APPLICATION OF EDUCATIONAL METHODS IN TEACHING BIOLOGICAL SCIENCES

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Abstract. *This article describes the integration of biology and pedagogical sciences, the concept of method, teaching methods used in teaching biological disciplines, oral, demonstrative, and practical types.*

Keywords: *methods, integration, lecture, conversation, demonstration methods, working with books, practical methods.*

INTRODUCTION

Method (from the Greek methodos - "study", "study") - a set of ways, methods, techniques and procedures used to achieve a specific goal, study phenomena or solve a problem. It is a systematic means of applying theoretical knowledge to practice, collecting and analyzing facts. Along with determining the scope of the content of the subject and selecting materials for the lesson, the selection of teaching methods is also of great importance in school education. The word method in a general sense is a way to achieve a specific goal, an activity regulated in a certain way. The teaching method is the way in which the teacher imparts knowledge and at the same time the way in which it is acquired by the students. This definition of the method represents its two interrelated sides: the knowledge-giving, influencing-teacher and the receiving! assimilating students. The nature of this interaction depends on the source of knowledge.

LITERATURE REVIEW

The issue of effective biology teaching is one of the important scientific directions in the field of pedagogy and methodology. In the modern education system, the use of various pedagogical methods in teaching biology is of great importance in deepening students' knowledge, developing their scientific thinking, and forming practical skills. In pedagogy, teaching methods are considered one of the main factors that increase the effectiveness of the educational process. Scientists I.Ya.Lerner and M.N.Skatkin interpreted teaching methods as methods of organizing students' cognitive activity and divided them into such types as explanatory, problem-based learning, research method, and heuristic method. In their opinion, it is necessary to widely use problem-based learning and research methods to develop students' independent thinking.

The effectiveness of educational methods is also widely covered in scientific works on the methodology of teaching biology. In particular, V.V.Pasechnik emphasizes the importance of forming a scientific worldview in students through observation, experiments, laboratory work and practical exercises in biology lessons. It is also noted that experimental and practical methods occupy a key place due to the direct connection of biology with nature. Local scientists have also conducted a number of studies on biology teaching methodologies. They have scientifically substantiated that the use of innovative methods such as interactive methods, project-based learning, problem-based learning, clustering, brainstorming, and concept maps in teaching biology increases students' cognitive activity.

Modern pedagogical technologies, information and communication technologies are also important tools in improving the methodology of teaching biology. The use of multimedia presentations, virtual laboratories and interactive platforms allows for more interesting and effective organization of biology lessons.

RESEARCH METHODOLOGY

This study aimed to study the effectiveness of the use of educational methods in teaching biology, and used a comprehensive approach to theoretical and empirical methods of pedagogical research. The methodological basis of the research is the competency-based approach, the systematic approach, and the concept of activity-oriented education. Modern pedagogical technologies and innovative teaching methods also form the theoretical basis of the research.

ANALYSES AND RESULTS

Teaching methods are literally the way a teacher conveys knowledge to students and at the same time ensures that students absorb it. Oral, demonstration, and practical methods are widely used in teaching biology in secondary schools.

A group of oral presentation methods of teaching. The oral method includes the following: story, explanation, Oral methods have always been used in the teaching process. There were periods when these methods prevailed among the methods. Currently, oral methods prevail in the traditional education system. In recent years, it has become customary to criticize oral methods and include them in methods that do not actively influence student activity. An objective approach is necessary when assessing methods; its importance cannot be absolutized, exaggerated, and its reduction cannot be allowed.

In the process of teaching, the teacher's word is the main source of knowledge for students, that is, the teacher gives students knowledge through words, directs the students' activity to listen, think, and find answers to the questions posed. Therefore, the teacher's word should not be simple information, but reliable, substantiating, and have the power of activating the students' activity. The teacher's vivid, emotional, evidence-based, logically structured, demonstrative stories, conversations, and lectures have not lost their value even now.

Oral methods allow students to convey a large amount of educational material to their minds in a short time, create problem situations, show ways to solve them, and develop students' speech. Also, many methods are used in combination with oral methods in the teaching process. The successful use of oral methods requires that the teacher:

• mastery of speech culture, including fluency of speech, voice power, intonation, imagery of information, reliability, substantiation, proof, emotional, and personal attitude;

• in electronic textbooks created on the basis of information technologies, it depends on the level of harmony of sound, animation, and movements. The group of oral presentation methods includes conversation, story, and lecture methods.

The story method involves presenting the educational material to students in a holistic manner, asking questions and explaining it without interruption. The story method is used when there is a lot of new concepts and scientific information in the content of a new topic, as well as when the teacher is unable to conduct an active discussion on the educational material, when it is necessary to explain and explain, when the volume of educational material is large and it is necessary to study it at the time specified in the program. The didactic purpose of the story method varies depending on the stage of the lesson at which the story method is used.

The narrative method used in the introductory part of the lesson is considered to prepare students to perceive the content of a new topic. In this process, the narrative method is aimed at creating a need for students to master a new topic, arousing sustained interest, and ensuring an understanding of the purpose of the educational tasks to be completed during the lesson.

The narrative method used in the process of studying a new topic develops the content of the new topic in a logical sequence and consistency, emphasizing key concepts and terms and explaining them using visual aids and convincing examples. In the narrative method used at the end of the lesson, the teacher summarizes the main ideas on the content of the topic studied,

concludes, draws conclusions, and recommends independent work assignments to students. The narrative method, which is used to monitor and assess students' knowledge, requires students to tell stories about specific topics.

Students' stories pave the way for the development of their scientific worldview, speech and communication culture. In this way, students acquire the skills to isolate the main idea in the content of a new topic, to justify and prove their opinion, to present it briefly and concisely, in a logical sequence. The effectiveness of the use of the storytelling method requires the teacher to carefully prepare a lesson plan, choose the most consistent way to cover the content of the topic, collect visual aids, handouts and didactic materials, and ensure the appropriate level of excitement of the presentation. The storytelling method includes the following methodological techniques: vivid presentation of educational material, description of the characteristics of objects, scientificity, consistency, clarity of information, fluency and expressiveness of speech.

The conversation method involves the teacher working with well-thought-out questions that ensure the active assimilation of the laws, concepts and terms in the content of the new topic by students. With the help of the conversation method, the previously acquired knowledge and skills of students are activated, systematized, generalized. A conclusion is drawn and their relationship with the newly studied concept is clarified.

It should be noted that it is recommended to study topics that allow students to master a new topic using questions based on their previously acquired knowledge. The conversation method aims to facilitate the process of students' mastering theoretical knowledge. It aims to prepare the ground for students to master new knowledge using a series of questions, using their previously acquired knowledge and skills, and life experience, and to understand how to apply this knowledge in practice. The conversation method helps students not only master theoretical knowledge, but also expand their scientific worldview, develop their speech, and develop their skills in comparison, analysis, and logical thinking.

The effectiveness of the conversation method depends on the teacher's ability to divide the subject matter into logically complete parts, create a chain of questions for each part, use these questions appropriately throughout the lesson, activate the cognitive activity of the class and direct them to find answers to the questions, motivate each student, and the degree to which the students have mastered the skills of concisely and briefly expressing their opinions and reasoning. This method includes methods of asking interview questions in sequence, asking auxiliary and additional questions at the right time, activating students, correcting errors in students' answers, and summarizing and summarizing.

The explanation method is a clear and concise presentation of educational material based on clear facts, analysis of facts and evidence, with conclusions drawn, and differs from a narrative. Giving short, clear instructions for performing practical work was also considered an explanation.

The lecture method is used when the educational material is large, has a complex logical structure, and is rich in concepts and terms. When using the lecture method, the following requirements should be considered:

1. The content of the lecture should be presented in a deep scientific, ideological and logical sequence based on demonstration tools.

2. Coverage in understandable, emotional, and simple language for readers.

3. Taking into account the age and mental state of the students, a short independent work or question-and-answer session should be held after 15-20 minutes, and the students' cognitive activity should be continued after the activation.

At the end of the lecture, the teacher repeats the conclusions aimed at deepening and generalizing the students' knowledge. Then, the students' answers to the educational tasks are

checked and the completion of the table is reviewed. A question-and-answer session and an educational discussion are held. The teacher's lecture can be structured inductively or deductively, depending on the content and the organization of the students' activities. When the lecture is structured inductively, students are first introduced to phenomena and objects, and then a general conclusion is drawn. In a deductive lecture, the opposite is true, that is, general concepts are first given, and then its content is revealed using objects and phenomena. This method includes presenting educational material in a logical sequence, posing problems, identifying objects, comparing, drawing conclusions, generalizing, and attracting students' attention.

Group of visual methods. The use of visual methods in the teaching process allows for the sensory perception of objects and phenomena, their comparison, identification of specific features, generalization, synthesis, and conclusion based on the content of the educational material. Demonstrative methods are used in the teaching process in combination with verbal. practical. logical. problem-based methods. For example, students are given assignments on the basis of demonstrations orally by the teacher. In the process of completing assignments, demonstrativeness is combined with practical methods, and in solving problem situations that arise in the lesson, it is combined with problem-based methods. The appropriate and effective use of demonstration methods in the teaching process has the following advantages:

• develop visual and figurative thinking in students, activate students' cognitive activity, and master the methods of mental activity;

• clarifying the theoretical issues being studied, modeling phenomena and processes that cannot be directly observed in class;

• allows observing biological objects, conducting experiments on them, applying the theoretical knowledge gained in practice, clarifying and classifying the studied phenomena on the basis of diagrams and tables. The following are among the visual aids used in teaching biology:

• natural and living objects - herbariums, collections, micro and wet preparations, houseplants, animals kept in a living nature corner, etc.;

• specially prepared visual aids that reflect real objects - tables, diagrams, pictures, models, mannequins, etc.;

• conventional and symbolic means of visualization - maps of biogeographic regions, globes;

• technical means of teaching - educational film, film slides, slides, videos, etc.

• multimedia teaching aids - educational computer programs, electronic versions and textbooks, multimedia incorporating sound, animation, dynamic movement and three-dimensional images, etc.

Visual methods include natural and living objects, visual exhibitions, screen tools, computer visual programs, and multimedia demonstration methods, and in particular, the following visual aids are used: illustration, demonstration, educational films, video films, computer educational and modeling programs, electronic textbooks, multimedia demonstration, the exhibition meeting taste and aesthetic requirements, highlighting the content of the lesson, and methods of organizing student activities in sequence.

Group of practical methods. It allows students to apply their acquired theoretical knowledge in practice, to form their skills and qualifications, to develop their creative abilities, to prepare for life, and to direct them to a profession. This method is used in the teaching process in combination with demonstration, problem, and verbal methods. Practical work performed by students serves as a source of knowledge. For this, the teacher must determine the purpose of practical work, select the necessary visual aids to achieve the goal, and clearly formulate

educational tasks. Educational tasks given for practical work must be clear in content, concise, understandable, and goal-oriented.

This group of methods includes methods such as recognizing and identifying natural objects, observing, organizing and conducting biological experiments, caring for plants and raising animals, and they consist of methods such as recognizing and identifying objects, observing and conducting experiments, explaining the progress of practical work to students, drawing up a plan for carrying out practical work, monitoring the implementation of practical work tasks, analyzing the results of completing tasks, self-control, completing and formalizing practical work, observing and experiments.

The method of recognizing and identifying natural objects has a leading position in teaching biology, because in botany lessons, plant organs, plant species, genera, families, and classes are determined. For this, the teacher must have prepared sufficient handouts and didactic materials, herbariums, and collections and use them effectively in his/her place. In zoology classes, in addition to learning about animal organs and their functions, they also determine which type, class, order, and family animals belong to. The effectiveness of this method requires the availability of didactic and handout materials such as wet preparations, models, costumes, and complexes made from animals and their organs that reflect the diversity of the animal world. This method is widely used not only in biology lessons, but also in extracurricular activities, extracurricular activities, and excursions.

The observation method is a purposeful perception by students of the processes occurring in living organisms and phenomena occurring in natural objects. In this method, the data collected by students through their observations are considered a source of knowledge. The observation method is used in all forms of biology teaching. When the observation method is used in the lesson, students independently observe the exhibits related to the content of the lesson, as a result of which they obtain evidence proving the specific characteristics of the objects of observation. Such observation is short-term and serves to achieve a specific goal. Observations such as spring and autumn seasonal changes in plant life, observation of the life of migrating birds, and study of the development of insects are considered long-term continuous observations.

The method of conducting biological experiments - includes the recognition and identification of biological objects, observations, but differs from them in content. Conducting biological experiments allows students to understand the essence of the process or phenomenon being studied, to understand the cause-and-effect relationships between them, and to "rediscover" biological laws.

Summarizing the results of the experiment, drawing conclusions, and formalizing them develops research skills in students. Biological experiments can be conducted in the classroom, in extracurricular activities, in a living nature corner, and on an educational experimental site. Biological experiments can also be short-term and long-term, depending on their duration. Experiments on "Determination of the composition of seeds", "Plasmolysis and deplasmolysis in plant cells", "The effect of amylase on starch" are short-term, while experiments on "Necessary conditions for seed germination", "Seed respiration", "Water evaporation from leaves". "Starch formation in leaves", "The role of earthworms in soil formation", "Study of the laws of inheritance of traits in plants" are long-term experiments.

The effectiveness of this method depends on the teacher organizing the experiments in a specific system, determining the topics and goals of the experiment, preparing clear instructions and learning tasks for each experiment, providing students with experimental objects, necessary tools and equipment, organizing, managing and controlling the activities of students conducting the experiment, and using the results obtained in the lesson.

CONCLUSION

In conclusion, it can be said that practical methods in teaching Biology are widely used in plant care, animal husbandry and breeding. This method, incorporating students' acquired knowledge in biology, observation and physical labor skills, plays an important role in teaching students the basics of agricultural work and directing them to the profession, as well as providing ecological and economic education.

In biology teaching, the topics of practical work on plant care and animal husbandry vary depending on local economic conditions and the specialization of agricultural institutions. Depending on the purpose and content of the practical work, the biology teacher must carefully plan it, fully explain the content of the work to be carried out, and give students clear instructions on how to formalize the results obtained.

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