

IMPACT OF ENVIRONMENTAL EDUCATION DEVELOPMENT ON PROMOTING ENVIRONMENTALLY SAFE USE OF NATURAL RESOURCES AND CAREFUL ATTITUDE TOWARD NATURE

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ABSTRACT

The implementation of education for sustainable development is a top priority. Environmental education serves as a tool for fostering a responsible, humane, and ethical attitude toward nature. At the current stage of human development, where environmental issues have reached a global scale, environmental education aims at transforming human consciousness and attitude toward nature. This article highlights the importance of organizing an educational process to inform children and the youth about environmental protection issues. Children and young people are the driving forces that will influence the environment in the future. The foundation for implementing an effective environmental education strategy lies in the institutional development of a three-tier system for environmental education: preschool institutions, general education schools, and higher education institutions. The effectiveness of environmental education can be achieved through the maximum integration of formal and informal environmental education efforts.

Keywords: sustainable development, greening, environmental education, formal education, informal education.

INTRODUCTION

The primary goal of sustainable development is to ensure dynamic socio-economic growth, preserve environmental quality, and rationally use natural resource potential (Filonova et al., 2024; Gnezdilova et al., 2024) while meeting the needs of current and future generations by establishing a highly efficient economic system (Bratko, 2023). This system should promote ecological sustainability, productive labor, and scientific and technological progress (Vittoria et al., 2024) and maintain a social orientation (Abdullayev et al., 2023).

The current state of the environment has compelled the global population to consider its protection (Rednikova, 2023; Zhuk, 2023). Recent human economic activities have led to significant environmental pollution (Dolgopolo et al., 2024; Minich, 2023). This problem is particularly relevant because the condition of the environment is a crucial factor for the survival of human civilization (Kiseleva et al., 2024; Oshakbay et al., 2024). Chapter 36 of the

Program of Action “Agenda 21” (adopted at the United Nations Conference on Environment and Development) (United Nations, 1992) declared education as the cornerstone of sustainable development. It emphasized that forming a new worldview should focus on creating conditions to preserve life on Earth by raising public awareness about environmental conditions and the challenges to the survival of humankind. In this context, education serves as a prerequisite and a priority for achieving sustainable development, while environmental education emerges as a new focal point in the broader education system (Akhmetshin et al., 2024).

Environmental education for sustainable development is grounded in the conceptual foundations outlined in the UNECE Strategy for Education for Sustainable Development (United Nations Economic Commission for Europe (UNECE), 2005), adopted at the high-level meeting of representatives from environmental protection and education ministries, including authorized government representatives from Russia, on March 17-18, 2005. The document establishes that environmental education plays a vital role in the long-term formation of an integrated education system for sustainable development. This role is determined by the current need for the systemic integration of environmental principles into all areas of social activity and the ecologically sustainable development of society. This includes the environmental integration of economic sectors and all education systems: formal and informal, general, economic, humanities, engineering-technical, agricultural, etc. At the current stage of social development, comprehensive ecological integration is a key criterion for assessing the ecological, social, and economic balance of society and its economy (Kurniawan et al., 2024a, 2024b; Utomo et al., 2024).

Environmental education in Russia has a long history, starting from the introduction of the first university courses on ecology, environmental protection, and sustainable natural resource use in the mid-1970s. Over time, various environmental education concepts have been developed, the most recent being the Concept of Environmental Education in the General Education System (approved by the Federal Educational and Methodological Association on April 29, 2022) (Zakhlebny et al., 2022). This concept is an important regulatory document that considers the current state and future development of public knowledge. It aims to restructure the content of general education in line with modern demands and foster environmental culture as an integral part of national and public upbringing systems. Modern Russia has established basic regulatory acts in education, including the National Project “Education” (Ministry of Education of the Russian Federation, 2019), the Federal Law “On Education in the Russian Federation” (State Duma of the Federal Assembly of the Russian Federation, 2012), and the Foundations of State Policy in the Field of Environmental Development of the Russian Federation for the Period until 2030 (President of the Russian Federation, 2012). These innovations are marked by new educational standards and a regulatory framework governing innovative educational activities (Katkova and Mekka, 2024; Slanov, 2023). Educational reforms, their quality, and the effectiveness of educational institutions fail to meet the current needs of individuals and society. A notable drawback is the lack of institutional support for implementing the concept of Education for Sustainable Development (ESD) (Bazavlutskaya et al., 2018). ESD courses are available only in a few Russian universities (Kolesova, 2021). Environmental education in Russia still largely relies on a perception of nature as an inexhaustible resource, ignoring the catastrophic consequences of this approach. These consequences have already caused irreversible changes, necessitating a fundamental overhaul of approaches to formulating general principles of environmental education and the preparation of professional ecologists for all sectors and systems of economic activity. This includes ensuring adequate techno-ecological safety in human activities (Kotlyarova and Serikov, 2022).

Literature review

The term “environmental education” was introduced in the Journal of Environmental Education in 1969, authored by W.B. Stapp, a professor at the University of Michigan and the first director of environmental education at UNESCO. Stapp defined environmental education as the process of fostering citizens who are aware of environmental issues, knowledgeable about their solutions, and motivated to take action (Savchuk, 2009).

The urgent need to address pressing environmental issues led to the emergence of the term “nature conservation education” in Russian psychological and pedagogical science during the late 1960s and early 1970s (Zinchenko et al., 2023). Significant progress in the development of environmental education coincided with the rise of social ecology in the 1970s when environmental education became a key priority (Iskenderova, 2020). The 1980s and 1990s were marked by worsening environmental problems, prompting the introduction of a new definition: “education in the field of the environment”. However, this term did not gain widespread acceptance despite being conceptually similar to “environmental education”. Environmental education is recognized globally as “an essential and integral part of the education of every citizen” (Shakhmardanov, 2008, p. 80).

Environmental education is not an end in itself but rather a means of shaping an environmentally conscious life stance (Ivashkina et al., 2024; Levchenko and Rogovaya, 2023). Its definitions are diverse (Table 1).

Table 1. Definitions of the term “environmental education”

No.	Source	Definition
1	N.N. Marfenin and L.V. Popova (2006)	Continuous assimilation of knowledge, values, and concepts aimed at the formation of knowledge and intellectual skills necessary for understanding and evaluating the interrelationships between people, their culture, and the environment, which ensures the progressive development of eco-friendly decision-making skills and the assimilation of appropriate behavior in the natural environment
2	A.N. Zakhlebnyi and E.N. Dzyatkovskaya (2012)	Psychological and pedagogical process of influence on a person, whose purpose is to form a theoretical level of ecological consciousness, which in a systematized form reflects various aspects of the unity of the world, regularities of the dialectical unity of society and nature, and knowledge and practical skills of rational nature management. This type of education should be based on the principle of anticipatory reflection. In human consciousness, there should be a constant assessment of possible consequences of interference in nature, both immediate and future. Environmental education should help a person understand the causes of environmental changes to suggest ways to prevent them
3	L.Yu. Ivanova (2017)	Set of the following components: ecological knowledge, ecological thinking, ecological outlook, ecological ethics, and ecological culture. Each component corresponds to a level of ecological maturity: from elementary ecological knowledge and ideas at the preschool level to their comprehension and realization at higher levels
4	A.K. Khaustova (2024)	The continuous pedagogical process which has no time boundaries but gradually passes from one stage to another and is aimed at the formation of values-based, motivational, activity-based, behavioral, and spiritual-moral spheres of personality, beliefs about the need for respect for all living beings, and responsibility for the future environment

Environmental education and the cultivation of a highly moral attitude toward the environment are crucial as the materialized forces of knowledge have equaled, and in many cases surpassed, the forces of nature. It is essential for human intellectual potential and moral qualities to evolve together with technological progress (Shagieva and Serikbaeva, 2021). The primary goal of environmental education is to foster appropriate environmental awareness and clarify specific aspects of the interaction between sciences and the environment (Ilin et al., 2017).

The formation of personal responsibility for the natural environment is essential and arises only through enhancing human morality and non-violent opposition to the aggressive consumerist ideology. Using various means, environmental education can cultivate global traits of personal consciousness, enabling individuals to adopt these principles as models for their behavior:

- Transition from an aggressive consumerist civilization to an alternative model of resource consumption characterized by the exploration of humankind’s existential potential rather than the escalation of material needs (Gadirov, 2023; Svetskiy, 2023; Vargas-Chaves and Dermer-Wodnicki, 2022);
- Voluntary self-limitation of needs based not on coercion but on the free will of individuals (Ignatova and Ignatov, 2011; Le et al., 2024);
- Development of the structure of a civilized personality and a corresponding lifestyle (O’byrne, 2022; Oreshkina, 2017).

The main objective of the article is to analyze the development of environmental education in Russia as a factor in achieving the principles of sustainable development.

Research tasks are as follows:

1. To identify the components of environmental education aligned with clearly structured stages, targeting all age, social, and professional groups of the population.
2. To highlight the challenges associated with implementing environmental education at each stage.

MATERIAL AND METHODS

Methods

This article employs a comprehensive methodological approach, combining the analysis of scientific literature to study environmental education for sustainable development and the expert survey method.

The analysis of scientific literature determines the current state of environmental education as a multi-stage process designed for different age groups throughout life-long learning for sustainable development. This method highlights the key components of formal environmental education stages and the main actors involved in informal environmental education. In line with the research objective, an attempt was made to demonstrate the significance of various components of formal and informal environmental education and the challenges arising at different stages of this multi-stage process. To attain this end, the expert survey method was employed with a sample of 43 experts invited to participate in the survey via email. The criterion for selecting the experts was at least three publications on the research topic in peer-reviewed journals. A total of 40 respondents agreed to participate in the survey, and the necessary information for the research was obtained through electronic correspondence with these experts. Inductive reasoning was used to discuss the results, which allowed general conclusions to be drawn from detailed observations and analysis. This approach was crucial for making assumptions about the future directions of environmental education. Each methods contributed to a comprehensive analysis of the research topic and helped us understand the different aspects of environmental education in a holistic educational process.

RESULTS AND DISCUSSION

The implementation of environmental education in Russia encompasses two primary directions: formal and informal. Formal environmental education covers all levels of the established education system in Russia, including preschool, school, extracurricular, vocational, technical, higher, and postgraduate education. The second direction (informal environmental education) focuses on fostering ecological awareness among the population through various channels, such as the church, mass media, public environmental organizations, etc. Formal environmental education strives to transfer specialized knowledge, particularly in the theoretical foundations of basic and applied ecology. Table 2 outlines the components of environmental education.

Table 2. Components of environmental education.

Components of environmental education	Ranking	Impact
Formal education		
Preschool education and upbringing	1	0.33
School education	2	0.28
Higher education	3	0.23
Distance education	4	0.10
Refresher courses	5	0.06
Informal education (main actors)		
Church	1	0.38
Mass media	2	0.35
Public environmental organizations	3	0.27

Source: own research; results of the expert survey; the coefficient of concordance $W = 0.71$ ($p < 0.01$), which indicates a strong consistency of expert opinions

The results require detailed discussion with an emphasis on key problems. One of them is that environmental education in preschool institutions is initiative-based. Enhancing the level of eco-friendly resource use and teaching nature conservation must begin at the first stage of environmental education, i.e., preschool education. The basic component of preschool education in Russia instills a sense of responsibility in children for their surroundings and their actions within the environment. The curricula of preschool institutions should serve as the foundation for cultivating environmental awareness in children (Kotlyarova and Serikov, 2022).

At the next educational stage, society demands that schools ensure the maximum development of intellectual capabilities and the formation of universal human qualities (Novichkov et al., 2022; Zinchenko et al., 2023). Foremost among these is the spiritual development of personality, which is inherent in ecological thinking, culture, morality, and ethics. Therefore, schools should play a central role in fostering ecological thinking. School-level environmental education should be implemented through the ecological integration of various academic disciplines. An important component of the environmental education system is the network of extracurricular eco-educational institutions. It is essential to create educational environments based on the principles of sustainable development (Zakhlebnyi and Dzyatkovskaya, 2012).

A qualitatively new outcome in raising the level of environmental education can be achieved through cooperation and, in the future, integration between school and higher education (Khaustova, 2024).

Thus, a situation has developed where environmental knowledge gained in schools is disconnected from everyday life and exists in isolation. General education in schools faces insufficient methodological support with eco-oriented materials, limited opportunities for familiarizing students with these materials, and their inability to participate in real environmental conservation activities. Furthermore, most schools lack adequate materials and technical resources for environmental education, such as videos, laboratory equipment, modern camping gear, etc.

At the level of higher education, a qualitatively new approach to preparing university instructors is relevant. These educators should be capable of restructuring the educational process to emphasize ecological principles based on acquired knowledge, skills, and abilities (Aleksandrovich et al., 2024; Oreshkina, 2017). They must shift the focus of the learning process from simply imparting knowledge to exploring problems and developing potential solutions (Akhmetov et al., 2024). Environmental education at the university level fosters organizational skills in students, such as organizing environmental activities and independently addressing environmental issues to achieve results. It is essential to engage students in eco-educational activities. Outreach activities with general education students are important for this age group. Through conversations, presentations and self-created movies, university students can highlight environmental problems and the importance of nature preservation for younger and middle school audiences. In the form of training, students show and help high schoolers justify ways to solve a specific environmental problem. This stage serves as the final step in shaping environmental awareness and fostering a culture of eco-friendly behavior.

Teacher training is limited by the number of hours allocated to teaching natural sciences. Among other issues, we identified restricted opportunities to introduce specialized eco-oriented courses into the educational process, insufficient coverage of local environmental issues, and a lack of motivation among students to acquire environmental knowledge. Each stage in the formation of environmental awareness (child, pupil, student, specialist) must consider the psychological and age-related development of individuals. This is particularly important when planning eco-oriented activities (Abdullah et al., 2024). The process of environmental education may consist of emotional, cognitive, and behavioral components, each with varying levels of material perception depending on the age group and requiring their harmonious integration. Distance learning and professional development courses for specialists also play a significant role in advancing environmental education.

Distance environmental education should be based on a hierarchical modular approach to the study of disciplines (topics, problem areas) (Gadirov, 2023). This approach enables a step-by-step examination of issues and the establishment of cause-and-effect relationships. Delivering lectures in virtual reality allows for the use of simulation models, which significantly enhances material retention and comprehension (Polovchenko, 2024). Various mechanisms exist for implementing distance learning. The process should use information resources and include online seminars, conferences, and discussions, which allows for the evaluation of material assimilation. The effectiveness of such learning depends on information availability, the capabilities of information technology, and the professional competences and versatile education of the instructor (Kharkovskaya et al., 2024). Given that the success of distance education is directly linked to the professional level of the educator, staffing issues take on special importance (Abdullayev et al., 2024).

Despite the significant advantages of distance education and mobile technologies, there are several drawbacks: a lack of comprehensive knowledge; limited interdisciplinary connections (between various levels and directions); the impossibility of forming a complete idea of the discipline; the incomplete formation of professional competences.

Within advanced training courses, an important component is the readiness of specialists for innovative environmental activities at the professional level. This readiness can only be achieved through deliberate, well-organized, and comprehensive training.

Scientific theoretical knowledge is detached from practical problems, associated with the intensive technical development of society. In the process of informal education, environmental knowledge is formed in compliance with the principles of accessibility and practicality. Environmental education is impossible without environmental activities, in particular, excursions, observations, environmental games, and making objects and toys from natural materials, which are the basis of informal education. An important role in informal environmental education is played by churches, mass media, and public environmental organizations.

According to the results of the expert assessment, the main place in informal environmental education belongs to the church. The church takes an active position in solving environmental problems and becomes a powerful means of raising the environmental consciousness of society. Russia has preserved the determining authority of the church which serves as a powerful factor in forming environmental consciousness through sermons of the clergy and real environmental actions performed under the guidance of the church. Sermons on environmental topics and descriptions of environmental activities that are carried out under the patronage of the church can be found on the websites of all churches functioning in Russia (Levchenko and Rogovaya, 2023).

Mass media also play a significant role in forming the environmental consciousness of society. This applies to radio and television broadcasts and special editions, as well as actions of public environmental organizations on the use of environmental information brought to public consciousness. “Since there is a flexible connection between mass media and society and the topics covered by mass media should correspond to the needs of society (only then this information will be in demand), the recent growth of information on environmental topics is indirect evidence of the growth of environmental consciousness” (Maxim E.). It is expected that this tendency will increase with time.

Environmental education is a key process that helps raise awareness of environmental protection and form a public environmental position (Sukarsono et al., 2024). The analysis of the current state of formal environmental education indicates the insufficient realization of its structure and content. It is necessary to provide environmental training of personnel (educators, teachers, university professors) to form an active public position on environmental protection and sustainable development.

CONCLUSIONS

- The main objectives of environmental education include the development of fundamental ecological knowledge, ecological thinking, and an understanding of environmental issues at various levels (global, national, regional, and sectoral). Environmental education aims at fostering ecological responsibility based on the systematic knowledge of contemporary environmental challenges and the potential implementation of such concepts as sustainable development, modern civilization, and the environment. Other key goals involve fostering research-oriented knowledge and skills to activate creative approaches to solving emerging environmental problems, building motivation and a need for environmentally safe and rational activities, and promoting the necessity of addressing environmental issues. Environmental education also seeks to develop the ability to assess environmental situations from multiple perspectives, including legal, economic, and ethical.
- Environmental education should be a long-term and interdisciplinary process, focusing on fundamental environmental issues. It should provide young people with opportunities to apply their knowledge and help students perceive the environment in its entirety. We believe that environmental education can secure an indispensable position if it is oriented toward sustainable development. Regardless of approaches to implementing environmental education, it remains crucial to overcome the environmental crisis and ensure the ecological security of sustainable development.
- Without a new educational model, it is impossible to foster environmental awareness or address the challenges faced by society. Therefore, environmental education should be seen as an integral part of Russia’s transition to sustainable development. It must become an essential component of the humanities, encompassing all population groups and education levels while considering the social functions of ecology and drawing on the traditions, customs, and historical experiences of Russia’s multinational people. This educational model should include the following provisions: the alignment, consistency, and unity of educational and instructional processes to ensure the continuous development of environmental culture; the development of scientific and methodological frameworks for all stages of continuous environmental education, including family and adult learning; the creation of anthologies, scientific publications, and textbooks; the development and implementation of new methodologies and innovative approaches to optimize the educational process. To advance the scientific and educational components of sustainable development, key tasks are state support for scientific research on the challenges of transitioning to sustainable development and the introduction of “Sustainable Development” and “Ecology” as foundational disciplines in educational programs.

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