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**RETROSPECTIVE ANALYSIS OF EDUCATIONAL TECHNOLOGIES OF
FORMING STUDENTS' CREATIVE ABILITIES**

Summary. Basic pedagogical technologies of forming students' creative abilities such as: developing training, technology of creative abilities, theory of technical creation development, theory of inventors' tasks' decision (TRIZ), heuristic training, heuristic and module training are considered in this article.

Key words: pedagogical technologies, creative abilities, training of students, developing training, TRIZ-training, heuristic training, heuristically-modular training.

Production and relevance of the problem. Theoretical and methodological support of formation of students' creative abilities is one of the urgent problems of educational theory and practice. Its solution give an opportunity not only to increase the professional competence of graduates, but also to develop future professionals all-round, bring up responsibility, purposefulness, diligence, independence, criticality, the ability to act in new situations, offering exciting innovative approaches, the constant desire for development.

Analysis of recent studies and publications. In psychological and pedagogical science skills, including creative, were studied by scientists on the basis of the *activity approach* (B. Ananiev, L.Venher, L.Vyhotskii, Yu.Hilbuh, V.Drankov, O.Kovalov, H.Kostuk, N.Leietes, O.Leontiev, B.Lomov, V.Miasyshchev, B.Teplov, S.Rubinshtein etc.). They noted that unlike other personal traits, abilities are not only manifested and formed in a specific activity, they do not exist beyond it. The fundamental position of the representatives of active approach is quite clear: the leading factor of formation and development of abilities is social conditions, i.e. life and work conditions.

Underestimation of genetic factor led to the emergence of another approach – functional genetic or psychological and physiological approach, according to which great importance is paid to

the role of natural instincts in the development of abilities (E.Holubeva, Ye.Iliin, O.Matiushkin, Yu.Poluyanov, B.Rusalov and V.Shadrykov etc.).

However, previous approaches underestimated the activity of an individual as a subject of development. Abilities and particularly creative ones, were interpreted primarily as mental, rather than personal characteristics. According to the *personal approach* (T.Artemieva, V. Ivanov, M.Kachan, A.Mialkin, K.Platonov M.Holodna and others) the study of abilities is made not only through their analysis in the personality structure, but, above all, in the person's activity. The personality determines and ensures his or her own abilities to specific activity.

Following the personal-active approach in the study, we interpret the formation of students' creative abilities as those that are caused by internal and external factors as harmonious development of individual psychological characteristics through his or her involvement in various types of creative educational and professional activities and obtaining independently produced creative educational products in the process of these activities.

The purpose of the article is to consider the basic educational technologies of forming students' creative abilities based on analysis of psychological and educational theory and practice.

The main material. The basis of the concept of *developing (developmental) training* was worked out in the 30-s by L.Vyhotskii. He states that properly organized learning promotes creative thinking that is impossible beyond the study. Basic L.Vyhotskii's concepts concerning understanding of the main factors of creative thinking and its development were successfully used by pedagogical science. These factors are:

- training should promote creative thinking,
- learning must take into account the physiological and intellectual opportunities of development ,
- learning should precede training within the "zone of proximal development",
- the process of learning and personal development are in close dialectical unity,
- learning involves intellectual development,
- development of creative thinking is closely associated with creative and comprehensive development of the individual, it is a form of acquisition of historically developed "style of thinking" [2].

Nowadays, such scholars as A.Asherov, I.Beh, V. Bondar, V.Moliako, S.Maksymenko, O.Savchenko, A.Furman and others are dealing with the problem of developing training in Ukraine.

H.Altshuller and his scientific school were the founders of the theory of technical work and the theory of solving inventive problems (TRIZ). Application of TRIZ allows to replace chaotic options to algorithmic, herewith the real thought process is understood and managed.

The main ideas of TRIZ include the following:

- technical systems are evolved according to certain laws, these laws can be used to solve inventive problems;
- theory is a catalyst for problem solving;
- knowledge is the foundation (the starting point) of creative intuition;
- everybody is endowed with creativity (all can invent);
- creativity as any activity can be learned [1].

Practical possibility of creative technology mass learning appeared with the introduction of TRIZ. First TRIZ was used in engineering, but the laws on which it is based on, have been used in other spheres, particularly in pedagogy since the late 80-s of the twentieth century.

TRIZ-taining is a teaching course based on general laws of the theory of solving inventive problems, the purpose of which is to teach methods of solving creative problems. Modern TRIZ-training includes courses designed for age groups from pre-school to students. Special feature of work with each different age group is to choose objects according to appropriate level of inventive activity. To train students the base of educational inventive and research problems was accumulated in such fields as physics, biology, ecology, art, technology and business. Creative problems for students may contain explicit or hidden conflicts, which require the use of algorithmic procedures.

The structure of modern TRIZ-training can be represented as:

- development of creative thinking,
- development of creative imagination,
- development of creative personality.

The problem-search method like developing education is one of basic TRIZ instruments. But unlike in developing education, in the process of TRIZ-training students are not only given problems but they also are offered tools for their solution which helps to achieve success in problem solving tasks.

In our opinion, the advantages of TRIZ technology are:

- it develops the style of thinking,
- it is not aimed at the acquisition of ready knowledge but its self-generation,
- the ability to see, formulate and solve the problem in specific area of activity,
- the ability to highlight pattern regularities.

Technology of heuristic training (V.Andreyev, N.Huziy, B.Korotiyayev, M.Lazarev, V.Palamarchuk, O.Pehota, A.Hutorskoi etc.) has powerful teaching opportunities in restructuring educational process both in secondary and high school.

The prototype of heuristic training is Socrates' method of questions and reasons. Extraction of hidden knowledge cannot only be a learning method, but methodology of education [3].

Didactic heuristics is a training theory, which defines a system of goals, laws, principles, content, technology, forms, methods and tools that provide self actualization and educational development of students and teachers in the process of creating their educational products in research fields of knowledge and activity [4].

The term "didactic heuristic" is different in meaning from the term "heuristics". In general sense heuristics is a science of creativity, creative work of people aimed at obtaining new results in their field of research, such as computer science, psychology, criminology, medicine and so on. Moreover heuristics is a science concerned with explanation, systematization and prediction of creating processes. Didactic heuristics has a different purpose, that is to disclose individual features of creators (students and teachers) in the process of creating of educational products. The main characteristic of heuristic training is to create educational products in educational process and align individual educational trajectories in all sectors of education [4].

According to fundamental heuristic study creative self-realization of students has three main objectives:

- creation of educational products in knowledge fields;
- formation of basic contents of these fields through comparison with their own results;
- alignment of individual educational trajectories in all sectors of education according to personal qualities. [4]

Advantages of heuristic training over the problem-based and developing training are the following:

- unlike problem-based training the aim of heuristic training is not to give students past experience, but to create their personal experiences, focused on designing new products;
- problem-based training is used to study those subjects which require intelligent approach, but heuristic learning is more universal and can be applied to study all subjects, including emotional and imaginative ones.

Heuristic learning differs from developing education as it has qualitatively new challenge: it develops not only students, but the trajectories of their education, including development of objectives, curriculum and provides sufficient mechanisms, methods and techniques of creative activity, such as "analysis through synthesis", brainstorming, logical series of heuristic questions, methods of empirical knowledge to the level of theoretical, association, comparison, generalization, abstraction, objective diagnostics and evaluation of own or others' work and so on.

TRIZ supporters in education who are closer in their teachings to the problem-based training recognize the need to generate knowledge first on the reproductive level. Supporters of heuristic training as a metaobject, who are closer in their teachings to the developing training, consider reproductive knowledge as unuseful, as according to experimental data reproductive activity negatively affects creativity, giving stereotyped ideas of required educational product to students.

Heuristic learning is closely connected with student-centered learning.

The technology of heuristically-modular training (O.Demchenko, O.Kryvonos, M.Lazarev) integrates the positive didactic features of modular and heuristic technologies. Heuristic learning with its extensive possibilities was organically introduced into relatively rigid modular organizational framework, and thus appeared the heuristically-module training technology with strict organizational and time aspects, clear phases of activity, but which at the same time is democratic for all its subjects. This technology gives real independence, creativity and continuous cooperation for those who teach and learn, and provide evaluation of achieved results of internal and external products, which can be improved, corrected and changed in a specified time framework [3].

Heuristic learning, combined with the modular technology, helps to solve the contradictions between freedom of students' cognitive, creative activity and the need of strict standards of evaluation of their academic achievements. This happens primarily due to cultural and diagnostic approaches to different levels of activity - reproductive, research, heuristic. Achievement of certain cultural level of knowledge and skills is measured by appropriate and specific diagnostic criteria, which, on the one hand, help to anticipate and plan quality of knowledge and skills, and on the other hand, serve as a clear mechanism of adequate assessment. Besides, researchers follow the basic principle of heuristic activity – the creation of conditions for maximum self-realization and research, because the criteria of achievements become a powerful mechanism of self-actualization only when they are a product of creative collaboration of partners in the learning process. [4]

The essential difference of heuristically-modular technology is modification of learning goal of any module of any discipline. The purpose of students' cognitive effort is not to master certain knowledge, skills, ways of activity (as in traditional training), but to create their own creative educational products which are necessary and important in their profession.

Conclusion. In our opinion, heuristically-modular technology is the most appropriate for the development of creative students' abilities in higher educational institutions.

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