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BO‘LAJAK FIZIKA O‘QITUVCHILARINING ILMIY-MANTIQIY DUNYOQARASHINI SHAKLLANTIRISH

ФОРМИРОВАНИЕ НАУЧНО-ЛОГИЧЕСКОГО МНЕНИЯ БУДУЩИХ УЧИТЕЛЕЙ ФИЗИКИ

FORMING THE SCIENTIFIC AND LOGICAL OUTLOOK OF FUTURE PHYSICS TEACHERS

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Annotatsiya

Ushbu maqolada bo‘lajak fizika o‘qituvchilarining ilmiy-mantiqiy dunyoqarashini shakllantirishda taksonomik yondashuvlar haqida so‘z boradi. Mantiqiy-ilmiy dunyoqarashning rivojlanish darajalari didaktik tahlil qilingan. Ilmiy metodik resurslar samarali foydalanib fizik jarayonlarini taksonomiyalar asosida o‘qitish bo‘lajak fizika o‘qituvchilarining ilmiy-mantiqiy dunyoqarashini shakllantirishda kutilgan natijani beradi.

Аннотация

В данной статье рассказывается о таксономических подходах в формировании научно-логического мировоззрения будущих учителей физики. Дидактически проанализированы уровни развития логического научного мировоззрения. Обучение физическим процессам на основе таксономий с эффективным использованием научно-методических ресурсов дает ожидаемый результат в формировании научно-логического мировоззрения будущих учителей физики.

Abstract

This article talks about taxonomic approaches in forming the scientific and logical outlook of future physics teachers. The levels of development of the logical scientific outlook were analyzed didactically. Teaching physical processes on the basis of taxonomies with the effective use of scientific methodological resources gives the expected result in the formation of the scientific and logical outlook of future physics teachers.

Kalit so‘zlar: *Tafakkur, mantiq, ilm, dunyoqarash, kompetentlik, dialektik-materializm.*

Ключевые слова: *Мышление, логика, наука, мировоззрение, компетентность, диалектико-материализм.*

Key words: *Thinking, logic, science, worldview, competence, dialectic-materialism.*

INTRODUCTION

Physics is one of the natural and exact sciences among fundamental sciences. Teaching this science to the younger generation is a vital necessity and prepares the ground for future discoveries. Why to teach, what to teach and how to teach is the main task in teaching physics. The reason is that it is not possible to contribute to scientific progress by memorizing scientific laws. For new ideas, discoveries, and innovative development, personnel with a scientific and logical outlook are needed. In this, the place of physics teachers and the responsibility of the task assigned to them is great. If we want our children to be great inventors in the future, today the formation of the scientific and logical worldview of the future physics teachers at a high level is an urgent issue. In this case, we need to correctly choose the teaching methods, tools and organizational forms that match the educational goals[1].

LITERATURE ANALYSIS AND METHODS

The content, purpose, methods, forms and tools of teaching form a methodical system, which determines the strategy of pedagogical activity in which learning goals play a leading role, and in their interconnection, methods, tools and forms of teaching makes up the teaching technology. In didactics, the American scientist B.S. Bloom and his colleagues developed a taxonomy of educational goals (see figure 1) [3].

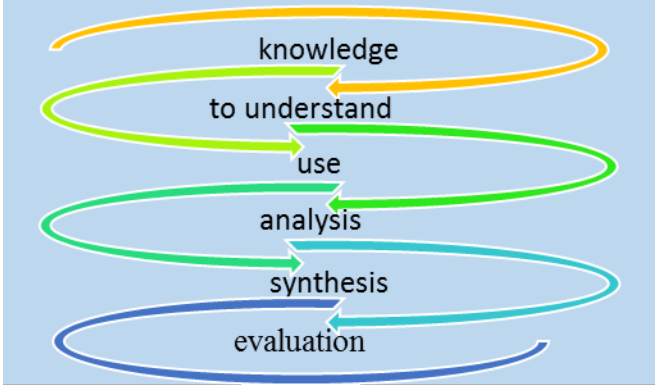


Figure 1. Bloom's taxonomy.

In the taxonomy proposed by the Russian didactic scientist V.P. Bespalko [4], four levels of educational goals and, accordingly, 4 levels of knowledge are distinguished as follows (see Table 1).

Table 1

Level of knowledge appropriate to educational goals			
Level I	Level II	Level III	Level IV
to recognize objects, features, processes in a certain field of real events, previously received information about them or actions performed with them in repeated perception (knowing, familiarization);	reproductive actions (knowledge) through independent repetition and application of information;	production action (knowledge-skill), activity according to a model in a certain set of objects, using an algorithm to perform a new action;	creative actions (changing knowledge), using existing knowledge and changing it to perform actions in a new situation.

The taxonomy of the Polish scientist P. Karpinczyk [3] as the main taxonomy of the objectives of teaching physics is ranked as follows, taking into account the above-discussed taxonomies and the characteristics of physical science (see Table 2).

Table 2

Learner levels	
Level I	Level II
Knowledge. Memory storage and understanding, understanding of physical phenomena, experiences, use of physical quantities and formulas and remembering physical concepts, formalization of physical laws, ensuring the priority of practice over theory	Ability. Applying acquired knowledge in practice and problem situations, including observation, measurement, application of physical laws and physical theories, use of tables, catalogs, graphs, mathematical symbols. Apply scientific methods of physics (induction, deduction) to find a solution to a problem, interpret, generalize and solve problems

When implementing a person-oriented approach in the educational process, it is necessary to determine the goals of development and education. Basically, there are four groups of person-centered learning objectives (see Table 3).

Table 3

Individualized educational goals	Mastering existing experience	Specific goals of teaching physics. Personal assimilation of existing experiences. Formation of knowledge about the fundamentals of physics: concepts, laws, theories, a unified physical picture of the universe

	Development of cognitive ability of the person	Mastering the methods of scientific knowledge in physics. Formation of knowledge about the scientific foundations of technology and the main directions of scientific and technical development. Forming practical skills, explaining phenomena, solving problems of scientific knowledge;
	Formation of a general typological characteristic of a person	Forming a scientific outlook. The formation of the understanding of the role of physics in society, the connection of the development of physics with the development of other sciences. Preparation for practical training, choosing a profession. Development of knowledge and abilities of a person Development of perception, memory, speech, imagination and thinking. Formation of generalized typological characteristics of the person Learning to work independently;
	Development of individual personality traits	Formation of moral qualities of the person. Aesthetic perception of the world. The development of personal qualities is the development of interest in physics. The main task in teaching physics is to form professional knowledge, career-oriented teaching, formation of a scientific outlook, development of students' thinking, formation of environmental, educational, educational motives of students.

RESULTS AND DISCUSSION

Physical knowledge to be studied in a physics course includes facts, concepts, laws, theories, a unified physical world view, methods of physical science, and application of physical laws in technology. The content of the basic material, as well as the knowledge and skills of students, is determined by the physics program for educational institutions. And society has a need to take into account the needs of personnel and take into account the interests of students. In the process of learning, in interaction with the world, a person chooses a certain concept of worldview. The teacher's role is to help make this choice [4]. Worldview is an integral part of personality structure. It includes a system of general views on the world, a person's place in it, as well as a system of views, beliefs, ideals, and principles that correspond to a certain worldview. Natural-scientific, social, humanitarian and epistemological aspects can be distinguished in worldview.

The physics course is designed to form the natural-scientific and epistemological aspects of worldview. Accordingly, several components of worldview formation in physics education can be distinguished (see Table 4).

Table 4.

Components of formation of worldview of future physics teachers		
The formation of a generalized system in which nature is perceived by man.	Formation of views and beliefs that correspond to the dialectical-materialistic understanding of nature and the process of knowing it.	Development of students' dialectical thinking (unity and struggle of opposites).

In the dialectical-materialist approach, the basis of worldview includes three groups of philosophical generalizations: the ideas of matter and movement, their interdependence, indestructibility; the existence of ideas of universal connection of events, certain laws of dialectics governing the movement of matter; the category of truth in all its aspects, the laws of the cognitive process. Thinking is the process of reflecting the objective reality at the highest level of human knowledge, and the teacher is engaged in the formation of students' logical thinking (ability to compare, analyze, classify, generalize). Logical visual-figurative thinking is a component of cognitive thinking, the development of which is very important for teaching physics, because it has many practical, logical and visual learning methods in its arsenal. However, it is equally important to develop scientific and theoretical thinking in the process of teaching physicsThe main

characteristics of scientific thinking are as follows: - simultaneous existence of dialectically opposite properties of objects and phenomena and the ability to work with dialectical contradictions (particle-wave dualism of light, relativity of motion); - the ability to identify and analyze mutual relations, interdependence of events and these relations; - the ability to understand the developing object (nuclear reactions, closed cycles of ideal gas); - the uniqueness of knowledge and the ability to understand the truth in certain conditions (the theory of relativity); - the ability to understand the relationship between qualitative and quantitative changes (the state of fusion of matter); - the ability to see the manifestation of negation in the development of scientific knowledge (physical models).

CONCLUSION

In conclusion, the teaching of physical processes based on taxonomies with the effective use of scientific methodical resources gives the expected result. Creating problem situations by forming scientific knowledge and logical thinking in the organization of physics classes, ensuring interdisciplinary integration, solving logical problems, students' individual approach , acquires a heuristic content in education along with the development of logical competence.

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