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Formation of Professional Competence in Students Using Mathematics

Rakhmanov Istam Yarikulovich [1]

Annotation: Through the teaching of higher mathematics in higher military educational institutions, opinions and reflections on the role of competence in the formation of the abilities of cadets to independently think and make unconventional decisions, increasing scientific worldviews and mathematical modeling, its implementation and planning of military actions are discussed in this article.

Keywords: competence, intuition, optimal, model, sphere, map, model classification.

INTRODUCTION

Currently, the reforms that are being carried out for the further development and improvement of all areas of the educational system of our Republic in accordance with the requirements of the times, as well as the training of qualified officers in accordance with the modern needs of the Ministry of Defense of the Republic of Uzbekistan and the improvement of the quality and efficiency of the activities of Higher Military Educational Institutions are the main was set as a priority task.

Reforms implemented in the field of education require increasing the independent activity of future officers, more approach to non-traditional methods in training.

In modern conditions, the requirements for students are not only professional knowledge, skills and qualifications, but also their social, professional and personal development. Improving the professional competence of the future officers, being competitive, loyal to the Military Oath, the Motherland, the people and the President, the government of the Republic of Uzbekistan, and being able to perfectly master the decisions of the state leadership and actively apply them to life are among the important indicators of training them. is one.

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Higher mathematics is one of the subjects that prepare students for independent work, making the right decisions in unexpected situations, analytical reasoning, logical observation, forming spatial imagination, developing abstract thinking, and independent thinking. It is the foundation for many specialty subjects and serves as a basis. The skills listed above are important for everyone to perform any activity.

Therefore, the future military specialist should also master this science in depth, use it widely in his work, and have the necessary skills and qualifications.

[1] Associate professor of the Department of Natural Sciences of the Academy of Armed Forces of the Republic of Uzbekistan, Ph.D.

Full realization of tasks such as revealing practical-military applications of theoretical knowledge based on scientific knowledge acquired during educational processes, and mathematical knowledge aimed at developing future officers' analytical thinking, logical observation, forming spatial imagination, and developing abstract thinking, and in cadets formation of mathematical skills, such as solving and analyzing problems related to knowledge, connecting mathematical laws and rules to one's field can only be achieved through.

LITERATURE ANALYSIS AND METHODOLOGY

An important factor in improving the educational process is inextricably linked with the formation of professional competence of officers at a high level in the higher military education system.

Competence, that is, professional competence, which we emphasize, is the acquisition of knowledge, skills and abilities necessary for professional activity by a specialist and the ability to retain them throughout his career. Professional competence does not rely only on skills, but requires constant enrichment of knowledge, acceptance of new information and their analysis, and the ability to successfully use them in professional activities.

In terms of professional training of specialists in foreign countries, the main place is occupied by the level of competence of the specialist. According to the nature of the national education system of our republic, the minimum requirements of the content of education are based on knowledge, skills and qualifications.

Our cadets, whom we are training, must have the following competencies in order to become patriots, mature specialists and officers who will serve the country's development in the future:

General competencies:

- Possessing a system of knowledge related to the scientific worldview, the basis of general professional sciences, having the ability to independently analyze the problems and processes of tactical warfare;
- to understand the essence of documents and works related to professional activity in one of the foreign languages, to know the methodology of scientific research and pedagogy, and to be able to use it in professional activities on a modern scientific basis;
- able to independently acquire new knowledge, work on oneself and organize service activities on a scientific basis;
- to know the fundamentals of humanitarian and natural sciences, current issues of current state policy, to be able to independently analyze social problems and processes;
- to have a comprehensive idea of the processes and events taking place in nature and society, to acquire knowledge about the development of nature and society, and to be able to use them in life and professional activities on modern scientific bases;
- creative critical review and analysis of acquired knowledge, ability to use them in scientific and practical activities;
- to be able to use regulatory and legal documents in his/her professional activities, to be able to make reasonable independent decisions in his/her professional activities;
- to have the basic methods and means of receiving, storing, and processing information from the Internet, to have the skills of working with a computer as an information management tool;
- Must be able to use today's information technologies, understand the essence and importance of information technologies in the conditions of an information society, understand the risks and threats of information attacks, and have the ability to comply with the basic requirements of information security.

Professional competencies:

- Knowledge of the defense doctrine of the Republic of Uzbekistan, the legal basis of military service and the main content of other regulatory and legal acts of the Republic of Uzbekistan;
- Oath to the Motherland, be loyal to the Motherland, its people and the President, the government of the Republic of Uzbekistan, understand the decisions of the state leadership and actively apply them to life;
- readiness to protect national interests and ensure national security, integrity and sovereignty of the state;
- Knowledge of the composition and structure of the Armed Forces of the Republic of Uzbekistan, the combat tactics of the types of troops and units of the Armed Forces and their comprehensive provision, as well as the weapons and military equipment according to their specialty and their practical use;
- It is necessary to know the state language of the Republic of Uzbekistan, to communicate with military personnel of other countries, and to know one of the foreign languages to the extent that ensures the acquisition of modern professional information.

DISCUSSION AND RESULTS

The possibility of many practical applications of higher mathematics is revealed to the cadets by teaching the mathematical model of problems related to the planning of combat operations, the development and analysis of optimal plans for the determination of the effectiveness of the work of the headquarters, communication and supply service, transport and cargo transportation.

Mathematical modeling, whether elementary or complex, is equally important. Elementary models are actively used in the development of simple tactical problems, such as march and skirmish combat, engineering support, evaluation of shooting and combat vehicle control training exercises, and similar problems, and somewhat complex problems, such as manual mathematical models built on the basis of the system of simple differential equations of higher mathematics are effectively used in solving problems such as tire management and the development of a plan of combat operations.

Elements of mathematical modeling and its application

Before studying a phenomenon with its own methods, mathematics creates its mathematical model, that is, writes down all the properties and characteristics of the phenomenon to be considered. The model makes it possible to choose the methods that allow to accurately illuminate the uniqueness and evolution of the studied phenomenon.

Studying life processes and the world through models is called modeling, and a specialist who creates models is called a modeler. The created model should be developed as close as possible to the real process, only then will its application possibilities be high.

In the process of learning "Elements of Mathematical Modeling", we will focus on the theoretical and practical knowledge given to our trainees, in particular, on the analytical model based on the system of simple differential equations. In practice, when solving such problems, it uses the available numerical calculation methods.

Combat action is a state of conflict between two opposing parties, which is dynamic in its physical nature and random in its transition. We describe the algorithm of a simple mathematical model used in the analysis of this process. In this:

I. Preliminary information necessary for the analysis of the current process of the trainees is included:

1. Combat groups (planes, tanks, missiles, etc.);
2. The number of available weapons units of the groups;

3. Shooting capabilities of weapons;
4. Shooting efficiency indicators;
5. The start time of the combat action (maneuver).

II. Analytical relationships are introduced:

1. Since the change in the number of weapons in groups depends on time, the process is expressed by a system of ordinary differential equations as follows:

$$\begin{cases} \frac{dm_1}{dt} = -k_2 m_2 \\ \frac{dm_2}{dt} = -k_1 m_1 \end{cases} \quad (1)$$

Here $m_1(0) = N_1$, $m_2(0) = N_2$initial conditions, $N_1 1$, number of weapon units of N_2 groups, $k_1 = P_1\lambda_1$, $k_2 = P_2\lambda_2$-parameter number of shots, λ_1, λ_2-parameter firing speed effectiveness, P_1, P_2-probability of hitting the target in one shot.

2. General solution of the system:

$$\begin{cases} m_1 = N_1 ch\sqrt{k_1 k_2}t - N_2\sqrt{\frac{k_1}{k_2}}sh\sqrt{k_1 k_2}t \\ m_2 = N_1\sqrt{\frac{k_1}{k_2}}sh\sqrt{k_1 k_2}t + N_2 ch\sqrt{k_1 k_2}t \end{cases} \quad (2)$$

Enter the following specifications:

$$\mu_1 = \frac{m_1}{N_1}, \qquad \mu_2 = \frac{m_2}{N_2} \quad (3)$$

3. Based on equality (2), we determine the specific solution of system (1):

$$\mu_1 = ch\bar{t} - \frac{1}{\alpha}sh\bar{t} \quad (4)$$
$$\mu_2 = ch\bar{t} - \alpha sh\bar{t}$$

4. - we enter the parameter:

$$\alpha = \frac{N_1}{N_2}\cdot\sqrt{\frac{k_1}{k_2}} \quad (5)$$

This parameter is an indicator of the priority of the battle, the first side wins when $\alpha > 0$, and the second side wins when $\alpha < 1$.

Judging from the above comments, it is necessary for a future officer to have the following skills when conducting combat operations:

In terms of math:

- Identifying and introducing functional connections;
- To analyze the mathematical model;
- To solve the system of differential equations;
- To use boundary conditions;
- to determine table values of trigonometric functions;
- Learns to use formulas reasonably.

In terms of competence:

- search for, collect, sort, process necessary and useful information and use it appropriately and effectively in activities (informational competence);
- critical and creative approach to professional activity, ability to demonstrate one's creativity (creative competence);
- being able to communicate sincerely with comrades-in-arms, fully hear their opinions and have a positive influence on them (communicative competence);
- to be active in social relations, to have skills, qualifications and ways of communication and rules of behavior in professional activity (social competence);
- mastering advanced technologies that enrich knowledge, skills and abilities in professional activity, being able to use modern (multimedia, electronic whiteboard, computer) technologies (technological competence);
- to be able to make rational and decisive decisions (extreme competence) in emergency situations (combat panic, when suddenly receiving completely new orders), scientific and creative approach to situations, drawing conclusions and making decisions, drawing up plans of combat actions based on them will have skills.

CONCLUSION

In conclusion, we can say that today's cadet studying in the higher military educational institutions of our Republic is tomorrow's research officer conducting research in the field of military science, army commander, and military science teacher. Therefore, mathematics is necessary for him to be able to make quick decisions on the execution of combat tasks that he will encounter in his career, not only relying on his own experience and empirical knowledge, but also to be able to make an honest and scientific assessment of the existing situations and draw the necessary conclusions. science, it is required to master its methods very well.

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