



AGROPEDAGOGICAL COMPETENCIES OF A TEACHER AT AN AGRICULTURAL UNIVERSITY BASED ON THE COMPETENCY- BASED APPROACH

Sultanov Elimbet Kalymbetovich

Doctor of Pedagogical Sciences, Candidate of Technical Sciences,
Associate Professor, Dean of the Faculty of "Mechanization of Agriculture and
Water Management" at the Institute of Agriculture and
Agrotechnology of Karakalpakstan

Abstract

In the context of the transformation of agricultural education and the implementation of the competency-based approach, there is an increasing need to rethink the professional competencies of teachers at agricultural universities. This article analyzes the structure of agropedagogical competencies, their specific features, and the ways in which they are formed in the context of modern educational requirements.

Keywords: Agropedagogical competencies, Agricultural education, Competency-based approach, Professional development, Digital technologies in agriculture, Virtual learning environment, Simulation and 3D modeling, Mechanization of agriculture, Integration of theory and practice, Research competencies.

Introduction

In the 21st century, education is globally recognized as a key factor in ensuring sustainable development. According to the international education agenda through 2030, one of the top priorities is the preparation of skilled personnel who possess digital and information technology skills, meet labor market demands, and are competitive. Currently, digital and information technologies are playing an increasingly important role in the dynamic development of the social sphere,



the wide application of scientific and innovative potential, the full mobilization of intellectual and financial scientific resources, and the advancement of scientific infrastructure modernization to a new qualitative level.

Research is being conducted in major educational experimental laboratories around the world to improve the creation of the professional education system through the selection of educational indicators. For example, at Northern Illinois University, two practical educational programs ("IERN" and "KIDLINK") have been implemented to train professionals for the region. Additionally, European universities such as **Wageningen University and Research Centre** (Netherlands) and the **Swedish University of Agricultural Sciences** (Sweden) are prioritizing the application of digital technologies in professional training. Emphasis is also being placed on the continuity of professional education based on individual and labor market needs.

Modern agricultural education is facing challenges related to digitalization, environmental changes, and globalization. A teacher at an agricultural university must possess not only deep subject-matter knowledge but also the ability to adapt the educational process to rapidly changing conditions. The competency-based approach becomes essential in shaping the professional qualities of educators, ensuring the training of specialists who can function effectively in today's agricultural sector.

In our country, reforms are being implemented to deepen the integration of science and practice in the field of agriculture, as well as to improve the provision of agricultural services based on science and innovation. A key priority in the development of the agricultural economy is ensuring the investment attractiveness of the sector, with a strong focus on training skilled professionals. The goal is to develop new methods for preparing specialists for professional activities within higher agricultural education institutions. To achieve this, it is necessary to elevate the quality of training, establish a system for preparing highly qualified personnel, and ensure that graduates can successfully find their place in the labor market **an important priority for the development of agriculture is the focus on ensuring the investment attractiveness of the sector and training qualified specialists" [1].**



Theoretical Foundations of the Competency-Based Approach in Agricultural Education. The competency-based approach focuses on developing students' abilities to apply knowledge and skills in practical activities. In the context of agricultural education, this means preparing specialists capable of solving real production problems using modern technologies and methods. Accordingly, the teacher must possess competencies that allow for the organization of such an educational process [2].

The virtual educational environment makes it possible to enhance the quality of the learning process, enrich it with innovative content, and develop students' skills in independently acquiring new knowledge. Areas of IT application in agriculture include: **“smart farming,” “smart farms,” “smart greenhouses and resource management,”** agricultural product storage, efficient use of agricultural machinery, **Big Data**, and others.

Agricultural specialists, by mastering digital technology skills during the study of core disciplines, gain the opportunity to apply these technologies in practice and develop new projects. In the virtual environment, special attention is paid to the training of agricultural specialists. To this end, current trends in the training of agricultural professionals in foreign countries — including the USA and European states — have been identified [6].

In the **United States**, future agricultural specialists are expected to meet the following requirements:

- the **competency to design solutions** to complex agricultural problems, taking into account social impacts and environmental safety for people;
- the **competency to collaborate** with individual team members and groups of colleagues to solve professional challenges;
- and other related competencies.

In **Europe**, the professional training of future agricultural specialists includes the following expectations:

- the **competency to develop creative ideas** for solving agricultural problems;
- the use of agricultural professionals' **critical and analytical thinking** to create environments that are safe for human life;
- **readiness to develop new forms and methods** for solving sector-specific problems;



– and the **competency to define goals and strategies** to achieve them.

In **Uzbekistan**, future agricultural specialists are expected to meet the following requirements:

- the **competency to accumulate interdisciplinary knowledge**;
- the **competency to use computer technologies and other means** of communication and information acquisition, including telecommunications networks;
- the **competency to creatively and professionally solve problems** in the field of agriculture;
- the **competency for lifelong learning**, the ability to solve professional problems using virtual technologies, and the ability to meet the demands of the labor market.

Structure of Agropedagogical Competencies. The agropedagogical competencies of a teacher at an agricultural university can be classified as follows:

-General professional competencies: the ability to design educational processes, methodological literacy, and the ability to organize the learning process with consideration of the specifics of agricultural disciplines.

-Specialized competencies: deep knowledge in areas such as agronomy, animal husbandry, agroengineering, and other relevant subjects, as well as the ability to integrate this knowledge into the educational process.

-Digital competencies: proficiency in modern information and communication technologies, and the ability to use digital tools and platforms in teaching.

-Research competencies: the ability to conduct scientific research in the field of agricultural sciences and to implement research findings into the educational process.

-Communicative competencies: the ability to effectively interact with students, colleagues, and representatives of the agricultural sector.

During the course of the study, levels of professional competence were identified based on a scientific pedagogical approach and specific criteria for competency development. Simulation and virtual technologies (such as graphic visualization and 3D modeling), as well as **Personalized Learning** technology (learner-centered education), were employed.



Effective use of agricultural machinery was achieved through the application of **Personalized Learning** virtual training technology, which focuses on personal development and improving technical readiness for the use of machinery in the sector.

Based on the methodology used to improve the professional competence of future agricultural specialists—through simulation, virtual technologies, and Personalized Learning—a refined method for implementing these approaches was developed [7].

Lectures, practical sessions, laboratory work, internships, and independent learning activities were conducted within the discipline "**Mechanization of Agriculture**", under the educational program "**Agromony (by type of agricultural production)**". These were delivered using various **didactic teaching tools**, including computer-based learning systems and programs, electronic monitoring, multimedia-based lessons, pedagogical software, and simulation and virtual technologies (graphic visualization and 3D modeling).

Levels of professional training were identified, along with **cognitive, creative, learner-centered, activity-oriented, and motivational criteria** for the development of the professional competencies of future agricultural specialists based on virtual technologies [7].

Development of Agropedagogical Competencies. The formation of agropedagogical competencies is achieved through the following:

-Professional development: participation in courses, seminars, and training sessions aimed at updating professional knowledge and skills.

-Scientific research activity: involvement of instructors in research projects, which contributes to the development of research and analytical competencies.

-Integration of theory and practice: organizing the educational process in accordance with real agricultural production conditions, and conducting practical training at agricultural enterprises.

-Use of digital technologies: implementing modern information systems, virtual laboratories, and other digital tools into the educational process.

We offer the following original definition of **agropedagogical competence** for future agricultural specialists:



Agropedagogical competence is a crucial component of the professional activity of every future agricultural specialist. It supports the selection of teaching methods and tools, defines the nature of interaction between students and instructors, and contributes to the development of the core competencies required for professional practice.

Therefore, the use of **didactic tools based on simulation and virtual technologies** (such as graphic visualization and 3D modeling), and particularly the use of internet services when teaching the subject “**Mechanization of Agriculture**” at agricultural higher education institutions, plays an essential role in forming the **professional competencies** of future agricultural specialists.

The Role of Agropedagogical Competencies in Specialist Training. The agropedagogical competencies of university instructors have a direct impact on the **quality of graduate training** in agricultural universities. These competencies ensure:

-Relevance of the educational process: aligning educational content with current demands of the agricultural sector;

-Practical orientation of education: focusing on developing skills essential for successful professional performance;

-Flexibility and adaptability: the ability to respond promptly to changes in the agricultural sector and adjust the educational process accordingly.

Conclusion. The **competency-based approach** in agricultural education demands that instructors at agricultural universities develop specific **agropedagogical competencies**. The formation and continuous improvement of these competencies are **key factors** in ensuring the quality of training for specialists capable of working effectively in the **modern conditions of agricultural production** [3].

References

1. Указ Президента Республики Узбекистан от 23 октября 2019 года ПП-5853 «Об утверждении Стратегии развития сельского хозяйства Республики Узбекистан на 2020-2030 годы». <https://lex.uz/docs/4567334>.



-
- 2.Тарасова Н.В. Стратегия реализации компетентного подхода в образовании: историко-педагогический аспект // Аналитические обзоры по основным направлениям развития высшего образования. – 2007. – № 1.
 - 3.Шестак Н.В., Шестак В.П. Компетентный подход в дополнительном профессиональном образовании // Высшее образование в России. – 2009. – № 3. – С. 29–38.
 - 4.Восковская Е.В. Педагогическая компетентность преподавателя вуза // Известия МГТУ “МАМИ”. – 2010. – № 2.
 5. Якупова О.В. Актуальные подходы к построению современной модели компетенций преподавателя вуза // Управление персоналом и интеллектуальными ресурсами в России. – 2016. – Т. 5, № 4. – С. 40–43.
 6. Sultanov E.K., On the Issues of Preparing Agricultural Specialists for Professional Activities. INTERNATIONAL JOURNAL OF FORMAL EDUCATION Volume: 3 Issue: 11 | Nov–2024 ISSN: 2720-6874. P.195-198. <http://journals.academiczone.net/index.php/ijfe>.
 - 7.Султанов Е.К., Совершенствование методики подготовки к профессиональной деятельности будущих специалистов сельского хозяйства на основе компетентного подхода. Автореферат диссертации на соискание ученой степени доктора (DSc) педагогических наук. Ташкент. 2024 г. 64 стр.