

ENVIRONMENTAL COMPETENCES IN STUDENTS RESULTS OF EXPERIMENTAL WORKS IN DEVELOPMENT AND THEIR MATHEMATICAL-STATISTICAL ANALYSIS

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Abstract: In the development of environmental education competencies in students, the history, culture, nature of our country, its modern life, the value, integrity and diversity of the surrounding world, awareness of one's place in it, ensuring effective and safe interactions in society a scientific approach to the formation of psychological culture and competence for

Key words: biosphere, technosphere, risk, safety, environment, ecology, protection, visual, competence, pedagogical.

Introduction

The duration of instability in production, economy and social life in world countries leads to a decrease in the survival and life expectancy of a person, a deterioration in the state of the biosphere, the technosphere, the health of the population in society, restrictions on the requirements, interests and needs of the population, the emergence of new previously unknown types of risks. Any state is obliged to solve the strategic task of obtaining a minimum loss or maximum benefit from its activities in conditions of limited resources to ensure security and with an acceptable level of security for society. The pace and scale of changes in the development and economy of society, carried out on the basis of technical, resistance and social factors, tactical and strategic tasks of government and society in conditions of limited resources, depends on the solution of this problem.

The problem of environmental safety comes to the fore in its relevance, when environmental safety becomes one of the components of national security. The current situation constantly requires citizens to be aware of environmental problems, determine the urgent need for the formation of a new environmental thought, which is impossible without universal environmental education and upbringing.

President Of The Republic Of Uzbekistan Sh.M.Mirzeyev's speeches focus on such issues as a systematic approach to the problem, critical analysis, raising the work carried out in all areas to a qualitatively new level, improving the efficiency of the existing system, raising the public administration system to the level of qualitatively modern requirements based on today's and tomorrow's requirements, improving the entire system of the working with personnel.

To determine the level of development of students 'competency in ecological education within the framework of the discipline "safety of life activity", as well as to examine the effectiveness of students outside the audience in studying the relationship of students to ecology, was carried out by the researcher and teachers of the same discipline.

The content of experimental work on the development of environmental competencies in students and the methodology for its conduct.

The purpose of the pilot work was to determine the degree of effective use of pedagogical conditions that allow to develop the competence of future educators on environmental education. In accordance with the stated goal, the following tasks were solved:

- study and generalization of competency levels of students in the educational process on the basis of special comprehensive programs within the framework of the discipline "Safety of life activity" on the principles of unity of e-study and generalization of competency levels of students in the educational process on the basis of special comprehensive programs within the framework of the discipline "Safety of life activity" on the principles of unity of Ecology, consistency, continuity, interdependence and environmental knowledge.

- identification of information on the development of environmental education competencies in the training of students of the educational direction of pedagogy in the field of "Safety of life activity" with the help of questionnaire surveys;

- study using the example of the content of the educational content of the subject "safety of life activities" of students, the topics of forms and methods of teaching and the tasks assigned for independent performance;

- to achieve the formation of competency characteristics related to ecological education on the basis of a competency approach in students of the pedagogical direction of Higher Education.

The pilot work was carried out during the academic years 2020-2023, in which the pilot work was carried out in three stages at Termez State University, Navoi State Pedagogical Institute, Urgench State University and Jizzakh state pedagogical universities:

1. At the stage of the **founding experiment**, pedagogical educational activity was organized, aimed at determining the level of development of competencies related to environmental education based on the teaching of the "Safety of life activity" of students in the process of obtaining special education. In achieving the intended goal, the process of teaching the subject "Safety of life activities" of students studying in the pedagogical educational direction was observed, with which a conversation was held about the preservation of nature, about the current situation of ecological culture and ecological situations, surveys. These works made it possible to define the direction and program of research. The scientific work of leading scientists and experienced educators in this field on the topic of research was analyzed. Based on the teaching of the subject "Safety of life activity", appropriate problem situations, tasks and methods, forms and means of their implementation were established, based on the characteristics of the development of competencies on the environmental education of students.

2. At the stage of the **forming experiment**, a practical and methodological activity was organized on the basis of teaching the subject of the recommended instruction, instruction, methodological developments and competence of students of the pedagogical educational direction on Environmental Education, 'Safety of life activities'. With the help of practical methods aimed at directly and indirectly pedagogical observation of students' activities, Organization of practical trainings with their participation, identification of their personal attitude to the ecological problems observed today in our nature, in addition to interviews, questionnaire surveys and lessons, knowledge, skills and qualifications, development of competencies related to ecological education, were formed in them. The level of development of competence in environmental education was analyzed on the basis of teaching students the science of "Safety of life activity".

3. The level of development of competencies of students of the pedagogical educational direction in the framework of the discipline "safety of life activities" at the stage of the emphatic experiment was analyzed on the basis of tasks for independently solving ways to eliminate ecological problems and what to rely on to identify the causes of the violation of the Today's ecological environment, as well as ways to find solutions to ecologic problems, as well as

the degree of development of their competence on ecalogic education in the framework of the science "safety of life activities" were identified in them.

The successful conduct of pilot work was ensured due to the presence of the following objective and subjective factors:

- the creation of methodological conditions aimed at the development of competence in the field of ecalogical education in the framework of the discipline "safety of life activities" in students of the pedagogical educational direction;
- having sufficient material and technical base in teaching the subject of "risk of life activity" in higher educational institutions;
- the efficient use of modern didactic and technical means and Information Technology in the process of educational and educational work;
- in the process of obtaining competencies on environmental education, environmental thinking in students is gradually formed as the basis of ecological culture and environmental maturity, which in turn is an important component of the formation of an intellectual and spiritual-moral personality;
- the involvement of educators in the field of qualified, highly pedagogical skills in the formation of the levels of development of students 'copences on echalogical education within the framework of the teaching of the subject" safety of life activities";
- responsible attitude to the consequences of its activities for environmental safety, human health and safety.

Experimental work on the basis of recommendations, guidelines, which were presented in the scientific work of Yu Karimov and others, were carried out in accordance with state educational standards and educational goals.

In the process of conducting pilot work, special attention was paid to the reflection of the following features in their upbringing in determining the degree of development of their competencies regarding echalogical education within the framework of teaching the subject "Safety of life activity" in students:

- 1) the ability to put environmental knowledge into practice in the identification, solution and Prevention of environmental problems, improving the state of the environment, the practical experience of copetension on environmental education, the degree of formation
- 2) presupposes the presence of value orientations, the understanding of the meaning of environmental activity, the understanding of the need to preserve the natural environment as the most important value
- 3) understanding the social and personal importance of Environmental Education, a reliably conscious civic position with its participation in the protection of the living environment
- 4) willingness to actively participate in environmental activities, environmental conditions
- 5) responsibility for the results of its environmental activities, decisions made in the field of environmental change and protection.
- 6) the principles of the formation of competency of students regarding environmental education are established, they connect all the components of the educational process to a holistic system, provide the necessary level of formation of environmental competence and are implemented in pedagogical technology
- 7) the competence in environmental education is the ability of future teachers to make a worthy contribution to the formation of their ecological culture, to develop their interest in nature, to make sure that environmental protection is necessary, to eliminate world environmental problems.

In order to determine the effectiveness of pilot work, respondents were attached to experimental and control groups on an equal basis. In the experimental group, practical activities

were established on the basis of the methodology recommended by the dissertation and helping to ensure the development of the competence of students of the pedagogical direction on environmental education in the framework of the discipline "safety of life activities", while in the control groups, educational work was carried out in the traditional manner.

In the process of substantiating and emphasizing experimental work, on the basis of a competency approach in respondents, a special questionnaire was developed aimed at determining the degree of content of concepts related to the development of environmental competence.

In the framework of the science of "safety of life activity" in the students of the experimental and control groups, the competence on environmental education was developed and the level of content content of ecological education was as follows according to the results obtained:

- in control groups, 26.67% of students tested positive at the beginning of the experiment, 34.22% achieved positive results at the end of the experiment, while in pilot groups, 24.32% of students tested positive at the beginning of the experiment, and at the end of the experiment, 37.62% of them achieved positive levels (table 1).

- the number of students who gave satisfactory answers in control groups initially showed a result of 35.57%, achieved a result of 37.42% at the end of the experiment, while in experimental groups they initially showed a result of 36.41%, and at the end of the experiment they achieved a result of 41.22%.

-the number of students with unsatisfactory indicator (no comment) decreased from 37.76% to 30.36% in control groups, while in pilot groups it decreased from 39.27% to 21.16% (table 1).

Table 1

The level of composition of concepts related to the development of methodological competence	Experimental group				Control group			
	At the beginning of the experiment, 322 students participated		At the end of the experiment, 321 students participated		At the beginning of the experiment, 323 students participated		At the end of the experiment, 323 students participated	
	t he numbe r	%	t he numbe r	%	t he numbe r	%	t he numbe r	%
Positive	7 8	2 4,32	1 20	3 7,62	8 6	2 6,67	9 1	2 8,22
Satisfactory	1 17	3 6,41	1 32	4 1,22	1 15	3 5,57	1 21	3 7,42
Unsatisfactory (no comments)	1 27	3 9,27	6 9	2 1,16	1 22	3 7,76	1 11	3 4,36
Total	22	00	21	00	23	00	23	00

From the noted indicators, it is understood that the overwhelming majority of respondents-students (127 at the beginning of the experiment and 69 at the end of the experiment) did not express any opinion on the problems that exist in the development of the competence of students of the pedagogical educational direction on environmental education within the framework of the science "safety of life". This situation is due to the fact that the respondent-students do not have sufficient ecological competence, allow slowness in independent feedback on the imflessness of

life activities, the results of the study should also effectively organize activities outside the audience and audience in the direction of developing the competence of students of the pedagogical educational direction on environmental education.

Comparative analysis of experimental results on the development of environmental educational competencies in the framework of the science of stage I "safety of life activities" :

$m=41, n = 43$ is the number of students in the experience and control group.

b-at the beginning of the experiment.

o-at the end of the experiment.

$$S_y = \sqrt{S_y^2} = \sqrt{0,41} = 0,64$$

Mean values Determination indicators:

$$S_x = \frac{S_x}{\sqrt{41 \cdot 3,44}} \cdot 100\% = \frac{0,65}{6,44 \cdot 3,44} \cdot 100\% = \frac{65}{21,15} = 3,07\%$$

$$S_y = \frac{S_y}{\sqrt{43 \cdot 3,35}} \cdot 100\% = \frac{0,64}{6,55 \cdot 3,35} \cdot 100\% = \frac{64}{21,94} = 2,96\%$$

$$a_x \in \left[3,44 - \frac{1,96}{6,44} \cdot 0,65; 3,44 + \frac{1,96}{6,44} \cdot 0,65 \right] = [3,25; \rightarrow 3,63]$$

$$a_y \in \left[3,35 - \frac{1,96}{6,55} \cdot 0,64; 3,35 + \frac{1,96}{6,55} \cdot 0,64 \right] = [3,17; 3,64]$$

Let's calculate what results these accounts have at the end of the experiment:

$$\eta_o = \frac{\bar{x}_o}{\bar{y}_o} = \frac{4,09}{3,6} = 1,13$$

relative growth.

Hence, the experimental group had a 1.13-fold (11%) higher rate at the end of the experiment compared to the control group.

If we compare with the beginning of the experiment then:

$$\text{in the experimental group } \eta_t = \frac{\bar{x}_o}{\bar{x}_b} = \frac{4,09}{3,44} = 1,18$$

$$\text{in the control group } \eta_n = \frac{\bar{y}_o}{\bar{y}_b} = \frac{3,6}{3,35} = 1,07$$

efficiency is achieved

$$S_x = \sqrt{S_x^2} = \sqrt{0,57} = 0,75$$

$$S_y = \sqrt{S_y^2} = \sqrt{0,53} = 0,72$$

Mean values Determination indicators:

$$S_x = \frac{S_x}{\sqrt{41 \cdot 4,09}} \cdot 100\% = \frac{0,76}{6,44 \cdot 4,09} \cdot 100\% = \frac{76}{26,17} = 2,02\%$$

$$S_y = \frac{S_y}{\sqrt{43 \cdot 3,6}} \cdot 100\% = \frac{0,72}{6,55 \cdot 3,6} \cdot 100\% = \frac{72}{23,58} = 3,05\%$$

$$a_x \in \left[4,09 - \frac{1,96}{6,44} \cdot 0,53; 4,09 + \frac{1,96}{6,44} \cdot 0,53 \right] = [3,94; \rightarrow \rightarrow 4,24]$$

$$a_y \in \left[3,6 - \frac{1,96}{6,55} \cdot 0,72; 3,6 + \frac{1,96}{6,55} \cdot 0,72 \right] = [3,4; 3,8]$$

The results obtained on each stage were analyzed mathematically-statistically and, according to these results, were checked through the Styudent criterion and conclusions were drawn.

$$T = \frac{|\bar{x}_b - \bar{x}_o|}{\sqrt{\frac{S_{x_b}^2}{n} + \frac{S_{x_o}^2}{n}}}$$

science I stage; experimental group:

$$\bar{x}_b = 3,44 \quad \text{and} \quad \bar{x}_o = 4,09$$

$\eta_t = 1,18$ efficiency ratio.

$$T_t = \frac{|3,44 - 4,09|}{\sqrt{\frac{0,43 + 0,57}{41}}} = \frac{0,65}{\sqrt{0,024}} = \frac{0,65}{0,15} = 4,34$$

$T_m = 4 > T_{0,96}(t) = 1,96$ Hence, hypothesis N_1 is accepted.

science I stage;

control group:

$$\bar{y}_b = 3,35 \quad \text{and} \quad \bar{y}_o = 3,6$$

$\eta_n = 1,06$ efficiency ratio.

$$T_n = \frac{|3,35 - 3,6|}{\sqrt{\frac{0,41 + 0,53}{43}}} = \frac{0,25}{\sqrt{0,021}} = \frac{0,25}{0,14} = 1,78$$

$T_n = 1,78 < 1,96$ is, and the hypothesis N_0 is accepted.

Conclusion

The basis of any pedagogical process is pedagogical States, which, depending on their ordered set, lead to the educational changes envisaged in the formed person, the formation of his scientific worldview.

Material and spiritual needs, directions of values, motivations, incentives, behavioral abilities and habits, qualities and character traits. The pedagogical situation determines the active interaction and unity of all the main components of the pedagogical process - the teacher, the student, the specific historical content, organizational and managerial structures, the pedagogical environment.

Each pedagogical situation reflects the state of the pedagogical process, the laws of upbringing and the principles of pedagogical activity are manifested, the main educational and educational contradictions, their timely identification and resolution determine the main driving force for improving the pedagogical process.

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