ISSN NO: 2770-2367
Date of Publication: 30-01-2023

Pedagogical Bases of Teaching Physics

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Annotation. This article discusses pedagogical aspects and features of teaching physics. It is reflected in the presence of specific features of teaching various divisions of the Physics.

Keywords: pedagogy, pedagogical methods, lecture, laboratory classes, lessons, teaching methods, efficiency, evaluation.

The main objective of higher educational institutions is the weapons of students with strong knowledge of the foundations of sciences, the formation of a scientific worldview, the development of creative abilities, a student and their comprehensive education. The determining role in achieving these tasks belongs to the methods of learning that are used in the lessons.

The educational work of the teacher is very diverse, and yet it is subject to certain laws that can only be understood when the experience of many teachers and the results of special scientific and pedagogical research. In the educational process, the teacher takes part with students, he organizes their educational and cognitive activities in various ways and methods.

And it is precisely these methods of interconnected activities of the teacher and students in a certain way that streamlined and aimed at achieving the set goal of education are called teaching methods.

The development of teaching methods and their classification is engaged in didactics. It is believed that the assimilation of knowledge occurs at three levels:

- meaningful perception and memorization;
- application of knowledge in the model and in a similar situation;
- Creative application of knowledge.

The same levels are characterized by the assimilation of methods of activity.

Based on the analysis of the types of content of education and methods of their assimilation M.M. Skatkin and I.Ya. Lerner has identified five teaching methods for the degree of implementation of the developing function of learning:

- explanatory, illustrative or information-receptive;
- reproductive;
- problem presentation;
- partial-search or heuristic;
- Research.

These teaching methods are considered in detail in the course of pedagogy.

In the process of teaching physics, the teacher in different ways leads the process of learning by students, taking into account the specifics of his subject. The methods that he applies are called private methodological. In the physics methodology, these methods classify these signs:

- by the method of transmitting information from teacher to students;
- behind the nature of the teacher's activity;
- behind the nature of the activities of students.

Verbal (verbal) methods include a story, explanation, conversation, lecture.

ISSN NO: 2770-2367
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Visual methods include a demonstration experiment, demonstration of models, diagrams, drawings, films and diaphyls and the like.

Practical methods include frontal laboratory work and laboratory workshops, extracurricular experiments and observation, and solving problems.

The classification of teaching methods, taking into account the learning tools that are used in the lessons, has gained widespread. On this basis, the following methods are distinguished:

- verbal;
- demonstration;
- laboratory;
- robot with a book;
- problem solving;
- illustrative;
- Methods of monitoring and accounting of knowledge and skills of students.

Each of the classifications makes sense in certain specific conditions, all of them have the right to exist and are considered equal. Each method is implemented in practice by applying a variety of techniques in their relationship.

2. Methods that are used in the training of physics must in a certain way reflect the methods of physics as science. Studies in physics are conducted by theoretical and experimental methods.

The methods of theoretical physics are divided into model hypotheses, mathematical hypotheses and principles.

Examples of model hypotheses are models of perfect gas, Brownian movement and the like. The method of model hypotheses is based on visual images and representations that occur during observations, as well as by analogy.

The method of mathematical hypotheses uses mathematical extrapolation. Based on experimental data, a mathematical expression of functional dependence between physical quantities is found. Of the mathematical equations, conclusions are obtained logically, which are tested experimentally. If experience confirms the conclusions, then the hypothesis is considered correct, in another case, the hypothesis is discarded. An example of a mathematical hypothesis is Maxwell's equations that underlie classical macroscopic electrodynamics.

The method of principles is based on the extrapolation of experimental or theoretical data, which are confirmed by all public practice. An example of such extrapolation is the laws of conservation of energy and impulse, the laws of thermodynamics.

The educational method of theoretical knowledge consists of such stages:

- observation of phenomena or their resumption in memory;
- analysis and generalization of facts;
- formulation of the problem;
- hypotheses
- Theoretical removal of the consequences from the hypothesis.

The central place in this method belongs to the formulation of the problem and the hypothesis. The hypothesis is a guess that it occurs intuitively, and does not appear as a logical consequence.

The experimental method is closely related to theoretical and includes:

- formulation of experimental tasks;
- nomination of a working hypothesis;
- development of the research and experiment method;
- observation and measurement;
- systematization of the results;
- analysis and generalization of experimental data;
- Conclusions about the reliability of the working hypothesis.

In the educational process, the theoretical method is implemented when the introduction and interpretation of basic concepts, laws and theories.

The experimental method is implemented in different types of educational physical experiment.

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3. Teaching methods appeared as a generalization of the enormous experience of teachers acquired in the process of teaching physics at school. Therefore, all methods of cognition and logical thinking, which have become the theoretical basis of each teaching method, found display in them.

• induction. Cognition takes place by summarizing a number of facts or data, by "from a separate - to general." The results of several different but similar experiments, several theoretical links become the basis for one theoretical conclusion. In learning, it provides a deep understanding of the educational material, but it does not lead to the truth in the shortest way. It is used at the first stage of training.

• Deduction. Certain theoretical conclusions or provisions of the theory are used to analyze or explain partial conclusions, which are ahead of the theory. Deduction develops theoretical thinking, the ability to apply acquired knowledge in practice, ensures time saving. It is used mainly at the second stage of training in physics next to induction.

• abstraction and generalization. The highest form of thinking is thinking concepts. Therefore, all the work of a physics teacher is aimed at the formation of physical concepts. The physical concept is understood as the statement or formulation in which the common features or properties of physical bodies or physical phenomena are displayed in their relationship and interdependence. The teacher leads the student to the physical concept through a generalization of a certain amount of knowledge gained by abstracting from specific objects, phenomena, manifestations.

Based on physical concepts, the theory is built - a set of ideas that arose as a scientific generalization of knowledge about physical phenomena. Knowledge of physical theories makes it possible to explain the known phenomena and foresee their development when changing conditions. Each theory has a core and shell. The core is a relatively stable part of the theory that does not change significantly for a long time. The study of physical theories contributes to the development of scientific thinking among students, weapons their knowledge of causal relationships that exist in nature between individual physical phenomena.

• Analysis and synthesis. Two interconnected and mutually opposite methods of thinking. On the one hand, this is the decomposition of the primary object into the components, from the second - the removal of the output based on individual manifestations.

• analogies - conclusions based on similarity. In the educational process, analogy can effectively use the previously learned material or knowledge of students, obtained in the study of other subjects or in everyday life. A striking example of this is the hydrodynamic analogy of the electric circle, in which the electric current is imitated by a stream of water, conductors - pipes, voltmeter - by manometer, etc.

• Models. These are objects or constructions that have a formal similarity with natural objects or logical constructions. There are material models (engine model, pump, electronic lamp) and sign or ideal (graphs, formulas, graphs).

4. Verbal teaching methods are based on communication between teachers and students using a language (verbal forms). The word of the teacher is simultaneously not only a carrier of information, but also an organizing and stimulating factor.

1. Conversation. Learning occurs on the basis of communication between the teacher and students through mutual exchange of questions and answers between the teacher and students. The effectiveness of the conversation is achieved when:

o it is organized on the basis of the material familiar to students;
o questions are selected in such a way that the answers are unequivocal;
o questions are posed in relation;
o a clear answer is achieved.

The conversation provides good feedback, but takes a lot of time to master new educational material.

2. The story. This is a short exposition of educational material that introduces students to a completely new (or almost new) material; The statement of facts or description of phenomena prevails.

3. Explanations. A short in time is the presentation of the material in which functional or other connections are established between physical phenomena, values, details.

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4. Lecture. A long -term exposition of educational material by a teacher, which is not interrupted by students' issues. The lecture should be highly scientific, emotional and clearly planned. It makes it possible to give students systematic knowledge in a compact form with their relatively large volume.
It is difficult to control the assimilation of knowledge at the lecture, since there is no feedback.

5. An illustrative teaching methods belong to a demonstration experiment, technical teaching aids, drawings, tables, drawings, excursions. The main feature of illustrative methods is that all information to the student comes through visual images.

References:

1. Bloom B.S.Taxonomy of EducationalObjectives Handbook 1.N.Y.,1976.–540 p.
2. Piaget J. Intellectual Evolution from Adolescence to'Adulthood. Human Development, 1972. 15, 1012. p.
3. Douglas C. Giancoli, Physics: Principles with Applications, Prentice Hall; 6th edition January 17, 2004 USA.
4. Bir G.L. Pikus G.YE. Simmetriya i deformatsionniye effekti v poluprovodnikax: Monografiya. M.: Nauka, 1972. 584 s.
5. Sabirov Leonard, Karshiboyev Shavkat, Kadirov Shavkat, Buriev Sardor, Khasanov Mukhriddin MANDELSTAM-BRILLUEN SCATTERING IN A STRETCHING SOLUTION ELECTRONIC JOURNAL OF ACTUAL PROBLEMS OF MODERN SCIENCE, EDUCATION AND TRAINING. . -SEPTEMBER, 2021-9/2. ISSN 2181-9750, UDC: 531.567:535
6. M.F. Atoyeva. Interdisciplinary relations in physics course at specialized secondary education. The Way of Science. – Volgograd, 2016. – №9 (31). – P.22-24.
7. M.F. Atoyeva. The significance of periodicity at teaching physics. The Way of Science. – Volgograd, 2016. – № 10 (32). – P.62-64.
8. Farkhodovna, A. M. (2020). The problems of preparing students for the use
9. of school physical experiment in the context of specialized education at secondary schools. European Journal of Research and Reflection in Educational Sciences, 8 (9), 164-167.
10. Saidov S.O., Fayzieva Kh. A., Yuldosheva N. B. Atoyeva M.F. The
11. Elements Of Organization Of The Educational Process On The Basis Of New Pedagogical Technologies. The American Journal of Applied Sciences, 2(09), (TAJAS) SJIF-5.276 DOI-10.37547/tajas Volume 2 Issue 9, 19.09.2020. ISSN 2689-09.92 **The USA Journals, USA** www.usajournalshub.com/index.php/tajas 164- 169. **Имп.5.2.**
12. Atoeva Mehriniso Farhodovna, Arabov Jasur Olimboevich, Kobilov
13. Bakhtiyor Badriddinovich. (2020). Innovative Pedogogical Technologies For Training The Course Of Physics. The American Journal of Interdisciplinary Innovations and Research, 2(12), 82-91.
14. Bazarova S.D. Yusupova F.Z. Interaction of teachers and students in system of independent work of students. Modernization of educational process:/problems and their solving. – Seoul, 2011. Inc.– 79-81.
15. С.Д. Базарова, Юсупова Ф.З. Информационно-технологическое обеспечение учебного процесса. Перспективы развития современной школы. – Воронеж, 2011. – №1. – С. 12-13.
16. С.Д. Базарова, Юсупова Ф.З. Инновационные формы совершествования подготовки кадров в технических вузах. Научно-технический журнал. «Технологии и методики в образовании». – Воронеж, 2014. – №1. – С. 22-25.
17. С.Д. Базарова, Манглиева Ж., Байчаев Ф. Организация учебного процесса на основе интеграции обучения с производством. Вопросы науки и образования, Москва,2018, №11- 38-39стр