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Using the Qualimetric Method in Conducting the Pedagogical Experiment Test

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Abstract: In the article, the general characteristics of the methodology and theoretical foundations of the quality assessment of various objects and processes in the practical fields of qualimetry, the development of a specific methodology and mathematical model for the assessment of the quality of the object used for special qualimetry for various purposes, and the fact that there are types of qualimetry such as expert, probabilistic-statistical, index, qualimetric taxonomy The information in the article, the control and evaluation of the effectiveness of the educational process in our Republic, the information about pedagogical quality methods in determining the level of professional and pedagogical training of pedagogues is presented.

Key words: TIMSS, TALIS, PISA, Qualimetry, Pedagogical Qualimetry, collective, competence, conceptual basis, rating system.

Introduction. Our republic has continuous education from the international assessment systems that are successfully used in the educational system of the developed countries of the world - TIMSS (The Trends in International Mathematics and Science Study), TALIS (Teaching and Learning International Survey) and PISA (Programme for International Student Assessment). It is advisable to use it in lime as well. For this, it is necessary to provide information about the science of qualimetry, which is designed to evaluate the quality of objects and processes.

Qualimetry is a science that studies the problems and methodology of assessing the quality of all objects in nature and processes occurring in society, products created in the field of production. It is a branch of science that incorporates the methods of evaluating the quality of objects, products, and processes, and determines the result achieved using various methods and tools .

Literature review and methodology. A qualitative indicator of each group mentioned above and develops a general evaluation procedure. Objects and products was established in the 15th century, and at first craftsmen determined the indicators that determine the quality of their products and began to put quality marks. In this way, commodity science was born and in 1549, the first department of "Commodity Science" was established at Paduan University in Italy.

The 20th century , the evaluation and standardization of objects and products by means of points was established in the USA and European countries. In this way, in other countries, certain works have been started to determine quality indicators and put them into practice. These actions led to the emergence of qualimetrics as a scientific discipline and the expansion of the scope of research.

Three theoretical (general), special and practical branches of qualimetry.

In theoretical qualimetry, a specific object is designed (abstracted) and the general laws and mathematical models of its quality indicators are studied. The research object of theoretical qualimetry is the development of philosophical and methodological foundations of quantitative assessment of the quality of objects, production products, objects and subjects.

In the practical fields of theoretical qualimetry, the methodology and theoretical foundations of quality assessment of various objects and processes have a common feature. Special qualimetry develops a precise methodology and mathematical model for evaluating the quality of objects used for various

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purposes. There are types of special qualimetry, such as expert, probabilistic-statistical, index, qualimetric taxonomy.

Is a field that develops quality assessment of technology, production, human activity, various projects and processes. It is interconnected with other disciplines and has branches such as technical qualimetry, social qualimetry, pedagogical qualimetry, medical qualimetry, geological qualimetry.

Pedagogical qualimetry is a scientific-theoretical science that was created and formed on the basis of years of experience and evidence. In this case, professional qualifications and pedagogical skills of pedagogues are determined by comparison.

Methodological problems of pedagogical qualimetry have so far escaped the attention of scientific researchers and they are waiting for their solution.

The research object of pedagogical qualimetry is the quality of the educational process, the organization and management of educational activities of students, monitoring and evaluation of teacher's activities.

The formation and development history of pedagogical qualimetry as a science can be conditionally divided into three periods:

1. The early middle and middle ages, that is, the period of empirical development that has not yet been scientifically based.
2. The end of the 16th and 19th centuries is the period when the first idea about the quality of the educational process appeared.

And newest development period of pedagogical qualimetry , that is, the period with scientifically based, methodological foundations, theoretical, special and practical branches, scientific measurement parameters.

In the early middle and middle ages, that is, in the period of empirical development, which was not yet based on science, the main task of educational institutions was to convey knowledge of philosophical and religious content to the minds of learners. The main focus is on the stabilization of the society and the development of people's religious literacy. In educational institutions of that time, 7 areas of art were voluntarily taught.

The study of art prepared the ground for the emergence of spiritual-ethical, intellectual, physical development, aesthetic taste, ecological views of the members of the society.

From the 16th century to the end of the 19th century , certain researches were carried out regarding the final result of the educational process and the evaluation of the pedagogical activity of teachers, but these researches did not give the expected results.

In the famous pedagogue Yakomensky's work "Great didactics", the main didactic categories, the purpose of teaching, the content of education, control of knowledge, and the determination of the quality of the educational process are didactically based. The scientist introduced new terms and concepts to the science of pedagogy, such as "control and assessment of knowledge", "exam", "collegium", "dictation".

A highly qualified and competitive personnel, a five-point evaluation system was established in higher education institutions.

The 20th century, control and evaluation of the acquired knowledge, skills and qualifications of students, and later their competence, were established in educational institutions.

At that time, in Russian educational institutions, emphasis was placed on the ideological and political direction of the content of education, a theoretical system based on the integrity of education was established, theoretical reproductive knowledge, skills and control of qualifications, formation of a comprehensively developed person as the final result of education is envisaged.

During the latest development of pedagogical qualimetry, the paradigm of education focused on the personality of students has appeared.

Person-oriented education is based on universal values, pedagogical relations are humanized, the student's interest, needs, internal and external educational motivations are taken into account.

On the basis of this paradigm, positive changes have been made in pedagogical quality, as well as in the educational system. They are:

- Transition from frontal education based on the socialization and adaptation of the person in the educational system to the process that prepares the ground for the individual development of the person;
- Determination of theoretical knowledge, practical skills and qualifications in students based on general cultural, universal human values ;
- Orientation of learners to independent education and preparation along with forms of compulsory education;
- transition to the use of integrated content, interdisciplinarity, module system in determining the value of knowledge, skills and competences, experience and value specific to creative activity, not on the basis of theoretical issues of educational courses ;
- Along with the reproductive methods and traditional technologies of teaching , the use of innovation and information technologies that enable the development of students' creative, critical and logical thinking skills;
- in monitoring and evaluating the final result of the educational process, it is necessary to abandon the paradigm of knowledge, skills and competence, and determine the level of development and upbringing of the individual by controlling the competences accepted as a perspective direction of the modernization of the educational system.

The positive changes that are intended to be introduced into the educational process, in turn, have an impact on the process of evaluating the acquired knowledge, skills, qualifications and competence of the students.

Pedagogical qualimetry as a science has the following conceptual foundations:

1. allows to determine the quality of the educational process organized at different stages of continuous education, the level of learning of students, and the professional qualifications of pedagogical personnel .
2. indicator of the researched object as a dynamic category and assumes an increase in the level of quality based on social orders placed before continuous education in the future.
3. is formed and develops as a science based on the achievements of two interrelated fields - theoretical and practical qualimetry.
4. Pedagogical qualimetry is the compatibility of the level of training of future teachers with the qualification requirements, the professional qualification of teachers working in the continuous education system, the quality of the educational process organized at this stage, the acquired knowledge, skills and qualifications of students, monitors and evaluates the conformity of professional competence (ability) to DTS, the quality of training of pedagogical personnel of higher education institutions, including existing departments, the quality of material and didactic support of courses included in the curriculum based on the rating in accordance with the established procedure.

Pedagogical qualimetry as a science determines the way to achieve the following goals:

1. Taking into account the ideological and political changes taking place in the world, the achievements achieved in the educational institutions of the developed countries of the world, the spiritual and educational updates in the life of the society, the modern requirements of the

educational process development of regulatory requirements that allow control of appropriate organization;

2. At the stage of creating legal and regulatory documents of the educational process, DTS based on state and social orders, model curricula based on the qualification requirements for pedagogues, modernized and integrated model programs introduced in the continuous education system, training development of ways to control the appropriateness of the material-technical, educational-methodical supply of educational courses and evaluate their quality;
3. Forming standards for quality control and evaluation of the educational process, educational and pedagogical practice in higher education institutions;
4. Providing employment to graduates of higher educational institutions, adapting them to the pedagogical process, analyzing the essence of the work being conducted in the mentor-student direction, and developing standards for evaluation.

The main tasks of pedagogical qualimetry as a science:

Control of the implementation of the tasks specified in the Law "On Education", the National Personnel Training Program, state programs, presidential decrees, decrees and orders, decisions of the Cabinet of Ministers;

- Development of normative documents and rating system of the attestation and accreditation process of higher education institutions;
- To determine the scientific potential of the departments of higher educational institutions, research, spiritual and educational work, the quality of the organized educational process;
- To determine the quality of pedagogical activities of professors , research, spiritual and educational work, material-technical, educational-methodical complexes of the taught courses.

Pedagogical qualimetry includes comparison of scientific research methods, analysis of the obtained results with the help of mathematical and statistical methods and drawing conclusions, conducting interviews with pedagogical personnel, conducting a survey to determine the opinions of teachers, carrying out an examination, social methods can be entered.

Actual problems of pedagogical qualimetry

Diagnostics, expertise, monitoring and pedagogical qualimetry are used to control and evaluate the quality of the educational process .

Qualimetric direction based on the theory of pedagogical measurement, due to its comprehensiveness, integrity of the test process, mathematical-statistical analysis of the obtained results, allows obtaining strict and accurate results about the level of development of students and the quality of knowledge acquisition.

Control organized in the theoretical qualimetric direction differs from the traditional ones in that there is a large amount of information and the possibility of quantitative evaluation in assessing the quality of acquired knowledge, skills and qualifications of the object under study.

In the educational monitoring of developed countries, test tasks are used , and with this method, it is possible to determine the quality of knowledge, skills and qualifications acquired by a large number of students in a short period of time, individual approach to students according to the obtained results, and to determine the quality of the educational process. and can be evaluated.

At present, ways of effective use of test assignments have been developed in educational institutions , new paradigms of pedagogical relations in the educational space are student - teacher, student - parents, teacher - management, education. Institutions — educational management bodies, as well as the control-evaluation system are being put into practice.

Pedagogical qualitative methods play an important role in monitoring and evaluating the effectiveness of the educational process at all stages of the continuous education system introduced in our republic,

and in determining the level of professional and pedagogical training of pedagogues working in this system.

From this point of view, teachers working at all levels of the continuous education system should learn the object, subject, purpose, tasks, principles of pedagogical qualimetry as a science, qualimetric scale, stages of the qualimetric process, education by means of pedagogical qualimetric methods. - to diagnose and evaluate the educational process, to make a general conclusion according to the obtained result, to understand the essence of approaches to the application of qualitative methods in professional and pedagogical activities.

In addition, teachers should be able to use test tasks, one of the main methods of qualimetry, to control and evaluate the acquired knowledge, skills, skills and competencies of students in the educational process, to be able to create standard and non-standard test tasks, test o the methodology of the transfer process, examination of the obtained results, summarization of the final results, creation of the professional-pedagogical model of the pedagogue and determination of the level of mastery of each component of the model, determination of the general and professional ability of students, the level of knowledge acquisition and upbringing, and the qualification of making a pedagogical conclusion must be possessed.

Results. To apply the qualimetric method, we first introduce the following definitions:

$High_{5,\text{мт}}$quality indicator of students who received an excellent (five) grade in the interim control

$High_{5,\text{ян}}$quality indicator of students who received excellent (five) marks in the final control

$Medium_{4,\text{мт}}$quality indicator of students who received good (four) grades in midterms

$Medium_{4,\text{ян}}$quality indicator of students who received a good (four) grade in the final examination

$Lower_{3,\text{мт}}$quality indicator of students who received a satisfactory (three) grade in the midterm

$Lower_{3,\text{ян}}$quality indicator of students who received a satisfactory (three) grade in the final control

$Unsatisfied_{2,\text{мт}}$quality indicator of students who received an unsatisfactory (two) grade in the interim control

$Unsatisfied_{2,\text{ян}}$quality indicator of students who received unsatisfactory (two) grades in the final control

$N_{5,\text{мт}}$the number of students who received an excellent (five) grade in the interim control

$M_{\text{гр}}$number of students in the group

$$High_{5,\text{он}} = \frac{N_{5,\text{мт}} * 100}{M_{\text{гр}}} (1)$$

For example, if there are N_5=5 $M_{\text{гр}} = 25$ students, the intermediate grade $High_{5,\text{он}} = \frac{5*100}{25}$will be =20%. Here is $N_{5,\text{мт}}$the number of students who received an excellent grade in the midterm examination (MT), $M_{\text{гр}}$the number of students in the group, $High_{5,\text{он}}$the percentage of students who received an excellent grade in the MT. as well as

$$High_{5,\text{ян}} = \frac{N_{5,\text{ян}} * 100}{M_{\text{гр}}} (2)$$

using the formula, the percentage of students who received an excellent grade in the National Examination is determined. Now

$$Medium_{4,\text{он}} = \frac{N_{4,\text{мт}} * 100}{M_{\text{гр}}} (3)$$

the percentage of students who mastered good (4 marks) from ON is determined.

$$Medium_{4,\text{ян}} = \frac{N_{4,\text{ян}} * 100}{M_{\text{гр}}} (4)$$

It is also possible to determine the percentage of students who have mastered YAN well.

$$Lower_{3,\text{ОН}} = \frac{N_{\text{Змт}}*100}{M_{\text{гр}}} (5)$$

$$Lower_{3,\text{ЯН}} = \frac{N_{3,ЯН}*100}{M_{\text{гр}}} (6)$$

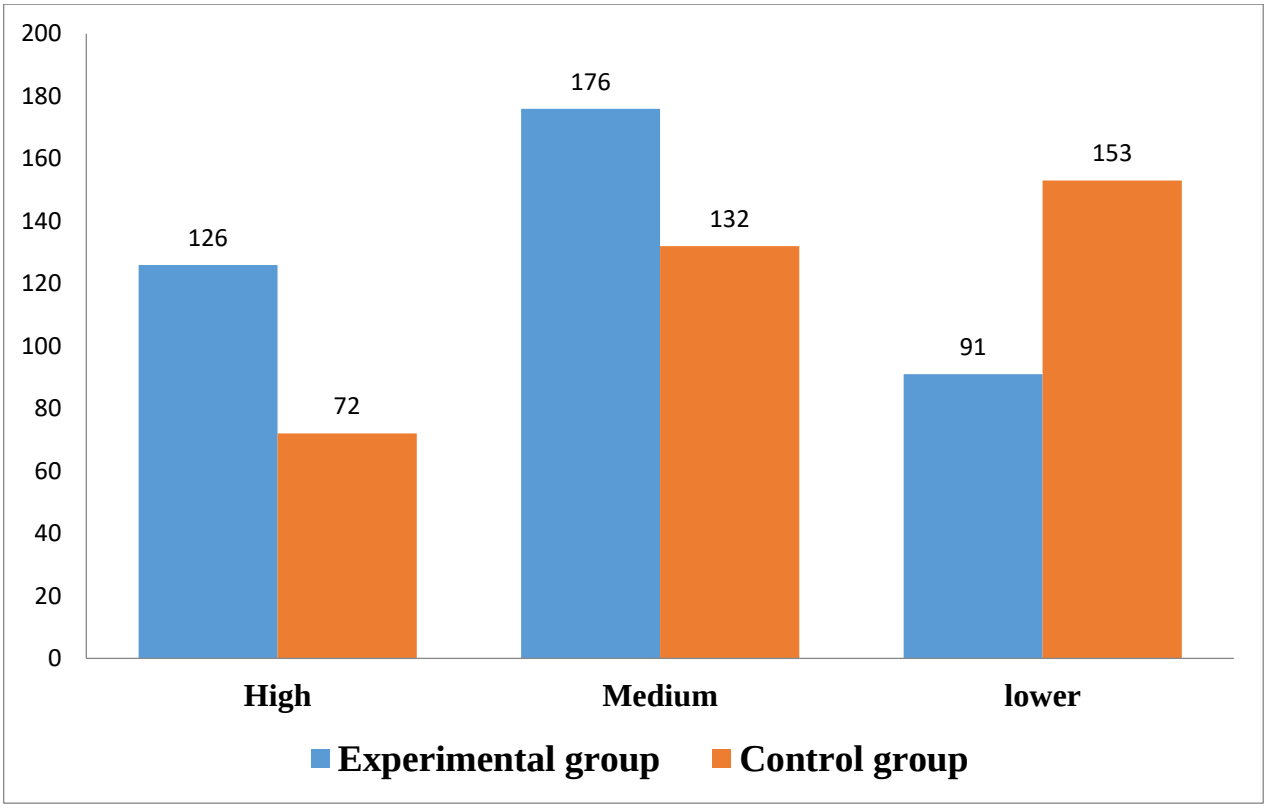
$$Unsatisfied_{2,\text{ОН}} = \frac{N_{2,\text{мт}}*100}{M_{\text{гр}}} (7)$$

$$Unsatisfied_{2,\text{ЯН}} = \frac{N_{2,\text{мт}}*100}{M_{\text{гр}}} (8)$$

Overall average scores of the control and experimental groups at the end of the experiment

Groups	Number of students	Grades obtained by the students of the students of the experimental and control groups		
		high	medium	lower
Experimental group	393	126	176	91
Control group	357	72	132	153

The diagram of acquisition of numerical values presented in this table took the following form.



Picture 1 *. Experience and Diagram of evaluation results in the control group*

1-8 above, quality indicators of students' learning are determined in percentages. This, in turn, leads to the use of the qualitative method in the conducted scientific research.

Conclusion. Pedagogical qualimetry also takes place in determining the professional skills of teachers. The following methods of pedagogical qualimetry are used to assess the professional and pedagogical training, professional ability and self-evaluation of pedagogues: expertise method, analysis method, observation and analysis of the pedagogical process, conducting questionnaires, test tasks, interview method, mathematical-statistical analysis and generalization.

There are prospects of using the achievements of pedagogical qualimetry on a very large scale in the educational process. In particular, in pedagogical activity , the possibilities of acquiring knowledge,

skills, skills and competences of students in educational institutions based on the requirements set by the DTS for subjects, determining their needs and the level of mastery, and in accordance with the obtained results, individual preparation of recommendations on the implementation of the approach.

One of the main methods of qualimetry in monitoring and evaluating the acquired knowledge, skills, skills and competences of students in a particular educational course is the use of test tasks, which is an example of the organization of the qualimetric process in an inductive logical direction.

The problems of using pedagogical qualitative methods are as follows:

- creation of methodological and software for researching the quality of the educational process;
- diagnosis of knowledge of students in educational institutions based on the requirements set by DTS in subjects by means of pedagogical qualitative methods, conducting fundamental research;
- development and implementation of the program for monitoring the quality of the educational process in the general secondary education, vocational education, higher education system of the continuous education system;
- development and implementation of control-measurement materials for courses taught in higher education institutions;
- information programs in the process of students' self-control: it is necessary to create non-standard adaptive test tasks in subjects with the help of Ispring or My test program and define ways of using them in practice.

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