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**IMPROVING THE QUALITY OF ENGINEERING EDUCATION WITH
THE USE OF MODULAR TRAINING**

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Introduction. As a result of the Bologna Process to the Ukrainian system of higher engineering education face global challenges. The central idea of the reform of higher education Ukraine on the principles of the Bologna Convention reorientation of the educational process is the priority forms of innovative teaching, such as modular training. This focus should ensure the implementation of the task of higher education – education of future mechanical engineer, capable of continuous updating of scientific knowledge, professional mobility and quick adaptation to changes in the socio-economic sphere, the management system and the organization of work in a market economy.

In the universities of our country is an experimental work with the educational process with various options of modular training (A. Aleksyuk, A. Dubin, Y. Zhydetsky, M. Lazarev, K. Mikhailov, Mr. Sikorsky, A. Tamarkina, P. Yutsyavychyne etc.). In the literature, there are the following features of modular training:

- a) construction of modular training course content and organization of its study;
- b) the emphasis on independent work of students;
- c) the presence of clear criteria for evaluation of different learning activities and their results;
- d) continuous monitoring and self-monitoring results of training activities.

Given these conceptual ideas, we believe actual implementation of model improvement of the quality of the design of training future mechanical engineers in agricultural universities using modular training.

The purpose of the article – to review and justify the model components improve the quality of the design of training future mechanical engineers in agricultural universities using modular training and review phases of each component of the model.

Model in pedagogy – is created or selected researcher system for the purpose of reproducing knowledge characteristics (components, elements, units, properties, relationships, settings, and so on.). Of the object and therefore is with him in this regard, substitution and similarity, her research is an indirect way of obtaining knowledge about the object and provides information uniquely converted into recognizable information about an object, and experimental verification, allowing [1].

In our study, we can distinguish three stages of modeling:

- 1) preparatory phase;
- 2) development cycle model;
- 3) stage verification of its quality.

The first phase aims to determine the purpose, object modeling methods and tools. The second stage is connected with the development model, its description and

characteristics. The third stage is associated with experimental test of its pedagogical conditions in practice university methods and assessment of their effectiveness.

The purpose modular training machine parts – is improving the quality of the design of training future mechanical engineers in agricultural universities. In our opinion, this goal can be achieved through the following tasks:

1. Forming students' positive attitude for design and construction in the profession.

2. Formation at students of design knowledge. The student demonstrates knowledge of theoretical positions typical of machine parts and assemblies, especially their structures and functioning, the method of calculation and design of machine parts and assemblies, the requirements ESKD based computer-aided design and methods of optimizing the design. Knows the provisions and requirements of the design documentation, rules of construction working drawings of parts, performing sketches of machine parts and assemblies. Reads the general form of drawings, assembly drawings to construct, demonstrates the ability of the system designations drawings, working drawings to the construction details.

3. Formation of students' design skills during the organization of design activity. The student demonstrates the ability to analyze specific technical requirements for machine design, draw diagrams kinematic mechanisms, settlement and layout diagrams of parts and components, perform test calculations, assembly design and working drawings, execute all design documentation in compliance with ESKD, ESDP.

4. Formation at students of introspection and self-assessment of the design of its activities and its results, can comprehend and assess the degree of realization of the desired goals of the design activity aimed at disclosing significant vocational knowledge and skills.

Considering the modular training components, we have identified the stages of designing modular programs:

a) development of the modular structure of the program and shaping the content of each module;

b) the use of rating stages: quantitative expression of the planned teaching quality, students set a cumulative rating based on the results of this monitoring and correction of the educational process, calculating the final ranking.

After analyzing the phases of each component modular training, we determined that the stages are: first stage – the modular design of the program; the second phase – implementation and correction of rating educational process; third stage – calculation of the rating and final examination.

The first stage of designing modular training – is a breakdown of discipline semester course 3 training modules, each module is scheduled quality quantitatively expressed in points. Then, the course material is structured into four elements: a theoretical module, a practical module creativity module and diagnostic module.

During the second stage of rating and correcting learning process, students accumulate cumulative rating. This is done by testing in all kinds of points of their training activities:

a) attendance of lectures;

- b) perform laboratory work and report;
- c) the tasks on practical classes;
- d) implement the course project according to schedule;
- f) control procedures.

Note that the cumulative value of the rating can not exceed the set on the first stage of the maximum score module. After the study of all modules calculated cumulative rating semester course as the sum of ratings of each module.

In the third stage of calculation rating and final certification occurs rating count each student as a percentage of the money received training to target expressed in points.

In our study, we consider modular learning as a pedagogical tool, the reason for this is the fact that this estimate is organizing the learning process, structuring it into modules and uses a rating as a tool mastering professional-relevant knowledge, skills, acquisition of experience the design activity.

We turn to the description of the second phase of modeling, designing the structure and content models improve the quality of the design of training future mechanical engineers with the use of modular training.

Model improve the quality of the design of training future mechanical engineers using modular training represented by three interdependent components:

- 1) regulatory target, which includes social order, purpose, objectives and principles;
- 2) Procedural content that incorporates modular program course «Machine parts» complex of pedagogical conditions, stages of modular training methods, means and forms;
- 3) effective, which includes criteria and outcome levels.

The model reflects demands that society makes to the quality of engineering training students of higher agrarian educational establishments, the basic idea of the study, the organization process (purpose, content, milestones, modular training, pedagogical conditions, result) and criteria for evaluating its effectiveness.

Consider components represent the model in more detail. The first component model stands regulatory target component because we consider it necessary to define the purpose of the process before you start to implement it. At the end of the process we achieved results even with the intended purpose, thus determine its effectiveness. The structure of the regulatory target component included: social order, purpose, objectives and principles. Detection of social order (improving the quality of engineering training in higher agricultural education) determined the purpose of the developed model as improving the quality of the design of training future mechanical engineers.

This objective can be achieved through the following objectives:

- 1) formation of students' positive attitude to the design and construction of a professional activity;
- 2) formation of students' design skills;
- 3) formation of students' design skills during the organization of design activity;
- 4) formation of students of introspection and self-assessment of the design of its activities and its results.

These tasks were decided based on modular implementation of the principles, context, personality and activity-oriented approaches, namely principles: modularity, structuring, responsibility, consciousness, differentiated, individual approach, reflexive activity, consistency and continuity are objectives that form the basis of regulatory target component model.

Entering the next, meaningful procedural component model associated with the need to determine the content of the process, its stages, the complex organizational and pedagogical conditions and methods, means and forms. The item «content» includes modular program course «Machine parts» field of training 6.100102 «Processes, machines and equipment for agriculture production». The introduction of modular training machine parts we carried out in three stages:

- 1) designing modular programs;
- 2) introduction of rating and correction of educational process;
- 3) the calculation of the rating and final certification; and was supplemented by a set of organizational and pedagogical conditions of efficiency modular training machine parts.

Defining the purpose of the process, its content, and types of organizational and pedagogical conditions, we identified elements for its implementation, namely:

- a) methods (tests, questionnaires, explanation, analysis, synthesis, monitoring, reflexive methods);
- b) means (primary – modular training, additional – tasks, discussions, tests, charts, drawings, atlases, discussions, questions, technical and electronic);
- c) forms (lectures, laboratory and practical classes, course design, consulting, group discussion, individual work, test, test).

Further, in order to evaluate the effectiveness of quality improvement of the design of training future mechanical engineers in agricultural universities using modular training we have selected criteria and evaluation indicators of the process and by level.

Therefore, the last component model, effective, includes proved our criteria, indicators, diagnostic methods and results. Analyzed in terms of different authors (L. Balashov, V. Belikov, V. Zahvyazinskiy etc.). We concluded that the criteria – a quality properties, characteristics of the object, which enable to judge its condition and level of functioning and development. Indicators – a quantitative or qualitative characteristics of each formation qualities, properties, characteristics of the object, ie a measure of formation of a criterion [2]. As part of our research is seen as a sign of criteria based on which conclusions about the level of quality of design preparation of future mechanical engineers. The indicator is defined as the characteristics (qualitative or quantitative) of formed criterion. In this approach, criteria and indicators related as common and private. Defining the criteria for assessing the quality of the design of training future mechanical engineers, we used the criterion and tiered approach with the following that these approaches are most fruitful because:

- a) the criteria for fixing activity-state entity carrying information about the nature of the activities and motives relation to its implementation;
- b) consider the process as a transition from one level to another, more complex

and qualitatively different;

c) in the pedagogical literature selected and justified level of training, the assessment of which is an important component of quality control of the design of training future mechanical engineers.

Conclusions. The developed model authoring improve the quality of the design of training future mechanical engineers in agricultural universities using modular training has a certain pattern. All its components are ordered sequence from the normative to the effective target. But not only evident connection between the three components of the model, but also within each of them, providing advance from one element to another in the specified direction. A definite link us all structural components of the model elements and creates its integrity.

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