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Using the Principle of Membership in the Teaching of Physics

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ANNOTATION: In this article presented methodical aspects of increase of efficiency of teaching physics in the higher technical educational institutions, and also examines the didactic conditions of use in the educational process to ensure intra-subject continuity between theoretical and practical knowledge.

KEYWORDS: method, knowledge, skill, training of technology, activity, conductor, electricity .

In order to clearly imagine the content and meaning of the principle of membership or coherence, it is necessary to know its methodological basis, for which it is expedient to understand its philosophical essence. In the history of philosophy, a dialectical approach to membership was carried out by Hegel. In the process of finding the law of negation, it is not denial, the complete destruction of the old, but the preservation of important elements of the old in the new, these preserved elements form the basis of further development [1].

The founders of dialectical materialism creatively developed the Hegel dialectic, looking at membership as an objective law in the development of nature and society, arguing that it was a necessary manifestation of the infinite development of matter. In particular, G.N. Isaenko described membership as a philosophical category: "Membership is a philosophical category that applies to any developmental process.

A.V. According to Timofeeva, membership is a manifestation of the law of negation.

E.A. Looking at membership as a full-fledged philosophical category, Baller described it as follows: By linking the present with the past and the future, membership ensures the stability of the whole. "[4]

Thus, in philosophy, the continuity in development is clearly understood, that is, the continuity indicates that some important elements of the old are preserved in the new in the explanation of the material object.

The following can be used as a basis for applying the principle of membership in the learning process.

1. The concept of membership reflects the objectively existing development in nature, society, and thought, and describes the developmental connections as well as the development of the connections themselves. Since didactics is a theory of teaching and learning, it must describe the development of these processes. Hence, membership also applies to it, i.e. it is a didactic concept.

2. Since membership is a philosophical category, it is also related to other categories. For didactic research, it is both interesting and important to analyze the interrelationships of the concepts of membership and generalization, membership and interdisciplinary connections, membership and structure.

3. Since development has both quantitative and qualitative aspects, it is necessary to consider the types of membership in accordance with the level of development of knowledge, based on the relationship between the concepts of membership and generalization in cognition. Therefore, it is expedient to use this method in didactic research as well.

4. The principle of membership serves as a methodological principle in pedagogical and didactic research.

Summarizing the above, the principle of continuity can be described as follows: Old and new knowledge come together and become one whole. "

Let us recall the principle of conformity in order to fully imagine the place, role and importance of the principle of continuity or consistency in the development of physics. The introduction of this principle into physics is associated with the formula for the spectral density of radiant energy, discovered by M. Planck in 1900 to explain the radiation of an



absolutely black body. The Relay-Gender formula is derived. This idea led Planck to the idea that the classical theory of radiation, the quantum effect in the new theory, should not be considered too small or the Planck constant. Thus, at the beginning of the twentieth century, the idea arose that there was a connection between the new quantum and the old classical theories.

Later, N. Bor dealt with this problem, according to which the mechanism of radiation of atoms cannot be explained on the basis of electrodynamics. He later introduced the concept of "compatibility principle" to solve this problem. According to him, "For large quantum numbers of radiation, the radiation that occurs when an atom moves from one state to another corresponds to one of the frequencies derived from classical theory" [5].

The principle of compatibility, which emerged at the beginning of quantum physics, played an important role in its emergence and development. In the process, the content of this principle was further clarified, resulting in quantum mechanics embracing "classical mechanics as its own special case."

The principle of continuity is important not only in the emergence and development of quantum theory, but also in other branches of physics. In particular, the Van der Waals equation found for real gases and the Mendeleev-Clapeyron equation when converting from the more than 200 case equations currently proposed to them to the ideal gas are considered incorrect.

As a second example, the connection between Einstein's special theory of relativity and classical mechanics can be shown. If the speed of motion of an object is very small relative to the speed of light, that is, if the condition is satisfied, the expressions of the special theory of relativity pass to the results of classical mechanics.

It should be noted that while membership in science reflects only forward development, it is also important to consider feedback in membership. This, in turn, leads to a spiraling growth of students' knowledge.

In order to better understand the importance of the principle of membership in the teaching process, it is important to consider its psychological aspects as well. In particular, EK Voishvili said: "The acquisition of knowledge is a process in which educational information is processed into images, concepts and stored in memory and forms the basis of human thinking" [6].

According to A.N. Leontev, thinking plays a key role in the acquisition of knowledge. The thinking process affirms and improves the perfect scheme of a particular activity. A distinctive feature of advanced thinking is that it is reflected in concepts [7].

In order to fully and comprehensively understand the psychological nature of the process of assimilation of different interpreted knowledge in the framework of different psychological theories and the importance of membership in this process, it is necessary to first think about psychological concepts that form the basis for developing theories about the formation of the human psyche.

S.L. According to Rubinstein, the specific features of the formation of the psyche are as follows [10]:

- Human technology is formed on the basis of social laws. Mental development is determined not by biological (hereditary) laws, but by social laws. Man is not born with ready-made ways of thinking and does not rediscover them, but assimilates them as the experience of generations. This means that the knowledge and experience accumulated by generations is the basis of human and social development, and reading serves as a tool for this process. Objects are passed down from generation to generation ready, and actions need to be mastered.

- Human internal (mental) and external (natural) activities are interconnected and form a single complex. For psychic mental actions, external natural actions, that is, the actions of the subject itself, and not of other people, are primary, because the formation of actions is important, not the image of such actions.

- Mental activity of a person is a modified form of his external practical activity. A new phase of mental activity can occur through external material activity focused on mental objects and events. Significant new elements of mental activity cannot be acquired by man in the form of inner mental action.

- The teacher is not able to fully form the knowledge of students through direct communication. Knowledge can be acquired by the student only in the process of personal activity aimed at the interaction of objects of the external world.



The activities of the teacher and the student in relation to the subject of the external world should be organized in such a way that it allows to discover the important aspects that determine the essence of the subject.

The role of membership in the teaching process and the search for appropriate ways to study it have always been given serious attention in didactics. In particular, R.K. Nimatov and K.X. According to Abdullayev, membership provides research and management of the multifaceted process of education and upbringing, as well as allows to achieve the goals of the taught science. The solution of the problem of interdependence is aimed at determining the state and possibilities of interdisciplinary interdisciplinary subject [7].

O' Tolipov and R. According to Choriev, consistency and coherence is one of the important principles of didactics. reaches [8].

M. Nishonova, K.A. Tursunmetov, A.M. The Khudoiberganovs said that in order to ensure the coherence and consistency of education in the curriculum, the following should be taken into account:

- taking into account the age characteristics of students;
- scientific substantiation of the level of knowledge and skills at each stage of education;
- Involvement of qualified and experienced practitioners in general secondary education, secondary special, vocational education and higher education in the development of curricula for each stage of education.

N.A. Alimov's monograph analyzes various approaches to ensuring the continuity of continuing mathematical education and describes a methodology to increase students' activity, comprehensive acquisition of knowledge, development of students' physical thinking, interest in physics based on the formation of independent thinking [9].

Thus, summarizing the above-mentioned methodological, philosophical, psychological and pedagogical aspects of the concept of membership, we consider it appropriate to define it as follows: need

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