

Technology and Innovation in the Development of Cognitive Activity



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Abstract: *Modern education is intensively developing, manifesting new approaches to learning, and progressive concepts in the system of knowledge acquisition. In recent years, global changes have undergone in the Russian education system from pre-school education through higher education. First of all, they affected the higher education system. On the one hand, there was a significant reform of external features: the merger of several universities into one, and the adjustment of the names of universities and institutions. On the other hand, the changes affected the structure of higher education, the levels of education were defined from bachelor's to master's course. Competence and practice-oriented approaches began to occupy a dominant position in the learning process, as well as independent work of students was given special attention. On the basis of the Federal State Standards of Higher Education adopted in 2016 in the Law Enforcement major and Jurisprudence training area, for high-quality and effective implementation of their professional activities, graduates of the universities and colleges sponsored by agencies of the Russian Federal Penitentiary Service must acquire a set of cultural, general vocational and specific professional competencies. To achieve the necessary competence (educational) level in the course of learning, the cadets are faced with the task of solving ideological, political, moral, and cognitive problems. Cognitive activity is key and conscious in the learning process, because it permeates the entire educational path of a person, starting with the initial cognitive efforts and ending with the satisfaction of the cognitive needs of trainees. Effective cognitive activity is impossible without positive motivation, sustainable cognitive interest, self-development and self-determination of the individual.*

Index Terms: *activation of the educational process, cadets, cognitive activity, goal-setting, motivation, self-development, self-improvement.*

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I. INTRODUCTION

In the context of continuous qualitative changes of professional activity in the penitentiary system, the problem of training future specialists capable of self-improvement, creative self-acquisition of professional competencies at the universities of the Russian Federal Penitentiary Service (FSIN of Russia) becomes increasingly urgent. In this regard, the problem of cognitive activity development of cadets of the universities of the Federal Penitentiary Service becomes of particular importance, because it is a backbone component of the learning process, as well as an important condition of professional development and self-evolution as specialists of the penitentiary system. The most promising is the development of cognitive activity based on the problem-activity approach to learning, which ensures its adequacy to the requirements of a professional environment getting complicated [1].

External and internal changes have occurred in the universities of the Federal Penitentiary Service (FSIN¹). A new common name of the FSIN universities of Russia came into circulation, namely, Educational Organizations of Higher Education of the FSIN of Russia, along with the change in the legal and organizational status of these universities (Academy, institutes, branches), and implementation of the bachelor's and master's courses as well as specialist's program. In accordance with the basic regulatory legal acts (Federal law No. 273-FZ of 29.12.2012 "On education in the Russian Federation", Federal law No. 197-FZ of 19.07.2018 "On service in the penitentiary system of the Russian Federation and on amendments to the Law of the Russian Federation "On institutions and bodies executing criminal penalties in the form of deprivation of liberty", National doctrine of education in the Russian Federation until 2025, the Concept of the penal system development of the Russian Federation until 2020) the state and society have put forward the requirements for the training of highly educated and qualified specialists, who should be able to analyze, quickly solve emerging problems and tasks, actively participate in the social development processes, have the ability to successfully and productively cooperate with colleagues, establish appropriate relationships, while maintaining self-control and composure, as well as be mobile in any life situations [2]. Today in the existing seven educational organizations of the FSIN of Russia, about 10 thousand people are trained.

¹ Abbreviation in Russian FSIN



The main majors and training directions, in which university cadets are trained, are Law enforcement and Jurisprudence. Cognitive activity is key and conscious in the learning process, because it permeates the entire educational path of a person, starting with the initial cognitive efforts and ending with the satisfaction of the cognitive needs of trainees. Effective cognitive activity is impossible without positive motivation, sustainable cognitive interest, self-development and self-determination of the individual. Unlike students of civil educational organizations, cadets of FSIN universities of Russia, having a specific status, and sharing their studies with the service, do not have the opportunity to fully and independently realize their needs in the field of cognitive activity [3].

II. LITERATURE REVIEW

To date, a significant number of studies have been carried out to find ways to activate the cognitive activity of students at a higher education institution. Thus, the study of the learning motivation phenomenon was conducted in the works of V.G. Aseev, V.P. Bepalko, A.N. Leontiev, A.N. Nebaba, and others. According to some authors, one of the perspective directions to activate the cognitive activity of trainees through the increase of their motivation to training can be pedagogical testing. Today it is often associated with the Bologna Process, which in terms of content is the set of main vectors of activity aimed at Russia's entry into the European educational space. As part of the Bologna Process, the success in studying the subject is determined by the rating scale, which, in turn, is built based on the results of pedagogical testing. The development of state educational standards of the third generation in Russian education is associated with the formation of a unified system for the whole country to assess the quality of education. This also actualizes the need to use pedagogical testing in higher education [4], [5].

Analysis of scientific literature and dissertation research allows stating the fact of the ever-increasing role of the use of pedagogical testing in the global pedagogical practice as the leading form of control and evaluation of students' knowledge. This is evidenced by a significant number of scientific publications devoted to the study of the nature and features of this phenomenon [6]-[12]. Among the Russian scientists, successfully working in this subject area, one can note V.S. Avanesov, M.S. Bershtein, V.P. Bepalko, B.G. Bobylev, A.N. Mayorov, N.F. Maslova, M.B. Chelyshkova, and others. Among the researchers of the higher military school, it is advisable to specify A.V. Barabanshchikov, V.N. Gerasimov, V.P. Davydov, etc. Among foreign scientists, one should distinguish D. Wexler, D. Wilford, F. Galton, D. Glaass, K. Ingen-Kamp, J. Kettell, W. McCall, J. Stanley, and G. Fischer. Foreign authors, namely, V. Muller, S. Wigman (interaction), D.R. Lee (group training), J. Töpfer (moderation) pay attention to nontraditional methods of active learning.

The problem of activation of cognitive activity in the educational process of students has always been and remains one of the most relevant issues in the teaching theory and practice. For several centuries, scientists have mastered various ways to increase cognitive activity and interest of

trainees from an early age through study at a higher education institution. To date, the pedagogical literature offers formulated concepts of "knowledge", "cognitive activity", and "activation of educational and cognitive activity of pupils". The latter concept is considered by scientists and teaching employees through methods and means by which a certain result in the training process is reached. In this regard, the authors propose to understand under the activation of cognitive activity of cadets the active interaction of teachers and cadets, aimed at increasing cognitive interest, creative activity, independence of cadets through the use of various methods and techniques, including interactive learning technologies, which form skills and practical experience. Therefore, in order to improve the education level of cadets, to prepare highly qualified specialists, on the one hand, it is necessary to encourage teachers to intensify their teaching activities, i.e. develop their own active position of teaching; seek to implement in practice new ways, techniques, and teaching forms that contribute to the activation of educational activities of cadets; and to improve the quality of their teaching experience. On the other hand, the teacher's task is to provide the cadet with active educational work, scientific search, to teach him to acquire knowledge independently and apply them in professional practice [13].

III. METHODS

A. General description

Today the issue of activating cognitive activity in the educational process of higher education institutions is one of the most urgent problems in the teaching theory and practice. The activation of cognitive activity of cadets of higher education institutions affiliated with the FSIN of Russia is understood as the active interaction of the teacher and cadets in the learning process, aimed at increasing cognitive interest, creative activity, independence of cadets through the use of various methods and techniques, including interactive learning technologies that form skills and practical experience [14].

The unity of purposes, motives, actions, and results are the essence of the activation of cognitive activity of cadets, which is considered through the consciousness of the trainee, i.e. through the *tool* of human cognitive activity; human reason and mind, rationality, sensuality, and deep intuition.

The purpose of cognitive activity of cadets of FSIN higher education institutions of Russia is the formation of the ability to acquire knowledge, process it for the professional needs and subsequently use in the practical activity, i.e. to master professional competence. The purpose of cognitive activity is closely related to motives. The cognitive motivation of students is distinguished as the main motive in the learning process, a crucial role here is also played by a teacher. The basis of cognitive motivation is cognitive interest, which affects the nature of the cognitive activity of the cadet. It is the teacher who should influence its development from reflex, reproductive-factual, descriptive-searching to creative evolution.

The achievement of the goal, i.e. the result, depends on the motives and actions [15].

B. Algorithm

The features of the activation of cognitive activity of cadets of educational institutions of the FSIN of Russia include the following [16]:

- a set of normative legal acts determining the learning and educational spheres of cadets' life-sustaining activity;
- the specificity of the teaching process in universities of the FSIN of Russia;
- application of interactive technologies in the educational process;
- organization of independent cognitive activity of cadets, which is closely related to the specifics of the educational process in these universities;
- the use of module-rating technology in the educational process.

The constructed model of "the cognitive activity activation process of cadets with the use of interactive technologies" refers to innovative types of models and content-structural-functional types. This model consists of three blocks: target, organizational-substantive, and productive-evaluative [3].

The methodological approaches (system, axiological, personality-activity, and competence interactive), as well as the principles of professional training (the principle of motivation modularity, open-mindedness, accessibility,

visibility, consciousness, the activity of the individual, freedom of choice, and feedback), have become the theoretical basis of this model.

The target block of the model includes the purpose, objectives, methods, and functions of the model of "activating the cognitive activity of cadets based on the use of interactive technologies".

The organizational-substantive block contains the conditions of activation of cognitive activity of cadets of educational institutions of higher education of the FSIN of Russia.

The productive-evaluative block of the model represents the levels of cognitive activity of cadets formed as a result of the implementation of the formulated conditions (low, lower, medium, and high) as well as the levels of competence formation of future specialists (competence is not formed, basic, medium, and high levels).

C. Flow chart

The created theoretical model, resulted from the purposeful selection of the most suitable pedagogical conditions to activate the cognitive activity of cadets of the higher education institutions affiliated at the FSIN of Russia, is presented in Table I.

Table I. Brief of the pedagogical model

Model name	"The activation of cognitive activity of cadets of educational institutions of higher education of the Russian Federal Penitentiary Service based on the use of interactive technologies"
Model type	Content-structural-functional type model
Kind of the model	The innovative model of educational process organization

IV. RESULTS

In the course of experimental research I.V. Bryzgalova [2] studied the initial degree of cognitive activity of cadets (motives, cognitive interest, psychological climate,

independent cognitive activity, etc.) by various pedagogical methods, and based on the obtained results, determined criteria of levels to assess the cognitive activity of cadets (Table II).

Table II. Criteria of levels to assess the cognitive activity of cadets

Criterion	Indicators	Methods
Value-motivational criterion	Formation of motives for educational and cognitive activity (focus on the assimilation of knowledge obtaining methods, and methods of knowledge self-acquisition)	Questionnaire "Motivation of educational activity: levels and types" (developed by I.S. Dombrovskaya)
	The emergence of cognitive interest in cadets (curiosity, inquisitiveness), the manifestation of interest in the future profession	Pedagogical observation
	Development of cadets' cognitive independence	Analysis of works performed independently on a specific academic discipline (on the example of the discipline "History of state and law of Russia"), analysis of the scientific circle's activity of the department.

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Cognitive criterion	Formedness of knowledge and skills in specific academic disciplines	Current academic performance (on the example of the discipline "History of state and law of Russia") based on the modular rating system of assessment.
	The emotional involvement of the cadet in the educational activity	Conversation
	A creative and constructive approach to learning	A set of questionnaires: "Sense of novelty", "Creative approach", "Self-esteem", "Criticality" (methodology of M.I. Rozhkova, Yu.S. Tyunnikiva, and L.A. Volovich)
Activity criterion	The ability to exercise choice in learning activities (choice of methods and solutions to address professional tasks)	Analysis of tasks completed in accordance with the project methodology
	Well-formed cognitive independence	Work in a scientific circle, the analysis of the performed independent works (at the end of the academic year)
	Ability to synthesize and generalize theoretical knowledge	Analysis of completed tasks using the case-method
	Mastering skills and abilities (completeness of mastering generalized practical skills, solid mastering of skills, the deepness of skills, consciousness)	Assessment of learning progress based on the modular rating system, intermediate results (semester exam)
	Developed self-expression, well-formed ability to communicate in a team and mastering learning activities	Expert evaluation method

In the course of application of various types of interactive technologies in the educational process, E.V. Zautorova, and V.I. Bryzgalova [17] defined knowledge, abilities, and skills emerging in students during lessons conducted with the use of these technologies. Further, general cultural and professional

competencies are distinguished, whose core includes the components such as knowledge, abilities, and skills. In conclusion, based on the above, pedagogical conditions for the activation of cognitive activity of cadets were formulated (Table III).

Table III. Pedagogical conditions to activate the cognitive activity of cadets

Type of interactive technology	Knowledge, abilities, and skills	General cultural and professional competences	Pedagogical conditions to activate cognitive activity
The interactivity	<ul style="list-style-type: none"> - forming speech culture, responsibility, consciousness, and the favorable psychological climate in the learning process; - developing critical thinking; - stimulating active independence of cognitive activity; - implementing a differentiated and individual approach to learning. 	<ul style="list-style-type: none"> - possessing thinking culture, the ability for generalization, analysis, information perception, goal setting and choice of ways of its achievement; - ability to carry out professional activities based on the developed legal awareness, legal thinking, and legal culture; - the ability to communicate verbally and in writing logically correctly, clearly, and in a well-argued manner. 	<ul style="list-style-type: none"> 1) creating a socio-psychological climate through a meditative approach; 2) application of module-rating training technology; 3) using Internet information resources to develop cognitive independence of cadets; 4) implementing the technological structure of interactive training of cadets; 5) ascending to interdisciplinary connections in cognitive activity through the use of integrated techniques
Analysis of the text of the legal source, the solution of situational problems, and legal incidents	<ul style="list-style-type: none"> - forming speech culture, and qualification bases of the legal profile specialist; - developing critical thinking; - stimulating and developing creative activity; - implementing theoretical knowledge in practice; - creating a friendly, humane environment, mutual interest, and trust in each other. 	<ul style="list-style-type: none"> - ability to work in a team, be tolerant of social, ethnic, religious and cultural differences; - ability to perform professional duties in good faith, comply with the principles of lawyer's ethics; - the ability to legally qualify facts and circumstances. 	
Project technique	<ul style="list-style-type: none"> - forming a positive emotional background in the team; - developing system thinking; 	<ul style="list-style-type: none"> - knowledge of the basic methods, techniques, and means of obtaining, storing, and processing 	

	<ul style="list-style-type: none"> - stimulating active cognitive self-sufficiency; -implementing a differentiated and individual approach to learning. 	<ul style="list-style-type: none"> information, as well as computer skills as a means of information management; - the ability to communicate verbally and in writing logically correctly, clearly, and in a well-argued manner. - ability to self-organization and self-education. 	
Integrated and binary technique	<ul style="list-style-type: none"> - forming speech culture - developing theoretical thinking; - stimulating the activity of the thought process and cognitive activity - implementing skills and abilities to analyze and compare complex processes 	<ul style="list-style-type: none"> - ability to work in a team, be tolerant of social, ethnic, religious and cultural differences; - the ability to communicate verbally and in writing logically correctly, clearly, and in a well-argued manner. - ability to carry out professional activities based on the developed legal awareness, legal thinking, and legal culture; 	
Game techniques	<ul style="list-style-type: none"> - forming specific theoretical knowledge and practical skills, sustainable motivation for cognitive activity, the experience of joint cooperation; - developing individual professional thinking, active position in the practical application of theoretical knowledge; - promoting self-education; - developing the ability to analyze and forecast 	<ul style="list-style-type: none"> - ability to work in a team, be tolerant of social, ethnic, religious and cultural differences; - the ability to logically correct, reasoned and clear to build oral and written speech; - ability to carry out professional activities based on the developed legal awareness, legal thinking, and legal culture; 	

V. CONCLUSION

In modern pedagogical literature, the concepts of "knowledge", "cognitive activity", "educational and cognitive activity of schoolchildren", "activity", and "activation" are widely covered. The definition of "activation of cognitive activity of cadets" is considered through the use of certain methods and techniques by which the expected result of training is achieved [18]. Therefore, in order to activate the cognitive activity of cadets and to train highly qualified specialists for the penitentiary system, it is necessary that teachers take a proactive stance in the learning process. On the one hand, this should be manifested in the desire of the teacher to learn and practice innovative methods and ways of learning, as well as systematically improve their qualification. On the other hand, the teacher should provide the cadet with the opportunity to actively and comprehensively participate in the educational process, scientific activities, as well as instill a strong desire to independently acquire new knowledge and skills with the subsequent prospect of applying them in professional activities.

The essence of cognitive activity of cadets is active, purposeful and systematic search and acquisition of knowledge, as well as the formation of professional skills and abilities in the course of learning at the university. The structural elements of the cognitive activity essence are the goal, motive, action, and result.

Motivation in the educational process is of particular importance to achieve the set goal and the expected successful result. At that, cognitive motives should prevail in cadets in the course of their training. To do this, it is necessary to give

cadets the ideas regarding their future profession (kind of example or model) at the earliest stages of education.

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