

INNOVATIVE TECHNOLOGIES FOR SOLVING BIOLOGICAL PROBLEMS AND EXERCISES BASED ON A CREATIVE APPROACH

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Abstract

Today, the introduction of a modern education system based on creativity is one of the main tasks. This task can be solved only by the targeted implementation of creative educational methods, allowing each participant in the pedagogical process to explain, create and effectively use new knowledge. This article highlights innovative technologies based on the development of creative activity while increasing the biological literacy of secondary school students. Pedagogical psychological aspects of the development of creative activity of students, the exploration of contextual, didactic, constructive factors, the development of methods for predicting the level of development of their creative potential by means of interactive educational technologies and methods are considered the most important scientific, theoretical and practical issues.

Keywords: Creativity Research, Contextual, Didactic, Constructive Factors, Interactive Educational Technologies, Tools and Exercises, Motivational, Integrative Approach, Logical, Creative, Independent Thinking.

Innovative development in the world is the formation of creative activity of students. This includes the creation of new experiences, the ability to find solutions to complex processes, a creative approach to professional activities, the ability to take reasonable risks and professional excellence. On a global scale, the creation of intellectual resources for socio-economic development through the development of creative potential, acmeological competence and creativity of teaching staff is becoming increasingly important¹.

The European Community, with education as a primary factor, addressed the challenges of running a dynamic economy and knowledge-based competitiveness in the world at pan-European summits held in Lisbon, Barcelona and other countries. At the end of the summit, it was confirmed that a successful transition to a knowledge-based economy and society must be carried out through a continuous educational process, in which the main focus should be on adult education².

Research shows that the social and economic needs of society depend on creative thinking and high demands on the creativity of a university teacher, which is implemented with the help of innovative educational technologies in the system of training and retraining of teaching staff [2].

In the decisions and decrees of the President of the Republic of Uzbekistan in recent years, much attention has been paid to the development of intellectual and creative activity of youth, as well as to solving such problems as expanding the base of methodological support for the development of the main qualities and abilities of the mature generation, enriching the content

of new educational literature. To ensure the fulfillment of these tasks, it is necessary to actively systematize training at all levels of education, to create guidelines for the creative and motivational approach of teachers to their professional teaching activities. Because the motivational activity of the teacher is a factor that develops the creative activity of students in the process of improving the quality and effectiveness of the lesson. Therefore, let us analyze the concepts considered from the point of view of creativity and its pedagogical activity.

From the analysis of books it is known that questions of the formation and development of creativity were raised by representatives of various fields - poets, scientists, artists, writers. Views on creativity have been studied as a major theme among philosophers from the distant past to the present day. In the encyclopedia dictionary, creativity (Latin *creo* – to create, to create) is defined as the ability to make creative changes aimed at finding solutions to given processes and problems [1]. In the student's educational activities, most attention is paid to creativity, such as high memory, imagination, comparative, logical thinking, and a developed intuitive sense.

The development of creative activity of students has social and pedagogical significance, while it is necessary to develop such personal qualities as revealing their ability to acquire knowledge and ensuring a high level of assimilation of the concepts given in the curriculum, the ability to apply biological knowledge in their activities. It is important to systematize the methods of assimilation content of related skills. One of the main problems of teaching biology in secondary schools is the issue of developing knowledge, skills and competencies in students, which are the main components of the content of education. Biological knowledge consists of scientifically defined concepts about important features and properties of existing things and events, processes and connections between them [3].

The formation and development of biological concepts is considered the driving force of biological education and training, the main unit of content of educational material. Scientist-teacher J. O. Tolipova highlighted the possibilities of forming students' concepts at the following stages: receiving educational material through the senses; perception; imagine; keep in mind; practical use; check the results; consists of summarizing information and drawing conclusions [6].

Following the stages of concept formation by the teacher enables students to accept and understand the concepts [3]. Therefore, the teacher should define concepts in the content of each academic subject and focus on the formation of concepts in students when working on topics, tasks and exercises that are complex in content. Skills in solving biological problems and exercises are gradually developed and improved on the basis of creative activity. As is known, tasks and exercises related to genetics are perceived by students at a complex level. However, there are tasks and exercises not only related to genetics, but also tasks and exercises based on the development of general biological concepts that encourage students to be logical, independent, analytical and creatively active in the subject.

In the course of our research work, the scientific significance of tasks and exercises in biology was determined as follows:

- Consolidate students' theoretical and practical knowledge in biology by topic, through specific systematization and generalization of tasks and exercises;
- Development of logical, analytical, comparative, independent and creative thinking skills of students through tasks and exercises presented with the help of pictures, tables, problem situations;
- Formation of healthy lifestyle skills in the content of health-saving anatomical, physiological and ecological issues and exercises;
- Development of a healthy family and sexual culture through questions and exercises related to genetics in terms of the content of heredity and variability;
- Tasks and exercises in biology are aimed at developing students' abilities to understand science and apply the knowledge gained from science in their lives based on generalizing the results and formulating conclusions [7].

The teacher must engage students' mental activity with exercises that stimulate logical creativity, creating the basis for them to acquire skills in using logical thinking operations, such as comparing objects, finding similarities and differences, generalizing and drawing conclusions. The tasks and exercises used in biology lessons require students to work independently with the textbook, prepare various didactic materials and programs, self-observation, perform various physiological experiments, comparative tables, diagrams, tasks on logical thinking and calculation, and questions. In the process of solving biological problems and exercises, students can be recommended to use educational technologies in interaction when performing logical operations and forming interactive communicative activities.

R. Slavin, one of the authors of cooperative learning technology, said that it is not enough to instruct students to complete tasks together. It is necessary to create real cooperation between students, rejoice in the success of each student, sincerely help each other, and create a comfortable socio-psychological environment. In this technology, when determining the quality of knowledge assimilation by students, they are compared not with each other, but with the previous results of each student [5]. Only then do students, realizing that the result achieved in the lesson will benefit their team, feel responsible and strive to learn more, master their knowledge, skills and abilities.

In this process, we recommend organizing problems and practicing problem-solving skills using "Let's Learn Together" collaborative learning technology method as follows. Students are divided into small groups of 3-5 children. Each group completes a specific part of the task to be completed in class. As a result of complete completion of group assignments, comprehensive assimilation of educational material is achieved. The main principles of this method are group recognition, individual approach to students, and the creation of equal opportunities to achieve success.

1 - Educational tasks for group

Very dry summers make trees weak and flimsy for cold weather in winter. Explain the connection between these situations.

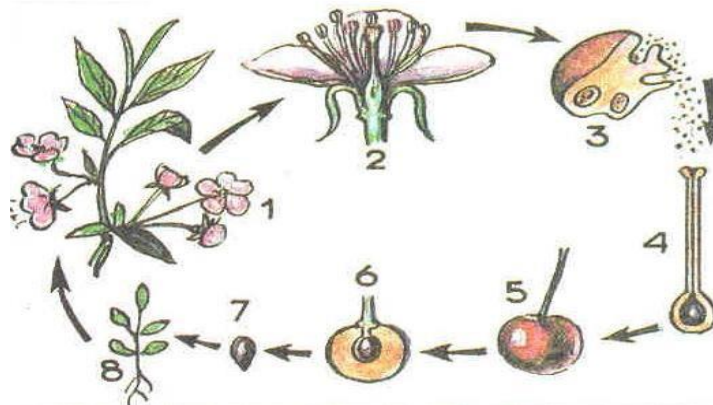
Solution method: Here students understand the role of air humidity in the life of plants, water is an indispensable and indispensable participant in the process of photosynthesis, the use of reserve nutrients by plants synthesized during photosynthesis during hibernation, a logical connection. between these processes they need to be able to draw conclusions and justify their answers.

2 - Training ball for the group

Consider a cross-sectional image of a leaf. Upper epidermis (), leaf pulp cells (), pore tissue cells (), lower epidermis (), upper (leaf aperture) (), veins (), mechanical fibers (), conductive. Determine the numbers in which the tubes are given (). and write them in parentheses.

Problems and exercises of this format teach students to develop skills in working directly with a textbook and to think creatively.

In order to develop the creative activity of students, providing exercises with pictures and tables also gives the expected result. The given graphic and tabular tasks are performed in direct connection with the content of the textbook text. For example, tasks such as considering the reproduction cycle of flowering plants shown in the picture, drawing and commenting on the picture in a notebook, are the basis for guiding the student towards creative activity.



It is recommended to write down the sequence of cycles in a notebook.

1____. 2____. 3____ 4____ 5____ 6____ 7_____

Methods of using joint teaching methods in biology lessons, the differences and advantages of these lessons from traditional lessons, ways of organizing and managing the cognitive activity of students, the development of methodological knowledge, skills and abilities, culture of speech and communication.

In conclusion, it should be said that when teaching biology, the use of a creative approach in developing students' problem-solving skills and exercises helps to improve students' biological

concepts, the formation of educational motives related to science, and their creative thinking. Textbooks and supplements are the basis for independent work on literature.

It is necessary that students be able to return the studied material when developing problems and problem-solving exercises, be able to use it in further study of biological theory, and be able to apply it to solving problems. To memorize new knowledge, it is necessary to use different methods of reception: hearing (speech of the teacher and students), vision: video, multimedia, use of drawings, reading books, writing in notebooks, visual aids, student attentiveness. speech also helps to remember and provides creativity to the student.

Footnote

- 1) The framework promotes ICT competence. UNESCO recommendations. - Hamburg. – 2011. URL: <http://ru.iite.unesco.org/publications/3214694>.
- 2) Conclusions of the Presidency of the European Council. - Lisbon, 23-24 March 2000, pp. 2 – 8.

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