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SYSTEMS FOR FORMATION OF ENVIRONMENTAL SAFETY CULTURE IN STUDENTS AT TECHNICAL HIGHER EDUCATIONAL INSTITUTIONS

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***ABSTRACT**--This article was written with the aim of improving the systems of formation of environmental safety culture among students of technical higher educational institutions. The following research objectives are identified in the article and their solutions are given: a theoretical analysis of the definition of the process of formation of an environmental safety culture among students of technical higher educational institutions; identification of didactic, acmeological and axiological capabilities of the system of forming a culture of environmental safety among students; improving the model of infrastructure of systems for the formation of an environmental safety culture among students; determination of methods, forms, means of innovative educational strategy of the process of forming a culture of environmental safety among students and the development of recommendations and proposals to improve its effectiveness".*

***Keywords--** ecology, environmental education, environmental competence, environmental culture*.

I. INTRODUCTION

In the world, in the context of aggravation of global environmental problems, the educational process of higher education institutions introduces mechanisms to form a culture of environmental safety (CEB) of students. In the Stockholm Declarations, Rio de Janeiro on Environmental Protection and the UN General Assembly resolution on the “World nature map”, ensuring the moral, ethical, axiological, cognitive and active actions of environmental safety components is recognized as the most important task. In modern conditions, when there is a growing demand for specialists capable of independently solving economic and environmental problems, based on the theory and practice of sustainable development, the formation of a culture of environmental safety is of particular importance.

Studies to improve the various components of the process of environmental education, ensure the rational use of natural resources and protect the environment are carried out all over the world. The development of environmental ethics, law and education, the transfer of production tonon-waste technologies, improving the theoretical foundations of alternative energy and closed-circuit technologies are important for the future of countries. Improving the categories of culture of environmental safety, environmental thinking and moral qualities of the individual, ensuring the environmental imperative is recognized as the most urgent problem for the future of mankind.

In our country, ecology and environmental protection are developing as an integral part of the continuing education system. The “Concept of Continuing Environmental Education” was also implemented, the content of

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environmental education was being improved, and its material and technical base was being modernized. “Prevention of environmental problems that damage the environment, public health and the gene pool” is identified as priority4 in the Strategy for the Further Development of the Republic of Uzbekistan. Therefore, the assessment of ecology as an interdisciplinary field, the moral essence and modern content of ecology, innovative thinking and the introduction of new approaches into the educational process serve to ensure the effectiveness of environmental education.

II. METHODOLOGY

The purpose of the study is to improve the systems for the formation of an environmental safety culture among students of technical higher educational institutions.

Research Objectives:

• theoretical analysis of the definition of the process of formation of environmental safety culture among students of technical higher education institutions;

• identification of didactic, acmeological and axiological capabilities of the system of forming a culture of environmental safety among students;

• improving the model of infrastructure of systems for the formation of an environmental safety culture among students;

• determination of methods, forms, means of innovative educational strategy of the process of forming a culture of environmental safety among students and development of recommendations and proposals to improve its effectiveness.

The object of the study is the process of the formation of an environmental safety culture among students of the Tashkent State Technical University, Tashkent Institute of Chemical Technology, Karshi Engineering and Economics Institute, Jizzakh Polytechnic Institute, 948 students and 50 professors and teachers were involved in the experimental work.

The subject of the study is the forms, means and methods of forming a culture of environmental safety among students.

Research Methods. In the course of the study, such methods were used as pedagogical observation, expert assessment, theoretical analysis, comparative typological and analytical methods, interviews, questionnaires, answers to questions, generalization, mathematical and statistical analysis, and an experimental experimental method.

The scientific novelty of the study is as follows:

• the system for the formation of an environmental safety culture has been improved on the basis of the development of the pedagogical process project (inventiveness, modeling and experiment), the definition of its didactic content (facilitation, contact, contextual, situational, adaptive) and the provision of effective personnel training (priority of professional competence and emotional intelligence);

• On the basis of the integration of didactic, acmeological, axiological factors of the educational process, the possibility of building a culture of environmental safety among students (natural, technical, social and

humanitarian sciences; continuity of theory and practice; coordination of the educational functions of educational and civic institutions) has been expanded;

• a model for the formation of an environmental safety culture based on a combination of classroom and extracurricular activities, relying on the protection of the environment and people in ecology, the need for a transition to bilateral security, the expansion of the register of environmental specialties, and the competencies of environmental inspectors are aimed at environmental humanitarian values;

• recommendations and suggestions were developed to ensure the effectiveness of education based on the integration of the innovative and methodological strategy of the environmental safety formation system, its experimental level, criteria, competencies and qualimetric properties of a technical specialist, ecosystems + ecohumanization + ecoethics + qualimetric indicators = human safety.

III. LITERATURE REVIEW

In several countries, various social, economic, legal, historical, spiritual, educational and pedagogical aspects of environmental relations were studied by such scientists as P.I. Agalarova [1], P.A. Aksenova [2],I.V. Bazulina [3], O.F. Vichkanova [17], M.T. Gafurov [5], P.A. Gulukina [7], L. Kushnir [12], A.O.Lagutin [13], Yu.A. Nikitina [14] addressed issues of creating a responsible attitude to the environment, interdisciplinary integration and development environmental awareness in teaching the subject of ecology.

In the study and development of environmental culture and its social problems from the perspective of the theory and practice of work A. Blakman [4], M. Gray [6], J. Solomon [16], HsingYun [10], C. Harding [8], S. S. Haugen (USA) [9] were of great importance.

IV. THEORY AND DISCUSSION

Theoretical foundations of the formation of environmental safety culture among students of technical higher educational institutions.

Environmentalists (protecting the environment) believe that all these environmental changes and ecosystem problems are the result of human production and social activities. Meanwhile, an opposition group has also formed in relation to environmentalists, whose representatives argue that most environmental threats do not pose a serious danger and resolve themselves in accordance with the internal laws of ecosystem development. In addition, people and their activities cannot violate the laws of natural development, since the ecosystem is more perfect and stronger than human power. Among the environmentalists, currents have emerged that defend their ideas so decisively and fiercely that they are rightly called "ecoterrorists." They are engaged in ecotage, that is, environmental sabotage. In 1991, the Czech scientist Vaclav Nemets introduced a new concept - the term “geoethics”. In his report on “Technical and ethical problems of organizing open cast mining based on computer technology”, he first mentioned the existence of ethical problems along with technical problems in the production process. In relation to the Earth, geoethics was defined as a system of a complex of ethical relations and ethical principles.

A.M. Novikov notes that at present “safety pedagogy” is being widely developed. Safety education today has become an independent field with life experience in organizing a safe human life5. E. Weizsacker, director of the European Institute for Environmental Policy, believes that in the future the environmental paradigm will begin to

dominate the economic paradigm, and the economic paradigm will be subject to the environmental paradigm. Thus, the XXI century will be the century of environmental safety.

Academician N.N. Moiseev proposes the term "co-evolution of man and the biosphere." There will be a need to mean by sustainable human development not the person himself, but the impact of the environment on the conditions of his life.

Until recently, the term “ecology” was understood to mean the deterioration of the state of the environment mainly under the influence of an anthropogenic factor, however, in the future this term takes on a different interpretation from the point of view of “sustainable development”. In the West, environmental protection is, first of all, a set of measures to prevent the negative impact of human activity on nature. In particular, in the United States, the United Kingdom, the European Union, Australia and New Zealand, the term environmental protection is used (“environmentalism is essentially an environment” derived from the word “nature”), which in Uzbek corresponds to “science of environment".

In our opinion, environmental culture → is a combination of the following components: values, morality, attitude, character, behavior; environmental education → a system of targeted formation of consciousness, reason, thinking, knowledge, skills, qualifications, activities; The culture of environmental safety is an environmentally conscious human behavior based on environmental knowledge in the field of nature protection, on the anthropogenic impact on the environment of production, especially industrial, economic activity, used in practical activities and decision-making, if there are skills, competencies, experience, that is, behavior that does not harm the natural and socio-cultural environment.

The culture of environmental safety is assessed as a set of spiritual, ethical, emotional, sensory axiological and acmeological properties aimed at providing in the future safe living conditions for all of humanity and for each individual. Safety is a complex, multifaceted concept, and it is advisable to clearly define its pedagogical factors.

The culture of environmental safety is a historical-social, philosophical-social, pedagogical-psychological and ethical-aesthetic category. Possessing a culture of environmental safety is a moral and ethical quality.

The formation of a culture of environmental safety among students of technical higher educational institutions (HEIs) is an integral part of modern environmental education, one of its most important stages, a pedagogical and psychological task, and an educational process. It is an educational category related to moral, spiritual, emotional-sensitive, moral and behavioral actions. The formation of a culture of environmental safety is the organization of the target educational process and system for the formation on the basis of certain competency and qualimetric requirements of thinking, consciousness, concepts, value system, moral standards and beliefs, lifestyle, human decisions, steps, actions, environmental safety behavior.

Possessing an environmental safety culture is a set of scientific and theoretical views on the interaction between the universe, nature, living organisms, communities, that is, the relationship of the existing ecosystem, ideas, environmental knowledge, nature, standards of behavior and morality, lifestyle, actions, actions, the specialist’s activity, expressed in the harmony of man and his environment, eliminating the harm to each other and ensuring their security

The content, forms and methods of forming a culture of environmental safety among students of technical universities.

Modernization in education is the provision of an effective, quick, high-quality, dynamic learning process through the use of various innovative tools, forms and methods. The modernization system covers the whole range of issues, including forms, content of education, its methods, conditions and means of training.

The study revealed the existence of didactic, acmeological, axiological factors in the formation of CEB. Didactic factors (related to the educational process): psychological, pedagogical, material and technical, economic and financial, historical, scientific and theoretical, methodological, methodological, innovative, provision with professional and modern specialists, innovative training. Acmeological factors (associated with personality development): personalized ideas - creativity, creativity, heuristic, motivational, personal skills, talent and interest, will, decision-making ability, as well as social, historical, regulatory, scientific, theoretical, and behavioral. Axiological factors (associated with personal values): spiritual, educational, ideological, aesthetic, ethical.

When forming a culture of environmental safety, it is necessary to purposefully form a set of personality-oriented (sensual-emotional, professional-psychological, contextually-sensual, personality-volitional) and professionally-qualifying (methodological, reflective, systematic, and qualitative) qualities. In this process, all the achievements of the world community should be creatively implemented in the national education system. The formation of a culture of environmental safety should be based on the transition from a single-component education system (subject “Ecology”) to a multi-component education system (integration of special disciplines and general humanities, environmental sciences, ecology, faculties, special educational institutions). It is this multicomponent learning process that provides the formation of personality with a culture of environmental safety.

One of the main criteria demonstrating the maturity of students of technical universities is their environmental safety culture.

The formation of an environmental safety culture can be interpreted as a process consisting of a combination of the following categories: knowledge + skill + qualification + concept + consciousness + thinking + worldview + values + culture + attitude + character + decisions + real and concrete actions and active work + ensuring sustainable development.

The integration of environmental education is as follows: interdisciplinary integration of natural, technical and humanitarian disciplines (compatibility of didactic content); pedagogical system, training and production process, integration of interactive methods, forms, tools, innovative pedagogical approaches (integration of methodological principles); the development of science in the framework of the culture of environmental safety, production needs and training practices, the integration of theory and practice (the concept of the integrity of pedagogical settings); integration of ethical, aesthetic, sensual and emotional qualities and personality characteristics, philosophical, religious and secular views (unity of didactic, acmeological, axiological principles); integration of propaganda between technical higher educational institutions and civil society institutions (a set of main and auxiliary structures oriented towards the didactic goal).

The study used such methods as modeling, OpenDoor, emotion, animation simulators, virtual modeling of real production situations, smart equipment, multimedia. "OpenDoor" is a direct preparation of students for all production processes in the oil and gas, mining, energy and engineering enterprises, ensuring their participation in them.

This method links the educational process with the production process of technical education, ensures their continuity, strengthens the interest of the parties in interaction, and contributes to the development of technical

competencies. The principle of emotion (Eng. Emergent - unexpectedly and suddenly arising) is equivalent to the principle of "do no harm" in the biological chain "society - population - organism - organ - cell - gene". Animation simulators, virtual models of real production situations, smart equipment, multimedia emergency systems also play an important role in creating a culture of environmental safety.

V. EXPERIMENTAL WORK

"The Strategy and Efficiency of Forming an Environmental Safety Culture among Students of Technical Universities", the analysis of the results of an experiment of the processes of forming an environmental safety culture and determining the effectiveness of the results achieved is carried out. The level of formation of a culture of environmental safety among students is differentiated in the following order: excellence (highest degree), maturity (high degree), activity (good degree), awareness (medium degree), passivity (low degree) and indifference (low degree).

It was established that purposefully organized pedagogical conditions, innovative content and an integrated system ensure that the subjects of research perceive the necessary theoretical knowledge, practical skills and qualifications in the CEB as competencies of the specialty. In this case, special pedagogical conditions are created for the integration of sensitive-emotional, behavioral and intellectual capabilities and the achievem**ent** of a high level of demand and quality.

We analyzed the average values of the effectiveness of the formation of an environmental safety culture based on the results of experience in the experimental and control groups, on the ethics, behavior and lifestyle of respondents based on national and international values using the mathematical and statistical method of Student and Pearson χ^2. The experiments were attended by 948 respondents. Of these, 476 in the experimental group and 472 in the control group. Based on the data in the table, hypothesis H1 and the opposite hypothesis H0, which demonstrate the effectiveness of the digestibility of the respondent student in d control group, were selected. The results are shown in the table below (table 1).

Table 1: The degree of indicators of the effectiveness of the formation of environmental safety culture before and after the experience

Time spending experience	Groups	Indicators (quantity)		
		High	Medium	Low
Before experience	Experimental group (n1 = 476 human)	187	140	149
	Control group	182	135	155

	(n2 = 472 people)			
After the experience Time spending Experience	Experimental group (n1 = 476 human)	347	105	24
	Control group (n2 = 472 people) Groups	184	132	156

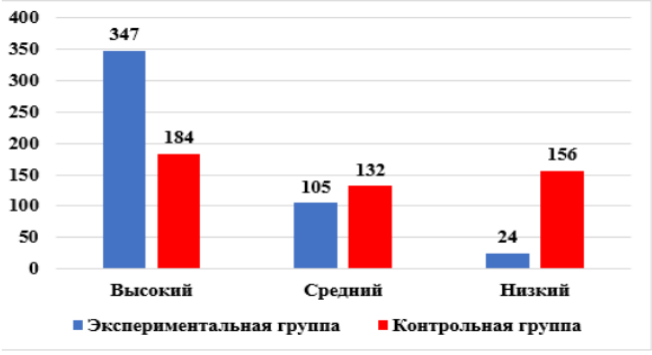
The diagrams corresponding to these samples are as follows:

Therefore, the degree of assimilation in the experimental group is higher than in the control group.

Thus, the statistical analysis confirms the high efficiency of the formation of the CEB based on ethical, be I.

VI. CONCLUSION

1. Tasks closely related to the implementation of environmental education in Uzbekistan are priority areas of national importance. Environmental education is an integral part of the learning system. At present, when worldwide monitoring of the environmental situation and threats is recognized as a strategically important task, the formation of the CEB is the main feature of human capital, an integral and necessary element in the formation of the personality and competencies of a specialist, the development of mechanisms for the interaction of theory and practice in the national system of technical education putting them into practice, creating a holistic system and ensuring the harmony of innovation, the development of science, economic growth and those The clinical practice is important.



2. Due to the increased attention to environmental education at the international level, the formation of a culture of environmental safety is considered as an important direction for the prevention of environmental crises, meanwhile, the KEB is not sufficiently implemented in the national education system, therefore, it is necessary to accelerate the work on critical and creative study of international experience with implementation with national interests. Globally, the register of environmental specialties has been replenished with new specialties, therefore, in our country it is necessary to accelerate the process of their introduction into our education system and inclusion in the national registry, develop new curricula for them and introduce them into the educational process.

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3. When KEB is formed for students of technical universities, the effectiveness of activity is achieved only by observing such principles as problematic, independent mastering of subjects, integration of all participants in the educational process, taking into account individual characteristics and personal qualities of students, ie the principle of individualization, the organization of the educational process on the basis of the laws of the four "I". This can only be achieved if the student is familiarized with such conditions as analysis, generalization, conclusions are drawn, they use their knowledge and qualifications, if necessary, maintain calm in emergency situations, learn about the collective development of educational material, and take into account student motivation.havioral qualities and lifestyle, national and universal values.

4. In the course of the study, special attention was paid to identifying creative potential, the degree of knowledge, skills and qualifications, personal freedom, individuality, compliance with the requirements of the specialty, choosing a profession based on your interests and desires, the availability of a scientific and theoretical concept regarding personal improvement in the formation of students of environmental safety culture.

5. The problem of the formation of culture is closely related to the conditions of self-realization of a person, his ability to behave in society and the process of his creative self-realization. That is, a person with a high culture of environmental safety is a multifaceted and complex phenomenon when the existing set of knowledge and certain skills and qualifications are constantly manifested through behavior and morality. Therefore, from the pedagogical process one should expect comprehensively thought-out, scientifically substantiated actions and relationships that reflect all elements of the culture of environmental safety, taking into account the individual qualities of the person.

6. Environmental education as a pedagogical process is not limited by the level of environmental knowledge, but rather is determined by the psychological, emotional, emotional, emotional attitude to the environment, nature and reality. The formation of a culture of environmental safety in humans should take place on the basis of the principles of the natural environment and human values. The formation of a culture of environmental safety requires a holistic and organic manifestation in the behavior and actions of a person of a whole series of personal and social needs. A person with low environmental education does not form a sense of environmental responsibility. The emergence of environmental responsibility is directly related to the targeted formation in the pedagogical process of environmental awareness, thinking, character, behavior, lifestyle. If a person does not have universal values, such a person cannot possess a real culture of environmental safety.

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