Network interaction of educational institutions: the practice of using in extended environmental education and upbringing

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**Abstract.** The experience in organizing the network interaction of educational institutions in the field of extended environmental education and upbringing is revealed. The model of the regional network interaction is presented, which is the model of the “resource concentrated network”, the central link of which is the resource center - Volgograd State Socio-Pedagogical University. The specificities are determined and substantiated, inhered of the implementation of the regional model of the network interaction of educational institutions in conditions of the digital educational environment of the University, in extended environmental education and upbringing of students. The obtained results of testing of the regional model of network interaction in extended environmental education and upbringing of students, allow us to speak about the effectiveness of the selected model.

1. Introduction
Reflections on the reasons of the present-day ecological crisis that has engulfed the whole planet by today, the results of studying the history of the relationship between nature and society, lead to a number of conclusions.

First of all, the present-day ecological crisis arose as a result of the activity of the human being itself, i.e. as a consequence of the human civilization development. At the end of the XX century, scientists came to the conclusion about the globality of the ecological crisis. In the modern era, which V.I. Vernadsky called the epoch of the biosphere evolution into the noosphere, man has to perform the biospheric function - really, wisely, competently participate in the noosphere formation. That being the case, nature itself will make high demands on humanity: to correspond to the universal laws of existence, to fit into natural cycles, to realize the ontological forces of man – one’s spiritual mind. In these conditions, human capacities, qualities, abilities to act in accordance with the laws of nature, without disturbing the expected course of natural processes, acquire a special significance.

“If we want to change the world, at first we have to change man, the system of one’s qualities and values” (A. Pechchei). Those events triggered the development of ecology as a science that studies the entire complex of natural-science and sociocultural aspects of the problem of interaction between society and nature.

Environmental education has become one of the factors determining the vector of development of the entire education system. This is evidenced by a number of regulatory and program documents adopted in recent years – the Constitution of the Russian Federation (1993), the Federal Law “On
ecological culture” (2000), Environmental Doctrine of the Russian Federation (2002), the Federal Law “On protection of the natural environment” (2002), Fundamentals of the State Policy in the Field of Environmental Development of the Russian Federation for the Period up to 2030 (2012), etc., containing the provisions stating that environmental education is becoming one of the basic factors in the development of the entire education system.

The success of the state environmental policy undoubtedly depends on the citizens’ participation in its implementation. The Law of the Russian Federation “On protection of the natural environment” (2002) emphasizes that for the successful upbringing of a person capable of harmonious communication with nature, taking into account the mechanisms of rational interaction, environmental education and upbringing must continue over a lifetime and affect all spheres of human activity. That is why there has come into the scientific use the concept of “continuous environmental education”, which is aimed at the acquisition of the systemic environmental knowledge, abilities and skills for nature protection activities, and the formation of environmental culture [1].

In the view of most scientists, the leading goal of environmental education is the environmental culture that best meets the needs of society. According to A.N. Zakhlebny, I.D. Zverev, I.T. Suravegina, S.N. Glazachev, I.N. Ponomareva, N.D. Andreeva, and others, the most important feature of environmental culture is the individual’s responsible attitude to the environment. At present, environmental education is carried out at many educational institutions by introducing various forms and kinds of training. So, in Volgograd region, the activities of environmental centers, ecological camps and clubs, environmental expedition teams, environmental societies in the system of extended environmental education of schoolchildren, are becoming increasingly important.

2. Methods
Continuous environmental education and upbringing implies not only training and education of the individual at educational institutions in the system of preschool, general, secondary, and higher professional education, but also professional development of specialists. As the analysis of the state of environmental education at educational institutions shows, many teachers are not ready to carry out environmental education on the basis of up-to-date requirements of the pedagogical science, though the effectiveness of the educational process depends more just on the professionalism of the teacher. In the opinion of V.A. Yasvin, the key problem of teachers is their insufficient methodical armament with modern effective means of environmental education and upbringing of students, as well as the low social activity of the majority of specialists.

One of the ways to overcome difficulties is to create the network interaction of the educational institutions in the region [2-6]. At present, the network interaction in the field of education is the subject of special attention from the state. This is evidenced by a number of regulatory and legal documents (including the law “On education in the Russian Federation” as amended in 2016), which regulate the procedure for regulating the relations in conditions of the network system.

In our study, when developing the model of the regional network interaction in the field of extended environmental education and upbringing of students, the model of “the resource concentrated network” is taken as a basis, the central link of which is the resource center - Volgograd State Socio- Pedagogical University (VSSPU). In its activity the resource center implements various tasks related to the development of methodological foundations and technologies of extended environmental education and upbringing, practice-oriented technologies for studying wildlife, as well as to providing the network members with information, consulting, scientific-methodical and organizational assistance; accumulates and distributes the experience of biology teachers in the field of extended environmental education and upbringing of students. The activity of the resource center VSSPU is conceptually based on the provisions of eco-humanitarian pedagogy, the basis of which is the belief in the positive potential of man, one’s unlimited creative abilities for self-improvement and self-development, and the consideration of the system “man-nature-society” as a set of inherently valued components, which also have the same laws of development.
It is important that the possibilities of achieving the common goal in conditions of using the system of network interaction of educational institutions, are much wider than the possibilities of its individual structural elements. The reason for this is the preservation of the significant independence of the network elements, their use of their own forms, methods and means to achieve the goal. In the future, these forms, methods and means become the common property, which substantially enriches the system as a whole.

3. Results
Network interaction in conditions of the digital educational environment of the University expands the opportunities of rural and urban students, teachers and educators, regardless of their place of residence, with regard to the study of the ecological situation of their area, allows to participate in environmental events of different levels, fulfill research projects of the ecological orientation, improve the environmental awareness. Using the digital educational environment of the higher educational institution in conditions of network interaction, individualizes the cognitive activity, makes it more independent and intellectually rich [7-12].

As part of fulfilment of the scientific project “Organization of network interaction of educational institutions in extended environmental education and upbringing”, we have prepared the training manual “Theory and Methodology of Teaching Biology: Environmental Education and Upbringing”, in accordance with the requirements of the Federal State Educational Standard. It is published and placed in the Electronic Library System. The manual contains theoretical generalizations and practical recommendations based on the generalized results of the research conducted by the authors of this article, and the professional experience of the leading teachers of the region and country, it is addressed to students and teachers of biology.

For the purpose of improvement of the methodical competence of biology teachers in the organization of extended environmental education and upbringing, there is also developed the online course “Solution of tasks in genetics with the basics of ecology” – a detailed course with support of the theoretical content of genetic laws, in which the content of the basic genetic terms is revealed, all types of tasks in biology from the section “Genetics” are analyzed, attention is drawn to the correct recording of the task conditions, drawing up the solution scheme and the content of the answers to the posed questions. The online course includes seven sections, each of them contains two or three video sessions revealing the corresponding topic and providing for the fulfillment of tasks for independent work with the subsequent auto-checking of answers. In total, the course includes 15 video sessions, 96 tasks for independent work, 80 tasks of which contain a detailed algorithm for their solution.

In April 2019, VSSPU hosted the all-Russian scientific and practical conference with the international participation “Actual Issues of the Theory and Practice of Ecological-Biological and Chemical Education”, which was attended by scientists, biology teachers of the general education institutions of Volgograd and 27 districts of Volgograd region, as well as Astrakhan and Voronezh regions, students. More than 30 reports were submitted for the section “Network interaction of educational institutions as the basis for the development of extended environmental education and upbringing”. The range of problems presented at the section was very wide: from clarifying the essence of the concepts “ecology”, “environmental education”, “environmental upbringing”, “environmental culture” through the systematic analysis of the scientific research and practical experience of the conference participants to recognition of the need for network interaction using the digital educational environment of VSSPU. The participants of the conference expressed the unanimous opinion stating that one thing is certain: the problem is so urgent and versatile that it is absolutely necessary to join the efforts of scientists and practitioners in solving it.

4. Discussion
The important aspects of environmental education of schoolchildren - the formation of children's needs for the healthy lifestyle, abilities and skills for health promotion, abilities to transform the surrounding reality in conditions of the careful and responsible attitude to nature, attracting students to the creative
work in nature, to the participation in nature protection actions, competitions of scientific environmentally-oriented projects - are implemented in conditions of the network interaction in VSSPU at the faculty of natural-science education, physical culture and life safety. In the framework of the implementation of the program of the scientific biology and regional ethnography center of education and upbringing, with the support of the Committee of Education, Science and Youth Policy of Volgograd region, the work of the biological and ecological camp “Green Moment” is being successfully performed. This is the only camp of the ecological orientation in Volgograd region. Students and teachers of the faculty of natural-science education, physical culture and life safety of VSSPU take an active part in the work of the camp, under their supervision from 100 to 150 schoolchildren at the ages from 12 to 17, studying at educational institutions and institutions of extended education in Volgograd and Volgograd region, engaged in research and local history activities, participating in district, city, regional competitions and an open university competition in biology, annually participate in the specialized shifts of the camp.

The work program of the biological and ecological camp “Green Moment” includes the unified comprehensive experimental study, in the course of which school pupils get acquainted with the diversity of the flora and fauna of their native land, methods of measuring various ecological parameters of the environment; accumulate the relevant experimental material, conduct the complex processing of the data obtained, draw conclusions about the state of the environment in the places of observation; carry out socially useful volunteer activities focused on solving actual ecological problems. The real environmental activities of the camp are aimed at helping the children master the methods of the nature study; creating conditions for their subject-to-subject communication with nature; work carrying out with the use of methods of cooperative pedagogy; using ecological activities for environmental, aesthetic and labor education with the purpose of forming a harmoniously developed personality. When implementing the assigned tasks, special attention is paid to the selection and development of special forms and methods of work. So, in the first half of the day, the program includes master classes on bioecological topics, workshops, field excursions, role-playing and business games, training sessions aimed at the development of skills to work in a team, independent research activities of students, events and actions of the nature-protection and nature-saving pattern. In the afternoon the leisure program is implemented aimed at the development of collective activity skills; personal creative, leadership qualities (environmental conferences and parties, contests of drawings, essays, collages, handicrafts items made of the natural material, etc.). The specialized shift of the camp “Green Moment” ends with the regional environmental rally where the students present their work experience.

The formula “knowledge + relations” acquires the special relevance for today. Knowledge without giving it an emotional color, without experiencing it, is not included in the inner world of the individual and does not contribute to one’s development. Since 2018, VSSPU on the basis of the specialized faculty has been working on the creation of the “Youth Academy” for students of grades 9 to 11 in the natural science direction with the elements of online learning. The model of environmental education at the "Youth Academy" is based on the following guidelines:

- formation of the knowledge about the ecosystemic organization of the nature of the Earth, a complex of intellectual and practical skills for study, evaluation and improvement of the state of the environment and public health in their area;
- fostering the needs, motives, behavior and activities aimed at the healthy lifestyle and improvement of the state of the environment;
- development of convictions in the need of solving environmental problems, aspirations for personal involvement in practical matters for the environmental protection;
- implementation of the real environmental activities.

The main result of children's participation in the work of the biological and ecological camp “Green Moment”, the “Youth Academy” in the natural science direction, is the readiness for the ecologically appropriate interaction with the surrounding nature. This readiness includes as follows:
• emotional sensitivity to the world of nature, the sense of surprise, enthusiasm, emotionally positive attitude to its objects;
• intellectual readiness – a certain level of knowledge about nature, connections between the objects and phenomena of nature, perception of oneself as a carrier of environmental culture;
• practical readiness for implementation of their knowledge, the desire to participate in the environmental protection activity.

5. Conclusion
The data of the pedagogical monitoring of 2019 conducted during the spring shift of the biological and ecological camp “Green Moment” confirms the effectiveness of the system of extended environmental education and upbringing in conditions of the network interaction of educational institutions; states the positive dynamics in the formation of such important personal qualities of students as the values-based attitude to nature – intolerant attitude to all manifestations of the mismanagement of nature, the need to protect the environment, patriotic feelings towards the native nature, the wish to protect it, the civic activity in solving the ecological problems of the region, the need for the healthy lifestyle [13,14,15].

In the diagnostic study in 2019, 116 students from 21 educational institutions took part.

Based on the survey data, and taking into account the changes in the other indicators of the state of the students’ formedness of the values-based attitude to nature (in comparison with 2017), we observe the positive tendency: 13.4% of students have the high level (in 2017 – 7.8%), 57.2% – the middle level (in 2017 – 46.7%), 29.4 % – the low level (in 2017 – 45.5%) of formedness of the values-based attitude to nature.

Thus, there is a positive trend in the development of environmental culture of students, which evidences the effectiveness of the proposed model of the network interaction (resource concentrated network) of educational institutions in the system of extended environmental education and upbringing of students.

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