Abstract to the dissertation work of Primbetova Aigul "Developing the ecological education of future educators in the process of teaching pedagogical and psychological subjects", for the degree of Doctor of Philosophy (PhD) in the specialty "6D010300-Pedagogy and Psychology"

Relevance of the research topic: In the context of the current ecological crisis, the formation of ecological culture in all spheres of society, including the education system, is of particular importance. One of the most significant factors in addressing this task is environmental education, which fosters a responsible attitude toward nature. In this regard, the development of ecological literacy and responsibility among future teachers is considered an essential component of their professional competence.

Pedagogical and psychological disciplines play a leading role in shaping the worldview, value orientations, and professional-ethical qualities of future teachers. The integration of ecological components into their content makes it possible to systematically develop the environmental knowledge of students in pedagogical specialties. The insufficient degree of research into this problem and the lack of a holistic practical and methodological framework confirm the relevance of the chosen research topic.

Environmental education for future teachers should be continuous, since they are key agents in shaping the ecological culture of society. By transmitting ecological knowledge to students and fostering in them a sense of responsibility, teachers contribute to the upbringing of a generation capable of valuing the environment, preventing pollution of land, water, and air, conserving natural resources, and caring for the future of the country.

The analysis of scientific, philosophical, psychological, and pedagogical literature, as well as educational practice, revealed the following contradictions:

- between the need to form environmental education among future teachers in accordance with their professional training and the insufficient development of the content and methods of environmental education in higher education institutions;
- between the demand for new methods of environmental education for future teachers and the insufficient use of innovative socio-pedagogical practices in the university learning process.

The identified contradictions determined the formulation of a scientific problem related to defining a methodological system that ensures the effective development of environmental education for future teachers in higher education institutions.

The purpose of the study: the theoretical and practical substantiation of the development of environmental education for future teachers through the teaching of pedagogical and psychological disciplines.

To achieve the purpose of the research, the following tasks were set:

1. To analyze the historical stages of the development of environmental education and international experience, and to reveal the content of the concepts “environmental education”, “environmental awareness”, “environmental literacy”, and “environmental upbringing”.

2. To clarify the content of environmental education and the psychological-pedagogical conditions for its implementation in the context of sustainable development.

3. To characterize the features of pedagogical and psychological diagnostics in the process of forming environmental education.

4. To develop a structural-content model of the development of environmental education based on pedagogical and psychological disciplines.

5. To present the content and results of experimental work on the development of environmental education among future teachers.

6. To determine the prospects for the development of environmental education among students in pedagogical training programs.

The object of research: the pedagogical process in higher education institutions.

Subject of the research: the development of environmental education of future teachers based on pedagogical and psychological disciplines within the framework of pedagogical degree programs.

The research hypothesis: effective formation of environmental literacy among future teachers will be achieved if the historical-theoretical, psychological, and pedagogical foundations of environmental education are identified, if a structural-content model of environmental education is developed and implemented in the educational process, and if the scientific and practical foundations of this process are refined. In this case, the formation of environmental competence among future teachers will occur more effectively, since the proposed model and methodology are grounded in the theory and practice of environmental education.

Research methods used in the dissertation work: analysis of scientific literature, study of normative documents, empirical methods (questionnaires, interviews, observation, experiment), as well as statistical methods of data processing.

The leading idea of the study: the development of environmental education for future teachers contributes to the achievement of Kazakhstan's sustainable development goals by orienting the training system of specialists toward harmonizing the relationships between "human – society" and "human – nature" through effective ecological activity.

Research base: Korkyt Ata Kyzylorda University. Respondents: students of pedagogical training programs — 6B01101 Pedagogy and Psychology, 6B01405 Physical Education and Sport (Physical Education Teacher), 6B01517 Biology, and 6B01516 Chemistry-Biology (future teachers).

Scientific novelty of the research:

- The historical stages of the development of environmental education and international experience have been analyzed; the content of the concepts "environmental education", "environmental awareness", "environmental literacy", and "environmental upbringing" has been clarified. In international practice (USA, Japan, Germany), environmental education is organized on the basis of interdisciplinary connections. These countries have developed integrative

programs aimed at shaping environmental awareness and a responsible attitude of future teachers toward nature. Domestic and foreign theories and concepts have been examined, and an analysis of research and practical experience has been carried out.

- The content of environmental education has been specified, and the psychological-pedagogical conditions for its implementation in the context of sustainable development have been defined. Based on a classical approach, three stages of environmental education development in Kazakhstan have been identified: Pre-revolutionary period (late 18th – early 20th centuries); Soviet period (1920s–1970s); Contemporary period (from the late 1990s to the present). The psychological-pedagogical conditions for the formation of environmental education among future teachers include: integration of environmental issues into the educational process; creation of a pedagogical environment that supports environmental upbringing; use of active learning methods; significant role of teachers; development of motivation for ecological activity; expansion of social engagement and socio-cultural initiatives.
- The features of psychological-pedagogical diagnostics of the process of forming environmental education have been characterized. Diagnostics in the field of environmental education is considered an important tool for identifying the level of knowledge and skills among future teachers. To achieve a high level of perceptual-affective development of attitudes toward nature, guidelines have been proposed aimed at deepening the aesthetic and emotional perception of the natural environment. Cognitive development of attitudes toward nature is linked to activating students' independence in seeking ecological information. Practical development is manifested in the aspiration of future teachers toward subject–subject interaction with living objects of nature. Behavioral (activity-based) development of attitudes toward nature is expressed in the readiness of future teachers to resist any threats to the well-being of natural objects.
- A structural-content model of the development of environmental education based on pedagogical and psychological disciplines has been developed. The model represents an integrated procedural scheme for the formation of environmental education among future teachers and includes four interrelated components: Target component – formation of environmental education and enhancement of professional training of future teachers; Content-structural component – reflection of the ideas and methodological foundations of environmental education in the content of pedagogical and psychological disciplines; Technological component – inclusion of environmental topics in lectures, seminars, practical and laboratory classes, and the formation of ecological values through learning activities; Evaluation-criteria (resultative) component – development of ecological culture, readiness of future teachers to implement environmental education in professional activities, which presupposes the formation of environmental literacy, upbringing, awareness, and practical activity.
- The content and results of experimental work on the development of environmental education among future teachers have been presented. The experiment was conducted in stages: Stating stage – determination of the level of

environmental education of students majoring in 6B01517 Biology, 6B01516 Chemistry-Biology, 6B01101 Pedagogy and Psychology, 6B01405 Physical Education and Sport; Formative stage – implementation of pedagogical conditions for the development of environmental education of future teachers; Control-generalizing stage – identification of the level of formation of the components of environmental education in control and experimental groups, determination of the dynamics of their development, substantiation of the effectiveness of the experimental work carried out.

- The prospects for the development of environmental education among students in pedagogical training programs have been determined. Within the educational process of higher education, directions for the further development of environmental education for future teachers have been outlined.

The main provisions submitted for defense:

1. Environmental education is an integral part of the professional competence of future teachers and can be systematically developed through pedagogical and psychological disciplines. An analysis of theories of environmental education and normative documents has been conducted, and authorial conclusions have been formulated. Definitions of the concepts "environmental education" and "environmental knowledge" are presented in tabular form.
2. The integration of environmental content into pedagogical and psychological disciplines contributes to the development of ecological thinking, value orientations, and professional responsibility of future teachers. In this regard, the pedagogical and psychological conditions for the development of environmental education have been identified, including: awareness of the inseparable connection between humans and nature; recognition of both positive and negative impacts of human activity on the environment; and the need for regulation of this interaction.
3. Methodological approaches to the development of environmental education for future teachers should be based on systemic, learner-centered, value-oriented, activity-based, integrative, and ecological approaches. On this basis, a structural-content model for the development of environmental education in the process of teaching pedagogical and psychological disciplines has been developed, the effectiveness of which has been confirmed during experimental work.
4. In the course of the study, targeted work with students was carried out, which revealed their subjective attitudes toward nature. The experimental work demonstrated that enriching pedagogical and psychological disciplines with environmental content contributes to enhancing the level of environmental competence of future teachers.
5. In the higher education process, prospects for the development of environmental education of future teachers have been formulated. Based on comparative analysis, scientific-pedagogical and professional educational programs have been developed, the effectiveness of which has been confirmed by practical pedagogical activity.

Scientific works: the content of the dissertation has been published in 13 works, including: 4 articles in journals recommended by the Committee for Quality Assurance in the Sphere of Science and Higher Education of the Ministry of Science and Higher Education of the Republic of Kazakhstan; 2 articles in international journals indexed in Web of Science and Scopus; 5 papers in collections of international scientific conferences; a textbook "Pedagogy" co-authored with the domestic scientific advisor; and an electronic textbook "Ecopedagogy".

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