

**ANNOTATION**  
**of the dissertation for the degree Doctor of Philosophy (PhD)**  
**in the specialty 6D011300-«Biology»**  
**of Amantayeva Arailym Kairatovna**

**Research topic:** Methodological foundations for the formation of environmental competence of future teachers of biology (on the example of project technology).

**The purpose of the study:** theoretical substantiation of the formation of environmental competence of future teachers of biology, methodological support and verification of its effectiveness in the course of experimental work.

**Research objectives:**

- theoretical description of the essence of ecological competence in professional pedagogical activity;
- substantiation of the structural-content model of formation of ecological competence of future teachers of biology;
- development of a methodology for the formation of environmental competence of future teachers based on teaching technologies;
- approbation of experimental work, proof of the effectiveness of the results and their implementation in the educational process, preparation of guidelines based on the study.

**Research methods:**

- theoretical (review, analysis, synthesis, grouping, generalization of philosophical, psychological-pedagogical and scientific-methodical literature);
- empirical (interview, survey, experimental work, observation, control, diagnostic and formative experiment);
- statistical (mathematical and statistical processing of the reliability of the results of the study).

**The main provisions submitted for defense (proven scientific hypotheses and other conclusions representing new knowledge).**

- the results of the analysis of the scientific and theoretical foundations of the formation of environmental competence of future biology teachers;
- structural and content model of formation of ecological competence of biology teachers. The model consists of three components, design technology and results. The motivational component - contributes to the motivation and orientation of the student's activity in meeting his needs in educational and research activities; the procedural component - forms the basis for the application of analytical, methodological, practical activities, design technology; the content component - serves as the basis for the educational and cognitive activities of future biology teachers;
- methodology of formation of ecological competence of future teachers based on project technology;
- experimental work proving the effectiveness of the methodology for the formation of environmental competence of future biology teachers confirms the correctness of the provisions submitted for defense.

### **The main results of the study:**

- the concept of ecological competence of future biology teachers has been clarified;
- theoretically and methodologically justified the formation of environmental competence of future biology teachers on the example of design technology;
- a structural and content model of the formation of environmental competence of future biology teachers;
- provided with a methodology for the formation of environmental competence of future teachers based on design technology;
- a methodology for the formation of environmental competence of future biology teachers has been developed and experimental testing has been carried out in order to verify its effectiveness.

### **The novelty and importance of the scientific result:**

- the novelty of the first result - the analysis of philosophical, pedagogical, psychological scientific works, dissertations and normative documents approved by the Ministry of Education and Science of the Republic of Kazakhstan on the problem of research, an explanation of the concept of methodological foundations for the formation of environmental competence of future biology teachers. The significance of the results obtained is determined by the theoretical and methodological foundations of the formation of the personality of the future teacher-biologist and the possibilities of integration into the modern educational process;
- the novelty of the second result was developed on the basis of design technology, the formation of environmental competence of future teachers. The significance of the results contributed to the formulation of the problem and the systematization of problem tasks, the determination of the theoretical, cognitive, practical significance of the result and the forms of organization of the project method, the effective organization of independent research activities of students;
- the novelty of the second result was given a theoretical characterization of the essence of environmental competence of future biology teachers. The significance of the results obtained made it possible to substantiate the structural and content model of the formation of environmental competence of future biology teachers, a systematic model of methodological execution was developed, the possibilities of application by future biology teachers were considered;
- the novelty of the third result as a result of the developed methodology for the formation of environmental competence of future teachers based on project technology, the textbook "Project technology for the formation of environmental competencies" was developed and implemented in the content of the elective course "Organization of scientific activity". The significance of the results obtained is due to the fact that in accordance with the educational programs 6B01513-Biology, 7M01513-Biology, 8D01513-Biology in order to train biologists of the pedagogical University, it is recommended to use as an auxiliary tool in the prepared educational process for students, as well as school teachers, methodologists, education system workers;

- the novelty of the fourth result, the ascertaining, forming, control stages of experimental work were carried out. The significance of the obtained results was analyzed and the results of experimental work were clarified.

**Compliance of Science with directions of development or state programs:**

The research work is based on the Law of the Republic of Kazakhstan "On Education", the state mandatory standards of higher education of the Republic of Kazakhstan, "Professional standard of a teacher", the Law of the Republic of Kazakhstan "On the status of a teacher", the Environmental Code of the Republic of Kazakhstan dated January 2, 2021 No. 400-VI ZRK, the annual program of the Head of State Kassym-Jomart Tokayev, dedicated to to the people of Kazakhstan, environmental education in the Republic of Kazakhstan, the formation of personal competencies corresponds to the normative documents and state programs adopted by the state.

**Description of the doctoral candidate's contribution to the preparation of each publication (indicating the percentage of the total publication of the author of the dissertation).** The work is performed reflected in 11 scientific papers, including:

- in 1 article published in an international scientific publication, which, according to the Scopus information base, has;

- in 3 articles published in journals recommended by the publication of the results of scientific activities of the Committee for Quality Assurance in the Field of Education and Science of the Ministry of Education and Science of the Republic of Kazakhstan;

- in 6 materials and abstracts of international and republican scientific seminars and conferences, 2 of them - in the materials of foreign conferences;

- in 1 textbook under the heading of the educational and methodological association (project management group) in the field of education «Pedagogical Sciences» the Higher and Postgraduate Education Department of the Ministry of Education and Science the Republic of Kazakhstan at KazNPU Abai (minutes the online meeting No. 3 dated 02/21/2021). All publications were prepared during the study.

1. Forming environmental competence in future biology teachers through project tasks // Cypriot Journal of Educational Sciences.-Vol 17(2), 2022. -P.664-675 (Scopus)(Karbaeva Sh., Childebaev Zh., Turlybekova G., Isaev G., Stankevich P. in the author's association 75%) . The article discusses the formation and development of environmental competence of students based on the considered project technology.

2. Problems of development of ecological competence of future biology teachers in the educational process// Bulletin of KazNPU Abai. The series «Pedagogical sciences». - No. 1, 2019. -P.120-125 (Childibaev Zh. 80% in the author's association). The article contains many new concepts of environmental science as an aspect of human environmental literacy, one of the main tasks of environmental education is the formation of human environmental literacy, which is based on human cognitive abilities.

3. Ways to develop students' environmental competence based on the components of the content of environmental education // Reports of the Kazakh Academy of Education. – Astana, 2019, No. 2. -P.87-93 (Childebaev Zh. 80% in the author's association). The article discusses the ways of developing environmental competence of students based on the components of the content of environmental education.

4. Ecological competence of a teacher is the basis for the formation of ecological culture of students// Bulletin ofKazNPUAbai. Series Pedagogical sciences.- No. 1, 2022.- P. 25-31(ChildibaevZh., LakhbayevaZh. 80% of the author's association). The article examines the importance of the formation of ecological culture among future specialists, its components and possible ways of its formation for each member of society. Environmental science as an aspect of human environmental literacy is one of many new concepts. The possibility of their use in solving problems is considered.

5. Modern problems of development of ecological competence of future teachers // VIII International scientific and practical conference of young scientists, students and schoolchildren «Young scientist - 2019» Taraz, 2019.- P.25-29 (Childibaev Zh. 80% in the author's association). The article gives a pedagogical, psychological, theoretical analysis of the works of domestic and foreign scientists and teachers, defines the meaning of the words «competence», «environmental competence» and gives a number of definitions.

6. Development of ecological competence of future biology teachers based on methodological aspects of environmental psychology // IV International Scientific and Practical Conference of students and young scientists «Methodology, theory and practice of modern biology». - Kostanay, 2019.- P.454-458 (Childebaev Zh. 80% in the author's association). The article considers environmental psychology as an interdisciplinary field of knowledge about the psychological aspects of communication, interaction between a person and the environment (spatio-geographical, social, cultural).

7. Ecological culture is the basis for the formation of ecological competence //Herzen readings on the topic «Problems of biological and environmental education of schoolchildren and students». - St. Petersburg, 2019. - P. 77-82 (Childibaev Zh. author's association 80%).The article analyzes the concepts of «ecological culture» of famous scientists as the basis for the formation of environmental competence and is considered from a modern point of view.

8. Development of environmental competence of trainers on the basis of the components For ecological education // International scientific and practical conference «Developing educational environment in school, college and university - modern trends and research». - M., 2019. - P.56-62 ( Childibaev Zh . author's association 80%).The article provides a comprehensive analysis of the components of the authors' environmental education and provides a system of measures for the development of environmental competence of young people in the educational process, based on the content of the terms.

9. Scientific and theoretical foundations of the content of environmental education in the formation of environmental competence of students // II

International Scientific and Practical Conference «Ecology and bio-sufficiency», - Almaty, 2019. -P. 18-22 (ChildebaevZh. 80% of the authors' association) presented their views and opinions from a modern point of view.

10. The effectiveness of the use of design methods in the process of environmental education in higher school//«Topical issues of biological and environmental education in secondary and higher education (innovations and experience)», dedicated to the 75th anniversary. Almaty, 2021. - P.190-195 (Stankevich P. 80% in the author's association). The article provides a number of recommendations on the effectiveness and advantages of project technology in the implementation of projects in the educational process.

11. Project technology in the formation of environmental competence// textbook. - Almaty: Ulagat, 2021. -102 p. (Childibaev Zh., Lakhbayeva Zh. in the author's association 80%). The textbook provides a theoretical and methodological analysis of the project technology and gives several project tasks for the formation of environmental competence of students. The structure, topics, theoretical issues of the textbook, the main considerations in it are addressed to school teachers and students, undergraduates, doctoral students studying in higher educational institutions.