

# Development of Measurement Model of Educational Activities Quality of Students in Pedagogical Higher Education: Theoretical Methodical Aspect

Halyna F. Ponomarova<sup>1</sup>, Ivan O. Stepanets<sup>2</sup>, Olena M. Vasylenko<sup>3</sup>

<sup>1</sup> Municipal Establishment “Kharkiv Humanitarian-Pedagogical Academy” of the Kharkiv Regional Council, Ukraine

<sup>2</sup> Municipal Establishment “Kharkiv Humanitarian-Pedagogical Academy” of the Kharkiv Regional Council, Ukraine

<sup>3</sup> Municipal Establishment “Kharkiv Humanitarian-Pedagogical Academy” of the Kharkiv Regional Council, Ukraine

## Summary

Article materials reflect the results of scientific research and generalization of experience concerning quality measurement of student’s educational activities in the context of innovative development of the educational process, which is ensured by introducing educational innovations. The main point of monitoring of higher education students’ activities and also phenomenon of education quality, particularly its results, are determined in the research. Guided by the scientific theory and personal experience of scientific and pedagogical activities, the attempt to single out the key components, important indicators and to introduce component indicator model of quality of higher education students’ activities on the qualimetry base has been performed. Methodical solutions concerning the application of the developed model to determine the dynamics of pedagogical students’ educational achievements by particular educational components in the process of innovative development of educational process are proposed. The advanced studies that relate to the development of methods for monitoring the quality of pedagogical higher education students’ activities on the basis of systemic, competence and qualimetry approaches taking into account the levels of education and chosen specialties have been decided.

## Keywords:

*educational activities, quality of education, pedagogical higher education students, monitoring of higher education quality, component indicator model.*

## 1. Statement of problem

The development of educational process, particularly in the pedagogical institution of higher education, is extremely actual problem, especially in view on the fact that it needs modernization to ensure a high level of quality.

The formation of appropriate competencies among specialists, in particular in the field of education, which guarantee their competitiveness in the labour market, is especially important for qualitative development of educational process.

As educational practice proves, necessary condition for this process, which depends on many factors, should be to improve the quality of education through the application of

innovative finds adapted to educational activities in scientific and methodical work (SMW) of higher educational teachers.

At the same time, we must state the fact that there is insufficient level of higher, particularly pedagogical, education in Ukraine that is connected with the range of factors such as the low efficiency of scientific activities of higher education teachers, only 40 % of scientific and pedagogical staff (there was about 20 % in 2004) is actually engaged in science [40]; the results of scientific research, for example in pedagogy, are still inadequately implemented in the educational, methodical, etc. work of teachers, or their realization has insignificant pedagogical effect; the introduction of pedagogical innovations is carried out spontaneously, that is, methodically unjustified, and this leads to low results in students’ education.

This determines the need to review existing approaches and correct the practice and methods of educational process monitoring, particularly the measurement of quality and effectiveness of educational activities of future teachers in the context of their relationship with the introduction of educational innovations.

## 2. Methods of research

Theoretical methods are synthesis and system analysis of scientific literature on the theory and methods of education management and its quality assessment for theoretical grounds of the development of a model for measuring the effectiveness of students’ educational activities; abstracting and concretization to clarify the essence and features of the methods for monitoring of pedagogical higher education quality in a pedagogical institution based on the achieved learning outcomes; modelling for presentation of the component indicator monitoring model of students’ education activities of pedagogical institutions.

Empirical methods are expert evaluation for defining the key indicators and numerical coefficients of monitoring of

students' education activities quality in pedagogical higher institutions.

### 3. Analysis of research results and publications

In our research the theoretical basis for the substantiation of component indicator model of quality measurement of general secondary education future teachers activity based on the interpretation of system, competence and qualimetry approaches in education is built on a system of scientific theories and concept: theory of pedagogical systems and technologies (I. Dychkivska [17], A. Ratsul [34], L. Petrychenko [28], J. Bruner [1], P. Mitchell [2], F. Percival [4]); theory of research methods integration (D. Morgan [3]); peculiarities of ensuring quality control of education (T. Buriak [14], M. Kisil [19], L. Lisina [22], O. Piekhota [30]); specifics of the implementation of the competence – based approach (B. Beziazychnyi [11], N. Bibik [13], O. Ovcharuk [27], O. Pometun [31], L. Khoruzha [37]).

Experience and research results (P. Anisimov [7], V. Ashumov [8], P. Baranova [9], T. Buriak [14], L. Vitkin [15], V. Kachalov [18], M. Kisil [19], V. Luniachek [24], O. Liashenko [25], L. Petrychenko [29], H. Ponomarova [29], O. Popova [29], Z. Slepkan [36], E. Khrykov [39], P. Yasinets [41] and others) persuade that in the development of a modern higher education institution innovative activity objectively plays an important role as it contributes to the formation of scientific methodical culture of teachers, and as the result, improvement of effectiveness and quality of educational process that is reflected in the level of its scientific and methodological support and students' learning success. At the same time, the problem and tasks of quality measurement of students' educational activities in the context of system, competence and qualimetry approaches are updated.

Systems analysis of scientific works (V. Ashumov [8], S. Beliaev [12], P. Husak [16], L. Husak [16], Ya. Kodliuk [20], O. Savchenko [35]) proves that all indicators of the quality of pedagogical higher education should be considered in unity and interdependence, but at the same time, the main system-forming indicator is the result of educational activity, that is, the formation of the professional competence of a higher education graduate.

Under the professional competence of the future teacher, the absolute majority of scientists understand the integral characteristic of students' professional maturity at a certain stage of training that unites the level of knowledge, skills, abilities, pedagogical qualities which, on the basis of motivation, give opportunity to carry out effectively professional activity, that is, to realize, according to L. Khoruzha [38], a full set of competencies aimed at its result.

At the same time, the quality of the process and result of educational activity directly and indirectly, as the

experience proves, depends on the specific implementation of modern achievements of psychological and pedagogical science, innovative authors' ideas and technologies which determines the expedience of measuring their effectiveness for further improvement of activities of higher educational institutions in the context of the education quality.

Based on the results of the research by O. Lokshyna [23], we update the thesis that objective and reliable information about its effectiveness regarding the introduction of pedagogical innovations in dynamics is necessary to improve the quality of the educational process. Ensuring the solution of the mentioned task, according to scientists, is advisable to associate with the introduction of the qualimetry approach in education, especially in higher education, that provides actual and quantitative assessment of the quality of educational activities and its results. The basis of qualimetry measurement is clear understanding of the quality of education and the implementation of the system of qualimetry principles [32].

In the Law of Ukraine "On Higher Education" the quality of higher education is considered as a set of qualities of a person with higher education which reflects his professional competence [33] that completely coordinates with the aim of our research.

In the theory of measurement of higher education quality, the principles of qualimetry approach developed by N. Akinfieieva [6] also deserve attention.

**Objective of research** – theoretical and methodological substantiation and development of component indicator model of measurement of quality of students educational activities in pedagogical higher institutions.

### 4. Presentation of the main research material

Considering innovations in a pedagogical higher institution as a factor of improving the quality of educational activities, it is necessary to emphasize that the adoption of timely and effective management decisions regarding the organization of educational activities, its semantic content, the implementation of performance analysis, etc. mostly depends on the objectivity, reliability and completeness of information about the course of the educational process, which is implemented on innovative principles. This, accordingly, requires the creation and development of a monitoring system, in particular regarding the measurement and evaluation of the quality of educational activities of students of higher educational institutions.

In the context of the research, we proceed from the fact that the success of educational activities of students is directly related to the quality and effectiveness of scientific and methodical work in the educational institution, in the process of which scientific justification, development and

implementation of innovative (effective, optimal) forms, methods, means, technologies of learning, etc. is carried out.

The concept of monitoring of students' educational activities in pedagogical higher education institutions is defined as tracking its quality and effectiveness according to a reasonable and developed component-indicator model. That is, monitoring is considered as a system of diagnostic procedures for collecting information about the educational activities of students under the influence of certain factors and with the help of certain indicators.

The definition of the quality of higher education is based on well-established concepts about it, such as balanced compliance with diverse needs, goals, requirements, norms and standards. At the same time, higher education is understood both as a process, as a result, and as an educational system, as V. Kremin [21] pointed out. Such a concept is fully consistent with the ISO 9000:2000 series standard, which sets out requirements, in particular, for the organization and functioning of the quality management system for educational services. In turn, the management process can be implemented according to both the result and according to its individual links, components or consequences by establishing compliance with certain features of the management object with specified (established) requirements, norms and standards [26].

Note that, regarding the monitoring of the directly effectiveness of educational activities of pedagogical higher education students, it is based on the principle of mirror reflection of the quality of the educational process in its results. This makes it possible to measure the quality of educational activity by actual results, which will directly indicate the quality of the educational process and the effectiveness of innovative implementations.

Based on the generalization of the results of scientific research [32], measurement refers to the procedure of determining the numerical value of quantities with some measure. At the same time, we do proceed from the fact that in the educational system this is the essence of comparing or superimposing the existing reality (the level of formation of certain indicators) with an etalon (standard) or scale.

As our pedagogical experience convinces, the quality of education should be considered as a set of characteristics that reflect the levels of achieved qualitative and quantitative results. In addition, the conducted research convinces that it is difficult to establish an unambiguous correspondence between the results of monitoring of the students' educational activities in a pedagogical higher educational institution and the conditions of the educational process. Therefore, let us emphasize certain components and indicators that would allow us to evaluate and compare the quality of students' educational activities in a pedagogical higher educational institution of a certain level of education. Some scientists even believe that the training of specialists in a separate specialty should not be unified and should be oriented towards the individual trajectories of

students, that is, the formation of a specific list of competencies [5].

The attention is focused on the choice of the measure and method of measuring the compliance of educational activities with the specified standards (requirements, norms).

Agreeing with scientists V. Bakhrushyn and O. Horban [10], an approach has been chosen that lies in the expediency of constructing an integral indicator as a certain combination of individual indicators, for example, their weighted sum:  $\Pi = a_1 \Pi_1 + a_2 \Pi_2 + \dots + a_n \Pi_n$ , where  $a_i$  – weight coefficients, which are preliminarily determined by experts from among the leading scientists. We also use the requirements regarding the sum of the weighting coefficients for each indicator:

$$\sum_{i=1}^n a_i = 1.$$

The conducted research made it possible to develop a component-indicator model for measuring the quality of educational activities in pedagogical higher education institutions (see Table 1), which is based on expertly determined key indicators and their weight coefficients. 89 scientific and pedagogical workers took part in the expert evaluation.

Table 1: Component-indicator model for measuring the quality of students' educational activities for a master's degree in a pedagogical higher institution

No	Component	Indicators		V - weightiness	k - coefficient of viability	Partial valuation of indicators	Partial valuation of components
		Professional competence	Knowledge, skills and abilities				
1.	Motivational target $\Phi_1 = m_1 * (v_1 * k_1 + v_2 * k_2 + v_3 * k_3 + v_4 * k_4 + v_5 * k_5)$	Ability to determine, justify and develop programs of educational activities in accordance with the purpose of education process, educational needs, and requirements for ensuring the quality of education.	1. Knowledge and awareness of the subject area of the discipline. 2. Knowledge of new scientific achievements and trends in the development of the subject area. 3. The ability to correlate the purpose, content, methods and results of training in the discipline and design educational activities. 4. The ability to develop a syllabus of an academic	0,15  0,2  0,25  0,25	$k_1$  $k_2$  $k_3$  $k_4$		

			discipline and prepare materials of an educational and methodological nature. 5. Skills in monitoring the satisfaction of students' expectations from educational activities and their results.	0,15	$k_5$		
2.	Context and gnoseological $\Phi_2 = m_2 * (v_6 * k_6 + v_7 * k_7 + v_8 * k_8 + v_9 * k_9 + v_{10} * k_{10})$	The ability to select ground and plan (model) the content of educational activities to solve specific educational problems.	6. The ability to acquire knowledge related to the chosen problem. 7. The ability to perceive, realize and formulate learning tasks in the context of a cognitive problem. 8. The ability to identify shortcomings and needs related to the assimilation (augmentation, deepening, improvement) of knowledge to solve problems of educational activity. 9. Knowledge of methods and approaches and the ability to justify the expediency of their application for solving cognitive and practical tasks in educational activities. 10 The ability to model the content of education and learning activities regarding their acquisition.	0,15 0,15 0,3 0,2 0,2	$k_6$ $k_7$ $k_8$ $k_9$ $k_{10}$		
3.	Operationally efficient $\Phi_3 = m_3 * (v_{11} * k_{11} + v_{12} * k_{12} + v_{13} * k_{13} + v_{14} * k_{14} + v_{15} * k_{15})$	The ability to ensure the achievement of planned learning results, taking into account the individual characteristics and needs of students.	11. Modern knowledge of the scientific and theoretical foundations of the use of teaching methods in the learning activities of educational institutions. 12.The ability to use the features and specifics of the organization of the educational	0,15 0,15	$k_{11}$ $k_{12}$		

			process at various levels and for different forms of education. 13. The ability to implement modern methods and technologies of educational activities in accordance with the purpose and tasks of a particular academic discipline. 14. The ability to organize and stimulate students' learning activities taking into account their psychological characteristics and educational needs. 15. The ability to provide individual support to students on the basis of partnership and cooperation.	0,2 0,25 0,25	$k_{13}$ $k_{14}$ $k_{15}$		
4.	Control correctional $\Phi_4 = m_4 * (v_{16} * k_{16} + v_{17} * k_{17} + v_{18} * k_{18} + v_{19} * k_{19})$	The ability to develop (select) methodological and pedagogical tools for monitoring and correction (identification, evaluation, self-control, self-correction) of students' educational activities and their results.	16. Knowledge of criteria, methods and technologies of control (self-control) of the learning process and results of education.. 17. The ability to plan, develop (select) assessment tools in accordance with the objectives of assessment, the content of education, the specifics of the academic discipline, the characteristics and level of effectiveness of students learning. 18.Knowledge of the methods and ways of the most optimal and effective communication in the process of organization and ensuring the evaluation of learning results on the principles of	0,2 0,25 0,2	$k_{16}$ $k_{17}$ $k_{18}$		

			academic virtue. 19. The ability to analyze and correct (self-analysis and self-correction) the process and results of students' learning activities, to justify ways and techniques to improve their quality.	0,3	$k_{19}$		
Total estimate $\Phi_{gen} = \Phi_1 + \Phi_2 + \Phi_3 + \Phi_4$							

Let us define the total estimate in fractions of units as follows:

- 0.5 – the quality of learning results does not meet the criteria of the internal quality assurance system of a higher education institution;
- 0.51 – 0.55 – low level of quality;
- 0.56 – 0.65 – sufficient level of quality;
- 0.66 – 0.75 – satisfactory level of quality;
- 0.76 - 1 – high level of quality.

The data obtained are entered into the table, it allows to track the position and dynamics of the quality of educational achievements of higher education students both in individual modules and in the subject as a whole, both for an individual student and for the academic group as a whole (see Table 2).

Table 2: Summary data of development dynamics of learning achievement quality of higher educational students in a pedagogical higher educational institution regarding individual components of the educational program

Partial assessment of components for _semester_ ac.year						
Group __		Full name of a student _____				
Beginning of the semester	Mod. 1	Mod. 2	Mod. 3	Mod. 4	Mod. n	End of the semester

To visualize the dynamics of the development of the quality of learning of higher education students regarding individual components, it is advisable to build the following diagram. (Fig.1).

This approach, as is obvious from the foregoing, is currently quite optimal for developing the technique for assessing the quality of educational achievements of students regarding individual professional competencies. On the one hand, it meets modern quality requirements, in particular higher pedagogical education, and on the other hand, it is based on a qualimetry approach that allows measuring and evaluating this quality objectively.

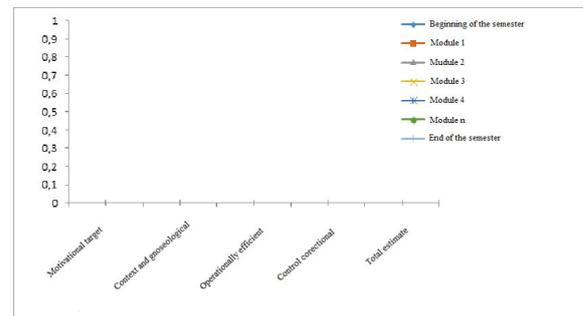


Fig.1 Development of learning quality of pedagogical higher educational students in a higher educational institution regarding individual criteria of its indicator.

At the same time, today there is no single concrete understanding of the quality of higher education, in particular pedagogical education (there are only separate standards), and there are no universal methods for evaluating it.

The state of modern pedagogical theory and practice also determines the expediency of a prospective study of such aspects of this problem as the choice (development) of an optimal method for calculating the final quality indicator, determining weight coefficients that would take into account the significance of each of the indicators, and so on.

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