



Methodology of using developing educational technology in teaching zoology

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Abstract: This article highlights the theory and practice of using interactive methods to activate the cognitive activity of students, increase the effectiveness of teaching in the process of teaching the subject biology.

Keywords: Learning system, learning efficiency, interactive method, cognitive activity, biological scientific worldview, amphibians, reptiles, transcription, translation, reduplication.

Introduction: Globally, special attention is paid to the professional and methodological self-improvement of future teachers, the formation of knowledge, skills, qualifications and competencies based on innovative approaches, the development of professional skills, and the application of interactive technologies in the process of their future pedagogical activity. In particular, in order to develop the innovative activity of students, large-scale reforms are being carried out to develop the ability to think creatively, to work independently on themselves, to receive independent education, and to analyze themselves independently.

In this regard, fundamental reforms have also been initiated in our country's education system. In particular, paragraph 2 d) of the Resolution of the President of the Republic of Uzbekistan No. PQ-289 dated June 21, 2022 sets the task of "introducing methodologies aimed at developing students' independent learning, systematic analysis and creative thinking skills into the educational process of higher educational institutions that train pedagogical personnel by September 1, 2024."

In order to achieve the above objectives in the educational process, the implementation of developmental educational technology directly into the

educational process is one of the important factors. The main idea of this technology is the formation and development of learners as competitive personnel.

The main features of developmental educational technology are as follows:

- forms and develops the thinking mechanism as a result of turning learners into subjects of their own cognitive activity;
- the cognitive activity of the requirements involves the study of knowledge in the process of learning from general to specific knowledge by organizing empirical and theoretical knowledge in a holistic manner;
- the basis of the learning process is the independent activity of learners that occurs through the completion of educational tasks on the subject;
- serves as the basis for the intellectual development of learners, preparing the ground for the formation of critical and creative thinking in this process.

Developmental educational technology creates an opportunity to form critical, analytical, coherent, independent, logical, systematic, creative (creative) thinking skills of learners in the educational process, to conduct educational discussions and debates based on the content of the subject.

Thought is a spiritual and human quality that reflects a person's conscious activity, his own strength, potential, power and knowledge. Thought is the basis of human cognitive activity. Since the development of

thought is an important driving factor of social, economic, political development, the development of students' critical, analytical, logical, independent creative (creative) thinking skills is of great importance in the educational process.

Critical thinking forms the learner's attitude and objective opinion about events and phenomena occurring in nature. Critical thinking is interpreted as a separate type of thinking and is considered a primary type of thinking in the process of forming general conclusions by analyzing facts.

Through analytical thinking, students form general conclusions by analyzing the information being mastered, selecting the facts they need, and comparing the specific aspects of the selected information. The types of critical and analytical thinking always complement and require each other. In the process of forming analytical thinking skills in students, professors and teachers should create tasks that allow them to identify the connections between previously studied objects and the object being studied in each lesson in zoology and use them effectively in their pedagogical activities. In particular, in the process of studying the topic "Representatives of the Mammalian Class - the Internal Structure of a Rabbit or Dog", it is recommended to divide students into several small groups and, along with the learning tasks related to the topic, to fill out the following table:

Body systems	Pond frog	Fast lizard	Blue dove	Rabbit or dog
Muscular and body cavities				
Digestive system				
Circulatory system				
Respiratory system				
Excretory system				
Nervous system				
Sensory system				
Reproductive system				

Students analyze the educational information presented in the textbook in the process of mastering it, select information about organ systems, compare the information being mastered with previous objects, and draw a general conclusion.

So, analyzing the internal structure of a rabbit or dog, they study it by comparing it with the previously studied frog, swift lizard, blue pigeon. The study of this type of educational material during the lesson prepares the ground for the formation and development of analytical thinking skills in students.

Associative thinking makes it possible to identify the

mechanisms of connections between previously mastered knowledge and factual materials, to find new features and qualities of objects and phenomena familiar to them that have not been studied before. Connective thinking is the basis for students to acquire new knowledge and skills by applying previously acquired knowledge, skills and competencies in unexpected, new (unusual) situations.

The student recommends that in order to activate the knowledge previously learned in zoology when studying the topic "Ecology, origin and conservation measures of the class of mammals", students complete the following

table along with the learning tasks.

their structure.

I - task. Compare the structure of reptiles, birds and mammals. Identify the similarities and differences in

Comparable aspects	Amphibians	Amphibians	Birds	Mammals
Ecology				
Origin				
Distribution				
Conservation measures				

Task II. Determine which of these classes dominates the animal kingdom. Justify your opinion.

birds and mammals. Identify the similarities and differences between them.

Task III. Compare the structure of amphibians, reptiles,

Comparable aspects	Amphibians	Amphibians	Birds	Mammals
Body Cover Digestion Circulation Heart Structure Respiratory Organs Excretory Organs Nervous System Structure				

IV-Task. Determine why representatives of the bird class dominate the animal kingdom. Prove your opinion with evidence.

After the students complete the tasks listed above, the teacher provides information about the main directions of biological progress and recommends that students give examples. After that, students use the table they filled out during the lesson to determine the aramorphoses in birds and mammals. In this way, students' communicative thinking skills are formed and developed. It is advisable for the teacher to use this type of tasks continuously during the lesson. Because communicative thinking skills are not formed in students in one or two lessons.

In zoology lessons, it is advisable to widely use tasks that create a basis for students' independent thinking. In the process of forming independent thinking, the student generates ideas, new ideas, scientific

hypotheses, goals, etc., and they are developed in the individual's mind as concepts, judgments, and conclusions. Independent thinking is formed in close connection with the first and second signal systems. On the basis of independent thinking, problem situations are analyzed, new hypotheses are put forward, new knowledge, skills and competencies are acquired by applying previously acquired knowledge, skills and competencies in new situations, and an opportunity is created to prove one's opinion. Independent thinking is of great importance in human life. Therefore, it is important to attach importance to the development of independent thinking skills in students in all forms of teaching zoology (lessons, extracurricular and extracurricular activities, and excursions). Independent thinking in students is carried out at the following stages.

№	Independent thinking is carried out in the following stages:
1.	Analyzing problematic situations on the topic
2.	Proposing hypotheses about the problematic situation
3.	Applying previously acquired knowledge, skills, and competencies to new situations and acquiring new knowledge, skills, and competencies
4.	Proofing one's own opinion about the problematic situation
5.	Checking the correctness of one's answer

To develop independent thinking in students, the teacher should create problem situations in the study

of each topic and direct students' cognitive activity to solving problem situations.

For example, when studying the topic "Reproduction and development of the class of mammals", a problem situation should be created, allowing students to apply the knowledge they have acquired in studying the species of the class of birds in new unexpected situations. In particular, students are recommended to complete the following educational tasks.

Didactic purpose of the task:

To study the specific features of the class of birds in reproduction, the importance of wild and domesticated representatives of birds.

№	Learning tasks on the material that students must master	Instructions for completing the assignment
	Read the text in the textbook carefully, find answers to the following questions and complete the tasks qualitatively:	Work together with a group of students.
1.	Identify the distinctive features of the representatives of the class of birds.	
2.	Determine which orders belong to the class of birds.	
3.	Determine the distinctive features of the order of sparrows.	
4.	Study the structure of the representatives of the order of sparrows.	
5.	Compare the reproduction of a house sparrow and a dog. Identify similarities and differences.	
6.	Compare the reproduction of a house sparrow and a dog and fill in the table below.	Actively participate in Q&A sessions with students.

Comparable Aspects	House sparrow	Dog
Body Structure and Cover		
Sensory Organs		
Reproduction		
Distribution		
Importance		

Independent thinking and logical thinking are inextricably linked. The development of logical thinking skills consists of the following stages: initially understanding the problem situation; identifying ways to solve the identified problem; logically justifying the solution, taking into account the internal and external logic of solving the problem; determining the logical sequence of methods for solving the problem; proving the correctness of one's own answers; checking the correctness of the answer. Logical thinking is a set of concepts that mean that a person, through vision, hearing and other analyzers, contemplates existence, reality or impressions in a way that is understandable to others.

Systematic thinking is based on the development of students' skills in dividing the object being studied into

parts, determining its integrity, interdependence and describing it.

In order to develop systematic thinking in students, the teacher should organize independent work of students on topics that need to be studied within the framework of the program and create appropriate educational tasks. In particular, on the topic "General description of representatives of the class of mammals", it is appropriate to recommend the following educational tasks to students on the structure of the brain of mammals.

Didactic purpose of the task: by studying the structure of the brain of mammals, to determine the connections between them in controlling the organism,

Bosh miya qismlari	Tuzilishi	Funksiyasi

Thus, critical thinking embodies analytical, connected, independent, logical, systematic thinking, and there are internal and external, specific and relative connections between them.

In developing creative (creative) thinking skills in students, the teacher can use the above-mentioned components of analytical thinking, in particular, independent thinking skills. The teacher must always remember that without developing critical thinking, analytical, connected, independent, logical, systematic thinking skills in students, creative thinking skills cannot be formed and developed. Because creative thinking is formed on the basis of the above thinking.

Creative thinking skills form the basis of creative activity experiences. When acquiring creative activity experiences, students master the methods of mental activity - analysis, comparison, decomposition, synthesis, visualization of cause-and-effect relationships, generalization and conclusion of the studied object - after which the features that form the basis of creative activity emerge, in particular: finding new, unexplored properties and functions of familiar objects; independently solving problems in familiar situations; solving problems by applying knowledge and skills in new, unexpected, unusual situations; can learn to creatively apply the acquired knowledge and skills in their pedagogical practice.

Our research shows that the effective use of interactive methods in didactic and methodological literature, in the process of organizing educational discussions and debates, is of great practical importance. The formation of subject-subject relations in the process of learning, based on the study of new educational material being studied, the recommendation of various options for solving the identified problem, the contribution to the success of the group, the exchange of ideas, information and experience between them pave the way for their participation. Since this cooperation takes place in a friendly, comfortable socio-pedagogical, psychological, mutual assistance environment, students not only acquire new knowledge, but also develop their cognitive activities, raise it to a higher level and allow them to enter into cooperation.

Based on the above ideas and considerations, any educational discussions are organized on the basis of creative research. It is advisable to organize creative research in the following stages: clarifying the purpose of creative research; correctly organizing independent work in accordance with the purpose of creative research; exchange of ideas and information between group members; visualize and project the results obtained; analyze the achievement of the goal and the

result obtained; if necessary, make appropriate changes based on the problem situation.

CONCLUSION

In conclusion, a future biology teacher should organize his pedagogical activity on the basis of pedagogical technologies used to change the nature and course of the pedagogical process, thoroughly master the specific features of these technologies, and determine in advance the ways of using them in organizing and managing students' cognitive activities. Young teachers in most cases do not pay serious attention to the pedagogical technologies used to change the nature and course of the pedagogical process, and therefore, do not organize the educational process correctly and achieve low efficiency in achieving the intended results in the pedagogical process. The main reason for this is that teachers do not pay attention to the pedagogical technologies used to change the nature and course of the pedagogical process.

Therefore, it is important for professors and students to form and develop critical, analytical, coherent, independent, logical, systematic, and creative thinking skills in students, as well as to thoroughly master the pedagogical, psychological, and methodological aspects of conducting educational discussions and debates on the topic being studied, when teaching not only mammals but also the entire subject of zoology.

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