

PAPER • OPEN ACCESS

Network support for personnel training: evaluation component

To cite this article: N V Zolotikh *et al* 2019 *IOP Conf. Ser.: Mater. Sci. Eng.* **483** 012018

View the [article online](#) for updates and enhancements.

Network support for personnel training: evaluation component

N V Zolotikh¹, A V Chernyaeva¹, T U Shevchenko²

¹Volgograd State Agricultural University, 26 University Aven., Volgograd 400002, Russia

²Volgograd State Socio-Pedagogical University, 27 Lenina Aven., Volgograd 400066, Russia

E-mail: shefdtj@yandex.ru

Abstract. The article is devoted to the evaluation component of graduate personnel training. Professional training of graduates of agricultural sector is a set of indicators (theoretical knowledge in the field of agricultural education and the ability to apply this knowledge in new and unusual situations), providing subsequent socio-professional adaptation and potential career growth of graduates of agricultural universities, taking into account the requirements of the modern labor market. There are four components in the evaluation of graduate professional training at Agricultural universities for those who has completed a certain level of education (bachelor), which is seen in the readiness and ability to be successful and productive in socio-economic activities, taking into account possible social risks: professional and personal potential, agroecological culture, basic and innovative technologies. On the material of research an attempt is made to reflect one of the fragments of network support for professional formation of production personnel at Agricultural University.

1. Introduction

Currently, the system of professional agricultural education is going through a complicated period of adaptation in the context of socio-economic reforms, innovation and technological developments. Higher education institutions of the Ministry of Agriculture of the Russian Federation should be more mobile, flexible and be more responsive to the needs of the modern labor market. Rapidly changing priorities replace the vector of assessment of professional qualities of production personnel to the stage of preparation of a graduate at Agricultural University. This aspect implies the search for the evaluation components of the graduate, providing an effective result of the education, the most adapted to the real conditions of agricultural industry.

Modern didactics in issues of students' professional training has been confirmed in the network interaction of subsystems of teaching staff and students in order to ensure the constant development of the student's personality in accordance with the social demand and production requirements [1;2;3]. Network support for professional personnel assumes to accept what is offered to graduates. In particular, paradoxical induction utilizes what a graduate is able to do or doing.

At Agricultural University network support is carried out through the strategy of development of agricultural education until 2030. Its aim is to teach students pedagogical strategies that allow to organize a professional activity for the production, processing and sale of agricultural products, as well as the development of rural areas for the purpose of personal self-actualization of students in the educational process.

At present, there is no common view on the elaboration of pedagogical measuring materials for the assessment of educational achievements on the basis of monitoring the formation and determination of the level of graduates' professional training at Agricultural University, forms of its organization and didactic technologies [4;5;6].



The platforms for the implementation of the results of scientific work among the staff of Volgograd State Agricultural University in the framework of network support were: Federal State Budgetary Education Institution of Higher Education 'Volgograd State Agricultural University', Federal State Budgetary Education Institution of Higher Education 'Bashkir State Agricultural University', Federal State Budgetary Education Institution of Higher Education 'Dagestan State Agricultural University', Federal State Budgetary Education Institution of Higher Education 'Kostroma State Agricultural University', Federal State Budgetary Education Institution of Higher Education 'Voronezh State Agricultural University N.A. Emperor Peter the Great', Federal State Budgetary Education Institution of Higher Education 'Don State Agricultural University'.

2. Results and Discussion

The evaluation component of the graduate at Agricultural University is provided by a set of modern requirements for the professional training of the graduate [7]. At the same time, integrated groups of indicators have the greatest potential in terms of training for professional personnel: professional and personal capability, agroecological culture, basic and innovative technologies. The level of the expert's professional activity in agrarian profile is defined by degree of indicators' formation.

The content and procedural aspects of training should be taken into account when the evaluation component of the graduate professional training at Agricultural University is realized. The modeling of the content of professional training of the graduate is based on the recourses of pedagogical support and includes the components of educational standards: programs and course material [8;9;10]. In this case, the modeling of the professional training refers to the cooperative activity of the teacher and the student where different forms of training are divided into three stages: empirical, theoretical and practical.

The basic information is systematized and summarized within the groups of basic and innovative technologies, for the purpose of invariant preparation and the fastest graduate's adaptation to the conditions of the entry into professional activity.

Pedagogical support for the graduates professional training is regulated by internal documents of the University, related to the requirements of the general management and structural departments of the University.

The assessment of graduate professional readiness at Agricultural University lies in the personal-developing sphere. It contributes to the activation and realization for production personnel potential. A unique holistic person is in the focus who is ready to self-development and self-improvement. As a result, each position of the evaluation component creates a certain set of favorable conditions for a complex assessment of graduates professional readiness.

The process of the personality's professionalization in terms of training at Agricultural University is associated with a consistent strengthening and deeping of personal and value-semantic orientations of the graduate's consciousness: (professional and personnel potential, agroecological culture, basic and innovative technologies) [11]. These changes are the internal conditions for the professional training's assessment.

In order to evaluate the graduate professional training, the experimental program should be organized. It, in turn, must be a part of the process of professional training; the diagnostics of indicators of integrated groups also should be implemented. These conditions are external factors in the process of assessment of graduates' professional training at Agricultural University.

The professional training is a complex system that includes external and internal factors that consistently form the levels: "Human" – "Agroecological resource" – "Technologies" – "Innovations". A specific foundation of the integrated structure of the graduate professional training at Agricultural University is the formation and development of his professional and personal potential (the level of "Human"), responsibility for his vital activity, especially in relation to nature, as the main source of agricultural production.

The rational use of natural resources (the level of "Nature") will preserve the ecological balance of the biological basis and agricultural production. The formation of agroecological culture of the future specialist is one of the main agricultural teaching and training, regardless of the education field.

Having such a "foundation", it is necessary to form a technological base of professional education of the specialist, a scientific elaboration of technological programs and strategies in the sphere of agriculture (the level of "Technology") are meant here. Developing, testing and implementing innovative technologies (the level of the "Innovations") should be in agricultural production in perspective.

To sum up, the graduate professional training at Agricultural University involve two subjective sense-forming groups, they are professional and personnel potential and agroecological culture. The process of being formed of these two groups allows to move to the mainly objective level of technological readiness.

The analysis of works has enabled the researchers to use the following conclusion on the essence of the notion "the level of the professional training of a graduate". The presence of a set of formed indicators is meant, which provide the subsequent social and professional adaptation and potential career move of the graduate at Agricultural University taking into account the requirements of the modern labour market in the conditions of intensification of agricultural production.

Identifying the levels of the graduate's professional training, we base upon the methodological consideration of V.G. Afanasyev. He highlights the emergence of a new system based on disparate components at the initial level, the certain unity on the middle level and the replacing one system with another as a result of changes and the development of a new system at higher levels [12]. This scientist's position helped us to identify 4 groups of graduates of Agricultural University with low (critical) level, middle (acceptable) level, high (the best possible) level and advanced (scientific) level of professional training's formation of graduates of Agricultural University. Let us briefly discuss the generalized characteristics of each level. The obtained results are generalized in the characteristics related to different levels of pedagogical competence. Characteristics of the levels of formation of graduates' professional training can be presented in the following form:

2.1 Low (critical) level

Indicators of formation.

The first integrated group-professional and personnel potential.

Graduate:

- doesn't show adaptive abilities, socially not oriented, has some difficulties in making decisions and in personification of professional interaction;

- has some difficulties in behavior regulation (volitional effort is not easy);

- communicative potential does not allow establishing meaningful communication;

- not oriented on the moral normativity of his own personnel and professional actions.

The second integrated group – agroecological culture.

Graduate:

- doesn't express ability to use agroecological knowledge in separate spheres of life;

- didn't take part in the activity, that controlled the state of the environment and the compliance with ecological regulations of production and land use;

- does not use environmentally sound technologies of agricultural production during the practice;

- doesn't search for ways to preserve the quality of natural potential and ways of its reproduction while doing practical tasks;

- didn't take part in a monitoring study or agroecological assessment or expertise.

The third integrated group – basic technologies

Graduate:

- didn't take part in any regional seminars, conferences, contests, or competitions;

- did not pass the professional retraining program;

- didn't take part in the student's work of agro teams;

- didn't receive an invitation for employment.

The fourth integrated group – innovative technologies.

Graduate:

- didn't take part in special elective course or program, scientific project;
- didn't participate in any international contests, competitions or exhibitions;
- formulates the issue of diploma project, which is mainly theoretical (includes the results of research, but does not rely on the real needs of agricultural enterprises);
- doesn't have any patents for invention or utility model, computer program.

2.2. *Middle (acceptable) level*

Indicators of formation.

The first integrated group - professional and personnel potential.

Graduate:

- shows adaptive abilities situationally, is socially oriented, has no difficulties in making decisions and in personification of professional interaction;
- has no difficulties in behavior regulation (is oriented on the social norms);
- communicative potential is oriented on the personnel communication;
- is oriented on the moral normativity of his own personnel and professional actions partially;

The second integrated group – agroecological culture

Graduate:

- expresses ability to use agroecological knowledge in separate spheres of life;
- took part in the activity, that controlled the state of the environment and the compliance with ecological regulations of production and land use;
- uses environmentally sound technologies of agricultural production during the practice partially;
- sometimes searches for some ways to preserve the quality of natural potential and ways of its reproduction while doing practical tasks;
- took part in a monitoring study or agroecological assessment or expertise.

The third integrated group – basic technologies.

Graduate:

- took part in any regional seminars, conferences, contests, or competitions;
- passed the professional retraining program;
- took part in the student's work of agro teams;
- received an invitation for further employment.

The fourth integrated group – innovative technologies.

Graduate:

- took part in special elective course or program, scientific project;
- didn't participate in any international contests, competitions or exhibitions;
- formulates the issue of diploma project, which is mainly scientific and practical (includes the results of research, relies on the real needs of agricultural enterprises);
- filed a patent application for invention or utility model, computer program.

2.3. *High (the best possible) level*

Indicators of formation.

The first integrated group - professional and personnel potential.

Graduate:

- shows adaptive abilities, is socially oriented, has no difficulties in making decisions and in personification of professional interaction;
- has no difficulties in behavior regulation (is oriented on cooperative activity);
- communicative potential is oriented on the professional interaction;
- is oriented on the moral normativity of his own personnel and professional actions.

The second integrated group – agroecological culture

Graduate:

- expresses ability to use agroecological knowledge in separate spheres of life;
- takes part in the activity, that controlled the state of the environment and the compliance with ecological regulations of production and land use;
- uses environmentally sound technologies of agricultural production during the practice;
- regularly searches for some ways to preserve the quality of natural potential and ways of its reproduction while doing practical tasks;
- takes part in a monitoring study or agro-ecological assessment or expertise.

The third integrated group – basic technologies.

Graduate:

- took the first prizes in some regional seminars, conferences, contests, or competitions;
- passed the professional retraining program during some semesters;
- took part in the student's work of agro teams several times;
- received an invitation for further employment according to the results of practice.

The fourth integrated group – innovative technologies.

Graduate:

- took part in special elective course or program, scientific project;
- won prize-places in some international contests, competitions or exhibitions;
- formulates the issue of diploma project with his scientific guider, which is mainly scientific applied (includes the results of research, relies on the real needs of agricultural enterprises);
- has a patent application for invention or utility model, computer program.

2.4. *Advanced (scientific) level*

Indicators of formation.

The first integrated group - professional and personnel potential.

Graduate:

- shows the highest level of adaptive abilities, is socially oriented, has no difficulties in making decisions and in personification of professional interaction;
- has no difficulties in behavior regulation (is oriented on a result);
- communicative potential is of high level (has the leading positions in personnel and professional communication);
- is completely oriented on the moral normativity of his own personnel and professional actions.

The second integrated group – agroecological culture

Graduate:

- expresses ability to use agroecological knowledge in separate spheres of life regularly;
- takes part in the activity, that controlled the state of the environment and the compliance with ecological regulations of production and land use regularly;
- uses environmentally sound technologies of agricultural production regularly during the practice;
- offers some ways to preserve the quality of natural potential and ways of its reproduction while doing practical tasks;
- takes part in a monitoring study or agro-ecological assessment or expertise regularly.

The third integrated group – basic technologies.

Graduate:

- won prize-places often in some regional seminars, conferences, contests, or competitions;
- passed some professional retraining program during training;
- took part in the student's work of agro teams regularly;
- received an invitation from some households for further employment according to the results of practice.

The fourth integrated group – innovative technologies.

Graduate:

- takes part in special elective courses or program, scientific project regularly;

- won prize-places in some international contests, competitions or exhibitions several times;
- formulates the issue of diploma project, which is mainly scientific (includes the results of research, relies on the real needs of agricultural enterprises, where he tests his research and tries to implement it);
- has some patents application for invention or utility model, computer program.

Statistical data has required essential changes in the construction of the entire assessment process for graduate's professional training at Agricultural University, including a computer program for integrated statistical evaluation and its experimental approbation.

The ability to achieve the maximum possible unity of social demand and natural potential in the agricultural sector can be considered as a sign of high assessment of the level of formation of the graduate's professional training at Agricultural University. Being aware of that fact that the environmental protection is the only means of preserving human beings as a species and the very formation of professional readiness is not possible without their personal participation is also considered as a criterion of high level of professional training.

The principles of systematization, science and mathematical modeling are the basis of efficiency's estimate of the graduate's professional training. They were realized in theoretical and practical approach and in some requirements of scientific substantiation, criterions of measurement procedures.

The scientific research has been carried out since February 2018 and contains quantitative statement of the issue under the study. The assessment's integral index of the level of vocational training's formation was calculated with the help of developed integral mathematical statistical method. The control comparative diagnostics was carried out among 100 students of different departments: 35.03.06 "Agroingeering", 35.03.03 "Agrochemistry and Agriculture soil science" (specialty "Agroecology"), 36.03.02 "Zootechni".

Database methods of assessing the graduate's level of professional training at Agricultural University were developed in phpMyAdmin, by using Database Management System (DBMS) application. It is a web-interface for system administration DBMS MySQL. All this is illustrated in figure 1.

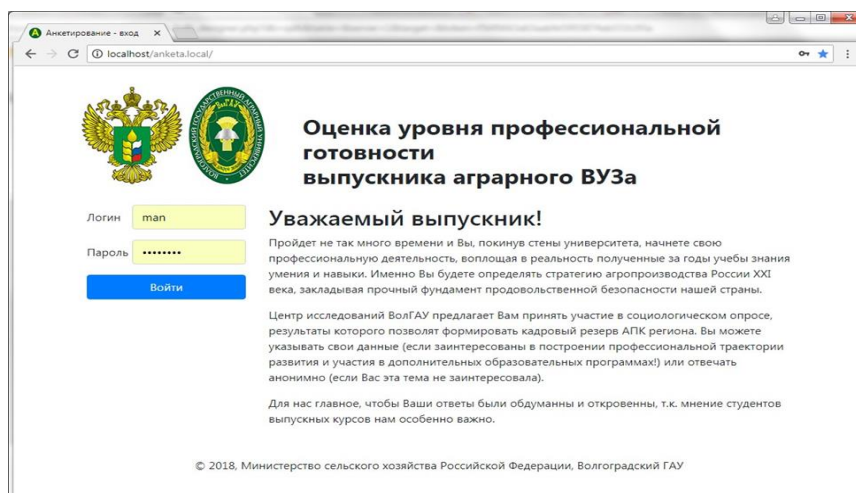


Figure 1. System of screen forms

The program provides a selection of prepared formats *.doc or *.docx questionnaire options. The paragraph of the questionnaire template text is a structural element in the automated questionnaire generation via the interface. It includes the rules of registration of structural elements of the questionnaire and takes into account 4 types of them: the beginning of the questionnaire, a question, an answer, a number, a title and a weight of index, appropriated to the group of questions. The program makes it possible to generate the following types of reports: 1. summary report; 2. the year report; 3. universities reports; 4. education field reports; 5. detailed report.

The detailed report provides a selection of questionnaire on the maximum set of parameters: 1. title of questionnaire; 2. university; 3. education field; 4. specialty; 5. year of admission; 6. completed questionnaire or not; 7. date and the beginning of questionnaire (optional).

Private groups' indicators are determined by taking into account the sample from the general database filtered by the specified parameters (kind of questionnaire, university, education field and others). Particular indicators characterize the average index for each of the categories.

Calculation algorithm of integrated parameter of the level of professional training was carried out according to the following:

$$I = \sum_{i=1}^m a_i \times \left(\sum_{j=1}^{n_i} b_j \right) / n_i \quad (1)$$

where

m – the count of question groups in the questionnaire;

n_i – the count of questions in group;

i – index of questions' group

j – index of the question in a group;

a_i – significance of the indicator corresponding to the group of questions;

b_j – score of “j” question.

The values of the parameters ‘ a_i ’ and ‘ b_j ’ can scale the value of the integral index ‘ I ’ to the necessary range of values. It should be noted that significance indicators a_i , can be adjusted only by system administrator. The following values are accepted:

$a_1 = 0,5$ – part of the indicator's contribution of "Basic technologies" to the integral;

$a_2 = 0,3$ – part of the indicator's contribution «Innovative technologies»;

$a_3 = 0,1$ – part of the indicator's contribution «Agroecological culture»;

$a_4 = 0,1$ – part of the indicator's contribution «Professional and personnel potential».

The integral index is calculated according to these coefficients. A detailed report of the results is shown in the figure 2.

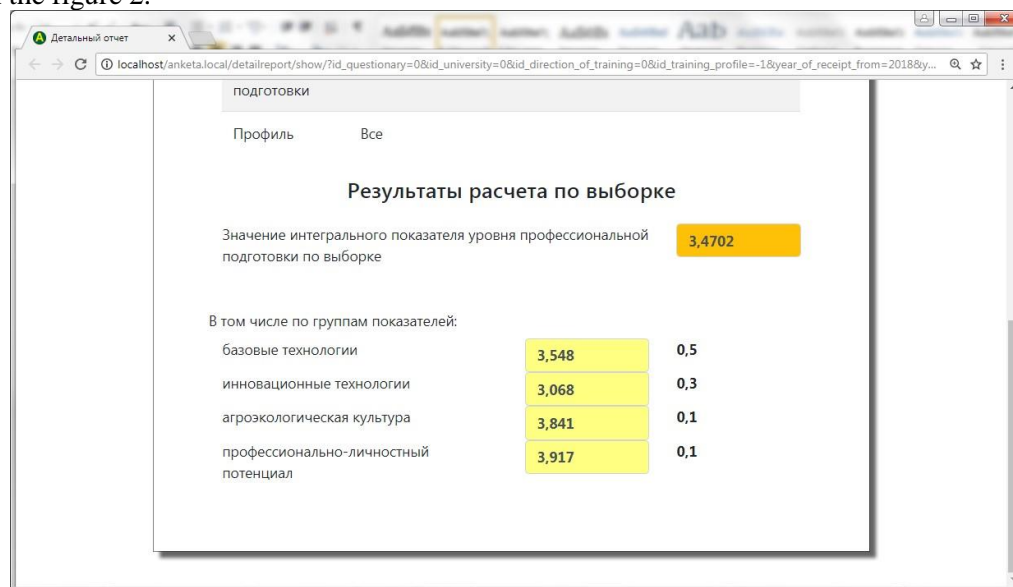


Figure 2. A detailed report: calculation results

The main page in the mode of the survey organizer provides an opportunity for the respondent to fill in not a required string “Notice”, the results of the questionnaire are saved. The value of the string is displayed on the page “Results” in the administrator mode.

3. Conclusion

The evaluation component of the graduate professional training at Agricultural University, presented in the scientific research, and built on its web-based interface of diagnostic assessment's module showed a high effectiveness in solving the tasks of network support.

Assessment of the level of personnel training makes it possible to identify peculiar differences in the ability of critical evaluation, presentation and results' research defence, in using methodological, general scientific and special knowledge on the stage of studying at the University. The results of the study presented above may be of practical use for various specialists at Agricultural Universities.

Prospects for further research are obvious for us in the assessment enhancement for graduate professional training at Agricultural Universities and this research ideas and principle extension for the various student training.

References

- [1] Rozhdestvenskya M G 2014 *The World of Science, Culture, Education* **2** (45) 116-119
- [2] Aleksandrova E A 2016 *Modern Problems of Science and Education* **6**
- [3] Kajl U A 2008 *Bulletin of Buryat State University* **1** 21-24
- [4] Lobok A M 2008 *School technology* **1** 49–59
- [5] Zolotikh N V, Chernyaeva A V 2014 *Proceedings of Nizhnevolzskiy Agrouniversity Complex: Science and Higher Vocational education* **4** (36) 222-226
- [6] Mogilevkin E A 2012 *HR-tools: practical assessment. How to identify employees who can give the maximum result: educational and practical guide* (Saint-Petersburg: Rech) p 320
- [7] Volodarskya I A 2010 *Russian Scientific Journal* **14** 48-56
- [8] Zaitseva G A 2014 *Bulletin* **3** (30) 54–57
- [9] Chuchalin A I, Epihin A V, Muratova E A 2013 *Higher Education in Russia* **1** 13-20
- [10] Zvyagdinskiy V I 2006 *Dictionary of Pedagogy* (Moscow: Academia) p 352
- [11] Isakova E K, Lazarenko D V 2014 *Rusnauka, Science-Pedagogy* **9**
- [12] Afanasyev V G 2018 *System and society* (Moscow: Lenand) p 242-244
- [13] Safronofa E M, Beylinson L S, Zolotikh N V, Shevchenko T U 2016 *International Journal of Enviromental & Science Education* **11** (16) 8968-8980
- [14] Shevchenko T U, Slyshkin G G, Moseyko A A and Korovina K G 2018 *SHS Web of Conferences* **50** 01173