of the education system, which should form a new love-creative type of personality, which is the only way to overcome the global environmental crisis and prevent a possible ecological catastrophe (Ochirov 2015).

In the modern world, knowledge is becoming the most important source of human progress, leading it to power, freedom, humanism and prosperity, and scientists are becoming the social force that generates a new worldview and social culture. Man begins to play the role of the main regulator of all processes taking place not only on the planet but also in space. In such conditions, great importance is given to higher education, for the effective operation of which it is necessary to create conditions for full autonomy of universities, freedom of teaching and research, openness of higher education for all comers, democracy of its internal management, the activities of higher education for the realization of the interests of the country and civilization in the indissoluble unity of scientific research and teaching within the values of noosphere development (Drobzhev 2018).

In the 90 years of XX century in the pedagogical science, the question arose about the necessity of

modernization of the educational process with the use of methods focused on the formation of students' holistic thinking, an intensification of all their potential. Scientific substantiation was given to the noosphere concept of education, based on knowledge in the field of philosophy, physiology, psychology, physics, neurophysiology and pedagogy. It substantiates the methodology of bio-adequate teaching of various disciplines and the use of holistic relaxation-active methods based on the visualization of thought forms, which are psychologically and physiologically safe, but extremely effective (Lymar 2015).

Environmentally oriented higher education based on the noosphere concept is the most promising and socially significant, it can provide a strategic breakthrough to a new quality of individual and social thinking and consciousness, the organization of the social state and improve living standards. The noosphere approach to the management of the higher education system aims to ensure the training of professional, highly qualified and competitive professionals with the skills of independent activity within the chosen area of knowledge and a high level of spiritual, cultural and moral qualities that can ensure the effectiveness of scientific, technical, economic, socio-political and cultural development of the state (Mishina and Veriga 2017).

LITERATURE REVIEW

Basic Approaches to the Methodology of Modern Environmental Education

Modern higher professional education ceases to be narrowly professional and increasingly acquires the features of the fundamental, uniting all spheres of science and education and forming a new environmental consciousness, environmental culture and worldview in society. One should consider the basic modern concepts of environmentally oriented education.

The Central concept of the noosphere concept is the concept of the socio-sphere, which is understood as a self-organized, self-regulating system of planetary scale, characterized by structural and functional unity of natural and social subsystems. Its memory and regulator is a unified social intelligence. The future of the socio-sphere and biosphere as its subsystem depends on the efficiency and reliability of the regulator in making management decisions in complex socio-sphere processes. The function of feedback between the biosphere, Geosphere subsystems and socio-sphere lies on integrated global monitoring. Therefore,

environmentally oriented higher education should include sections related to such monitoring at various levels: natural, social, economic and other. This concept can be called epistemological (Fortunatov 2010).

The cultural concept proceeds from the fact that in modern conditions a person should more deeply comprehend the dialectics of the relationship between natural and social, to see ways of solving global human problems. Man's attitude to nature can no longer be formed chaotically, it must come from knowledge and understanding of its fundamental laws. It is important for young people to form responsibility for the future development of their country and the world as a whole in the process of education and upbringing at all its stages. Therefore, it is necessary to form a high level of ecological culture in the process of ecological education, make the foundations of moral creative nature management and the ability to resist the negative impact on the environment (Yurochkina 2017).

The concept of sustainable development is based on the impossibility of considering the environment and socio-economic development as isolated areas, it should be considered within the unity and interdependence of high quality of natural environment and effective healthy economy. The relationship between man and nature should be harmonious and lead to the formation of an ecological society. Environmentally oriented education and upbringing should be improved in order to form an ecologically consistent way of life and production activities in order to achieve harmonious sustainable development of society and nature. The concept of sustainable development in environmentally oriented education forms a new post-material system of values based on the conscious limitation of needs related not to quantitative growth, but to qualitative development, humanism, freedom, creativity, morality, focus on cooperation and dialogue, professionalism, self-realization, high quality of a healthy lifestyle, awareness of its role in nature and the formation of responsibility for its preservation and restoration for future generations (Ivanov and Voroshilova 2010).

The Informatization concept proceeds from the idea that the development of society's Informatization and increasing the importance of information activities will reduce the anthropogenic impact on nature, despite the fact that the creation of information technique and the development of information technology of interaction with information requires significant use of material and energy resources. Still, these costs are much less than for the creation of traditional real-energy

equipment and technologies. Therefore, environmentally oriented education should be informational and focused on the management of information processes at both local and global levels, on the creation of an integral collective intelligence of humanity based on the system synthesis of natural and artificial intelligence (Parakhonsky 2014).

The concept of the outrun education consists of two basic aspects. The first is that education is the broadest area of social activity and its development should be ahead of other forms and activities, especially economic ones. The accelerated outrun development of science and education is the basis for the development of civilization in the present and future, which indicates the need to create a unified scientific and educational system. The second aspect points to the fact that education in content should become internally outrun, oriented to the future, and not a retrospective, and the education system, especially environmental in its modern broad sense, should become the dominant factor in social processes. Foresight and forecasting skills will help to prevent activities that harm the existence of civilization and address global environmental and social problems. Outrun education should become continuous in time and global in space and transmit to modern and future generations the values, moral guidelines, knowledge and ways of activity that ensure the survival of mankind (Ilyin and Ursul 2010).

All the considered concepts of environmentally oriented education are based on the principles of humanization and ecological compatibility of modern society's development. We can say that the unifying basis for them is the noosphere concept of modern education.

Philosophical Foundations of the Noosphere Concept

The noosphere is the sphere in which the interaction of nature and humanity takes place, and reasonable human activity plays the role of the main determining factor of development. It is a new, higher stage of the biosphere, formed due to the emergence and development of humanity in it, which through the cognition of the laws of nature and the improvement of technology becomes the most important force that has a decisive influence on the processes occurring in the biosphere (Shil'nov 2017, Vernadsky 2012).

In the biosphere-noosphere concept, the main role in the development of the world is given to geological processes and biological evolution, living matter and

humanity as part of it and the main geological force, scientific thought as a planetary phenomenon. A single historical process on the scale of the entire biosphere and the socio-sphere of the planet is due to the steady rapid strengthening and deepening of integration processes at the regional, national and social levels, which link together all of humanity and its culture. Naturalistic noosphere picture of the world includes interrelated elements of social cohabitation and territorial location of living organisms that affect their surrounding biogenic and abiogenic environment, as well as this environment influences on living organisms, including humans (Drobzhev, 2018).

The main condition for the transition of the biosphere to the noosphere is the deep transformation of economic, techno spheric man into ecological, noospheric man, change of the vector of civilization's development from the material into the spiritual. A modern production-economic and social system focused on maximum profit cannot provide the conditions for such transformation; therefore, a new system should be formed based on a global environmental culture, a multifaceted dialogue of cultures, which will require certain political, economic and social willpower. The main imperative of development in the new conditions should be to ensure the preservation of human life and nature and their safe development. Anthropocentric worldview should be replaced by bio-centric egalitarianism, which imposes restrictions on human activity and production in accordance with the principles of preservation of ecosystems and harmonious interaction with them. Moreover, despite the fact that the formation of the noosphere is of some hypothetical nature, due to the difficulties of overcoming human egoism, human civilization has no alternatives to joining this path, implementing the principle of co-evolutionary relationship between humanity and nature (Kochergin 2014).

The noosphere concept is based on the idea of developing an outrun model of the best interaction between society and the environment in the process of exchange of matter, energy and information. Optimization of such interaction is manifested in increasing the suitability of the natural environment for life and development of society. The concept of noosphere includes the optimal unity of social and natural phenomena and has a complex socio-natural character. The noosphere is a planetary and cosmic space, transformed and controlled by the mind of man and humanity, which guarantees the all-embracing

progressive development of civilization. The laws of nature in the noosphere are closely interrelated with the laws of thinking and the laws of socio-economic development. The era of the noosphere is an era of reasonable use of one's power and ensuring the harmonious development of the environment, man and society in interaction and interrelation. The morality of man, as well as his mind, is the most important dominant factor in achieving the balance of the world, and the spiritual and moral formation of the individual is provided by the system of all social institutions, and first of all-by education (Kartashova 2017).

Theoretical Aspects of Modern Noosphere Concept of Education

The concept of noosphere education is a system of scientific and theoretical knowledge, epistemological and methodological principles, practical skills in education aimed at improving its effectiveness in modern society. Noosphere refers to as the era of the new holistic thinking based on a synthesis of the intellect of every person and a collective intelligence, spirituality of personality and spirituality of society. Noosphere development is a consciously controlled, value-oriented and mutually conditioned process of development of the individual, society and the biosphere, which restores the ecological balance on the planet, meets the vital needs of man without harming future generations (Polikarpova 2008).

In the noosphere concept the higher school, higher education is understood as the center of scientific thought of the state and the nation. Institutions of higher education are instruments of influence both on the worldview of people and on the environment as a whole, as the thoughts of mankind, its aspirations and mind change the natural world, give it certain qualities that are not inherent in it from the very beginning. Such non-immanent qualities of nature have an impact on the attitude of mankind to the products of its activities, the existence of nature is changing and cannot only facilitate and improve people's lives, but also create problems for social life, manifested in environmental crises and disasters Higher education should be based not only on its internal potential, but also on the external – on the natural, social and cultural environment. The intellectual potential of all participants in the educational process should transform the environment, taking into account the awareness of involvement in the biosphere and noosphere co-creation. The methodological basis of this transformation of higher education is in the holistic worldview, based on the priority of the whole over the

private, the emergence of the whole, that is, its ability to acquire qualities that are not peculiar to individual parts of it. Higher professional education, therefore, should be interconnected with General humanitarian education in order to form not only a competent specialist, but also a new person of the new society (Nikitenko 2017).

Maslova (2016) highlights ten principles of noosphere education, defining the implementation of the condition of nature appropriateness or bio-adequacy:

1) The principle of greening (the use of natural, inherent in human nature channels and methods of transmission and processing of information with minimizing the role of discursive and logical thinking);

2) The principle of consistency (pedagogical activity is based on the system-wide scientific theories of development of natural, social and mental systems);

3) The principle of harmonization (application of technologies and techniques of holistic harmonious thinking);

4) The principle of humanization (technocratic model of education is replaced by socio-cultural);

5) The principle of instrumentality (the acquired knowledge should be applicable in all spheres of human life, including in the universal sphere-the sphere of being *man-society-nature*);

6) The principle of personal orientation (individual approach to forms, directions and means of education);

7) The principle of outrun development (focus on trends in the development of scientific and technological progress and the development of psychological and pedagogical practices);

8) The principle of simplicity of knowledge (technique of reference to *children's* models of the world and nature);

9) The principle of profitability (teaching methods should not exceed the social costs of technological development);

10) the principle of potential intellectual security (the results of educational technologies should provide students with the formation of a genetically determined way of cognition; intellectual security in compliance with the principle of *do no harm* is due to the natural appropriateness of educational technologies and

provision of information self-organization in all systems of training sessions) (Maslova 2016).

Noosphere education pays great attention to the process of self-development of the individual, demonstration of alternative ways of development that the student chooses himself. One of the main ideas of noosphere education is the idea of acme-synergetic self-development and self-improvement, which provides for the implementation of the processes of self-determination (self-analysis and determination of auto-characteristics), self-prediction (goal setting and planning), self-training (formation of personal and professional qualities) and self-realization (realization of plans, self-expression, self-assertion and self-correction). Therefore, from the point of view of the noosphere approach, the competence-oriented content of professional environmentally oriented education should be based on the acmeological management of educational activities to design a holistic view of professional activities and its indicative foundations in the minds of students (Serezhnikova 2016).

Noosphere education develops the potential of man to live harmoniously in unity with nature and society, his spiritual and creative potential and ability not to violate the laws of the Universe and maintain a stable existence of civilization. Noosphere education is a socio-cultural process of transferring of knowledge, skills and abilities through the organized motivation of mental images of each student, underlying the holistic dynamic thinking, and the realization of the energy contained in them. The student gets a complete system, not scattered information in all subjects, re-experiences it and convert into knowledge. On this system of mental images, his positive consciousness is based and the mechanisms of creative activity are formed. The student feels and is aware of the motivation to obtain information in the learning process, the need and the possibility of its application in life and professional activities in the form of personal quality experience. Noosphere education is personally focused on each student, his abilities and personal experience, and provides him with the opportunity to create a zone of comfortable thinking and feeling, thus launching the process of his internal self-organization, the process of internal formation of personality. A teacher from the outside can only start these internal processes, but cannot form a personality from the outside (Butz 2015).

RESULTS AND DISCUSSION

Based on the analysis of scientific literature, we have determined that higher environmentally appropriate

education in terms of noosphere concept is a natural, socially and culturally oriented system of obtaining, accumulation, transmission and updating of knowledge, skills and abilities of interaction in the system *man-society – environment* for preservation and development of conditions of existence of human civilization and natural environment and entering into a new stage of evolution of human mind and space of its functioning on the basis of ecologically oriented worldview values, attitudes and norms.

Modern environmentally oriented higher education should be based on holistic relaxation-active methods of forming a holistic consciousness and a system of knowledge, skills, abilities of self-development and self-improvement (self-determination, self-analysis), self-prediction (goal-setting and planning), self-training (formation of personal and professional qualities) and self-realization (realization of plans, self-expression, self-assertion and self-correction). Therefore, from the point of view of the noosphere approach, competence-oriented content of professional environmentally oriented education should be based on the construction of a holistic view of professional activity and its value-oriented foundations in the minds of students.

The content of environmentally oriented higher education should integrate knowledge from different scientific fields:

- Philosophy (ideological foundations of the noosphere concept);

- ecology (knowledge of the state of the environment, the risks of environmental emergencies, ways and means to prevent them, solve environmental problems, eliminate the consequences of environmental disasters and restore the environment);

- Psychology (knowledge about the features of human consciousness and behavior, their formation, functioning and impact on the biosphere and socio-sphere);

- Biology (knowledge of the laws of existence and development of the biosphere);

- Physiology (knowledge of the functioning of the human body in various pathogenic and non-pathogenic environmental conditions and the basics of health preservation);

- History (knowledge of the historical development of the biosphere and human civilization, their

relationship and the historical prospects of their interaction);

- Cultural study (knowledge of value, moral and spiritual foundations of interaction in the system man-society-environment)

The methodology of modern noosphere environmentally oriented higher education should be characterized by environmental friendliness and nature appropriateness, that is, it should be based on natural mechanisms of work with information, develop holistic environmentally adequate thinking and improve the health of the participants of the educational process. It should be biosphere one, that is, focused on the harmonious coexistence of man, nature and the Universe, and not on the anthropocentric subordination of nature to man. This methodology should be scientific and based on modern interdisciplinary research. It should be based on the idea of systemic genetic energy and information unity of the biosphere and the socio-sphere. The methodology of noosphere education should contribute to the realization of creative opportunities of all participants of the educational process, to combine active and relaxation forms of organization of classes, to provide comprehensive development, harmonious self-realization and the joy of cognition, to be humane in purposes, methods and means. It should form new tools of thinking and cognition, which will continue to function effectively without the participation of a teacher. Innovative, progressive and advanced nature of such methodology should ensure the formation of individuals with a holistic prognostic thinking, with environmentally safe creative self-realization, as well as optimally minimize possible errors in the educational process.

CONCLUSION

The beginning of the XXI century in the development of human civilization was a stage of a qualitatively new state of global economic, political and social processes caused by the threat of local and global environmental disasters, the cause of which lies in the negative consequences of the existing ill-considered nature management and development of the technosphere on the basis of the worldview of the industrial revolution and the consumer society. The need to overcome not only the ecological, but also the cultural and ideological crisis in the interaction and relationships between people, with society and with the natural environment becomes urgent. The third Millennium should be the Millennium of the entry of the biosphere

and human civilization into the noosphere to ensure the conditions for their preservation and further development on the principles of ecological and cultural consistency. Moreover, the most important role in the success of this process is the modernization of the system of higher education based on the noosphere concept.

It is established that the modern ecologically oriented higher education from the point of view of the noosphere concept is a natural, socially and culturally oriented system of obtaining, accumulation, transmission and updating of knowledge, skills and abilities of interaction in the system *man – society – environment*.

Its content should integrate knowledge from various scientific fields: philosophy, ecology, psychology, biology, physiology, history and cultural studies to create a holistic system of ideas about the world and the place of man in it, its ability to influence the biosphere, techno-sphere and socio-sphere processes to preserve the existence of its civilization, the existence of the biosphere in all its diversity and create conditions for their harmonious interaction and development.

The methodology of such education should be based on the principles of greening, consistency, harmonization, humanization, instrumentality, personal orientation, outrun development, simplicity of knowledge, profitability and potential intellectual security in order to form a system of knowledge, skills and abilities of self-development and self-improvement, self-prediction, self-training and self-realization. Therefore, from the point of view of the noosphere approach, competence-oriented content of professional environmentally oriented education should be based on the construction of a holistic view of professional activity and its value-oriented foundations in the minds of students.

The materials of the article are of theoretical and practical value for the development of educational and methodical complexes in various disciplines of higher education, taking into account the noosphere concept, teachers' training and retraining programs, as well as programs aimed at the formation of new environmentally appropriate worldview and value-based attitudes among the contemporary youth.

REFERENCES

- Butz NV (2015) Modern noospheric education in the scientific picture of the world. *Geopolitics and ecogeodynamics of regions*, 3: 30-36.
- Vernadsky VI (2012) *The biosphere and the noosphere*. Moscow: Iris-press.
- Drobzhev MI (2018) The transition of the biosphere into the noosphere: pathways and contradictions. *Issues of modern science and practice*. V.I. Vernadsky University, 1 (67): 48-57.
- Ivanov SA, Voroshilova TA (2010) Modern environmental education: from self-centeredness - to the noosphere worldview. *Education and science. News of the Ural scientific and educational center of the Russian Academy of education*, 8(76): 53-64.
- Ilyin IV, Ursul AD. (2010) Evolutionary approach to global research and education: theoretical and methodological problems. *Age of globalization*, 1(5): 3-17.
- Kartashova OV (2017) Development of society in the transition from the biosphere to the noosphere. *Scientific almanac*, 2(27): 294-297.
- Kochergin AN (2014) Globalization and ecology: co-evolutionary interaction of society and nature as a condition of transition of the biosphere to the noosphere. *Bulletin of Moscow University. Series 27: global studies and geopolitics*, 3(4): 83-87.
- Lymar YuA (2015) V. I. Vernadsky's ideas about the noosphere and education. *Pedagogical experience: theory, methodics, practice*, 2: 27-29.
- Maslova NV (2016) Noosphere. Noosphere development. Noospheric education. *Open education*, 2: 6-10.
- Mishina Yu A, Veriga AV (2017) Noospheric vector of management of the system of higher professional education. *Open education*, 5: 72-81.
- Nikitenko VN (2017) Vernadsky about higher school. *Problems of higher education*, 1: 73-75.
- Ochirov MN (2015) The doctrine of the noosphere: a perspective interpretation. *Bulletin of Buryat state University*, 15: 4-7.
- Parakhonsky AP (2014) Formation of information society and development of information ecology. *Pedagogy and modernity*, 3: 20-28.

- Pogrebnoy FV, Khristaforov OV (2016) V.I. Vernadsky's concept of transformation of biosphere into noosphere. *New science: current state and ways of development*, 3: 194-197.
- Polikarpova YaN (2008) The concept of noospheric education as a basis for emergency prevention. *Philosophy of education*, 4(25): 239-243.
- Serezhnikova RK (2016) Personal and professional formation of the future teacher in the space of noosphere education. *Psycho-pedagogical magazine Gaudeamus*, 2: 9-14.
- Fortunatov AA (2010) Domestic concepts content analysis of young people environmental education. *Bulletin of the Moscow state regional University. Series: Pedagogy*, 2: 134-139.
- Shil'nov AA (2017) Philosophical aspects of doctrine about noosphere and problems of development of world civilization. *Philosophical school*, 1: 84-91.
- Yurochkina IYu (2017) Formation of ecological culture of personality in the context of modern educational paradigm. *Bulletin of pedagogical innovations*, 4(48): 61-68.