

METHODS OF TEACHING A SUBJECT “DESCRIPTIVE GEOMETRY AND ENGINEERING GRAPHICS”

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ABSTRACT

The article describes the methods of teaching the subject of “descriptive geometry and engineering graphics. Training along with the upbringing and development of the personality is one of the main pedagogical processes. The task of the teacher is to organize the learning process during the period of familiarization and study of the subject, so that students not only learn the individual topics and the whole aspect as a whole, but also comprehend and correct their position in reporting, when discussing, realize the connection of the studied subject with other disciplines of the curriculum (between subject connections). The effectiveness of the management of the learning process is determined by the quality of the didactic training of the teacher. The learning process is a complex, multifactorial social processes and requires constant attention.

Keywords: Descriptive geometry, engineering graphics, training, methods.

INTRODUCTION

The learning process is a purposeful, socially determined and pedagogically organized process of developing the personality of students, taking place on the basis of mastering systematized scientific knowledge and methods of activity. Learning is represented as a chain of learning situations, the cognitive core of which is the learning and cognitive tasks, and the content is the joint activity of the teacher and students, carried out using the methods and methods of teaching. Principles of learning combine theoretical ideas about learning with teaching practice. They are considered as recommendations for pedagogical activity and educational process.

The discipline “Descriptive Geometry and Engineering Graphics” is taught at the university, as a rule, for first-year students. The development of a student in various courses has some special features. At this stage, the question arises of the close relationship of the social and educational component of the learning process.

Information visualization techniques will allow to translate educational information coming through different channels of perception into a visual form and increase the speed of processing and assimilation of the material due to the most effective ways of working with it.

It should be noted that no, and there cannot be a universal method that would be equally effective at all stages of training.

Therefore, when choosing teaching methods in this discipline, the teacher must take into account the connection of various methods with the purpose and content of the lesson, as well as the basic requirements that are currently imposed on modern higher education.

LITERATURE REVIEW

The system of methods proposed by Lerner I.Ya. and Skatkin M.N [1-5], which can be presented as follows, most fully discloses the specifics of teaching Descriptive Geometry and Engineering Graphics.

1. Explanatory illustrative method. It consists in the fact that students receive knowledge at a lecture, from educational, methodical literature in the “finished” form. The method involves the transfer of a large amount of information to the student. Students at the same time become members of a scientific search. This approach is widely used in university practice.

2. Reproductive method. The teacher with the help of the tasks organizes the work of students in the classroom on the reproduction of the material and methods of activity. In this case, students produce some kind of sample answers. The first two methods are compatible when students demonstrate their knowledge.

3. Problematic presentation. A problem is posed which is revealed by the teacher taking into account the logical reasons for a possible solution. Students mentally follow, take whatever part they can and learn the steps of solving the problem posed.

4. Partial search method. The teacher constructs the learning problem, distributes it to auxiliary, outlining the search paths, and the students themselves make the search and conclusions, while motivating their actions. Here the teacher can orient students with some thoughtful in sequence questions. This method contributes to the revitalization of thinking, excitement of interest in learning at the seminars.

5. Research method. This is a way of organizing independent work of students, creative activity to solve new problems that they find when studying a problem. And only then, having discovered this problem, which is hidden in the educational material, they realize the lack of their knowledge to solve it. Students turn to the teacher, and the first method is “turned on”. From this it follows that the learning process is not necessarily divided into stages; in real learning work, all the methods described are combined, intertwined and alternated.

For a firm mastery of knowledge and skills, repetition and consolidation of the material studied is of great importance. The most common method for achieving these goals is an oral survey, which does not always justify itself, as students literally reproduce their learned knowledge. A much better effect in Descriptive Geometry is given by the use of commented and varied tasks on the cards.

The curricula of very many areas of higher and secondary special education - as a separate subject or as part of it - includes descriptive geometry. This discipline is a two-dimensional geometric apparatus and a set of algorithms for the study of the properties of geometric objects.

The teaching of descriptive geometry, which is one of the main academic disciplines in a technical college or college, is based on a close combination of analytical and synthetic methods. The knowledge of the basics of elementary geometry - planimetry and stereometry - is based on the course of descriptive geometry, and that is why the greatest attention should be paid to those definitions and theorems of elementary geometry that are used in the process of mastering this discipline [5-7].

METHODOLOGY

Currently, there is a perception that the science of descriptive geometry has no practical value due to the development of computer technology and the apparatus of linear algebra, but the activities of specialists in science and production refute this assertion: it is indispensable as an integral part of general engineering education in machine building construction specialties.

Modern engineering and technical worker can not carry out its activities without communication with a computer. The development of powerful computational tools stimulates new methods of designing, building various volume models in their programs, studying numerous modes of operation on these models, etc. Under these conditions, the need for science itself does not disappear, but the approach to studying it is changing, new requirements are put forward for methods and means of its development. Each academic subject, including descriptive geometry, needs to develop a learning concept that will establish the essence of this subject and will contribute to the definition of approaches and teaching methods. The method of teaching the subject is based on general didactics, while this technique is a necessary source of didactics. Between didactics and methods there is a relationship that exists between the general and the particular.

One of the main tasks of didactics is to reflect as deeply as possible the experience and generalizations that exist in the teaching methods in individual subjects. The methodology of higher education combines scientific and educational foundations, while the educational basis is always based on a scientific basis. The method of teaching derives from the scientific content and methods. The scientific method makes it possible to evaluate what is possible and what is impossible in science. For those many dozens, and maybe hundreds of years, of studying descriptive geometry in special educational institutions, the methods of teaching students in this discipline have been worked out and polished to the highest degree. Almost all of these techniques are aimed at teaching students how to solve problems first in space, i.e. simulate the task by the power of spatial imagination. And only after all the elements of the task are placed in their places, i.e. the student will see his task in space, move the learner to proceed to depicting it on the plane using descriptive geometry methods.

Special attention is paid to the ability to correctly analyze the source data of the problem, since it is from a properly conducted analysis that all subsequent operations follow. And meanwhile, methodological problems to teach students to deeply master and consolidate the skills of practical use of materials of descriptive geometry in real industrial or scientific activities remain highly relevant.

An analysis of the results of the “slice” revealed the reasons for this situation - the low quality of independent work on home practice assignments. What does not allow students to effectively and efficiently conduct practical exercises related to the implementation of these tasks? The answer is almost obvious:

1. Lack of time for a thorough and thoughtful solution of the tasks. This is most often due to the fact that some educational institutions give tasks on paper carriers - in the methodological manuals on the discipline being studied and the solution of the questions posed. In this case, the student has to spend considerable time allotted for independent work in order to redraw the task and arrange the frame and stamp of the graphic sheet.

2. In the majority of educational institutions they successfully cope with the aforementioned deficiency: a workbook for conducting practical exercises on descriptive geometry is the "Workbook". It is designed in such a way that students implement the solutions directly in the workbook and do not spend extra time on redrawing the graphic condition. In addition, the possibility of an incorrect decision due to distortion of the graphical condition during redrawing is excluded. But here a new problem appears: in all universities, without exception, copies of the Workbooks with correctly solved all variants of the tasks go hand in hand or are sold for a nominal fee - almost any student overloaded with worries prefers just to buy a job well done.

3. The tasks assigned to students for independent homework are most often very complex and more like some kind of charade, the purpose of which is not to teach the student individual methods of descriptive geometry, but to test him for quick wits or test him for his accumulated skills. And in this case, a significant portion of students, faced with an unbearable task for themselves, prefer to turn to "assistants", most often paid ones. The problems listed above are easily solved by methodical techniques using modern computer technology; for example, as follows: all assignments for practical homework on descriptive geometry are given to students in electronic form in a pre-specified graphics programs (AutoCAD, Compass-3D); the conditions of the tasks are designed so that the student can proceed without further preparation to the necessary constructions directly related to the solution of the problem.

RESULTS

Preparing assignments in a digital format makes it possible, with minimum time for the teacher, to create countless variants of these assignments, which makes it impossible to create samples for copying completed work. It is an extremely important approach to get effective results when doing domestic practical work: this work is not an IQ control and not an exam, but a systematic cognitive process, the purpose of which is to form and consolidate a student's stable knowledge and practical skills. It seems that any task for domestic practical work should not consist of 4-7 complex tasks on curriculum themes, but of a much larger number of extremely simple questions, each of which would be a logical and didactic continuation of the previous one. After a certain succession of elementary tasks, a complex task must follow, requiring an understanding of the algorithms of the previous questions. For example: all studied material of the discipline consists of 5 sections; 3-5 elementary problems and one complex question are given for each section.

DISCUSSION

The first course - solves the problem of introducing a recent applicant to student forms of collective life. The behavior of students is distinguished by a high degree of conformism; Freshmen lack a differentiated approach to their roles. The period of the most intense educational activities of students. All forms of training and education are intensively included in the life of a freshman. Students receive general training, their broad cultural needs and needs are shaped.

All components of the learning process are closely interrelated. Accepting a goal by students requires a pedagogically expedient influence on their motivational and need sphere. The purpose of learning determines its content. The purpose and content of training require certain methods, means and forms of stimulation and organization of this process. In the course of training is necessary to monitor its course and result. Implementation of all components in the

complex ensures the achievement of results. Evaluation of the result determines the new goals of the learning process.

CONCLUSIONS

Thus, in this work there will be 15-25 intermediate tasks and 5 tasks complex by sections. Such a method of forming a home practical study can be figuratively compared with the movement to the heights of knowledge and skill along a convenient flat ladder with intermediate platforms where you can stop and look around; moving up such a ladder is much more handy than trying to immediately jump to the top floor or hire a crane. It is interesting that this approach to the practical development of various educational materials is used in many schools and colleges in the USA. But it should be noted that all the arguments about the method of performing independent practical homework only make sense if the teachers do not trade in retail with finished works and their own conscience. Summing up, I would like to say that the discipline of descriptive geometry is extremely important for the training of highly skilled engineering specialists, and the effectiveness of its development in educational institutions depends largely on the rational use of both proven teaching methods and new methods related to the use of modern information technologies.

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