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DESIGNING TECHNOLOGY FOR TEACHING NATURAL SCIENCES TO DEVELOP ECOLOGICAL AWARENESS IN PRIMARY SCHOOL STUDENTS

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Abstract

This article covers the issues of using design technology in the process of teaching natural sciences in the formation and development of environmental education in primary school students. The study analyzes the content of environmental education, the pedagogical possibilities of project education, and their mutual harmony. The article substantiates the effectiveness of project-based learning in the formation of environmental awareness, responsibility, and practical skills.

Keywords

environmental education, natural sciences in primary education, design technology, project-based learning, environmental consciousness, environmental culture, sustainable development, educational innovations, practical activity, environmental protection, environmental responsibility, integrative education, competency-based approach.

In today's context of globalization and technological progress, one of the most pressing problems facing humanity is environmental issues. Problems such as environmental pollution, depletion of natural resources, and climate change pose a serious threat to societal development. Since the human factor plays a leading role in the emergence of these problems, their elimination is inextricably linked to fostering individuals with ecological awareness and culture.

According to the Uzbek pedagogical scholar A. Abdullayev, "Ecological education is a continuous pedagogical process aimed at forming an individual's conscious attitude toward nature." Therefore, it is important to organize environmental education systematically, especially starting from the primary education stage.

Primary school students are inclined to acquire knowledge through direct observation, sensation, and perception of nature. The attitudes and views formed during this age have a strong impact on a child's later life. For this reason, the

effective organization of environmental education in primary education is considered a pedagogically important task.

Natural sciences are one of the main sources of environmental education in primary schooling. Through these subjects, students acquire initial scientific concepts about natural phenomena, living organisms, and the interrelationship between humans and nature. However, traditional teaching methods cannot sufficiently develop students' ecological awareness. From this perspective, the need arises to introduce innovative pedagogical technologies into the educational process. In particular, project-based methodology serves as an effective tool for increasing student activity, connecting knowledge with practice, and understanding environmental problems. American educator John Dewey states, "Education is not preparation for life; education is life itself." This idea fully expresses the essence of project-based learning.

The process of forming and developing environmental education in primary school students is a complex, multifaceted pedagogical process that requires the organic unity of education and upbringing. In this process, the main task is not only to impart environmental knowledge to students but also to cultivate a conscious attitude toward nature, a sense of responsibility, and an ecological culture. Project-based methodology for teaching natural sciences proves to be an effective pedagogical tool for achieving this very goal. Children of primary school age are inclined to learn about nature through direct perception, observation, and experimentation. Therefore, using methods based on the active participation of students in natural science lessons is of great importance. Project-based learning is one such method, which serves to increase students' cognitive activity, develop their independent thinking, and enhance their understanding of environmental problems.

The essence of project-based methodology lies in directing students to conduct research on a specific problem or topic. In this process, the student acquires knowledge not in a ready-made form, but through inquiry, observation, and practical activity. As a result, the acquired knowledge becomes deeper and more lasting. Since projects with environmental content are directly linked to the daily lives of students, their educational significance is further enhanced. In the teaching of natural sciences based on project methodology, environmental education is carried out in the following areas: forming knowledge about nature, developing ecological awareness, building practical environmental skills, and fostering environmental responsibility. Each of these areas is developed in close interconnection during project-based activities.

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Environmental projects designed for primary school students must be simple, understandable, and have practical significance. For example, projects like "Save Water," "Clean Air, Healthy Life," "Protect the Birds," and "Green School" are appropriate for the students' age group. Through these projects, students learn to identify environmental problems, understand their causes and effects, and propose solutions. Project-based activities are typically organized in several stages.

In the first stage, the project topic is chosen and the problem is identified. At this stage, the teacher guides the students toward a specific environmental issue, taking their interests into account.

In the second stage, the goals and objectives of the project are defined, and an action plan is created. This stage serves to develop the students' planning skills.

In the third stage, information gathering takes place. Students collect information on the environmental topic through books, pictures, video materials, and observations. This process develops their inquiry and research skills.

The fourth stage involves practical activities, where students carry out environmental events, experiments, or observations. For instance, tasks such as planting trees, cleaning the school grounds, and sorting waste are performed. In the final stage of the project, students analyze and present the results of their activities. The presentation process develops the students' public speaking skills and their ability to express their thoughts freely. At the same time, they come to understand the environmental significance of the work they have accomplished.

Project-based learning methodology integrates the educational and instructional aspects of environmental education. During the project process, students acquire social skills such as teamwork, cooperation, and mutual assistance. This helps them understand the necessity of collectively solving environmental problems. Project-based learning also plays an important role in shaping an environmental culture. This environmental culture is manifested in the students' daily actions. During the project, students acquire habits such as conserving water and electricity, not polluting the environment, and treating plants and animals with care.

The role of the teacher changes fundamentally in project-based learning. The teacher acts not as an information provider, but as a facilitator, organizer, and advisor. The teacher supports the students' initiative and encourages them to make independent decisions. This aligns with the principles of humanism and cooperation in the educational process. Project-based learning also allows for the integration of natural sciences with other subjects. For example, within an environmental project, students can compose texts in their native language class, perform calculations in mathematics, and create posters in art class. Such an

integrative approach helps develop students' knowledge more systematically and thoroughly. Furthermore, project-based activities serve to develop students' personal qualities. They acquire qualities such as initiative, responsibility, diligence, and creativity. These qualities are intrinsically linked to environmental education and are of great importance in the students' future lives.

Conclusion: Teaching natural sciences using a project-based learning methodology creates broad pedagogical opportunities for developing environmental education in primary school students. Through this technology, students gain a deeper understanding of environmental knowledge, form a conscious and responsible attitude toward nature, and are nurtured as individuals ready to actively participate in solving environmental problems. Developing environmental education in primary school students is crucial for ensuring the sustainable development of society. The formation of an environmentally conscious individual must begin at the primary education level. The natural sciences play a leading role in this process. Teaching natural sciences based on project-based learning allows for the effective organization of environmental education. This methodology connects students' knowledge to real life, shaping them into active, independent, and responsible individuals. Through project-based learning, students develop qualities such as a commitment to not being indifferent to environmental problems and a desire to preserve nature.

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