EMPIRICAL AND THEORETICAL METHODS OF GNOSOLOGICAL CHAIN KNOWLEDGE IN THE PRACTICE OF EDUCATIONAL COGNITIVE ACTIVITY

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Annotation: This article talks about teaching physics based on empirical and theoretical methods of gnoseological chain knowledge in the practice of learning activities.

Keywords: scientific, acmeology, acmeological culture, future teacher, pedagogical conditions.

Introduction

Any science, including natural sciences, is made up of scientific concepts. Mastering the basics of science consists first of all in mastering scientific concepts and the system of these concepts. To understand means to express through concepts. In other words, thinking consists of a series of concepts. In the process of teaching, it is necessary to achieve scientifically correct interpretation of concepts [1]. A concept is a logical form of representation of objects from a general point of view.

In scientific knowledge, the concept as a form of knowledge reflects not just a generality, but a generality with an essence, therefore it includes meaningful generalizations [2]. For example, the molecular kinetic interpretation of temperature is a clear example of this.

The first stage of the formation of concepts involves direct acquaintance with things and events in the material world that surrounds us. The essence of this stage is to observe, study, and obtain their important signs. But getting to know them can be done at different times; if it is carried out at a certain time, then it is based on perception and perception; if it has been realized before, then based on familiarity with it, a renewed imagination will appear.

A concept is a form of general imagination and thinking that sums up the logically separated important signs, connections and relationships of things and events[37].

Events that occur in nature are interrelated. Therefore, there are connections between concepts and physical quantities. The most important connections between quantities are represented by

physical laws. In physics, scientists usually call some short but almost general conclusions about the description of natural phenomena as laws. Sometimes such conclusions take the form of a certain ratio between the magnitudes that describe the phenomena. For example, such conclusions include the laws of thermodynamics. Opinion is a logical form of reflection of one or more properties in an object in the form of confirmation or rejection. Reflection reflects the independent presence of unity and commonality in objects. For example, ideas about the existence of a function of the state of a physical system such as system entropy. Conclusion is a logical form of reflection of unity, generality and individuality in the object. For example, it is thought that there are only two ways of transferring energy in nature - work and heat. When concepts are collected as generalizations, it becomes possible to classify them according to one or another character, to identify their similarities and differences. Integrated concepts - categories are developed in thinking. Categories are conceptual concepts that reflect the most general and important features and relationships of existence in cognition [4]. Individual concepts exist in specific categorical environments. For example, the concept of functions of the state of a thermodynamic system can be considered as a categorical concept, the concept of temperature as a concept of internal energy, and the concept of entropy as some elements of this category. As mentioned earlier, from the point of view of epistemology, the stages of the cognitive process can be imagined as a chain, moving from singularity (experimental data and empirical law) to generality (fundamental laws as postulates of the theory), and from there to limit generality (resultant laws describing concrete physical systems). The content structure of the physical theory is epistemologically similar to this cognitive process chain. In our scientific-research work, in the practice of cognitive activity and, accordingly, in the practice of educational cognitive activity, this epistemological chain of knowledge is carried out using empirical and theoretical methods. Empirical methods are aimed at describing specific scientific evidence through inductive generalization of experimental data. An example of such an inductive generalization is the empirically defined gas laws. Theoretical methods make it possible to determine the basic cause-and-effect relationships in a part of the studied universe using not only formal, but also dialectical logic.

The most demonstrative view of the development of physical thinking has gone from the description of mechanical motion to quantum mechanics, which is explained by mathematical images. Similarly, the development of molecular physics and thermodynamics spans a period from the study of energy transfer and conversion phenomena to the description of dissipative systems and non-equilibrium processes.

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