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THE ROLE OF THE DEBATE-DISCUSSION TECHNOLOGY IN INCREASING THE EFFICIENCY OF TEACHING THE SUBJECT OF THE BIOLOGICAL FOUNDATIONS OF RADIATION PROTECTION AND SAFETY

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Abstract
As a result of the correct selection of educational methods by the pedagogue in the teaching of technical sciences, the content and peculiarities of the studied subject are fully revealed. This plays a key role in the formation and development of student's knowledge, skills, and competence in the field of science. The article talks about interactive methods of teaching radiation safety in higher educational institutions - discussion method, gives information about the practical importance of the method, methods and tools of its use, and pedagogical analysis.

Keywords: Deterministic effect, Stochastic effect, Radiation leukaemia and hereditary diseases, Acute damage.

Introduction

The "Discussion" method is a teaching method that is conducted in the form of a debate and exchange of ideas with students on a topic. This method is used assuming that any topics and problems are discussed on the basis of existing knowledge and experience. The task of leading the discussion can be given to one of the students or the teacher himself. The main thing is to conduct the discussion freely and try to involve every learner in the discussion. During the implementation of this method, it is necessary to immediately try to eliminate conflicts that arise between students [1,2,3].

The main part

When conducting the "Discussion" method, the following rules should be followed:

— Creating opportunities for all students to participate;

— Observance of the "right hand" rule (i.e. raising one's hand and speaking after receiving permission);

— The culture of listening to ideas;
— Mutual respect for each other.

Table 1. The structure of conducting the "Discussion" method.

A problematic question is raised
Various comments and opinions are heard
The ideas expressed by the students are collected
Opinions will be analyzed
Clear and acceptable answers will be summarized by the teacher

The stages of the "discussion" method are as follows:

1. The teacher chooses the topic of discussion and develops questions about it.
2. The teacher asks the students a question about the problem and invites them to a discussion.
3. The teacher writes down the answers given to the given question, that is, different ideas and opinions, or appoints a secretary from the students to perform this task. At this stage, the pedagogue creates conditions for students to freely express their opinions.
4. The teacher divides, summarizes and analyzes the thoughts and ideas expressed together with the students into groups.
5. As a result of the analysis, the optimal solution to the problem is selected. For example. Step 1 problem question may be as follows. In general, what is the effect of radiation on a biological object and how many types are it divided into. After that, it goes to the 2nd stage. Every student's opinion is heard. Only the student who wants to answer should raise his right hand and express his opinion after receiving permission. Otherwise, chaos may occur. Whether the student is telling the truth or not, all opinions must be heard. In the 3rd stage, ideas are gathered. For example, in the 16th century, T. Parascls and G. Agricol discovered an abnormal disease in the lungs of mineral mine workers, which is considered a relevant fact regarding the negative effects of radiation on the human body.

From this period, many scientists began to study phenomena such as radiation. Radiation exposure and radiation safety are one of the most pressing issues today [4,5,6,7].

Determinative affect - the degree of severity is determined depending on the value of the radiation dose, and also occurs in the description with a step level and is expressed by the occurrence of pathological conditions such as radiation sickness, dermatitis, cataracts, and infertility.

Stochastic effect - **in the description of the dose of radiation, which does not have a step value, it is expressed by the occurrence of tumour diseases, leukaemia and hereditary diseases that develop for a certain time after radiation. Also, according to the consequences of the biological effects of radiation, it is divided into the following 3 groups.**

Acute damage is noted under the influence of high doses of radiation

In particular, under the influence of 0.5-1 Zv (50-100 Ber) of radiation in the human body, serious disturbances in the blood system can occur. Also, in the case of 3-5 Zv (300-500 Ber) radiation exposure, bone marrow dysfunction and a sharp decrease in the number of leukocytes in the blood, 50% of people who received radiation will die as a result of acute radiation sickness. Under the influence of 10-50 Zv (100-5000 Ber) radiation, after 1-2 weeks, as a result of the death of cells in the mucous membrane of the gastrointestinal tract, there is also a case of death due to bleeding.

Consequences of radiation that occur continuously (over time, gradually)

Based on the research conducted on experimental animals and the analysis of the consequences of the atomic bomb explosions in the cities of Hiroshima and Nagasaki (Japan), radiation exposure not only manifests itself in the form of radiation sickness on the human body but also the consequences that occur gradually over time. It is also observed to be expressed in the form.

Genetic consequences of radiation exposure

As a result of the conducted studies, it was found that 2 out of every 1000 babies born with a serious genetic defect during the generations (for 30 years) of the human organism under the influence of 1 Zv (100 Ber) radiation in a chronic description. If the effect of radiation exposure is recorded continuously, and chronically, then the probability of meeting genetic mutations also increases. Biological organisms differ in their resistance to the effects of radiation. For example, the radiation value that kills 50% of the animals irradiated for 30 days under the influence of radiation - for a guinea pig - 250 Roentgen, for a dog - 335 Roentgen, for a monkey - 600 Roentgen, for mice - 550 650 Roentgen, for a snake - 8000-20000 Roentgen. Also, it was determined that some types of yeast die under the influence of 30,000 X-rays, amoeba - 100,000 X-rays, and infusoria - 300,000 X-rays. Among plant species, it was noted that 64,000 X-ray radiation does not have a significant negative effect on the germination of cabbage seeds.

Sensitivity to the effects of radiation (radiosensitivity) – is the level of response of cells, tissues and biological organisms to the effects of ionizing radiation. Radiation dose (Gr) is used as the unit of measure for radiosensitivity. The property of radiosensitivity varies among biological species and also among organisms individually. The LDX value is used to compare the radiosensitivity properties of different biological species. LDK is a dose that kills 50% of organisms exposed to radiation.

Result

Information has been collected, heard, and discussed, now it's time for analysis. In this step 4, all the data collected is analyzed. At the final stage, that is, at the stage of finding a clear and acceptable solution, the pedagogue mainly carries out his main work and takes an active role. Puts the heard thoughts into a general framework. Like two sides of a coin, this method has advantages and disadvantages.

Advantages of the "Discussion" method:

- Encourages students to express their independent opinions;
- Students will be given the opportunity to try to prove the correctness of their opinion;
- Helps students develop listening and analytical skills.
- Disadvantages of the "Discussion" method:
- It requires high management skills from the teacher;
- It is necessary to choose a topic that is suitable and interesting for students' knowledge level.

Conclusion

In conclusion, it can be said that the correct choice and application of interactive methods in the teaching of technical sciences is a rather difficult task. The reason is that finding a suitable method for the subject and applying it to students of higher education requires some research and work. Nevertheless, a dynamic, creative and searching pedagogue solves a difficult problem. The article also talked about the solution to one of these problems and gave suggestions. This article № AM-PZ-2019062031 was written based on the pedagogical analysis of the materials prepared as part of the innovative project "Creation of multimedia textbooks for bachelors and masters in the fields of "Nuclear energy", "Nuclear medicine and technologies", "Radiation medicine and technologies" We thank the authors of the textbooks.

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