



METHODOLOGY FOR ASSESSING THE QUALITY OF TRAINING SPECIALISTS IN INSTITUTIONS OF PROFESSIONAL PRE-HIGHER EDUCATION

Petro Luzan ¹, Olena Titova ², Irina Mosya ³, Tetiana Pashchenko ⁴

- ¹ Doctor of Pedagogical Sciences, Professor, Chief researcher of laboratory of scientific and methodical support of training specialists in colleges and technical schools, Institute of Vocational Education and Training of the NAES of Ukraine, Kyiv, Ukraine, <http://orcid.org/0000-0002-8853-9275>, e-mail: petr.luzan@ukr.net
- ² Doctor of Pedagogical Sciences, Associate Professor, Assistant Rector of Tavriya State Agrotechnological University named after Dmitry Motorny, Melitopol, Ukraine, <https://orcid.org/0000-0002-6081-1812>, e-mail: helena38ok@gmail.com
- ³ Candidate of Pedagogical sciences, Senior Research Fellow of laboratory of scientific and methodical support of training specialists in colleges and technical schools, Institute of Vocational Education and Training of NAES of Ukraine, Kyiv, Ukraine, <https://orcid.org/0000-0001-7641-3352>, e-mail: mosyaira@ukr.net
- ⁴ Candidate of Pedagogical Sciences, Senior Research Fellow of laboratory of scientific and methodical support of training specialists in colleges and technical schools, Institute of Vocational Education and Training of NAES of Ukraine, Kyiv, Ukraine, <https://orcid.org/0000-0002-7629-7870>, e-mail: tantarena@ukr.net

Abstract.

Relevance. Adequate functioning of any pedagogical system, including the system of training specialists in the college, is impossible without feedback, establishing the effectiveness of the educational process, evaluating the results of competency-based learning. At the same time, pedagogical science has not yet developed detailed theories and valid methods that would allow to reliably assess the level of students' mastery of professional skills, abilities, other complex competencies, defined by educational standards and learning outcomes. In view of this, there is a need to develop a reliable, systematic and accessible, in practice, methodology for assessing the quality of training the specialists in colleges.

The purpose – to substantiate the methodology (for assessing the quality of training specialists in colleges) on the basis of the analysis of essential characteristics of pedagogical estimation, features of the competence approach in professional pre-higher education.

Methods: theoretical (theoretical analysis of scientific sources, study of the requirements of professional and educational standards, educational programs, analysis of programs of academic disciplines – to clarify the state of the research problem and determine areas of scientific research; comparison – to study scientific approaches to solving the problem; analysis and synthesis – to develop a method for assessing competencies (educational outcomes), empirical (observation, testing – to determine the validity of tools, making adjustments to the assessment methodology; didactic experiment – to determine the importance of the topic and highlight the dominant learning elements).

Results. The essence of pedagogical assessment as a process of establishing the level of student achievement in mastering the content of the discipline (topic, module, etc.) in accordance with the standardized requirements is specified. There is a lack of sustainable approaches to the definition of "pedagogical control", "pedagogical (educational) monitoring", "pedagogical diagnostics", "pedagogical evaluation", "assessment", "verification", "accounting", "pedagogical measurement" and the others that are closely related to the above. It is proved that the assessment of the quality of professional training of specialists in the college should be carried out by comparing the students' demonstrated knowledge, skills, abilities and other competencies (current state of the object) with the reference (expected, standardized) results declared in the standards of professional pre-higher education (educational programs). The methodology for assessing the quality of professional training of specialists as a algorithm for the consistent implementation of nine stages – from the establishment of reference learning outcomes to the production of conclusions about the level of quality of competency-based learning of students. A method for assessing the formation of skills (other competencies)

of students based on the description of the structural components of professional action (subject (object); process (procedure); means; conditions; result (product)) is proposed.

Conclusions: The methodology for assessing the quality of professional training of specialists in colleges makes it possible to determine the real level of compliance of students' preparedness with the established regulatory requirements at all stages of mastering the educational program by applicants. The proposed method of assessing competencies (educational outcomes) on the basis of didactic differentiation of professional activities provides an opportunity for interested subjects of the educational process, no longer intuitively, but purposefully, on a scientific basis, to develop diagnostic tools, conduct diagnostic procedures and reliable results of testing students' competencies.

Keywords: *professional pre-higher education, quality of professional training, pedagogical assessment, method of competence assessment, reference learning outcomes.*

Introduction. Rapid changes in the technosphere, the dynamic introduction of innovative technologies in all sectors of the economy necessitate a significant reform of the established system of training technicians, technologists, managers in institutions of professional pre-higher education. Modern normative educational documents indicate the need to significantly change the conceptual principles of organization of the educational process, where the personality of the student, his interests, needs, inclinations and preferences should be in the center. From a simple consumer of scientific and technical-technological information, a performer of exclusively reproductive tasks of mastering future professional activity, the applicant has the main advantage to give away independent educational work, purposeful development of creative abilities and inclinations. That is why, modern professional education, in particular professional pre-higher education, is dynamically moving to the models of competence-oriented learning, which allow to train versatile, highly qualified, competitive professionals, capable of professional self-improvement, self-realization. At the same time, the control of students' competence achievements and objective assessment of the quality of their professional training become especially important.

Instead, the system of monitoring the learning outcomes of vocational education applicants, established for years, is based on outdated principles and methods, can not provide an authentic, reliable assessment of the quality of their training. The reasons for this negative phenomenon are due to the complexity of methodological (understanding of the essence of the quality of training specialists by the pedagogical community), didactic (what principles, rules, conditions should be followed when assessing the quality of training technicians, technologists, managers, etc.), methodical (what methods, technologies, tools should be used to measure the level of quality of professional training of applicants for professional pre-higher education) problems.

It should be noted that pedagogical science has not yet developed detailed theories and valid methods that allow to reliably assess the level of students' mastery of professional skills, abilities, other complex competencies, defined by educational standards and learning outcomes. In view of this, there is a need to develop a reliable, systematic and accessible, in practice, methodology for assessing the quality of training specialists in colleges.

Sources. It is worth noting that there are a number of regulations that contain references to models, procedures, and order for ensuring the quality of training specialists in colleges. In particular, the Law of Ukraine "On Education" specifically states that the quality of education is the compliance of learning outcomes with the requirements established by law, the relevant standard of education and / or the contract for the provision of educational services. Along with this concept, the quality of educational activities is defined as "the level of organization, provision and implementation of the educational process that ensures the acquisition of quality education and meets the requirements established by law and / or the contract for educational services." It is assumed that the assessment of learning outcomes (external, independent) should be carried out on the principles of validity (validity and suitability of assessment methods and technologies for specific purposes), openness and transparency, objectivity, reliability, accessibility, responsibility.

In turn, the Law of Ukraine "On Professional Pre-Higher Education" declares that the main criterion for the effectiveness of this educational unit is its quality – compliance of the conditions of educational activity and learning outcomes with the requirements of the legislation and the standards of professional pre-higher education. Section IV emphasizes the need to ensure the relevance, reliability, transparency and objectivity of the evaluation of the quality of educational activities.

The Concept of Quality Assurance in Higher Education, prepared as a result of the Tempus project "TRUST" "National system of quality assurance and

mutual trust in the system of higher education of Ukraine", states that the development of quality concepts and national concept of quality assurance, value systems in accordance with the best European standards, increasing student motivation and the participation of all important stakeholders in quality assurance procedures are long-term goals that we must achieve in the future. At the same time, criticizing the "distorted and outdated system of values [...] aimed at controlling, pressuring and punishing those who do not meet the established criteria", specific indicators and methods of assessing the quality of higher education are not mentioned here.

The scientific and theoretical principles of solving the problem of assessing the quality of training specialists in institutions of professional pre-higher education are the works of domestic scientists:

– methodological principles of ensuring and monitoring the quality of education were studied by V. Kremen (2014), V. Luhovyi (2010; 2016), N. Nychkalo (2002), J. Talanova (2010; 2016), O. Sliusarenko (2010; 2016), A. Stavytsky (2016), V. Stavytskyi (2016), E. Khrykov (2018); G. Tsekhmistrova (2005);

– O. Lokshyna (2004), O. Liashenko (2007; 2012), S. Babinets (2019), V. Bobrytska (2015), S. Kretovych (2012), I. Bulakh (2006; 2020) substantiated the theoretical bases of assessing the quality of vocational education;

– methodological bases of monitoring and evaluation of the quality of training specialists were covered by P. Luzan (2012), L. Iaroshchuk (2010), A. Kalenskyi (2012), N. Vanina (2012), I. Mosya (2012), T. Pashchenko (2012), V. Cheshuk (2010), L. Yurchenko (20120) and others.

The results of modern research of such Doctors of Sciences as (Yu. Dutchak (2021), G. Krasylnykova (2015; 2016), I. Hyrylovska (2021) are of particular importance for solving the problem of assessing the quality of professional training of specialists in colleges. It is also worth noting the monograph "Methods of test control of student achievement" (Ilin, Luzan and Rudyk, 2010), where the authors, using the theory of formation of mental actions and concepts, propose to assess students' skills by means of test methods.

Despite the number of scientific investigations of problems in monitoring the educational process and diagnosing student achievement, we must state that the development and substantiation of detailed methodology for assessing the quality of training specialists in institutions of professional pre-higher education, although has been intensified recently in

connection with the National Qualifications Agency, National Agency for Quality Assurance in Higher Education, but has not yet received adequate coverage.

The article aims to substantiate the methodology (for assessing the quality of training specialists in colleges) on the basis of the analysis of essential characteristics of pedagogical estimation, features of the competence approach in professional pre-higher education.

Methods: *theoretical* (theoretical analysis of scientific sources, study of the requirements of professional and educational standards, educational programs, analysis of programs of academic disciplines – to clarify the state of the research problem and determine areas of scientific research; comparison – to study scientific approaches to solving the problem; analysis and synthesis – to develop a method for assessing competencies (educational outcomes), *empirical* (observation, testing – to determine the validity of tools, making adjustments to the assessment methodology; didactic experiment – to determine the importance of the topic and highlight the dominant learning elements).

Results and discussion. The problem of the quality of professional pre-higher education is decisive in the search for effective forms and technologies of teaching, methods of selection and structuring of competency-oriented educational content, conditions for creating information and educational environment of the college by both scientists and teachers-practitioners. Instead, scientists do not demonstrate a unity of opinion on the meaning of "quality of education", so today there are several hundred definitions of this phenomenon in widespread use. Most often, scientists understand the quality of education (Yaroshchuk, 2010, p. 12) as:

- compliance of learning outcomes with the requirements of the educational standard;
- efficiency of the educational institution;
- the result of the educational process;
- the effectiveness of the education system of a certain level or industry;
- priority of state educational policy

It is worth supporting the opinion of R. Kubanov (2014) that the concept of "quality of training" arose as a result of narrowing the concept of "quality of education (professional pre-higher, higher)". Without dwelling on a detailed analysis of this term, we point out that in our study, the quality of training specialists means the compliance of learning outcomes with the requirements of the standards of professional pre-higher education and educational and professional programs.

Naturally, the adequate functioning of any pedagogical system, including the system of training specialists in college, is impossible without feedback, establishing the effectiveness of the educational process, the results of competency-based learning. Therefore, it is extremely important to objectively, reliably and systematically assess the quality of training of future technicians, technologists, managers, foremen, etc. The question rightly arises: how, by what methods, tools, by what criteria and indicators should the quality of professional training of such specialists be assessed? First of all, let us turn to the essential characteristics of pedagogical assessment and related didactic categories.

We will note that in the works known to us there are no sustainable approaches yet to definition of concepts "*pedagogical control*", "*pedagogical (educational) monitoring*", "*pedagogical diagnostics*", "*pedagogical assessment*", "*assessment*", "*check*", "*accounting*", "*pedagogical measurement*" and the others that are closely related to the above. Very often they are mixed, used as synonyms, and, sometimes, in different meanings. This is one of the factors that in the training of specialists in colleges control does not fully perform its basic functions, weakly contributes to the productive independent work of students. In addition, not all pedagogical and scientific-pedagogical workers have sufficient psychological and pedagogical bases for the organization of systematic, comprehensive, developmental, objective and impartial control of students' competence achievements.

Most often, *pedagogical (educational) monitoring* (Latin *monitor* - one that reminds, supervises, stores) means a specially created system of collecting, processing, storing and disseminating information about the state of education, forecasting on the basis of objective data on the dynamics and main trends of its development and the development of scientifically sound recommendations for making management decisions to improve efficiency of functioning of a certain educational branch. E. Khrykov (2018) defines, rightly, pedagogical monitoring as a system of measures for collecting and analyzing information in order to study and assess the quality of training and decision-making on the development of the educational process based on the analysis of typical features and trends.

A component of educational monitoring is *pedagogical diagnostics* – division of pedagogy that studies the principles and methods of recognition and establishment of features that characterize the

normal or deviant course of the educational process. The essence of pedagogical diagnostics should be understood as a holistic set of structural (purpose, pedagogical diagnosis, methods, objects, subjects of diagnostics) and functional (tasks, types, functions, principles) components that are closely interrelated. Thus, pedagogical diagnostics includes control, verification, accounting, evaluation, analysis of statistical data, detection of dynamics of changes, clarification, adjustment of curricula, forecasting.

Control of learning outcomes plays an extremely important role in the system of competence-oriented training of future specialists. This is primarily due to its objectives (Fitsula, 2006): determining the quality of students' assimilation of educational material, the degree of conformity of skills and abilities to the goals and objectives of the subject; identifying students' readiness to perceive, understand and assimilate new knowledge; obtaining information about the nature of independent work in the learning process; determining the effectiveness of organizational forms, methods and tools of teaching; finding out the degree of correctness, volume, depth of students' acquisition of knowledge, skills and abilities.

We are impressed by the definition of *pedagogical control*, which M. Fitsula (2006) substantiates. This is a didactic tool for learning management, aimed at ensuring the effectiveness of the formation of knowledge, skills, abilities, their use in practice, stimulating students' learning activities, the formation of their desire for self-education.

The result of the control should be an assessment that involves comparing what students have learned with what they had to learn in accordance with the requirements of the educational-professional program (educational standard). Thus, *pedagogical assessment* is the process of establishing the level of student achievement in mastering the content of the discipline (topic, module, etc.) in accordance with the requirements of current educational and professional programs. At the same time, *pedagogical measurement* is used as a specific procedure of quantitative comparison of the studied feature with a certain standard, taken as a unit of measurement. We add that the set of measurement methods for evaluating the obtained information is called *scaling*.

In our opinion, pedagogical assessment as a category of didactics is correlated with similar related concepts, as shown in Fig. 1.

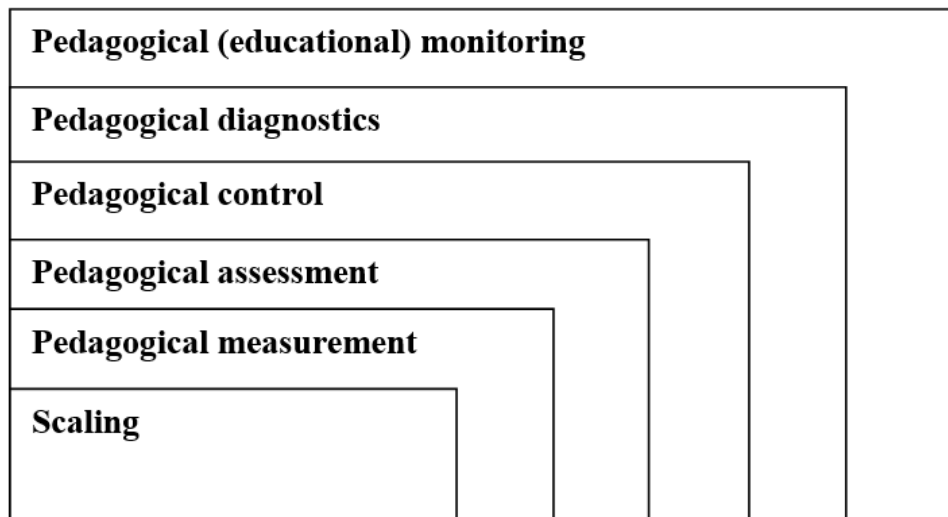


Fig. 1. The scheme of subordination of concepts related to the term "pedagogical assessment"

Thus, the main criterion for the effectiveness of professional training in colleges is *the quality of education* – compliance of educational conditions and learning outcomes to legal requirements and educational standards, professional and / or international standards (if any), and the needs of interested parties and society. Let us remind ourselves that in terms of the new competency methodology, educational outcomes are a set of knowledge, skills, abilities and other competencies declared in educational standards, which must be mastered by a person in the process of studying according to the particular educational program, and which can be identified, quantified and measured.

Thus, *the reference learning outcomes* are the program learning outcomes declared in a particular educational program. In turn, the set of knowledge, skills, abilities and other competencies acquired by a person in the process of learning, according to a certain educational program, are real, educational results. Thus, the basis of the assessment procedure is to compare the students' demonstrated knowledge, skills, abilities and other competencies (current state of the object) with the reference (expected, normalized) results and establish an objective level of quality of training specialists in college (Fig. 2).

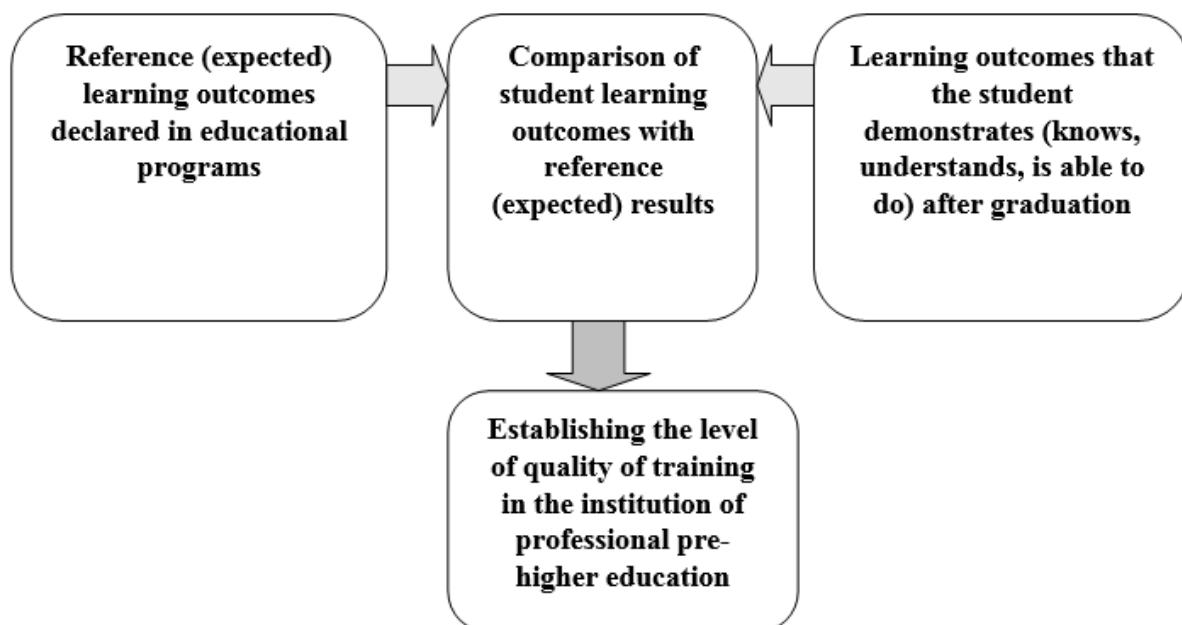


Fig.2. Model of the procedure for assessing the quality of training specialists in colleges

In the scientific literature, scientists associate the essence of the process of pedagogical evaluation mainly with the systematic collection and interpretation of data, producing judgments (based on them) to organize certain actions to improve the system. At the same time, informational (collection of information about a student, student group, specialty, etc.), interpretive (establishing the degree of formation of knowledge, skills, individual personality traits, the level of student cohesion, the state of engineering education, etc.) and corrective (making certain changes in the educational process, optimization of methods, forms, technologies of teaching and education, providing methodological assistance to the subjects of pedagogical interaction, etc.) functions of assessing the learning outcomes of students (Liashenko et al., 2012).

In the scientific literature, scientists associate the essence of the process of pedagogical evaluation mainly with the systematic collection and interpretation of data, producing judgments (based on them) to organize certain actions to improve the system. At the same time, informational (collection of information about a student, student group, specialty, etc.), interpretive (establishing the degree of formation of knowledge, skills, individual personality traits, the level of student cohesion, the state of engineering education, etc.) and corrective (making certain changes in the educational process, optimization of methods, forms, technologies of teaching and education, providing methodological assistance to the subjects of pedagogical interaction, etc.) functions of assessing the learning outcomes of students (Liashenko et al., 2012).

It is worth agreeing with the recommendations of scientists that pedagogical assessment can be used for various purposes: to determine the academic achievements of students; to establish the effectiveness of methods and forms of training; to determine the effectiveness of activities of the educational institution; to determine the effectiveness of a substantiated way of learning, didactic technology, etc. In our case, we will focus on evaluating "for the purpose of development, improvement and refinement (for improvement)" of the results of students' competency achievements – their professional training.

In view of the above, we believe that assessing the quality of professional training in colleges should be considered as a logical structure that hierarchically combines four stages with the appropriate stages (Fig. 3).

Stage 1. Analysis of the State Classification of Professions DK 003: 2010, qualification characteristics of the specialist, profesiogram, professional standard. At this stage, the provisions of the classifier of professions, professional standard, qualification

characteristics, etc. regarding the functions, labor actions, general and special competencies of the graduate, requirements for his professional qualities and the others are analyzed.

Stage 2. Establishment of reference (program) learning outcomes as regulatory requirements for training specialists. Using the content of professional, educational standards (if any), educational and professional training program, we write out the educational results that must be demonstrated by applicants for a particular specialty at the stage of state certification. For example, Table 1 shows the general program learning outcomes that graduates must demonstrate at the end of mastering the educational and professional training program for technicians in the operation and repair of equipment (specialty 133 "Industrial Engineering").

In particular, such learning outcomes in the profile of the educational-professional training program 19: from «1. Ability to communicate in the state language on professional issues" to "19. Skills to work on drilling machines: to perform drilling, deployment, countersinking on single and multi-spindle machines".

Stage 3. Determining the list of knowledge, skills that should be assessed at a certain stage of diagnosis of the quality of training specialists in college. At this stage, the reference learning outcomes are specified depending on the objectives of assessing the quality of training specialists. For example, after mastering the discipline "Fundamentals of Economic Theory", the future technician should be able to: evaluate indicators of efficiency of functioning of the technological equipment and systems and develop measures to optimize their work: to analyze technical and economic indicators of design solutions in the field of tool production; to analyze economic phenomena, processes and action of economic laws in society. We will remind: that learning outcomes are a kind of indicator of a student's gradually acquired competencies and are formulated by pedagogical staff at the level of the educational program and a separate discipline / module. In the mentioned educational-professional program the results which the student should show on completion of mastering of bases of the economic theory are formulated in such edition: "Ability, working under the guidance of leading experts, to carry out tool cost calculations, the price and economic efficiency of its implementation, the complexity of the planned production volume and the amount of necessary equipment and salary". This skill is reference in assessing the quality of student mastery of the basics of economic theory. We have to demonstrate a similar logic when assessing the quality of training of technicians for the operation and repair of equipment when mastering a particular module or topic of the course.

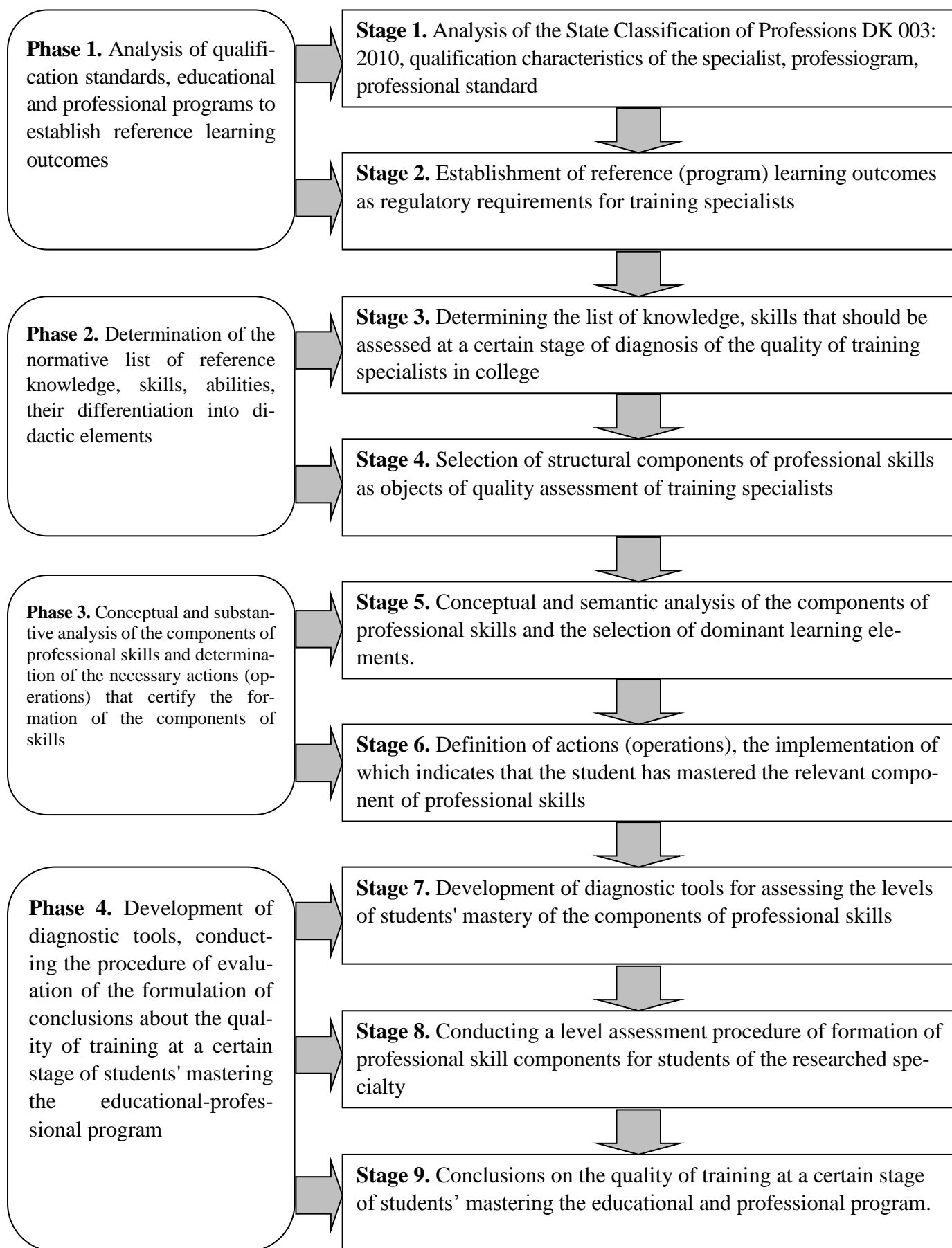


Fig. 3. The structure of the methodology for assessing the quality of training specialists in colleges

General program learning results in the specialty 133 "Industrial Engineering"
(Qualification - 3117 technicians for operation and repair of equipment)

№	Learning outcomes
1	Ability to communicate in the state language on professional issues
2	Ability to perform technical drawings using a single system of technological (SSTD) and design documentation (SSDD) with the use of modern computer tools: detailing and assembly units
3	Ability, working under the guidance of leading specialists, to perform calculations of the cost of the tool, the price and cost-effectiveness of its implementation, the complexity of the planned production volume and the amount of necessary equipment and salary
...
16	Ability to work on lathes. Be able to perform: machining of workpieces on universal and specialized lathes, external and internal threads on lathes
17	Ability to work on milling machines: perform milling of workpieces of medium complexity for machine parts and tools on different types of milling machines
18	Ability to work on grinding and sharpening machines: grinding parts on different types of grinding machines, sharpening cutters and drills
19	Ability to work on drilling machines: perform drilling, deployment, countersinking on single and multi-spindle machines

Stage 4. Selection of structural components of professional skills as objects of quality assessment of training specialists.

The reference educational results (skills, abilities) defined for estimation are directed on performance of certain professional actions. By means of didactic differentiation, we distinguish the structural components of professional action in the following order: *subject (object)*; *process (procedure)*; *means*; *conditions*; *result (product)* (Ilin, Luzan and Rudyk, 2010). The description of the structural components of each skill should be as detailed as possible so that there is no discrepancy in the definition of: the subject of action, its components and features; the content and sequence of operations that are part of the action; devices and tools that must be used during the action; the conditions under which the action must be performed; the results to be evaluated and achieved as a result of the action. We use the following rule: we can tell about the formation of a certain professional skill when the student can with regard to: *the subject (object of action)* – recognize (choose) the desired object from the available or name its specific features; *process (procedure)* – name the operations provided by the procedure and indicate their sequence or perform practical operations on the provided object; *means* – name necessary means, devices, tools, the equipment, select necessary means, show ability to use the necessary devices or tools; *conditions* – name the conditions necessary for performance of action, define sufficiency of available conditions for

performance of operations; *result (product)* – on the basis of available signs, make a conclusion about the conformity of the result obtained as a result of professional action, established by the requirements.

For example, we give a method of selecting the structural components of the professional skills of future technicians for the operation and repair of equipment "*The ability to perform internal threading on lathes*". We characterize the main structural components of the relevant professional action – to perform internal threading on lathes. Thus, we will carry out the analysis in the context of structure of professional action in the following order: *concepts* (categories; terms; definitions; designations); *phenomena* (properties; phenomena; facts; signs; description of objects, mechanisms; systematics); *relations* (ratio; theorems; laws; concepts; rules; hypotheses; physical and mathematical models; dependencies – analytical, graphical, logical; structures, etc.).

Thus, the subject (object) of the specified professional action is: threaded connection; carving; thread classification; threaded surface elements; ways to control the thread; thread systems; designation of a carving surface; internal thread cutting; tap; the device for fastening of a tap.

Process: the procedure of performing internal threading on a lathe consists of the following operations (Baz and Zakharenko, 2020):

1. Determination of the diameter of the hole by the formula:

$$PHD = TD - TP, \text{ mm},$$

where PHD – diameter of the hole for cutting, mm;

TD – thread diameter, mm;

TP – thread pitch, mm.

2. Drilling of the hole (socket) and chamfering;
3. Installation of workpiece in the lathe chuck
4. Preparation of the surface for threading;
5. Insertion of the tap into the hole of the intake part and fixing the tail part in the appropriate device;
6. Installation of a conic shaft of a mandrel in the hole of the quill of the rear headstock;
7. Cutting the thread with a tap to a certain length;
8. Thread control.

Means: formula for determining the diameter of the hole ($PHD = TD - TP, \text{ mm}$); lathe **1K62**; drill; through-turning lathe; tap; the device for fastening of a tap; threaded caliber plug.

Conditions: 1. Drilling a hole in a steel billet is carried out with cooling; 2. With increasing and decreasing hardness (strength) of the processed material, the tabular values of speed must be reduced or increased, but not more than 30%; 3. When the depth of the hole is more than three of its diameters, the feed is reduced by 10-30%, and the cutting speed – by 20-50%; 4. It is expedient to perform a single manufacture of chamfer parts with a combination of transverse and longitudinal feeds of the cutter; 5. The workpiece is installed and fixed in the chuck so that the axis of the hole of the part coincides with the axis of rotation of the spindle. 6. To cut the first turns of the thread, you need to gently and evenly press on the tap, rotating the handwheel of the rear headstock. When the tap crashes into the hole for 1-1.5 turns, its further movement will be self-tightening due to the rotation of the part. 7. Before you cut the thread in the blind holes, you must remove the chips. 8. To prevent thread breakage, it is necessary to choose the correct diameter of the hole, use taps with sharp cutting edges and clean them more often from chips.

Result: cut thread of a certain length with allowable parameters (thread pitch; average diameter, half of the profile angle, as well as inner and outer thread diameters) without defects (tap failure in the hole; torn thread; incomplete thread; thread failure).

Stage 5. Conceptual and semantic analysis of the components of professional skills and the selection of dominant learning elements. Naturally, it is extremely difficult to assess the student's formation of all educational elements of one or another component of professional action. To determine the basic, dominant learning elements, we must first analyze these elements from the following positions: with what probability can we say that, demonstrating

knowledge of a particular element, the student knows other, slightly simpler components? It will be better if such conclusions are made by an expert group.

Obviously, the elements of knowledge are not always combined with each other: sometimes it is impossible to say that if a student has mastered some concepts, he has mastered others on this topic. However, very often, the training material is connected in the following order: in order to master a certain topic, a certain issue or term, it is necessary to know the previous material. In other cases, the above dependence is less severe: the student can thoroughly master a certain issue of the topic, and not to own the material at all on other issues of the same topic.

For example, mastering the topic "Machines for sowing" (discipline "Agricultural Machinery"), future agricultural specialists must master the material on the following issues: 1. *Purpose and classification of seeders*; 2. *General structure and technological process of grain seeder operation*; 3. *Beet seeders, their structure, operation, regulation*; 4. *The structure and operation of the corn drill*. It is quite obvious that when a future agricultural engineer demonstrates excellent knowledge of the structure, technological process, operations of grain drill adjustment, the student must have knowledge of the purpose and classification of drills in general. But he may not have knowledge of the structure, operation and regulation of beet or corn drills. To control the system of such knowledge, scientists recommend using the probabilistic method (Polonskyi, 2018). Here we are talking about the fact that you can test a system of knowledge with the help of questions, the answers to which are most likely to indicate that students have mastered the entire system of this knowledge. Such questions are selected according to their diagnostic weight, which is experimentally defined as the fraction of the number of students who correctly answered all questions on a given topic (section, module, etc.), the number of students who correctly answered a question or group of questions. It is not difficult to notice that, in fact, the diagnostic weight of the question is actually always less than 1. To implement the probabilistic method of knowledge assessment, the following steps are proposed:

1. To define the purpose of control.
2. To make the list of tasks, questions, the answers to which testify about mastering the whole amount of knowledge, skills, abilities.
- 3 To determine empirically the frequency of correct answers to each question or a group of questions.

4. To calculate the diagnostic weight of a question or a group of questions.

5. To control the system of knowledge on issues with the greatest diagnostic weight.

We consider it necessary to present the data of the didactic experiment, which illustrates the application of the probabilistic method of knowledge control (Table 2). The experiment involved 100 students – future mechanical technicians of agricultural production

(specialty 208 "Agricultural engineering"). Assimilation of educational material from the course "Agricultural Machinery" (topic "General purpose plows") was checked. According to the structure of the content of the study of agricultural machinery, respondents were asked 9 questions – from the purpose of this agricultural machine to technological adjustment and regulation. Evaluation was performed by means of testing.

Table 2

Determining the diagnostic importance of the topic "General purpose plows" (discipline "Agricultural Machinery", specialty 208 "Agricultural engineering")

№	Questions on the topic "Machines for the main tillage "	The number of students who answered the questions correctly	Diagnostic significance of the issue
1	The purpose of the plow	98	0,20
2	Agrotechnical requirements for plowing	96	0,21
3	Classification of plows	88	0,23
4	Technical characteristics of the general purpose plow	78	0,26
5	The general structure of a ploughshare	80	0,25
6	Structure and purpose of plow working bodies	47	0,42
7	Plow working process	50	0,40
8	Operations performed by the components of the plow	48	0,41
9	Technological adjustment and regulation of a ploughshare	30	0,66
10	All questions of the topic	20	-

Analysis of student test results shows that each of the 9 questions of the topic has a different weight. In particular, out of the total number of respondents, 20 people answered all 9 questions correctly. Almost all students answered the first and second questions of the topic correctly (Purpose of the plow – 98 people; Agrotechnical requirements for plowing – 96 people). In addition, 88 respondents performed control tasks on the classification of plows correctly, respectively 78 – the technical characteristics of the general purpose plow, 80 – the general structure of the ploughshare. On the other hand, this does not mean that with the help of these five questions it is possible to check the mastering of the material of the whole topic: the correct answers to the ninth, sixth, eighth, seventh questions of the topic were demonstrated by a much smaller share of students.

Obviously, if a student answers these "difficult" questions, then the highest probability of testing knowledge on the whole topic is achieved. We mean

a hypothetical statement: if a student demonstrates the correct answers to the ninth, sixth, eighth, seventh question of the topic, then with a high probability (more than 90%) we can say that he has mastered the whole content of the topic. We support the reasoning with the following example: if a student solves the problem of determining the volume of a triangular pyramid correctly, he can determine the area of the triangle (*to calculate the volume of the pyramid you need to determine the area of the base – the triangle – and multiply it by a third of the height*).

Let's try to apply a similar logic of selection of dominant training elements for the professional action "*Performance of internal threads on lathes*". Note that we have identified 10 didactic elements that define the subject (object) of the specified professional action. Among such educational elements as "threaded connection", "thread", "thread classification", "threaded surface elements", in our opinion,

the last one is the most important: if the student has mastered the parameters of the threaded surface

(P is the thread pitch; H is the V-form height; t is the thread height; d – the major diameter; d_{av} – is the pitch diameter d_1 is the minor diameter; ε – the angle of the thread profile), then with high probability we can say that our imaginary student knows: the thread is "... a helical groove of a certain profile, which is cut on a cylindrical or conical surface"; the thread can be left-right (in the direction of the helix), single-start – multi-start (by the number of ridges), outer – inner (by location), triangular, trapezoidal, rectangular, stubborn, round (by profile shape), etc.

Among the other educational elements that determine the subject (object) of the studied professional action, the dominant ones are: devices for fixing the tap (Fig. 4); designation of a carving surface. Note that the training element "device for fixing the tap"

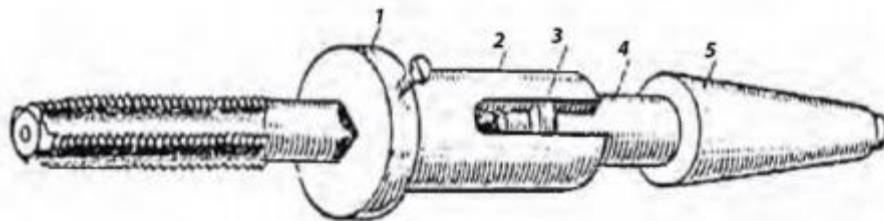


Fig. 4. Device for fixing the tap on the lathe:

1 – sleeve with a square hole; 2 – bushing; 3 – key; 4 – mandrel; 5 – adapter sleeve

Stage 6. Definition of actions (operations), the implementation of which indicates that the student has mastered the relevant component of professional skills. To assess the formation of certain professional skills, it is necessary to prescribe operations, the implementation of which should certify the student's mastery of all components of professional action. For example, to assess the formation of the ability to perform calculations, the student has to:

- characterize the object of calculation (the value that is determined during the calculation);
- name the conditions under which the calculation is made;
- give definitions of concepts used during the calculation;
- name the values (parameters) used in the calculation;
- determine the formulas used in the calculation;
- make a calculation.

The separation of operations to assess more complex professional skills is also carried out by means of analysis of structural components of action. For example, to assess the ability of students to set sowing machines for grain drills to the seeding rate (discipline "Agricultural Machinery") we should make sure that they are able to:

contains the following information: "The device for fixing the tap consists of a mandrel with a key and a sleeve with a groove, which includes the key. The tap is fixed with two bolts in the square hole of the sleeve. The mandrel has a conical shank that is inserted into the hole of the quill of the rear headstock". It is not difficult to notice that during mastering of this didactic element, our imaginary student should know (understand, figuratively imagine) the tool of cutting of an internal carving – a tap. At the same time, imagining this way of threading, knowing its functions and design features, the learner may not know the design of the device for fixing the tap.

A similar analysis must be performed in determining the dominant didactic elements for the other components of professional action.

- determine the parameters, the change of which affects the seeding rate;
- determine the nomogram length of the coil and the speed of rotation of the coil drive shaft;
- name and show the structural components of the coil sowing machine;
- show the sequence of transmission from the axis of the wheels to the shaft of the actuator (drive) of the sowing machines on the gearbox;
- name the parameters that are regulated during the establishment of the seeding rate;
- characterize the changes that occur in the seeding machine during the regulation of the seeding rate;
- characterize the changes that occur in the gearbox during the adjustment of the seeding rate;
- name the content and procedure for performing operations to verify the established seeding rate;
- calculate the sowing rate set for the drills according to the values of the number of seeds sown during the test;
- control the performance of the drill in accordance with agrotechnical requirements.

Stage 7. Development of diagnostic tools for assessing the levels of students' mastery of the com-

ponents of professional skills. This stage aims to develop control tasks, tests, expert letters, other means of assessing student achievement according to established criteria (1. *Characteristics of student response*; 2. *Quality of knowledge*; 3. *Degree of skills*; 4. *Level of mastery of cognitive operations*; 5. *Experience of creative activity*). Methodological aspects of developing diagnostic tools for assessing the levels of students' acquisition of knowledge, skills, abilities and other competencies can be a problem of independent research.

Stage 8. Conducting a level assessment procedure of formation of professional skill components for students of the researched specialty.

When assessing student achievement, it is necessary to follow certain rules, which are based on the provisions of modern theory of control of learning outcomes. We are talking, in particular, about the observance of the following principles:

- *a positive approach in assessing student learning outcomes.* Valuation as a result of assessment should focus on the level of achievement and progress of the student, not to emphasize his failures: only such an approach provides a real, stimulating impact on the development of educational and cognitive activities of the student, his attitude to learning;

- *individual approach when assessing the results of students' academic achievements* – providing such didactic conditions under which psychological stress, students' anxiety for the objectivity of their knowledge assessment are removed, an atmosphere of friendliness is created, and fair assessment stimulates each student to systematic educational and cognitive activities, elimination of identified shortcomings.

Stage 9. Conclusions on the quality of training at a certain stage of students' mastering the educational and professional program.

Based on the results of the examination of students' competence achievements, a conclusion is made on the compliance of the preparedness of students (graduates) with the regulatory requirements. Naturally, the objectivity of the conclusions depends on the provision of certain didactic conditions for assessing the quality of professional training, which include:

- purposeful application of valid, reliable, accurate methods of objective assessment of student achievement;

- the use of several tools for assessing (scientists call from 2 to 4) the quality of training specialists (testing, observation, project, practical task, discussion, presentation, interviews, role-playing games,

etc.), each of which is the most adequate to assess the relevant object being diagnosed (component of professional competence – professional knowledge, skills, attitudes, personal qualities, etc.);

- tools for assessing the quality of training should be relevant to the objects of assessment and the characteristics of students;

- production of conclusions about the quality of training is carried out on the basis of the triangulation method of improving reliability – taking into account information from various sources, including self-assessment of students and peer assessment of classmates;

- acquaintance of students, in advance, with the criteria for assessing the quality of their training in institutions of engineering and technical education.

It is important to emphasize that the effectiveness of assessment of knowledge, skills and abilities, the reliability and the validity of testing methods depend almost entirely on the individuality of the teacher, his experience, professional competence, psychological and pedagogical erudition, pedagogical techniques and tact. Therefore, research of possibilities of the scientific approach to pedagogical estimation, especially concerning its objectification is of great interest. Factors such as the choice of the most effective forms and methods of testing and assessing knowledge, skills, efficiency of tactics of knowledge diagnosis, the choice of formal evaluation criteria and statistical analysis of control results, conclusions and decision-making are important. Each of the factors is an independent problem that requires in-depth analysis and study.

The proposed methodology for assessing the quality of professional training of engineering and technical specialties was tested during 2010-2020 on the basis of the Tavriya State Agrotechnological University named after Dmytro Motorny and the National University of Life and Environmental Sciences of Ukraine. With the help of the methodology, tests and control tasks were developed to assess students' academic achievements both in the course of mastering the educational and professional program and for the final certification, which had a positive impact on the quality of professional training of future agricultural engineers.

Conclusions. The substantiated methodology for assessing the quality of professional training of specialists in colleges makes it possible to determine the real level of compliance of students' preparedness with the established regulatory requirements at all stages of mastering the educational program by applicants. The proposed method of assessing competencies (educational outcomes) on the basis of didactic differentiation

of professional activities provides an opportunity for the interested subjects of the educational process, not intuitively, but purposefully, on a scientific basis to develop diagnostic tools, conduct diagnostic procedures and obtain objective, reliable results of testing students'

competencies. Prospects for further scientific research are associated with the development of a methodological system for evaluating the results of competency-based training of future specialists in agricultural specialties..

List of references

- Базь, О.С. та Захаренко, Г.С., 2020. *Токарна справа. Частина 1: навчальний посібник*. Чернівці: Букрек.
- Бобрицька, В.І., 2015. Моніторинг якості освіти як чинник формування ефективної державної кадрової політики України з підготовки працівників для системи вищої освіти. *Теорія і практика навчання і виховання*, 26, с. 41-47.
- Булах, І.Є. та Мруга, М.Р., 2006. *Створюємо якісний тест: навч. посіб.* Київ: Майстер-клас.
- Булах, І.Є., Чешук, В.Є. та Юрченко, Л.С., 2013. Методика співставлення процесних та результативних показників якості діяльності ВНЗ. В: *Перспективні напрями світової науки: збірник статей учасників першої міжнародної (двадцять першої всеукраїнської) науково-практичної конференції Інноваційний потенціал світової науки – XXI сторіччя. Том 1. Науки гуманітарного циклу. Запоріжжя: Видавництво ПГА. С. 33-35.*
- Гириловська, І.В., 2021. *Теоретичні і методичні основи моніторингу якості професійної підготовки майбутніх кваліфікованих робітників*. Доктор наук. Національний авіаційний університет, МОН України, Київ.
- Дутчак, Ю.В., 2021. *Система забезпечення якості професійної підготовки майбутніх магістрів середньої освіти з фізичної культури*. Доктор наук. Національний педагогічний університет імені М.П. Драгоманова, Київ.
- Ільїн, В.В., Лузан, П.Г. та Рудик, Я.М., 2010. *Методика тестового контролю успішності навчання студентів: монографія*. Київ: Видавництво НУБіП України.
- Каленський, А.А., Лузан, П.Г., Ваніна, Н.В. та Пащенко, Т.М., 2018. *Стандартизація професійної освіти: теорія і практика: монографія*. Житомир: Полісся.
- Красильникова, Г.В., 2015. *Моніторинг якості професійної підготовки інженерів швейної галузі у вищому навчальному закладі: теоретичні та методичні засади: монографія*. Хмельницький: ХНУ.
- Красильникова, Г.В., 2016. *Теоретичні та методичні засади моніторингу якості професійної підготовки інженерів швейної галузі*. Доктор наук.. Ін-т пед. освіти і освіти дорослих. Київ.
- Кремень, В.Г., 2015. Проблеми якості української освіти в контексті сучасних цивілізаційних змін. *Український педагогічний журнал*, 1, с.8-15.
- Кретович, С.С., 2012. *Наукові засади моніторингу розвитку ВНЗ I–II рівнів акредитації*: Кандидат наук. Університет менеджменту освіти НАПН України.
- Кубанов, Р., 2014. Якість вищої освіти: порівняльний аналіз поглядів зарубіжних і вітчизняних науковців. *Порівняльно-педагогічні студії*, 2-3(20-21), с. 27-32.
- Локшина, О.І. ред., 2004. Моніторинг якості освіти: становлення та розвиток в Україні. Рекомендації з освітньої політики. Київ: К.І.С.
- Луговий, В. та Таланова, Ж., ред., 2016. *Гуманізація вищої освіти як засіб забезпечення її якості в Україні: методичні рекомендації*. Київ: ІВО НАПН України.
- Луговий, В.І., Слюсаренко, О.М. та Таланова, Ж.В., 2010. Рамка кваліфікацій та система гарантування якості національної вищої освіти: труднощі реалізації. *Вісник Київського національного університету ім. Т. Шевченка. Тематичний вип. «Вища освіта України у контексті інтеграції до європейського освітнього простору»*, дод. 4, Т. V (19), с. 257-266.
- Ляшенко, О.І., 2007. Організаційно-методичні засади моніторингу якості освіти. *Педагогіка і психологія*, 2 (55), с. 38-40.
- Ляшенко, О.І., Лукіна, Т.О., Булах, І.Є. та Мруга, М.Р., 2012. *Методика і технології оцінювання діяльності загальноосвітнього навчального закладу: посібник*. Київ: Педагогічна думка.
- Освіта UA, 2019. Бабінець, С., 2019. *Моніторинг якості освіти: педагогічний аналіз*. [online] (Останнє оновлення 2 Серпень 2019) Доступно: <<https://osvita.ua/school/method/353/>> [Дата звернення 8 Липень 2021].
- Полонский, В.М., 2018. Оценка достижений школьников: методическое пособие. Москва: Вентана-Граф.

Стандарти професійної освіти: сучасні підходи. В: Ничкало, Н.Г. ред., *Державні стандарти професійної освіти: Теорія і методика*. Хмельницький : ТУП, с. 14-33.

Фіцула, М.М., 2006. *Педагогіка вищої школи: навчальний посібник*. Київ: Академвидав.

Цехмістрова, Г., 2005. Моніторинг якості професійної туристської освіти. *Вища школа*, 1, с. 66-72.

Ярошук, Л. Г., 2010. Основи педагогічних вимірювань та моніторингу якості освіти : навчальний посібник. Київ: Видавничий Дім Слово.

Translated & Transliterated

Baz, O.S. ta Zakharenko, H.S., 2020. *Tokarna sprava. Chastyna 1: navchalnyi posibnyk [Turning business. Part 1: textbook]*. Chernivtsi: Bukrek, [in Ukrainian].

Bobrytska, V.I., 2015. Monitorynh yakosti osvity yak chynnyk formuvannia efektyvnoi derzhavnoi kadrovoy polityky Ukrainy z pidhotovky pratsivnykiv dlia systemy vyshchoi osvity [Monitoring the quality of education as a factor in the formation of an effective state personnel policy of Ukraine for training employees for the higher education system]. *Teoriia i praktyka navchannia i vykhovannia [Theory and practice of teaching and education]*., 26, s. 41-47, [in Ukrainian].

Bulakh, I.Ie. ta Mruha, M.R., 2006. *Stvoriuiemo yakisnyi test: navch. posib*. Kyiv: Maister-klas, [in Ukrainian].

Bulakh, I.Ie., Cheshuk, V.Ie. ta Yurchenko, L.S., 2013. *Metodyka spivstavlennia protsesnykh ta rezultatyvnykh pokaznykiv yakosti diialnosti VNZ [Methods of comparing process and performance indicators of the quality of university activities.]*. V: *Perspektyvni napriamy svitovoi nauky: zbirnyk statei uchashchykh pershoi mizhnarodnoi (dvadtsiat pershoi vseukrainskoi) naukovo-praktychnoi konferentsii Innovatsiinyi potentsial svitovoi nauky – XXI storichchia. Tom 1. Nauky humanitarnoho tsyklu [In: Promising directions of world science: a collection of articles by participants of the first international (twenty-first all-Ukrainian) scientific-practical conference Innovative potential of world science - XXI century]*. Zaporizhzhia: Vydavnytstvo PHA. S. 33-35, [in Ukrainian].

Hurylovska, I.V., 2021. *Teoretychni i metodychni osnovy monitorynhu yakosti profesiinoy pidhotovky maibutnikh kvalifikovanykh robotnykiv [Theoretical and methodological bases of monitoring the quality of professional training of future skilled workers]*. Doktor nauk. Natsionalnyi aviatsiinyi universytet [Doctor Dissertation. National Aviation University, Ministry of Education and Science of Ukraine], MON Ukrainy, Kyiv, [in Ukrainian].

Luhovyi, V. ta Talanova, Zh., red., 2016. *Humanizatsiia vyshchoi osvity yak zasib zabezpechennia yii yakosti v Ukraini: metodychni rekomendatsii Humanization of higher education as a means of ensuring its quality in Ukraine: guidelines]*. Kyiv: IVO NAPN Ukrainy, [in Ukrainian].

Dutchak, Yu.V., 2021. *Systema zabezpechennia yakosti profesiinoy pidhotovky maibutnikh mahistriv serednoi osvity z fizychnoi kultury [The system of quality assurance of professional training of future masters of secondary education in physical culture]*. Doktor nauk. Natsionalnyi pedahohichnyi universytet imeni M.P. Drahomanova [Doctor Dissertation. National Pedagogical University named after M.P. Drahomanov], Kyiv, [in Ukrainian].

Ilin, V.V., Luzan, P.H. ta Rudyk, Ya.M., 2010. *Metodyka testovoho kontroliu uspishnosti navchannia studentiv: monohrafiia [Methods of test control of student learning success: monograph]*. Kyiv: Vydavnytstvo NUBiP Ukrainy.

Kalenskyi, A.A., Luzan, P.H., Vanina, N.V. ta Pashchenko, T.M., 2018. *Standartyzatsiia profesiinoy osvity: teoriia i praktyka: monohrafiia [Standardization of vocational education: theory and practice: monograph]*. Zhytomyr: Polissia, [in Ukrainian].

Krasylnykova, H.V., 2015. *Monitorynh yakosti profesiinoy pidhotovky inzheneriv shveinoi haluzi u vyshchomu navchalnomu zakladi: teoretychni ta metodychni zasady: monohrafiia [Monitoring the quality of vocational training of engineers in the garment industry in higher education: theoretical and methodological principles: a monograph]*. Khmelnytskyi: KhNU, [in Ukrainian].

Krasylnykova, H.V., 2016. *Teoretychni ta metodychni zasady monitorynhu yakosti profesiinoy pidhotovky inzheneriv shveinoi haluzi [Theoretical and methodological principles of monitoring the quality of professional training of engineers in the garment industry]*. Doktor nauk. In-t ped. osvity i osvity doroslykh [Doctor Dissertation. Institute of Pedagogical Education and Adult Education]. Kyiv, [in Ukrainian].

Kremen, V.H., 2015. *Problemy yakosti ukrainskoi osvity v konteksti suchasnykh tsyvilizatsiinykh zmin [Problems of quality of Ukrainian education in the context of modern civilization changes]*. *Ukrainskyi pedahohichnyi zhurnal [Ukrainian Pedagogical Journal]*, 1, s.8-15, [in Ukrainian].

Kretovych, S.S., 2012. *Naukovi zasady monitorynhu rozvytku VNZ I–II rivniv akredyatsii [Scientific principles of monitoring the development of universities of I-II levels of accreditation]*. Kandydat nauk. Universytet menedzhmentu osvity NAPN Ukrainy [PhD dissertation. University of Education Management of the National Academy of Pedagogical Sciences of Ukraine], [in Ukrainian].

Kubanov, R., 2014. Yakist vyshchoi osvity: porivnialnyi analiz pohliadiv zarubizhnykh i vitchyznianskykh naukovtsiv [The quality of higher education: a comparative analysis of the views of foreign and domestic scientists]. Porivnialno-pedahohichni studii [Comparative and pedagogical studies], 2-3(20-21), s. 27-32, [in Ukrainian].

Luhovyi, V.I., Sliusarenko, O.M. ta Talanova, Zh.V., 2010. Ramka kvalifikatsii ta systema harantuvannia yakosti natsionalnoi vyshchoi osvity: trudnoshchi realizatsii [Qualifications framework and quality assurance system of national higher education: implementation difficulties]. Visnyk Kyivskoho natsionalnoho universytetu im. T. Shevchenka. Tematychnyi vyp. «Vyshcha osvita Ukrainy u konteksti intehtratsii do yevropeiskoho osvithnoho prostoru» [Bulletin of Kyiv National University named after T. Shevchenko. Thematic issue. "Higher education in Ukraine in the context of integration into the European educational space"], dod. 4, T. V (19), s. 257-266, [in Ukrainian].

Liashenko, O.I., 2007. Orhanizatsiino-metodychni zasady monitorynhu yakosti osvity [Organizational and methodological principles of monitoring the quality of education]. Pedahohika i psykhohihiia [Pedagogy and Psychology], 2 (55), s. 38-40, [in Ukrainian].

Liashenko, O.I., Lukina, T.O., Bulakh, I.Ie. ta Mruha, M.R., 2012. Metodyka i tekhnolohii otsiniuvannia diialnosti zahalnoosvitnoho navchalnoho zakladu: posibnyk [Methods and technologies for evaluating the activities of a secondary school: a guide]. Kyiv: Pedahohichna dumka [Kyiv: Pedagogical thought], [in Ukrainian].

Lokshyna, O.I. red., 2004. Monitorynh yakosti osvity: stanovlennia ta rozvytok v Ukraini. Rekomendatsii z osvithnoi polityky [Monitoring the quality of education: formation and development in Ukraine. Recommendations on educational policy]. Kyiv: K.I.S., [in Ukrainian].

Standarty profesiinoi osvity: suchasni pidkhody. V: Nychkalo, N.H. red., Derzhavni standarty profesiinoi osvity: teoriia i metodyka [State standards of vocational education: Theory and methods]. Khmelnytskyi : TUP, s. 14-33, [in Ukrainian].

Osvita UA, 2019. Babinets, S., 2019. Monitorynh yakosti osvity: pedahohichnyi analiz [Monitoring the quality of education: pedagogical analysis.]. [online] (Ostannie onovlennia 2 Serpen 2019) Dostupno: <<https://osvita.ua/school/method/353/>> [Data zvernennia 8 Lypen 2021], [in Ukrainian].

Polonskiy, V.M., 2018. Otsenka dostizheniy shkolnikov: metodicheskoe posobie [Assessment of schoolchildren's achievements: manual]. Moskva: Ventana-Graf, [in Russian].

Fitsula, M.M., 2006. Pedahohika vyshchoi shkoly: navchalnyi posibnyk [Higher school pedagogy: textbook]. Kyiv: Akademydav, [in Ukrainian].

Tsekhmistrova, H., 2005. Monitorynh yakosti profesiinoi turystskoi osvity [Monitoring the quality of professional tourism education]. Vyshcha shkola [Higher school], 1, s. 66-72, [in Ukrainian].

Yaroshchuk, L. H., 2010. Osnovy pedahohichnykh vymiriuvan ta monitorynhu yakosti osvity: navchalnyi posibnyk [Fundamentals of pedagogical measurements and monitoring of education quality: textbook]. Kyiv: Vydavnychi Dim Slovo [Kyiv: Slovo Publishing House], [in Ukrainian].

УДК 377.014.6:005.6

МЕТОДИКА ОЦІНЮВАННЯ ЯКОСТІ ПІДГОТОВКИ ФАХІВЦІВ У ЗАКЛАДАХ ФАХОВОЇ ПЕРЕДВИЩОЇ ОСВІТИ

Петро Лузан¹, Олена Титова², Ірина Мося³, Тетяна Пашенко⁴

¹ доктор педагогічних наук, професор, головний науковий співробітник лабораторії науково-методичного супроводу підготовки фахівців у коледжах і технікумах Інституту професійно-технічної освіти НАПН України, Київ, Україна, <http://orcid.org/0000-0002-8853-9275>, e-mail: petr.luzan@ukr.net

² доктор педагогічних наук, доцент, помічник ректора Таврійського державного агротехнологічного університету імені Дмитра Моторного, Мелітополь, Україна, <https://orcid.org/0000-0002-6081-1812>, e-mail: helena38ok@gmail.com

³ кандидат педагогічних наук, старший науковий співробітник лабораторії науково-методичного супроводу підготовки фахівців у коледжах і технікумах Інституту професійно-технічної освіти НАПН України, Київ, Україна, <https://orcid.org/0000-0001-7641-3352>, e-mail: mosyaira@ukr.net

⁴ кандидат педагогічних наук, старший науковий співробітник лабораторії науково-методичного супроводу підготовки фахівців у коледжах і технікумах Інституту професійно-технічної освіти НАПН України, Київ, Україна, <https://orcid.org/0000-0002-7629-7870>, e-mail: tantarena@ukr.net

Реферат:

Актуальність. Адекватне функціонування будь-якої педагогічної системи, зокрема і системи підготовки фахівців у коледжі, неможливе без зворотного зв'язку, без встановлення ефективності освітнього процесу, оцінювання результатів компетентнісно-орієнтованого навчання. Водночас педагогічною наукою ще не напрацьовано докладних теорій і валідних методик, які б давали змогу надійно оцінювати рівень опанування студентами професійними вміннями, навичками, іншими складними компетентностями, визначеними освітніми стандартами результатами навчання. З огляду на це, постала необхідність у розробленні надійної, системної і доступної у практичному застосуванні методики оцінювання якості підготовки фахівців у коледжах.

Мета – на основі аналізу сутнісних характеристик педагогічного оцінювання, особливостей компетентнісного підходу у фаховій передвищій освіті обґрунтувати методику оцінювання якості підготовки фахівців у коледжах.

Методи: теоретичні (теоретичний аналіз наукових джерел, вивчення вимог професійних і освітніх стандартів, освітніх програм, аналіз програм навчальних дисциплін – задля з'ясування стану проблеми дослідження та визначення напрямів наукового пошуку; порівняння – з метою вивчення наукових підходів щодо розв'язання проблеми; аналіз і синтез – для розроблення методу оцінювання компетентностей (освітніх результатів); емпіричні (спостереження, тестування – для визначення валідності інструментарію, внесення коректив у методику оцінювання; дидактичний експеримент – для визначення вагомості питань теми та виділення домінантних навчальних елементів).

Результати. Конкретизовано сутність педагогічного оцінювання як процесу встановлення рівня навчальних досягнень студента/студентів в оволодінні змістом навчальної дисципліни (теми, модуля та ін.) відповідно до унормованих вимог. Констатовано брак сталих підходів до визначення понять «педагогічний контроль», «педагогічний (освітній) моніторинг», «педагогічна діагностика», «педагогічне оцінювання», «оцінка», «перевірка», «облік», «педагогічне вимірювання» та інших, що тісно пов'язані з названими. Доведено, що оцінювання якості професійної підготовки фахівців у коледжі має здійснюватися шляхом зіставлення демонстрованих студентами знань, умінь, навичок, інших компетентностей (актуальний стан об'єкта), з еталонними (очікуваними, унормованими) результатами, задекларованими в стандартах фахової перед вищої освіти (освітніх програмах). Обґрунтовано методику оцінювання якості професійної підготовки фахівців як алгоритм послідовної реалізації дев'яти етапів – від встановлення еталонних результатів навчання до продукування висновків про рівень якості компетентнісно-орієнтованого навчання студентів. Запропоновано метод оцінювання сформованості умінь (інших компетентностей) студентів на основі опису структурних компонентів професійної дії (предмет (об'єкт); процес (процедура); засоби; умови; результат (продукт)).

Висновки: Обґрунтована методика оцінювання якості професійної підготовки фахівців у коледжах дає можливість визначити реальний рівень відповідності підготовленості студентів встановленим нормативним вимогам на всіх етапах опанування здобувачами освітньою програмою. Запропонований метод оцінювання компетентностей (освітніх результатів) на основі дидактичного диференціювання професійних дій надає можливість зацікавленим суб'єктам освітнього процесу вже не інтуїтивно, а цілеспрямовано, на науковій основі розробити діагностичний інструментарій, провести діагностичні процедури й отримати об'єктивні, надійні результати перевірки компетентнісних досягнень студентів.

Ключові слова: *фахова передвища освіта, якість професійної підготовки, педагогічне оцінювання, метод оцінювання компетентностей, еталонні результати навчання.*

Received: 12 June 2021

Accept: 30 June 2021