Development of professional competence in future teachers in the study of special disciplines

Khasanov Muzaffar Sadikovich

Tashkent State Pedagogical University

Abstract: The substantiation of the content of education is one of the most important and traditional problems of didactics. Taking into account the social essence and pedagogical affiliation of the educational content, it can be defined as a pedagogical model of a social order addressed to the educational system. This model has a multilevel hierarchical structure. At the highest level - the level of general theoretical representation, the content of education is fixed in the form of generalized systemic knowledge about the composition, elements, structure and functions of social experience transmitted to students. At the level of the academic subject, an understanding of the individual parts of the content that carry specific functions in education is developed. Therefore, approaches to solving the problem of the content of education depend on the social order, the goals of education and training.

Key words: productive activity, motivation, cognitive activity, modeling of professional activity, professional competence

The process of education in universities, its content and organization objectively depend on the level of development of military science, weapons and equipment, technologies for their use, the organizational structure of the relevant law enforcement agencies, methods of warfare and protection of state interests. A graduate of a military educational institution must be fully prepared to perform his functional duties in any conditions. This dependence is expressed by the dialectical principle of the correspondence of the training content in a military university to the needs of the professional activity of an officer in peacetime and in time.

The content side of training is determined by the nature of military labor and is reflected in the academic disciplines that are included in the training programs of a particular higher educational institution, fixed by orders, manuals, instructions, curriculum and class schedule. In the content of training military personnel take into account the specifics of specialties and specialties for which their training is organized.
The principles of forming the content of education from the point of view of general didactic concepts are reflected in the works of Yu.K. Babansky, Z.D. Zhukovskaya, I.K. Zhuravleva, I.A. Winter, V.G. Kazanovich, V.V. Kraevsky, B.C. Ledneva, I. Ya. Lerner, N.A. Seleznova, M.N. Skatkin and other scientists. They consider the problem of the content of education in the context of the goals of education, principles of teaching and didactic laws of the educational process.

The works of SI are devoted to the content of higher professional education. Arkhangelsky, A.A. Verbitsky, R.E. Gorbatova, V.V. Karpova, N.V. Kuzmina, I.B. Morgunova, Yu.L. Polevoy, V.M. Sokolova, A.I. Subetto, S.A. Tikhomirova and others. A certain contribution to the solution of the named problem was made by military educators-researchers A.V. Barabashchikov, V.V. Gusev, V.P. Davydov, A.I. Kamenev, O.A. Kozlov, N.I. Konyukhov, P.A. Korchemny, V.M. Kosukhin, L.G. Laptev, V.G. Mikhailovsky, P.I. Exemplary, and others. At the same time, it must be stated that the depth of development of the problem of the content of education in special disciplines today remains very insignificant. This is explained by the fact that it was not considered in the direct setting in the works of the named authors.

The design of the content of a specific discipline in a technical university is devoted to the works of O.V. Dolzhenko, Z.S. Lukina, CE. Malkhanova, SI. Meshcheryakova, P.I. Obraztsova, T. D. Potapova, A.V. Smirnova, A.L. Sukhanova, Yu.M. Uvarova, V.L. Shatunovsky and others. It should be noted that all of them are carried out mainly on the material of fundamental and general technical disciplines.

The greatest contribution to solving the problem of using the existing experience in the formation of a categorical apparatus for creating a state educational standard was made by V.G. Kinelev, V.F. Manuilov, N.A. Seleznева, L.G. Semushina, V.N. Sokolov, A.I. Subetto, Yu.G. Tatur, V.D. Shadrikov and others. At the same time, in the practice of developing state educational standards, there are two opposing points of view on their role and place in the system of lifelong education. On the one hand, the position of A.P. Valitskaya and I.A. Kolosnikova, who perceive state educational standards as a product of the dominant technocratic paradigm in modern Russian society, as a desire to suppress and unify human individuality. On the other hand - the position of V.P. Bespalko, of which we are also supporters - rigidly oriented towards a diagnosable, normative approach to the role, structure and content of the educational standard.

This decision is determined by the fact that specialists in the field of information security are carriers of technologies that are critical for the state. The presence of a state diploma provides for the possibility of using a specialist in areas where incompetent actions can lead to serious harm to society. In this regard, strict state regulation of the process of training relevant specialists is required.

The content of the block of general humanitarian, socio-economic and natural-scientific disciplines of the standard reflects a deeper understanding of the structure of the basis of the professional core, reflecting the content of the fundamental training of an information
security specialist. In accordance with this, and according to the approaches of V.P. Davydov, stated in the work, as well as the principles used in the second generation standards, it seems possible to consider GOS in software as a derivative of two main elements: the fundamental and professional components of the standard. As part of the fundamental component, it is proposed to consider general humanitarian, socio-economic, mathematical and natural science disciplines, and as part of the professional one - general professional and special disciplines.

For the first three to four years, a university student covers the entire horizon of science, including mathematical, natural science and humanitarian disciplines, because they contain a range of fundamental questions both in fundamental areas of knowledge and in general education, without which an intelligent person, a professional is unthinkable. The selection of the core of fundamental laws and concepts necessary for the study is in reality a problem, since the development of science changes the priorities between its individual achievements. Sometimes scientific discoveries fundamentally change our understanding. Therefore, an unshakable, rigid structuring is practically impossible here. Moreover, even in generally recognized fundamental sciences, not all results are significant, necessary for study.

According to P.I. Obraztsov on a fundamental component, students master ready-made algorithms and acquire skills for their use. This greatly simplifies the knowledge control system, connects them with productive activities, increasing the motivation of students and stimulating their cognitive activity. The ability to use algorithms not only in their specialty, but also in other areas of knowledge, allows a graduate of a higher educational institution to overcome functional illiteracy.

The group of disciplines of the cycle of information technology hardware includes disciplines: "Means of documentary communication", "Systems and networks of information transmission" and "Means and complexes of confidential communications", etc. The content and concept of the courses as a whole consists in preparation for the performance of functional duties a graduate in mastering the material part of complex information security systems.

The group of disciplines of the information technology software cycle includes: "Network technologies", "Guiding systems of telecommunication and multichannel transmission systems", "Technology of secure document circulation", etc. Software of operating systems and means of their integration, database management systems is studied not so much from a functional point of view as from an analytical point of view. At the forefront are architectural and basic technological solutions and their analysis from the point of view of ensuring the security of information technologies based on them.

The group of disciplines defining the specialty includes "Fundamentals of designing secure telecommunication systems" and "Computer security". The last of the listed disciplines determines the specifics of profile training in the specialty, while the rest of the SD form the
core of the graduate's training. They are designed to form the main professional tools of an information security specialist.

The academic discipline "Fundamentals of designing secure telecommunication systems" (OPZTKS) is one of the important special disciplines in the training of qualified specialists in the field of information security of telecommunication systems. The significance of the course is also determined by the fact that, according to the State Educational Standard of Higher Professional Education, an information protection specialist in accordance with special training, in addition to experimental research, organizational, managerial and operational professional activities, must be able to carry out project activities. The discipline gives the necessary amount of knowledge about the content of the process, methods and means of designing telecommunication systems and protection systems, which is necessary in practical work as intended when ensuring information security of systems and networks.

The practical orientation of the discipline is determined by: the job assignment of students and listeners, and determines the need to study the principles of designing secure telecommunication systems (ZTKS), the basics of managing the design process of ZTKS, the need to switch from passive methods of assimilating knowledge to methods of actively mastering them, educating the student's skills as a researcher and design culture.

A feature of special disciplines is the obligatory conduct of practical and laboratory classes (exercises), social projects, during which students must acquire real skills in the use of modern software and hardware, studied in the corresponding courses.

The publications of recent years testify to the growing awareness of the scientific and pedagogical community of the need to correct the traditional differentiated-disciplinary didactic training model, which has limited capabilities in the formation of interconnected knowledge systems in future engineers. This problem is relevant especially for technical education, which is due to the pronounced integrative and interdisciplinary nature of professional engineering activities.

A reasonable version of the current model can be the integration of elements of the content of education, the prerequisites for which in the technical high school are the constant growth of the volume and variety of transmitted knowledge, as well as the evolution of the style of military engineering activity and thinking.

The integration of the content of special engineering education has a three-level organization of goals. The objectives of the first are to improve the content of training, its structure and organization of the process. These goals are achieved directly as a result of the implementation of the integration procedure itself. The goal of the second level is the development of trainees in the cognitive, intellectual and creative, moral and ethical spheres, the formation of the PZK. The goal of the third level is the formation of a specialist as a person and a professional.
For the purposeful formation of integral integrative knowledge among graduates of higher educational institutions, as well as PZK, the design of the content of special training in a technical higher education institution should be carried out using the principles of interdisciplinarity and qualimetric validity on the basis of an integrative approach, which consists in the systemic structuring and integration of the content of related academic disciplines of a special cycle that have similarities in the object, subject, teaching goals and conceptual and terminological apparatus.

The content side of training in special disciplines is the system-activity approach, as a single methodological basis for teaching all disciplines without exception - general scientific, general technical and special profile. All this is associated with the mastery of a new teaching methodology, with the transition from the reproductive nature of the assimilation of knowledge and skills, aimed at memorizing and reproducing this knowledge by students, to the productive and creative nature of training, which is based on the student's own activities in assimilation, obtaining, application of knowledge. It should be noted that creative and productive methods and forms of training should cover not separate types of classes or even individual courses, but cycles of courses and the entire training of specialists in general.

No matter how effective the system-activity approach in teaching is, without a program system for the purposeful combination of general scientific, general technical and special disciplines into blocks according to the principle of stage-by-stage (block or modular) formation, it is impossible to achieve the final goal of learning with a high degree of efficiency.

The modular teaching principle is a component of the invariant model of intensive teaching technology. It is based on the all-round implementation of the system of invariants in educational practice, since its implementation is best ensured only when this system covers all disciplines both horizontally within one course of study and vertically from course to course. While providing flexible interdisciplinary communication. The modules should provide the formation of a specialist at levels united by blocks of academic disciplines that allow solving complex problems. At the same time, the technology should provide for an increase in the volume and complexity of complex tasks as it moves from module to module (vertically). Modules as a set of disciplines are purposefully guided by the formation are guided by the formation of a specific activity of a specialist, given by the model of a specialist in accordance with the State Standard of Higher Professional Education.

The formation of the modules is carried out on the basis of the analysis of interconnection matrices of individual requirements of the qualification characteristics (tasks and functions of activity) of special, general scientific, general engineering disciplines, as well as interdisciplinary relationships. In this case, it is necessary to note the following feature of the modular principle. It lies in the fact that the provision of flexible intersubject connections destroys the restrictions due to the interests of individual departments, the level of their methodological preparation. The elimination of these restrictions, which usually cause duplication of educational material, terminological discrepancy between courses, a discrepancy between the theoretical and practical levels of presentation of the material, is
achieved due to a flexible system of modules - a hierarchical structure of all increasing complexity (in accordance with the system of invariants) educational blocks -kov on the complex development of creative skills for solving specific engineering problems. At the same time, the construction of modules on the basis of interdepartmental and interfaculty relations goes beyond the various methodological views of departments, forcing them to work on training modules according to a single plan. This ensures not only the implementation and control of the implementation of the invariants system, but also (which is very important) the general rise of the methodological culture of teachers, the introduction of new thinking as the basis for the active participation of all teachers in a single interdependent learning process, based on the ultimate goal of training the required specialist.

Thus, as the main guidelines for improving the training of future specialists in special disciplines in modern conditions, it is advisable to single out the goals and content of education. The goals of training and the result of vocational training can ensure the readiness of a specialist for activities of a certain level, i.e., the activity in this case acts in as a kind of different standard. The structure and content of military activity determine the very content of education in the block of special disciplines, and training in the field of professional activity characterizes the degree of the formed professional competence of a specialist.

In the context of informatization of higher military professional education, today we are talking not only about the need to rethink many positions in the organization of the didactic process: in terms of goals, content, methods, means and forms of education, but also about rethinking the role and place in it of its main subjects - teachers and students. From the professional competence of the former and active involvement in the learning process of the latter largely depends on the possibility of creating a special professionally oriented learning environment in a military higher educational institution in the study of disciplines of specialization, the basic basis of which can be VET. This actualizes the need for a new answer to a number of key questions facing modern military didactics today - who to train? Who to teach? What to teach? How to teach? Based on the foregoing, from the positions of the system-activity and personality-oriented approaches, as well as the main provisions of the theory of management of pedagogical systems, we see that the integral model of a special professionally-oriented learning environment can be presented in the form of five independent and, at the same time, interconnected and interdependent models - the learner, the academic discipline, the management of the learning process and the teacher, Let us analyze each of them separately.

The model of a specialist (who to train?) Reflects the requirements for fundamental, theoretical, special and applied training, significant professional qualities of a university graduate. As this model, we consider the normative-functional model of a specialist (NFMS).

Its basis is the model of activity, under which in this case is understood the "systemic description of the subject of activity and related objects and environments in which the activity is carried out". We can say that conditionally the model of a specialist is a kind of ideal standard of his training in the military university.
At present, in military pedagogy, a sufficient number of methods and techniques for modeling the professional activities of officers have been developed. As a rule, all of them are based on the general requirements of the SES HPE and qualification requirements, which are a model that includes a set of norms, values and requirements for the basic level of content and quality of professional training of specialists. The system-forming factor of these models is the level of education and qualifications.

The analysis of the existing methods of modeling professional activity, given in, showed that, unfortunately, none of them is universal. In most cases, they are narrowly specialized in nature, in accordance with the types, objects and environment of professional activity of various specialists, and reflect narrow departmental interests.

To the greatest extent, in our opinion, the method of normative-functional modeling of the professional activity of a specialist, proposed by V.V.Gusev, is free of these shortcomings. The term normative-functional modeling defines two approaches implemented in this case. The normative indicates the priority importance of the requirements of the regulatory documents of the state and the corresponding department (SES VPO and qualification characteristics), which determine the level and quality of professional training of a specialist, and the functional implies a deep analysis of professional tasks that a military specialist has to solve when implementing their functional responsibilities. In the development of this technique, A.S. Fedorenko [169] developed a technology for monitoring significant professional qualities (PZK) of a specialist at various stages of his professional development in a military university.

As the main advantages of the named methodology, it should be pointed out, firstly, that on its basis the modeling of professional activity is carried out in strict accordance with the requirements of social order, which ensures the unity of the system-activity and personality-oriented approaches to the training of a specialist. , secondly, the technique allows, on the basis of linguistic, correlation and factor analysis, to systematize and determine the qualification characteristics of a specialist; training in a higher educational institution, that is, monitoring the professional development of a graduate, fourthly, the method presupposes the possibility of identifying the main stages of graduate training and building on each of them in a multidimensional space of signs of "real" and "ideal" images of future specialists. Calculation of the measure of proximity between them using the pattern recognition method allows us to assess the degree of formation of students and trainees of PZK and, on this basis, to develop adequate managerial actions to correct the process of training a specialist, and fifthly, the method is quite universal in nature, allowing to simulate professional activity in this way not only specialists from Federal agencies, but also specialists from other departments of the state security system.

Thus, "normative-functional modeling is considered as a socially determined process of the design representation of the totality of personal and PZK of a future specialist, determined by the organic unity of his ideal images at the main stages of professional development in a military university, and is based on a comprehensive and dynamic analysis of the nature of the professional activity of a specialist after graduation ".

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Considering the advantages of this technique and the fact that it was developed directly in the interests of one of the law enforcement agencies of the Russian Federation, we decided on the possibility of using it as a base for the design of information technology training for training information security specialists.

The model of the academic discipline (what to teach?) Includes educational goals, features of a professionally oriented system of knowledge, skills and abilities, the degree and depth of study of the subject area, information capacity and didactic requirements: scientific content, systematicity, sequence of training, visibility, etc. e. This model can be implemented within the framework of the DKIO of an academic discipline, which is an information component of VET.

- The model for managing the learning process (how to teach?) Takes into account the peculiarities of the teacher's implementation of the didactic capabilities of the teaching technology developed by him.

The student's model (who to teach?) Is a certain reduction of the student's personality, which allows the teacher to analyze and take into account in his pedagogical activity the personal, psychophysiological and socio-psychological qualities of the student, the level of his readiness to work with information media, the background of training, the level of basic and current knowledge, skills and abilities that characterize his educational and cognitive activity, the dynamics of the formation of a specialist in a student of PZK. It should be noted that the student's model, organically including the synthesized personality model and complementing each other, at the final stage of professional training in a military university should approach the NFMS.

The model of the teacher (who to teach?) Takes into account the personal characteristics of the teacher - professional pedagogical qualities, the depth of knowledge of the subject area of the taught discipline, possession of modern teaching methods and technologies, his information culture and others.

Thus, in order to create a special professionally oriented learning environment in a military university when studying a special educational discipline, the teacher must, in accordance with the requirements of the NFMS, which is being trained in this higher education institution, consistently develop all the named models. Their optimization within the framework of the integral model, in our opinion, will contribute to a more complete fulfillment of the social order requirement for training professionals with a fairly solid base array of special knowledge and practical skills in all areas of their future service and combat activities.

At the same time, the above components of the learning model (normative and functional) allow us to clearly identify the contours of the constructed object and conclude that the activity of designing training includes a clear formulation of the didactic task and the rationale (choice) of the learning technology that reflects its social, activity and personal preference. In the process of designing training, it is advisable to use a predictive-oriented approach, and the organization and conduct of training for students and trainees must be
carried out using the system-activity approach, which naturally reflects all its components and keeps the system-forming characteristics of the learning process in unity.

Due to the fact that the process of training future officers is complex, contradictory and multifaceted, it is rather difficult to assess the qualitative and quantitative parameters of its dynamics. Therefore, on the basis of an integral model of a special professionally-oriented learning environment, it is necessary to determine the criteria for the formation of professional competence of specialists, which are understood as a set of objective and subjective indicators that give a qualitative characteristic of its state, based on which it is possible to identify its essential properties and the measure of manifestation in the activity.

Recall that professional competence should be understood as a system of significant professional qualities, professional positions, acmeological invariants and psychological characteristics that are necessary for a university graduate for the successful implementation of professional functions. Based on this, it seems appropriate to conduct an analysis to identify the designated criteria. The following directions of the student's activity: the degree of formation of the need for educational activity and the ways of its satisfaction; satisfaction and attitude to the performed activity; manifestation of amateur performance, self-organization and self-education in educational and service activities; holistic provision of the student's professional readiness by means of educational and cognitive activities; the content of the prevailing motivation in the activity and its focus; consistency, the depth and strength of the assimilation of knowledge, skills and abilities necessary for understanding the essence of natural and social processes of functioning of the special activity of a university graduate, their creative application in the performance of functional duties; a creative level of professional activity, due to the presence of appropriate preparedness.

Thus, the formation of the professional competence of a specialist can be judged on the basis of how and in what specific form the system of PZK is implemented in practice, directing a person to the practical application of its norms, helping to adequately organize professional activities, determining the creative decision of special tasks.

Taking into account the above, as well as on the basis of the analysis of the block of special qualities of the NFMS for the protection of information, we consider it expedient to use the following didactic criteria for assessing the formation of the professional competence of a graduate of universities, the volume and quality of mastering special knowledge, skills and abilities -nia, the quality of performing creative tasks and work in solving professionally-oriented tasks, motivation and activity of students.

For an objective experimental study, as well as taking into account the need for a qualitative assessment, it turned out to be possible to single out four levels of formation of a student's professional competence: high, medium, sufficient and critical, the content of the requirements for which is given below.

A high level is characterized by the ability to ensure the maximum productivity of activity and the manifestation of the stability of the coherence of the unity of thoughts, feelings and actions, harmony in subjective characteristics. Students of this level are inherent in the
thoroughness of knowledge that forms such operational thinking, in the structure of which they are systematically ordered and actualized, allow them to set and solve creative tasks when performing professional activities. Students are distinguished by the manifestation of initiative, amateur performance, activity in educational and cognitive activities, they are fluent in the techniques of working with the material part of weapons and military equipment.

The average level is characterized by the ability to provide a relatively high productivity of activity. Students are characterized by the appropriate beliefs, necessary knowledge, practical skills and abilities that allow competently perform a variety of educational and service activities under the supervision and with the advice of teachers and experienced comrades. This level is distinguished by consistency in the manifestation of thoughts, feelings, behavior as a unity; however, this consistency is quite inharmonious. This reveals the lack of development of independence (subjectivity). Cognitive activity is manifested in the mastering of popular science literature and information technology with a focus on oneself. Most students are involved in partial self-education for personal and professional reasons. Of no small importance for them is the possibility of emotional communication and self-expression in the course of classes. They are active in social activities, mainly when prompted from outside (teachers, commanders).

A sufficient level is characterized by the ability to provide partial productivity of activity. This is realized mainly at the level of the motivational-need-sphere. Students have situational professional knowledge that has not acquired the power of motive, is limited, and unsystematic. They make serious mistakes or do not perform the techniques quickly enough, that is, their practical skills are limited. Show situational dependence of behavior on external circumstances.

The critical (lowest) level is characterized by the inability to ensure the productivity of the activity (professional competence is not formed). There is no cognitive activity in the field of professional activity, knowledge is fragmentary and manifests itself at the level of familiarity with the educational material, the ability to work with the material part of weapons and military equipment is poorly developed, there is no understanding of the current situation and the ability to appreciate objective values, there is an emotional and moral underdevelopment... In the classroom, students are passive, there are no motives for positive behavior, susceptibility to the influence of a specific situation is characteristic, a negative attitude dominates, the sphere outside of educational activity is rejected.

The boundaries of the selected levels are movable. They indicate the presence of a number of contradictions, the main one of which is between the modern requirements for the military-professional development of a specialist's personality and the actually achieved level, which is the driving force behind the development of her professional competence in a university environment.

These levels formed the basis for diagnostics and forecasting of the process of forming students' professional competence. The four levels of formation of professional competence
that we identified were quite consistent with the task of classifying the studied groups of students in the process of educational activity in the conditions of the academy. These levels made it possible to sufficiently differentiate the PZK. A smaller number of them would cause too much heterogeneity in the composition of the group that would be attributed to the same level, while a larger number would too fragmented the observed group of students, which would create additional difficulties both for research and for processing his data.

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