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Algorithm for the formation of personnel potential in the scientific and educational sector of the agrarian sector based on cluster and pedagogical approaches

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Abstract. The main product of higher education is a young specialist of an educational institution, the preparation of which consumes significant financial resources. In this regard, the relevance of the formation of operational, reliable, and complete indicators of student labor activity in-creases. Obtaining operational, reliable, and complete indicators of satisfaction of students with senior university activities, as well as analysis of these indicators and the formation of indicators to evaluate the effectiveness of the educational process serves as a basis for identifying and forecasting the labor activity of students, forming a list of popular areas and specialties, including adjustments to educational programs. The article discusses the motivation of students of the Agrarian University, as a prerequisite for the manifestation of the intra-sectoral structure of employment and differences in its effectiveness, as well as the level of satisfaction with the knowledge gained in various types of activities. In order to improve the educational process and its methodological support, surveys of graduates and employers are held, exhibitions and conferences devoted to the problems of innovative technologies in agricultural education. The activity on the development of an independent personality among students, the formation of entrepreneurial spirit, and the disclosure of research talent, leadership qualities. A study of the level of satisfaction with the educational activities of the university, focused on the formation of research competence among students according to the methodology of L. V. Mishchenko showed high results of satisfaction with the activities of the university, namely 84%, with an average level of 11% and the lowest level of 5%. Studying at the university, future young professionals (farmers) should get the best in order to adapt to the conditions of real production, and this in turn affects the level of key competencies of the future graduate. The article substantiates the directions for increasing the prestige of the agricultural professions, increasing the informational level of students on the possibilities of self-realization in the agro-industrial sphere, and measures to be taken in order to increase the motivation of students during the period of study and the post-graduate period.

1. Introduction

Agriculture continues to be one of the main links forming the socio-economic policy of the state. The President of the country set the task to ensure maximum implementation of industry potential. The Oryol region is confidently moving in this direction, creating favorable investment conditions for the development of the agricultural sector of the economy. Special achievements in the modernization of the agro-industrial complex of the region belong to the research of agricultural scientists and young



specialists, which is of great importance in the reform of agriculture, the development of new technologies in Orlovshchina, the Central Federal District, and other regions of the Russian Federation. Students and graduates of universities are specialists susceptible to innovations, able to work in accordance with the modern requirements of world agricultural development.

The problem of ensuring food security of Russia is closely linked to the sustainable reproduction of the labor and personnel potential of the agricultural sector of the economy [1]. The transition of the Russian Federation to the innovative path of development in the context of import substitution necessitates the formation and prosperity of the new economy, i.e. the “knowledge economy”. The key factor for growth and functioning is information and knowledge [2].

Currently, the Oryol State Agrarian University is one of the agricultural universities in Russia with a strong training and production base, which allows to prepare highly professional competitive young professionals and innovative developments for the agro-industrial complex of the region. The development of the university is largely determined by the demand for personnel and scientific support in the modernization of the agro-industrial complex. Scientists and graduates of the university together are the initiators and guarantors of the development of new technologies and the implementation of agrarian reforms, making a significant contribution to the formation of the economy of a new type-based economy knowledge. Organizational and methodological work is based on the integration of scientific, educational, and production processes, which ensures a developed system of continuous innovative education. Industrial training of students takes place on the basis of the best and advanced holdings and organizations, leading research institutes and abroad in the framework of cooperation programs. Young professionals participate in the development of the agro-industrial complex of the region, in the implementation of state programs and projects for the development of rural areas (Figure 1).

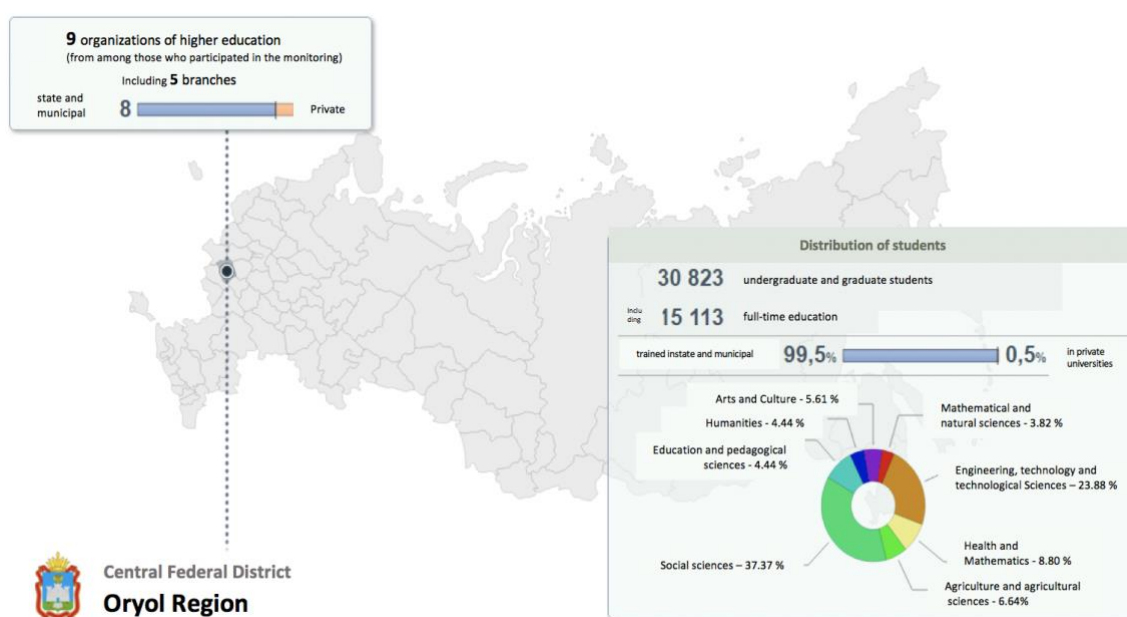


Figure 1. Distribution of the given contingent of students by branches of science in the Oryol region.

Figure 1 shows the distribution of the given contingent of students by branches of science in the Oryol region [10]. In general, the training of agricultural specialists is in demand by the real sector of the economy of the Oryol region, which is focused on the development of the agro-industrial complex. Orlovshchina is among the regions in which the agrarian sector of the economy prevails; therefore, we can safely say that agriculture is the future. The increase in agricultural production, the use of new

technologies, agricultural machinery and equipment. All these factors objectively lead to an increase in the industry's need for qualified specialists (Figure 2).

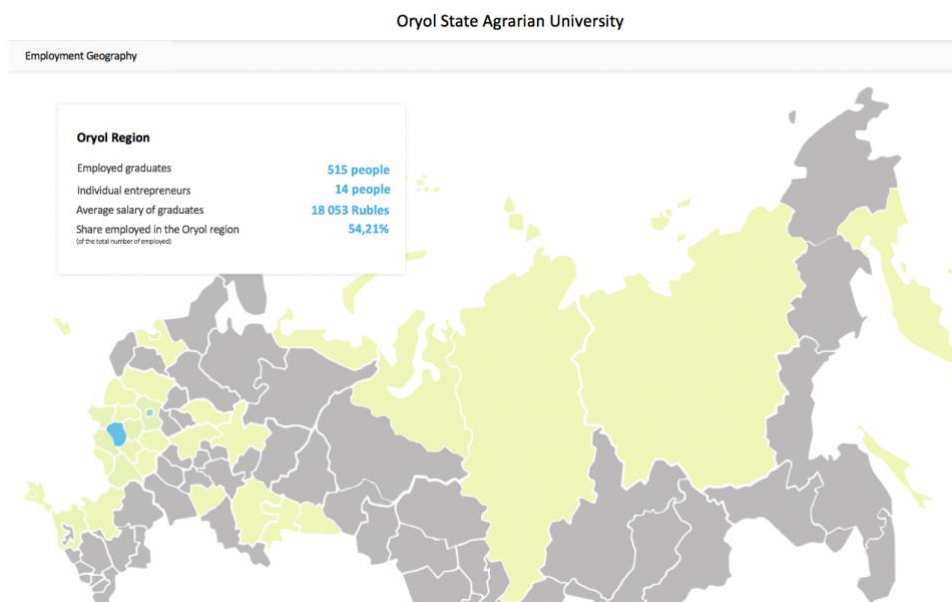


Figure 2. Information about the employment of graduates of the Orel State Agrarian University named after N. V. Parakhin.

Figure 2 demonstrates the successful employment of graduates of the Orel State Agrarian University, this is one of the key indicators of the effectiveness of the activities of the university and the result of effective cooperation with employers [3-7]. The share of labor-improvement of graduates of Orel State University in the region is 54.21% according to the monitoring data of the Ministry of Education and Science, which was published in 2017 [11].

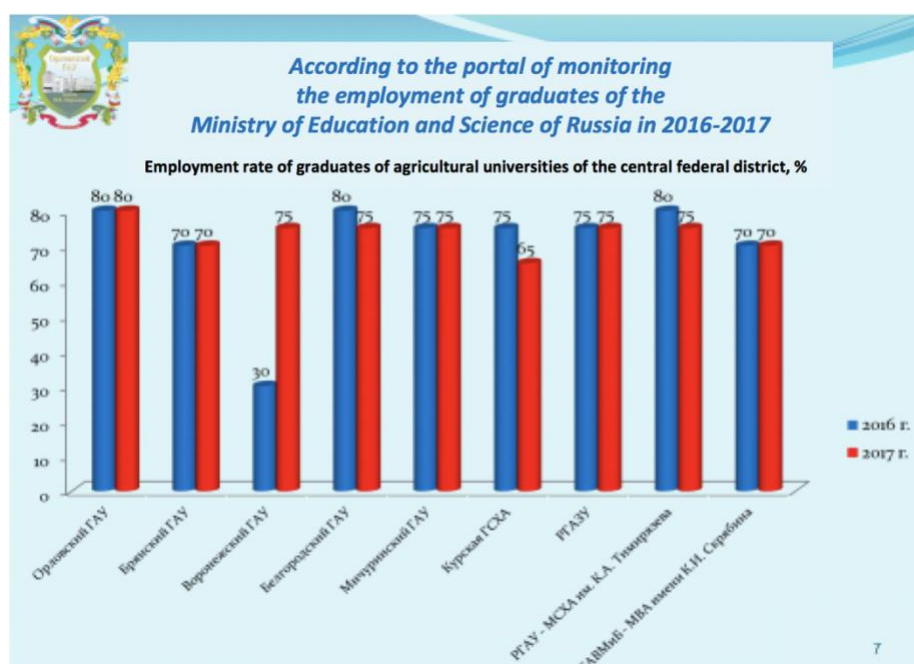


Figure 3. The share of employment of graduates of agrarian universities of the Central Federal District participating in the monitoring of the Ministry of Science and Higher Education.

According to the Ministry of Science and Higher Education of the Russian Federation (published in 2017), the share of employed graduates of the Orel State Agrarian University is 80%, which exceeds the regional threshold by 10%, and the Central Federal District takes a leading position among other agrarian universities (Figure 3). Currently in the market of educational services of the Oryol region from higher educational institutions (Fig. 4), the Orel State Agrarian University named after N. V. Parakhin occupies a special place. This is the only university that provides the agro-industrial complex of the region with highly qualified personnel with higher and secondary education and personnel of working professions providing innovative development of the agrarian economy, creates a pool of specialists and managers of economic profile who know the features and technology of organization of production in agriculture and processing industries. Thus, enterprises of the agro-industrial complex and the business community are in great need of young, energetic personnel. The training of such specialists is the main task of the Orel State Agrarian University named after N. V. Parakhin, which is successfully solved [9].

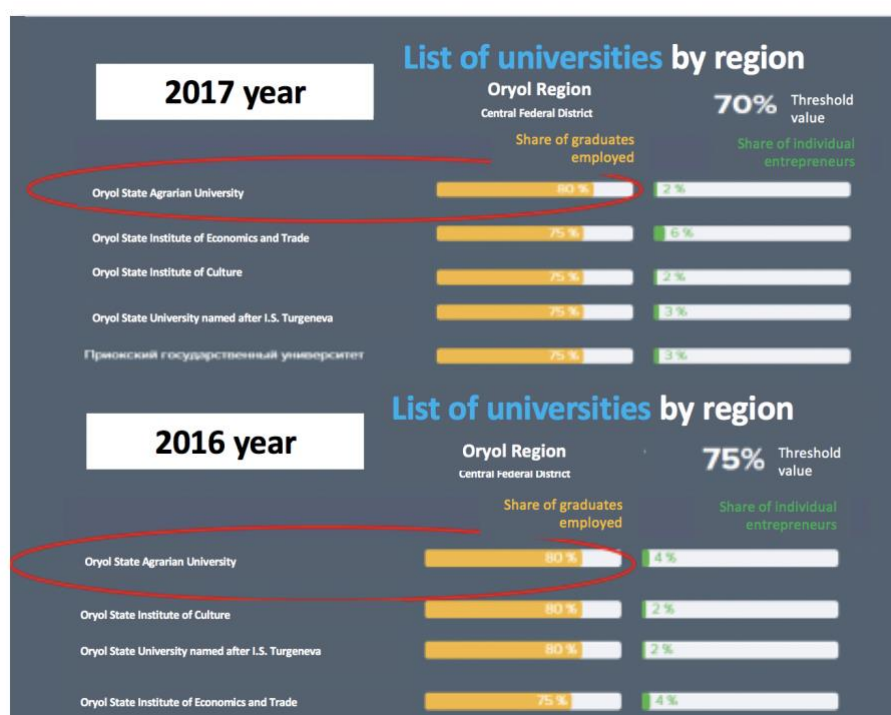


Figure 4. Results of monitoring the activities of educational institutions of higher education in universities of the Oryol region.

Conducted studies on the level of satisfaction of students with the activities of the university are of practical interest when working with young professionals [3-7].

2. Methods

The materials for the study were questionnaires of university students, where the technique was used according to L.V. Mishchenko ("Test-questionnaire satisfaction with learning activities") [8]. The method includes 7 scales and 70 questions of statements of emotional and evaluative nature and the presented answers (wrong, perhaps wrong, right and perhaps true). The results of the study were processed in the program statistics by the Kruskal — Wallis criterion revealed that in this sample (474 students). The results of the rank of the Kruskal — Wallis DA are shown in the form of tables and figures and significant statistical differences in the satisfaction scale of educational activities of the university, the results obtained are processed, systematized, and decoded. The main results of the

study are reflected in the article. The materials of this study can be used in the development of programs, disciplines for training and retraining, students of the university.

3. Research Results and Discussion

474 students of 2-4 courses of all faculties and a building institute in December 2017 took part in the study of satisfaction with educational activities. The results of the study showed that more than half of the students surveyed (52%) study “good” and “excellent.” This trend can be traced in all faculties. The highest grades, as well as in 2012-2013, were noted by students of the Faculty of Biotechnology and Veterinary Medicine: 57% of students study “good” and “excellent”. As the data in the table shows, 58% of respondents study well and nothing prevents them. 23% of students say that they cannot bring themselves to study better, 20% do not memorize educational material, and 19% hardly understand it (Figure 5).

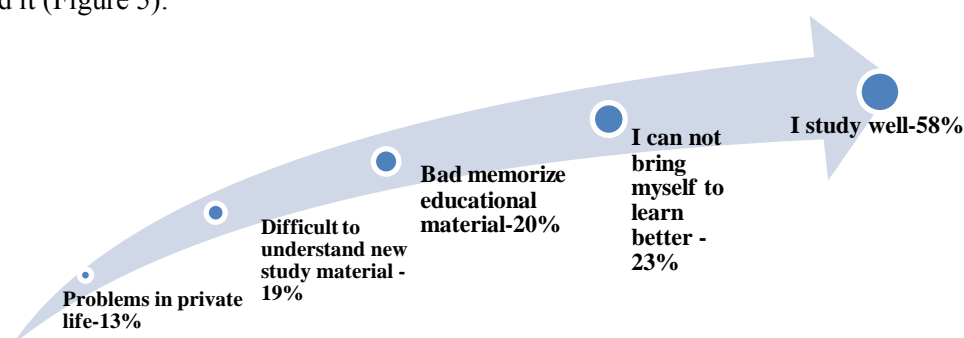


Figure 5. Distribution of answers to the question “What prevents you from learning better?”

As the data of Figure 6 shows, satisfaction with the knowledge gained in various types of classes, both in terms of faculties and the university as a whole, has increased compared to the 2012-2013 academic year. Average grades of student satisfaction with various types of classes are at the level of 4.21 points, which is 0.38 points higher than the results of the survey conducted in the 2012-2013 academic year (3.83 points). In the 2012-2013 academic year, students were most satisfied with the knowledge gained at lectures and seminars; moreover, in the 2017-2018 academic year, knowledge gained in laboratory classes. It is worth noting the increase in student satisfaction with work experience. The highest level of satisfaction was expressed by students of the Faculty of Agribusiness and Ecology (4.44, which is 0.61 points higher compared to 2012-2013), but the students of other faculties are also completely satisfied with the knowledge gained (all faculties are above 4 points).

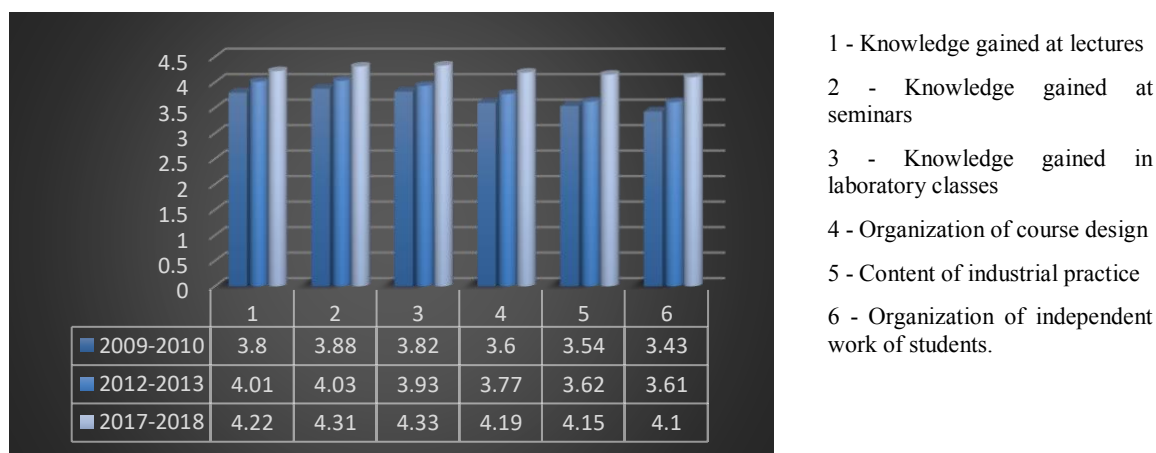


Figure 6. Satisfaction with knowledge gained in various types of exercises.

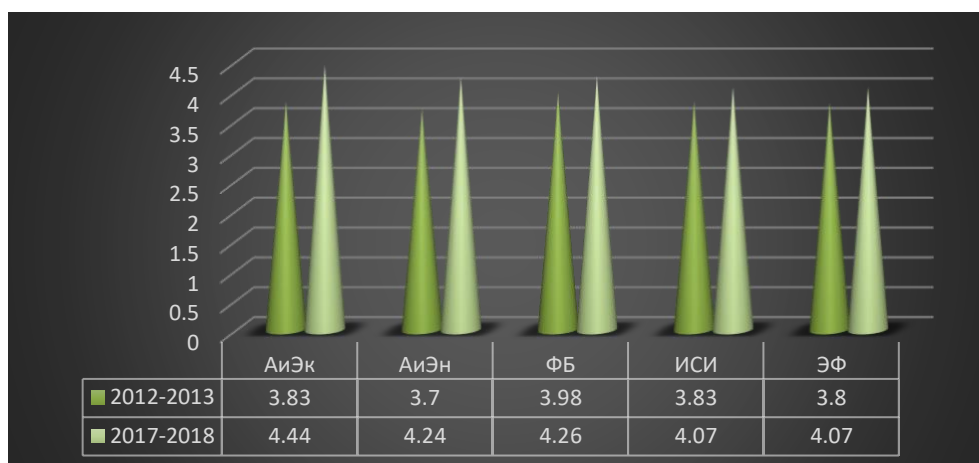


Figure 7. The average level of satisfaction with knowledge gained in various types of classes at the university in 2012-2013 and in the 2017-2018 academic years, score.

Also, students were asked to rate satisfaction with the quality of teaching in various disciplines (Figure 8).

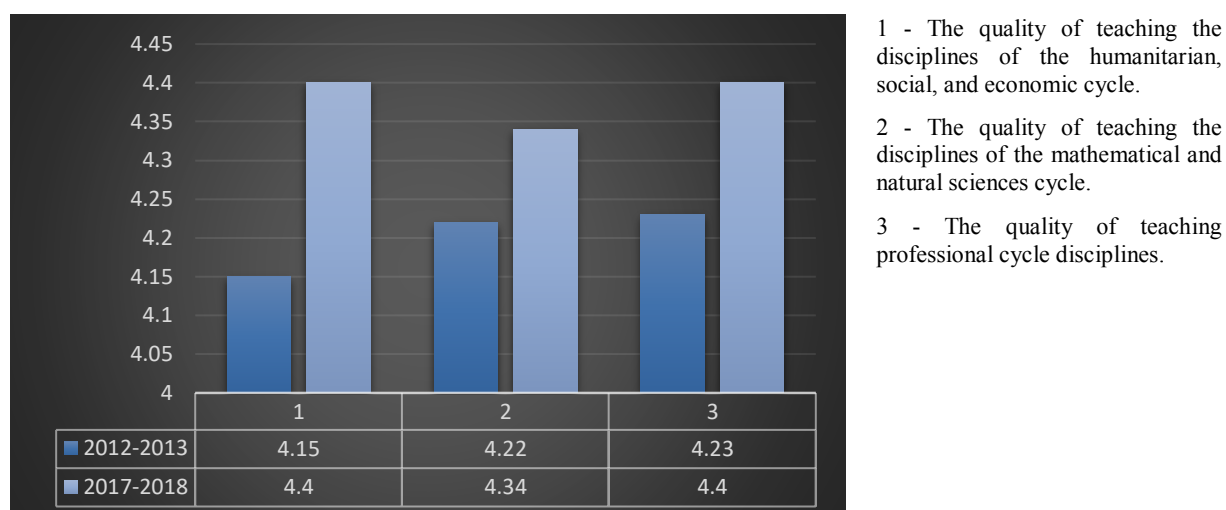


Figure 8. Satisfaction with the quality of teaching in various disciplines.

The quality of teaching in all disciplines was estimated at 4.38 points on average. It should be noted that in all faculties the average satisfaction score exceeded 4 points. The connection of the taught special disciplines with the latest scientific developments was estimated by students at an average of 4.18 points (the value of this indicator in the 2012-2013 academic year was 3.69 points). Assessment of the quality of scheduling classes increased to 4.25 points (compared with the 2012-2013 academic year). The most satisfied with this indicator are students of the Faculty of Agribusiness and Ecology (4.5 points), the least was among the students of the Faculty of Economics (4.13 points). Satisfaction with the knowledge control system was assessed by students at an average of 4.31 points (in the 2012-2013 academic year it was 3.97 points). In general, the students surveyed believe that there are no problem areas in the assessment of students, unlike 2012-2013 UG, so we can conclude that students are satisfied with the knowledge control system. To the question “Do you think that the modular technology of teaching students (scoring knowledge) is sufficiently objective and fair?” more than half (77%) of the respondents gave a positive answer (Fig. 9). For 12% of students, the scoring of knowledge is fairly objective, but it is difficult to understand. 11% of respondents are satisfied with

the more traditional assessment of knowledge than the score. Basically, the students of the Engineering Construction Institute (17%) responded in this way. However, 53% of students of the Faculty of Agrotechnology and Energy supply, on the contrary, believe that the modular technology of teaching students most accurately reflects the level of students' knowledge compared to traditional knowledge assessment. Also, modular technology is an incentive for the systematic work of students during the semester and provides an opportunity to be exempt from the semester exam for 48% of students of the Faculty of Economics.

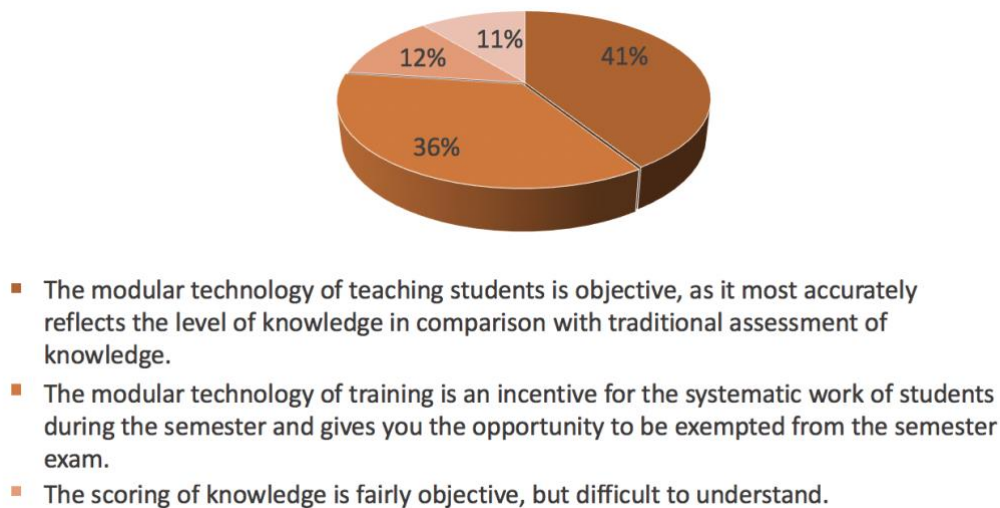


Figure 9. Distribution of answers to the question: “Do you think that the modular technology of teaching students (scoring of knowledge) is sufficiently objective and fair?”

Students consider it necessary to improve the quality of classes, mainly in disciplines related to the future profession. Most of the students are completely satisfied with the personal and professional qualities of the teaching staff.

In general, 56% of students are satisfied with the level of development of the educational program (Figure 10), in particular, students of the Faculty of Agribusiness and Ecology (67%) and the Faculty of Biotechnology and Veterinary Medicine (67%). And only 6% of respondents gave a negative answer. On average, the content of educational programs, teaching methods

, and organization of the educational process were assessed by students by 4.15 points, up by 0.23 points compared with the 2012-2013 academic year.

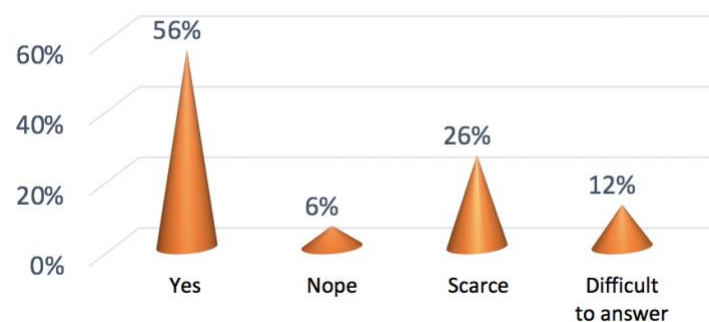


Figure 10. Satisfaction with the achieved level of development of the educational program.

A study of the level of satisfaction with the educational activities of the university, focused on the formation of research competence among students by the method of L. V. Mishchenko showed high results of satisfaction with the activities of the university (84%), the average level was 11%, including the lowest level of 5%.

4. Conclusions

Studying at the university, future young professionals (farmers) should get the best to adapt to the conditions of real production, and this affects the level of key competencies of the future graduate. To increase the prestige of the agricultural professions, increase the level of informational students on the possibilities of self-realization in the agro-industrial sector, measures are being taken to increase the motivation of students during the period of study and the postgraduate period.

The motivation of students of an agrarian university as a prerequisite for the manifestation of employment and fixability in the agro-industrial production depends on many factors:

1. Modern trends in the development of the agro-industrial complex;
2. The social package of a young specialist, including the solution of the housing problem and the social aspects of life support;
3. Career growth and social adaptation in the labor market in the modern conditions of the country's development.

An important factor affecting the motivation of students is the attitude of the teaching staff and employers themselves. The growth of students' motivation can be achieved through the use of interactive forms of education, scientific and methodological conferences, exhibitions, the provision of modern learning technologies, research programs on modern problems of agricultural science, the implementation of grants and research work and training of teachers, graduate students studying in foreign universities, combining theoretical training with practical activities through the system of research and production center, laboratories and educational and experimental farms. The educational process is organized on the basis of modern information technology training, focused on the intensification of the cognitive process, increasing the efficiency of knowledge control.

The staffing issue is a hot topic, where the university's activities make a great contribution to the training of sought-after young specialists. According to V.V. Putin, "Levers in the employment of graduates should be only market." Taking into account the requirements imposed on students of higher educational institutions, from the point of view of training qualified personnel, special importance is attached to additional education as a tool for training and developing a young specialist throughout their working life. In the challenging conditions of the modern Russian labor market, promoting the motivation and employment of graduates and increasing their adaptation contributes to the preservation of the country's intellectual potential.

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