**Concept and structure of bachelor’s degree holders in the field of environmental teaching**

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**Abstract.** The article discusses a new approach to the content, technology, methods, and methodology of environmental education formation, and shows the theoretical and practical foundations of education aimed at forming high values in the individual.

**INTRODUCTION**

In psychology, the concept of “formation” in relation to the individual is considered as an objective and natural process, in which the individual acts as both an object of influence and a subject of activity and communication. At the same time, psychologists emphasize that personality is formed through the assimilation and assimilation of socially developed experience in the process of active interaction with the external and objective environment. As a rule, the personality is considered relatively formed in relation to early adolescence and subsequently develops in various spheres of life. At the same time, the formation of individual abilities, in particular professional and life skills, begins to be carried out in the process of mastering individual labor functions. In this regard, we consider it expedient to carry out the formation of a future teacher’s readiness for environmental education at school in the process of the individual’s initial acquaintance with the world of their future profession. In addition, the process of formation is a step-by-step activity based on the environment of the individual and their activity, which is characterized by changes in the value, cognitive, and activity spheres [1].

In this regard, the formation of readiness to carry out environmental educational activities should be considered as a series of identified and directed external influences on the student’s own activity. Based on the foregoing, we define the formation of a future teacher’s readiness for environmental education activities at school as a gradual process of its formation, which allows the future teacher to perform the educational, upbringing, communicative, regulatory, and prognostic functions of environmental education. It should be noted that, based on the process of forming the studied preparation, the future teacher currently has corresponding records for a number of mental functions that are not yet mature and, as a result, not fully defined. Accordingly, directed and irreversible changes in the motivational-semantic, affiliative-gnostic, and activity-reflexive components of readiness determine the process of its formation. Among other things, we believe that the understanding and formation of a person’s living space (according to K. Levin) also occurs here.

At the same time, if the relatively formed personality of the student understands and regulates their connection with the surrounding universe, their behavior will be more ecologically favorable, and statements about the importance of preserving the ecology of our planet, starting with the ecology of their native land, will be more convincing. For the effective organization of the formation of a future teacher’s readiness for environmental educational activities at school, it is important to choose the correct methodological approaches, among which ecological-psychological, system-activity, and acmeological approaches are the most suitable. (Table 1) The main idea of the first approach is that man and the natural environment are closely interconnected and interdependent [3].

The state of the environment influences human activity, mental and physical well-being, and vice versa. Based on the analysis of the rules of this approach, the methodological principles of forming the future teacher’s readiness for environmental education activities at school are highlighted. These principles are borrowed from V. A. Yasvin, who explains them in connection with working with schoolchildren. Understanding their significance and prospects, we identified these principles as part of an independent pedagogical condition.

The next approach - system-activity - allows for the implementation of the formed targeted and methodological guidelines directly in activity. As mentioned above, it is impossible to call purposeless activity conscious, and the activity of environmental education is not only conscious, but also internally accepted and meaningful.

In this description of the components of the first block, we will try to show its structural units, starting from the approaches. As a result, we will see how the ideas presented in the ecological-psychological approach are translated into their practical implementation through systematization [2].

In the same logic, we determine the place and role of the third methodological approach in the presented model. The acmeological approach involves achieving a certain high level in the professional field and, if there is no perfection, at least striving for it. We consider this aspiration to be an extremely important quality of a future teacher, especially conducting educational activities on the topic of the environment. Moreover, such professional development should be based not only on environmental ideas, but also on the teacher’s communicative competence, the ability to influence and persuade. Such improvement is carried out only in activity and systematic activity, where the entire ecology, the ecology of the homeland, and communication skills are combined, primarily related to the ability to influence the audience. This approach in the model indicates the need. The necessity of taking into account psychological regularities in the formation of students’ readiness for environmental education. It allows for a comprehensive, systematic, and active consideration of the process of preparing a future teacher for environmental education activities at school. Students learn the basics of environmental education activities at school through active forms of work, field practice, interaction with various social institutions that implement environmental education; guides the teacher towards active forms of work, knowledge of the basic foundations of the profession, and understanding the essence of providing pedagogical assistance in the best possible way [5].

**TABLE 1.** Acmeological approach

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| Acmeological approach: | Kistaubaev Sh.L., Makhmudova Sh.L., Samanova Sh.B., Mamashokirov S., Mironova G. V., Sitnikov A. P., et al. |
| Basic concepts of the approach: | "maturity," "perception," "professional competence." |
| Contents: | allows the future teacher to be perceived as a subject of professional activity improvement. |

There is a regulation of personal forms of professional activity, individual aspects of environmental education activities into a single system that develops along with the personality of the future teacher. Such professional activity should transition to the level of effective achievement of professional goals in pedagogical activity. Emphasizing the interdependence of the chosen methodological approaches, we want to show how logically everything should be structured and correctly verified in the process of preparing a future teacher for environmental educational activities. At the same time, it is necessary to take into account the functions of environmental education activities, which we defined in the first paragraph of the study. In fact, therefore, we defined the goal of the model as assisting the future teacher in mastering theoretical concepts and methods of practical activity for the implementation of basic ecological and educational functions among students in school. Achieving this goal is ensured by a number of tasks presented in the prognostic-semantic component of the model [7].

The next block in the model - operational-activity - is intended for the direct implementation of planned results into the educational process of the university. It should be understood that the preparation of a future teacher for environmental educational activity in school is determined by the knowledge he has acquired in his specialty, therefore the environmental educational activity of a physics teacher and the environmental educational activity of a chemistry and biology teacher are qualitatively different, although, by definition, they are aimed at achieving the same goal. To clarify the content of such work, we consider it within the framework of the activities of a future chemistry and biology teacher. Consequently, based on the analysis of the content of the work programs of the educational profile “Chemistry” and “Biology,” the content component is determined. Having analyzed the disciplines of the main and variable parts, we came to the conclusion that the working programs have sufficient opportunities for the formation of ecological literacy in students. These opportunities contribute to the development of fundamental scientific ideas that form the basis of environmental education: knowledge of environmental foundations, culture of Karakalpakstan, legal foundations of nature management, ecology of plants, animals, humans, biosphere, hydrosphere, atmospher, flora and fauna. At the same time, these disciplines do not always have comprehensive information that fully contributes to the mastery of methods and techniques of persuasion necessary for educational activity. We also consider the formation of ecological discipline among students using a complex combination of research activities in real field conditions in the territory of the Republic of Karakalpakstan (in nature reserves and others) as an important guide, which provides forms, methods, and means of preparing the future teacher for the high-quality implementation of environmental education tasks with various categories of students. The third block of the model - diagnostic and effective - includes a comprehensive description of the results of the entire process of forming the future teacher’s readiness for environmental education at school. In particular, the criteria and indicators of preparation are defined here. When forming the system of criteria, a previously obtained conclusion on the structure of the future teacher’s readiness for environmental education in school was used. In particular, motivational-semantic, affiliation-gnostic, and activity-reflexive components are separately distinguished. Accordingly, the criteria received the same names. Also, indicators according to the formed system of criteria are published here (Table 2) [6]:

**TABLE 2.** Set of criteria and indicators of a future teacher’s readiness for environmental education activities at school

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| --- | --- | --- |
| **№** | Criteria | Indicators |
| 1 | Motivational-semantic | - paying attention to environmental protection activities;  - environmental responsibility;  - introduction into educational activities with an ecological content; |
| 2 | Affiliate gnostic | - knowledge of the principles of environmental education;  - developed communication and organizational skills;  - moral attitude towards nature. |
| 3 | Activity-reflexive | - attention to environmental protection measures;  - formation of ecological culture;  - use of various forms of environmental educational activity; |

Understanding the complexity of the process of forming readiness for environmental education in school, we come to the conclusion that different levels of manifestation of readiness criteria (levels of intensity) are distinguished. Based on the understanding of the reality of the situation, we take into account that not every student can be highly prepared for environmental education at school. Therefore, the effectiveness of the preparatory work can be assessed by changes in the level of intensity of the training criteria.

There are five of them in total: low, below average, average, average, and high. The characteristics of the intensity levels of the readiness criteria are presented in the next chapter.

Thus, the presented model provides an overview of the strategy for implementing the professional training of a future teacher in environmental education. This reflects the logic of the choice of content and organizational-pedagogical tools necessary for the future teacher to master the methods of implementing ecological and educational functions (educational, upbringing, communicative, regulatory, and prognostic) among students at school.

Based on the above, we have identified three pedagogical conditions.

The first condition is the use of methodological principles in the lesson based on the activation of the ecological consciousness of the future teacher and the formation of his subjective and moral attitude to environmental objects - aimed at the formation of a value orientation for the implementation of the future teacher.

The second condition is the inclusion of systematized knowledge and methods of activity in the content of professional education, which ensure the mastery of persuasion methods by the future teacher - this ensures the formation of a sufficient theoretical base for the qualitative implementation of this activity in various areas.

The third condition is the improvement of the norms of ecological behavior of the future teacher through pedagogical practice - helps to develop the skills of implementing educational, educational, communicative, regulatory and prognostic ecological and educational activities in real conditions of pedagogical practice. We also emphasize that the identified pedagogical conditions are interconnected both with the elements of the model and  
with the components of training. This position is reflected in Table 3.

These structural components correspond to this characteristic, therefore they were selected as performance criteria.

Below we present the characteristics of the intensity levels of the criteria for the readiness of a future teacher for environmental education.

**TABLE 3.** Bases for highlighting the pedagogical conditions of formation preparation for ecological education (EMF)

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| --- | --- | --- |
| Model block term | EMF Readiness Component Name | Pedagogical conditions |
| Prognostic-targeted | Motivational-semantic | The use of methodological principles in the lesson is based on activating the ecological consciousness of the future teacher and forming his subjective and moral attitude towards environmental objects. |
| Operation-activity and diagnostic-efficiency | Affiliativ gnostic | Incorporating systematized knowledge and methods of activity into the content of professional education that ensure the future teacher’s mastery of persuasion techniques |
| Activity-reflexive | Improving the norms of ecological behavior of future teachers through pedagogical practice |

Motivational-semantic criterion.

Low level. Indifferent attitude to environmental education activities; weak attention to compliance with environmental standards in one’s activities; unformed meanings of environmental behavior.

Level below average. Knowledge of the basic laws of environmental behavior; formal attitude to environmental protection measures, but understanding of their necessity.

Average level. Interest in environmental education activities; subjective and conscious attitude to nature; rational use of its resources.

Level above average. Positive attitude towards environmental activities; desire to disseminate environmental information among schoolchildren and the general population.

High level. Understanding of educational work in the field of ecology as a subjectively important opportunity for self-realization, as an important activity not only for the individual, but also for society as a whole, for preserving the integrity of our planet and life on it [8-11].  
Affiliation-gnostic criterion.

Low level. The future teacher’s unwillingness to carry out ecological educational activities; weak motivation for communication with students; undeveloped ability to establish trusting relationships in communication.

Level below average. Formation of the need to carry out ecological educational activities; arousing interest in interaction with schoolchildren; attempts to establish trusting relationships in communication.

Average level. Promotion of ecological educational activities and interaction with schoolchildren in them; interest in establishing trusting relationships; availability of basic knowledge about the essence of ecological educational activities.

Level above average. Pursuit.

The future teacher’s desire to carry out ecological educational activities; promotion of interaction with schoolchildren in the process of ecological education; ability to establish trusting relationships; knowledge of the basics of ecological education at school.

High level. The future teacher’s desire to carry out environmental education activities, empathy, communication skills; the presence of fundamental scientific and pedagogical knowledge about the essence of environmental education, its principles, and laws.

Criterion of reflexive activity

Low level. Consumer behavior in the outside world; indifferent attitude to pedagogical activity; passivity in environmental education activities.

Level below average. Formalization of environmental activities; use of standard methods of implementing environmental knowledge; lack of self-assessment of professional abilities.

Average level. Ability to apply standard methods and methods of environmental protection in practice; use of effective methods of implementing environmental knowledge; presence of subjective assessment of professional capabilities.

Level above average. Ability to creatively implement environmental protection methods in activities, use effective methods of implementing environmental knowledge, and carry out objective self-assessment of professional abilities.

High level. Conducting an objective self-assessment of professional abilities; ability to observe innovative processes in environmental education and use modern educational technologies in environmental education.

Thus, the above characteristics were used by us to determine the level of formation of the criteria for readiness of a future teacher for environmental education. Therefore, further we will indicate the mechanism that is the basis for such identification and, accordingly, a conclusion was drawn about the formation of readiness in general.

At the same time, we emphasize that the same diagnostic tools were used at all stages of diagnosing the level of formation of the criteria for readiness of a future teacher. Below we describe these diagnostic tools.

The following indicators were used to assess the motivational-semantic criterion: 1) attention to environmental protection; 2) environmental responsibility; 3) installation in educational activities of ecological content. The following diagnostic methods are used: observation method, methodology, “Alternative” method, technique for assessing the orientation of the individual.

The affiliation-gnostic criterion was assessed according to the following indicators: 1) knowledge of the principles of ecological education; 2) developed communicative and organizational inclinations; 3) ethical attitude to nature. In addition to the observation method, the following diagnostic tools are used: the questionnaire “Communicative and organizational inclinations”, verbal associative technique (authors: V. A. Yasvin, S. D. Deryabo).

The assessment of the formation of the activity-reflexive criterion was carried out according to the following indicators: 1) attention to environmental protection measures; 2) formation of ecological culture; 3) use of various forms of ecological educational activities. As in previous cases, the observation method was actively involved.

In addition, in the process of passing pedagogical practice of students in general education institutions, we used the method of expert assessment. The method of A. A. Kalmikov and A. V. Kalmikova was also used in the diagnosis of ecotypology.

In addition, it should be noted that we used some mathematical models and tools to determine the essence of the dynamics of the future teacher’s readiness for environmental education. For example, the compliance of the future teacher with one or another level of readiness criteria is expressed in quantitative form. In the scientific literature, there is a concept of a “measurement scale”, where the authors offer various methods for measuring and determining the results of diagnostics. Using these recommendations, we accept the following score ranges for use:

- low level - 1 point;

- above average level - 2 points;

- average level - 3 points;

- above average level - 4 points;

- high level - 5 points.

Based on this, we determined the average values ​​of the general criteria for the sample of students. This value was calculated as the arithmetic mean of the values ​​corresponding to the level of formation of the criterion for each student (future teachers) in the sample. This approach is quite justified, since on the basis of comparing the average values, it was possible to determine the effectiveness of the implementation of the model of formation of the readiness of a future teacher for environmental education. In addition, information on the distribution of future teachers according to the intensity levels of the criterion (within a given sample population) made it possible to assess the statistical difference (non-separability) of the experimental data.

**REFERENCES**

1. V. I. Panov, *Environmental Psychology: A Study Guide*, Akademiya Publishing House, Moscow (2019).
2. Sh. Shodmonov, *Ecology and Environmental Protection*, Oliy Ta’lim Publishing House, Tashkent (2021).
3. N. S. Kasimova, *Ecological Culture and Theories of Environmental Education*, Fan Publishing House, Tashkent (2020).
4. Alisher Eshimbetov, Shahobiddin Adizov, Inderpreet Kaur, Akhmed Reymov. Is it possible to differentiate between 2-phenylaminodihydro-1,3-thiazine from 2-phenyliminotetrahydro-1,3-thiazine by spectral methods? New glance to the old problem. European Journal of Chemistry 12 (1) (2021). <https://doi.org/10.5155/eurjchem.12.1.77-80.2068>
5. T. I. Nazarova, *Pedagogical Foundations of Environmental Education of Students*, Prosveshchenie Publishing House, Saint Petersburg (2018).
6. A.Ahmadjonov, U.Alimov, P.Tuychi, A.Seitnazarov, A.Reimov, Sh.Namazov, S.Sadullayev. Effect of temperature on the kinetics of the process of nitric acid decomposition of Arvaten serpentinite. IOP Conf. Series: Earth and Environmental Science 1142 (2023) 012034. <https://www.scopus.com/pages/publications/85151285667>
7. D. R. Karimova, *Innovative Pedagogical Technologies in Developing Ecological Competencies*, Istiqlol Publishing House, Tashkent (2022).
8. Reymov, A.M., Namazov, S.S., Beglov, B.M. Effect of phosphate additives on physical-chemical properties of ammonium nitrate. Journal of Chemical Technology and Metallurgy 2013 48(4), 391-395. <http://dl.uctm.edu/journal/>
9. Reymov Akhmed, Namazov Shafoat. Nitrogen-phosphorous fertilizers on the base of concentrated ammonium nitrate solution and Central Kyzylkum phosphate raw material. Polish Journal of Chemical Technology 16(3), Sep 2014, 30-35. <https://doi.org/10.2478/pjct-2014-0046>
10. UNESCO, *Education for Sustainable Development Goals: Learning Objectives*, UNESCO Publishing, Paris (2017).
11. Law of the Republic of Uzbekistan, *On Environmental Protection*, Tashkent (2023).