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SPECIFIC ASPECTS OF THE PROCESS OF MODERNIZATION AND IMPROVEMENT OF ECOLOGICAL EDUCATION IN UZBEKISTAN

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ABSTRACT

This article examines the theoretical-methodological foundations for fostering eco-literacy in students during the modernization of ecological education. It explores the pedagogical-psychological features of modernizing ecological education, which aim to develop eco-creativity, eco-responsibility, and competencies related to eco-literacy, highlighting the corrective impact of ecological education on the relationship between nature and humans. Additionally, the unique aspects of the ecological education modernization and enhancement process in Uzbekistan are analyzed.

KEYWORDS

Ecology, biosphere, eco-literacy formation, environment, national values, healthy lifestyle, ecological communication, pedagogical process, professional-pedagogical activity, integrative, value-based approach, national, historical, technological.

INTRODUCTION

In Uzbekistan, educational initiatives aim to increase students' ecological literacy, develop ecological awareness, and foster ecological culture by addressing regional geographical and ethnographic characteristics. The effective organization of ecological education and upbringing processes is crucial, as illustrated by the adoption of Uzbekistan's

Ecological Education Development Concept. This concept reflects the need to impart both theoretical and practical knowledge on modern scientific foundations for environmental protection and practical application of acquired skills.

METHODS

Key issues in ecological education, upbringing, and culture, as well as interdisciplinary integration, have been explored by researchers including Thomas E. Lovejoy (2017), Eugene Pleasants Odum (2018), F. Stuart Chaplin (2020), N. M. Mamedov (1981), S. N. Glazachev (2016), M. A. Zaborina (2022), A. V. Khutorskiy (1998), A. R. Meliboyev (2017), X. B. Norbotayev (2019), M. Nishonboyeva (2009), N. O. Nishonova (2012), O. T. Abdiyeva (2013), M. M. Aliqulova (2016), B. Qultorayev (2019), P. O. Berdanova (2017), V. Sattorov (2015), T. T. Saparov (2019), M. B. Rahimqulov (2013), N. M. Egamberdiyeva (2008), M. Rahmatullayeva (2013), and X. Rahmatova (2018), with competency-based approaches studied by J. O. Tolipova (2014), G. S. Ergasheva (2019), A. K. Rakhimov (2020), N. Muslimov (2021), and B. Khodjayev (2023).

RESULTS AND DISCUSSION

Early ecological concepts introduced to preschool children in Uzbekistan serve as a foundation for later nature education in schools. An algorithmic approach to improving ecological education—progressing from simple to complex concepts while maintaining continuity—is tailored to students' ages, physical capacities, and psychological characteristics, ensuring systematic integration of theoretical and practical knowledge. The principle of convenience guides content selection, making it accessible and suitable for young children's comprehension.

In primary schools, the subject "Natural Sciences" plays a critical role in forming basic ecological

understanding. It is essential to conduct classes in non-traditional formats to familiarize students with nature and environmental events. Ecological concepts in primary education are taught with interdisciplinary integration, aiming to impart knowledge on understanding and preserving nature, as well as fostering ecological awareness through a cross-disciplinary approach to theoretical and practical skills.

At the secondary level, subjects like "Biology," "Geography," "History," and "Natural Sciences" incorporate ecological education. However, in secondary specialized and vocational education, ecological education remains underrepresented, with limited hours and reliance on teachers of related subjects. This trend continues in higher education, resulting in ecological education that does not fully build upon students' competencies. Prior to 2021, non-ecological subjects made up 70-75% of the curriculum in environmental education programs.

In the process of retraining and professional development, ecological competence models highlight the importance of interrelated components within ecological education. This is particularly relevant to meeting the distinct professional and social demands placed on technical ecologists. For example, the model designed for developing professional competencies in technical ecologists emphasizes component integration, enhancing the educational process by training specialists with a comprehensive approach.

Figure 1. illustrates the stages and content of ecological education in Uzbekistan.

Education Stage	Content of Ecological Education and Upbringing
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Preschool Education	Instilling primary concepts about the surrounding environment and nature, understanding that plants and animals are living beings who breathe, drink water, eat, and feel pain like humans.
Primary Education	Understanding the interrelation and differences between living and non-living nature; characteristics of natural objects; interrelations of natural components; effects of natural phenomena; the universe's connection with Earth; knowledge of Uzbekistan's nature and its protection; fostering responsible attitudes towards nature; solving ecological issues.
General Secondary Education	Concepts about pollution levels in the environment; the scope of ecology's impact on living organisms; global climate change; ozone layer depletion; acid rain, and other global ecological issues.
Vocational Education	Understanding the impact of organisms on their habitat; rational use of biological resources; predicting changes in nature due to human activity; learning ways to manage natural processes.
Higher Education	Mastery and practical application of synecology, evolutionary ecology, historical ecology, abiotic factors, anthropogenic factors, and the concept of resilience thresholds.

Firstly, ecological education is recognized as a fundamental factor in societal development. It aims to reshape human attitudes toward nature, foster new thought processes and behavioral patterns, influence economic and social progress, and encourage states and individuals to adopt new principles of professional ethics, culture, and justice. This approach includes establishing certain restrictions, promoting ecosystem laws, and supporting ecological literacy.

Secondly, this perspective clarifies the conditions necessary for developing the professional competencies of ecologists. Thirdly, the technological structure of the ecological education model provides an organizational foundation for implementing ecological education. Fourthly, it aligns ecological

education with international standards and categorizes ecological activities, including production, organizational-management, and information-analytical practices.

Fifthly, incorporating new information technologies makes ecological education more adaptable. Sixthly, it develops ecological culture alongside scientific advancement, reflecting life experiences and ethical principles.

Implementing ecological education principles across all stages of continuous education is essential, especially in enhancing young people's ecological knowledge. In particular, instilling a sense of responsibility towards plant and animal conservation through videos and documentaries can be highly effective. Additionally,

ecological awareness should be fostered through community and family initiatives, promoting cautious attitudes toward the environment.

In recent years, higher education institutions have improved educational resources for relevant bachelor's and master's programs, focusing on fields such as ecology, environmental management, and conservation. Subjects like "Ecology," "Hydroecology," "Zoology," "Youth Physiology," "Hydrogeology and Hydrometry," "Concepts and History of Ecology," "Biogeocenology," and "Environmental Law" have been modernized to meet contemporary standards.

Over the past decade, research topics have included methods for addressing ecological issues and protecting natural resources, causes of ecological imbalances, strategies to prevent factors contributing to ecological problems in Uzbekistan, and the current state of Uzbekistan's reserves and protected areas. Additionally, graduates have conducted research on topics such as "The Bioecology of Promising Plants for Greening Kokand" and "Environmental and Social Problems of Forming Ecological Culture."

CONCLUSION

Modernizing ecological education is crucial for tackling global ecological challenges, shaping the younger generation's approach to nature, and enabling active participation in sustainable development efforts. Ecological security is a vital part of national security, differing from other security factors in its often subtle nature. Therefore, the development of skilled ecological professionals within the national education system remains one of the most pressing issues of our time.

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