

THE ROLE OF INNOVATIVE EDUCATIONAL TECHNOLOGIES IN TEACHING BIOPHYSICS

Raximov Bobur Turg'unovich

Toshkent tibbiyot akademiyasi

bobur_raximov@inbox.ru

ANNOTATION

By the use of contemporary educational tools, the essay informs readers about the study of biophysics in the medical area. Information about contemporary pedagogical techniques for teaching biophysics is made available in medicine. Today, the university professor is no longer the primary information source when teaching biophysics to students in medical higher education institutions; instead, he expresses his opinion on the need to broaden students' perspectives on education by utilizing a variety of information and communication technologies.

It is also evaluated whether using contemporary pedagogical methods to teach biophysics to students in medical universities is sensible. The article deals with issues related to the development and improving the knowledge of students using various innovative technologies in the process of teaching biophysics at a medical university.

Key words: *biophysics, medicine, innovation, information and communication technologies, medical devices.*

In the modern world, physics and medicine are two scientific fields that support and advance one another. Medical biophysics is acknowledged as the field of study on which future doctors' professional education is founded in accordance with medical technology [1]. On the premise of early development, biophysics is built.

Due to their applicability to molecular, membrane, and cellular interpretations of biological occurrences in living things, physics and chemistry patterns have been defined in terms of physical, chemical, and biological regularities in microbes, populations, biocenotic, and other systems, various layers of the biosphere [1].

Biophysics has its own patterns and procedures even if it is in the close link with other natural disciplines.

The development of biophysical theory and its incorporation into biology and medicine have been impacted by the formation of theoretical bases in biological sciences.

Recognized as the science of the 20th century is biophysics. Nonetheless, it cannot be argued that the objectives of this discipline were not accomplished by the 20th century. This is demonstrated by the numerous discoveries and research

conducted in the 20th century by a large number of scientists. One of these, Maxwell's color theory experiments, shown that he had distinct hues using a dynamical top, and German physiologist Helmholtz found the speed at which nerves pulse. The Dutch physiologist Einthoven, the founder of electrocardiography, made the heartbeat recorder and used it for the first time for diagnostic purposes. Known physiologist Sechenov by researching the dynamics of breathing discovered the patterns of melting gases in biological solutions. Here are some more examples.

At present, biophysics has been transformed into fundamental issues such as inheritance and variation, ontogenesis, phylogenesis, metabolism and teaching biophysics by using innovative technologies.

Methods used in biophysics include various optical methods, spectroscopy, electrometric methods, methods of microelectronic techniques, chemiluminescence, laser spectroscopy, targeted atoms [3].

One of the most important issues in the education system in developed countries is the informatization of education, it means the use of information technology in the learning process. Nowadays, in the education system of the country, it is known that the creation of an information environment in the innovation sphere is a topical issue. [4].

It is important to expand the educational space to new requirements in the context of the growing role of human resources in education as a criterion of political and economic development in the field of education from the point of view of expanding the information space and joining the world community.

For modern pedagogical specialists, the main task of our time is not only the constant professional development of the teacher, but also psychological, political, economic and information literacy and historical knowledge. Today's teacher should work on improving the knowledge of students using innovative pedagogical technologies. In this regard, one of the most commonly used concepts that we use later is innovation. «Innovation» is a new outcome that has been achieved in reaching the specific goals [6, 7].

Understanding of modern innovative pedagogical technologies and wide use of knowledge in the field of education, especially in higher educational institutions, is the main condition for increasing students' knowledge, as well as the qualifications of young specialists. Overall innovation is recognized as a key factor in improving the quality of education.

The effectiveness of innovative technologies:

1. it identifies the process of learning innovative
2. technologies and innovations in education, which is acquired in everyday life through television or the Internet and opens the way to a new world.

3. teaches a student to adapt to innovations and intelligence, to explain and express their views and opinions.
4. innovative methods are active teaching methods, which means that 80% of theoretical knowledge and 90% of practical knowledge is stored in student's memory by this method.

Today quality of education in each educational institution unsatisfactory; inefficiency of results of reforms in education; insignificance at increase in number of documents; lack of skills of self-education at students; there is not enough general creativity of students and teachers. The only way to solve this problem - to introduce the latest innovative approaches in educational process, to induce each pupil to training, to increase his motivation to study and to work independently.

Thanks to the new innovative technologies directed to improvement of quality of education in researches and the analysis it is possible to draw the following conclusions: -

Today quality of education in each educational institution is unsatisfactory; inefficiency of results of reforms in education; insignificance with an increase in the number of documents; lack of students' self-education skills; there is not enough general creativity of students and teachers.

The only way to solve this problem - to introduce the latest innovative approaches and methods in learning process, to encourage each student to learn, increase his motivation to study and work independently. Thanks to the new innovative technologies directed to improvement of quality of education in researches and the analysis it is possible to draw the following conclusions:

- -improving the quality of student learning, teacher's
- professional competence, ability to apply various innovative
- technologies in the learning process and its results;
- -systematic and targeted use of innovative technologies
- in education will allow to reach great achievements;
- the introduction of new innovative educational technologies
- is often incompatible with the modern requirements of
- the material and technical base of each educational institution,
- the lack or low level of knowledge of the staff is also
- problematic.

The adoption and integration of cutting-edge technologies into educational institutions' teaching and learning processes is essential for providing the younger generation with a high-quality education. Consequently, each teacher's primary

responsibility is to investigate, put into practice, and successfully apply cutting-edge educational technology, not to lag behind scientific and technical advancement.

All teachers are well aware of the significance of creative training manuals for integrating cutting-edge educational technologies into the teaching and learning process. Online education is one such instrument. Students can enhance both their subject-specific knowledge and computer abilities by using electronic textbooks. With the help of this textbook, students will have the chance to work independently and put their theoretical knowledge into practice, enabling them to succeed in school thanks to the usage of electronic textbooks.

With regard to contemporary medical higher education, it is essential to train future professionals who is ready to master new knowledge, accustomed to multifaceted activities, and adapted to new requirements quickly, as well as to prepare them for a competitive environment that is fully fulfill to modern requirements [8]. In this regard, it is essential to improve the quality and level of diagnostic, therapeutic and clinical research conducted by future doctors in the practical laboratory, and also to enhance the quality of professional training in this area.

In the modern world, special medical devices are used in various fields in the health-care sector (such as therapy, surgery, gynecology, oncology, etc.), so future doctors cannot be treated separately from medical equipment. Aware of the availability of medical equipment and the correct relationship between medical devices and physical factors during diagnostic and treatment activities in the field of medical education, the ability of future doctors to improve their skills, ability to work with medical equipment plays an important role in enhancing cognitive functions. It should also be borne in mind that every student works with many medical devices based on physical phenomena in medicine (mechanical phenomena, oscillations and currents, molecular, electric field and electric current, magnetic field, electromagnetic oscillations and waves, optics, laser radiation).

The main purpose of teaching biophysics at medical universities is to teach future doctors how physiological processes are performed in the human body, and to use physical patterns and phenomena in medicine, such as diagnostics and the optimal use of therapy. In this regard, students of medical universities oblige to look for new ways of teaching the characteristics of medical equipment and practice in the field of professional training.

The content and purpose of vocational education in modern medical institutions of higher education is to demonstrate the results of the work of the teacher, as well as the nature and content of the work and how to implement them.

Accordingly, it is necessary to identify indicators characterizing the ability of students to conduct diagnostic, therapeutic and laboratory tests. To this end, students can choose to use a medical device in accordance with their application; registration and registration of its influence; know the physical nature of the diagnostic or therapeutic effect of the physical factor used in the medical device; knowledge of the harmful effects of medical equipment on the patient and the method of its removal; Information on the development of modern medical equipment, etc. can be achieved through the use of innovative educational technologies and tools.

At present, modern teaching methods are widely used in the development of students' learning activities. The use of modern teaching methods leads to high efficiency in the teaching process. Today, in a number of developed countries, the methods that form the basis of extensive experience in the use of modern pedagogical technologies that guarantee the effectiveness of the educational process are called interactive methods [10].

Interactive methods are methods that activate learners and encourage independent thinking, with learners at the center of the learning process. When using these methods, the educator encourages the learner to actively participate. The learner is involved throughout the process. The benefits of a student-centered approach include:

- more effective learning;
- high level of student motivation;
- taking into account previously acquired knowledge;
- adapting the intensity of reading to the needs of the learner;
- support the initiative and responsibility of the student;
- practical study;
- creation of conditions for bilateral discussions.

An interactive method is a collaborative solution to an activity or problem through dialogue, discussion, and reflection. The advantage of this method is that the whole activity teaches the student to think independently and prepare them for independent living.

The choice of interactive teaching methods takes into account the purpose of education, the number and capacity of students, the educational and material conditions of the educational institution, the duration of education, the pedagogical skills of the teacher and others.

There are many different types of interactive methods, and all of them, like any progressive method, require, first of all, a great preparation from the teacher before the lesson.

Interactive learning allows you to solve multiple problems at once. The main thing is to develop students' communication skills, help to establish emotional ties between students, ensure the fulfillment of educational tasks by teaching them to work in a team, to listen to the opinions of their peers. The main features of the interactive lesson in the organization of these lessons can be better understood by considering some of its differences from the traditional lesson (Table 1) [10].

Some differences between traditional and interactive lessons

№	Basic concepts	Traditional lesson	Interactive lesson
1	Level of application	It is used in the form of lessons that are convenient for them on all topics	On some topics, interactive lessons are used in the form of convenient forms of lessons. For other topics, the traditional lesson will be used
2	Course Objectives	Knowledge, skills, competencies on the subject formation, strengthening	Independent thinking on the topic of the lesson, drawing conclusions, explaining them, teaching to defend
3	Teacher responsibilities and working methods	Explain, reinforce, supervise, assign assignments to a new topic	Organizing, managing, supervising, and summarizing students' independent work and presentations
4	Requirements for lesson preparation	Preparation of lesson plans, abstracts and didactic aids	Preparation of interactive lesson plans, assignments for independent work, handouts, other necessary tools
5	Student tasks and work methods	Listening to and mastering the teacher, completing assignments	Independently think about the tasks given by the teacher, compare their opinions and conclusions with others and come to the final conclusion
6	Lesson modules and algorithms	The modules and algorithms of the lesson are used by each teacher according to the method he / she uses	Each lesson is conducted according to pre-prepared modules and algorithms, projects
7	The level of activity required	The teacher is active in all aspects, the students are	Both the teacher and the students are very active.

The differences in the table clearly show the advantages and disadvantages of these two types of training.

Over the last 20 years, new methods, a source of paperless information: a video computer system, have rapidly entered life, as well as education.

According to the sources of knowledge currently being studied, the methods are divided into 5 groups and include a number of methods:

1. Practice, experimental method:

- experimentation, practice;
- Participation in the process of training, labor, production.

2. Demonstration method:

- Student observation, internship.

3. The method of verbal expression:

- explanation, awareness;
- to tell a story;
- exchange of views;
- interview;
- way - instruction, instruction;
- report;
- discussion, debate

4. Work with the book:

- read, study, review quickly;
- Quote and work on it, write a statement;
- Writing an abstract, composing a synopsis.

5. Video method:

- computer exercises, tests;
- control;
- work on the Internet;
- preparation and screening of educational films;
- calculation of economic indicators on a computer on the basis of programs developed on the basis of information technology, study of the influence of factors on them;
- covers multimedia presentations, presentations and more.

Advantages of the methods:

- - know certain concepts, have certain skills;
- - high level of teacher control over the teaching process and learning environment;
- - efficient use of time;
- - Relying on accurate scientific knowledge.

Disadvantages of the methods:

- The most serious shortcomings of such a system of teaching are the passivity of students in the classroom and, consequently, the low efficiency of learning;

- Full teacher supervision does not create motivation for all students;
- the student is not able to communicate directly with the teacher;
- group learning may be low because not everyone has the same level of memory;
- There are no conditions for independent study and decision-making.
 - In the educational process of students, the use of modern educational technologies in all areas of biology is widely practiced[10].

Conclusion. Based on the foregoing, we believe that:

- reduction of hours in biology is unacceptable;
- biophysics should be integrated with special subjects or with other theoretical subjects such as normal anatomy, normal physiology, histology, biomedical physics, pathological anatomy, pathological physiology, etc.
- the teaching of the subject should be progressive, qualitatively, at a higher, modern level;
 - - the transfer of knowledge must necessarily be carried out with the active participation of students, this requires the creation of clear, unified textbooks, teaching aids, the development of programs, laboratory work and seminars.

90% of the information we receive and perceive by vision, so the learning process should be carried out using visual aids.

This means not only a static picture that reflects any physical phenomenon, but can also be seen in virtual motion. This resource allows teachers to teach basic patterns easily and freely, the basics of biophysics, as well as to conduct online laboratory work in many sections of the general education program. It is necessary to create an environment (ICT) over the Internet using interactive whiteboards,

projectors, computers, portable devices and tablets and smartphones for teaching biophysics. Using an innovative curriculum in the form of a playlist, with professionally developed multimedia concepts, visual materials and virtual solutions, the learning process can be made more understandable and meaningful. The complex structure allows you to make a new theme interesting and understandable, to perform various practical tasks, consolidate the knowledge gained, organize various tasks, and students' achievements. Also with the help of illustrations, videos, clear fonts, animated descriptions and much more you can memorize information easily. Explaining examples and concepts from real life will

be easy and efficient. New models of the aforementioned training will allow students to participate in the daily learning process if, for whatever reason, they are unable to continue their basic education. Of course, modern online education has a great future for most of the younger generation.

REFERENCES

1. Toleukhanov S. Biophysics. - Almaty, 2009. - 3 p.
2. Abylkhairov S. Biophysics. - Zhetisay «Syrdarya» University, 2009. – 54p.
3. State Compulsory Educational Standard of the Republic of Kazakhstan. Astana, 2012 p.
4. Buzaubakova K.Zh. New pedagogical technologies. - Taraz, 2013, 78 p.
5. Koshimbetova S. Opportunities for using innovative technology in improving the quality of education. - A.: Bilim, 2008
6. Antonov V.F. Physics and Biophysics: textbook. -M. «Geotar-Media»,2008
7. Antonov V.F, Korjyev A.V. Physics and Biophysics: a lecture course for medical students:textbook,-3-edition.,proc. add.-«Geotar-Media», 2007
8. Ualikhanova B.S Methods of professional training of physics in medical universities. Ph.D. in 6D011000-Physics ... - Turkestan, 2017. - 3 p.
9. Aminjonova, C. (2021). Problems and methods of teaching the subject “Biology”. *Центр научных публикаций (buxdu. uz)*, 1(1).
10. Aminjonovich, A. A., & Akmalovna, A. C. (2021, March). METHODS OF TEACHING THE SUBJECT “BIOLOGY” IN MEDICAL UNIVERSITIES. In *Euro-Asia Conferences* (Vol. 3, No. 1, pp. 38-40).
11. Akmalovna, A. C., & Olimovna, A. G. (2020). Methodology and problems of teaching the subject “Biology” in medical universities and secondary educational schools. *Eurasian Medical Journal*, (2), 6-8.
12. https://scholar.google.ru/citations?view_op=view_citation&hl=ru&user=if1GVJMAAAAJ&citation_for_view=if1GVJMAAAAJ:Tyk-4Ss8FVUC
13. https://scholar.google.ru/citations?view_op=view_citation&hl=ru&user=if1GVJMAAAAJ&citation_for_view=if1GVJMAAAAJ:zYLM7Y9cAGgC