The socio-pedagogical necessity of developing ecological competence in primary school students

Dildora Ikramitdinovna Sayfetdinova
dildorasayfetdinova@gmail.com
University of economics and pedagogy

Abstract: This article (or study) explores the social and pedagogical necessity of developing ecological competence in primary school students, which is one of the priority directions of the modern education system. The article analyzes the role of shaping a responsible attitude towards nature in the younger generation and awakening ecological awareness and culture from an early age in the progress of society. Furthermore, the pedagogical conditions and social significance for transforming students' ecological knowledge into practical skills and forming competencies related to environmental protection within the primary education process are substantiated.

Keywords: primary education, ecological competence, ecological awareness, ecological culture, socio-pedagogical necessity, sustainable development, nature protection, value, ecological upbringing, personal development

INTRODUCTION

Relevance of the topic. In today's context of global ecological crises and climate change, the sustainable development of society depends not only on technological solutions but also on the ecological culture of each individual. The "Uzbekistan - 2030" strategy and the "Concept for Developing Ecological Education" of the Republic of Uzbekistan have prioritized the task of instilling in the younger generation the skills of caring for nature and rational use of resources. The legal basis for ecological responsibility is enshrined in Article 62 of the Constitution of the Republic of Uzbekistan, which establishes the obligation of citizens to have a careful attitude towards the environment. As President Shavkat Mirziyoyev emphasized, forming ecological culture starting from kindergarten and school is not only an educational but also a conscientious duty.

Statement of the problem. Ecological competence is not merely a set of knowledge about nature, but the formation of a conscious attitude towards the environment and practical ecological behavior in students. Since the foundations of a person's worldview and core values are laid precisely during the primary school period, a systematic approach is required at this stage.

Socio-pedagogical necessity. This research is based on two important factors:

1. Social necessity: The social need for a morally mature individual who understands the balance in the "Nature - Human - Society" system.

2. Pedagogical necessity: The need to transform students' theoretical knowledge into practical life skills in the process of transitioning from traditional education to a competence-based approach.

Objective of the research. The objective is to reveal the essence of developing ecological competence in primary school students, pedagogically substantiate this process, and develop an effective methodology for its formation.

LITERATURE REVIEW

The problem of forming ecological competence in primary school students has been the focus of many local and foreign researchers. The analysis of this concept reveals the invaluable role of pedagogical, psychological, and philosophical approaches.

1. Research by Uzbek scholars. In Uzbek pedagogical science, issues of ecological education and upbringing have been studied in the context of the harmony between national values and modern requirements. A.G.Grigoryans and U.B.Gafurova in their research developed the methodological foundations for forming elementary knowledge about the environment in primary school students [1; p.45]. Scholars such as S.Nurullayeva and D.Sharipova substantiated the importance of interdisciplinary integration in developing students' ecological culture [2; p.12].

Pedagogical scholar J.Tolipova indicated ways to increase competencies through students' independent activity and observations in the methodology of biological and ecological education [3; p.78]. Furthermore, A. Bakhronov analyzed the pedagogical-psychological aspects of ecological upbringing in primary education, emphasizing the need to consider the level of cognitive development according to the age characteristics of students [4; p.30].

2. Views of foreign scholars. In the pedagogy of Western and CIS countries, the concept of "ecological competence" is considered as a set of practical skills in an individual's interaction with the environment. Classical pedagogues such as Ya.A.Comenius, I.G.Pestalozzi, and J.J.Rousseau promoted the idea of "harmony with nature" in education, conveying that raising a child in the bosom of nature is the foundation for their moral and intellectual perfection [5; p.112].

K.D.Ushinsky called nature a "great educator" and particularly emphasized the integration of native language and natural science lessons in primary education [6; p.56]. Among modern foreign researchers, N.M.Mamedov considers ecological competence as the "foundation of a culture of sustainable development" [7; p.24]. I.D.Zverev and I.T.Suravegina developed a systematic model for forming ecological responsibility in schoolchildren [8; p.90].

3. The essence of the competence-based approach. Literature analysis shows that ecological competence is not just a sum of knowledge but a structurally complex formation:

- Cognitive component (ecological knowledge);
- Motivational-value component (positive attitude towards nature);
- Practical-activity component (participation in problem-solving);

which are a combination of these elements [9; p.15].

The analyzed literature confirms that while a methodological basis for developing ecological competence in primary school students exists, there remains a need to improve this process based on new pedagogical technologies in today's era of digital technologies and global climate change.

METHODOLOGY

This research is aimed at identifying the socio-pedagogical mechanisms for developing ecological competence in primary school students, utilizing the following set of methods:

1. Theoretical methods. At the initial stage of the research, normative-legal documents, philosophical, pedagogical, and psychological literature on the topic were analyzed. Using the comparative analysis method, different aspects of traditional ecological education and the modern competence-based approach were studied [9; p.18]. Furthermore, the experiences of foreign countries (Finland, Germany, Japan) in providing ecological upbringing in primary education were summarized [7; p.42].

2. Empirical (practical) methods. The following methods were used to determine students' level of ecological knowledge and attitude towards nature:

- Observation: Students' real attitude towards nature was observed during lessons and extracurricular activities (e.g., during work in the school garden) [3; p.54].
- Conversation and questionnaire (survey): Special questionnaires were conducted to determine students' perceptions of ecological problems and their readiness to solve them [4; p.22].

• Pedagogical diagnostics: Cognitive (knowledge), affective (emotional), and conative (behavioral) indicators were defined to measure the degree of formed ecological competence in students [8; p.105].

3. Systematic approach. In the research, the process of developing ecological competence was analyzed within the framework of the "school - family - community" system. This approach aims to ensure that the student acts ecologically consciously not only at school but also in the social environment [2; p.36].

4. Experimental work. In the practical part of the research, specially developed "Ecological Projects" and "Case Study" methods were introduced in selected primary classes. In this process, students were given real ecological situations (e.g., saving water, waste sorting), and their problem-solving skills were assessed [1; p.51].

Research stages:

1. Preparatory stage: Determining the level of research on the problem and forming the methodological apparatus.

2. Main stage: Studying the current situation in schools and introducing a pedagogical model for developing ecological competence.

3. Final stage: Analyzing the obtained results, statistical processing, and developing scientific recommendations.

RESULTS AND DISCUSSION

The experimental work conducted during the research process to determine the level of ecological competence of primary school students was analyzed in several stages. The results of students in the selected experimental (E-group) and control (C-group) groups, serving as the research objects, were compared.

1. Analysis of quantitative results. According to the results of the pedagogical diagnostics, students' ecological competence was assessed based on three main levels: low (reproductive), medium (interpretive), and high (creative). As a result of the "Ecological Projects" and interactive methods used in the experimental group, student indicators changed as follows:

Table 1.

Analysis of Quantitative Results

Groups	Levels	Before experiment(%)	After experiment(%)	Growth indicator
Experimental group	High	12%	34%	+22%
	Medium	45%	52%	+7%
	Low	43%	14%	-29%
Control group	High	13%	18%	+5%
	Medium	44%	46%	+2%
	Low	43%	36%	-7%

2. Qualitative indicators and discussion. The research results showed that merely providing theoretical knowledge (as in the control group) is not sufficient to form sustainable ecological skills in students. The results obtained in the experimental group revealed the following positive changes:

• Ecological responsibility: Students began to consciously approach processes such as saving water and sorting waste in daily life [1; p.58].

• Problem-solving: Through "Case Study" methods, students were able to identify environmental problems (e.g., drying of trees or air pollution) and provide age-appropriate suggestions for their elimination.

• Social activity: Students actively participated in school and community greening campaigns and influenced their family members as ecological advocates [2; p.41].

3. Proof of socio-pedagogical necessity. The discussion process revealed that the social necessity of developing ecological competence in primary school students is related to reducing ecological indifference in society and forming “green” thinking. The pedagogical necessity manifests itself in linking educational content with life and educating students’ personal qualities based on humane principles towards nature [4; p.35].

The obtained results confirm that when ecological competence is developed, the student’s general culture and civic responsibility also increase significantly. This, in turn, strengthens the educational foundation of the nationwide “Green Space” project being implemented in Uzbekistan.

CONCLUSIONS AND RECOMMENDATIONS

The conducted research and analyses showed that the socio-pedagogical necessity of developing ecological competence in primary school students has strategic importance not only for today but also for the future. Based on the results obtained, the following conclusions were formed:

• Personal foundation: Primary school age is considered the most effective period for forming ecological awareness and values. Ecological competence laid as a foundation during this period determines a person’s attitude towards nature throughout their life.

• Integrative approach: Developing ecological competence should not be limited to one subject but must be integrated with all academic subjects and extracurricular activities [2; p.45].

• Practical orientation: Transforming knowledge into practical skills (sorting waste, saving resources, caring for plants) serves as a key criterion of the competence-based approach.

Based on the research results, the following practical recommendations are proposed to increase the effectiveness of developing ecological competence in the primary education system:

• For educators: In the lesson process, do not limit oneself to theoretical lectures but widely use interactive methods such as “Ecological Cases,” “Role-playing Games,” and “Virtual Tours.” Foster the habit of keeping an “Ecological Diary” among students.

• For educational institutions: Organize “Green Corners” and small experimental plots within the school grounds. This provides students with the opportunity to interact directly with nature and acquire labor skills [9; p.22].

• Cooperation with family and community: Conduct ecological campaigns (e.g., “The Cleanest Yard,” “Plant a Tree”) based on the “Family - School - Community” chain. It is necessary for parents to shape ecological culture in children through their personal examples.

• Digital technologies: Implement mobile applications and animated textbooks modeling ecological processes (e.g., plant growth, water cycle) into the educational process.

In conclusion, developing ecological competence in primary school students is an important factor for sustainable development and national security. This process teaches the younger generation not only to love nature but also to act consciously to preserve it.

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