
Mechanisms and Conditions for Ecological Safety Provision in University Educational Environment

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Abstract

The relevance of the study is due to the fact that the increasing risks of global and local environmental crises put forward new demands to ensure national, economic, political, public ecological safety, including ecological safety of the educational space. The right to a favorable environment is one of the fundamental rights of citizens; therefore, ensuring ecological safety and comfort of the educational environment for the formation of a person focused on harmonious interaction with nature and protected from environmental threats becomes very important. The purpose of the study is aimed at the analysis of different approaches to the ecological safety of the University educational environment, the identification of mechanisms and conditions of the very process. The results of the study reveal that the system of ecological safety of the University educational environment is the combination of regulatory, training, educational, medical, recreational activities, aimed at harmonious interaction of man with the biosphere and the ecosphere. The ecological safety of the educational environment is determined by the compliance degree of the actual parameters of the environment ecological state with their optimal indicators for the preservation of the health of the educational process participants. The main elements of the mechanism to ensure environmental safety of the University educational environment are revealed: a comprehensive environmental assessment of the University and its surrounding area, environmental monitoring and effective management decisions in this area. The main conditions for the effectiveness to ensure environmental safety in the University educational environment are the use of the regulatory framework, the use of organizational and administrative impact and financial support, the unity of all participants' activity in the educational process in this area. The Materials of the article are of theoretical and practical value for the development of educational and methodical complexes on ecology and environmental pedagogy, teachers' training and retraining programs, as well as programs aimed at the formation of ecological safety of the University educational environment.

Keywords: ecological safety, educational environment, ecological safety provision, security, mechanism of ecological safety, ecological safety conditions, efficiency, educational process

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INTRODUCTION

Ensuring ecological safety occupies one of the first places in a number of environmental problems that require immediate solutions in order to ensure economic and national security, economic and political sustainable development of the country (Chernyavskaya et al. 2016, Dlimbetova et al. 2018,

Potapova et al. 2018). As a rule, a person does not realize that his activity interferes with the objective laws of the biosphere processes, creates unfavorable changes for himself and cannot predict the consequences of his activity. The scale of harmful human intervention in the biosphere at the present stage has reached catastrophic proportions. In such circumstances, the most important

issues are those, which are related to the formation of environmental culture and environmental consciousness of the individual and society (Omarova et al. 2018, Rassolov et al. 2016, Ulengov et al. 2018). It is possible only in the system of continuous environmental education. But the education system itself at all levels must ensure its environmental safety. Insufficient knowledge of the basics of ensuring environmental safety of the University educational environment, the lack of programs for its implementation actualize the problem of the research.

One of the priorities of the concept of Russian citizens' environmental safety is a sufficient degree of their environmental safety. The activities of educational and awareness-raising organizations, the media should be aimed at promoting the rules of environmentally consistent behavior, compliance with environmental safety requirements, training in the basics of environmental safety and appropriate education of citizens (Glushko 2015).

Moulin, considering philosophical and methodological foundations of environmental security from the perspective of the activity-based approach, under environmental safety understands sustainable state of socio-techno-natural systems, which is achieved due to the optimum fit of human activities in natural processes, which enables to prevent the dangerous effects of these processes on the lives and human activities (Moulin 2005).

Under environmental safety, Gosteva (2010) understands acceptable in appropriate conditions of development degree of protection of the basic vital interests of individuals, society, state, civilization from the threats and consequences of negative environmental changes caused by anthropogenic and natural impact on it. The objects of environmental safety are socio-ecosystems of all levels of economic entity, from global to individual. Subjects of economic and any other activities related to significant environmental risk factors are sources of environmental danger. Ensuring environmental safety is a systemic control action of the social system and ecosystem, the purpose of which is to minimize environmental threats and protection from environmental consequences to achieve a level of safety, that is, an acceptable level of protection (Gosteva 2010, Yachina et al. 2018).

To improve the environmental safety of the individual, society and the state, a high level of individual and mass ecological culture and ecological consciousness is important. Scientists note the

disastrously low level of environmental culture among Russian citizens in comparison with other developed countries. They are not aware of the full scale of environmental danger, they are most often indifferent to the environment, which leads to their actions, environmentally incongruous and harmful to varying degrees of severity, and often such actions go unpunished. In Russia, environmental upbringing and education, the formation of ecological culture and ecological consciousness in the system of continuous environmentally consistent education should become a priority (Bochkova and Mamiy 2017).

Due to the deterioration of the environmental situation in the world, because of the unresolved problems of human protection from damaging natural and anthropogenic factors, the environmental safety of the educational environment is a priority, its mandatory characteristic. In the educational environment is the formation and development of the individual, whose activities will not only be carried out in the future, but also largely determine the future, which determines the need for futurological orientation of modern processes of training and education. The creation of an ecologically safe educational environment will allow understanding the laws and forming the basis of environmental culture, to construct an environmentally consistent living environment of the individual based on enduring human values. Its design in theory and in practice makes it possible to provide a developing person with comfortable conditions in an environmentally protected, environmentally appropriate educational space, created based on an ecological imperative, which is, not damaging the natural environment and harmonizing the interaction of personality and nature (Alisov 2014a).

LITERATURE REVIEW

Theoretical Basis of Environmental Safety

Historically, the relationship between man and nature began with unity, man was an integral part of nature, deified and worshiped it, and developed in accordance with it. The danger for him was the spontaneous natural phenomena, and his activities did not do any harm to nature. However, with the development of their needs, people begin to master nature and the relationship with it are becoming more extensive and diverse. The stages of the harmonious relationship between man and nature were replaced by stages in which man realized that his activities are harmful to nature, are a threat to the safety of the environment and it requires environmental

friendliness, respect for nature. At the present stage, we are talking about sustainability of the ecosphere and the socio-sphere in their interaction, their co-adaptation on the way to the noosphere (Tyumaseva et al. 2017).

Mulin (2005) writes about the fact that environmental safety is of a systemic nature, which is manifested in the relationship of all the processes of the socio-techno-natural system, which are dangerous only because of inadequate human activity. The mechanism of ensuring environmental safety is the need to adapt human life and activities to the natural environment. To do this, it is necessary to develop new or restructure old ways of working so that they do not pose a danger to nature and man, to predict the consequences of activities, to identify unpredictable consequences and transfer them into predictable, to develop tools and methods for managing technical, technological and natural processes. At the subjective level, it is necessary to form ecological consciousness and ecological culture. At the global level, ensuring environmental safety consists, on the one hand, in reducing the rate of growth of material consumption, on the other – in the use of natural technologies that contribute to the conservation, restoration and development of the biosphere (Mulin 2005).

Mileshko (2018), considering the modern General theory of environmental safety, indicates that it should be based on three basic principles. The first is that short – term impact can be relatively safe and long – term impact can cause significant damage, local impact can be almost non-harmful and long-term can cause environmental disasters (the principle of time and scale limitation). The second principle – the principle of continuous variability-says that the qualitative and quantitative accumulations of substances, energy and information that make up any system change continuously, due to changing environmental parameters. The third principle is based on the fact that information interactions lead to the least energy loss and do not disturb the balance of ecological systems, but ensure consistency in the behavior of subsystems, that is, lead to the ordering of systems and reduce entropy (the principle of self-organization of open systems in non-equilibrium conditions). He also formulates four basic rules for environmental safety: 1) any human activity should not have a negative impact on the environment; 2) all actions, states and processes taken together should not directly or indirectly cause vital damage to the natural environment, individuals and humanity; 3) any actions, states and processes in the complex must ensure the balance of the earth's

ecological system in any place and at any level to which humanity is ready to adapt at the appropriate stage of its development; 4) There is virtually no lower limit to the concentration of safe exposure, especially over time (damage may occur in the future) (Mileshko 2018).

Ensuring environmental safety should be based on the basic laws of ecology:

1. The biosphere is a complex self-regulating dynamic system, which includes many subsystems and interrelated elements (everything is connected with everything).

2. Biosphere technologies are non-waste, such should be the technology of human civilization (everything goes from one form of matter movement to another).

3. All knowledge and technology must be learned in accordance with the laws of nature (nature knows everything better).

4. All that humanity took from the nature, it must be returned to it (nothing comes for nothing) (Arkhipov et al. 2017).

The Main Approaches to Understanding the System of Ecological Safety of the Educational Environment

Alisov (2010) offers the concept of formation of ecological safety of the educational environment based on the sensor ecological approach as the methodological scientific direction focused on optimization of interaction of the person with the world around by sensory channels of perception of the world. Formation of environmental safety of the educational environment is a multifunctional pedagogical activity aimed at creating or changing the existing objects of the educational environment, to ensure the effectiveness of interaction of all components of the environment, to ensure their environmental protection through the optimization of environmental factors important for the environment. The purpose of creation of the educational environment ecological safety is formation of system of organizational and pedagogical conditions, which are focused on development of representations, the relations and technologies of interaction of the person and world around based on ensuring its ecological protection in the course of education (Alisov 2010).

Pantuyuk and Yanushevich (2018) from the standpoint of human ecology under the environmental safety of the educational environment understand the

environmental protection of all its components: the environment of educational activities and its participants, their fundamental interests and rights from the threats that arise because of various, mainly anthropogenic impacts on the natural environment. The main priorities of the formation of the educational environment ecological safety are the provision of favorable sanitary and hygienic conditions of education, rest and nutrition, organization of medical care, the creation of diverse, complex, flexible and manageable space-subject and information environments. It is also important to ensure access to reliable information on the current state of the environment and to develop skills in the prevention and elimination of possible emergencies. The main components of the structure of the educational environment ecological safety are its subjects (participants of the educational process), objects (relevant elements of the environment), other types of security of the educational environment, as well as threats (risk factors for environmental safety violations) (Pantuyuk and Yanushevich 2018).

Neprokina et al. (2012) note that for the educational environment the most important humanitarian characteristics of environmental safety, are such as culture-forming, moral, psychological, health-saving, corresponding to the understanding of nature in the modern world culture. Risks of violation of the educational environment ecological safety are shortcomings of management of the educational organization, the organization of educational process, features of interaction with social, subject-spatial and natural environment, and they can be connected both with the child, his family, and with the teacher. Environmentally comfortable and safe educational environment can be provided only through the unity of all participants in the educational process. Its creation is the result of not only the assimilation of environmentally significant knowledge by its participants, but also the formation of environmentally oriented skills in its organization. Environmental safety should become one of the basic human needs, an integral part of his worldview, ideals and values (Neprokina et al. 2012).

The modern educational environment is becoming increasingly information, and from this point of view, its environmental safety is characterized by interdependence of sources of knowledge (real – on physical media and virtual – on electronic media) and its consumers, that is, the subjects of the educational process, the interaction of which is not a negative psychophysiological impact on humans. Intensive

exposure of information on the verge of endurance limits can cause personal destruction, manifested in asocial behavior and in extreme cases can lead to the death of the body, which from an environmental point of view is a factor of information origin. To ensure environmental safety, it is important to form information tolerance among the subjects of the educational process, which will ensure the stability of the educational environment as a system, which is necessary for its successful existence and development (Strukova 2018).

Ecologically safe educational environment is a set of measures and activities aimed at the organization of the educational process (training and education), taking into account the ecology of the surrounding material and intangible (information, social) environment, on the formation of a strategy of environmentally healthy lifestyles among all participants of the educational process. It permeates not only the process of training and education, but also social and cultural leisure, sports, catering and medical services, in the course of active interaction of all participants in the educational process. This educational environment is the condition and way of ecologization the relations of the young specialist with the biosphere, the ecosphere and the socio-sphere, it sets the benchmarks that minimize the environmental risks and contribute to the adoption of ecologically oriented solutions in all spheres of life (Shayakhmetova and Smirnova 2018).

In a broad sense, under the system of environmental safety is understood as a set of legislative, medical and biological measures aimed at maintaining a balance between the biosphere and anthropogenic loads, as well as natural external loads. Environmental safety is achieved by a system of measures for forecasting, planning, early preparation and implementation of a set of preventive measures that ensure a minimum level of adverse effects of nature and technological processes of its development on the life and health of people while maintaining sufficient rates of sustainable development of industry, communications, agriculture (Poselyanova 2010). Therefore, under the system of environmental safety of the University educational environment can be understood as a set of normative, educational, medical, leisure activities aimed at the harmonious interaction of man with the biosphere and the ecosphere.

Pedagogical design and implementation of the system of the educational environment environmental safety is carried out at several levels.

1. The technological level, which is associated with the appropriate pedagogical technology, involving a preliminary conclusion about the compliance of the design object with environmental safety requirements, the allocation of the most significant positive and negative parameters of its environmental safety, forecasting features of environmentally oriented interaction of participants of educational activities on the basis of their existing environmental attitudes and values, determination of the state of filling the educational environment with necessary and sufficient means and conditions for safe interaction.

2. The project, content-activity-based level is associated with the prediction of opportunities for the implementation of environmental safety in the educational environment, the planning of measures for the implementation of the designed environmental strategy.

3. Stage of assessment of the possibilities to implement the model of the educational environment ecological safety in the educational process (Alisov 2014b).

Among the main components to ensure ecological safety of the educational environment are two systemic components: organizational-technical and psychological-pedagogical. The organizational and technical component includes the features of physical space and the subject environment, the negative impact of which can potentially cause a state of environmental danger. The psychological and pedagogical component consists of a system of pedagogical and psychological conditions and influences that provide the opportunity to form a personality in a state of protection from the negative effects of environmental factors and harmonious interaction with nature (Kislyakov 2011).

The following components are distinguished in the structure of environmental safety of the educational environment:

- cognitive: the assimilation of information and knowledge about the basic laws of the ecosphere, about environmental problems and challenges, about the risks of environmental safety both at the global level and at the level of the country, region, place of residence and specific educational organization;

- motivational: awareness of the need for activities to maintain balance in the ecosphere and readiness for it, to prevent possible threats to environmental safety and

to act in a situation that violates the environmental safety of the educational organization;

- Operational: the presence of environmentally appropriate skills in the educational process, the use in practice of knowledge and skills;

- Value: the presence of a system of environmental values that meet the modern noosphere worldview and allow harmonious interaction with the biosphere;

- Cultural: the presence of a formed ecological culture at the spiritual, social and behavioral level of all participants in the educational process (Kiselev 2015).

RESULTS AND DISCUSSION

In accordance with the objectives and the subject field of our research under the educational environment of the University, we understand the complex of external and internal factors, including the technological environment (territory and buildings), the content of the educational process and its management, the material base of the educational process, as well as all its participants.

Ecological safety of the educational environment of the University is a state characterized by the protection of the participants of the educational process and its material base from possible negative impacts of natural, man-made or anthropogenic nature, various emergencies. Ecological safety of the educational environment is determined by the degree of compliance with its inherent actual parameters of the environmental state of their optimal performance, with a high degree of compliance that allows you to maintain the health of the participants of the educational process, to improve its efficiency.

The system of ecological safety of the University educational environment is a set of standard-setting, educational, medical, leisure activities aimed at the harmonious interaction of man with the biosphere and the ecosphere.

The mechanism for ensuring ecological safety in the University educational environment, which provides a permissible negative impact on humans and the nature of natural and anthropogenic factors, includes three main elements:

1. Comprehensive environmental assessment of the University and the surrounding area, taking into account the environmental situation of the surrounding area and the region as a whole. It is important for it to identify and assess a set of factors of real and possible

environmental hazards in a particular University, to compile and maintain an inventory of those objects of the University that directly affect the environment, and those whose impact on the environment may violate the environmental safety of the educational environment, to determine the anthropogenic load on the educational environment.

2. Environmental monitoring of the educational environment. It consists in regulation of impacts on the environment, control over the sources of possible negative impact on the environment, control of the ecological state of all objects of the University and the surrounding area.

3. Management decisions. These include the formation of the University environmental policy, prevention of anthropogenic environmental hazards, neutralization of the effects of natural environmental hazards, development and improvement of internal regulations related to the protection of nature and the formation of ecological Outlook.

The methods to ensure environmental safety of the whole complex of the University educational environment include: methods of monitoring the level of environmental safety: quantitative methods of measurement, expressed by numerical value, and biological – qualitative, expressed verbally, or partially quantitative; predictive and modeling methods: system analysis, system dynamics, computer science and others; combined physics-chemical, ecological-biological, ecological-Toxicological and other; methods of environmental quality management.

Based on the analysis of scientific literature, the necessary conditions for ensuring environmental safety of the University educational environment were determined. These include:

- Effective use of the existing legal framework to ensure environmental safety at the University level, participation in its revision and improvement;
- Effective application of mechanisms of organizational and administrative impact on the process of ensuring environmental safety of the University educational environment, financial support for this process and its management;
- Regular and systematic monitoring of the situation in the field of environmental safety of the University educational environment;

- Development of the system of environmental measures in the framework of educational activities of the University;

- Support for environmentally oriented research of students, postgraduates and teachers, their activities to ensure ecological safety of the educational environment of the University;

- Unity of purposeful activity of all participants of the educational process in the field of environmental safety of the University educational environment.

CONCLUSION

The relevance of the study is due to the fact that the increasing risks of global and local environmental crises impose new requirements to ensure national, economic, political, public environmental safety, including environmental safety of the educational environment. The right to a favorable environment is one of the fundamental rights of citizens; therefore, ensuring environmental safety and comfort of the educational environment for the formation of a person focused on harmonious interaction with nature and protected from environmental threats becomes very important. Due to the deterioration of the environmental situation in the world, because of the unresolved problems of human protection from damaging natural and anthropogenic factors, environmental safety of the educational environment is a priority, its mandatory characteristic. The creation of an ecologically safe educational environment will allow understanding the laws and forming the basis of environmental culture, to construct an environmentally consistent living environment of the individual based on enduring human values.

Under the educational environment of the University, we understand the complex of external and internal factors, including the techno-natural environment (territory and buildings), the content of the educational process and its management, the material base of the educational process, as well as all its participants.

It is established that the system of ecological safety of the University educational environment is a set of normative, educational, medical, leisure activities aimed at the harmonious interaction of man with the biosphere and the ecosphere. The ecological safety of the educational environment is determined by the compliance degree of the actual parameters of the environment ecological state with their optimal

indicators for the preservation of the health of the participants of the educational process.

The main elements of the mechanism in ensuring environmental safety of the University educational environment are revealed: a comprehensive environmental assessment of the University and the surrounding area, taking into account the environmental situation of the surrounding area and the region as a whole, monitoring the environmental status of all facilities of the University and the surrounding area and effective management decisions in this area, and the formation of the environmental policy of the University.

The main conditions for the effectiveness in ensuring environmental safety of the University

educational environment are the effective use of the regulatory framework, the effective use of mechanisms of organizational and administrative impact on the process of ensuring environmental safety and financial support, the development of environmental protection measures in the framework of educational activities of the University, support for environmentally-oriented research students, graduate students and teachers, the unity of all participants in the educational process in this area.

The materials of the article are of theoretical and practical value for the development of educational and methodical complexes on ecology and environmental pedagogy, training and retraining programs for teachers, as well as programs aimed at the formation of ecological safety of the University educational environment.

REFERENCES

- Alisov EA (2014a) Psychological and environmental safety of creative educational environment. *Bulletin of Moscow city pedagogical University. Series: Pedagogy and psychology*, 1(27): 8-18.
- Alisov EA (2010) Essential provisions of the concept of formation of ecologically safe multi-level educational environment. *Bulletin of Tula state University*, 12(92): 37-40.
- Alisov EA (2014b) Technology of pedagogical design of ecologically safe educational environment of the University. Materials of the international correspondence scientific-practical conference Teacher of higher education: from design activity-to design competence. Voronezh: Voronezh state University.
- Arkhipov MV, Kulnev VV, Nosyrev MB, Parfenova LP, Pochechun VA, Semyachkov AI, Semyachkov KA, Fominykh AA, Khoroshavin LB (2017) Environmental and techno sphere safety. Yekaterinburg: Publishing house of Ural state mining University.
- Bochkova TA, Mamiy SA (2017) Problems of ecological safety of Russia. *Scientific journal of Kuban agrarian University*, 125(01): 800-811.
- Chernyavskaya YS, Kiselev SV, Rassolov IM, Kurushin VV, Chernikova LI, Faizova GR (2016) Assessment of the main indicators' relationship of projects of information and communication services' development. *International Journal of Environmental and Science Education*, 11(15): 7348-7357.
- Dlimbetova GK, Bulatbayeva KN, Abenova SU, Fahrutdinova GZh, Khuziakhmetov AN (2018) Management of Ecologization of Professional Education. *Ekoloji*, 106: 1217-1225.
- Glushko OA (2015) Priorities of the concept of environmental safety. *Scientific journal of Kuban agrarian University*, 109(05): 901-912.
- Gosteva SR (2010) Environmental safety of Russia and sustainable development. *Bulletin of Tambov state technical University*, 3: 704-718.
- Kiselev SA (2015) Pedagogical aspects of environmental safety of the educational environment. *Molodoi uchonyi*, 7: 777-780.
- Kislyakov PA (2011) Formation of ecologically safe educational environment of the University. *Modern studies of social problems*, 4(8): 46-52.
- Mileshko LP (2018) Modernization of the General theory of environmental safety. *Management of economic systems: electronic scientific journal*, 6(122): 32-53.
- Mulin IB (2005) Philosophical and methodological basis of environmental safety: abstract of PhD thesis. Moscow: Moscow state University named after M.Yu. Lomonosov.
- Neprokina IV, Bolotnikova OP, Oshkina AA (2012) Safe educational environment: modeling, design, monitoring. Togliatti: Publishing house of Togliatti state University.
- Omarova LB, Kalimullin AM, Grudtsina LY, Korzhuev AV, Zhukova MY. (2018) Philosophical anthropology in postmodernism. *XLinguae*, 11(3): 76-85.

- Pantjuk IV, Yanushevich II. (2018) Structural elements of ecological safety of the educational environment. Materials of the 13th International scientific-methodical conference "Higher school: problems and prospects". Minsk: state educational institution "Republican Institute of higher education".
- Poselyanova EA (2010) Management of formation and development of the ecological safety system. Bulletin of Volzhsky University named after V. N. Tatishchev, 9: 41-50.
- Potapova SV, Danilova IY, Prasolov VI, Makarova EV, Kryukova NI. (2018) Mythological foundations of ontology. XLinguae, 11(2): 672-685.
- Rassolov IM, Sidyacheva NV, Zotova LE, Salitova FS, Konyushenko SM, Gzhemskaya NK (2016) Socio-pedagogical priorities of the educational process at the university: The didactic aspect of information technology. International Journal of Environmental and Science Education, 11(18): 10987-10997.
- Shayakhmetova MM, Smirnova YuK (2018) Ecological issues of the educational environment. International student scientific Bulletin, 1: 3-8.
- Strukova EA (2018) Ecological safety in the modern information educational environment. Informio. Modern media technologies in education and culture. URL: <http://www.informio.ru/publications/id3844/Yekologicheskaja-bezopasnost-v-sovremennoi-informacionnoi-obrazovatelnoi-srede>
- Tyumaseva ZI, Orekhova IL, Natarova DV (2017) Ecological safety as the basis of human relations with the natural and educational environment. Bulletin of Chelyabinsk state pedagogical University, 3: 102-107.
- Ulengov RA, Khuziakhmetov AN, Nasibullov RR, Yarullin IF (2018) Approaches to the Environmental Assessment of Landscapes in the Republic of Tatarstan. Ekoloji, 106: 1713-1717.
- Yachina NP, Khuziakhmetov AN, Gabdrakhmanova RG (2018) Formation and Development of the Regional System of Continuous Environmental Education of a Teacher. Ekoloji, 106: 1315-1322.