# THE ROLE OF INNOVATIVE EDUCATIONAL TECHNOLOGIES IN TEACHING BIOCHEMISTRY

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According to the level of generalization of the biochemical and methodical content mastered by the students, four stages of their methodical preparation were distinguished during the study of the biochemistry course:

- entry stage;
- initial stage;
- main stage;
- final stage

In the study of biochemistry, it was considered important to understand and independently determine important aspects for students, since the specific features of methodological preparation of students are directly related to the features of biochemical content. Among the characteristics typical for the teaching methodology of biochemical material at school, the following were included:

1. Generalizing nature of biochemical content in relation to the content of chemical and biological sciences.

2. The interdisciplinary nature of biochemical content, which means that biochemical material serves as a kind of bridge connecting the sciences of chemistry and biology.

3. Complexity of biochemical material for students' mastery.

The teacher faces the problem of explaining the objectively complex material to the students in an understandable form.

The biochemical content of the introductory stage consisted of students "inventing" the most general concept of biochemistry, "cell", with the help of the teacher. This concept reflects the main problem of biochemistry of a new quality - the integration, interaction, and mechanism of chemical components of biological systems that lead to the emergence of life.

At the introductory stage of studying biochemistry, students got acquainted with the specific features of research-biochemical methods as chemical methods of studying biological objects. The introductory stage is the stage of familiarization with biochemical content, so the independent work of students at this stage is difficult. Problem lectures on biochemistry were chosen as the most suitable form of teaching. Methodological preparation of students is the initial stage in the process of studying biochemistry. Methodical training of students

the main goal of the initial stage is to acquire the skills of didactic analysis and processing of biochemical content. These skills are adaptation of the educational material of the higher education course to the level of preparation and development of high school students.

The initial level of methodological training coincided with the initial stage of mastering the biochemical content of the course by the students. At the end of the initial stage of methodological training, students should know how to:

• analysis, selection and structuring of educational material on a given topic;

• identifying and expressing the pedagogical goals and objectives of learning a specific subject;

• identifying and expressing educational problems reflected in the content of the subject;

• modeling of problematic situations in which students face a given problem;

• independent solving of the problems and methodical analysis of the solution.

As a result of the work, a system of goals, tasks and learning problems, a card file of problematic tasks (questions, assignments), biochemical experiments, abstracts of problematic stories were created for each studied topic. In the process of solving methodical tasks, students simultaneously mastered algorithms for solving educational tasks in biochemistry.

The performance of individual assignments by students is carried out in the form of team work, which involves playing the roles of teacher and students, together with conducting pedagogical games.

Modern information technologies allow a teacher without programming skills to create very interesting multimedia simulators and educational interactive videos, test students and receive feedback to determine the most difficult topics of the course from the students' point of view. In addition, it is important to emphasize the importance of interactivity, the ability of cloud technologies to provide tools for organizing group and collective activities.

Video hosting was used to host lectures and practical exercises on the topics "Protein Metabolism", "Carbohydrate Metabolism", "Enzymes and their importance in laboratory diagnostics". This system increases visibility and increases students' interest in learning, in addition to encouraging them to make videos of themselves for laboratory work that can be considered as a report of academic progress. Video hosting has a set of tools that allow you to get notes and comments directly on the video.

There are different opinions about multimedia support for teaching subjects that require the representation of chemical formulas and complex transformation schemes. Proponents of purely traditional forms of teaching believe that if the teacher consistently describes the formulas on the board with chalk, the student will be able to master the logic of the presentation of the material, the reinforcement of which includes further work with literature.

Creating mind maps by students in a biochemistry course increases the level of understanding of such a complex topic as "Protein Metabolism". This topic includes several sections: "Protein digestion","Exchange of amino acids by carboxyl group, amino acids and radicals", "Determination of acidity of stomach, activity of

aminotransferases in blood serum". Unification, systematization and classification of the didactic material on the specified topics according to its characteristic or feature allows to create a visual diagram-map.

This classification covers both the theoretical material of the department and the material directly related to the future practical activities of the graduate students. Knowledge of amino acid and protein metabolism is used in various fields of biochemistry, as well as in the study of "Pathophysiology", "Pharmacology", "Therapy" and other sciences.

Thus, the determination of protein in blood and urine is required to diagnose diseases of the liver, gastrointestinal tract, kidneys and other organs and systems. Knowing the composition of gastric juice, the mechanisms of its release, determining the level of acidity is necessary for the diagnosis of various diseases of the stomach. Measurement of aminotransferase activity is of great importance for the diagnosis of liver pathologies and myocardial infarction.

This method, in our opinion, is suitable for studying material of any complexity. An image in the form of a mental map helps to activate mental activity, because it implements the processes of information perception through visualization - different line thickness and color of branches, different symbols; as well as well-chosen keywords.

The technique of creating mind maps helps not only to organize information, but also to better understand, remember and connect it. Students engage in productive activities, and group work develops their ability and willingness to cooperate, resolve conflicts, and be patient. In order to develop some important concepts of "Biochemistry" by students, we suggest using the digital resources of the didactic game, in addition to the technique of developing mind maps.

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