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## QUALIMETRIC EVALUATION OF THE QUALITY OF COURSEWORK IN THE ACADEMIC DISCIPLINE "VOCATIONAL TRAINING METHODOLOGY"

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Among the priority areas in the development of the education system in Ukraine is the introduction of monitoring of quality of education. The accomplishment of this task is connected with the movement to the European education space, which requires constant improvement of the education system. One of the types of effective tools for monitoring is a factor-criterion model for evaluating a phenomenon or a process being studied. The paper presents a technology of organizing and conducting evaluation of the quality of coursework in the discipline "Vocational training methodology" using the developed factor-criterion model. Based on the sources of scientific information, the analysis of the concept "monitoring" has been carried out; its functions in the educational process have been identified. The academic discipline "Vocational training methodology" has proved to implement the methodological training of vocational education teachers, namely the formation of their competence to create didactic projects. The coursework is an individual didactic project, and its content, as well as the sequence of implementation stages, fully simulates the teacher's activities. Thus, the coursework is one of the main components of training vocational education teachers and, accordingly, requires the development and implementation of objective tools for evaluating the results of the educational process on the basis of qualimetry. There have been shaped and carried out actions to create a factor-criterion model, namely: definition of the essence of the term "factor-criterion model for measuring the quality of coursework"; substantiation of the components of the model for evaluating the quality of coursework; determination of factors and criteria for measuring the quality of coursework; description of the method for determining the weighting coefficients of each of the factors and criteria; building a model for measuring the quality of coursework. The following factors have been identified: content quality of execution; quality of presentation; quality of the speech delivery with a fragment of the developed didactic project on the topic, – the criteria are the content of each component. Based on the results of the experimental study, the developed tools have proved to be effective because of their contribution to the positive dynamics of the quality of education. The developed technology can be used in higher education institutions with the aim of preparing for the development of factor-criteria models for evaluating students' coursework.

**Keywords:** monitoring, factor-criterion model, vocational training methodology.

**Бачієва Л.О.** «Реалізація кваліметрічного оцінювання якості курсової з дисципліни «Методика професійного навчання»

Серед пріоритетних напрямів розвитку освітньої системи в Україні є впровадження моніторингу якості освіти. Реалізація цього завдання пов'язана з рухом до європейського освітнього простору, що вимагає від освітньої системи постійного вдосконалення. Одним із видів ефективного інструментарію реалізації моніторингу є факторно-критеріальна модель оцінювання явища або процесу, що вивчається. У статті представлена технологія розроблення та реалізації оцінювання якості курсової з дисципліни «Методика професійного навчання» за допомогою розробленої факторно-критеріальної моделі. На основі джерел наукової інформації здійснено аналіз поняття «моніторинг», визначені його функції у освітньому процесі. Доведено, що дисципліна «Методика професійного навчання» реалізує методичну підготовку викладачів професійної освіти, а саме формування компетентності створення дидактичних проєктів. Курсова робота є авторським дидактичним проєктом, при цьому, його зміст, послідовність кроків виконання в повній мірі моделюють діяльність викладача. Отже, курсова робота є однією з основних складових підготовки викладачів професійної освіти та, відповідно, потребує розроблення та впровадження об'єктивного інструментарію оцінювання результатів освітнього процесу на засадах кваліметрії. Сформовані та реалізовані дії щодо створення факторно-критеріальної моделі, а саме: формування сутності терміну «факторно-критеріальна модель вимірювання якості курсової роботи»;

обґрунтування складових моделі оцінювання якості курсової роботи; визначення факторів та критеріїв вимірювання якості курсової роботи; опис способу визначення вагових коефіцієнтів оцінювання кожного з факторів та критеріїв; складання моделі вимірювання якості курсової роботи. Факторами визначені: змістовна якість виконання; якість оформлення; якість виступу з фрагментом розробленого дидактичного проєкту з теми, критеріями є змістовне наповнення кожної складової. За результатами експериментального дослідження визначено, що розроблений інструментарій є ефективним тому, що сприяв позитивній динаміці якості освіти. Розроблену технологію можливо застосовувати у закладах вищої освіти з метою підготовки розроблення факторно-критеріальних моделей оцінювання курсових робіт здобувачів освіти.

**Ключові слова:** моніторинг, факторно-критеріальна модель, методика професійного навчання.

**Articulation of the issue.** The growing public interest in educational issues shifts the "quality of education" concept from the study and analysis of a limited number of experts in the field of public policy, making it the subject of extensive public, professional and scientific discussions. The concept of modernization of Ukrainian education provides for the creation of forms of independent objective evaluation of the quality of education to establish the degree of conformity of real educational results with the government requirements, social and personal expectations of students.

Furthermore, the quality of education should be assessed not only at the stage of its completion, but also at the stages of its direct implementation. Thus, this refers to the monitoring of the quality of education. General information on educational monitoring is provided in Article 48 of the Law on Education (2017). In accordance with the provisions of the Law "On Education", monitoring provides for a system of consistent and systematic measures, the purpose of which is to identify and observe trends in the quality of education. Therefore, the question arises as to the development of such tools.

Introduction of student-centered learning provides an added value to the issue of "equipping" the student with means of diagnosing the quality of education. Some of its main requirements regarding the implementation of evaluation criteria and methods are the following: evaluation criteria and methods, as well as evaluation criteria are made known in advance; assessment allows students to demonstrate the extent of their achievement of the planned learning outcomes; students receive feedback, which is accompanied by advice on the learning process, if necessary; where possible, the assessment is carried out by more than one examiner; assessment rules provide for the possibility of taking into account mitigating circumstances; assessment is applied consistently and fairly to all students and is carried out in

accordance with established procedures; there is a formal procedure for student appeals.

In addition, there are contradictions: between the public requirement for an assessment that allows students to demonstrate the extent of their achievement of the planned learning outcomes and the available tools that allow for scoring on the basis of subjective considerations of the teacher; between the need of students to know objective set of tools for self-assessment of the quality of their work (including coursework in the discipline) and evaluation criteria that are generalized.

**Analysis of recent research and publications.** Theoretical principles of monitoring in education are considered in works by the following authors: N. Abramovsky, V. Horb, A. Krupyna, A. Kuznetsov, O. Mayorov, V. Narovsky, A. Orlov, A. Sevruck, N. Seleznyova, E. Sukhovienko, S. Shykhov, R. Shyshov, E. Yunina and others. Thus, works of many authors deal with the issues of monitoring in education, but the issues of monitoring the quality of performance of certain components of independent work of students, in particular, the fulfillment of coursework, have not been sufficiently considered.

**Statement of basic material.** The purpose of the paper is to present the technology of developing qualimetric tools for evaluating the quality of coursework in the academic discipline "Vocational training methodology" in the training of teachers in vocational education.

**Research objective.** The presentation of the methodology for developing qualimetric tools will begin with determining the purpose of its use in the educational process. Analysis of sources of scientific information has identified that evaluation with a help of qualimetric tools is used in monitoring studies [8]. The content of the "educational quality monitoring" concept is presented in the Law "On Education" (2017). Thus, "...monitoring of the quality of education is a system of consistent and systematic measures taken to identify and observe trends in the quality of education in the country, in certain areas, in educational institutions (other entities of

educational activity), to determine conformity of actual results of educational activities with its stated goals, as well as assessing the extent, direction and causes of deviations from the goals "[8, p.10].

Monitoring in education performs the following functions: informational - provides an opportunity to assess the efficiency of the pedagogical process, to obtain information about the state of the object, to provide feedback); research - involves participation in the monitoring of various educational actors); formative - introduction of monitoring in education contributes to a more effective implementation of the process of personality formation; corrective – is closely related to the formative function; system-forming - ensures the implementation of the requirements for scientificity of monitoring, namely its organization and carrying out on the basis of a systematic approach [3].

Thus, monitoring acts as a complex system, that aims to monitor the state of development of the pedagogical process with a view to optimal selecting the goals, objectives, tools and methods of achieving them.

There are several types of monitoring used in education: pedagogical, educational, and profессиographic. Pedagogical monitoring refers to accompanying control and current adjustment of the teacher-student interaction in the organization and implementation of the educational process. Educational monitoring refers to a system of organizing the collection, storage, processing and dissemination of information about the activities of the pedagogical system, which provides continuous monitoring of its state and forecasting its development. Profессиographic monitoring refers to the process of continuous scientifically sound, diagnostic and prognostic, planned supervision over the state and development of the pedagogical process of training a specialist for the most optimal selection of educational tasks, as well as means and methods of solving them [4,11].

Thus, the issue of systematic control of quality of learning the educational information is central in the management of the educational process. Without special monitoring of which it is difficult to imagine the effectiveness of educational teacher's activities. The adoption of state standards and new programs obliges them to apply the uniform science-based means of control and those allowing to objectively assess the results of education. Having known such tools, the teacher can timely and effectively make changes in the forms, methods and means of educational activities.

The basis for the teacher of vocational education is the solution of organizational, educational, methodological and research tasks aimed at the effective organization and implementation of the educational process. The implementation of the methodological component is aimed at designing in pedagogical activities. The strategic level of which involves the design of pedagogical systems. It is manifested in the ability to focus on the ultimate goal, to address relevant issues taking into account the prospects. When planning the content of the academic discipline it is necessary to take into account its place in the curriculum and establish links with other disciplines. The tactical level of designing is related to the development of design systems and learning technologies. The operational level is implemented in the development of components of the educational process: lessons, classes, learning situations, methods of teacher and student activities. The operational level is based on the results of the tactical and strategic levels (the guide in this work is the program, lesson-thematic planning, etc.), and the design of higher levels is specified at the level of operational design. In addition, the design of the procedural aspect of educational activities is based on the results of designing elements of the system of goals, requirements for the basic level of knowledge and skills (competences), learning content, forms and methods.

Points of pedagogical design are learned by students, future teachers of vocational education, in the process of their methodological training. Basic knowledge is formed in the course of studying the following disciplines: "Educational theories and methodologies in pedagogical activity", "Professional pedagogy", "Psychology of pedagogical activity" and others.

The methodological component of training provides integration of psychological, pedagogical and engineering components of vocational education of specialists. The purpose of the methodological training is to form in students the ability to carry out pedagogical design, i.e., to create and implement didactic (educational) projects. The actions to implement partial methodical objectives on a material of certain educational topics, as well as reproduction of the theoretical material learned are typical within the methodical activity of the first level. This level of vocational training is formed within the methodical training by studying the discipline "Vocational training methodology". The criterion for the assessment of the first level is the ability to solve professional issues related to the analysis of

educational documents; building the content of educational material on this topic; development of pedagogical technologies at the level of a certain topic. The purpose of the second stage is the formation of abilities to perform a set of methodological actions for the development of pedagogical technologies within a specific specialty. Criteria for assessing this level are the ability of students to design real learning systems in a particular specialty, to develop the content of educational material for a particular profession and the selection of the necessary training technologies for relevant professionals. The purpose of the third level is the formation of abilities to design their own pedagogical system depending on the conditions of the educational process of a particular specialist, as well as the creation and testing of the developed system. The ability to choose the most effective ways to solve pedagogical issues based on the analysis is typical for this level. This level is formed during pedagogical practices. The criterion for its evaluation is the ability to develop their own didactic project.

Coursework in the academic discipline "Vocational training methodology" provides the formation of didactic and design skills in students, future teachers of vocational education. Completion of the coursework should ensure the development of didactic and design skills to the level necessary for the organization and implementation of the educational process in the course of pedagogical practices, as well as the accomplishment of the diploma project. Thus, the discipline "Vocational training methodology" and coursework in this discipline are important components of vocational training of teachers in vocational education and, accordingly, requires the development and implementation of objective tools for evaluating the results of the educational process on the basis of qualimetry.

The theory of qualimetry is in the focus of many scientists, the main developments have been presented in the works of G. Azgaldov, O. Anufriev, G. Dmitrenko, G. Yelnykova, E. Reichman, V. Cherepanov, V. Tsyba and others, but modern theory and practice still require the development and implementation of qualimetric models to assess certain aspects of the activities of specialists.

In this regard, the term "qualimetry" (from the Latin *quails* - quality and from the ancient Greek *metrio* - to measure) refers to a scientific discipline that studies the methodology and issues of developing comprehensive quantitative assessments of the quality of any objects, subjects, phenomena or processes (G. Azgaldov). The

implementation of a qualimetric approach to the objective, quantitative assessment of any object, subject, phenomenon or process is to create a factor-criterion model. Theoretical principles of development and use of factor-criterion models are given in the works by O. Havrylishena, V. Hryhorash, G. Yelnykova, O. Zahika, R. Zelensky, O. Kasyanova, O. Kovalenko, K. Kolos, O. Slobodyanyk, M. Rostock, Z. Ryabov and others.

Based on the work of scientists [2, 3, 4, 6, 7, 10,11] we will determine the sequence of actions to development qualimetric tools for measuring the quality of coursework. Thus, the sequence of actions is as follows: defining the essence of the term "factor-criterion model for measuring the quality of coursework"; substantiation of the components of the factor-criterion model for evaluating the quality of coursework; presentation of certain factors and criteria for measuring the quality of coursework; description of the method of determining the weighting coefficients of each of the factors and criteria; definition of a factor-criterion model for measuring the quality of coursework.

Based on the work of scientists and personal experience, we define that the factor-criterion model for measuring the quality of coursework is a system of interrelated factors and criteria that determine the extent of conformity of the concept with the established training standards, goals of the course project in the discipline "Vocational training methodology: basic learning technologies".

At the next stage we will define the factors and criteria of the future model. Based on the work provided by V. Hryhorash [1], G. Yelnykova [2], R. Zelensky [9], O. Kovalenko [5], K. Kolos [6], we define that the values characterizing the main qualities of the object (or its main components) are taken as the factors which correspond to the global goals of the object, the criteria detail the factors, i.e., reveal them. In our work, indicators of the coursework quality are taken as the main qualities. So, we take the following factors: content quality of execution; quality of presentation; quality of the speech with a fragment of the developed didactic project on the topic. The content of each component is chosen as the criteria.

Thus, we present an algorithm for implementing the method of expert assessments in the process of determining the importance of factors and criteria for measuring the quality of course work. The sequence of actions is as follows: definition of a group of experts;

establishing the competence of each expert; determining the optimal number of experts; final formation of a group of experts.

We recommend that UEPA teachers be included in the expert group, which will determine the significance of factors and criteria for the coursework quality model. The competence of the expert can be assessed in the following ways [12]: on the basis of self-assessment; assessment of the results of the past work of the expert; special testing; assessment of each expert by the group (if the group members know each other). Consider the method of regulated self-assessment as the simplest. Thus, in the process of self-assessment, each expert determines the degree of his or her knowledge of the issue, on the following scale: 0 – doesn't know; 1 - 3 - the issue is not within the scope of his/her specialization; 4 - 6 - the issue is within the scope of his/her specialization, but the expert is not directly involved in addressing issues on the matter; 7 - 9 - the expert is involved in addressing issues on the matter, but this issue is not within the scope of his/her specialization; 10 - the expert specializes in this issue, has theoretical knowledge and practical experience in addressing it [7, 10].

The coefficient of competence of the  $j$ -th expert  $K_j$  is determined by dividing the obtained self-assessment score by 10 points. The analysis of self-assessment allows for making a more reasoned conclusion about the inclusion of the expert in the group. In addition, the results of self-assessment make it possible to judge not only the real knowledge of the expert in a particular field, but also his/her ability to critically (objectively) assess their own capabilities [7, 10]. A detailed description of the calculation of the expert competence on the basis of objective data about him/her is given in [7, 10]. In our study, we used it to select experts.

In this case, based on the results of [7, 10] it has been identified that the increase in the number of experts in the group, starting from some point, leads to an increased examination error rate. Therefore, if it is possible to determine the competence of experts, it is advisable to include in the expert group no more than 10 - 15 most competent experts. Thus, based on the results of our work, an expert group of 12 expert teachers was created.

After the final formation of a group of experts, they are invited to determine the weighting of factors and criteria for the model of evaluation the quality of coursework in the academic discipline "Vocational training methodology".

Weighting of factors and criteria was made taking into account that the sum of weighting of all

five factors  $K_1 + K_2 + K_3 = 1$ , as well as the sum of weighting of criteria for each of the three factors should also be equal to 1. Point evaluation of each criterion was carried out by the 4th year students of the Ukrainian engineering and pedagogical academy. The following scale should be observed in the evaluation process: 0 points - does not meet the requirements; 0.25 - meets only some requirements; 0.5 - meets most requirements; 0.75 - generally meets the requirements, but there are some inconsistencies; 1 - meets the requirements.

The final evaluation of the quality of the coursework was determined by the formula:

$$O_q = O_1 + O_2 + O_3 \quad (1)$$

where  $O_1$  - factor 1 score;  $O_2$  - factor 2 score;  $O_3$  - factor 3 score.

Thus, on the basis of works by G. Yelnykova [2], the overall results of the measurement should be evaluated on the basis of such evaluation scale: 0 – 0.35 - inadmissible level; 0.35 - 0.6 - critical (low) level; 0.6 - 0.75 - sufficient (medium) level; 0.75 - 0.9 - high (above medium) level; 0.9 - 1 - excellent (very high, with honors) level.

At the next stage of the study, each of the factors and criteria for its evaluation is presented. The results are shown in tables 2, 3, 4. Thus, we have completed the third stage of development of qualimetric tools for measuring the coursework, namely, the determined factors and criteria have been presented.

The next stage of the study is to determine the system of calculating the weights of factors and criteria. In accordance with the theoretical provisions of the qualimetric approach, the specific values of the weights of factors and criteria are determined by expert methods (questionnaires, surveys, etc.). Among them, in modern conditions, the method of group expert assessments (GEA), as noted by O. Subetto, is the most promising one as the most objective and standardized. As part of this method, pedagogical examination (e.g., of questionnaires, tests or competencies) is carried out according to a certain algorithm by a group of specially selected experts (teachers, graduates, representatives of employers) with a preliminary assessment of their competence, consistency and number, which ensures a given measurement error and significance level [13]. As part of our study, a group of experts selected in accordance with these procedures, have determined the weights of factors and criteria. The results of determining the weights of factors and criteria (numerical values) are presented in tables 2, 3 and 4.

Table 2.

Evaluation of the quality of coursework in the academic discipline  
"Vocational training methodology"

Factor	Weight of the factor		Criterion	Weight of the criterion	
	K1	0.2			
1. Quality of the coursework presentation	K1	0.2	1.1. Total volume of paper is 30-35 pages	k1.1	0.1
			1.2. Text formatting	k1.2	0.2
			1.3. Page numbering	k1.3	0.1
			1.4. Presentation of illustrations	k1.4	0.2
			1.5. Presentation of tables	k1.5	0.2
			1.6. References	k1.6	0.2

Thus, the evaluation of the factor of "quality of the coursework" is carried out based on the indicators of conformity with the overall requirements; text formatting; page numbering; presentation of illustrations, tables and references. During the

distribution of weights, the first and third criteria received the lowest weighting value of the criterion.

Consider the content of the second criterion - the content quality of the coursework, the results are shown in table 3.

Table 3.

Evaluation of the quality of the content component of the coursework in the academic discipline  
"Vocational training methodology"

Factor	Weight of the factor		Criterion	Weight of the factor	
	K2	0,4			
2. Content quality of the coursework	K2	0,4	2.1. Analysis of the specialist professional activity	k2.1	0.1
			2.2. Design of the specialist qualification description	k2.2	0.1
			2.3. Development of the vocational training content	k2.3	0.1
			2.4. Statement of operational goals of training	k2.4	0.1
			2.5. Design of didactic materials	k2.5	0.1
			2.6. Analysis of basic learning environment. Selection of ways of actualization (formation) of basic knowledge	k2.6	0.1
			2.7. Design of basic learning technologies	k2.7	0.2
			2.8. Preparation of a long-term lesson plan	k2.8	0.1
			2.9. Development of binary actions of teachers and students	k2.9	0.1

Thus, the assessment of the factor "content quality of the coursework" is carried out by the indicators: analysis of the specialist professional; design of the specialist qualification description; development of the vocational training content; statement of operational goals of training; design of didactic materials; analysis of basic learning environment. Selection of ways of actualization (formation) of basic knowledge; design of basic learning technologies; preparation of a long-term lesson plan; development of binary actions. Note that the criterion of "design of basic learning technologies" has the highest weight (0.2), which indicates the importance of the content of this point of the coursework.

Consider the content of the following factor - the quality of the speech with a fragment

of the developed didactic project and the criteria for its evaluation, the results are shown in table 4.

Thus, the evaluation of the factor "quality of the speech with a fragment of the developed didactic project" is carried out by the indicators: structure of the speech; visibility of the presentation; design and customization of presentation slides; content of the speech; conformity with the public speaking requirements. Note that the weights of the criteria are equal, which emphasizes the importance of each of them. The final stage of creating a factor-criterion model involved combining of all the factors and criteria and creation of a comprehensive evaluation table. Further work was related to the experimental study of the developed model.

Table 4.

Evaluation of the quality of the speech with a fragment of the developed didactic project of coursework in the academic discipline "Vocational training methodology"

Factor	Weight of the factor		Criterion	Weight of the factor	
	K3	0.4			
3. Quality of the speech with a fragment of the developed didactic project	K3	0.4	3.1. Structure of the speech	k3.1	0.2
			3.2. Visibility of the presentation	k3.2	0.2
			3.3. Design and customization of presentation slides	k3.3	0.2
			3.4. Content of the speech	k3.4	0.2
			3.5. Conformity with the public speaking requirements	k3.5	0.2

Experimental pedagogical study was conducted on the basis of the Ukrainian Engineering and Pedagogical Academy. The respondents were 72 students in specialty 015 Vocational education (by specializations). The number of experts was calculated and amounted to 12 teachers. The experimental technology was introduced into the academic discipline "Vocational training methodology".

The first stage of monitoring was carried out prior to starting work on the coursework and aimed to familiarize students with the list of tasks to be performed in the coursework and the criteria for evaluating the quality of its completion. The developed factor-criterion model for evaluating the quality of the coursework served as an evaluation tool. During the consultations, special attention was paid to the review of the weights of each criterion.

The second stage of monitoring was implemented after the coursework completion before preparing for the defense and preparing a speech to present the results. It should be noted that students still had the time and opportunity to finalize the paragraphs of the coursework. The developed factor-criterion model for evaluating the quality of the coursework served as an evaluation tool. In the evaluation process, they followed such

scale: 0 points - not developed; 0.25 - developed in violation of the requirements; 0.5 - developed in accordance with the requirements, but the justifications and author's considerations are not provided; 0.75 - developed in accordance with the requirements, fragmentary justifications and author's considerations are provided; 1 - developed in accordance with the requirements, justifications and author's considerations are provided. The evaluation of the factor was determined by the sum of points for each criterion (product of weighting and score point). The main purpose of this stage was self-assessment by students of their work, forecasting future score, alignment of the expected score with personal goals.

The third stage of monitoring was implemented immediately before the defense of the coursework. The procedure and tools of this stage were similar to the previous ones. The main purpose of this stage was self-assessment of the quality of their coursework submitted for defense, demonstrate the consistency of the results of self-assessment and evaluation by teachers, "equipping" of students with arguments to justify the subjectivity of the teacher (in case of disagreement with the assessment). The results of the second and third stages of monitoring are shown in Table 5.

Table 5

The results of monitoring the quality of the coursework in the academic discipline "Vocational training methodology"

Item No.	Factors (components of coursework evaluation)	Partial evaluation of factors	
		second stage of monitoring	third stage of monitoring
1.	Quality of the coursework presentation	0.15	0.21
2.	Content quality of the coursework	0.27	0.32
3.	Quality of the speech with a fragment of the developed didactic project	0.25	0.31
Overall score		0.67	0.84

Thus, the analysis of the results of the experimental study makes it possible to recognize the effectiveness of the developed tools for monitoring the quality of coursework in the academic discipline "Vocational training methodology" because of its contribution to the positive dynamics of the quality of education.

**Conclusions and prospects for further research.** Educational monitoring acts as a complex system, the objective of which is to monitor the state of development of the pedagogical process with a view to optimal selecting the goals, objectives, tools and methods of their solution. Coursework on the vocational training methodology is the final link of the second stage, its accomplishment provides the formation of didactic and design skills to the level necessary for the organization and implementation of the educational process in the course of pedagogical practices, as well as the fulfilment of the diploma project. The above justifies the need to develop and implement qualimetric tools -

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factor-criterion model for evaluation of coursework. The sequence of actions for its development is as follows: definition of the essence of the term "factor-criterion model for evaluating the quality of coursework"; substantiation of the components; presentation of certain factors and criteria; determination of weighting coefficients for evaluation of each of the factors and criteria; model building. In this case, the factor-criterion model for evaluating the quality of coursework is a system of interrelated factors and criteria that determine the degree of conformity of the quality of the coursework with the goals of the educational process. The following factors have been identified: content quality of execution; quality of presentation; the quality of the speech with a fragment of the developed didactic project on the topic; the criteria are the content of each component. Based on the outcomes of research and experimental work, the results show that the developed model has positively influenced the results of the educational process.

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