

POSSIBILITIES OF STIMULATING THE STUDENTS' CREATIVITY BY THE STUDY OF BIOLOGY

POSSIBILITĂȚI DE STIMULARE A CREATIVITĂȚII ELEVILOR PRIN STUDIAREA BIOLOGIEI

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Abstract. *Human creativity stands at the base of all the progress made by the humankind during the time, in all fields of knowledge and social life. In school, the creativity potential of students can be positively or negatively influenced, depending on the methods used by the teacher within the lesson. Avoidance of the excessive use of methods centered on stimulation of memory and opting instead for the use of some active-participative and interactive methods within the biology lessons, elaboration of some products (rebuses, materials with interdisciplinary character, etc.) by the independent work in class or at home, as well as the organization of out of school activities aiming at realization of some artistic and literary creations, of some student's exhibitions on various themes, realization of posters, collages, etc., represent possibilities of stimulating the students' creativity by the study of biology in gymnasium and high school. Our paper is aiming at presenting a full range of such possibilities.*

Key words: students' creativity, biology lessons, didactical methods, creations

Rezumat. *Creativitatea umană stă la baza tuturor progreselor realizate de omenire de-a lungul timpului, în toate domeniile cunoașterii și vieții sociale. În școală, potențialul creator al elevilor poate fi influențat pozitiv sau negativ, în funcție de metodele utilizate către profesor în lecție. Evitarea folosirii excesive a metodelor axate pe stimularea memoriei și optarea pentru utilizarea în lecțiile de biologie a unor metode activ-participative și interactive, elaborarea unor produse (rebusuri, materiale cu caracter interdisciplinar, etc.) prin munca independentă în clasă sau acasă, precum și organizarea unor activități extrașcolare ce vizează realizarea unor creații artistice și literare, a unor expoziții ale elevilor pe diferite teme, realizarea unor postere, afișe, colaje, etc. reprezintă posibilități de stimulare a creativității elevilor prin studierea biologiei la gimnaziu și liceu. În articol, se urmărește prezentarea unei game complete de astfel de posibilități.*

Cuvinte cheie: creativitatea elevilor, lecții de biologie, metode didactice, creații

INTRODUCTION

From the psychological perspective, creativity comes into four acceptations: 1) as a product; 2) as a process; 3) as a disponibility, human general potentiality; as a capability and creative ability; 4) as a complex dimension of personality (Zlate M., 2006). Is the ability to produce something new, original, valuable, scientifically efficient and socially-useful, which relies on previous data and solutions. It can

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manifest itself in all stages of age, during the human life and in all fields of knowledge and social life, thus talking about scientific, technical, economical, artistic, organizatory, pedagogical creativity (Bontaş I, 2001). Stimulation, education and exercising the school children creativity should be permanently in the teacher's attention. The teacher must to know the creative potential of each pupil and modalities for its stimulation, to seize the creative manifestations of the school children, to make them aware of their own capabilities and to develop their ability and habit of selfevaluation (Oprea C. L., 2009). Adequate attitude of the teacher towards the behavior specific to creative school children and the help given in order to pass over the different blockages of creativity have an important role in stimulating the school children to be original, inovative, creative.

Education of creativity involves the improvement of some intelectual abilities and features of personality to the school children, such as: 1) perceptive faculty; 2) ability to interpretate, redefine, reformulate; 3) ability to analyse and synthesize; 4) ability to perceive immediate links between the available data, to make associations and correlations; 5) ability to structure and restructure the ideational contents; 6) flexibility and fluidity of thinking; 7) operational psychic structures required to solve the problems into an unprecedented manner; 8) intra- and interdisciplinary conexions; 9) courage to have personal initiative and perseverance in pursuing the proposed aims; 10) epistemic curiosity, intrinsec motivation, interest, passions, attitudes (Albulescu I., 2008).

Taking into consideration the fact that teaching-learning the scientific content specific to different study matters can contribute to the development of school children creativity to a lesser or higher extent, we initiated a research aiming at emphasizing some possibilities for stimulating the school children creativity by the study of biology in gymnasium and high school. When carrying out this research we were aiming at the following objectives: 1) Identification and exemplification of the use of some didactic methods in order to stimulate the school children's creativity within the lessons of biology; 2) Identification of some products which can be created by the school children; 3) Pointing out some modalities of stimulation the school children's creativity within some extracurricular activities.

MATERIAL AND METHOD

For emphasizing the biology teacher's possibility to stimulate the school children creativity, we have analysed the present content of Biology school manuals used in gymnasium and high school, and in the specialty literature, concerning the creativity. Thus, we have identified different possibilities of stimulating creativity of the school children, both with the ocassion of studying some biology themes, and within some extracurricular activities.

RESULTS AND DISCUSSIONS

Within the lessons of biology, the teacher can stimulate the school children creativity with the help of some didactic methods. One of these methods is the method of brainstorming. In applying this method, the issue of new ideas or finding the best

solution for a problem to be solved must be taken into consideration, for instance: How do you explain the present normal chromosome make up?, What consequences does have the mutations affecting the plant, animal and human genome?, How do you explain the great number of insects existing on the Earth?, What experiences can you realize in order to demonstrate the respiration of plants at light and respectively in darkness?, What implications would have cloning on the humans?, What implications have the use of modern technologies on the human life? etc. (Petruța G.P., 2010). This is applied more often in the high school and contribute to formation and development of school children imagination, of the scientific language, of some personality features (spontaneity, courage to express a point of view), of the interpersonal relations, by valorization of the each one's ideas (and, consequently, by understanding of the qualities of the peoples around), etc. A method of the type of brainstorming, which allows the approach in a limited time interval (6 minutes) of more aspects of a problem, is the "Phillips 6/6" method. Can be taken into consideration problems such as: What is the potato tubers, root, stem or fruit? (the theme "Potato", Vth grade); Why the lake frog dies in certain environmental conditions – lack of water, or lack of air? (the theme "Lake frog", VIth grade). The use of this method in lessons contribute to the development of school children's ability to analyze and synthesize, of their ability to make associations and correlations between the knowledges acquired previously. A method similar to that of brainstorming is the method of brainwriting, or 6.3.5. As problems which can be given to the school children to solve, can be the following: What would happen if the bees disappears from the Terra? (the theme "Bees, bumble bees, wasps, ants", the VIth grade); Which would be the consequences of decomposers disappearance from a deciduous forest? (the theme "Forrest", VIIIth grade).

Another method with which the school children discover solutions to certain problems, situation from the real life, is the method of case study. By using this method, the school children can analyze pollution of an aquatic or terrestrial ecosystem, natural or artificial, situated in the locality where the school is located, or close to this (the VIIIth grade) and propose solutions for its removal.

The role-playing game is a method which can be used in order to emphasize the mode in which can be solved different problem-situations which the school children will be facing in the future. For instance, the consequences of getting married with a person who have a certain hereditary disease (sindactily, polydactily, color blindness, haemophilia, sickle cell disease etc.), in what concern the health of progeny (the theme "Normal and pathological human cariotype, IXth grade"). Another situation which can be simulated by the role-playing game is the existence of a child with blue or green eyes in a family in which both parents have black eyes (the theme "Genetic determinism of some normal and pathological traits in humans", XIIth grade). Direct participation of the school children to the scenario design, interpretation of roles by the school children-actors (schoolgirl-mother, schoolboy-father, school children-parents in law and schoolchild-doctor), reflection and colective debate of the role-playing game, contribute to formation of attitudes, behaviors, adequate beliefs.

Another possibility of stimulating the school children creativity consist in asking them to elaborate new, original products. Thus, at school, if the teacher used rebus

within the lessons, as modality of verifying and fixing the school children's knowledges, or before passing to the new lesson, then, within some recapitulation lessons, the school children can be requested to elaborate by themselves a rebus. For instance, within the recapitulation lesson "Plant nutrition – vegetative organs" (Vth grade), the school children can create, in groups, a rebus for the words "root", "stem" and "leaf", respectively. The school children will be requested to use own formulations for the concepts used in building the rebus.

At home, the school children can realize independently various works, which can contain elements of originality, own points of view: compositions poems, puzzles and essays (in gymnasium), papers and essays (in high school). The titles of essays can be selected from the manual, or can be proposed by either the teacher or school children, for instance, "Photosynthesis, the most impressive process in nature" (IXth grade) or "Chemical and physical processes involved in the proper functioning of analyzers of humans" (IXth grade). Literary and scientific creations realized by the school children can be presented within some scientific communication sessions organized in the school.

Within the extracurricular activities, organized on themes of environment protection during the entire school year, school children can realize and display numerous artistic creations. Thus, with the occasion of celebrating some special events, such as: "World Water Day", "Birds Day", "Earth Day", "International Biodiversity Day", "World Environment Day" etc., poster exhibitions, drawings, paintings, ecological posters, collages, pictures realized from spring or autumn pressed flowers and leaves, created by the school children, can be organized in the school. These can be realized within the biology circle or at home.

CONCLUSIONS

1. The creativity of school children can be stimulated within the biology lessons by the use of certain didactic methods (brainstorming, "Phillips 6/6", brainwriting, case study, role-playing game).

2. Requesting the school children to elaborate different new, original products (scientific, literary, artistic creations), within the lessons and extracurricular activities, contribute to the development of their creative potential.

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