



METHODOLOGICAL PRINCIPLES OF DEVELOPING PROFESSIONAL COMPETENCE IN FUTURE ELECTRICAL TECHNICIANS AT AGRICULTURAL COLLEGES

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Abstract.

Relevance: the need to justify the methodological foundations for the future professional competence of electrical technicians is determined by the needs of qualified specialists in the agricultural sector.

The *purpose* of the study is to substantiate methodological principles, to specify and to cover the scientific approaches to the formation of professional competence of future electrical technicians in agricultural colleges.

Methods: theoretical research methods: analysis of psychological and pedagogical literature on the problem – to identify the state of the problem under study in pedagogical theory and practice; analysis, synthesis, abstraction, generalization – for substantiation of methodological bases of formation of professional competence of future electrical technicians.

Results. The article highlights a number of methodological approaches, such as: systematic, competent, humanistic, cultural, axiological, personality-oriented, activity-developmental, environmental, information, integration, technological, synergistic approaches, which it is expedient to rely on in the process of analysis of professional competence of future specialists of technical and technological specialties in agricultural colleges. The content and essence of these approaches are considered. This made it possible to set the basic requirements for the formation of professional competence of future electrical technicians and understanding of the construction of the educational process in the higher school for the preparation of these specialists.

Conclusions: the methodological principles for the future professional competence of electrical technicians should be based on the unity of such basic scientific approaches as competent, personality-oriented, activity-developmental, humanistic, cultural, axiological, informational, and, to a lesser degree, synergistic approaches.

Keywords: *methodological approach, professional competence, future electrical technician, agricultural college.*

Introduction. Changing the paradigm of agricultural development implies dynamic transformations of the main landmarks of agricultural activity of industries and other economic entities of Ukraine and the world. Therefore, there is a need for modernization of agrarian professional higher education, which is the basis for reviewing the existing methodological requirements for the professional training of future junior specialists in technical and technological specialties, in particular electrical technicians. It is also important to determine the reserves for improving the quality of training of specialists in technical and technological specialties in agricultural colleges. In this

aspect, the problem of developing and implementing basic scientific approaches to the formation of professional competence in them appears as a priority tendency to improve professional higher education. The need for substantiation of methodological bases for the formation of professional competence of future electrical technicians is determined by the needs of qualified specialists for the agricultural sector.

The value of a professional higher education is to prepare students for their participation in socio-cultural and professional activities, to form their outlook, to develop a system of values and ideals that determine the civic position of each individual, their attitude to

the world and determining their place in it (Yershova, 2015).

Sources. The basics of a competence-oriented approach to learning are substantiated in the works of Amelina S., Bezpalko V., Goncharenko S., Zeer E., Zimmaya I., Ziazun I., Ovcharuk O., Kalashnikova S., Lugovoi V., Nichkalo N., Pukhovskaya L., Radkevich V., Khutorsky A., Yagupov V. The conceptual principles of professional training of specialists in technical and technological specialties are motivated in the works of Bender I., Bryukhanova N., Duganets V., Demin A., Demin O., Koloska I., Koshuk O., Lazarev M., Luzana P., Manka V., Martseva L., Nagirmoho Y., Romanovsky O., Chernylevsky D., and others. Theoretical and methodological aspects of professional training of future junior specialists in technical and technological specialties are covered in the works of Zueva O., Ishchenko T., Kostyuk D., Kovtun T., Koshuk O., Litvinchuk S., Pashchenko T., Pogoreloi N., Ryabets V., Khomenko M. and others.

Despite the considerable number of scientific works devoted to various aspects of professional training of specialists in technical and technological specialties, the methodology of this process remains one of the most controversial. Obviously, the problem identified today requires concretization and theoretical generalization of the established scientific provisions, the use of the results of new scientific explorations and methodological approaches.

The purpose of the study is to substantiate methodological principles, to specify and to cover the scientific approaches to the formation of professional competence of future electrical technicians in agricultural colleges.

Methods. The following theoretical methods were used in the study: analysis of the psychological-pedagogical literature on the problem (to identify the state of the problem under study in pedagogical theory and practice); analysis, synthesis, abstraction, generalization (for substantiation of methodological bases of formation of professional competence of future electrical technicians).

Results and discussion. Today, there are a large number of scientific approaches to the organization of educational activities in the system of vocational education, including professional higher education. Traditional approaches are largely knowledge-oriented. To a lesser extent, attention is paid to mastering practical skills, and even less so to the formation of personal qualities and adequate behavior necessary for professional activity. As a result, future electrical technicians are not sufficiently able to use knowledge to perform their professional activities. There are many approaches in science that are aimed at knowing the objects of reality. These or other approaches fully take into account the features of a particular object,

contribute to the fullest realization of the goal of his knowledge.

All methodological approaches are aimed at overcoming certain shortcomings of the traditional vocational training system. Let us briefly dwell on the peculiarities of the application of these approaches in the study of the phenomenon.

The systematic approach in the preparation of electrical technicians in agrarian colleges is aimed at discovering the integrity of pedagogical objects, identifying various types of communication in them and bringing them into a single theoretical picture.

According to many researchers (Bezpalko V., Litvinchuk S., Neverdova N., etc.) the systematic approach in the organization of the educational process in college is aimed at studying the problems of synthesis of meaningful and formal methods of systematic pedagogical research, improvement of methodological culture, integration of various ideas about pedagogical system, the integrity of its models.

The constituent components of a systematic approach make it possible to anticipate a continuous transition from a common to a partial basis which reveals the true purpose and is realized through professional standards, content, functions and a set of methods. Allows you to predict the creation of an emotionally favorable atmosphere, psychological comfort for each student, improving the methodology and technology of the educational process, creates organizational and pedagogical conditions for professional formation and actions of the mechanism of professional self-education and self-education.

For this reason, the systematic approach relies on components and provides for a continuous transition from joint to partial based on a true goal. It also gives an opportunity to consider the pedagogical process in terms of its structure, content, functions, set of methods, system connections, the possibility of transforming the professional skills of electrical technicians into professional activities.

The process of forming the professional competence of the future electrical technician according to the systematic approach is based on the individual characteristics of students, offers various forms of organization of the educational process (lectures, practical classes), also covers classroom, extra-auditory and research work, self-education and professional self-education.

We have outlined the main tasks of formation of professional competence of preparation of future junior specialists of technical and technological specialties: mastering of the holistic system of technical and technological knowledge necessary for competent conducting of classes, formation of technical thinking; acquisition of technical supervision of electrical equipment, electric machines, transformers; devel-

opment of students' creative abilities, skills to use the acquired knowledge to solve new technological problems.

The practice of training future electrical technicians in professional higher education confirms that the content of training on the basis of a systematic approach should cover fundamental concepts that reflect the specifics of electrical systems, principles of their construction and operation, and contribute to the understanding of basic technological approaches. Studying special disciplines in college gives the opportunity to form a harmoniously developed specialist who combines electrical engineering skills related to the ability to solve technical tasks, systematically think, design and design electrical installations, to understand the issues of economics, occupational safety, ability to work. Specific technological systems in this approach should illustrate the practical application of the general provisions.

The competency approach focuses on educational outcomes. Moreover, the result of education is not the amount of information learned, but the ability of a person to act in various problematic situations (Khutorskoy, 2003). Current trends in evaluating the effectiveness of education are spread by three models:

– *content*: curriculum (syllabus) is a set of “knowledge” opportunities of those who are taught that can be implemented in educational and professional activities;

– *learning process*: real phenomena and processes occurring in the educational process when the cognitive activity is carried out are subject to analysis;

– *results*: a set of competencies (knowledge, skills, attitudes, attitudes, etc.) mastered by those who have been taught.

The need to include a competent approach in the system of professional higher education is determined by the change in the educational paradigm as a set of values, installations, equipment, etc., which is characteristic of future electrical technicians.

The main goal of modern professional higher education is to make the future specialist a subject of professional activity on the basis of mastering professional competence, capable and ready for personal and professional self-actualization in the modern labor market. The peculiarity of professional activities of electrical engineering in the future is associated with a wide range of mutually agreed and interacting professionally important qualities, such as: professional intelligence and practical thinking, professional mobility and dynamism, initiative and constructiveness, the desire for constant self-education and self-reliance with self-education. independent decisions, ability to successfully adapt in social and professional sphere, work in a team, etc.

Using a competent approach, you can analyze all aspects of training – motivational, meaningful, evaluative. Yes, the ideas of a competency approach have become pivotal today to developing a new system for evaluating the educational attainment of future professionals (Luzan, 2018).

In the educational process, new forms and methods of professional training of specialists, new ways of educational activity that promote mastery and development of a set of key, general-professional, specialized-professional competences should be introduced. Within the motivational aspect, the psychological factor is important – the ability of the future specialist to adequately respond to changes in the professional environment, flexibility in decision-making, departure from the stereotypical thinking, etc.

Person-centered approach is a methodological orientation in the teaching activity of the college teacher, which, based on a system of interrelated concepts, ideas and methods of action, supports and provides processes of self-knowledge, self-improvement and self-realization of personality. By applying this approach, the teacher makes major efforts to develop for each student the unique personal qualities of a future professional with a technical focus.

This approach should significantly change the educational process, make it humane, fill with high moral and spiritual experiences, affirm relationships of justice and respect, maximize the potential of each student, stimulate them to personal development.

The essence of a personality-oriented approach in professional higher education lies in the student's conscious self as a person, in the identification and disclosure of their own capabilities, the formation of self-awareness, in the realization of personally-meaningful and socially acceptable self-realization, self-realization, self-affirmation.

Person-centered approach involves creating the conditions for self-realization and self-development of the individual. The teacher should not only explain the teaching material, but also show how to effectively operate knowledge, think critically, actively act in non-standard situations, make quick decisions. At laboratory-practical classes, consultations, excursions the teacher has the opportunity to pay attention to each student, which helps to master the content of vocational training in the conditions of professional higher education.

Specific in the application of a personality-oriented approach to the formation of professional competence of future electrical technicians is the ability to implement leading personality-oriented forms of training, namely: to promote the interest of each student in the work of the group through a clearly, clearly and accessible formulated motivation; use of various

forms and methods of organization of student-oriented learning activities; encouraging students to speak up, using different ways to solve situational tasks without fear of making a mistake or getting the wrong answer; creation of pedagogical situations in classes that allow to show initiative, independence, to support the student's desire to find his own way of work, to analyze and evaluate the work of others; use of various types of cognitive activity, as well as motivational, content-operational and strong-willed components of cognitive independence of electrical technicians.

Activity-development approach is implemented according to the scheme "need-motive-action-development". The implementation of this approach requires the acquisition of knowledge, skills and competences that represent the practical experience of electrical technician. After all, the knowledge for electrical technicians is to obtain more complete and in-depth information, characterized by systematic, efficient, flexible and durable storage; ability to reason and express their own thoughts; improvement of professionally important qualities such as perseverance, responsibility, commitment.

Thus, from the point of view of activity-developmental approach, two consecutive tasks of pedagogy – transfer of knowledge and formation of skills to apply them, are replaced by one – acquisition of knowledge simultaneously with mastering of ways of action with them. After all, the learned knowledge is the knowledge, turned into a mental action: first, objects and concepts are transformed as a result of interaction, then they (subject knowledge) are rethought (the student begins to operate on them) and skills (the mode of action is learned). In practice, students can accomplish this task in the form of technical calculations for the choice of electrical equipment, drawing a circuit diagram, solving situational problems, and more. At the same time, it is advisable to consider the content of teaching not only as a system of knowledge, but also as a well-defined system of actions, which is important in the pedagogical design of the teacher's activity (Atanov and Pustynnikova, 2002, pp. 14-96).

Modern pedagogy offers an *environmental approach* as a theory and technology of direct control (through the environment) of the processes of education and development of the student's personality; as a system of action by the entity aimed at transforming the environment into a means of designing and diagnosing learning and upbringing.

The modernization of the education system and the whole of society depends on the quality and effectiveness of pedagogical education. Therefore, in accordance with modern requirements, the problem arises of creating an effective educational environment for

the professional training of future electrical technicians in agricultural colleges. In order to solve it, it is necessary to create a mechanism for real changes in pedagogical education, in particular, to develop a general strategy for designing the educational environment of vocational training.

Today, the vocational training model for electrical technicians requires a change in the educational environment. Its main characteristics should be: conceptual integrity of learning and development at all levels of learning; multidimensionality and sufficiency of information; moral and value completeness that enables any subject of the modern educational environment to create not only its own trajectory of learning, but also moral education and development; providing communication conditions at the linguistic, intercultural, interpersonal, ethnic and technical levels.

The humanistic approach to teaching requires that students acquire a significant amount of study material at a sufficiently high level. In analyzing the psychological and pedagogical literature, it can be traced that the historical traditions of interpreting the term "humanistic" imply a characteristic of a system of values that exalts a person, promote his or her good, happiness, freedom and justice (Ball G., Ohneviuk V., Panfilova T., and etc.).

The education of a highly professional specialist, a person with diverse views, deep knowledge, broad outlook and political culture is an urgent problem of today. Therefore, the process of study in a modern college should ensure the individual development of each student, promote successful learning, the maximum development of his abilities and talents.

Developing the basic provisions of the *axiological approach* in pedagogy as the basis of humanism, Vyshnevskyi O., Vitvytska S., Ziazium I., Sukhomlynskyi V. and others note its leading role in the formation and formation of personality of future agrarists. An important place in the formation of the professional competence of electrical technicians is played not only by abilities, skills and abilities, but also by motivation, professional interest, attitudes, needs that are directly formed under the influence of the value-motivational sphere of the individual. Therefore, the process of forming the necessary competencies of the future specialist in the agricultural industry can not be imagined without recourse to the values, mechanisms and technologies of transformation of social values into personal ones. Values determine the meaningful basis of vocational education, where the educational process is not a simple transformation of knowledge, but the arming of the individual with the "methodology of creative transformation of the world" (Shukshunov, Vziatyshev, and Romankova, 2011).

It is worth paying attention to the growing role of the axiological approach in the modern educational process, where the demands of a harmoniously developed personality emerge from the regularities of rapid development of social and technological progress. The moral, intellectual, scientific, technical, spiritual, cultural and economic potential of any society depends directly on the level of development of the educational sphere, which today aims at realizing humanistic ideals in education by improving the social, pedagogical and economic efficiency of its functioning (Nikohosian and Asieieva, 2017).

The cultural approach is aimed at mastering the basics of economic, legal, political, aesthetic, ecological, professional culture, vision of prospects of development of different branches of knowledge, skills of scientific organization of research and introduction of them into their future professional and technical activities. It should be noted that the problems that arise in the process of forming the technical competence of electrical technicians are that the young man at the end of secondary school already has the appropriate baggage of life and educational competencies, but has not yet decided on their application. Then there are contradictions that help you to orient yourself, to create yourself, to develop yourself and to improve yourself. Therefore, teachers of special disciplines should also pay attention to the cultural development of the student, his desire for self-improvement.

One of the leading factors in the selection of content training professionals is to synthesize and dialectically interconnect the prospects for the development of education, production, technology, labor, the market of skilled personnel and culture. It should also be remembered that a skilled worker is not only a specialist but also a cultural personality. Therefore, as many agricultural colleges as possible have extra-curricular activities.

The information approach in the preparation of electrical technicians is a specific modern means of cognitive and practical activity, which focuses the expert's attention on the study and use of all types of information, information aspect of any phenomena.

Scientists have found that information technology is the basis of informatization of education, which is intended to: improve the quality of learning through better use of available information; increasing the efficiency of the educational process on the basis of its individualization and intensification; introduction of active teaching methods, enhancement of creative and intellectual component; achievement of the necessary level of professionalism in mastering the means of information technologies; integration of different activities (educational, research, methodological, scientific, organizational); ensuring continuity and continuity in training; preparation of participants of

the educational process for life in the conditions of information society; enhancing the professional competence and competitiveness of future specialists in different industries; development of didactic materials for distance learning; improvement of software and methodological support of the educational process (Hurevych and Kademiia, 2005; Kademiia and others, 2008).

For the study of professional competence of the individual, the provisions of the information approach have considerable possibilities in the context of the use of laws, functions, properties, methods and means of information to form the cognitive component of the phenomenon under study (Koshuk, 2017).

In addition to characterizing the basic scientific approaches, in the formation of the professional competence of future electrical technicians, we must consider some others. In particular, it is an *integrative approach* that allows you to make connections between knowledge in the various humanities and technical disciplines. Its purpose is the holistic and versatile development of the content of training (in our case – the professional competence of future electrical technicians). The use of an integrative approach in modern professional higher education is a very important aspect of training future professionals, as it enhances students' professional motivation, stimulates their creativity, helps identify and utilize personal resources to succeed in future professional activity. The period of the highest creative success, professional skill – is a harmonious combination of previously achieved skills and conscious opportunities, the discovery of new professional peaks and abilities, the development of creativity (Kovalchuk, 1999).

The technological approach characterizes the orientation of pedagogical researches on optimization, improvement of activity of training, increase of its efficiency, instrumentality, intensity. Teaching technology takes into account the objective didactic patterns and thus, in specific conditions, corresponds to the result of the activity previously set goals. The technological approach in the professional activity of future electrical technicians promotes the use of such means and methods of teaching, that during the performance of students educational and socially significant activity in them intensively developed consciousness, theoretical and practical thinking. Based on the generalizations, it can be argued that the technological approach to the study of the problem of formation of professional competence of electrical technicians involves changes in the organization of the educational process, its improvement taking into account the current level of development of pedagogical technologies.

A synergistic approach is the basis for a holistic perception and awareness of the world, forging

synergistic ideas about the openness of the world, for scientific and technological development, for the integrity and interconnectedness of man, technology, nature and society. As a result of the synergistically thought-out process of education, the personality of the learner is deeply restructured. Training proceeds as a specific modification of already existing behaviors in the direction of the outlined task. Synergistic knowledge, focused on solving new educational problems, becomes the basis of search activities. Based on this knowledge, we can build models of expectations and predictions about the nature of social and cultural processes, their place in the person, in particular, his

place in the system of values that can not be linked and which one should choose.

Conclusions. The methodological foundations for the formation of the professional competence of future electrical technicians should be based on the unity of such basic scientific approaches as: competence, personality-oriented, activity-developmental, humanistic, cultural, axiological, informational, and, to a lesser extent, technological, technological requirements approaches. The prospects for further scientific research are connected with the justification and development of the project of purposeful formation of professional competence of future electrical technicians in the agricultural college.

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Методологічні засади формування професійної компетентності майбутніх техніків-електриків в аграрних коледжах

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Реферат.

Актуальність: необхідність обґрунтування методологічних засад формування професійної компетентності майбутніх техніків-електриків визначається потребами в кваліфікованих спеціалістах для аграрної галузі.

Мета дослідження полягає в обґрунтуванні методологічних засад, конкретизації та висвітленні наукових підходів щодо формування професійної компетентності майбутніх техніків-електриків в аграрних коледжах.

Методи: теоретичні методи дослідження: аналіз психолого-педагогічної літератури з проблеми – для виявлення стану досліджуваної проблеми в педагогічній теорії та практиці; аналіз, синтез, абстрагування, узагальнення – для обґрунтування методологічних засад формування професійної компетентності майбутніх техніків-електриків.

Результати. У статті виокремлено низку методологічних підходів (системний, компетентнісний, гуманістичний, культурологічний, аксіологічний, особистісно-орієнтований, діяльнісно-розвивальний, середовищний, інформаційний, інтеграційний, технологічний, синергетичний), на які доцільно спиратися в процесі науково-теоретичного аналізу професійної компетентності майбутніх фахівців техніко-технологічних спеціальностей в аграрних коледжах. Розглянуто зміст і суть цих підходів, що дало змогу встановити основні вимоги до формування професійної компетентності майбутніх техніків-електриків та розуміння побудови навчального процесу у вищій школі для підготовки цих фахівців.

Висновки: методологічні засади формування професійної компетентності майбутніх техніків-електриків мають ґрунтуватися на єдності таких основних наукових підходів, як: компетентнісний, особистісно-орієнтований, діяльнісно-розвивальний, гуманістичний, культурологічний, аксіологічний, інформаційний, і, меншою мірою, на вимогах інтеграційного, технологічного й синергетичного підходів.

Ключові слова: методологічний підхід, професійна компетентність, майбутній технік-електрик, аграрний коледж.

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