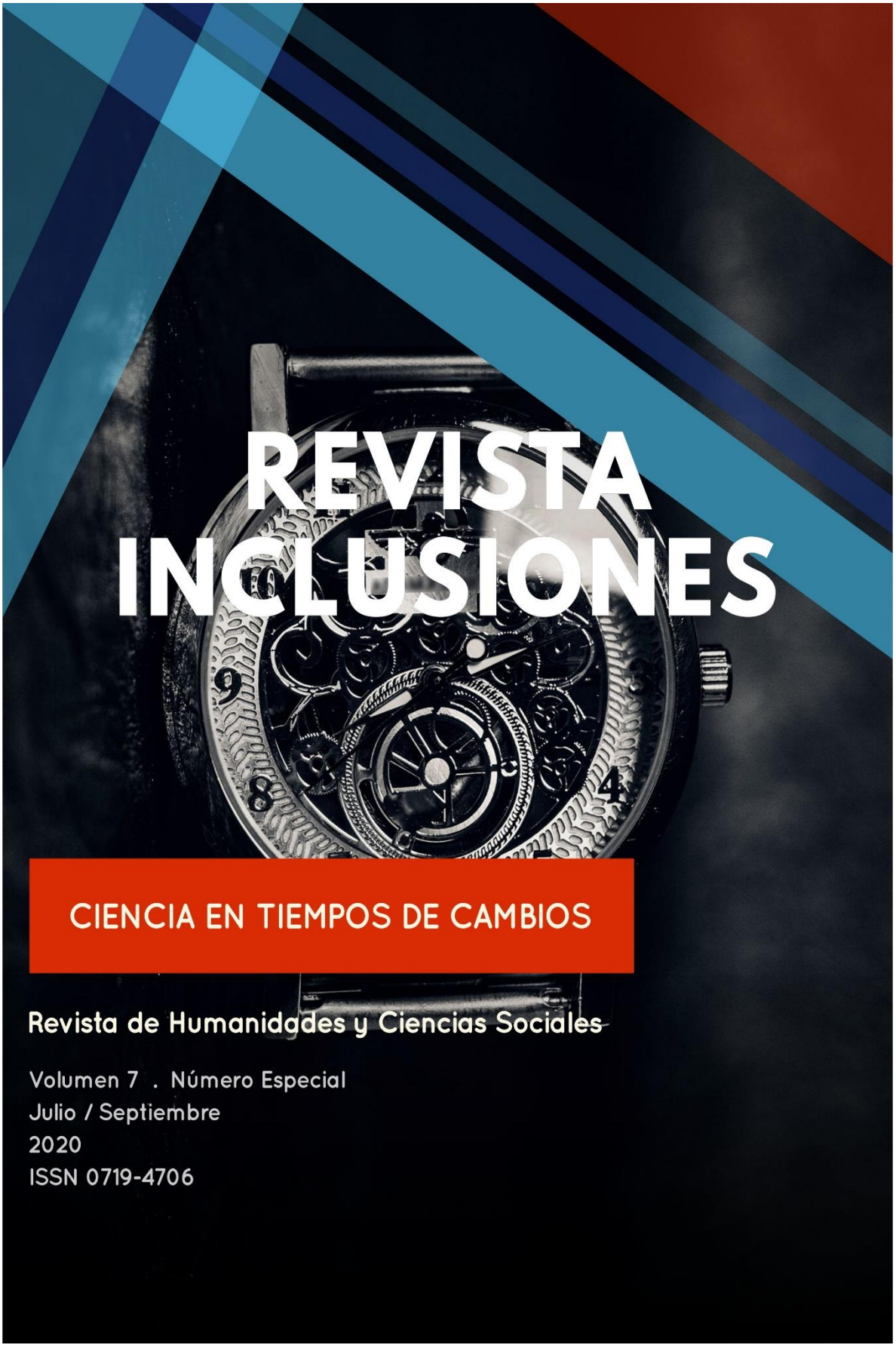

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APPROACHES TO THE PROBLEM OF EVALUATING STUDENTS' COMPETENCES IN ACCORDANCE WITH PROFESSIONAL STANDARDS

Ph. D. Axiniya E. Egorova
M. K. Ammosov North-Eastern Federal University, Russian Federation
ORCID 0000-0003-0768-564X
kse-egorova@yandex.ru
Ph. D. Marina P. Andreeva
M. K. Ammosov North-Eastern Federal University, Russian Federation
ORCID 0000-0001-8639-7886
andreeva_odonu@list.ru
Ph. D. Vasiliy V. Nokhsorov
M. K. Ammosov North-Eastern Federal University, Russian Federation
ORCID 0000-0003-2412-4019
vv.nokhsorov@s-vfu.ru
Ph. D. Mariya I. Arzhakova
M. K. Ammosov North-Eastern Federal University, Russian Federation
ORCID 0000-0002-2060-3082
pmippl@mail.ru
Ph. D. Tatyana D. Vasileva
M. K. Ammosov North-Eastern Federal University, Russian Federation
ORCID 0000-0002-9249-5631
vatadm1970@mail.ru
Ph. D. Paraskovia V. Lazareva
M. K. Ammosov North-Eastern Federal University, Russian Federation
ORCID 0000-0002-7818-7018
patik_@mail.ru
Ph. D. Maria S. Dmitrieva
M. K. Ammosov North-Eastern Federal University, Russian Federation
ORCID 0000-0003-2282-1187
mariasavvinova@mail.ru

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Abstract

This article examines approaches to the problem of assessing and evaluating competences, methods and mechanisms for measuring results of the educational program 44.03.05 – "Pedagogical Education", the specialization "Biology and Chemistry" in a particular regional university environment. The study has established that competences play the main role as the final result of education in the real educational process within the competency based approach, while educational technologies serve for the formation of these competences. Evaluation tools, assessment technologies and evaluation procedures serve as a means of the claimed results proof. The application of the competency based approach in the educational process is closely connected with the problem of assessing students' competence. Competency and competence are able to act as the main system-forming factors, which unites the activity of various departments of the university or teaching modulars (subjects) within a particular educational institution. Our educational program of the educational program "Pedagogical Education", being a methodological system for applying the ideas of the

competency based approach, is aimed at solving problems in the field of professional activity, since it is focused on the formation of the methodological student competence while being one of the approaches to assess and evaluate students' competences.

Keywords

Federal State Educational Standard (FSES) - Pedagogical education– Competences

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Introduction

The topicality of the study is caused by the need to introduce a competency based approach to the Russian educational system, which is now greatly influenced by the European and global integration trend, the globalization of the world economy. This approach sets the task of changing the educational paradigm, the principles of the graduate's adaptability to the principle of competency[1]. In this regard, Zimnyaya I.A., analyzing the theoretical and methodological content of the competency based approach with reference to the concept of competence/ competency, writes that competency-based education (CBE) was formed in the 1970s in America[2]. The author points out three stages in the formation of the CBE approach in education: the first stage (1960-1979) is characterized by the introduction of the category "competence" into the scientific apparatus; the second stage (1970-1990) is characterized by the use of the competence/competency category in the teaching theory and practice; since 1990 the third stage has been introduced, which is characterized as the beginning of studies of competency as a scientific category in Russia[3]. The last decade has been marked as a shift from such concepts as "education", "general culture", "upbringing" to the concepts of "competence", "student's competency"[4].

On this basis, we see that the movement of higher education institutions to new educational standards, the conceptual basis of which is considered a competency-based approach, consists in replacing the Teaching Paradigm with the Learning Paradigm which defines the educational process as the one which does not only stimulate to perform actions, but to assess and analyze the results of these actions as well[5]. Within the study, we revealed the mechanisms for introducing the ideas of a modular and competency based approach under the conditions of a particular institution of higher education and factors to improve students' teaching and training process when considering the actual educational situation; different articles have been published on the issue mentioned. It is noted that the most problematic are still the issues of assessing and evaluating the acquirability of competencies stated in Federal State Education Standards (FSES), the methods or mechanisms for measuring results, since the result is not only subject knowledge but also the properties and qualities of the individual manifested in the form of competences[6]. Thus, the main goal of

[1] V. M. Filippov, (Ed). Education Reform: Analytical Review (Moscow: Center for Educational Policy, 2003)

[2] T. E. Isaeva, "To the nature of Pedagogical Culture: Competency-Based approach to its Structure". Teacher of Higher School in the 21st Century, works of International Scientific and Practical Internet Conference. Rostov-on-Don (2003).

[3] I. A. Zimnyaya, Key competences as the effective-target basis of competency based approach in education. Author's version (Moscow: Research Center for Quality Problems in Training Specialists, 2004)

[4] I. A. Zimnyaya, Key competences as the effective-target basis of competency based…

[5] N. F. Efremova, Competencies in education: formation and evaluation (Moscow: National Education, 2012).

[6] K. E. Egorova, "Factors contributing to the development of the personality in the context of an integrative system of continuous classical university education". Humanitarian education as an imperative of the development of civil society: materials of the international scientific and educational forum Education, Forward-Yakutsk: Publishing House of NEFU (2014): 139-143 y K. E. Egorova, "Features and mechanisms for the implementation of federal state educational standards at different levels: experience and problems". Collection of materials of the forum with international participation "Natural Science Education in the Context of Transition to New State Educational Standards: Experience and Prospects". Northeast Federal University. Yakutsk: Publishing House of NEFU (2016): 9-15.

our research is a theoretical analysis of existing literature sources on the problem of the competency based approach and the identification of methodical ways and conditions of its application, as well as assessment of students' competences (the educational program "Teacher Education", specializations "Biology and Chemistry" and "Chemistry").

Materials and Methods

The carried out theoretical analysis of the issue made it possible to find out that almost all authors of existing publications are of unanimous opinion that the competency based approach is an objective need and the only way to ensure the competitiveness of graduates at the present stage. This approach is able to act as the main system-forming factor and is directly related to the problem of assessing students' competences.

Despite existing amount of preparatory work within the competency based approach in higher education institutions the questions below still remain open for many teachers:

- what kind of competences are formed by different modulars, sections or subjects of the curriculum and how to identify them?
- what training technologies help develop certain competences?
- what assessment means serve for identifying competence formation and how?
- how to form, at what levels, with what efforts and functions, what to include or not in the Federal State Education Standard (FSES)?;
- how to ensure the functioning of the FSES, its feasibility, effectiveness and updating?
- what results of the university assessment system to take into account during the accreditation, etc.?

To solve the abovementioned problems, universities are trying to involve system and activity approaches. Different studies carried out in Nizhny Novgorod Pedagogical University, have shown that researchers tried to identify the correlation between the concepts "competence", "educational results", "necessary knowledge", "skills", "employment activity", and then proposed to compare the employment activity, reflected in professional standards with the tasks and activities necessary for the educational program mastering. This article sets the problem of the formation of professional (methodological) competence among future bachelors of such pedagogical specializations as "Chemistry" or "Biology and Chemistry", etc. and approaches to the competence assessment. Considering a number of studies by Tryapitsyna A.P., Simonenko V.D., Stefanova N.L., SyasinaT.N. and others, we define professional competence as an integral characteristic of the future teacher's business and personal qualities, reflecting his level of knowledge, skills, expertise and experience, sufficient for his effective professional activity related to the decision making process. In order to obtain objective results and reveal the general picture of the students' interest in pedagogical specializations, we conducted a study among students of the educational program "Pedagogical Education", the specializations "Chemistry" and "Biology and Chemistry". The main goal of the study was to identify the motivation and orientation of students on pedagogical activity. At the initial stage of the study, different students were grouped for the survey: the first year students enrolled in 2017; students in the third year, who entered the university in 2015; students of the fifth course, graduates, who enrolled in 2013. Such a selection of courses was stipulated by our goal to see a general picture of students' motivation and their orientation on pedagogical activity. Finally, by the end of the study we also wanted to find out whether our graduates achieved the competences declared in the FSES, such as, for example, "a student is capable of monitoring and assessing the

formation of the results of the pupils' education, identifying and correcting learning difficulties" (GPC-5, i.e. general professional competence in the FSES), etc.[7]. On the whole, 63 students were surveyed.

Results

The first question for the students concerned their motive for entering the specializations. The students were given a question and, correspondingly, six answers: "What are the reasons for choosing the pedagogical program and the specialization of "Chemistry" and "Biology and Chemistry" when applying for the North-Eastern Federal University? The students answered in the following way: for the first-year students (22 students) the reason (motive) for entering these specializations was, first of all: a) low competition (27%); b) the attractiveness of the future profession (18%); for the 3rd year students (21 students): a) attractiveness; b) the prestige of the future profession (38%), and for graduates-bachelors (20 students) who entered the university five years ago the reasons (motive) for choosing these specializations were: a) a lower passing score (33%); b) interest in this field of science. Below there is a bar graph of the students' answers received; the graph represents different level of motivation among students of different years of enrollment.

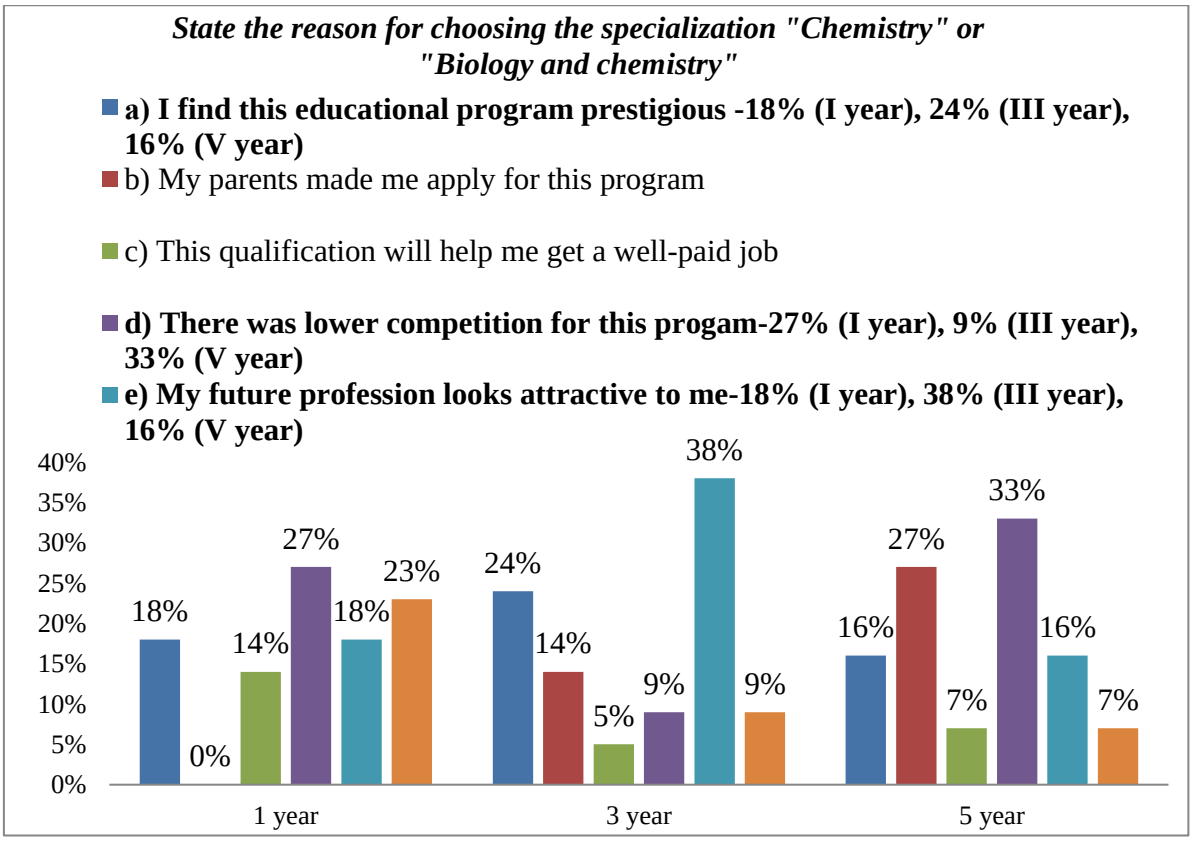

Figure 1
State the reasons for choosing the specialization "Chemistry" or "Biology and chemistry"

[7] Federal state educational standard of higher education in the field of training 44.03.01 Pedagogical education (Bachelor's degree). Approved by the Ministry of Education and Science of the Russian Federation of February 22, 2018 num 121

The results obtained (as expected) have shown that students have different motives for entering the specializations, but such reasons (motives) as a "low competition for the educational program", "prestige" and "attractiveness" of the profession are found in all three courses. In our opinion, such students' response at the preliminary stage of the study shows that, in general, all of the students, to some extent chose these specializations deliberately.

The next question was focused on the part of the curriculum, which the students are trained for. It is widely known that in many universities of the country students of pedagogical specializations enroll on the basis of the results of the unified state examination: the Russian language, mathematics and social studies; specialization subjects like chemistry, biology and others are not taken into account for the admission. As a result, in the process of studying principle disciplines, students have certain problems and difficulties, which can be one of the reasons for not achieving the planned results. The students were asked: "What subjects do you find most difficult to master?" The bar graph gives the following results.

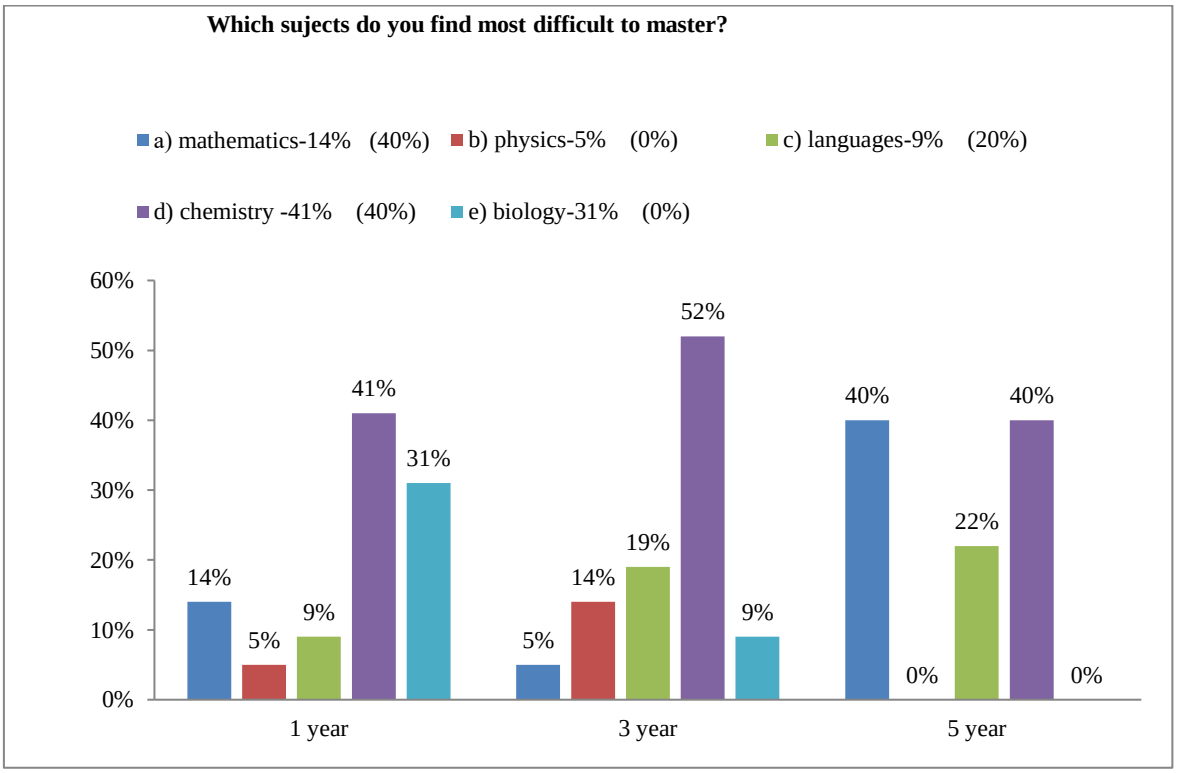

Figure 2
Which subjects do you find most difficult to master?

The results of the survey show that the greatest difficulties for first-year students are caused by such academic subjects as "chemistry" and "biology"; the third course set find "organic chemistry" and "languages" rather problematic; for the 5th year (graduates), difficulties were caused during the period of mastering such disciplines as "chemistry" and "mathematics".

The next logical question for students was the question about the quality of teaching specific academic subjects; the question aims at identifying the reasons why there are some gaps in the subject knowledge. In this regard, students were asked: "What can be improved in the teaching process of some subjects, especially chemistry?"

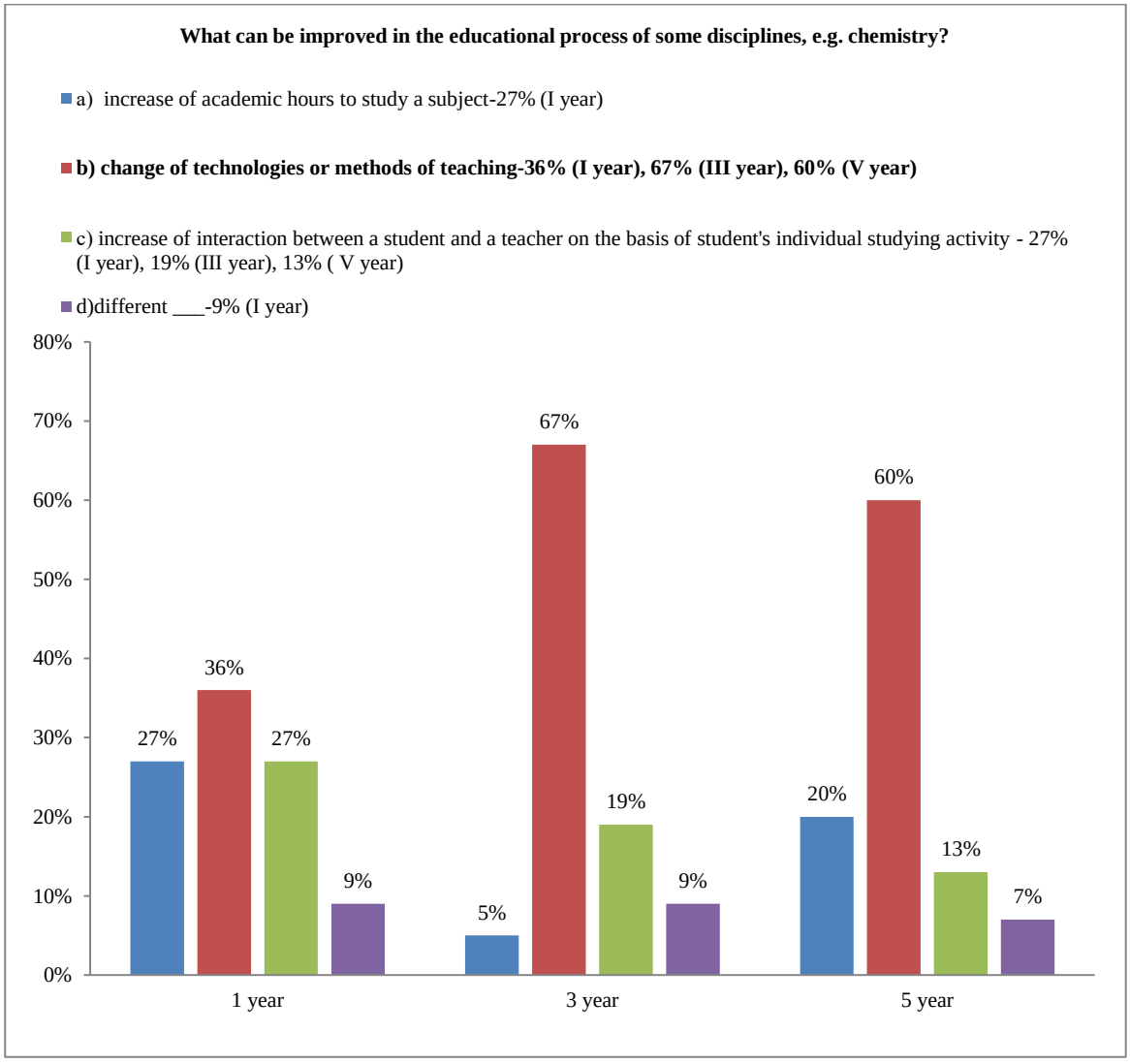

Figure 3
What can be improved in the educational process of some disciplines, e. g. chemistry?

As can be seen from the bar graph, the students are almost unanimous in their answers: in general, all three student groups suggest improving technology and teaching methods, as well as methodology for studying specific topics.

The final question was devoted to the choice of the three most important professional qualities required for the future teacher of chemistry and biology. According to the answers the following qualities are necessary: a) basic fundamental (chemical, biological) knowledge; b) skills to use information technologies; c) personal qualities such as responsibility, purposefulness, self-management, etc.

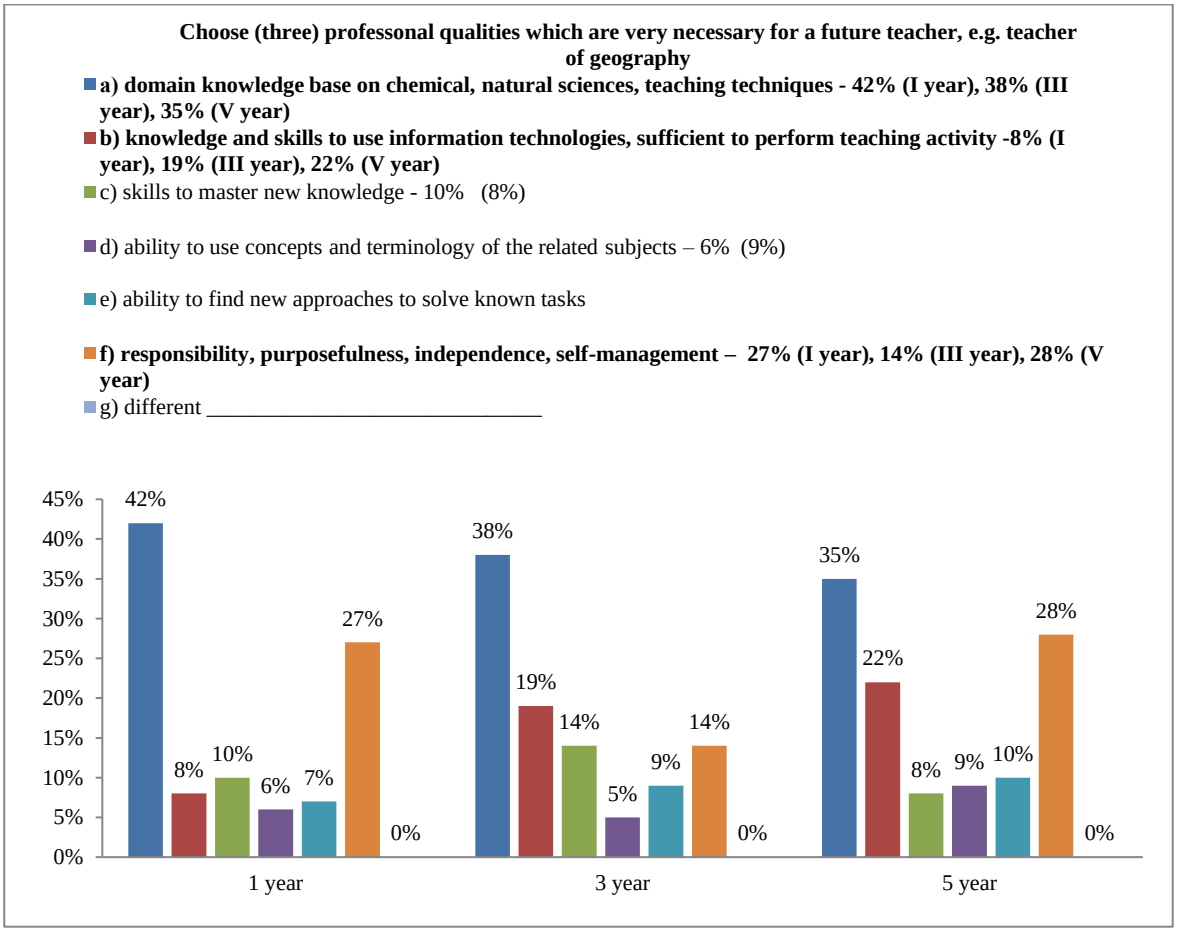

Figure 4
Choose (three) professional qualities which are very necessary for a future teacher, e.g. teacher of geography

Discussion

The theoretical analysis of the competency based approach shows that there are different views on the application of this approach in the educational process. Some authors consider it as a technology for the implementation of Federal State Educational Standard (FSES) in the educational process. At the same time, they pay attention to the fact that this approach is oriented on accepting new goals and assessing the results of vocational education, the approach also requires certain components of the educational process such as content, pedagogical technologies, monitoring and evaluation means and tools[8].

There is no doubt that this approach is essential in implementing the basic regulations of the standard in higher education institutions, but due to the fact that the pedagogical community and the teaching staff of higher education institutions are not fully familiar with the theory of the competency based approach, the lack of a unified interpretation of the concepts "competence" and "competency", their classification, etc., the application of this approach in practice is difficult; many important issues that could become the basis for project work have not been thoroughly if at all investigated. There are authors

[8] G. I. Ibragimov, "Competence approach in vocational education", Educational Technology & amp: Society, num 10 (3) (2007): 361-365.

who believe that the peculiarity of this approach lies primarily in the correct formulation of the competences set forth in the Federal State Educational Standard in order to clarify the formation, sequence and hierarchy of competencies in the course of an educational program introduction.

As Efremova N.F. writes. "...most teachers have no idea that one should control the formation and assessment of competences; those who find it obvious have no idea how to launch this process; those who understand how to do this tend to do much more than they can – how to distinguish the main thing, etc."[9]. The abovementioned allows us to make a partial conclusion that in the real process of a competency approach application the main role is devoted to the final result of educational process – competence and competency, and educational technologies are the way to form competences. Evaluation tools, assessment technologies and evaluation procedures serve as a means of the claimed results proof.

Recently, the concept "competence" has been widely discussed in the media by many authors. Competence, as many believe, is not limited to the sum of individual competences, it is the result of their synergy, an integral quality of the individual, including his individual psychological characteristics[10]. Such authors as Efremova N.F., IgnatievaE.Yu., SubettoA.I. and others, consider a competence as an integrated result, which can solve a number of problems (in contrast to the separate element of functional literacy). They point out that a competence exists in the form of activity, rather than information about it (as opposed to knowledge); it is portable (connected to the whole class of subjects of influence), it is improved not by automation and skill development, but by integration with other competences through awareness of the common basis of activity; a competence increases in the process of competency education, while the activity itself is included in the internal resources base (as opposed to the skill); it manifests itself consciously (in contrast to the skill)[11].

As Ignatieva E. Yu. writes: "... educational results at intermediate stages can manifest as separate formed components that make up the corresponding competence. At the same time, there arises an issue of defining the structure of a competence (knowledge, skills, values/attitudes towards something, etc.), since until the structure is defined, it remains vague what to shape, how and what to assess. These components must necessarily integrate into a unified construct – competence, the possession of which the student has to

[9] N. F. Efremova, "Problems of the formation of evaluation funds in universities", Higher education today, num 3 (2011): 17-22.

[10] K. D. Dyatlova and I.A. Kolpakov, "Students' individual work as a way of forming competencies. Innovations in Education", Bulletin of the Nizhny Novgorod University N.I. Lobachevsky, num 1 (2012): 25-29.

[11] N. F. Efremova, "Problems of the formation of evaluation funds in universities", Higher education today, num 3 (2011): 17-22; V. A. Bogoslovsky; E. V. Karavaeva; E. N. Kovtun; O. P. Melekhova; S. E. Rodionova; V. A. Tarlykov and A. A. Shekhonin, Methodical recommendations on the design of evaluation tools for the implementation of multi-level educational programs within the competency based approach. (Moscow: MGU. 2007); N. N. Bykova; L. A. Mierin & Zarukina, E. V. Modern educational technologies in the university: the teaching method. Student's guidance. (St. Petersburg.: Publishing house SpbGU, 2015); M. Yu. Prakhova; N. V. Zaichenko and A. N. Krasnov, "Evaluation of professional competencies formation", Higher Education in Russia num 2 (2015): 21-27 y A. I. Subetto, Evaluation tools and technologies for attesting the quality of training specialists in universities: methodology, methodology, practice. (St. Petersburg, Moscow: Research Center for Quality Problems in Training of Specialists, 2004).

demonstrate, and for the evaluation of which the development of specific tools is required[12]. For most authors, the "bottleneck" lies in insufficient development of funds of evaluation means and tools for result assessment due to poor methodological base and development of means and methods of forming competences.

Undoubtedly, the level of the graduate's competence does not depend solely on the student himself, but also on how methodologically correct those modulars (disciplines) that form a competence are included in the curriculum. Therefore, the main task of the university teacher and the whole methodological community is the competent development of a curriculum on the basis of competences and the development of procedures and criteria for evaluating learning outcomes and, accordingly, the development of evaluation funds. This issue becomes especially actual in connection with the upcoming mandatory update of the Federal State Educational Standard of the Higher Education based on professional standards.

As the analysis shows, universities use different approaches to develop funds of evaluation means and tools for assessing students' learning results. Some studies have been conducted at the Nizhny Novgorod Pedagogical University. The authors of these studies offered a conceptual framework for developing learning results assessment means and tools: the transition from competences to educational results should show that a graduate has successful acquired the employment activity characteristics. This approach, according to the authors, meets the requirements of professional standards, which mention employment activities, which a graduate is to possess upon university graduation. Indicators of competence acquirability are certain characteristics that clarify and disclose the formulation of a competence in the form of specific actions performed by a graduate who has mastered this competence[13]. At the same time, the problem of evaluating the results of future bachelors of pedagogical specialization such as "Chemistry" or "Biology and Chemistry" is directly interrelated with the concept of a professional (methodological) competence. In many studies, as, for example, by Tryapitsyna A.P., SimonenkoV.D. and others, this concept is considered as a complex of key, basic and special competences. Key competences are necessary for any professional activity; they are manifested in the ability to solve professional tasks based on the use of information, communication, socio-legal basis of the individual's behavior in the civil society.

Basic competences reflect the specificity of certain professional activities (pedagogical, medical, engineering, etc.). Special (subject-specific) competences reflect the specifics of a particular sphere of professional activity. These competencies are manifested when solving any specific professional tasks in different contexts, using a certain educational space[14]. Syasina T.N., who studies the methodological competence of the future teacher of

[12] E. Yu. Ignatieva, Means of evaluating the results of training of university students: methodolocial recommendations (Veliky Novgorod: Novgorod state university, 2014)

[13] E. N. Perevoshchikova, "Conceptual foundations of constructing means for evaluating educational results", Bulletin of the University of Minin, num 2 (2016). Retrieved from: //vestnik.mininuniver.ru/reader/search/kontseptualnye-osnovy-konstruirovaniya-sredstv-dlya/

[14] V. A. Kozyrev; N. F. Radionova and A. P. Tryapitsina, (Eds). Competence approach in pedagogical education. (St. Petersburg: Publishing House of the Russian State Pedagogical University, 2005); V. D. Simonenko, (Ed). General and professional pedagogy: Textbook for students of pedagogical universities (Moscow: Ventana-Graf. 2006) y T. V. Syasina,"The essence of the concept of "methodological competence" of the teacher". Culture of pedagogical work in the XXI century: materials of all-Russian scientific conference РГНФ (Khabarovsk, November, 18-19, 2004). Grigorieva, N.G (Ed). Part 2. Khabarovsk: Publishing House of the FENU (2004): 180-184.

mathematics, believes that methodological competence is an integral part of the formation and development of the system of professional and pedagogical training. The effectiveness of its formation and development is ensured by the creation of special pedagogical conditions, such as the development of a value-based attitude to the pedagogical profession, the integration of psychological-pedagogical, subject and methodological knowledge, etc.[15]. Sharing the author's opinion, we believe that the process of forming the professional student competence and approaches to its evaluation is a long and time-consuming process, which presupposes several stages and depends on many factors. For example, we consider a student's inner motive to be one of the factors of students'commitment to pedagogical professions (specializations). In this regard, at the concluding stage of the study, we examined the motive and professional commitment, as well as their quality of chemical and biological training of the students of the specialization "Chemistry" and "Biology and Chemistry". Knowing in advance that graduates of different years came from pedagogical colleges or secondary schools, we assumed that the motive and professional commitment, as well as their level of chemical and biological preparation, would be different. At this stage of the study, students from different courses were taken for the survey.

The analysis of the results obtained allowed us, first of all, to make an adjustment of the curriculum of the first course, according to the students' opinions. As a result a new discipline "The main sections of the school chemistry course and the methodology for their study" was added to the curriculum, as a discipline, which in its content was logically connected with the school curriculum. This discipline is studied at 1st and 2nd courses along with general, inorganic courses (1st course) and organic chemistry (2nd course). The discipline receives its further development on the 4th course in the form of the discipline "Methodology for studying the main sections of the school chemistry course". Thus, the discipline offered to students in its internal structure and logic of presentation, improves the basic chemical knowledge that they received at school, and its content acts as a link for studying university chemistry. At the same time, the parallel development of the new proposed discipline with the disciplines of the modular "Chemistry" enables students to master special competences, i.e. subject matter such as: "a student can use basic chemical and physical concepts, knowledge of the fundamental laws of chemistry and physics; phenomena and processes, studied by chemistry and physics" (SC-2, i.e. special competence); "a student has knowledge of the composition, structure and chemical properties of simple substances and chemical compounds; he has an idea of the electronic structure of atoms and molecules, the laws of chemical transformations of substances" (SC-3)[16]. When a student starts studying and mastering professional disciplines, preparing for his future profession (4th year), this discipline becomes one of the components of the formation of the student's professional and methodological competences. As a result, it allows, first, to level out the difference of initial level of chemical training for students of junior courses, and secondly, when new disciplines begin (e.g. "Theory and Methods of Teaching Chemistry" (3-4 courses)), where all components of the chemistry method are considered, students understand and realize the relations of the studied chemical disciplines with the very method of studying certain sections of the chemistry course, which is one of the factors for acquiring the planned competencies.

[15] T.V. Syasina,"Diagnostics of the formation of the methodological competence of the teacher of mathematics", Bulletin of the Pacific National State University, num 4 (27) (2012): 249-258.

[16] Sample basic educational programs of the educational program 050100 "Pedagogical Education": in 3 parts. Part 1 (Moscow: MPGU, 2012).

Thus, the initial stage of the study on the formation of professional (methodological) competence of future teachers of biology and chemistry allowed us to see the relations between students' specializations and main type of their activity – pedagogical – from the point of view of their internal motive, self-awareness, as well as problems and ways for teaching process improvement. These preliminary data of the concluding stage of the study allowed us to build the logic of our research on the formation of professional (primarily–methodological) competence of students and approaches of the students competences assessment. First of all, we paid attention to the peculiarities of the content, i.e. structure of the main educational program based on the ideas of the modular and competency based approach; we also considered creating an adequate system for monitoring the acquirability of planned learning outcomes in the form of competences, in accordance with professional standards.

The developed educational program aimed at solving problems in the sphere of professional activity, is oriented on the formation of professional (methodological) competence in the real educational process. It is considered as a *methodical system* of training in a university, which can be viewed as if it had two levels:

- as a theoretical model of a sufficiently high level of generalization, the purpose of which is to be both a cognitive tool for studying real practice and an instrument for practical improvement of the existing methodological system;
- as a really existing practice of teaching at the university on the whole and for separate educational disciplines.

With this approach, the researchers believe, the mutual influence of the theory and practice can quickly reveal contradictions and problems, determine driving forces of these contradictions, and then develop the improvement strategy and its application[17].

The theoretical level of the study views the category "methodical learning system" as a system to differentiate the patterns of interaction of participants in the educational process; the system is manifested in the functioning of its components, such as goals, content, methods, forms and means of teaching. The connection of its components makes it consistent. Therefore, in the construction of such a system, the main task is the establishment of links between different components; this presupposes mainly to understand the inner nature, the driving forces of the educational program process, thereby making a step to systematically manage the learning process and achieve the final results –competences.

The purpose of the developed methodical system is to increase the effectiveness of the educational program within a special university environment, taking into account the purpose and objectives of the university; specificity of the content of each program, its specializations; the specifics of the organization of the learning process, depending on the educational program, as well as the professional and personal preparation of the future teacher. Thus, the methodological system makes it possible to link together the content-purpose, process-activity and performance-evaluation components of the process of applying the educational program of these specializations. The content-purpose component of the system is aimed at:

[17] State educational standard of basic general education (theory and practice) (Moscow: Pedagogical Society of Russia, 1999)

– basic fundamental training of students in disciplines such as chemistry, biology and their methods of study;

– formation and improvement of professional (methodological) knowledge and competences through long-term courses, such as the discipline "The main sections of the school chemistry course and the methods of studying them", discussed above.

– development of research skills and competences through curricula adjustment with such disciplines as "Student Research and Project Work", "Elective Courses", etc., since the standards of school chemistry education focus on the activity approach in the form of carrying out various studies and projects;

The content-purpose component of the system presupposes the selection of modulars (complexes) in curricula of a more integrated content aimed at achieving the competences required in the professional sphere. A more detailed idea of selecting content modulars and specific academic disciplines for the educational program 44.03.05*Pedagogical education*, the specialization "Biology and Chemistry" has been revealed in other articles[18].

The second component of this methodological system – process-activity – involves developing a student's own educational path which ensures his independence on the basis of a modular and competency based approach. This component reflects the formation of professionally required requirements of FSES, in other words, competences. The learning process is based on the didactic principle of unity of the procedural and content aspects of education. In this regard, the training or educational process of any modular (complex, discipline), its goals, content, organizational forms, methods and means should be in accordance with the requirements of the standard and should be based on innovative technologies and modern teaching methods (distance courses, on-line training, interactive forms of conducting classes, etc.), suggesting the organization of different levels of student activity in order to achieve the declared competences and contribute to the professional activity performance(e.g. pedagogical, project work, methodical, etc.) and the development of a positive attitude and interest in their future profession. At the same time, special attention is paid to organizing the independent work of the student through the "moodl" system, which allows introducing the idea of an individual educational path through various activities, such as educational research and research work, projects, case technologies, critical thinking technology, etc..To activate independent work means to increase its role in achieving the declared competences.

The third component of the methodical system – the performance-evaluation approach –involves the development of an adequate monitoring system that is oriented on the acquirability of competencies, methods or mechanisms for measuring results, since the result is not only subject knowledge, but also qualities of an individual manifested in the form of competences. After all, forms of control should become a kind of a teaching method,

[18] K.E. Egorova, "Factors contributing to the development of the personality in the context of an integrative system of continuous classical university education". Humanitarian education as an imperative of the development of civil society: materials of the international scientific and educational forum Education, Forward-Yakutsk: Publishing House of NEFU (2014): 139-143 y K.E. Egorova,"Features and mechanisms for the implementation of federal state educational standards at different levels: experience and problems". Collection of materials of the forum with international participation "Natural Science Education in the Context of Transition to New State Educational Standards: Experience and Prospects". Northeast Federal University. Yakutsk: Publishing House of NEFU (2016): 9-15.

allowing the learner to more clearly realize his progress and drawbacks, adjust his own activity[19].

Thus, the application of the proposed methodological system for the formation of professional (methodological) competence requires a phased approach: *at the first stage* of training (presumably 1-3 courses), students enter the preparation for professional and pedagogical activity, master basic theoretical courses, initial professional knowledge and skills. This stage is called the beginning of the formation of professional (methodological) competence of the future bachelor – teacher of chemistry, biology and chemistry. The main content that students should master is concentrated on such training modulars as "Chemistry" or "Biology". These theoretical modulars serve as a basis for the formation of subject based competences, reflecting the specificity of a certain area of professional activity. For example, the modular "Chemistry" includes all components of the fundamental science of chemistry: "General and inorganic chemistry", "Analytical and physical chemistry", etc. Further, the modular "Professional training" is consistently included in the training process with such disciplines as "Psychology", "Pedagogy", "Theory and methodology of chemistry teaching". These two modulars are aimed at the students' introduction into the profession of a chemistry teacher. After the content of these modulars is studied, students get a new status – the future teacher of chemistry – since they have acquired special competence in chemistry, general professional competence in psychology, pedagogy and initial knowledge of the theoretical foundations of chemistry teaching methodology (professional-methodological) competences.

These competences should gradually manifest themselves in the learning process as abilities to solve typical problems that reflect the connection between chemical science and practice with the goals, content and methods of instruction in the secondary and profession-oriented schools. In this case, integrated tasks and questions that are aimed at solving the goals of the initial stage – the formation of professional (methodological) competence of students – serve as assessment tools. So, for example, according to the curriculum of the third year of the discipline "Theory and methodology of teaching chemistry" the preparation of a library-research paper is as a form of knowledge control. At the same time, the following indicators that characterize what a student will be able to demonstrate after finishing this paper are educational results from the viewpoint of a professional standard since they show:

- the ability to work independently with sources and literature; a student must show his ability to analyze, compare sources of information; he should identify those sources that reveal the essence of the problem;
- the ability to set goals, objectives of the work ahead;
- the ability to justify the relevance of the chosen topic;
- the ability to make scientific conclusions based on the material studied;
- the ability to clearly and consistently express thoughts in writing, use scientific terminology;
- the ability to arrange work in accordance with the requirements of scientific research.

[19] V. A. Bogoslovsky; E. V. Karavaeva; E. N. Kovtun; O. P. Melekhova; S. E. Rodionova; V. A. Tarlykov & A. A. Shekhonin, Methodical recommendations on the design of evaluation tools for the implementation of multi-level educational programs HPE with a competency based approach (Moscow: Moscow State University, 2007)

At the end of the third year of study, the student goes to compulsory educational training in the scientific camps of various schools of the republic in order to organize research and project work with pupils. In the training process, he must demonstrate the total set of knowledge and skills, which reflect those competences that are regulated by the FSES. For the educational program 44.03.05 Pedagogical education such competences are "a student is able to organize joint and individual educational and upbringing activities of pupils ..." (GPC-3, general practical competence); "a student is capable of carrying out pedagogical activity on the basis of special scientific knowledge" (GPC-8). In these competences, as we see, three interrelated aspects of future professional activity are laid. The first component of competences is related to the student's special scientific chemical knowledge, which he receives while studying the chemical modular. The second component of competences is connected with the organization of joint and individual work with pupils in the form of research and project work in the summer camp (in our case). This means that the curriculum of this specialization should be provided with such disciplines that disclose the methodology of organizing the research and project work of students in the school.

When having practical training a student applies his "purely" theoretical knowledge, as well as the ability to work with pupils, to research work organization: a) he teaches them to work independently with sources and literature; b) he teaches them to set the goal, tasks of the forthcoming work; c) he develops their ability to justify the relevance of the chosen topic, etc. Here students master basic methods of scientific knowledge in chemistry: observation, description, experiment, the ability to explain the results, etc.

The third aspect of the student's professional activity is related to the organization of educational work with pupils. This means that in the curriculum there should be a modular, for example, "Innovations in the school", where different forms and types of educational work will be considered. In terms of the teacher's professional standard, educational results include the knowledge necessary to perform actions in the student practical activities or in specially created, practice-oriented situations. Here student's actions and skills act as a personality characteristic.

The second stage in the formation of professional (methodological) competence of students and evaluation of their progress coincides with their vocational training on 4th-5th courses as well as their pre-graduation practical training. The main content that future teachers of chemistry, biology and chemistry should master is the final stage of studying the disciplines of general vocational training: "Theory and methodology of chemistry teaching", elective subjects that reveal innovative processes in schools: "The Creative Laboratory of the Teacher of Biology and Chemistry", "Modern educational pedagogical technologies", etc. Thus, the acquirability of the methodological competence by the future teacher of chemistry as an integrative multi-level professionally significant characteristic of his personality, ensuring the unity of all modulars of the contents of the curriculum – psychological, pedagogical, methodical and subject training – can only be identified after the completion of pedagogical training at the 5th course. Up to this period of study at the university the student has mastered the basic professional knowledge and skills, and possesses the initial pedagogical experience.

As a result of two stages of the formation of the methodological competence of the teacher of chemistry, we consider the positive motivation of pedagogical activity, the pedagogical orientation; the systematic nature of professional knowledge; mastering the methods of reflecting their educational and professional activities in accordance with the goal; acquirability of various innovative technologies for teaching chemistry. The formation

of professional (methodological) competences among students can be judged by their activities during the period of the summer educational training (3rd-4th courses), as well as vocational and pre-graduation practical trainings (5th year). In fact, the activities, skills and abilities performed and manifested by students during different training periods point to how an employment activity competence is acquired.

Conclusion

At the end of the article it should be noted that the competency based approach being considered one of the topical issues of our time becomes the mechanism for implementing the main normative document – the Federal State Educational Standard in the higher education system. According to many researchers nowadays this standard reflects an objective need and the only way to ensure the competitiveness of graduates.

The competency based approach in teaching is directly related to the problem of assessing students' competences as well as to the methods or mechanisms for measuring the results, since the result is not only subject knowledge, but also the qualities of the individual manifested in the form of competences.

The concluding stage of the study of the approaches to the competences assessment for the educational program "Pedagogical Education", the specializations "Chemistry", "Biology and Chemistry" presented the students' attitudes toward the main kind of their activity – pedagogical. The obtained results formed the basis for constructing the logic of our research, first of all, on the formation of professional (methodological) competency/competence of students and approaches to assessing the competences of students.

The peculiarity of the content of the basic educational program, built on the ideas of a modular and competency based approach and aimed at solving tasks in the field of professional activity, as well as creating an adequate system for monitoring the acquirability of the planned results of competences, taking into account professional standards, allowed to build a methodical system of education in a university; the types of a system which is a determinant, the essential beginning of the educational process in the university, which acts as a category of the greatest degree of generalization.

The constructed methodical system makes it possible to link together the content-purpose, process-activity and performance-evaluation components of the process of applying the educational program of these specializations.

The studies have shown that the process of forming professional (methodological) competence and approaches to assessing the competences of students is of a phased nature. At the same time certain types of knowledge, skills, personal qualities of the student, the system of their relations, attitudes and beliefs serve as the results. They all act as formed elements of competences, and the total of their activities provides data to speak about the level of competence formation.

The approaches considered and the logic of the study make it possible to assess the formation of competences among students within certain limits, on the other hand, the lack of norms and regulations to control the creation of scientifically validated funds of evaluation tools for assessing the students' progress leaves the problem open.

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