

ACTIVIZATION OF COGNITIVE ACTIVITY OF STUDENTS IN THE LEARNING PROCESS IN KAZAKHSTAN

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Abstract: At present, more than ever, there is a great demand for knowledgeable, business, responsible people. The modern society of information technology is interested in highly educated and competent specialists who can act independently and actively, make decisions, adapt flexibly to constantly changing living conditions. The current situation implies an increase in the educational, cultural, and professional level of each person; search for special forms of education; requires other skills and abilities; dictates the need to increase personal activity, responsibility, and enterprise. In the Republic of Kazakhstan, the content of education should be focused on ensuring the self-determination of the individual, creating conditions for its self-realization.

Keywords: cognitive activity, educational process, development of education, conditions for self-realization, educational standard.

1 Introduction

Following the content of the state educational standard, social demands for the training of professionally competent specialists have increased. In modern conditions, the process of training a young specialist does not end at the secondary vocational school (lyceum), technical school (college) or university - it becomes continuous. There is a direct link between the level of development of society and the intellectual potential of professionals: a high level of material and technical base and culture require specialists to have the appropriate knowledge and skills, as well as a constant desire to improve education and improve their skills. That is, there is an urgent need for each person in the system of continuing professional education.

The professional formation of the personality of the teacher of vocational training is part of the ontogenesis of a person from the beginning of the formation of professional intentions to the end of active professional activity. Many scientific works indicate the need for a new approach to the process of professional formation of the personality, the formation of a positive attitude to professional activity, interest in the content of the work (O.S. Anisimov, A.S. Belkin, N.S. Glukhanyuk, E.F. Zeer, A.A. Derkach, V.S. Lednev, L.E. Orban, G.M. Romantsev, V.V. Shapkin, and others). It is no coincidence that in recent decades a new science has emerged - acmeology, which reflects the problems of the formation of professional maturity of an individual. The effectiveness of the training of specialists, first of all, depends on the activities of the university in introducing students to their future profession, ensuring the formation of professional orientation in the educational process (A.B. Kaganov and others). The peculiarity of the acmeological approach consists in raising the question of the influence of moral principles and personality activity on the formation of professionally important qualities (O.S. Anisimov, A.A. Derkach, N.V. Kuzmina, A.A. Rean, and others).

During training at a vocational pedagogical university, an attitude toward engineering and pedagogical activity is being formed, which includes pedagogical, engineering, technical and production, and technological components. General engineering skills (polytechnic skills in reading and drawing drawings,

diagrams, graphs; measurement; technical diagnosis; performing design and graphic work; development of engineering documentation; determination of economic indicators of production, etc.) constitute an important part of the competence of the teacher of vocational training. In this regard, the forefront is the need to strengthen the professional orientation of the content of the courses of the engineering cycle and change the emphasis in the educational activities of students.

2 Materials and Methods

The methodology of teaching any academic discipline in a university needs constant improvement by the requirements of the development of pedagogy and scientific and technological progress. Therefore, the methodological support of graphic disciplines imposes ever higher requirements. Given the shortage of training time allocated for the subject, while trying to maintain common program material, the task of constructing a balanced teaching methodology for graphic disciplines that provides a high level of mastery of graphic knowledge is important and relevant.

Among the problems that are not reflected in the practice of training engineering and teaching staff is the lack of research that examines in detail the process of designing a modular technology for teaching graphic disciplines.

Requirements for the level of training of graduates of a vocational pedagogical university suggest a change in the existing approaches to organizing the process of teaching graphic disciplines, focusing on creating conditions for the formation of the personality of a specialist and ensuring the professional orientation of the educational process. (1) Thus, the strategic direction of the development of the system of continuing professional education is to solve the problem of personality-oriented education, in which the student's personality is in the focus of the teacher's attention, and the teaching activity is an active cognitive activity. Moreover, the most important trend in the development of education, including engineering and pedagogical, is the revision of the very concept of the organization of cognitive activity of students and pedagogical guidance.

The relevance of the problem of enhancing the cognitive activity of students is evidenced by the numerous works of psychologists (K.A. Abulkhanova-Slavskaya, B.P. Esipov, P.I. Pidkasisty, N.A. Polovnikova, M.N. Skatkin, I.F. Kharlamov, T.I. Shamova, G.I. Shchukin, A.F. Esaulov, and others). For example, K.A. Abulkhanova-Slavskaya, (2) considering this problem through the prism of personality psychology, says that activity is a generalized, valuable way of reflecting, expressing, and fulfilling her vital needs, typical of a given personality; it is a functional-dynamic quality of personality that integrates and regulates in dynamics its entire personality structure. This position is reflected in the work of many other researchers. Other scientists define the activation of cognitive activity of students as the ability and desire to creatively approach the surrounding reality, which ensures success and gives the educational work of students the character of an independent and creative search for truth (I.Ya. Lerner, P.I. Pidkasisty, N.A. Polovnikova, and others). In particular, M.N. Skatkin (3) in his writings emphasizes, "The activation of cognitive activity is necessary not only for the successful solution of educational but also educational tasks: it instills mental abilities ..., fosters love, respect and the habit of serious work, arouses curiosity". Highlighted areas reflect a humanistic approach to education, the hallmark of which is the individuality of a person, his personality.

Person-oriented learning according to M.Yu. Bukharkina, M.V. Moiseeva, A.E. Petrova, E.S. Polat, G.K. Selevko, N.E. Erganova and others suggest a differentiated approach to learning, considering the level of the intellectual development of

the student, his abilities and the level of preparation for a specific (in our case, graphic) discipline. The new education paradigm predetermines a change of priorities - from the traditional assimilation of ready-made knowledge during lecture and seminar classes to the independent active cognitive activity of each student. Moreover, the student's involvement in the active cognitive process should be accompanied by the assimilation of knowledge and a clear understanding of it, where, how, and for what purposes this knowledge can be applied in future professional activities. With such an organization of the educational process, the teacher is given the role of a competent consultant, manager of independent active cognitive activity of students. (4)

The problem of enhancing the cognitive activity of future "vocational training teachers seems to us especially relevant in connection with the fact that over the past decades, information technologies based on technical achievements, such as personal computers, multimedia equipment, and global telecommunication networks, have penetrated the educational process more and more deeply. Internet. Computer telecommunications contribute to the creation of a cognitive environment used to solve various didactic problems (cognitive, informational, etc.). The main feature of this environment is that it is suitable for both mass and individual learning and self-study, which opens up the possibility for distance learning.

The pedagogical experiment was attended by 237 students of a vocational pedagogical university. Characterizing the contingent of the study, it should be noted that the first-year students aged 17-19 years, which is sometimes called "student age", took part in the experiment. Following the age periodization of E.F. Zeera, this contingent refers to the period of early adulthood at the stage of youth.

When preparing the experiment, it was considered that the leading activity in youth is vocational education, the full implementation of which contributes to the professional formation of the individual. And psychological neoplasms of the personality at this stage of formation should be a professional orientation, independence, generalized methods of professional and cognitive activity, social and professional competence, social maturity. (5)

When forming the contingent of students to study the problem, we considered that youth is characterized by unevenness and accelerated pace in the development of the intellectual and cognitive sphere of personality. At the student age, the development of cognitive processes (verbal-logical ways of thinking, sustained attention, involuntary memorization, self-esteem, self-knowledge, etc.) occurs. In this regard, when developing an electronic training course, we considered the peculiarity and nature of the training material to be assimilated in the process of studying descriptive geometry.

Preparing students for the profession of a teacher of vocational training requires solving problems such as ensuring a high level of assimilation by students of knowledge and arming them with modern teaching technologies. That is why the theoretical aspects of the problem of enhancing cognitive activity using modern information technologies were considered in the dissertation. In the process of theoretical understanding of the problem, we put forward some assumptions that require experimental verification.

For experimental pedagogical research, control groups (114 students) were identified, in which training was carried out using traditional techniques of teaching descriptive geometry, and experimental groups (123 students), in which training was conducted by the developed hypothesis. Moreover, groups of students with approximately the same level of initial training in graphic disciplines were taken for analysis. The purpose of the experiment was to compare the learning outcomes in the experimental and control groups of students.

The resolution of urgent problems of vocational education depends on the competent use of pedagogical and information

technologies. It is practically impossible to separate one from the other since only the widespread introduction of new pedagogical technologies will make it possible to change the paradigm of education, and only new information technologies will most effectively realize the possibilities of these pedagogical technologies.

Thus, *contradictions* are revealed:

- between the increased demands of society on the quality of training and the conservatism of the existing system of vocational education;
- between the need to enhance the cognitive activity of students and the traditional education system, which does not consider the individual creative nature of student activity, facts, and trends in the informatization of the educational process;
- between the increased role of self-education in the professional activities of a vocational education teacher and the lack of modern adaptive didactic tools aimed at self-education;
- between the needs of the individual in varied, personality-oriented teaching technologies, interconnected with new information technologies, and the objective difficulties of their implementation in the practice of teaching graphic disciplines.

In connection with the foregoing, the research *problem* is to search for teaching technologies that contribute to the activation of cognitive activity of students and the formation of their professional orientation in the process of teaching graphic disciplines.

The purpose of the study is to develop pedagogical conditions for enhancing the cognitive activity of students in the process of teaching graphic disciplines based on the capabilities of modern information technologies and principles of acmeology.

The object of study - the process of teaching graphic disciplines in a professional-pedagogical university.

The subject of the study is the pedagogical conditions for enhancing the cognitive activity of students in the process of teaching graphic disciplines.

The basis of the study was the following *hypothesis*: the activation of cognitive activity of students in the process of teaching graphic disciplines is possible, with the complex fulfillment of the following pedagogical conditions:

- personality-oriented approach to learning;
- the formation of the professional orientation of students through the use of acmeology principles;
- educational and methodological support based on the capabilities of modern information technologies, including an electronic training course.

Following the purpose and hypothesis of the study, the following *tasks* were formulated:

1. To study the state of the problem under study in pedagogical theory and practice.
2. To justify the pedagogical conditions that contribute to the activation of the cognitive activity of students in the process of teaching graphic disciplines.
3. To clarify the principles of acmeology, contributing to the formation of the professional orientation of the student's personality.
4. To develop the content and educational and methodological support of the electronic training course in graphic disciplines.
5. Experimentally verify the effectiveness of the application of the complex of educational and methodological support for graphic disciplines.

In the study, we introduced a *limitation*: developing a set of educational and methodological support for teaching graphic disciplines at a professional-pedagogical university, we limited

ourselves to studying the problem within the discipline "Engineering Graphics: Descriptive Geometry" for students of engineering specialties.

The methodological basis of the study was the provisions in the field of philosophy of education and methodology of the learning process (V.I. Zagvyazinsky, V.I. Kagan, V.V. Kraevsky, V.S. Lednev, I.Ya. Lerner, M.N. Skatkin, I.A. Sychenikov, and others).

The study is based on the theory of the activity approach in cognition and learning (P.L. Halperin, A.N. Leontyev, S.L. Rubinstein, and others); as well as educational and developing training (L.S. Vygotsky, V.V. Davydov, D. B. Elkonin, and others).

The starting points were the theoretical provisions on the management of educational and cognitive activities (S.I. Arkhangelsky, A.M. Novikov, M.U. Piskunov, N.F. Talyzina, T.I. Shamova, G.I. Schukin, etc.); individualization of educational activities (A.A. Kirsanov, I.E. Unt and others); independence in learning (P.I. Pidkasty, I.G. Pustilnik, etc.); and also used work in the field of pedagogical theory V.P. Bepalko, V.I. Zhuravleva, M.I. Makhmutova, M.V. Clarina, which allow identifying ways and means of forming a creative personality in various activities.

The integrated approach to the study of the activation of cognitive activity in the process of teaching graphic disciplines in the preparation of a specialist is based on the works of scientists considering the following problems: personality, and its structure; professional training of specialists; professional orientation in training; laws and principles of professional development of the personality; training in graphic disciplines; design of pedagogical technologies; the use of computer technology in the learning process.

The following research methods were used to achieve the objectives: a retrospective analysis of philosophical, psychological, pedagogical and methodological literature on the topic of the dissertation, normative-programmatic and educational-planning documentation, teaching and learning aids; generalization of advanced pedagogical experience; comparison; abstraction; modeling; targeted monitoring of students in the process of educational and cognitive activities; diagnostic methods (testing, questioning, interviewing, conversation, etc.); expert assessment method; pedagogical experiment *u* (ascertaining and formative); generalization of data obtained as a result of pedagogical research; processing results by methods of *h*, mathematical statistics.

The scientific novelty of our study is as follows:

- The pedagogical conditions for enhancing the cognitive activity of students in teaching graphic disciplines were identified;
- a set of educational and methodological support for teaching graphic disciplines based on the use of information technologies was developed and scientifically substantiated, which contributes to the activation of students' independent cognitive activity;
- a set of acmeological principles has been identified and adapted to the educational process of the university that contributes to the formation of the professional orientation of the student's personality. (6)

The scientific validity and reliability of the research results are ensured by the research logic, its compliance with theoretical and methodological principles, the widespread use of complementary research methods, the use of system and factor analysis methods, protocol registration of the results of a pedagogical experiment, their mathematical and statistical processing, the correspondence of the results to existing scientific ideas and patterns in the system of psychological and pedagogical disciplines.

The theoretical significance of the study lies in the justification of the pedagogical conditions for the activation of cognitive activity of students using modern information technologies, and acmeological principles that contribute to the formation of a professional personality.

The practical significance of the work lies in the fact that pedagogical conditions have been identified that contribute to the activation of the student's cognitive activity, and the formation of professional orientation personalities.

The results of the study are a set of educational and methodological support for descriptive geometry, developed and implemented by us in the educational process of the university, including an electronic training course and the manual "Engineering Graphics: Descriptive Geometry".

The results of the study can be recommended for implementation in higher educational institutions.

Testing and implementation of the research results were carried out based on higher educational institutions of Kazakhstan. The main results of the study are embedded in the educational process. Pedagogical conditions for the activation of cognitive activity of students in the study of graphic disciplines, involving the use of pedagogical and information technologies, and contributing to the formation of professional orientation of the student's personality.

Organization of cognitive activity of students, providing for the use of a complex of educational and methodological support for descriptive geometry, including an electronic training course, subject to the choice as the basis for systematization, an increase in the degree of activity and independence of learning.

A set of adapted principles of acmeology, contributing to the formation of the professional orientation of the personality of a student teacher, starting with the first courses of study at a university.

Research stages:

The first stage – the search and theoretical – consisted of theoretical justification of the problem, a retrospective analysis of the psychological and pedagogical literature to identify the main theoretical and methodological concepts of the study, based on which his hypothesis, problem, and objectives were formulated.

At this stage, the possibilities and features of activating the cognitive activity of students in the process of teaching graphic disciplines were determined. The development of the program and organization of the pedagogical experiment.

The second stage – the experimental – consisted of a pedagogical experimental study, which was conducted with first-year students of engineering specialties.

At this stage, experimentally, the content, training technologies were clarified, as well as the adjustment of the curriculum in descriptive geometry, which contributes to the activation of the cognitive activity of students and the formation of professional orientation. The necessary information was collected to summarize the pedagogical experiment.

The third stage – the final – was devoted to the analysis and generalization of the results of a pedagogical experiment, statistical data processing, formulation of conclusions, design of dissertation research, preparation for its defense.

Enhancing the cognitive activity of students is an important and eternal problem of pedagogy, the solution of which is aimed at improving the effectiveness and quality of training. It is no accident that the study of this problem is carried out in various directions:

- the development and organization of cognitive activity of students, a necessary condition for improving the quality of

knowledge (L.P. Aristova, E.V. Korotaeva, I.F.

- Kharlamov, T.I. Shamova, I.S. Yakimanskaya, and others);
- organization of creative search and cognitive activities of students (V.G. Razumovsky, A.V. Usova, M.I. Makhmutov, and others);
- the formation of cognitive interests of students in the general didactic aspect (R.Sh. Akhtyamova, K.A. Rajapov, G.I. Shchukin, and others);
- organization of independent cognitive activity of students (B.P. Esipov, R.V. Oleinik, P.I. Pidkasisty, N.A. Polovnikova, and others).

Based on the study of psychological and pedagogical work, we identified some scientific problems associated with the study of cognitive activity.

A retrospective analysis of the scientific literature indicates the existence of numerous definitions of the concepts of "cognitive activity" and "activation of cognitive activity". Moreover, in many cases, the definitions given by various authors to these concepts diverge both in volume and in content. An ambiguous understanding of the content of these concepts indicates not only the existence of various approaches to their study but also the complexity of the concepts themselves.

In the dictionary S.I. Ozhegov, (7) the concept of "activation" is defined as the strengthening of activities. In English, the Russian word "activity" is translated by the term "activity, and any type of practical or cognitive activity of a person is defined by this concept, that is, activity is expressed in actions that constitute activity. The encyclopedic dictionary also interprets activity as "enhanced activity". In the philosophical literature, human activity is considered concerning activities that create new forms and properties of social reality.

The pedagogical dictionary defines activity in learning as a "didactic principle that requires the teacher to set up the learning process that fosters the initiative and independence of students, strong and profound assimilation of knowledge, the development of necessary skills, the development of observation, thinking and speech, memory and creative imagination. The principle of activity is in close connection... with the principles of consciousness".

In the psychological and pedagogical literature, with all the versatility of studies of cognitive activity, two main areas can be distinguished:

- cognitive activity as an activity;
- cognitive activity as a trait, personality quality.

The peculiarity of vocational and pedagogical education is that students of engineering specializations are preparing to teach several subjects of the general technical cycle in secondary vocational schools. General technical disciplines, which include graphic disciplines, are the general theoretical basis of special technical knowledge and form an important part of the professional training of a teacher of vocational training. The specifics of the content and teaching of general technical disciplines are considered in the works of V.A. Hervera, T.V. Kudryavtseva, V.A. Skakuna, N.E. Erganova, I.S. Yakimanskaya, and others.

3 Results and Discussion

Teaching students in technical disciplines is focused on the acquisition of professional knowledge of a technical nature and the formation of a scientific and technical outlook. Therefore, when studying technical disciplines, students need graphic activity (reading and executing graphs, diagrams, drawings, technical drawings, etc.), which ensures the application of the acquired knowledge and thereby completes the process of their assimilation. The content, goals and teaching methods of graphic activity are disclosed in detail by A.D. Botvinnikov and B.F. Lomov (8) in the book "The Scientific Foundations of the Formation of Graphic Knowledge, Skills of Schoolchildren". At the same time, considerable attention is paid to issues of

polytechnicism and intersubject communications in the process of teaching graphic disciplines. In their content, graphic disciplines occupy an intermediate place between general educational and special disciplines and make it possible to combine theoretical and practical knowledge, i.e. abstractness and concreteness.

An important feature of graphic disciplines is that students are trained in drawing construction, i.e. modeling. In training, models perform a visual function. The principle of visibility in the learning process is considered in the works of V.V. Davydova, D.A. Oshanina, N.G. Salmina, E.G. Serebryany, L.M. Friedman, V.A. Stoff, and others. Drawing as a graphic model can be attributed to materialized visualization. Solving graphic problems using a drawing is a model transformation, which leads to a change in the visual image.

In the process of teaching graphic disciplines, a variety of forms of information are used:

- verbal, which is carried out in the form of text and speech;
- visual, which is presented in the form of a material model (parts, layouts, etc.) and a materialized model (drawings, drawings, etc.).

In the study of graphic disciplines, information and visual aids serve as the basis for creating a geometric object. At the same time, a visual image serves as a means of "transcoding" information from one form to another and also connects various types of visibility and information related to the same object.

When constructing a drawing of a geometric object, the student, using the rules of projecting, independently creates a visual aid, materializing the existing mental visual image. Thus, when studying graphic disciplines, students develop the ability to carry out reversible translations from one "language" of presenting information to another.

The graphic activity of students, regardless of the nature of the task, is based on the search for its solution and a graphic display of the results. Therefore, an integral part of training at a vocational pedagogical university is graphic education.

Graphic education is an integral part of engineering training of students and involves the development of certain knowledge, competences, and skills in reading and executing drawings by existing state standards. In the scientific and methodological literature, the importance of graphic education is considered mainly in three interrelated areas such as general education, polytechnic and professional.

The general educational value of graphic disciplines consists in the students mastering one of the means of understanding the world around them, in developing their personality qualities such as accuracy, attentiveness, independence, aesthetics, planning in work, accuracy, and clarity of movements, etc. Besides, when studying graphic disciplines, students form cognitive experience, the criterion of which is competence. (9)

The importance of graphic education in polytechnic training lies in the ability of students to navigate in the main areas of technological progress, in the ability to understand the techniques and technologies of modern production, to understand the design of technical devices, the spatial relationship of objects.

Graphic disciplines are the basis of professional training of students, and because they contribute to the development of logical and spatial thinking and the development of students' techniques and methods of reading information of a production nature. (10-11)

The objectives of the pedagogical experiment were as follows:

- to check the effectiveness of the use of the pedagogical conditions developed by us to enhance the cognitive activity of students, including the electronic training course in descriptive geometry;

- to determine the content and dynamics of the levels of cognitive activity of students in the study of graphic disciplines;
- to obtain data on the formation of professional orientation in the process of teaching descriptive geometry;
- to identify the relationship of professional orientation with the cognitive activity of the individual in training and with the levels of mastery of graphic knowledge. (12)

4 Conclusion

The system of continuing professional education is designed to contribute to the implementation of the main tasks of the socio-economic and cultural development of society since it is the institutions of primary, secondary and higher professional education, as well as post-graduate education, that prepares a person for active work and full work. It is these needs of a society that dictate the need for serious reform of the education system. (13-15) However, at the present stage, the education system is far from perfect both in terms of the forms and methods of its organization and in terms of its motivation and stimulation. Therefore, the definition of strategic directions for the development of the system of continuing professional education for the future is of great importance. A 21st-century specialist must possess certain personality traits necessary for him to be competitive in the labor market. The following skills can be considered such qualities:

- flexibly adapt to rapidly changing life situations;
- integrate professional knowledge and skillfully apply them to obtain new ones;
- independently think critically and rationally solve various problems using modern technologies;
- have creative thinking;
- competently work with information (to collect, analyze, put forward hypotheses for solving problems, summarize, identify patterns, make reasoned conclusions);
- be sociable;
- independently work on the continuous development of their own educational, cultural and moral level. (16)

A professional-pedagogical university is a leading link in continuing professional education since the socially set goal of the professional activity of graduates of this university is to train qualified workers. Therefore, the university's ability to respond flexibly to the needs of society, while maintaining the accumulated positive experience, is important for the entire system of vocational education.

In the course of pedagogical research, we determined pedagogical conditions that ensure the possibility of the successful formation of a person's professional orientation in the first year of study at a vocational pedagogical university, which contributes to the activation of the student's cognitive activity. For this, in the process of teaching descriptive geometry, it is necessary to improve the graphic knowledge, skills acquired by students even before studying at a university; develop spatial and logical thinking; to cultivate diligence, attentiveness, and accuracy; to achieve high-quality graphic work; as well as the skills of independent work with educational and reference literature, GOST.

An experimental pedagogical study was conducted to verify the hypotheses put forward in the work, including assessing the

effectiveness of the application of the developed electronic training course in descriptive geometry.

Literature:

1. Lerner GI. Psikhologiya vospriyatiya obemnykh form [Psychology of perception of volumetric forms]. Moscow: Izdatelstvo Moskovskogo universiteta; 1980.
2. Abulkhanova-Slavskaya KA. Deyatelnost i psikhologiya lichnosti [Activity and personality psychology]. Moscow: Nauka; 1980.
3. Skatkin MN. Metodologiya i metodika pedagogicheskikh issledovaniy [Methodology and methodology of pedagogical research]. Moscow: Izdatelstvo «Feniks»; 1986.
4. Ganzen VA. Vospriyatie tselostnykh obektov [Perception of holistic objects]. Leningrad: Izdatelstvo Leningradskogo universiteta; 1973.
5. Harris LR. A phenomenographic investigation of teacher conceptions of student engagement in learning. *The Australian Educational Researcher*. 2008; 5(1):57-79.
6. Saparkyzy Zh, Isatayeva G, Kozhabekova Z, Zhakesheva A, Koptayeva G, Agabekova G, Agabekovag Sh. The formation and development of cognitive activity of students in the learning process. *International Journal of Environmental & Science Education*. 2016; 11(18):12235-44.
7. Ozhegov SI. Slovar russkogo iazyka [Dictionary of the Russian language]. Moscow; 1949.
8. Botvinnikov AD, Lomov BF. Nauchnye osnovy formirovaniya graficheskikh znaniy, umeniy, navykov shkolnikov [The scientific basis for the formation of graphic knowledge, skills of schoolchildren]. Moscow: Pedagogika; 1979.
9. Ananov BG, Rybalko YeF. Osobennosti vospriyatiya prostranstva u detey [Features of the perception of space in children]. Moscow: Prosveshcheniya; 1964.
10. Postalovskiy IZ. Trenirovka obraznogo myshleniya [Imaginative training]. Odessa: Mayak; 1997.
11. Yakimanskaya IS. Razvitiye prostranstvennogo myshleniya shkolnikov [The development of spatial thinking of schoolchildren]. Moscow: Pedagogika; 1980.
12. Demidov VYe. Kak my vidim to, chto my vidim [How do we see what we see]. Moscow: Znaniya; 1987.
13. Tashkeyeva G, Abykanova B, Sariyeva A, Sadirbekova D, Marhabaeva A. Application of Methods of Interactive Training in the Educational Environment of Higher Educational Institutions. *Proceedings of 16th International Multidisciplinary Scientific GeoConference SGEM 2016*; 2016: 747-53.
14. Abykanova B, Yelezhanova S, Mailybayeva A, Sadirbekova, D, Turmukhanova G, Kabiden K. Information technology in modern education. *Revista Dilemas Contemporáneos: Educación, Política y Valores*. 2019; 6 (Special Edition).
15. Abykanova B, Idrissov S, Saltanova G, Shazhdekeyeva N, Syrbayeva S. The problem of practice-oriented instruction in higher education. *Revista Espacios*. 2017; 38(56):2-6.
16. Tashkeyeva G, Abykanova B, Idrissov S. Intensification of students' creative activity in educational environment of higher educational institutions. *Life Science Journal*. 2014; 11(11s):133-7.

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