



Managing the Process of Cognitive Activity Development in Students of Pedagogic Specialties in Higher Education

Nina Mikhailovna Stukalenko^{1*}, Liza Naviy², Gulbakhyt Zholdasbekovna Menlibekova³, Nazgul Anarbek⁴, Balym Tyulegazinovna Abalakova⁵

¹Kokshetau State University of Sh. Ualikhanov, 76 Abaya Street, 020000 Kokshetau, Kazakhstan, ²Kokshetau State University of Sh. Ualikhanov, 76 Abaya Street, 020000 Kokshetau, Kazakhstan, ³Eurasian National University of L. Gumilev, 5 Munaytpasova Street, 010008 Astana, Kazakstan, ⁴Kazakh National University of Al-Farabi, 71 Al-Farabi Avenue, 050040 Almaty, Kazakhstan, ⁵East-Kazakhstan State University of S. Amonzholov, 30 Gvardeyskoy Divizii Street, 070000 Ust-Kamenogorsk, Kazakhstan.
*Email: nina.m.stukalenko@gmail.com

ABSTRACT

One of the significant problems in theory and practice of education management is managing the process of cognitive activity development in prospective specialists in the conditions of professional education. Various social and economic changes, which are currently happening in all of the life areas, stimulate human activity. Because of this, we are faced with the need to prepare pedagogic specialists, who can meet the current requirements that orient education system on the cognitive activity development, because the education has to provide successful personality integration in the world culture. Cognitive activity development is one of the priority directions in the present education system, which allows the college students to navigate in their future professional activity quickly and correctly and to flexibly adapt in the world of science and the new education system. Due to this, the system of higher professional education requires the development of conditions for managing the process of cognitive activity development in prospective teachers.

Keywords: Education Management, Managing the Education, Higher Education, Professional Education, Cognitive Activity, Cognitive Interest
JEL Classifications: I210, I280, Z180

1. INTRODUCTION

On the present stage professional education has to be oriented at developing prospective specialists' ability for independent task-solving, quick adaptation to the occurring changes, navigate in the fast-flowing informational stream and make responsible decisions. The goal of an education manager in colleges is to manage the process of self-organizational and self-educational skills in the students.

High significance of the "Personality activity" concept defines a strong interest of pedagogic researchers towards the problem of developing students' cognitive activity. In order to actualize this ability in a person's cognitive activity it is necessary to get

students' natural urge towards conscious and active knowledge, skills and abilities acquisition. This pedagogic statement has a great significance for higher professional education system. One of the aims of state education management program is reaching a high level of higher education quality, which would satisfy the needs of job market, correspond with the tasks of industrial and innovational country development and be coherent with the best educational practices world-wide.

One of the requirements towards the students' education level, which is articulated in the State mandatory standard of higher education, is mastering the skills of acquiring new knowledge, necessary for everyday professional activity. In particular, this requirement concerns the students of pedagogic specialties, who

are faced with the need in relatively high activation of their own cognitive activity. In the contemporary conditions there is a need in a social and professionally active personality of a teacher, who has high competence, professional mobility, independence, ability to constantly improve his professional knowledge, skills and abilities, professional self-actualization and support of the further creative growth. All of the abovementioned defines the goal of educating a prospective teacher, who would be able to take responsibility for his own education and become a subject of his own professional growth. Cognitive activity development would allow prospective teacher to actualize his potential, to increase the proficiency level and creative self-development, to create further professional activity and to perform life-long self-education.

The need of prospective teachers' cognitive activity development is defined by a controversy between the need in preparing teachers of new formation and the incomplete development of organizational and managerial aspects of college education process, which fully provide cognitive activity development in pedagogic specialties students. The problem's theoretical and practical significance defined the choice of the aim of the present study: To reveal and to experimentally prove the most efficient ways of cognitive activity development in prospective students in the frame of college education process.

During the study we proposed the following hypothesis: If pedagogic specialties students' education includes a scientifically verified model of education process management, which is based on a module technology, active learning methods and corresponding scientific and methodic support, it will efficiently promote the development of their cognitive activity. During the study we solved the following tasks: To analyze the current state of the problem of cognitive activity development in pedagogic specialties students during professional education; to generalize the essence of "Students' cognitive development" concept, based on the conducted analysis; to develop, scientifically explain and experimentally verify the level of education process model, which is based on the module technology, active learning methods and corresponding educational and methodic support, aimed at the cognitive activity development in prospective teachers.

2. METHODS

During the conduction of the study we used the following types of methods: Theoretical (analysis, synthesis, classification, generalization, deduction, induction, analogy and modelling); empirical (observation, survey, questionnaire and interview); experimental (stating, developmental and diagnostic experiment); statistical (statistical analysis of the data, qualitative and quantitative analysis of the study results).

Methodologic basis of the study consists of modern education frameworks, fundamental statements of higher education pedagogics (Abdulina, 1995; Babanskiy, 1992; Ilina, 2001), theory of professional education (Gershunskiy, 1997; Kenzhebekov, 2002; Kuzmina, 1990), theory of professional competencies development (Adolf, 1998; Bepalko, 2004; Kozberg, 2000; Stukalenko et al., 2013), theory of cognitive interest development (Ligay et al., 2015;

Ibraeva and Stukalenko, 2014) and theory of professional activity (Ilyasova, 2006; Markova, 1996; Savostyanov, 2007; Stukalenko, 2015). The study also references the governmental documents (The Concept of Higher Pedagogical Education of the Republic of Kazakhstan, 2005; The Concept of Continuous Pedagogical Education of the Teacher of New Formation of the Republic of Kazakhstan, 2005; The Law of the Republic of Kazakhstan "About Education," 2007), scientific works on the studied problem by national and international researchers, periodic editions of Kazakhstan and other countries, proceedings of scientific and applied conferences, educational programs, educational and methodic books.

3. RESULTS

3.1. Theoretical Part of the Study

During the conducted study we generalized the characteristic of the main concept of the studied process. Cognitive activity of a student is a personality trait, which manifests in his attitude towards cognitive activity, his urge for independent work, aimed at student's acquisition of professional knowledge and activity means, which manifests in active cognitive activity during the perception and thinking processes. Cognitive activity is a quality of a student's personality, which presents in his involvement in the cognitive process, highly visible urge to solve various especially difficult tasks and his wish to continue the lesson after it has ended. Moreover, cognitive activity, as a way of cognitive need manifestation, provides a student's orientation towards understanding the goals of educational activity, thus supporting a more thorough and deeper educational information acquisition.

The essence of managing students' cognitive activity development process consists of organizing the education process in college and constructing a validated model of the studied process, which implies defining particular aims and tasks, constructing the content and the method by using modern education technologies, as well as controlling and analyzing the reached results. In order to do this, during present study we developed a model of students' cognitive activity development process, which reflects its general structure and consists of the following main components: Goal-oriented component (the main goal and tasks), motivational component (motivation towards activation), content component (education content), activity component (technology of actualizing), resultative component (results of the process) and analytical component (analysis of the results). Let us present the characteristic of these components:

1. Goal-oriented component includes aims and tasks of the studied process; the main goal is the development of students' cognitive activity, which promotes their actions, self-education and self-development.
2. Motivational component includes prospective teachers' development of robust positive motivation towards cognitive activity development, which would stimulate them to perform determined systematic work on improving professional knowledge, skills and abilities.
3. Content component is a sum of knowledge, abilities and skills, views and beliefs, as well as a certain level of prospective teachers' theoretical and practical competence;

this component includes a system of professional knowledge, which participate in stimulating students' cognitive activity, developing their creative thinking and cognitive interest.

4. Activity component is a system of means for reaching the goal and tasks of the studied process, which include teachers' and students' activity and educational methods, types and means used by them, which represent the technology of students' cognitive activity development; in this case it is a technology of active learning, including systematic organization of students' cognitive activity development.
5. Resultative component is the results, obtained by the student during the education process; the main result of the studied process is prospective teachers' cognitive activity, professional competencies and their belief in the need for cognitive activity and personal self-education.
6. Analytical component includes analysis of the reached results and their correction, if necessary; another significant component of the studied process is the students' self-reflection, which promotes the diagnostics of the level of their cognitive activity and results correction.

Resultative and analytical components reflect the efficiency of the studied process and characterized the reached results in correspondence with the set goal.

The presented components of the students' cognitive activity development model possess all characteristics of a system - process logic, inter-connections of all its parts and integrity.

Analysis of the studied problem showed that college education process still lacks the use of new education technologies opportunities for students' cognitive activity development. Because of this, the solution of present problem becomes a significant task of modern pedagogic education.

During our study students' cognitive activity development was performed with the use of active methods, which include all types of classes. Special characteristics of active learning methods consist of high level of students' thinking, intellectual and analytical activity, which facilitates a more permanent knowledge acquisition, increases the interest towards the lessons, is related to positive emotions and causes an emotional and intellectual response to the education. Moreover, it is accompanied by a high level of motivation and self-management, communication is based on the business, cognitive activity, creative and communicational skills develop well. During the study we developed an educational module "Modern pedagogic technologies," which is based on the module technology. Module education is founded in the main idea, which consists of the fact that a student has to learn by himself, while a teacher has to perform the control over his education - To motivate, organize, activate, coordinate, consult and control it. The module technology, combined with active learning methods, efficiently facilitates students' cognitive activity development.

The technology of cognitive activity development in the pedagogic specialties students uses active learning methods. Active learning methods are the ways of activating educational and cognitive

activity during the process of studying the material, when not only teacher is active, but also the students.

3.2. Practical Part of the Study

During the study we organized a pedagogic experiment, which tasks included studying the problems of cognitive activity development in pedagogic specialties students in the college education process, evaluating a number of active learning methods during the studying of educational module "Modern pedagogic technologies" and validation of its efficiency level for students' cognitive activity development. We evaluated the educational module "Modern pedagogic technologies" in the amount of 1 credit - 15 class hours and 15 h of independent work of the student. Module program is developed on the basis of module education technology, which teaches prospective teachers to perform independent search of knowledge, navigates the search, develops cognitive activity and performs motivational management of their education.

During the experimental work we used the following active learning methods, aimed at prospective teachers' cognitive activity development: Work in small groups on the topic "Education is a global object of pedagogic paradigm," discussions on the topics "Education as multi-aspect phenomenon," "Main directions of learning in the modern education;" brainstorm on the topics "Ability to learn is the most significant characteristic of the educational activity subjects," "Pedagogic functions and competencies," "Variety of pedagogic technologies in the modern education;" seminar-discussion "Developmental learning in the education system;" imitation exercises on the topic "Interaction of the education process subjects;" business games "Difficulties in pedagogic communication," "Influence of educational and pedagogic cooperation on the educational activity," etc.

Thus, in order to develop cognitive activity in college students of pedagogic specialties we evaluated a model of the studied process with regard to the constructed education module "Modern pedagogic technologies" and active learning methods. In order to assess the efficiency of the developed model we organized and conducted a pedagogic experiment, which structure consists of the following stages: Exploratory, stating and developmental stages.

The conditions of pedagogic experiment and the experimental solution of the abovementioned tasks required corresponding experimental sites and respondents. These requirements defined the preparation and organization of the conducted experiment. In order to increase its validity and to reach the highest level of results reliability, we provided a representative subject sample of the experimental and control groups (CG). Empirical and experimental work was conducted on the pedagogic specialties students; their cumulative amount was 140 people.

During the exploratory stage of the experiment we revealed the opportunities for the cognitive activities development in college students of pedagogic specialties. During the stating stage the students participated in the initial assessment of cognitive activity level. As a result of the stating experiment we revealed that the amount of pedagogic specialties college students with high cognitive activity level is not close to the maximum. Control and

experimental student groups were organized with regard to their representativeness (initially the students had to have approximately the same cognitive activity development level).

Developmental experiment was conducted in two stages: Introduction the developed model of the studied process into the educational and mentoring process and final control of the students' cognitive activity level. During the conduction of the complex study it was important to predict obtaining such statistical results, which would be sufficiently valid and representative. Usually in the pedagogic problems studies the priority goes to the most popular analysis method - survey. In our study we used a number of methods, which implied control and open questions. These were the study methods we used:

1. Survey method, which included the questions on revealing the cognitive activity level, as well as the level of interest towards activating educational and cognitive activity.
2. Expert evaluation method, which included two blocks of questions: Questions, reflecting the prospective teachers' representations of the cognitive activity and self-evaluation of its level; and questions, which define the most efficient methods and forms of education for cognitive activity development.
3. Interview method, which was used to study the prospective teachers' cognitive orientation with regard to their psychological characteristics, tendency to activate educational activity and to self-educate, which allowed obtaining the data on the presence of the students' interest in cognitive activity development, on the correlation of this interest with the prospective teachers' education quality and on the dynamics of cognitive activity development and self-education.
4. Observation method, which was used to evaluate the cognitive activity development level and which, as a part of a complex study method, provides the integrity and reliability of the obtained material.

Furthermore, in order to study the cognitive activity level in pedagogic specialties students we used the methods of Skatkin (1995), Bogoyavlenskaya (1991), Shamova (1990). During the experiment, for getting a fuller characteristic of the obtained results, we defined three levels of students' cognitive activity: High, medium and low levels, which were described in correspondence with the criterions from these methods.

According the Skatkin method, a significant element of students' cognitive activity is the characteristic of the levels of its development. Replicating activity is characterized by students' urge to understand, memorize and replicate the knowledge, to master the mean of its implications (work with printed materials and the computer, tasks-solving, etc.). Interpretational activity is characterized by students' urge to reveal the essence of studied content, to find the object's essence, urge to reveal the connection between the objects and the processes, to master the knowledge implication in the changed conditions. A distinctive characteristic of the cognitive activity is the robustness of voluntary effort, which presents in the fact that the student strives to finish the act he began, does not refuse to solve the task in case of difficulties, but rather searches for ways to solve it. Creative level of the activity

is characterized by the student's urge to deeply understand the object's essence and to search and find new means for reaching this goal. With regard to that we developed three cognitive activity levels: Low (replicating level), medium (interpretational level) and high (creative level). Students' cognitive activity development level was defined while they were solving certain tasks. As a result we observed positive dynamics of the cognitive activity development in the experimental group (EG) by comparing the data of the stating and developmental stages of the experiment.

According to the Bogoyavlenskaya method, students' educational and cognitive activity does not contain separate activity characteristics, but the activity is viewed as an integral process. In this method the following students' cognitive activity levels are defined depending on the cognitive activity type: Reproductive level, during which the students generally remain in the frame of initially discovered activity mean; heuristic level, which is characterized by the urge to improve one's own activity and to search for the new ways of solving the problem; creative level, which is the highest intellectual activity level, characterized by the initiative in tasks setting and solving. This method, used in the present work on students' cognitive activity development, allowed us to assess the dynamics of its levels. Considering the criterions of this method we defined three cognitive activity levels: Low (reproductive level), medium (heuristic level) and high (creative level). The level of students' cognitive activity development was determined as the result of their performance of the special tasks the following way: High level - with 100-81% of the correct answers; low level - with 60% or less of the correct answers. During the empirical and experimental work this method also revealed positive dynamics of cognitive activity development during the comparison of stating and developmental stages of the experiment.

Furthermore, in the conditions of college education process and the conducted experimental work on the cognitive activity development with the use of active learning methods in studying the developed education module "Modern pedagogic technologies," we studied the following students' cognitive activity levels by the Shamova method. (1) Low cognitive activity level, which is characterized by student's urge to understand, memorize and reproduce the knowledge to master the way of their implication, according to the example; (2) medium level of cognitive activity, which is characterized by student's urge to reveal the essence of the studied content and to get in the essence of the object; (3) high level of cognitive activity, which is characterized by the interest and urge not only to thoroughly get into the essence of objects and their interaction, but also to find a new way of solution for this goal. In this method students' cognitive activity development level was defined during their solution of special tasks. As a result of the experimental work we revealed positive dynamics in cognitive activity development in the EG during the comparison of the data from stating and developmental stages of the experiment.

Generalized results of the conducted experimental work are presented in the Table 1; CG is the control group, EG - The experimental group. The Table 1 uses the following indicators for the analysis of the experimental methods results: 1 - By the

Table 1: Dynamics of students' cognitive activity development during the comparison of the levels in the stating and developmental stages of the study, defined with the used methods

Group name	CG (%)			EG (%)		
	1	2	3	1	2	3
Stating experiment						
Low	41.25	52.5	52.5	38.75	50	50
Medium	43.75	35	32.5	45	35	32.5
High	15	12.5	15	16.25	15	17.5
Developmental experiment						
Low	42	50	44.5	8.75	21.25	23.1
Medium	43.2	34.5	41.1	51.25	43.55	42.5
High	14.8	15.5	14.4	40	35.2	34.4

CG: Control groups, EG: Experimental group

Skatkin method, 2 - By the Bogoyavlenskaya method, 3 - By the Shamova method.

The results of the experiment allowed seeing the dynamics of cognitive activity development in pedagogic specialties students, who participated in the experiment. The presented data demonstrate that, as a result of the experimental work, cognitive activity level in the EG is significantly higher than in the CG. The results, obtained in the EG, compared to the results of the CG, prove the efficiency of the developed model of the cognitive activity development process in pedagogic specialties students, based on the active learning methods.

4. DISCUSSION

Present study was conducted by a collaboration of authors, which resulted in the creation of an extensive experimental ground based in Kokshetau State University of Sh. Ualikhanov, Eurasian National University of Gumilev, Kazakh National University of Al-Farabi and East-Kazakhstan State University of Amonzholov. The results of the conducted study were discussed during the meetings of those departments, the scientific seminar "Actual problems of psychological and pedagogic science and modern education" and on the international scientific and practical conferences: "Valikhanov's readings," "Current problems of contemporary education and pedagogic specialists training" in Kazakhstan (Kokshetau, Astana), "Introducing new educational technologies and principles of educational process organization" (Singapore), "Modern education: Problems and solutions" (Bangkok, Thailand), "Innovative technologies in higher and professional education" (Majorca, Spain), "Education and science without borders" (Munich, Germany), "Actual Problems of Education. Experience of Realization of Bologna Agreements" (Amsterdam, Netherlands), "Current problems of science and education" (Moscow, Russia), "Problems of international integration of national education standards" (Paris, France). The generalized results of the conducted study are being published for the first time.

5. CONCLUSION

The results of the pedagogic experiment proved the need to develop and introduce the educational module "Modern pedagogic

technologies" for prospective teachers in the conditions of higher professional education, along with its meaning and actualized opportunities of the students' cognitive activity development with active learning methods. Moreover, during the study we addressed the following questions: Specification of the goals and tasks of the cognitive activity development process in pedagogic specialties students; evaluation of the opportunities for their realization; development of a plan for executing the studied process; execution of the developed plan; analysis of the obtained results. During the analysis and the generalization of the study data we addressed: The information on the issue of the education module for prospective teachers; content, methods, types and means of prospective teachers' education; results and efficiency of the studied process; students' motivation and behavior.

Analysis of the results of the conducted study allowed drawing the following conclusion: There is a strong tendency for increase of the students' cognitive activity level during the implication of active learning methods. This fact should be regarded not only during the development of theoretical bases for prospective teachers' professional training, but also in methodic bases of organizing their educational and cognitive activity. The presented tables demonstrate higher scores of the EG students. The efficiency of the experimental work is confirmed by the results of the pedagogic experiment. Thus, according to the results of the conducted study, we proved the efficiency of the developed, scientifically validated and experimentally proven educational process model, which is directed at the cognitive activity development in pedagogic specialty students, based on the module technology, active learning methods and corresponding educational and methodic support.

Scientific novelty of the study consists of the scientific validation and experimental evaluation of the efficiency of the developed model of education process, aimed at the cognitive activity development in pedagogic specialties students. The conducted study has theoretical and practical significance. Theoretical significance of the study consists of the conducted analysis of the problem of cognitive activity development in pedagogic specialties college students; based on the conducted analysis, we generalize the characteristic of "Students' cognitive activity" concept; we developed and evaluated the education process model, which facilitates students' cognitive activity development. Practical significance of the study consists of the development of educational and methodic support for an active methods complex by module technology, which is aimed at cognitive activity development and can be used during the work with students, as well as for the post-secondary education courses for the teachers; based on the results of the study, we prepared recommendations on the cognitive activity development in pedagogic specialties students.

The results of the study allow proposing the following recommendations: To introduce the developed and scientifically validated model of the students' cognitive activity development in the college education process and to use the suggested method of cognitive activity development, which is based on the module technology, active learning methods and educational and methodic support in form of the educational module "Modern pedagogic technologies."

The conducted study does not propose the exhaustive solution to the problem of cognitive activity development in students; it can be viewed as one of the possible solutions of the studied problem. Further study perspectives consist of searching for new solutions of the present problem in the context of innovative directions in professional education modernization.

REFERENCES

- Abdulina, O. (1995), Actual problems of pedagogical education. *Journal of Higher School of Kazakhstan*, 5, 58-63.
- Adolf, V. (1998), Theoretical Bases of Formation of Professional Competence of Teachers. Moscow: Nauka. p344.
- Babanskiy, Y.U. (1992), Competence Model: From the Idea to the Educational Program. Moscow: Nauka. p366.
- Bespalko, V. (2004), Competences in the professional education. *Higher Education Today*, 11, 56-62.
- Bogoyavlenskaya, D. (1991), Formirovanie Pedagogicheskikh Sposobnostey. Moscow: Pedagogika. p124.
- Gershunskiy, B. (1997), Philosophy of Education for the XXI Century. Moscow: Nauka. p365.
- Ibraeva, I., Stukalenko, N. (2014), O razvitii poznavatelnoy aktivnosti buduschikh pedagogov. *Mezhdunarodnyy Zhurnal Eksperimentalnogo Obrazovaniya*, 8, 56-57. Available from: <http://www.rae.ru>.
- Ilina, T. (2001), Fundamentals of teachers professional competence. *Management in Education*, 1, 166-171.
- Ilyasova, K. (2006), Introduction to Teaching Activities. Almaty: Kazakhstan. p225.
- Kenzhebekov, B. (2002), The nature and structure of professional competence of a specialist. *Higher School of Kazakhstan*, 2, 171-175.
- Kozberg, G. (2000), Formation of Professional Competence of the Teacher in the Teaching Activities. Voronezh: Znaniye. p242.
- Kuzmina, N. (1990), The Professionalism of a Teacher'S Personality. Moscow: Nauka. p232.
- Ligay, M., Ermekova, Z.H., Stukalenko, N. (2015), Vazheyshie priorityety obrazovatelnoy politiki respubliky Kazakhstan i vozmozhnye puti ikh realizatsii. *Mezhdunarodnyy Zhurnal Eksperimentalnogo Obrazovaniya*, 11, 715-718. Available from: <http://www.rae.ru>.
- Markova, A. (1996), Psychology of Professionalism. Moscow: Publisher Prospect. p308.
- Savostyanov, A. (2007), Basis of the Professional and Personal Growth. Moscow: Nauka. p144.
- Shamova, T. (1990), Obschepedagogicheskaya Podgotovka Uchitelya v Sisteme Vyshego Pedagogicheskogo Obrazovaniya. Moscow: Prosveschenie. p142.
- Skatkin, M. (1995), Professionalno-pedagogicheskaya podgotovka studentov. *Pedagogika*, 2, 42-47.
- Stukalenko, N. (2015), About innovative development of university education in the Bologna process. *International Journal of Applied and Fundamental Research*. Available from: <http://www.science-sd.com/461-24834>.
- Stukalenko, N., Ermekova, Z.H., Tasbulatova, G., Kalymova, A., Kainikenova, G. (2013), Formation of future teachers' professional skills during the period of pedagogical practice. *Life Science Journal*, 12s, 139-141. Available from: <http://www.lifesciencesite.com>.
- The Concept of Continuous Pedagogical Education of the Teacher of New Formation of the Republic of Kazakhstan. (2005). Astana: Adilet.
- The Concept of Higher Pedagogical Education of the Republic of Kazakhstan. (2005). Astana: Adilet.
- The Law of the Republic of Kazakhstan about Education of 27.07. 2007. (2007), No. 319-III.