

TEACHING PHYSICS FOR NON-PHYSICS SPECIALITY ON MODULAR TECHNOLOGY

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Resume: *In the present article we considered the problem of application of modular educational technology in teaching process of physics for non-physics specialty students. It is given a comparative analysis of the mechanisms of teaching physics based on modular technology in higher education system.*

Key words: *modular education, modular technology, independent learning, electronic communication, pedagogical theory, module goal, learning continuity, individualization, optimization, subject, modular management, didactic goal, modular program, curriculum, problematic speech, structuring, systematization, virtual experience, brainstorming, problem communication, heuristic conversation.*

INTRODUCTION

As we know that the modular learning technology is based on the self-acquisition of knowledge by students, and the teacher manages their learning activities through electronic communication. In this process, the teacher must guide students to learning activities, arouse their interest in these activities, organize and coordinate independent learning activities and, in turn, give the necessary advice. This technology, combined with the use of modern information and communication technologies, as well as the Internet, combines all the best practices accumulated in pedagogical theory and practice. As for the use of this technology in teaching any science and in any educational institution, for example, teaching physics in the direction of "Technological education" of the Faculty of Physics and Technology of the Jizzakh State Pedagogical Institute, physics is taught as a general education subject, with a relatively small number of hours, a total of 60 hours and 20 hours of lectures, 30 hours of practical and 10 hours of laboratory classes. Considering the fact that physics consists of 5 sections and the great importance of science in this area, it is clear that the allotted time is extremely short. To master the entire subject in these hours, you need to master most of the subject yourself, and modular learning technology can directly help here. This means that the purpose of the module in

lectures, what topics it consists of, basic physical laws, important physical processes, important effects are listed and all of them are used in this area. Examples of practical tasks on the topic are solved, questions are posed that need to be developed independently. As a result, if students can complete more than one laboratory work on one module, but several laboratory works, it will be possible to solve several dozen tasks, rather than several tasks in practical classes.

THE DISCUSSION OF THE RESULTS

In modular training, the training is carried out in the form of electronic communication with the teacher, with the help of lecture materials, problem solving, laboratory work in areas difficult to understand, for obtaining independent knowledge, for solving independent problems and independent laboratory work. Based on the nature of science, the most effective module is created on the basis of a rigorous systematic analysis of the apparatus of this science. Since the teaching of natural sciences in an educational institution is based on only 10 lectures, in some cases one section of physics is covered by one lecture, and also the tasks solved in one section are the same. And in the case of a laboratory lesson, it will need to be limited to only one laboratory work. Therefore, if we apply modular technology to the teaching of natural sciences in higher education, we can get out of a difficult situation. Considering that the module should be structured according to separately grouped topics, in an educational institution the topics are grouped in a natural way, that is, the same physical processes are taught in one topic, for example, “Vibrations and waves”. For example, waves from mechanical vibrations and from waves to electromagnetic vibrations and waves, and further to sound vibrations. This is exactly what you need to create a module. In modular training, special attention is paid to ensuring the continuity of learning, individualization of learning, creating conditions for independent study of the material, accelerated learning for effective mastering of the subject. At the same time, the necessary conditions for learning are created for students in accordance with their abilities. The effectiveness of training depends on the following factors: the material and technical base of the educational institution, the level of qualification of teachers, the availability of literature, the development of didactic materials.

On the other hand, in modular training, the form of communication between the student and the teacher may be change and in the form of modular communication, that is, subject-based learning. The student works independently for most of the

learning process. They learn to plan, organize, control and evaluate their activities. The teacher will also have the opportunity to modularly manage the learning activities of students. This control will, of course, be targeted. Specific written modules allow teachers to individualize the activities of students and then it will be possible to give individual advice and expand the scope of assistance for them. To do this, the teacher must have a modular program. Such a program should consist of a set of didactic tasks and modules. Modules should serve to achieve the goal. At the same time, the didactic goal has two levels: the assimilation of educational material by students and the ability to use the knowledge gained in their future practical activities. For the module of educational and methodological complexes of higher educational institutions, it is necessary to prepare the following educational materials: the program, the purpose of mastering the module, guidelines for working with the module, a bank of theoretical information and basic concepts, the content of practical and laboratory classes, assignments and recommendations that will help them complete, current control tasks, independent tasks, tests to control students' knowledge, questions for self-examination, rating points that a student can score. Each module is completed with test runs.

For each module, a set of literature, handouts and illustrated materials is created, which is transmitted to the student in electronic form before the lesson. Each student learns the material and moves from one module to another. Talented students can take the test on their own. Modular learning requires problem solving lectures and guide lectures that provide a summary of each module. Lectures should be aimed at developing the intellectual and creative abilities of students. Practical and laboratory classes of the module are organized together with lectures, which, first of all, supplement the content of the lectures with new materials, as well as the technical application of theoretical knowledge in the lecture by solving problems and examples and conducting experiments. ability to solve problems theoretically and experimentally. In addition, practical exercises will allow developing the skills of the theoretical part of future research work, laboratory work, statistical processing of results, and completion of laboratory work with scientific conclusions.

When compiling the text of lectures using structuring methods, it is advisable to present the material with the introduction of flowcharts, image blocks and virtual experiments, and this allows you to increase the effectiveness of the material. As a result: the ultimate goal of the module is clear, the connections between the elements of the educational material are clearly visible, the entire volume of the educational

material is embodied in the eyes of the student and, most importantly, about each physical law, the imagination of the use of physical processes in this area is formed. So, it will be created a motivation of students to the lesson.

In order to fully use the acquired knowledge, we try to present the material to student in a convenient form. The strongest assimilation is achieved when information is presented simultaneously in several visual, numerical, symbolic, virtual and verbal forms. While a virtual representation of physical processes in various technical devices helps to understand the importance of a physical process in the operation of a device, graphs in images show the functional dependence of one physical quantity on another or more, forming an idea of scientific work. At the same time, it is advisable to create an explanatory dictionary of terms for each module. To improve the efficiency of modular technology, it is advisable to use the following interactive teaching methods: brainstorming, problem-based communication, heuristic conversations, educational games, educational projects, case studies and etc. The following advantages of modular education are mainly manifested: inter-modular continuity and flexibility of the modular structure of the subject are ensured, the assimilation of students is regularly and effectively monitored, students are stratified according to their abilities, as a result, the information process is accelerated. consolidation of information and optimizes the structure of study time, lectures, practical exercises, and finally hours for individual and independent work.

CONCLUSION

Thus, modular technological education primarily forms skills for self-study. The following conclusions can be drawn about the self-study:

- independent education contributes to the development of the intellectual abilities of each person;
- independent education serves as a basis for young people to continue this topic at the level of scientific work in order to further develop their scientific potential in areas and topics of their choice;
- each student first of all needs to develop the skills of self-study.

Within this modular system, we can focus on the independent study of physics it is necessary:

- to pay more attention to independent learning;
- to take into account the importance of physics in the technological field.

Based on the types of science teaching classes:

- in the process of preparing for lectures, it is advisable to independently research and collect information about the importance of each topic in technical work;
- it is especially important to solve the problems of physics used in the technical field in practical classes.

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