Environmental education of students of higher educational institutions

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Abstract. The article provides information about the need for environmental education for the development of a harmonious personality of students. With the optimal organization of environmental education, which is carried out by competent teachers with their own eco-culture, it is systematically capable of influencing the knowledge, skills, and abilities of students. Environmental education should be a unified learning process, which includes the assimilation, systematization of knowledge about the environment, the acquisition of skills and knowledge of nature conservation and the formation of a whole eco-culture. We believe that the goal of environmental education should be to develop a critical attitude towards nature. In the process of environmental education, there are three of its components: environmental education; environmental education; environmental education. Environmental education, according to the Federal State Educational Standard, must be implemented in the form of an eco-block of basic educational disciplines, as well as in the form of variable and optional components. Environmental education should be understood as the process of developing an understanding of the environment in a person, understanding the appropriate use of it. In the information age, the timely process of forming a system of society's worldview, which leads to the harmonization of relations between man and nature, is relevant. In this case, there should be an optimization of the further stability of the ecological situation on Earth. At the heart of eco-upbringing, a number of primary tasks can be noted that form a set of training, upbringing and development. The condition for the completion of the formation of a conscientious attitude towards the natural environment is considered to be moral concern for future generations. The principles of environmental education should guarantee the implementation of uniform requirements for the level of professional competence of future specialists, which are prescribed for each area of training for a bachelor's, specialist's or master's degree. Today, environmental education is the basis for the reform and modernization of higher education.

1. Introduction

Environmental education of students is a very important and relevant problem today, because it is the ecological worldview, the eco-culture of modern youth that can correct the situation of the ecological disaster that their ancestors created. Environmental education is also necessary for the development of a harmonious personality of students. If environmental education is well organized, carried out periodically, by teachers who themselves have an ecological culture, then it is able to influence their knowledge, skills, and abilities. In 1977 at the intergovernmental conference on environmental
education in Tbilisi, the issues of environmental education in the USSR were discussed for the first time. At the same time, the goals, objectives, the importance of environmental education, the need to form a system of continuous environmental education of the population were determined.

Environmental education can be considered as a single learning process, which includes the assimilation, systematization of knowledge about the environment, the acquisition of skills and skills in nature protection activities and the formation of an entire eco-culture. The goal of environmental education is to form a critical attitude to nature. I D Zverev considers environmental education as «a continuous process of training, education and development of the individual, aimed at the formation of a system of knowledge and skills, value orientations, moral, ethical and aesthetic relations that ensure the environmental responsibility of the individual for the state and improvement of the socio-natural environment» [1].

Under his leadership, a scientific school on environmental education in the framework of sustainable development was organized. Joint scientific work with A N Zakhlebny made it possible to concretize the goals, objectives, content, and methodology of the model for implementing environmental education in secondary schools on the basis of links between subjects [2, 3].

As early as the beginning of the 20th century, pedagogy saw the mass inclusion of various methods and forms that were supposed to form students’ cognitive and practical skills and skills of ecological nature in order to protect the environment. Later, knowledge of nature protection became a mandatory section of textbooks on ecology, biology, and geography. Further, various resolutions on nature protection are adopted to improve the quality of methods for studying native nature, and a rational attitude to it. In the mid-20th century, environmental education and education of the younger generation is becoming relevant all over the world. At the same time, a number of laws on nature protection are being adopted in all countries. There is a significant increase in interest in the problems of environmental education in the context of optimal use of natural resources and environmental protection. In the conditions of secondary school and secondary vocational education, optional environmental programs are introduced, which further increases environmental education to a qualitative level. According to the Decree of the President of the Russian Federation «On the State Strategy of the Russian Federation for Environmental Protection and Sustainable Development» (1997), the direction of development of environmental education was chosen as one of the main courses of state policy. An Interdepartmental Council on Environmental Education was organized, and the law «On State Policy in the field of Environmental Education» was adopted. The interaction of many countries on Earth in the field of environmental education is carried out by the United Nations Organization for Culture, Science and Education (UNESCO), whose staff notes the high need for the formation of environmental education in all general education programs of preschool, school, secondary vocational and higher education. Quoting the UN Director, it can be noted that «our survival, the protection of the environment can only be abstract concepts if we do not instill in everyone a simple and convincing idea: people are part of nature...» [4].

2. Statement of the problem
In the process of environmental education, there are: environmental education; environmental education; environmental education. According to the Federal State Educational Standard, environmental education should be implemented in the form of an eco-block of basic academic disciplines, in the form of variable and optional components.

Environmental education is the process of developing a person's understanding of the environment, understanding the appropriate use of it. In the information age, the process of forming a system of worldview of society, which leads to the harmonization of relations between man and nature, is very important, because in this direction, the further stability of the environmental situation in the world is optimized. The background of environmental education consists of a number of tasks that form a set of training, education and development. The condition for completing the formation of a conscientious attitude to the natural environment is considered to be moral care for subsequent generations.
N F Reimers noted that environmental education can take place under the influence of a complex of environmental and environmental education, which includes education, school and university environmental education, and the promotion of an ecological view of the world [5].

Thus, ecological education is a combination of ecological consciousness and behavior that is harmonious with nature [6]. To form a certain ecological consciousness, properly directed knowledge and beliefs are necessary.

In the works of N S Nazarova, the core goal of environmental education is highlighted - the formation of a harmonious personality, whose inner world and its needs are not in conflict with the environment. The principle of eco-education can be to improve the quality of the environment as a universal value, the only true habitat of living organisms on Earth and the reproduction of new generations of people [7].

Overcoming the environmental crisis can be achieved only if the worldview of a person changes to an environmentally oriented and socially oriented one.

Environmental education is a permanent process in line with the interdisciplinary connections of the university disciplines of acquiring environmental knowledge and skills, the purpose of which will be the appropriate and careful consumption of natural resources. Today, environmental education as a continuous process of training, education and development of a student should consist of the formation of an ecological culture, an emotionally positive attitude to the environment, the surrounding world, responsibility for health and the state of the environment, moral norms, value orientations that have contributed to the sustainable development of society and the harmonization of the «man – nature» system. The problem of sustainable development is interrelated with the environmental education of the population. The main issues of the concept of «sustainable development» that are relevant today include: the preservation of humanity as a whole and the natural environment for future generations; the awareness of a person that he is only one of the many biological species that coexist on an equal basis, and not the king of nature; the limited non-renewable resources, territories. In the light of the current environmental situation, it is necessary for a person to change his behavior, his values.

Thus, environmental education is «consciousness-thinking-knowledge-activity», and environmental education is «values-attitude-behavior».

The education of eco-culture is not determined only by environmental education. An integral part of the formation of humanity with a humane attitude to natural resources can be the stage of ecologization of consciousness (ecoculture). Ecoculture leads to the emergence of an environmentally oriented society, i.e. one in which the most important goal is the formation of correct environmental principles. All components of ecoculture are interconnected. A person who has environmental knowledge, can think and act rationally in relation to the natural environment, shows love for the native nature more steadily. To harmonize life on Earth, humanity needs to develop and inculcate the main values and components of eco-consciousness. Under the influence of eco-education, a responsible attitude to the natural environment is created. It is formed on the platform of ecological consciousness, which implies compliance with the moral and legal principles of optimal use of natural resources and promotion of ideas for its optimization, active activity in the study and protection of the environment.

At the same time, it is necessary that with such training and education, students’ activities should be organized in the relationship of science, morality, law, aesthetics and practical orientation, which would lead to an improvement in relations between nature and man [8].

Eco-consciousness is ultimately based on a person's knowledge of the laws of the integrity of the natural environment, the laws that determine the activities of people to preserve the viable state of nature. The priority goal of education is environmental thinking, consisting of scientific knowledge, eco-culture and ethics. At the moment, environmental education is aimed at the prospect of the existence of the planet, so it should include the ideas of harmony between nature and man, the stabilization of the biosphere, the breaking of certain stereotypes of society, especially in the consumer attitude to nature, which should be created during the formation of a spiritual, moral, environmentally enlightened personality, determine the condition of its development, be the social stability of society.
The tasks of environmental education include 3 groups: educational-the formation of a system of knowledge about the environmental problems of our time and the ways to solve them; educational-the formation of motives, needs and habits of environmentally appropriate behavior and activities, a healthy lifestyle; developing-the development of a system of intellectual and practical skills to study, assess the state and improve the environment of their area; the development of the desire for active environmental protection [8].

The program of environmental work with students should be based on the formation of scientific knowledge and ideas about the "man-nature" system, which would lead to the specification of issues of environmental expediency. At the same time, it is necessary to cultivate an attitude to nature, which would help to determine the goals and objectives of rational and conservation interaction with nature, the choice of motives and strategies for the coexistence of all biological species in nature; the formation of knowledge, skills, and skills of interaction with nature, which would help to reduce the negative anthropogenic impact on nature. At the same time, there are several directions in working with students. First, the development of interest in the relationship between man and nature. Secondly, the formation of ecological perception - the ability to hear, see, smell, touch nature in all its harmonious natural and aesthetic integrity. Third, the formation of a philosophical understanding of the importance of ecology for humans. Fourth, the development of socially valuable motives of students' personal attitude to nature. Fifth, the involvement of students in direct work on the protection of nature and the environment. Sixth, the implementation of environmental interior design of classrooms, corridors: placement of indoor plants, plant compositions, aquariums, posters and photo stands on environmental topics, the use of phytodesign [9].

The model of environmental education is the direction and type of activity. The model is based on the leading method, which should be chosen by the teacher, based on the characteristics of each student group on the basis of a systematic, democratic approach, based on the common interests and needs of each student in the team at the moment. For the correct education of certain personal qualities, it is necessary that the teacher must be able to create a positive microclimate in the student group [10]. For this purpose, ecological and psychological training, integral search group and role-playing games, creative «therapy», «brainstorming», and simulation modeling can be used to foster eco-awareness in the educational process, which will stimulate the actualization of personal involvement, the emotional sphere, and the formation of environmental content motives. All this should ensure the systematization of students' worldview attitudes [10].

The components of eco-education are easily acquired by students in their daily activities. Any form of the educational process can encourage students to engage in cognitive activity: independent work with various sources of information (accumulation of facts, identification of the essence of the problem), play (experience in developing a strategy for correct solutions), creativity (competitions, conferences-contribution to the study and preservation of local ecosystems, promotion of valuable ideas) [11].

In the works of A V Sakhno, it is noted that the main forms of eco-education of students are practical activities of students under the guidance of teachers, especially specialists in nature protection, landscaping, when actions are carried out to plant green spaces, clean small rivers and streams from garbage [11].

Methods of eco-education in higher education include technologies of interaction between the teacher and students in the implementation of the tasks of forming a harmonious personality of the future specialist. Among the most chosen methods by the teacher are such as explanation, story, conversation, lecture, work with students, demonstration, analysis, synthesis, comparison, problem presentation of the material, laboratory and practical work, exercises, independent work, creative work, encouragement, approval, censure, condemnation, survey, control work, verification of independent work, test, exam, test control [12].
3. Materials and Methods
To study the impact of variable learning in the system of environmental education of agricultural university students at the Orenburg State Agrarian University with the participation of 66 students of the 1st, 2nd, and 3rd year of the direction of training Forestry Profile Forestry and 12 students of the 3rd year of the direction of training Biology Profile Bioecology, a questionnaire was conducted with subsequent statistical processing of the results obtained.

The survey method was used, namely, the questionnaire «Problems of ecology and environmental education», which included the following questions:

1. What associations do you have with the term «ecology»?
2. What terms do you know from the field of ecology? (Well-known environmental terms; I find it difficult to answer).
3. What areas of ecology are of the greatest interest to you? (Global, regional, social, industrial, urban ecology, biological).
4. What sciences are related to solving environmental problems? (Natural science cycle, biological sciences, other, I find it difficult to answer).
5. The ecological situation in the Orenburg region today: ideal, good, satisfactory, unsatisfactory, catastrophic.
6. The most acute environmental problem of the Orenburg region is: drinking water, motor transport, sewage treatment plants, the problem of waste, chemical pollution, mining, radioactive pollution, I find it difficult to answer.
7. Which cities of the Orenburg region are the most polluted?
8. Formulate priority, global environmental problems that need to be addressed in the world; in Russia, in your city (village), in general.
9. In what way are you interested in environmental information? (Within the framework of the curriculum; in the perspective of future professional activity; impact on health, a healthy lifestyle; just interesting; not interesting).
10. From what sources do you receive information on environmental issues? (Television, radio; Internet resources; scientific literature; periodicals; educational institutions; personal contacts; not interested; difficult to answer).
11. Would you like to participate in actions dedicated to improving the environmental situation in the Orenburg region («Clean Shores», «Plant a tree», «Birdhouses» and others): yes, no, I find it difficult to answer.
12. How do you feel about eco-tourism: positive, negative, I find it difficult to answer.
13. What natural objects can you be interested in in terms of ecological tourism on the territory of the Orenburg region?
14. Place the objects of ecological tourism of the Orenburg region according to their attractiveness: National Park «Buzuluksky bor», the reserve «Orenburgskii», the reserve «Shaitan-Tau», the Karagaysky bor, the salt lake «Razval», «Red Mountain».
15. Do you agree to pay an environmental fee when visiting ecotourism facilities in the Orenburg region, in Russia, or abroad?

4. Discussion of the results.
Based on the analysis of the survey results, the following conclusions were made:

1. Students do not have a clear understanding of ecology as a science (75.3%). For most students, ecology is associated with pollution, the relationship of the environment, or only with anthropogenic activities. 12.5% of students find it difficult to answer.
2. The majority of students (76.8%) could not formulate and name the main terms of ecology. Of these terms, the following prevail: warming, ozone holes, biocenosis, environmental factor, pollution. These terms often appear in the media or are repeated many times in special disciplines.
3. The study of students' cognitive interest showed a variety of interests in the field of ecology (global, regional, social, industrial, urban ecology, etc.), which determines the need and possibility of forming different trajectories of in-depth study of ecology, the use of a variable approach.

4. There are problems of interdisciplinary relations in the field of ecology. Students pointed out the relationship between ecology and natural sciences: physics, chemistry, mathematics (19.6%) and biological sciences (69.8%). 13.2% of students found it difficult to establish inter-subject connections.

5. According to the results of the survey, it was found that students are interested in regional (11.2%), industrial (0.8%), global ecology (35.6%), urban ecology (74.1%), but there is a lack of knowledge in the questions in these sections.

6. The motivation for the formation of environmental education among students is not related to future professional activities. They showed interest in their own health and healthy lifestyle (58.3%).

7. Students receive the main flow of information, knowledge and problems of environmental content from the mass media (42.5%), as well as Internet resources (88.4%). The share of information from scientific literature (0.9%), periodicals (1.4%), and educational institutions (5.6%) is extremely small.

8. Many students (82.8%) regularly participate in actions dedicated to improving the environmental situation in the Orenburg region.

9. Ecotourism interests 45.8% of respondents. Many people are familiar with the ecological trails and objects on the territory of the Orenburg region. The National Park «Buzuluksky Bor» is the most popular as an object of ecological tourism. It was visited by 45.7% of students, and 89.6% plan to visit it this year.

10. When visiting ecotourism facilities, 67.1% of respondents are ready to pay the environmental fee abroad, 89.2% in Russia, and 34.3% in the Orenburg region. 23.5% find it difficult to answer.

Currently, it is necessary to distinguish such groups of methods as 1. Methods of education by means of reality: simulation modeling and business games, diagnostic methods, questionnaires, testing, interviews, case methods, coaching, sparring partnerships, collective solutions to creative problems; 2. Methods of target setting: the choice of goals and objectives of eco-education at each stage of higher education, taking into account the individual's personality, the development of eco-projects; 3. Planning methods: annual planning of the educational work of the faculty, areas of training, groups with the inclusion of points on eco-education and eco-culture; 4. Methods of persuasion (discussions: dispute, dialogue, discussion, including group, binary lectures, briefings, webinars, debates, debates, story, conversation, lectures-consultations, lectures-provocations, viewing and discussion of videos, including environmental orientation, conferences); amateur art activities of students, meetings with experts in the field of ecology and environmental protection.

It is possible to distinguish the components of environmental education, such as the cognitive component (the relationship between nature and society, issues of global environmental problems); the value component (value orientations on the importance of nature for humanity; the normative component (moral and legal norms of nature management); the activity component (types, methods, actions aimed at the formation of cognitive and practical activities in the field of environmental protection).

They also distinguish the principles of eco-education, which regulate the process of educating students, its direction, content, choice of methods and forms. Leading teachers have identified seven principles:

1. The principle of scientific knowledge is the scientific justification of natural phenomena, laws, laws that are studied by students, which can allow them to know their essence. This principle must necessarily include the relationship between the content of the work program on environmentally related disciplines and the current stage of development of science. The scientific nature of the educational material of the methodological guidelines for the study of the discipline and for independent work should include only the facts verified and established by science.
2. The principle of humanization is a principle that provides for addressing the student's personality, ensuring favorable conditions for learning, upbringing, and development of the individual in the totality of his interests, abilities, and opportunities).

3. The principle of consistency and accessibility. This principle provides for the use of a subject-block structure in the development of educational work plans and curricula of disciplines, which will be based on the issues of environmental education as patterns of knowledge, skills and abilities formed. In order for the educational material to be more accessible to the student, it is necessary that the subjects studied in terms of content, volume and teaching methods correspond to the order of mastering individual competencies, according to the age of students, their level of readiness and cognitive abilities of the students.

4. The principle of flexibility: implementation is ensuring the use of regional materials on the state of the environment, environmental issues, their solution, problems and the state of the environmental situation for use in the educational process, as well as for changing the content of environmental education, depending on changing conditions.

5. The principle of unity and interrelation of general, polytechnic and environmental education-this principle includes such a structure of curricula and work programs that was appropriate and optimal for the implementation of inter-subject and inter-block relations, all educational, professional and general professional competencies, general, professional and environmental education, theoretical and practical training.

6. The principle of active orientation of environmental education-this principle includes the relationship between the knowledge, skills, skills of students and the content of their practical activities in difficult-to-predict and changing environmental conditions.

7. The principle of unification is a principle that includes models of the curriculum for various options of environmental education, the use of a single model plan for all areas of training.

5. Conclusion
Thus, all these principles should guarantee the implementation of uniform requirements for the level of professional competence of future specialists, which are prescribed for each direction of bachelor's, specialist's or master's degree training [14].

Modern pedagogical conditions of eco-education include, thus, «accessibility and affordability, social utility, creativity, collective nature of environmental activities, activity and independent initiative of students» [15]. At the moment, environmental education should become an impetus for the reform and modernization of Russian higher education.

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