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Developing an Ecological Culture among Students in Physics Classes on the Basis of Innovative Technologies

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ABSTRACT. The article provides information on the formation of ecological culture among students in the process of teaching physics, the use of innovative pedagogical technologies in solving environmental problems and their solutions.

KEY WORDS: Innovative technology, physical field, radiation flux, nature, environmental problem, physical education, laws of physics.

*Only when we find common ground with nature will
humanity be able to reach its full potential.*

ChingizAytmatov

I. INTRODUCTION

The introduction of the concept of competence into the educational process bridges the gap between theoretical knowledge that has been used in pedagogical practice so far and its practical application, i.e. if a student has theoretical knowledge it is difficult to use it in problematic situations. This means that instead of the cognitive paradigm, which is the priority in traditional education, the paradigm of correct use of knowledge in problem situations becomes the priority paradigm.

The goal of competency-based learning is to develop an entrepreneurial, creative student who is able to find solutions to problems. To achieve this goal, teachers must first understand what a competence is and how to shape it in the classroom. The following is a case study on the competency-based development of pupils' environmental culture using innovative technologies in physics lessons.

II. MAIN PART

It is known that the Earth is an open system inhabited by mankind. Its main source of energy is the sun. The flow of energy from the sun to the earth is converted into another form of energy through the process of photosynthesis. The flow of energy falling to the earth is balanced by the thermal radiation of the earth. The existence of life on Earth is different because the frequency of this incident energy is greater than the frequency of energy propagating from the Earth into space.

The following scientific and pedagogical considerations are important when teaching physics to students:

- Explore the possibilities of solving environmental problems in the environment by explaining processes occurring in animate and inanimate nature by means of the laws of physics;
- Explore the magnitude, mechanisms, level of impact of physical fields on the environment, as well as methods and means of protection against them;
- To study the use of physical methods and tools in the development of environmental monitoring;
- To form students' ecological consciousness about the product of man-nature, its conscious part, about the necessity for each person to carry out his/her activities in harmony with nature.

To prevent eco-physical pollution that threatens the health of students in physical education, teachers should pay special attention to this additional task. Students' lives are at stake, unaware of this problem. Today, humanity is



"swimming" in these fields and fluxes of radiation. How does bathing affect human health? Many of them cannot be detected by the senses. Similarly, the mechanisms and regulations of many of them on living organisms have not been studied.

But the main source of this is the development of the world's technology. It is desirable to implement these objectives in the teaching of physics, biology, chemistry at all stages of the lifelong learning system. For example, the practice of using a single mobile phone is improved for all participants in lifelong learning, starting from primary school.

Waves from a mobile phone are life-threatening and in biology classes students learn the concepts of its biological and hygienic effects. All students should know that prolonged mobile phone use can impair memory and thinking and lead to cancer. In 6th grade, students learn about the effects of electromagnetic waves emitted by mobile phones on human health.

The students are introduced to the concept of light while learning about the use of solar energy in school. The biological effects of ultraviolet light can be explained in physics lessons using the following table.

Level (height)	The quantity of microbes in 1 cm ³ in a room exposed to sunlight	The quantity of microbes in 1 cm ³ in a room without sunlight
On the floor	14	110
0.5 m above the floor	5	88
1.7 m above the floor	7	78
2.3 m above the floor	4	89

The following conclusions can be drawn from an analysis of the figures in the table. This means that the doctor does not enter the house in the sun. This is the teaching of the ancestors. This is what should be done. Students should know that light not only cures disease, but can also be fatal if overdosed. For this reason, protection from the sun's rays is recommended. It is a good idea to organise a student conference on the harmful and beneficial effects of light use. The more a person has an attitude and sense of belonging to the nature around him, the more he has a sense of care and responsibility for nature.

A person's maturity is determined by his or her attitude towards the environment. Human beings are always striving for nature. Most of us, irrespective of whether we live in big cities or not, try to relax in nature, in the forest, on lakes, in the countryside. We feel very well the importance of nature in our lives, our unity. Based on this approach, we can carry out the following exercise to determine the students' attitudes towards nature.

"My attitude to nature"

№	Questions	Answers and points		
		"yes"	"no"	other
1	Have you ever thought about your attitudes towards nature?			
2	Do you categorize natural objects as attractive and non-?			
3	Do you always treat nature with care?			
4	Do you think the environment and the events that take place in it are remarkable?			
5	Do you always pay attention to the nature around you?			
6	Are you interested in everything in your environment?			
7	Is this interest reflected in your actions?			
8	Do you value diversity in nature?			
9	Does nature affect your emotions?			
10	Can you explain what attracts you to natural phenomena or natural objects?			
11	When you see the harm that others do to nature.... Will you interfere in their situation?			
12	Do you enjoy reading books about nature?			
13	Do you think the environment affects nature?			
14	Does nature affect your behavior?			



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15	How often do you relax in nature?			
16	Have you ever harmed nature (consciously or not)			
17	Are there any exercises you enjoy doing in nature?			
18	Do you always show kindness to nature?			
19	Did you participate in nature-safe activities in your school years?			
20	Did you participate in nature-safe activities in your adult life?			
21	Do you like to see animals, plants or landscapes in the pictures?			
22	Are you familiar with music related to nature?			
23	Have you ever worked with natural objects to draw a picture about nature or write a poem about nature?			
24	Do you always keep things clear and try to focus on the problem?			
25	Do lessons and exercises affect your attitude towards nature?			

Less than 20 points. Getting to know nature through art, exploring the environment and the emotions that arise from interacting with nature will not touch your heart. You are proud of nature, you do not feel connected to it. You just need to be more discerning in the help you give to others. You would do well to learn about the relationship between the history of humanity and the history of nature and its importance in our lives.

21 to 29 points. You are less active in nature and think less about it. Pay more attention to nature. Learn what you can and cannot do when designing websites. think about the phenomena occurring in nature, learn about the artwork created about its causes and effects. Pay attention to the influence of the people around you on nature.

From 30 to 39 points. You think deeply and deeply about nature. But, as you can see, not all answers in this area are positive. Pay attention to the nature and behaviour of the people around you. Take an active part in protecting the environment. Always be interested in works of art, i.e. read the works of artists, listen to copies and read more.

Above 40 points. Your attitude towards nature is not sufficiently formed and your world view often prevents you from thinking, feeling and being critical about what you do. Take it easy and try not to focus too much on the problem.

III. CONCLUSION

Based on the above results, we can say that such exercises help students to understand nature and to develop the skills and abilities to deal with it consciously. This will solve the most pressing environmental problems of our time.

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