Key Issues of Digital Transformation in Agricultural Education

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Abstract. In modern conditions in the agricultural sector, the priority is the training of personnel and the testing of their knowledge using digital technologies, as well as the development of the facilities and timely retraining of personnel. The essence of the digital transformation of agricultural education lies in the effective and flexible use of modern technologies for the transition to a personalized and result-oriented educational process. Digital transformation should not be seen as an end in itself, but as a means used to optimize the existing potential in an innovative way. The main goal of agrarian education is to improve the quality of personnel training for the agro-industrial complex that meets modern requirements. The productivity and profitability of animal husbandry is largely determined by the conditions of animal feeding, the herd management system and other technological aspects developed and implemented by specialists in the field of animal husbandry. In the field of training these specialists, there is an active search for new approaches. The article reveals the organizational and pedagogical conditions that determine the implementation of additional professional programs in the field of animal science based on professional standards. An important role in the formation and improvement of professional competencies belongs to additional professional education. In this study, considerable attention is paid to the theoretical component of the topic, namely, the importance of agricultural personnel as a strategic resource for the development of agricultural production is substantiated, and the characteristics of the key issues of digital transformation of agricultural education that determine human potential are given. The analytical research is based on the results of work on training personnel for the agro-industrial complex of the Novgorod region and its changes under the influence of the existing regional policy. The relevance of research carried out in this direction is confirmed by the result of joint work of agricultural universities and employers, thereby having a positive effect on personnel training, providing production with modern managers.

1. Introduction
In modern conditions, the development of the country largely depends on high-tech industries, the introduction of innovative scientific developments and digital technologies in agricultural production. Many researchers [1, 2, 3, 4, 5, 6] believe that the main factor providing the required level of enterprise competitiveness is the use of innovative technologies. In addition, applying a science-based approach to farming increases crop yields and animal productivity. All this makes fundamentally new requirements for the staffing of agricultural production. World practice in the development of agricultural sectors and many researchers A. Kuznetsova et al. [7], L. G. Bolman et al. [8], S. X. Huang [9], L. P. Semkiv et al.
[10], confirmed that the strategic resource that ensures the required level of competitiveness of the enterprise is the training of human resources.

Along with this, according to I. V. Mitrofanova et al. [11], Antero Olakivi et al. [12], in the current conditions, it is highly advisable to develop the resource potential primarily due to systemic qualitative changes in the educational environment. For specialists in the agricultural industry, modern digitalization opportunities [13] open up fundamentally new opportunities: distance learning, data storage in cloud storage, and others.

At the same time, according to a number of authors [14, 15], agrarian education is a process of purposeful mastering of knowledge, abilities, skills and methods of communication under the guidance of experienced teachers, mentors and specialists. At the same time, as noted by I. P. Malichenko and A.M. Sidorov [15], joint cooperation of professional and corporate education can benefit all agents of the educational services market.

Along with this, the transition to a two-level system of personnel training has led to qualitative changes in content and more active use of new educational technologies (interactive learning, problem-oriented teaching methods, the introduction of project activities). According to Daneykin Yu. V. [16], Kazarova O. A. et al. [16], the conditions of educational practice are characterized by a wide range of ways to optimize project activities, due to adaptive and innovative mechanisms.

At the same time, a number of scientists A. Djedovic, et al. [2], L. P. Semkiv, et al. [10], O.Y. Frolova et al. [14], believe that to solve the existing problem, it is necessary to organize a unified professional and competence-based approach in the training of new generation managerial specialists.

In this regard, the priority strategic tasks are the development of digital skills, a unified digital environment of the university, and the design of educational spaces. Therefore, it is necessary to propose effective measures for solving this problem, since the sustainable development of agricultural production and territories depends on the professionalism of managers.

2. Objects and methods of research

The object of the research was the analysis and assessment of personnel training in the context of digital transformation to ensure agricultural production. The work found application of the methods of monographic, comparative and system analysis, logical approach, questionnaires and standardized survey.

The theoretical analysis of sources – publications of foreign authors [2; 4; 7; 8], which made it possible to identify the key issues of digital transformation of agrarian education, trends in the integration of research approaches in the production systems of the agro-industrial complex of the Novgorod region.

Domestic research on this issue was studied.

3. Results and discussion

The agro-industrial complex of the country continues to experience an acute shortage of personnel. Currently, for the effective use of scientific achievements and advanced experience, personnel are required that meet the challenges of today, possess the necessary competencies, and contribute to the dynamic and sustainable development of rural areas. In this regard, the training of agrarian personnel requires joint efforts of governing bodies at all levels and educational institutions.

In order to achieve this goal in the industry, it is necessary to improve the system of agricultural education. Serious attention should be paid to the development of topical scientific directions and schools. And it is extremely important in modern conditions to create an effective model of interaction between agricultural education, business and government bodies. To attract young people to the industry, it is necessary to strengthen support for young specialists, create conditions for professional growth, and ensure the development of infrastructure in rural areas.

The changes taking place in the system of staffing of the agro-industrial complex require fundamental changes in improving the state regulation of financial support for scientific research on social and personnel problems.
The analysis of the staffing of the industry clearly reveals unresolved problems and shortcomings in the system of reproduction of human resources. There is a deterioration in the main qualitative and quantitative indicators of agricultural personnel. Today, production requires young professional managers to manage high-tech production. Leading organizations and enterprises are actively introducing digital technologies, using the latest achievements of genetics and breeding, molecular biology and biotechnology.

Positive results are shown by modern work with municipal districts on the organization of agricultural classes, which contributes to the choice of agricultural areas of training when entering a university and in the future to find a job at agricultural enterprises.

The formation of a highly professional teaching staff is the main resource for improving the quality of education and contributes to attracting young people to receive quality agricultural education. Strengthening the research facilities of universities and especially the laboratory fund of scientific laboratories, while the involvement of young scientists in the implementation of research projects and grants is fundamentally important for the development of youth science.

There is a need for a system of training, retraining and advanced training to define a new philosophy or, as it is fashionable to say today, to define a new mission - to be not only and not so much an educational structure, but also an educational and implementation structure, if you like, a reform-conducting structure that has a more effective impact on real transformation of rural areas.

At the present stage of development of agricultural production, the problem of conducting and implementing scientific research exists in almost every region. In recent years, the approbation of scientific research at Yaroslav the Wise Novgorod State University (NovSU) is carried out jointly with organizations and enterprises of the agro-industrial complex of the region (SEC “Levochsky”, collective farm “Russia” SEC and others) through scientific and practical conferences, seminars, publication of materials in scientific collections.

The university continues to improve the information ecosystem that allows the development of online learning. The main digitalization tools at NovSU are mass data management models, digital educational trajectories that allow developing competencies in the digital economy. They should become the drivers for the development of Novgorod University. In the key issue of digitalization of education, the university adopts the experience of the best universities in Russia. For example, Novgorod University uses a management system that works on the basis of big data. By collecting, structuring and analyzing information, it allows you to create new organizational and management models for organizing the work of the university. The introduction of new digital educational technologies – such as information ecosystems - allows students to access inter-regional education in an online format, for example, lecture courses by faculty members from other universities. Thus, the introduction of digital technologies at NovSU will allow students to gain access to interregional education formats.

The level of qualifications of workers in the field of animal husbandry is extremely important for the economic development of agriculture, which is due to the high role of the system of keeping and breeding farm animals in the production of marketable products. The productivity and profitability of animal husbandry is largely determined by the conditions of animal feeding, the herd management system and other technological aspects developed and implemented by specialists in the field of animal husbandry. In the field of training these specialists, there is an active search for new approaches in the formation of learning outcomes. An important role in the formation and improvement of professional competencies belongs to additional professional education. The productivity and profitability of animal husbandry is largely determined by the conditions of animal feeding, the herd management system and other technological aspects developed and implemented by specialists in the field of animal husbandry.

Currently, the duties of a zootechnician include:

- ensuring an optimal regime for keeping animals, special measures for caring for them;
- creation of a feed base that meets the needs of animals as much as possible at the expense of their own feed;
- development of a system for preparation, storage and use of feed;
- herd management in order to increase reproduction.
In the context of the fourth industrial revolution, the logical development of knowledge in various fields of science and, above all, biotechnology, robotics and artificial intelligence requires continuous education of Russian agricultural specialists. With an increase in the demand for agricultural professions, the requirements for the knowledge and skills of specialists working in this industry change. It is becoming more and more important to own automated herd management systems, production processes, microclimate control, digitalization and robotization, etc. [13]. The main educational programs for the types of professional activities of graduates in the direction of “Animal Science” were developed taking into account the professional standard “Breeder for Livestock Breeding”. Socio-economic, organizational and pedagogical conditions determined the need to develop a professional standard “Animal Science Specialist”, approved by order of the Ministry of Labor of Russia dated July 14, 2020 no. 423н. This professional standard describes the requirements for the type of professional activity: “Organization of production of livestock products”. Without denying the scientific and practical necessity and importance of optimizing the organizational and content components of basic educational programs based on professional standards, we believe that in modern conditions it is additional professional education that becomes one of the key components of the trajectory of the personal and professional development of specialists in the educational system.

In this regard, the Institute of Agriculture and Natural Resources of NovSU made an attempt to rethink its role and place in the ongoing processes of education and the agro-industrial complex. We tried to look at ourselves from the standpoint of not only an educational, but equally educational and implementation structure. In our opinion, the educational process in the system of additional professional education (implementation of the “Management in the Agro-industrial Complex” program) in these conditions becomes not a goal, but a means of providing deeper innovative (implementation) processes through personnel trained in accordance with the time requirements.

In turn, the regional law “On State Support for the Personnel Potential of the Agro-industrial Complex of the Novgorod Region for 2008–2024” defines the procedure for state support for young specialists.

We believe that only through joint efforts of integration – agrarian education, employers, agro-industrial complex governing bodies, it is possible to improve the quality of education, train competitive specialists in the modern labor market and thereby form a reserve of leading personnel for the region.

Based on the analysis of domestic and foreign experience, we have established that in the modern conditions of the development of the agro-industrial complex, the main directions are scientific, innovative approaches to organizing the conduct of agricultural production. In these conditions, specialists of a fundamentally different level and quality must work.

4. Conclusion
One of the most important aspects of the effective development of the agro-industrial complex is the availability of qualified personnel. As a result of the study, it was found that the strategic direction for further improving agricultural education is the transformation of digital technologies with the scientific achievements of educational institutions in partnership with advanced agricultural enterprises. At the same time, improving the quality of personnel training is necessary on the basis of integrating agricultural educational institutions, including the further formation of an extensive network of specialized agricultural classes.

At the same time, the program of professional retraining successfully implemented at the university “Management in the Agro-industrial Complex” is determined in the preparation for agricultural production of qualitatively new personnel who own production management. In turn, the formation of professional competencies of a specialist and monitoring of the need for personnel of a new format should be carried out in accordance with the programs and scenarios for the development of agriculture in the Novgorod region.

The result of the joint work of agricultural educational institutions and employers has a positive impact on personnel training and provides agricultural production with a new generation of specialists who are able to solve strategic tasks for the sustainable development of the industry. At the same time,
the main digitalization tools at NovSU are mass data management models, digital educational trajectories that allow developing competencies in the digital economy. Thus, in the key issue of digitalization of education, including agrarian education, the introduction of new educational technologies at NovSU will allow students to gain access to interregional education formats in the online format.

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