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"Nature of Saint-Petersburg" electronic educational edition as a mean of shaping ecological awareness in schoolchildren

Abstract

The article discusses in detail the contents of electronic educational edition of "Nature of St. Petersburg". It shows the scientific and methodological benefits, as well as the principles underlying the publication. Much attention is paid to the analytic section of the manual, especially to enable the development of ecological awareness of schoolchildren.

Key words: ecological culture; electronic publishing; electronic educational resources; educational resources; training pupils

The essence of modernization of school education is in the transition to the information society, and due to the global process of information as a strategy for further development of civilization. Specificity of formation of ecological culture of the student determines the search and necessitates the use of new teaching technologies, among which is the information technology. In practice, the computerization of education is closely related to the scientific basis for the creation, review and application of electronic publications and educational resources. The electronic educational publication – the book "Nature of St. Petersburg" (by V. Solomin E. Nesterov, O. Dziuba) and the teaching manual for the teachers (authors V. Solomin, E. Nesterov, N. Vereshchagina, T. Vileito) – contain a systematic and generalized materials on such issues as the environment and "small motherland". Readers (students and their parents) cannot be indifferent to the fate of their city after the reading. These publications have a high level of content; the quality of tools and good technical performance, with highly visual and logical presentation of the material. All this proves useful and beneficial in the education process, resulting in creative and active absorption of knowledge and skills connected with ecology.

The scientific and methodological construction of the book allows the teacher to carry out developmental education, whose mission is to organize the learning process in such a way that it provides a pupils-centered learning, in which the main subject of the education process is considered a schoolchild with their individual perception and level of environmental knowledge. The book meets the didactic, methodological and psychological requirements of the traditional textbook that match specific patterns of learning and, therefore, the principles of: science; availability;

activity; systematic; consistency; clarity; independence; taking into account features of cognitive mental processes, age and preparation of the student; and others. The principles are the theoretical basis for the creation and use of electronic educational publication in the formation of ecological culture of the school. They are being implemented through the selection, creation and delivery of educational material. The authors paid special attention to the selection and universality of information. It is connected with the base material of the book, which was produced by a careful selection of scientific terms and concepts, which was later supplemented with factual material that appeared as sophisticated digital data.

The principle of activity and independence is reflected in the rational combination and particular abilities and skills of independent work exhibited by pupils: self-control, the ability of analytical and synthetic thinking, the solution of education problems, preparation of messages, etc.

The principle of visibility, as well as taking into account the features of cognitive mental processes, specific age, and training of schoolchildren, is also reflected in the differentiation of textbooks for primary, secondary and explanatory information, e.g. using different font sizes and text colors, as well as including tasks with different levels of complexity. This principle is expressed in one of the most important areas in which the learning process can be optimized – its variability, which is in turn the basis of individual learning.

The electronic version of the book "The nature of St. Petersburg" is addressed to a wide audience and can be used as an additional source of information when studying the region during courses in geography, biology, history, the history of St. Petersburg, the basics of life safety, as well as optional and group work in additional education.

One section of the book, "The stone and the City", examines environmental issues, the "lifeless" nature of the Saint-Petersburg and its impact on the health of the population of the city. We discuss the influence of ecologically important factors (radon, man-made gases, waste water, etc.) on the environment and on the natural and cultural monuments. This section also describes the simplified methods of geo-environmental assessment, for example, of quality control (in this case – a visual assessment of an object or phenomenon in its entirety or part thereof) of buildings and cultural monuments, etc.

The second section, "Wildlife", shows the richness and diversity of Petersburg flora, which has retained original features and wildlife, and has adapted to the metropolis conditions. Description on the Nevsky Prospect reveals the amazing features of the natural environment of the historic centre of St. Petersburg.

Part three, "Environmental safari", discusses the causes and history of the emergence of protected areas (PAs) of St. Petersburg; a rich and diverse collection of flora and fauna and their conservation value for the city and the North West Russia. This section provides information about new protected areas and plans for their development, characterizes activities carried out on the territory of protected areas and discusses their impact on the health of the city population.

It seems that the foundations of ecological culture were efficiently generated using a relatively new teaching methods, the occurrence of which is precisely related to the development and use of electronic media and educational resources in the

educational process: the modeling method, the case study method, the game method, design and method of information resource (Gorbachev 2012; Solomin 2007).

Method of information resource based on students' working with educational electronic edition is quite traditional. The main advantage of the method is the possibility of repeated processing of the information at students' convenience and at their own pace. The task of the teacher, using the method of information resources in training, is to find the right questions and problems, to advise and to orient pupils to work with them, to manage the activities of the pupils, to share specific knowledge, to select and order electronic resource, and to control knowledge through the organization hours:

- with the tables: geological time table, Petersburg rocks table, timing of the flowering (pollination), plants that are pollen allergens in St. Petersburg, a table of plants growing in the Nevsky Prospekt and its neighbourhood, the table of protected areas;
- with schemes: the structure of the Earth, the scale of hardness, orography scheme of Petersburg and its surroundings;
- with maps and schematic map: geological map of the surrounding area of St. Petersburg, schematic map of the maximum scope of the last glaciation of the Quaternary period;
- with aerial photos: Petersburg from space, the Neva River delta, the region, great lakes of Europe, the cyclone over Petersburg;
- as well as with a wide range of images.

This method differs from the conventional method by:

1) using electronic educational resources found on the Internet;
2) the number of information resources and educational ties between the two being almost unlimited;
3) allowing pupils to find their own approach to the material, as well as to deepen and broaden the knowledge, based on their individual abilities and interests;
4) hypermedia technologies used on the Internet, with their potential to build into the material under study, photos, animations, video and voice information.

The main purpose of the method is the expansion and consolidation of theoretical and empirical knowledge of pupils and their using it.

A special place in the study of nature and ecology of the region is given to the method of projects. It is based on the cognitive development of students' interest, critical thinking, the ability to construct their own knowledge, to navigate in the information space, the development of expertise in the subjects related to the theme of the project. This method has always focused on the organization of independent work of pupils (individual, in pairs or in a group), for a certain time. It distinguishes (in accordance with the dominant method underlying the project): research, creativity, adventure – games, information, and practice- oriented projects.

The project "Save the city in which we live" can serve as an example of this kind of activity. The purpose of it is to study local environmental problems on the example of soil, water, air, and to find ways to solve them.

The main idea is the personal responsibility of each student. It is up to them what the city will be like. This project is aimed at pupils from grades 7 and 8 (and older). The activity is group-based (5–7 people per group). The number of groups is determined by the number of units of the project: the sanitary and hygienic

characteristics of St. Petersburg (or one of the regions), the protection of air, soil sanitary protection, hygiene and drinking water supply, waste disposal, sanitary surveillance of physical factors, etc. The work can be carried out as an experiment that pupils conduct not only in school but also in the centers of Sanitary Control of St. Petersburg, in parks, in specialized laboratories, using information from the site of the Committee on Environmental Management, Environmental Protection and Ecological Safety of St. Petersburg. Experiments may include: hygiene of water sources, wells and springs, soil (a school site or the neighborhood), the monitoring of the atmosphere, the effect of the acidity of the aqueous solution on the absorption of heavy metals by plants, a simulation study of environmental disasters and their impact on vital functions of living organisms. For each of the proposed areas of study pupils can make worksheets, charts, diagrams, reflecting the state of the environment of St. Petersburg (Vereshchagina, Vileito 2007).

Working on the project allows pupils to see the diversity of the city in broader context. The project contributes to the formation of principles in their daily lives. Pupils learn to make lists, reports, take photographs, draw, produce one-time or periodic newsletters, speak to the students of the class or school, work with other schools in the district, write articles in their local newspaper, etc. Cooperative learning has additional benefits. It has academic-work characteristics. It is not only about the work of pupils in the groups with network partners, but also about using new means of information and developing in students communicative writing skills in students.

If a pupils has the skills to work with e-learning resources and telecommunication systems, by using the educational project they can connect to their own material. This allows them to move to a new, higher level of using electronic resources for choosing the educational information. E-learning resources in this case can be seen as a tool of learning and self-development, which in turn contributes to the manifestation of social and cognitive activity of students, which is one of the important components in shaping the world, methodological knowledge and ecological culture. The method uses new forms of organization of the education process, such as webinars and virtual tours, creating a simple electronic educational resources as a result of the collective search and educational activities of students (Gorbachev 2012; Solomin 2007).

If a game method is used, one should take into account that the goals of the game for the pupils and the teacher can be different. If the pupil is committed to achieving the objectives of the actual game (winning), the teacher poses more serious ones: changing the general way of thinking; acquiring knowledge, skills and abilities required to solve problems in a particular section of the program; applying particular methods in order to solve problems of a certain type. In such a case the decision is personal making it a meaningful practice-oriented task. The nature of the urban environment can be studied with the help of games. Games are one of the oldest means of education and training of children. The main aim of the game is not the result, but the process that generates a certain knowledge and skills, creativity and valuable opportunity of relating to the reality which strengthens its developmental value associated with finding the right solutions. While explaining the nature and environmental problems of a megapolis, the teacher can play by the rules or,

depending on the level of creativity, invent their own. Game methods must be used separately and in a particular system.

Playing by the rules (desktop) is more suitable for the initial stage of training topics, such as in the "Stone and the City", in the study of the geographical location of the city, the main minerals, rocks, St. Petersburg, etc. They will help the absorption and retention of content and will take up relatively small amount of time at the end of the lesson, or at the stage of checking homework. Gaming system according to the rules can be summarized as follows: games on the assimilation of the nomenclature of numerical values, the definition of silhouettes, properties, concepts (What is it? Who is it?), crosswords or situational problems. Board games can be divided into two stages which are closely related to each other. The first phase is the development of the game master. Then, the teacher offers the game to students. At the first stage it is important to skillfully introduce pupils to the game, without imposing it. At the second stage, pupils are playing with the guidance of a teacher. Thus the main idea is not the technique of creating a board game, but the ability to use a textbook map, directory, additional literature on geography, including the book "The Nature of St. Petersburg", to ask proper questions and set goals. They have to apply their knowledge to new situations.

Creative games are flexible, as rules can be easily changed during the game, they do not take a lot of time and can be used at the end of the study subjects and sections in order to verify, consolidate and systematize the acquired material. These include games, competitions (WHC, quizzes, competitions, tournaments), role play, games, travel. In contemporary times computer games allow not only to consolidate the knowledge, but also to make decisions. Various forms of creative tasks encourage students to conduct research during the study of the nature of St. Petersburg, to uncover and develop the creative abilities of an individual. Pupils are given opportunity to use imagination, develop polemical and speaking skills.

Relevant, based on the objectives of Ecological Culture School, is the use of case method. Valuable judgments are formed when thinking about real-life situations related to the ecological processes in the city. The solution case studies with practical orientation, with justification of the selected solutions allow students to not only understand the real problems of life, perhaps extreme, but also to update a certain set of knowledge (including local history), necessary for the assimilation of the resolution of the problem (Solomin 2007).

This is the so-called SENSE problem (situational) – a new type of independent work with a clearly defined requirement to express their attitude, their assessment of the present situation. The book has a great potential in the implementation of the case method to solve problems with the use of local history material. Various real scientific or political issues can be included in its scope. For example, it is appropriate to solve a situational problem of the real consequences of environmental emergencies arising in freshwater aquatic and sedimentary environments in St. Petersburg and the surrounding area – a violation of water and ground systems. Petersburg is a city with a wide variety of water bodies in different condition. Tasks can include: City by the Sea, a town in the Delta, the city on the Neva River, the town near the largest lake in Europe – the Ladoga Lake, the city with various types of underground mineral waters. Tasks can be of different levels of difficulty.

Working with the method of modeling is a new form. It can be done both individually and in groups. Students must identify the most significant problems in a given case, pick up the material needed for the analysis of the problem, the underlying modeling jobs, etc. For example, students are asked to cut out the old card circuit in St. Petersburg and the surrounding area and model: a) the geographical location of the city and its surroundings, b) its position in the different geological time, c) the vegetation cover of Nevsky Prospekt and its courtyards, etc. A more difficult task for simulation can be offered at the end of the course and constitute creating their own integrated model of the nature of St. Petersburg and its surroundings in the present or in the near future. This complex task requires mastering modeling techniques at the research level. It involves the incorporation and implementation of a number of more specific tasks to determine the cause-and-effect relationships and displays geographic zoning laws, building a comprehensive characteristics of the area, mapping the „Nature of St. Petersburg and its surroundings", proposals for the economic development of the city, etc (Gorbachev 2012).

Forms of tasks used in the formation of ecological culture of students using electronic educational publications may also be different.

Thus, the educational potential of electronic educational publishing creates the necessary preconditions for the emergence of intrinsic motivation of student motivation and create a "shift to the ultimate goal", which is especially important in training students in the field of environmental education. The ability to control the process of cognitive activity with the use of electronic publications and educational resources in the formation of ecological culture creates a positive incentive for each student. Resources contribute to the provision of real freedom of students to choose educational tasks and supporting information according to their individual abilities and aptitudes. This trend toward differentiation and individualization of learning enables for more efficient application of ecological knowledge and shaping an ecologically aware student.

References

Gorbachev, S. (2012). Formation of the system of knowledge about natural hazards through solutions case studies to date OBZH. *Proceedings of the Volgograd State Pedagogical University.* 7 (71), 98–102.

Nesterov, E., Solomin, V., Vereshchagina, N., Vileito, T. (2007). Nature of St. Petersburg: Instructor's Manual: Teacher's Book. St. Petersburg: LLC "TESSA".

Vereshchagina, N., Vileito, T. (2007). The book as a means of forming the image of the city. IN: *Geography: science and education in the "public – school – university": proceedings of the international scientific – practical conference.* St. Petersburg: Asterion, 143–146.

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