

The study of regional natural heritage sites as an essential component of ecological education

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Abstract. In addressing the intricate relationship between ecological education and the preservation of biodiversity within the Russian Federation, the present study contemplates the urgent necessity of fostering systematic knowledge among students regarding the nation's natural treasures. The analysis highlights the significance of the “Sevastopol Studies” course, revealing its pedagogical capacity to cultivate an appreciation for natural heritage objects. Through a detailed exploration of teaching methodologies and techniques, the study proposes an enriched educational framework aimed at enhancing students’ engagement with their regional ecosystem. By integrating structured lessons focused on ecological values and sustainable resource management, the initiative seeks to stimulate cognitive activity and foster a profound interest in the intricate web of life that characterizes the diverse ecological landscape of Sevastopol. The culmination of this research not only contributes to the academic discourse but also presents a practical model for effective environmental education that aligns with the principles of sustainable development.

1 Introduction

Today, ecological education is faced with the problem of forming in students’ knowledge about ecological issues in the context of a sustainable development of Russia. The essential means for this task realization is the environmental education based on the fundamentals of rational use of natural resources. In this regard, the study of natural heritage sites in Russia becomes especially significant and relevant as it can provide students’ environmental consciousness and responsibility formation.

1.1 The relevance of the study

The relevance of the research topic is due to the fact that the pedagogical potential of working with natural heritage objects during “Sevastopol studies” lessons and out of school activities ensures the students’ interest in acquiring importance of the environmental problems of Crimea and Sevastopol as an inherent part of the Russian ecosystem, not only to assimilate facts, and also understand the reasons for changes in the landscape, see the direct influence of man on the world around them. It provides formation of students’ environmental culture

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as well. The uniqueness of Crimea and Sevastopol are created by natural landscapes. But people destroy the nature because of the different causes. “The likelihood of threats is highest for Natural Heritage Sites covered by forests or those in marine and coastal areas...” [1, p. 121113]. Most often, such destruction is justified by the good purpose of the need for construction. Huge problems for natural heritage sites are caused by plastic left behind by tourists. Accumulation of trash is taking over more and more territories and clean waters.

“Human activities and natural influences are key factors that significantly impact global ecosystems. These drivers not only affect the ecosystems directly, but they are also deeply interconnected with one another” [2, p.139238]. “World Heritage sites face many challenges that affect the quality of life” [3, p. 333].

Most commonly identified threats are illegal activities, mining, transport infrastructure and tourism Martin Thomas Falk, Eva Hagsten [1]. When listing the environmental problems of the city of Sevastopol and the Republic of Crimea, one shouldn’t forget about the unique health resort with unique sources, useful mud. The absence of monitoring of natural resource pollution and an action plan to protect the ecosystem aggravate these problems. Microbes, petroleum products, pesticides, heavy metals and other inclusions are found in coastal sea waters, in medicinal mud, and in mineral springs.

The environmental problems of Sevastopol and Crimea are briefly as follows:

- accumulation of huge amounts of waste and garbage in natural areas;
- anthropogenic pollution of unique natural resources;
- contamination of medical and health resources with chemical products;
- destruction of mountain and steppe landscapes.

Nature pollution also affects human health. Prohibitive measures do not solve the problem; educational work with young people is needed. The solution to the environmental problems of Sevastopol and Crimea is founded on the principles:

- forecasting the impact of human activities on natural resources;
- improvement of the ecological structure, where the main priority is the protection of the environment, natural heritage sites and the preservation of human health;
- formation of environmental consciousness of young people within the framework of sustainable development of our country.

1.2 Formulating a problem of the study

The tasks are achievable. It is on their basis that the environmental policy of Sevastopol and Crimea is planned. It is assumed to create a comprehensive system in which all spheres of social activity are involved, including education.

Thus, the problem arises: in which courses can sections on environmental problems of Sevastopol and Crimea, natural objects be included, and what pedagogical technologies should be used to develop environmental consciousness and responsibility?

1.3 Literature review

The issues of external threats to the Natural World Heritage Sites are described in the researchers’ works (table 1): Eva Hagsten and Martin Thomas Falk [1], Huan Huang, Liang Chen, Dong Han, Yi Xiao, Xinyuan Wang, Haonan Yang, Juan Du [4]. They stated that “sustainable development situation in World Natural Heritage Sites” [4, p. 109920] is an essential topic nowadays and it needs special attention. Emmanuel Eze, Alexander Siegmund say that “Heritage plays a critical role in sustainability” [5, p.100239]. The scientists make a conclusion that “enhancing preparedness through experiential learning and coordinated knowledge-sharing mechanisms will preserve our collective heritage for sustainable futures” [5, p.100239].

Haonan Yang, Liang Chen, Huan Huang, Xinyuan Wang,Ming Chang, Dong Han, Yi Xiao, Dong Yao, Shiyu Liu, Qingxia Yang, Xin Xiang prove that “with the rapid development of tourism in the World Natural Heritage Sites (WNHSs), it made ecological environment issues increasingly become prominent while boosting regional economic development” [2, p.139238].

Francesca Turati, Elena Lucchi, Eva Schito, Benedetta Colombo proposed a “methodology for achieving sustainable development goals in cultural and natural heritage” [6, p.142431].

Amira A. Elbahy, Mohanad A. Fouda, Sherif A. sheta researched “the most important problems of Egyptian World Heritage Sites, with a focus on the Memphis site due to its outstanding universal value (OUV) and the posed threats that may affect its global value” [3, p. 333].

Social functions and educational significance of natural heritage sites Bruno de Andrade, Mahda Foroughi, Ana Pereira Roders [7].

The issues of educational significance of ecological objects were studied by many scientists. For example, Theodoros Kevrekidis, Angelos Markos, Theodora Boubonari, Athanasios Mogias, Paraskevi Malea, Chrisa Apostoloumi, Alkistis Kevrekidou realized an educational program aiming to enhance students’ ocean literacy which deals with facts about coastal lagoon ecosystem and human interconnection [8]. The program includes nature experiences.

Table 1. Issues considered by scientists

Authors	The most important unsolved problems
Martin Thomas Falk, Eva Hagsten	“A threat to the natural World Heritage site” [1]
T. Kevrekidis, A. Markos, T. Boubonari, A. Mogias, P.Malea, C. Apostoloumi, A.Kevrekidou	“Assessing the impact of an integrated educational program on students’ knowledge about nature” [7]
L.Chen,J. Du, H.Huang, D. Han, X. Wang, H. Yang, Yi Xiao	“The patterns of coupling sustainable development posture and economic development in World Natural Heritage Sites” [4]
E. Eze, A. Siegmund	“Disaster risk management and preparedness in UNESCO-designated heritage sites” [5]
M.Foroughi, B. de Andrade, A. P. Roders	“The role of social media in heritage managemen” [8]
A.A. Elbahy, Sherif A. sheta, M.A. Fouda	“World heritage sites management” [3]
E. F. Turati, B. Colombo, E. Schito	“Climate-responsive design practices” [6]
L. Chen, H.Yang, H.Huang, M. Chang, X. Wang, D. Han, S. Liu, Yi Xiao, D. Yao, X. Xiang, Q. Yang	“Natural and socio-economic factors’ impact on the sustainable development of the ecological environment in the World Natural Heritage Sites” [2]

As part of the analysis of the system of protection of natural heritage in the Republic of Crimea, V.V. Novoselskaya formulate recommendations for resolving these issues and the

need to create an interdepartmental commission and develop a strategy for the conservation and effective use of natural heritage sites of the Republic of Crimea [9].

2 The subjective, object, tasks and methods of the paper

The subjective of presented study is to propose a methodology for working with natural heritage objects in “Sevastopol studies” lessons.

The object of this article is the process of teaching “Sevastopol studies” in school.

The subject of the paper is methodological aspects of organizing work with natural heritage sites in “Sevastopol studies” lessons.

The following study tasks are:

— to define the role of the course “Sevastopol Studies” in classroom and out of school activities;

— to consider methods and techniques for working with natural heritage sites in Sevastopol studies lessons;

— to analyze the effectiveness of methods and techniques for working with natural heritage sites in the terms of “Sevastopol studies” lessons.

The research hypothesis is that the organization of work with natural heritage objects provides the efficiency of the educational process within the framework of lessons and out of school activities during “Sevastopol studies”, as well as pupils’ interest in learning the regional ecosystem.

The following methods are applied: theoretical analysis of methodological, pedagogical, psychological literature and the surveys. The theoretical significance of given study is identification of the role of “Sevastopol studies” lessons for organizing work with natural heritage objects and developing environmental consciousness and responsibility.

The practical significance of the work is in matching elements of work with ecological problems, formulation of recommendations on working with natural heritage sites of the city of Sevastopol that could be used in educational establishments.

3 Results and discussion

The essential component of environmental education is the study of regional natural heritage sites.

The need to include the natural heritage sites of the region in the content of the main educational programs of basic and secondary general education is determined by the Federal State Educational Standard [10].

The regional component in environmental education acts as an effective means of developing environmental thinking and consciousness, fostering a responsibility for the ecosystem.

The implementation of the course “Sevastopol Studies” in school occurs during the lessons and out of school activities [4]. The course is aimed at providing conditions for the students’ ideas formation about the ecosystems of the Sevastopol region, educating the younger generation of environmental consciousness and responsibility [10].

In accordance with the requirements of the Federal State Educational Standard, within the framework of the organization of classroom and extracurricular activities, “the content of the course “Sevastopol Studies” is aimed at achieving students’ personal, meta-subject and subject learning outcomes when studying the course” [10, p. 8]. The personal results of studying this course include beliefs and qualities, including in the “field of environmental education: awareness of the global nature of environmental problems of the modern world,

country and region, the need to protect the environment; readiness to participate in practical environmental activities in one's native town" [10, c. 8].

The realization of the course "Sevastopol studies" in school as an academic subject and in extracurricular activities plays a great role in the ecological education of the individual, since it involves working with natural heritage [10].

Sights are objects created as a result of man-made and natural objects: landscape architecture, natural reliefs, memorable places. "Natural heritage sites have long been regarded as an essential component for the diversification of the world's tourism industry" [4, p. 109920]. The Ancient City of Tauride Chersonesos was included in the UNESCO World Heritage List in the Russian Federation. The objects of Crimea proposed by the Russian government as candidates for the World Heritage List are: "Chufut-Kale, Kaffa and Chembalo, Cultural Landscape of the "Cave Cities" of Crimean Gothia: Mangup-Kale and Eski-Kermen and many others [11, p. 3].

The UNESCO World Heritage List also includes priceless creations of nature that have a unique ecosystem biodiversity. Natural monuments of Crimea and Sevastopol are the Uzun-Syrt aeronautical complex, Mount Klementyev (Natural Park of regional significance. A unique place, which has no analogues in Europe in terms of its aerodynamic properties), the mountain karst of Crimea, the Karkinitzky reserve, where swans and other waterfowl are concentrated (about 20 species), Tyrke (Botanical reserve of medicinal herbs, including 18 species of herbs which are listed in the Red Book; Cape Plaka (an original natural composition in the form of a mushroom); Ayu-Dag reserve (a picturesque mountain with typical xerophytic vegetation); Demerdzhi tract (picturesque geological formations, having the shape of columns, pillars, mushrooms, towers, formed as a result of centuries-old weathering of the Upper Jurassic conglomerates. Nearby is the Demerdzhinsky stone chaos, 0.8-1.1 billion years old.) and many other unique natural places [11].

It is prohibited on the territory of Natural Monuments, in order to preserve and protect natural complexes: to damage to relief forms and geological detachments; disturbance of soil cover; burning of vegetation; carrying out excavation work and plowing of land, construction of temporary structures; creation of waste disposal facilities; carrying out reclamation work that may lead to changes in the hydrological and hydrochemical regime; carrying out blasting operations; destruction of nests, holes, collection of eggs and fluff; pollution of the territory of the Natural Monument; organizing camps, recreation areas, making fires; carrying out archaeological field work within the Natural Monument; destruction; changes in the species composition of vegetation cover; collection of non-timber forest resources, wild fruits, berries, nuts, mushrooms, medicinal plants, tree sap, technical raw materials.

"It is permitted on the territory of the Natural Monument: to carry out recreational and environmental-educational activities subject to the regime of special protection of the Natural Monument and fire safety rules in forests; reconstruction of existing ones." [11, p. 3]. □

One can also conduct scientific research and practical training, excursions to study nature, use natural resources for research purposes, carry out archaeological field work and work to preserve cultural heritage sites [12].

As for Sevastopol are old growth trees are of particular value which are located within the boundaries of specially protected natural areas, such as the natural monument "Ushakova Balka", state nature reserves "Cape Aya", "Laspi" and "Baydarsky", natural park "Maximova Dacha".

Materials for the ecological justification for the creation of a natural monument for natural objects are being presented by scientists in accordance with current requirements. "It is thus our turn to do what we can for those who will come after us and save the remnant old-growth (or future old-growth) forests across the country" [13, p. 1]

Two new natural monuments appeared in Sevastopol in 2023. The first is located in the village of Dalneye and consists of two pedunculate oaks over 570 and 515 years old. The

territory of 0.02 hectares where they grow has become a specially protected natural area of regional importance called “Oaks “Guardians of Belbek”. The same natural monument, where pedunculate oaks grow over 570 and 440 years old, is located in the village of Ozernoye, it is called “Lake Oaks”. Obtaining the status of a natural monument introduces a number of restrictions for the territory.

Unfortunately on the 15th of July, 2024 a fire broke out near Koktebel. A few hundred meters from this place are the boundaries of the Karadag Nature Reserve.

Sometimes it takes hundreds of years for a unique ecosystem to recover. That is why it is so important to prevent the unfavourable impact of the human factor on nature. Education has enormous potential in environmental consciousness and responsibility formation.

The natural heritage objects learning provides conditions for solving educational problems, that emphasizes the significant pedagogical meaning [14].

The activity during “Sevastopol studies” lessons helps to solve such educational tasks as creating means for expanding, deepening, generalizing, and systematizing the knowledge.

While working with natural heritage objects during “Sevastopol Studies” lessons the tasks implemented are the creation of effective conditions for forming sensory and visual perception, observation, logical memory, cognitive interest, active, productive imagination, and the emotional and sensory sphere.

The objects of natural heritage are a means of stimulating, deepening, and enriching schoolchildren’s interest in learning in general, in studying the nature of their native town and region.

Thus, working with natural heritage objects ensures the unity of the three most important aspects of learning: developmental and educational, which allows for the achievement of comprehensive personality formation. It can be organized through excursions, heuristic conversations, project activities, educational and research activities.

A heuristic conversation is a problematic formulation of questions in which the teacher pushes students to independently search for knowledge. A problematic question must contain a component that generates motivation to overcome the discomfort associated with not knowing the answer [15, p. 12].

Educational excursions “represent educational activities in an urban environment, nature, museum, etc. for the purpose of observing and studying various objects and phenomena of reality” [16, c. 2].

It is necessary to focus on the correspondence of the content of the excursion to the educational program, the age capabilities and characteristics of the schoolchildren when organizing admission to nature objects for students as part of working with natural heritage sites. It is important to allow them to express their thoughts, emotions and impressions from visiting the excursion, for which purpose a subsequent discussion, writing a mini-essay, essay, etc. can be organized [17].

During the excursion, game elements can also be used: quests, role-playing games, riddles, crosswords, quizzes, etc., which promote the involvement of each student in the cognitive activity.

We can consider the possibilities of the excursion method for the formation of fire-safe behavior of an individual on the territory of environmental sites [18].

During “Sevastopol studies” lessons and extracurricular activities in school, a virtual excursion can also be used as part of working with natural heritage sites, and the students themselves can act as a guide.

The project method includes a set of techniques and student actions in a certain sequence in order to solve a specific problem. The result of the project is a product that is significant for students, for society and which will be applicable in practical activities.

An educational product can be a booklet about a particular natural monument, an excursion, a route, a layout, a film, a presentation, or a website page on the Internet.

Involving students in working with natural heritage sites of their native land in the work on the project will create conditions for the environmental consciousness and responsibility formation.

Creative reports can be an effective way of organizing work with natural heritage sites. "The system of lessons and extracurricular activities during the creative week represents the immersion of schoolchildren in the preparation and defense of ones performed both individually and collectively" [19, p. 203].

Work with natural heritage objects in the process of "Sevastopol studies" lessons can be carried out as part of research activities, which involves students completing educational tasks with a previously unknown solution under the leadership of a teacher.

Techniques for working with scientific texts can be: preparing a message, an abstract report based on a certain number of articles.

Tasks of a problematic nature encourage students to prove their own point of view and use facts. They include examination, advice, assistance to classmates, reviewing one's answers.

Another productive method is "Jigsaw groupwork". Students are divided in the jigsaw groups. The content of a lesson contains 5 stand-alone segments. The leader gives each member in the team a segment. "Then temporary expert groups are formed by having one student from each jigsaw group join other students assigned to the same segment. They can discuss main points and rehearse presentation they will make to their jigsaw group" [20, p. 4]. When the session is over, "a quiz is given that students have to fill in individually or give the jigsaw group a case to solve" [20, p. 4].

Pedagogical quest technology combines problem-based, project-based learning. Its key goal is students' cognitive activity and motivation formation [21]. Educational quests during "Sevastopol studies" can be carried out outdoors (in a park, on a square), when the quest includes the movement of participants there.

Thus, as part of the organization of work with natural heritage objects during "Sevastopol studies" lessons, methods and techniques such as heuristic conversation, excursions, creative reports, project and educational research activities, quests can be used, which allows to intensify cognitive activity and increase interest in studying ecosystems of the region.

4 Conclusion

Based on the consideration and analysis of the theoretical foundations for organizing work with natural heritage sites in the process of "Sevastopol studies" lessons, one can conclude that they have a high potential for including natural monuments in educational activities, providing the opportunity to use various methods and techniques for working with them in the classroom and outside schools, which allows to effectively solve educational, educational and developmental learning tasks.

The implementation of the course "Sevastopol studies" in class and extracurricular activities in school helps to increase interest in understanding the nature of Sevastopol, contributes to knowledge and ideas formation about the main ecosystems of the region, forming respect for the natural heritage, monuments of the city and the country as a whole.

In accordance with the age-related psychological characteristics of school students, natural heritage objects are an effective means of stimulating, deepening, and enriching their interest in learning in general. A variety of methods and techniques of work creates conditions for schoolchildren to effectively master new knowledge, allows them to intensify cognitive activity and increase interest in studying the regional ecosystem.

The organization of work with natural heritage objects provides the efficiency of the educational process within the framework of lessons and out of school activities during "Sevastopol studies" lessons, as well as the level of interest of pupils in the study of the

regional ecological problems and way of their solution. The certain pedagogical technologies are stated to be used in order to develop environmental consciousness and responsibility.

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