

METHODOLOGICAL FOUNDATIONS OF INTERDISCIPLINARY PHYSICAL PROBLEMS IN TEACHING PHYSICS AND GENERAL PROFESSIONAL MILITARY DISCIPLINES

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Abstract. *This article provides information on the importance of teaching physics in connection with general professional and special subjects in the training of senior military specialists in higher military educational institutions. The main didactic functions of interdisciplinary connections and the stages of its implementation are also identified.*

Keywords: *interdisciplinary connections, physical problem, didactic functions, general professional and special subjects, physics, military officer, scientific and technological progress, skills and abilities.*

INTRODUCTION

The system of higher military education includes general education, general professional and specialization, and special military training. General education subjects, including physics, serve as a theoretical and methodological basis for the formation of future military and technical specialists.

From this point of view, in addition to acquiring theoretical knowledge of physics, students also solve problems. Solving problems in physics has a positive effect on the formation of the scientific outlook of cadets. They get acquainted with the works of scientists, scientific and technical achievements. The use of problem-solving methods in continuous and consistent teaching of physics, explaining and strengthening new topics, repeating previous topics, and checking independent work and knowledge of cadets gives effective results.

RESEARCH MATERIALS AND METHODOLOGY

It is important to develop the didactic and scientific-methodical aspects of creating and solving interdisciplinary integrative military problems in the teaching of physics in higher military education.

N.A. Klesheva considers physics as the methodological basis of technical sciences taught in higher education institutions. Philosophical categories such as matter and its types, movement of matter, its forms are considered invariants of methodological knowledge. The invariant structures of general scientific knowledge are the principles that form the core of fundamental physical theories [5]:

principles of classical mechanics-causality, relativity, continuous interactivity, superposition;

molecular-kinetic theory, principles of substance structure and classical statistics;

theory of electromagnetic field - principles of near and far influence, continuity, superposition;

electronic theory - principles of classical statistics;
special relativity - Einstein's principles of relativity;
quantum mechanics – superposition, uncertainty, complementarity, Pauli principles [5].

In addition, the researchers included the invariants of general scientific knowledge - body momentum, angular momentum, energy, mass, electric charge and fundamental conservation laws. In our article, we paid special attention to the application of the relationship between invariant and variable components, which are the basis of physics education, to higher military education. In modern conditions, activities are prioritized for the purpose of preparation. Therefore, the fundamental education that forms the profession of a specialist is the theory of activated learning [6].

In the course of teaching, consistent study and analysis of the content and essence of interdisciplinary relations forms philosophical, psychological and pedagogical approaches to the problem. In the implementation of the main tasks of teaching, it performs the functions of formation and development of interdisciplinary links - methodological, constructive, psychological and didactic. According to researchers, the methodological functions of interdisciplinary connections are the provision of diversity and unity of the processes and phenomena studied by different disciplines. Therefore, interdisciplinary connections are a generalized form of relations between the structural elements of academic subjects.

The integrity of interdisciplinary links-methodological, constructive, psychological-didactic formation and development functions-effectively organizes the process of teaching academic subjects and opens a didactic direction to its content structure.

The teaching of physics in higher military education is formed on the basis of general secondary education, and on the basis of fundamental knowledge and skills, by developing the scientific worldview and professional-technical thinking of cadets, it creates the ground for the application of physics knowledge in the military-technical field. To achieve this, it is necessary to pay special attention to the tasks, content and forms of teaching physics in the higher military education system: ensuring continuity and coherence; mastering physical phenomena, laws and concepts; follow the education system from simple to complex; to ensure that cadets acquire interdisciplinary integrative knowledge, skills and competences in physics. The future officer should have a high level of interdisciplinary knowledge and skills, combining natural and scientific sciences together with military sciences.

It is related to the improvement of the quality of training of officer personnel and the development of higher military education, the characteristics of the conditions of human activity in the field. These features can be explained by the following situations: exchange of issues at a high dynamic level; increase in extreme and non-standard cases; presence of high moral and physical requirements; to adopt a quick solution in the management of military units and military equipment and to use it effectively in complex combat conditions [1,7].

The principles of dialectics are the basis of formation of natural-scientific, general-professional and special-military knowledge in interdisciplinary connections. Since the process of knowing is the process of reflection of the external world in the human brain, then the methodological basis of the interconnection of the above-mentioned cycles of fundamental and military sciences is the principle of dialectics, because the principle of dialectics is the understanding of phenomena and processes in nature, society and consciousness. the general connecting principle is that they are:

determining the content of military education with the priority of national interests and national security;

training of officer personnel in military and civilian schools based on the unity of state policy;

raising humanitarian and military education to a higher level, observing the laws regulating the activities of the armed forces;

respecting the rights and freedoms of a person, developing his intellectual, spiritual and physical qualities;

harmonizing the content of military education on the basis of continuity and continuity and increasing the efficiency of learning;

improvement of higher military education on the basis of fundamental sciences and technologies, that is, its educational content is based on the achievements of science, technology, technology and culture, and the formation of high scientific and technical degrees of military specialists.

Integrity in the teaching of natural and scientific sciences - didactic synthesis of natural and scientific knowledge based on the studied system and its observation; fundamentality is the consistency of the structure of scientific knowledge and the dialectical relations of the study of existence of natural sciences. These are to open the way to the intellect, which allows to be highly educated based on the acquisition of natural sciences and rational knowledge and the study of universal methods to satisfy personal interests. The feature of higher military education is that it prepares cadets for military specialization. On the basis of providing basic education to cadets, it is envisaged to independently adapt them to their future professional activities. Fundamental education is universal education.

Natural sciences, especially physics, not only provide technological progress, but also form people's scientific thinking, rational professional thinking. There is a great need for such a dialectic of development in society. In particular, the issues of formation and development of physical thinking and scientific worldview are of urgent importance in the educational process.

Fully applying the ideas presented in methodological studies, in our opinion, the fundamentality of physical science is strengthened by the following methodological aspects [1,2,3]:

describe the world in a modern natural-scientific way, including the physical landscape of the world, as completely as possible;

as a research subject of classical and modern physics, defining the integrity of physical approaches (corpuscular, quantum-field and statistical-probability) and physical categories (terms, basic models);

to describe the invariant-nuclear part of objects and natural processes based on fundamental physical theories in a rationalistic, quantum statistical form;

physical modeling, analysis of the principles of operation of the object as a method of scientific thinking, comparison of theoretical models with the original, abstract visualization and formation of information;

achieving physical reliability as a result of correct and sufficient use of mathematical equipment;

based on experience, formation of theoretical knowledge of modeling and forecasting of the final result not only empirically, but also deductively based on inductive analysis of the object (process);

accepting and considering the modern requirements of the problem and the physical aspects of nature as a whole;

formation of objective and subjective proportions of scientific knowledge in the process of interaction between nature and the subject.

RESEARCH RESULTS

Physics as a fundamental science is primary - consists of basic concepts, categories, theories and laws. They were formed not through the means of other sciences, but as a direct reflection of all existence and facts in nature and society, as well as the systematization and harmonization of laws and principles. In particular, by fundamentalizing the basis of military professional education, it means methodological and psychological preparation of cadets in order to strengthen their abilities, interests and motivations, to consistently develop the skills of graduates and to maintain their needs in the conditions of social and technical development.

Compared to technical knowledge, fundamental and theoretical knowledge does not become obsolete, because theoretical knowledge is methodologically based on the laws and principles of dialectic of objective development. There are enough studies in this direction, including the methodological basis of the classification of interdisciplinary connections of natural, scientific and technical sciences studied in the studies of V. E. Medvedev. The methodological task of interdisciplinary connections in education is a systematic approach to the educational process. In particular, the theory of activity in education makes it possible to develop a professional-specialist model that meets the requirements of fundamental sciences. At the same time, scientific theory is the fundamental basis in professional and practical activities [6].

DISCUSSION

In education, if the cadet acquires repetitive-variable knowledge of many specific specific-variable situations on the basis of basic invariant knowledge and applies it in practice, he can find a solution to the problem of any situation without taking part in additional special training. Because, through fundamental knowledge, it allows to learn the elements of activity corresponding to the general solution of these problems. In order for the future specialist to acquire skills and professional qualifications, it is necessary for the graduate to master the methodology of interdisciplinary communication in educational activities. In order to develop the thinking ability of a person, including a military specialist, it is necessary to have interdisciplinary theoretical and professional knowledge related to his professional activity. Each task has a systemic nature and requires the creation of an integrative learning model for its analysis and implementation. Finding systemic solutions to problems in professional activity through knowledge and implementing interdisciplinary didactic integration in the fields of education is the main criterion.

Specific features of interdisciplinary connections in higher education often depend on the following circumstances:

the need to use didactic high levels of interdisciplinary connections;

internal and external types of interdisciplinary connections and their professional orientation;

specific features of organizational forms in the application of interdisciplinary connections.

CONCLUSION

Thus, one of the methodological aspects of the development of the military training of cadets is to combine the interdisciplinary connections of the invariant and variable components of physical problems with vocational-technical and specialty courses at the level of didactic integration in a dialectical unity. The educational value of solving problems is manifested as a tool for training the character of cadets, diligence, perseverance, and willpower. Solving a problem is not an easy task, it requires attention, attention, whole body, and in some cases a creative approach, faith in one's own strength. As a result, in some cases, along the way, he loses interest in physics. This requires creating motivation to solve the problem. Based on the above-mentioned ideas, such opportunities require the development of methods and ways of interdisciplinary didactic integration and synthesis.

REFERENCES

1. Axrorov Sh.S., Nurillaev B.N., Safarov A.Sh. Oliy harbiy ta'limda fizik masalalarni fanlararo va integrativ yechishning ahamiyati // Zamonaviy fizika va astronomiyaning muammolari, yechimlari, o'qitish usullari. Respublika miqyosidagi onlayn ilmiy-amaliy anjumani. - Toshkent, 2022. – B. 358 - 360.
2. Ахметгареев Р.А. Интегративные военно-профессиональные задачи в системе подготовки курсантов высших военных учебных заведений: Дисс. ... канд. пед. наук. – Казан, 2000. -184 с.
3. Бауэр Н.М. Особенности методики обучения решению задач по физике курсантов военных вузов: Дисс.канд.пед.наук.–Челябинск.2000-236 с.
4. Кондратьев В.В. Фундаментализация профессионального образования специалиста на основе непрерывной математической подготовки в условиях технологического университета: Дисс...докт. пед. наук. –Казан, 2000. - 421 с.
5. Клещева Н.А. Курс физики как методологическая и методическая основа системы обучения студентов дисциплинам технического цикла в вузе: дисс. ... канд. пед. наук. – Владивосток, 2000.- 319 с.
6. Медведев В.Е. Дидактические основы межпредметных связей в профессиональной подготовке учителя (на примере естественнонаучных и технических дисциплин): Дисс. докт. пед. наук.–Москва, 2000. – 380 с.
7. Safarov A.Sh., Maxmudov N.A. Harbiy sohadagi muammolarning yechim topishida fizika mashg'ulotlarining ahamiyati //“Замонавий узлуксиз таълим муаммолари: инновация ва истикболлар халқаро илмий конференция.– Тошкент, 2018. – Б. 166-167.