
FEATURES OF TEACHING BIOPHYSICS TO MEDICAL STUDENTS

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Abstract

In a constantly changing world, in the dynamics of ongoing social transformations, dehumanization of human life and culture, the question of its full spiritual development is of particular importance. In this regard, a number of urgent problems arise concerning the sphere of education in general, higher education in particular, associated with a change in attitude towards it as a value.

Keywords: Biophysics, teaching, teaching methods, medicine, needs, laboratory, mechanics, acoustics, diffusion processes.

Higher school, reflecting the objective needs of the social development of society, seeks to build its work in the conditions of active reform of the entire system of national education based on the recognition of the value of a person as an individual, a subject of educational and cognitive activities. Therefore, the main task of the educational policy of the state at the present stage, according to the Law of Uzbekistan "On Education", should be considered the creation of conditions for achieving a high quality of education based on the orientation of each to the values, meanings and motives of learning, which are determined by the long-term needs of a person, society, state.

In medical universities, in the first year of study, the discipline "Medical and biological physics" is studied. This is a rather specific discipline that has a lot of points of intersection with the usual school physics course, but also differs significantly from it. So, for example, the course of medical and biological physics includes such main sections as: biomechanics (a section of biophysics that studies the mechanical properties of living tissues and organs); hemodynamics (a section of biomechanics that studies the movement of blood through the vessels); cell biophysics (deals with the supramolecular structures of a living cell, among which a special place is occupied by the membrane structures of cells and subcellular particles); a special place is occupied by the section that studies the physical processes occurring in the tissues of the body under the influence of currents and electromagnetic fields, etc. Of course, all this is very interesting and important in the process of studying the course of medical biophysics, in addition, physical and mathematical knowledge is necessary for a doctor, as they contribute to the formation of a materialistic view of a living organism and the processes occurring in it. But, despite all of the above, physics teachers in medical schools face very serious problems in teaching this discipline. And first of all, this is due to the very low, and sometimes completely absent interest and passivity of medical students in the

study of physics, in the weak motivational side of education. In addition, the problem is aggravated by the very poor physical preparation of students, which is sometimes shocking due to the lack of elementary knowledge and skills not only in physics, but also in mathematics. Thus, physics teachers are forced to look for a wide variety of ways, methods and methods of teaching, control, which help to increase the cognitive activity of students in the study of medical biophysics. It is necessary to interest students in this subject, and first of all, the improvement of this situation depends mainly only on the teacher of physics.

At present, the teaching of academic disciplines, especially at the university, is carried out quite autonomously, without sufficient tracking of successive connections. This leads students to form an opinion about discreteness, fragmentation of the studied disciplines. Integrations general educational basic and specialized education allows to make the learning process at the university more effective, and therefore requires close attention and detailed study. For this issue published a significant number of works. However, in the practice of teaching medical and biological physics are underused results of theoretical and practical research on the problems continuity and interactivity. Physics is an experimental science and without demonstrations it is difficult to achieve a deep understanding of the subject. Unfortunately, a demonstration experiment is difficult to organize, and sometimes impossible, which means that other methods of demonstrating the physical phenomena and processes under study must be used. This is where virtual demonstrations are used.

Multimedia lectures on biophysics read at the department include videos of experiments, animations and physical phenomena and processes. A set of presentation materials has been developed for lectures at the department. Presentations are prepared for each lecture in all areas of biophysics studied: mechanics, acoustics, diffusion processes in biological membranes, electrodynamics, medical electronics, optics, elements of quantum biophysics, ionizing radiation, the basics of dosimetry.

An essential place in the study of biophysics is occupied by a laboratory workshop. The use of a laboratory workshop helps to develop in students: the ability to perform assigned tasks, the ability to analyze the results obtained, use the acquired skills of experimental work, the use of the physical and mathematical apparatus in research work. In laboratory classes, students, exploring the task, applying the connection between theory and practice, analyze the result and learn to draw conclusions. When studying biophysics, it is important to be able to use various equipment that is used in modern medicine.

Laboratory works are divided into: introductory - study of the equipment design, their settings; experimental - problem statement, experiment, analysis of results. When conducting a laboratory workshop on biophysics, at our department, depending on the type of work, the group is divided into subgroups of 2-4 people. Having received a task from a teacher, students carry out measurements, necessary calculations, consulting with each other, exchanging information. Protection of laboratory work is carried out individually. In another type of workshop, the results of the experiment of each

subgroup are entered into a table, a final graph is drawn, according to which a conclusion is made about errors in the experiment, an analysis is made of at what stage a mistake was made in one or another subgroup. In this case, the subgroup redoes the experiment.

In the analysis of the results of laboratory work, the method of "brainstorming" is used - a method in which any answer to a given question is accepted. This method of teaching is used when it is necessary to find out the opinion of each student. The teacher poses questions to the group on the subject of work, asking whether the students agree with the answer or not. In this type of work, the whole group participates, everyone's opinion is heard. The activity of each student and only the correct answers are evaluated. With this form of conducting classes, the students' fear of getting an unsatisfactory grade disappears, and the teacher analyzes the degree of assimilation obtained during the theoretical presentation of the material. All laboratory results are recorded in the report forms. The design of the forms is a mandatory requirement for the formation of practical skills - the results of the experiment are presented in the form of tables, graphs.

The purpose of studying biophysics for students studying in the direction of training "General Medicine" is the formation of systemic knowledge and skills in medical students in the field of mathematical and natural sciences, necessary for mastering other academic disciplines; the ability to independently use them in professional activities, determined by the competencies of the Federal State Educational Standard.

For high-quality training of medical specialists, it is necessary to use active and interactive forms of education.

Active - the teacher and students actively interact with each other during the lesson, jointly solving the tasks. This form of learning is aimed at the ability to independently comprehend and solve problems.

Interactive - a form of learning in which students, interacting with each other and with the teacher, learn to model situations, while using a group solution to the problem. In the practice of teaching biophysics at the department, various methods are used to improve the quality of education and develop independent thinking of students: test tasks, multimedia lecture courses, online classes, analysis of specific situations.

Test tasks - are used at the beginning of the study of the discipline "biophysics" to determine the level of basic training of students, as well as for the current monitoring of progress. Each topic of the section under study ends with a control test containing theoretical questions and tasks formulated both in the form of definitions of physical laws and quantities, and in the form of qualitative and computational tasks. In our opinion, such an organization of any practical lesson in physics contributes to the systematic work of students and allows all students to be included in the learning process, to control each of them. Undoubtedly, the proposed methodology leads to a significant increase in the workload of the teacher associated with the verification and preparation of control tasks, but at the end of the semester, the teacher can alleviate the situation when conducting and monitoring the final control work.

Thus, on the basis of the above, we have developed a methodology for conducting practical classes in physics in a medical university. The main components of the proposed methodology are the activation of the cognitive activity of medical students in the study of physics, increasing the interest and activity of students in the classroom, highlighting, stimulating and encouraging the most capable and diligent students. According to the new educational standards, upon completion of the study of this discipline, students do not take an exam, but receive a credit, then you can consider the possibility of obtaining a credit "automatically". Of course, some teachers believe that automatic final grades are unjustified, since students have a significant number of questions about the course they are studying when preparing for the test.

In preparation for the test, the student repeats the material again, it is consolidated and systematized. But, as practice shows, the possibility of obtaining a credit automatically for students is a good motivation for regular and active work throughout the entire period of studying the discipline, in addition, physics is not a major discipline in a medical university and therefore, the possibility of obtaining a credit "automatically" has practical meaning.

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