

METHODOLOGICAL FEATURES OF TEACHING BIOLOGICAL SCIENCES (ON THE EXAMPLE OF HUMAN ANATOMY AND PHYSIOLOGY)

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Abstract. Today, the most important task of higher education is its focus on the acquisition by each student of his own full-fledged personal experience. In this regard, in the coming years, a number of presidential decrees and orders will be adopted, raising the education system to a new, higher level. Particular attention is paid to improving teaching methods, the gradual introduction of the principles of individualization of the educational process, the introduction of modern information and communication technologies and innovative projects in the field of higher education. The article discusses the methodological features of teaching biological sciences, in particular, "Human Anatomy and Physiology" in pedagogical higher educational institutions using information and communication technologies, traditional and didactic lectures, problem-based learning and multimedia teaching aids, and also considers the role of pedagogical skills and competence of the teacher in teaching the discipline. In pedagogical educational institutions, this discipline is carried out in the areas of "Methods of teaching biology" under the name "Anatomy and human physiology" in the 4th semester of the 2nd year and 5.6 semesters of the 3rd year of the bachelor's degree, and in the direction of "Defectology" under the name "Anatomy. Human Genetics" at the 1st semester of the 1st year undergraduate course.

Key words: innovative technologies, competence, skill, multimedia teaching aids, problem-based learning, traditional and didactic lectures, science and art.

I. INTRODUCTION

In the Republic of Uzbekistan, special attention is paid to the field of education, in particular, in Presidential Decree No. 4947 of February 7, 2017 "Action Strategy for the Five Priority Areas of Development of the Republic of Uzbekistan 2017-2021" [4], the fourth strategy aimed at developing the social sphere lists tasks dedicated to improvement of continuous education. Tasks focus on the following:

- training of highly qualified personnel in accordance with the modern needs of the labor market
- equipping educational institutions with educational and laboratory equipment,

computers, teaching aids

– deepening the study of important demanded subjects, including biology, physics, chemistry.

As we can see from the above proposals, biology is an important direction in the field of education. "Human Anatomy and Physiology" is considered one of the fundamental disciplines of biology in the education system. The purpose of studying the subject "Human Anatomy and Physiology" in pedagogical higher educational institutions is to study the structure of the human body and the formation of such concepts as the relationship between nature and man on the example of the functioning of organs.



Figure № 1. The relationship between nature and man

II. LITERATURE REVIEW

The analysis of the literature shows that the development and use of electronic learning tools developed in two main directions. Within the framework of the first direction, automated training systems for various academic disciplines are being developed and operated. The core of automated training systems are the so-called author systems that allow teachers to enter their educational and methodological material into a database and program algorithms for its study using specialized tools.

According to the Uzbek researcher (A. Khodzhiyev) the electronic textbook is the main educational electronic publication created at a high scientific and methodological level, fully corresponding to the component of the discipline of the educational standard of specialties and directions determined by the didactic units of the standard and the program, ensuring the continuity and completeness of the didactic cycle of the learning process, subject to interactive feedback [10].

Based on the above, let us turn to the opinion of foreign scientists (Kuo-Liang Huang, Kuo-Hsiang Chen) who believe that due to a more nonlinear experience, teachers realized that they would need to create a "toolkit", not a "textbook", and provide students with several ways to navigate through thematic areas [11].

According to Kazakh researcher (Tortayeva A.K.) an electronic textbook is a methodological complex designed to study the course of the material. It is an integrated tool containing theory, practice, tasks and other components [15]. Based on the above proposals, the electronic textbook is considered as a training software tool [16].

III. METHODOLOGY

For many years, among the numerous professions, the profession of a teacher remains unchanged and irreplaceable. We all know that teachers play an important role in the

educational and educational process of students. The development of the education system and the upbringing of the younger generation is an important direction of modernization of education in the Republic of Uzbekistan (Khamdamova Malika) [8]. As you know, the activities of a university teacher are divided into pedagogical, methodological and scientific. Methodological activity is the activity of a teacher aimed at organizing methodological work that contributes to increasing the effectiveness of the lesson.

The methodological activity of a university teacher is represented by the following types:

- educational and methodical activity;
- scientific and methodological activity;
- organizational and methodological activity. (Khamdamova Malika) [9]

Summarizing the above, we note that special attention should be paid to the consideration of the system for assessing the effectiveness of the educational process, which is one of the main and systematic elements of the educational process at the university, provided that the criteria, principles and functions of assessing knowledge in general, as well as knowledge on individual topics, are clearly defined.

In the course of studying the subject "Human Anatomy and Physiology", students are required to acquire knowledge about the main systematic groups of organs of the human body. It should be specifically approved that the course "Human Anatomy and Genetics" is held in the 1st semester of the 1st year in the direction "Defectology" and "Anatomy and Human Physiology" in the 4th semester of the 2nd year and 5.6 semesters of the 3rd year of the direction "Methodology of teaching biology". The course consists of:

Defectology (1 course)	Methodology of teaching biology (2-3 courses)		
Lecture (16 hours)	2 course 4 semester Human Anatomy	3 course 5 semester Human physiology	3 course 6 semesters Human physiology
	Lecture (44 hours)	Lecture (36 hours)	Lecture (30 hours)
Laboratory classes (22 hours)	Laboratory classes (52 hours)	Laboratory classes (38 hours)	Laboratory classes (30 hours)
Independent work (30 hours)	Independent work (70 hours)	Independent work (56 hours)	Independent work (44 hours)
Total: 68 hours			Total: 410 hours

Table № 1. Number of hours of the subject "Anatomy. Human Genetics" and "Human Anatomy and Physiology"

When teaching the subject "Human Anatomy and Physiology" in pedagogical higher educational institutions, specific features should be taken into account:

The first feature. For example, teaching in the direction of "Methodology of teaching biology" the subject is called "Human Anatomy and Physiology". The program of the discipline "Human Anatomy and Physiology" of the direction "Methodology of Teaching Biology" determines the profile of training specialists, taking into account the future profession, with the

profession of a teacher (Pogonysheva Irina Alexandrovna, & Skorobogatova Olga Nikolaevna) [12]. For students of the direction "Defectology" the subject is called "Anatomy. Human Genetics", is carried out with a deeper medical bias. The reason for this is that defectology is divided into several subsections. For example, teachers of the deaf work with deaf patients, and they need to have a deep knowledge of the structure of the hearing organs;

The second feature. Another feature of teaching the discipline is the approach to anatomy, that is, the approach not only as a subject, but also as a science (Artyukhina A.I., Ageeva V.A., Gorelik E.V., Bagri E.G., Chekanin I.M., Fedotova Yu.M., Orekhov S.N., Matveev S.V) [1].

The most important aspect of teaching the discipline "Human Anatomy and Physiology" is technology. The Degree of the President of the Republic of Uzbekistan "On measures for the further development of higher education" [3] lists such tasks as improving the educational process of higher educational institutions based on the widespread use of the latest pedagogical technologies.

I want to note that when studying the course "Human Anatomy and Physiology" in a pedagogical higher educational institution, lectures, laboratory classes and independent work are conducted.

Lectures are the main foundation for studying the course "Human Anatomy and Physiology". The structure of the lecture on "Human Anatomy and Physiology":

- communication of the topic, purpose, objectives of the lesson and motivation of educational activities;
- preparation for the study of new material through repetition and updating of basic knowledge:
- introduction of new material;
- primary understanding and consolidation of connections and relationships in the objects of study;
- summing up the results of the lesson;

Recommendations for the organization of lectures include the following types of lectures:

Traditional lectures have their own advantages, as they can be especially effective for disseminating many facts to a large group of students in a short time, synthesizing information from multiple sources, and clarifying complex concepts. For example, when studying the topic: "The subject of anatomy, methods and tasks. The structure of the cell and tissues of the human body" or "Introduction, methods, history of physiology".

The study on this research topic shows that, in teaching the subject "Human Anatomy and Physiology", information and communication technologies are considered one of the priority technologies (Shegebaev M.A.) [14]. Information technologies in education are the special methods used, software and hardware for working with information. The use of this technology contributes to the perception of a new type of information. You can use information technology at various stages of the lesson, for example, at the stage of learning new material, or when controlling students' knowledge.

Didactic lecture: video lecture, slide or other educational material available on a computer. The advantage of this approach is that relevant reference materials can also be

accessed via links at specific points in the lecture. Well-designed lecture presentations can be graphically impressive. According to Mayer R.E. and Anderson R.B. the ability to integrate text, images, videos and animations into a lecture presentation is a great advantage and improves the learning process, resulting in better integration and retention of knowledge. Reading a lecture course in the studied disciplines is accompanied by the use of presentation programs showing not only slides and diagrams of micropreparations, but also fragments of video films on the features of the structure and function of an organ or tissue. For example, when studying the topic: "Bone as an organ. The skeleton is part of the musculoskeletal system. The structure and connection of the bones of the body "or" Physiology of the cardiovascular system (Shakhmurova G.A., Khamdamova M.I.) [13].

A multimedia lecture can be fully automated and be accompanied by pre-recorded narration, or it can be accompanied by the teacher's words. The multimedia program sequentially displays frames that reveal the content of the lecture, define tasks for students, evaluate their actions, etc. Students under the guidance of a teacher or the program itself automatically change frames. The duration of displaying each frame lasts no more than 1 - 2 minutes, and the video clip - 5 minutes. Anatomy Laboratory's multimedia interactive software improves both memorization and visualization and has been said to be an effective teaching tool. For example, when studying the topic: Nervous system. Neuron. The structure of the spinal cord.

Internet, computer-assisted learning (CAL) computer-assisted learning (CAL) is being introduced into anatomy as a means to supplement or replace traditional teaching. Computer-aided learning represents an important alternative pedagogical tool (Khamdamova M., Shakhmurova G.) [7].

Laboratory classes - is carried out after the end of lectures in order to consolidate the acquired knowledge. Conducting laboratory classes in "Human Anatomy and Physiology" requires well-prepared, specially equipped classrooms with the use of equipment adapted to the conditions of the learning process. Recommendations for the organization of laboratory classes can be listed as follows:

Interactive teaching methods are especially effective in conducting laboratory classes in the study of the course "Human Anatomy and Physiology". This method is based on the fact that there is a wider interaction of students not only with the teacher, but also with each other.

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For example, the case study method [5] solve an individual situational problem. After that, the performance of this work by the teacher is checked with analysis as the very solution to the proposed situation. For example, when studying the topic: "circulation of blood"

Conducts classroom work with a case: Which of the circles of blood circulation passes through the heart faster?

Organizes the activities of mini-groups to solve the case:

- divides students into mini-groups,

- introduces (reminds) the rules of work in groups, with a memo to the discussion participant;
- explains the instructions for group work on the analysis and solution of a practical situation;
- introduces the technique of evaluation and selection of the most acceptable idea;
- proposes to start discussing and agreeing on the different ideas of the group members about the situation, the problem and ways to solve it.

Brainstorming - the application can significantly increase the activity of all students, since all students are included in the work. During the work, students get the opportunity to demonstrate their knowledge and think about possible solutions to the problem. At the same time, they learn to express their thoughts briefly and as clearly as possible, to analyze them. For example, when studying the topic: "Compiling a diet (energy exchange)"

Lesson structure: Question: What foods are more useful when compiling a diet?

- a clear statement of the problem for which a solution is required, the definition of the rules for the process of generating ideas and the agreement of all participants with them;
- the maximum speed of generating ideas (alternatives) with a complete ban on discussion and criticism;
- a separate stage for grouping and selecting the most valuable ideas for further development;

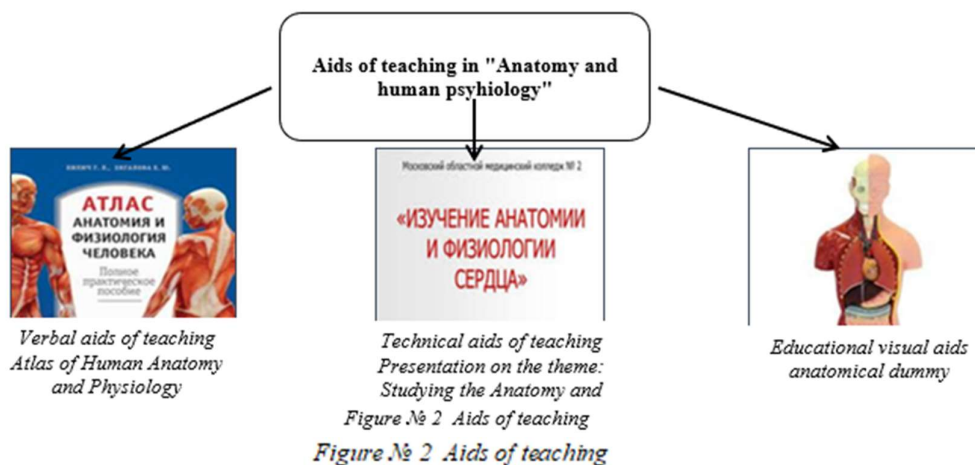
Independent work - students on the course "Human Anatomy and Physiology" is designed not only to consolidate and deepen the knowledge gained in the classroom, but also to contribute to the development of students' creative skills, initiative, and the ability to organize their time. When fulfilling the plan of independent work, the student needs to read the theoretical material not only in the textbooks and teaching aids indicated in the bibliographic lists, but also to get acquainted with publications in periodicals (Bankina T.E., Dilekova O.V., and Tokarev O.I.) [2].

Project method - this method involves the creation of a project and its implementation point by point. This is a special organization of the educational process, aimed at solving educational problems by students on the basis of independent analysis of information. For example, when studying the topic: "Physiology of memory, sleep, emotions, speech"

Lesson structure:

- preparation;
- direct development of the project "Physiology of memory, sleep, emotions, speech";
- registration of results;
- presentation on the topic: "Physiology of memory, sleep, emotions, speech";
- reflection:

Third feature. It should be noted that another feature of teaching "Human Anatomy and Physiology" is the wide possibility of using teaching aids. Learning aids can be classified as follows



In teaching Human Anatomy and Physiology, the above teaching aids are used. For example: when conducting lectures, it is advisable to use presentations, adding materials in the form of diagrams, drawings, photographs, video clips in a lecture allows the teacher to cover more information in a short time. For example: Presentation on the topic: Studying the Anatomy and Physiology of the Heart. It must also be remembered that verbal teaching aids such as study guides and anatomical atlases form the core of the Human Anatomy and Physiology course.

Educational and visual aids, such as natural, visual, posters, dummies can be used in laboratory classes, for example, when conducting the topic "Digestive system" to control students' knowledge, you can use a model of a person with his digestive system, students will show the organs of the digestive system with a pointer. Technical teaching aids, such as a computer, a projector, can be used when students demonstrate the project "Physiology of Memory, Sleep, Emotions, Speech" prepared in the form of independent work. Multimedia teaching aids can significantly increase the visibility of lectures, laboratory and practical classes.

Fourth feature. I want to emphasize that Anatomy is both a science and an art. Anatomy as an art is the teacher's pedagogical skill. Pedagogical excellence is a special state. Pedagogical skill is a high level of pedagogical activity, it is the possession of pedagogical technique, the personality of the teacher, his experience. The main life purpose of a teacher is to become a master of his craft. Pedagogical skill is impossible not to be associated with the professional competence of the teacher. It is competence and skill that can improve the quality of education, which is required from the teacher of the discipline "Human Anatomy and Physiology". However, despite the widespread use of multimedia tools in practice, one of the main reasons hindering the process of informatization of education is the lack of personnel who own new technologies and are able to include them in their professional activities. Of course, the teacher must possess certain qualities, such as:

- striving for the development and formation of personal creative qualities;
- be able to find, evaluate, select information;

– be able to choose and use multimedia teaching aids (websites, presentations, electronic textbooks);

IV. CONCLUSION AND METHODOLOGICAL RECOMMENDATIONS

The conclusion is that today the actual issue in higher educational institutions is the problem of improving the quality of the educational process. As we can see, according to the above proposals, all conditions have been created to improve the educational process of teaching the course "Human Anatomy and Physiology" in optimal conditions. The article examined four features, in particular, the differences in conducting classes in different directions, such as "Methods of teaching biology" and "Defectology", the use of innovative technologies and teaching aids in order to improve the quality of classes conducted by the teacher, analyzed the approach of anatomy as a science, as well as to art.

"Human Anatomy and Physiology" is a subject that can interest every student. Features of teaching "Human Anatomy and Physiology" in modern conditions are due, first of all, to the high requirements for the level of anatomical knowledge of future teachers of biologists, as the foundation of professional and ideological training. One question remains, the professional competence of the teacher, in particular multimedia competence, which depends on the teacher, the more he works on himself, the better the quality of the classes he will conduct.

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