



Pedagogical Conditions For Improving The Quality Of Professional Education In The Study Of Descriptive Geometry At Higher Education Institutions

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Abstract: The article proposes the ways of formation and professional development of the subjective position of students on the basis of the relationship between the systems of teaching and learning in the practice of teaching a university, which is considered as an integral, interconnected complex with an invariant of relations. The materials are based on the concepts of systems theory, control theory and didactics.

Keywords: training system, professional education, descriptive geometry, knowledge quality, modeling.

In pedagogical science, there are many directions and approaches to improving the quality of education. The application of the concept of the system approach can effectively organize the search for effective methods of research and organization of the educational process in a university, since the system approach allows us to consider pedagogical education in a university as "an integral, interconnected invariant of relations between its elements (goals), a complex, the technological mode of influence of which allows you to guarantee the result - a professionally trained specialist" [1].

The training of a specialist from the position of a systematic approach is carried out due to the view of the student as a subject of the system of learning, interacting with the system of teaching, the subject of which is the teacher.



A subject is a developing person who is able to realize goals and technologies adequate to them, to model his behavior, to organize activities to achieve goals and to self-analyze the result [2].

Modeling begins with the comprehension of goals, the development of technologies adequate to the goals, the construction of the model itself, and the organization of activities to achieve the goals.

From the standpoint of the system approach, the educational space of a university is the interaction of three systems: the system of education, the system of education, and the system of management [3]. We consider a system as an organized set of means to achieve a common goal. A system is characterized by composition (a finite list of elements), structure (an invariant of relations between the elements of the composition, which is the goal), and functioning (interaction between the teacher and students aimed at achieving goals).

In systems and social management theory, there are three levels of goals: strategic, operational, and tactical.

The strategic goals in the education system of the university are the goals of the higher education system, formulated in the State Standards of Higher Professional Education: the development of the intellectual, spiritual and professional potential of the younger generation.

Learning objectives at the operational level are implemented in the form of educational, educational and developmental components.

Educational goals determine the level of assimilation of information material. Assimilation of knowledge occurs at three levels: the 1st level of assimilation is conscious perception, understanding and memorization, which is externally manifested in the accurate and close reproduction of information; 2nd level of assimilation - application of knowledge according to the model in a similar situation; The 3rd level of assimilation is the creative application of knowledge, that is, the application of knowledge in a new, previously unfamiliar situation to the learner [4].

In order to achieve strategic goals, it is necessary to bring the system of interrelated and gradually more complex knowledge to the operational and tactical level. This allows us to formulate the following understanding of cognitive self-development: by setting the goal of the 1st level of assimilation and using the algorithm of assimilation of information at this level (perception



→ understanding → memorization → reproduction), we develop memory by providing students with information on the subjects that are studied in class.

The 1st and 2nd levels of assimilation are the goals of the development of cognitive activity, which ensures the reproduction of scientific information developed by previous generations.

One of the areas of development of mental activity is the development of abstract thinking by means of descriptive geometry, which uses visual images expressed in abstract images as objective means.

Levels of assimilation are complemented by the qualities of knowledge (parameters that reflect the educational goal and learning outcome). In modern pedagogical literature, a certain system of knowledge quality has been formed: completeness (1), depth (2), concreteness (3), generality (4), convolution (5), comprehensiveness (6), consistency (7), systematicity (8), efficiency (9), flexibility (10) [5].

The qualities of knowledge are related to the ways in which thinking works: induction and deduction, analysis and synthesis, judgment and inference. At certain levels of assimilation, the corresponding qualities of knowledge are formed. This relationship can be expressed as follows:

- 1st level of assimilation: knowledge qualities 1, 3, 4, 5, 6, 7, 8 in any set with mandatory specificity 3;
- 2nd level of assimilation: knowledge qualities 1, 3, 4, 5, 6, 7, 8 + 2, 9, that is, the qualitative characteristics of the first level of assimilation are supplemented by depth 2 (due to the element-by-element superimposition of the sample on a specific example) and efficiency 9 (as the speed of the operation of superimposing the sample on a specific example);
- 3rd level of assimilation: knowledge qualities 1, 3, 4, 5, 6, 7, 8 + 2, 9 + 10, that is, to the qualities of knowledge that can be formed at the first and second levels of assimilation (with the mandatory 3, 2, 9), flexibility 10 is added to apply knowledge in non-standard situations.

The qualities of knowledge as characteristics of ways of thinking must be assimilated in learning. The formation of the qualities of knowledge as forms of information retention in the classroom is carried out consistently and purposefully (from the first level of assimilation to the second and then to the third). The quality of knowledge as a preserved model of the content of education is guaranteed by the use of teaching technology (the sequence of



methods, means and forms of teaching) and is monitored at the output with the help of technological documentation.

By setting the goal of the 2nd level of assimilation, we process the essential knowledge of the concepts learned at the 1st level of assimilation into the technological form of an algorithm for applying the knowledge in a similar situation. In addition, we apply an operational algorithm as necessary (analysis → diagnosis → decision → result).

The system of education, the system of education, and the system of management enter into relations which are variables, that is, one of the systems in these relations is the subject, and the other is the object. Variable subject-object relations are formed in these systems.

When the teacher determines the purpose of the lesson, then the teaching system becomes a subjective system, and the learning system in this case is an object system. In the event that the goal is accepted by the students and they begin to implement it, the system of learning becomes subjective. Once a goal is set, the system becomes self-organizing. If the goals are the same (the teacher communicates the goal and the students accept it), there is an interaction. If the goal is accepted and not realized, then the assimilation of knowledge by students does not occur.

In addition to the goals, the teacher embeds the subject area of the academic discipline - descriptive geometry - into the topic of the lesson. The topic contains the problem to be solved and the information area of the academic discipline, expressed in information and methods of activity. From the topic of the lesson, the teacher notes the goals for the achievement of which technologies are developed in the language of the subject area. The domain becomes the composition of the system. And the student becomes a subject in the formed system: he comprehends the goals, develops technologies, models his activities according to goals and technologies, applies technologies, that is, translates the ideal model into a real one and analyzes whether the goal has been achieved or not.

In this logic of reasoning, the student gains experience in goal setting and technology development. In this situation, the system reaches a new qualitative level: on the one hand, the student himself acquires the qualities of a subject, and on the other hand, the object itself passes into a new qualitative state - the task or problem is solved.



The analysis of the result by the degree of achievement of goals is carried out not on the basis of "the problem is solved or not", but whether the level of assimilation is realized or not; whether the goal is set correctly, whether the technologies are properly developed. On the basis of a systematic approach, we strive to teach students to control their thinking when solving educational problems, and therefore, we set the goal of training sessions to achieve self-development and self-education of students.

Thus, when setting educational goals, there is a consistent complication of the levels of assimilation and the qualities of knowledge, which corresponds to one of the leading principles of didactics - the principle of consistency and accessibility of learning.

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