

UDC 331.45:004.4:620.91-049.34

## DECISION CONSTRUCTIVE-TECHNICALLY TASKS IN CONDITIONS OF DEFORMATION OF TASKS MAINTENANCE

Berezova L. V.

National University of Life and Environmental Sciences of Ukraine, Ukraine.

*Corresponding authors: berezova@nubip.edu.ua.*

*Article history: Received: March 2018. Received in the revised form: April 2018. Accepted: May 2018.*

*Bibl. 8, fig. 0, tabl. 0.*

**Abstract.** Tasks, questions and practical tasks is an effective didactic way, which makes active creative activity of the person. The constructive thinking carried out at the decision of creative tasks is considered. Analyses of creative technical thinking development and the peculiarities of the constructive-technical tasks solving are given. The creative thinking is a search and opening something new, for creative work, it is necessary to own ability independently and critically to think. On the basis of the main ways, methods of the solution strategy of the task solution is formed. Transformation of the solution strategy of the constructive-technical tasks with use of complications is considered.

In the paper the application of methods of information insufficiency and prohibition. at the decision by students of constructive-technical tasks are considered. These methods stir up the cogitative activity of students, assists to enlarge the forms of necessary structurally functional groups searching, assists of construction of optimal variants of the solution of tasks.

**Key words:** creative thinking, transformation of strategy, constructive-technical task, solution of tasks, complication.

### Introduction

The improvement of complicated technical and natural systems occurs, as a rule, on the basis of a knowledge deepening of the world around which makes an essence of scientific and technical progress. The need of techniques puts all new and new tasks before a science.

### Formulation of Problem

Therefore modern education should prepare the specialists, capable to be responsible for the professional future, capable to confirm themselves in conditions of a competition in the labor market. The basic purpose of vocational training and education consists in training specialists who own skills and knowledge for satisfaction of market needs of labor; specialists who are prepared for creative professional activity that would have constant aspiration to the best, more improved.

One of the main tasks of psychological of students

training to technical the development of the stable positive attitude of students to creative activity is possible.

Training of the future specialists for labor activity should be based on the solution of its constructive-technical, technological, organizational tasks which would display situations of real work.

The solution of different scientific, practical, art, constructive and other tasks which arise in a life of people, demands knowledge by them not only external properties of objects, and their internal connections and attitudes. Therefore, as G.S. Kostyuk marked, "a problem of the development of thinking, and especially the development of creative thinking which differs originality and creativity is very important presently" [2].

### Analysis of Recent Research Results

Ability to think is a property of the person. The thinking arises during interaction of the person with an external world and serves its successful realization. It is generated, first, by the need to understand any new situation to the person, new object to it that is given to it in alive contemplation, or represents or is described by words. The creative thinking is a search and opening new. For creative work, it is necessary to own ability independently and critically to think, get into essence of subjects and the phenomena, to be inquisitive, that appreciably provides productivity of cerebration.

The problem of creative thinking development is in the center of attention of many scientists during all development of a psychology-pedagogical science about creativity (L.S. Vygodskyy, J. Gilford, O.S. Yermakova, A.B. Kovalenko, G.S. Kostyuk, S.D. Maksymenko, O.M. Matyushkin, V.O. Molyako, A. Osborn, Y.O. Ponomaryov, R.O. Ponomaryova, S.L. Rubinshteyn, E. Torrens, M.G. Yaroshevskyy, etc.).

One of the methods of students training to technical creativity is the solution of constructive-technical tasks which display tasks of manufacture both on engineering, and at an executive level. Such approach is named as determining in works of many scientists (T.V. Kudryavtsev, A.F. Esaulov, Y.O. Ponomaryova, V.O. Molyako, etc.).

Based on continuous studying design activity on professional level, V.O. Molyako has offered the system of

creative training of students during their training for technical labour activity [3, 7]. The component of creative training method is the using of complications during the solution of constructive-technical tasks. We shall consider the psychological features of this process.

In the system-strategy concepts of the activity developed by V.O. Molyako, strategy is defined as "more or less flexible system objectively and situationally defined actions in which the tendency to subject advantage of one mental action to another prevails" [3, 8]. Thus, the term "strategy" can be applied to "to the description of all solution process of the solution in which the dominating tendency of the person mental activity concerning a specific target is realized" [3, 7].

V.O. Molyako separates the contents of concept "strategy" from categories "method" and "way". He does not consider them as synonyms, as a way and a method, unlike the strategy, abstracted from the personality.

In the structure of strategy of V.O. Molyako allocates: 1) studying of task's condition; 2) search of the solution way; 3) an embodiment of a hypothesis solutions [3].

As the strategy is a dynamic, remedial formation, the following basic stages are allocated in it: 1) studying of a task's condition; 2) check of a condition by concrete knowledge – correlation of a new task with system of the knowledge and experience of practical actions; 3) a choice of a hypothesis about possible structural and functional transformations of the set components; 4) "designing" of a hypothesis on all conditions as a whole and its localization concerning a place of concrete application; 5) check of a hypothesis by means of tactics stipulated by it and auxiliary methods; 6) detailed elaboration [3].

The person, as a rule, realizes and mentally determines the basic moments of cogitative activity besides there is always a certain attitude of the person to the process of the solution, i.e. this process is always emotionally painted. Actually, based on the basic methods of the solution and confidence of the actions the strategy of the solution of a constructive-technical task is formed. Cogitative strategy consists of complete formation of the person ability, a disposition that defines a character of actions and the tendency of mental behavior as a whole.

In I.G. Shupeiko's research laws of evolution and transformation of the solution strategy of tasks during the process of studying. As the result of carried out research it was established, that the process of formation of effective solution strategy represented the alternation of evolution stages and strategy transformation which are "intermediate" concerning "basic" which acts in the form of studying. It was also established, that the character of dynamics, i.e. process of effective strategy formation could be operated [8].

The essence transformation theories of operators studying, offered by V.F. Venda is the process of effective strategy formation of the solution during training represents some sequence of evolution stages and transformation of intermediate strategy. In the opinion of the author of this concept, process of strategy mastering depends on the amount of intermediate strategy and duration of their mastering, and of peculiarities of transition from one strategy to another [1].

We consider, that the definition of strategy by means of such terms as the set of rules, plan, the general scheme,

some structure, etc. is little productive as these terms designate the certain set of methods which fixed firmly in activity, i.e. something static. The approach to strategy which associates with the general orientation of mental activity, its dynamics takes place in the works G.S. Sukhobska, Y.M. Kulyutkin and V.O. Molyako.

The viewing strategy of the tasks solution as structured formation that operates the process of the solution at its all stages is of great importance at the solution of constructive-technical tasks.

### Purpose of Research

The purpose of article is to reveal features of cogitative activity, functioning of strategy during the solution by the students of the first course of technical specialties of constructive-technical tasks with use of complications.

Proceeding of it, the primary goals of our research consist in definition of influence on cogitative of students' activity of complications introduction during the solution of the constructive-technical tasks.

### Results of Research

Two groups of students (20 in each) have taken part in the experiment. They are the students of the first course of Mechanical and Technological and Design and Construction faculties of National University of Life and Environmental Sciences of Ukraine.

According to the structure, the experiment consisted of such stages: theoretical training, the solution of tasks on acquainting, the solution of tasks with complications and the solution of tasks of a control series.

We have taken the constructive-technical tasks of V.O. Molyako's thesis research.

The solution of the constructive-technical tasks causes in students steady interest, as they are interested in novelty, originality of tasks, and the opportunity to make use of the practical experience.

Some possible methods of complications use at the solution of the constructive-technical tasks are offered, namely: limit of time, new variants, prohibitions, information insufficiency and so on [3].

The results of research received by V.Z. Skakun, testify that the introduction of sudden prohibitions influences mental actions of the subject, thus, that there is faster change of variants in cogitative activity, ordering of interrelations between structures and functions aside of their optimum association [5].

In a situation with complications the great value has how quickly and successfully the subject finds a way out of the created situation, what methods are used, how complications influence on its emotional condition, on its behavior in general [7].

It is possible to allocate such groups of students according to the reaction on introduction of the complicated conditions:

- Students in which cogitative activity is broken, some of them refuse the solution of tasks;
- Investigated that try to solve tasks in that way, as

before the introduction of complications;

- Students for whom the stimulating factor of cognitive activity is the introduction of complications.

On results of research carried out by us the majority of students concern to the third group (76 %).

In our experiment, we used a method of information insufficiency and a method of a prohibition. These methods are expedient for introduction at the stage of studying of a condition of a task as for stimulation of creative activity it is important to make active thinking at the initial stages of the process of the solution of a task.

The method of information insufficiency was used in several forms:

- The direction of the manipulation of one of the structural elements (functional insufficiency) was not marked;

- The task was given only in the text form;

- Complications were combined: functional insufficiency with the text form of a task.

The text form of a task stimulates the subject to renderline the main structural element with unequivocally defined functional property, which meets the requirements of a task.

Functional insufficiency forces the subject, besides the allocation of a structural element, to allocate a functional attribute and to subordinate to the course of thinking. Therefore, during cognitive activity at the stage of condition studying of a task and plan formation the subject the most optimal unites structural elements with functional.

The solution of the constructive-technical tasks is inconceivable without use of graphic activity. Nevertheless, a level of graphic training of students is low. In addition, students are not able to display correctly a structural element in a projection. The essence of difficulties is that the students are not able to transfer correctly a structural element (as a product of figurative thinking of the subject) to graphic activity.

At modern school Drawing it is not studied, and consequently there are difficulties

At students at the initial stages of studying at high school on technical specialties, and especially at students from countryside, most of them have low level of training from disciplines behind the school curriculum.

Information insufficiency stimulates cognitive activity, thus, that the subject during thinking process, and then, having convinced of the choice correctness, uses such structural element from the mental stock which most full answers both to a condition of a task, and its graphic skill.

At introduction of information insufficiency, the role of graphic activity during the solution of the constructive-technical task is decreased. It is very difficult to allocate during the solution the stages of understanding of a condition and formation of a plan without specially given experiment. We shall notify only, that such method of information insufficiency is an effective stimulator of cognitive activity and all or a significant part of cognitive actions are directed to the searches of necessary structurally functional elements at the stages of understanding of condition and origin of intention. This idea is also confirmed by the fact that at the solution of a task on graphic activity is spent less than 40 % of time.

Within the limits of research the experiment with the

purpose of features revealing of process of the solution of is constructive-technical tasks with use of a method of a prohibition has been carried out.

Transforming influence of sudden prohibitions can be connected with the change of that "tool", by means of which the pupil solved a task at the previous stages of work, and which represents less or most measure the organized system of constructive actions (in an ideal – strategy), directed on construction of the required solution, in particular analogy, a combination, reconstruction [6].

During of tasks solution by the students use the certain stamps and give advantage to structurally functional elements, ways and methods of the solution.

We considered, that introduction of a prohibition at the certain stage of solution process of the constructive-technical task makes active thinking of the subject, will destroy stamps in the choice of structural and functional elements and will qualitatively improve the solution of a task. A prohibition was introduced at the stage of studying of a task condition: carried out research earlier tasks solved by the subject, we forbade applying that type of transfer, which was used more often. Researches testify, that the prohibition positively influences on productivity of thinking, assists of activization of thought process, – helps "to extract" more remote structures and functions that increase the probability of optimal association of structurally functional elements and the correct solution from memory.

The task solutions are the solutions in analogies for the students. During the process of a prohibition method using beside with the solution of tasks in analogies, combinatory actions appear then, and they become steady in using.

V.O. Molyako marked that in technical creativity the advantage is given to combinatory actions [3, 100]. Our researches have shown: if it doesn't pay attention to quality of solutions of tasks with use of combination theory, and to take the fact of its use for a basis, and frequency of combinational actions realization in cognitive activity of students has increased up to 20 % at the solution of constructive-technical with complications.

## Conclusion

So, our researches have shown, that introduction of complications during the solution of the constructive-technical tasks stirs up the cognitive activity of students, assists to enlarge the forms of necessary structurally functional groups searching, assists of construction of optimal variants of the solution of tasks.

## References

1. *Venda, V. F.* (1990). The systems of the artificial intellect. Evolution, psychology, information science. Moscow, Mashinostroyeniye, 93. (in Russian).
2. *Kostyuk, G. S.* (1982). The problems of psychological thinking. Psychological questions. No 7, 8-15. (in Russian).
3. *Molyako, V. A.* (1983). Psychology of design activity. Moscow, Mashinostroyeniye, 134. (in Russian).

4. *Molyako, V. A.* (2002). The strategies of solution of the new tasks in the process of creative activity. No 4, 33-34. (in Ukrainian).

5. *Molyako, V. O.* (2004). Psychology of creativity – new paradigm researching of the constructive activity of a man. Practical psychology and social work. No 8, 1-4. (in Ukrainian).

6. *Tretyak, T. M.* (2005). Solving of the tasks by pupils in the complicated conditions. The creative potential of a personality: problems of the development and realization. Kyiv, 264-267. (in Ukrainian).

7. *Skakun, V. Z.* (1986). Applying of the creative training in senior pupils' training to a work. Kyiv, Rad. Shkola, No 26, 52-60. (in Ukrainian).

8. *Shupeiko, I. G.* (1983). Evolution and transformation of the solution strategies of the operative tasks in the process of studying. Thesis abstract of Candidate of Psychology Science. Moscow, 25. (in Russian).

### Список літератури

1. *Venda V. F.* The systems of the artificial intellect. Evolution, psychology, information science. Moscow, 1990. 93 p.

2. *Kostyuk G. S.* The problems of psychological thinking. Psychological questions. 1982. No 7. P. 8–15.

3. *Molyako V. A.* Psychology of design activity. Moscow, 1983. 134 p.

4. *Molyako V. A.* The strategies of solution of the new tasks in the process of creative activity. 2002. No 4. P. 33–34.

5. *Molyako V. O.* Psychology of creativity – new paradigm researching of the constructive activity of a man. Practical psychology and social work. No 8. 2004. P. 1–4.

6. *Tretyak T. M.* Solving of the tasks by pupils in the complicated conditions. The creative potential of a personality: problems of the development and realization. Kyiv, 2005. P. 264–267.

7. *Skakun V. Z.* Applying of the creative training in senior pupils' training to a work. Kyiv, Rad. Shkola, 1986. No 26. P. 52–60.

8. *Shupeiko I. G.* Evolution and transformation of the solution strategies of the operative tasks in the process of studying. Thesis abstract of Candidate of Psychology Science. Moscow, 1983. 25 p.

Трансформація стратегії рішення конструктивно-технічної задачі з використанням ускладнень є.

У статті розглядається застосування методів інформаційної недостатності і заборона. на підставі рішення учнями конструктивно-технічних розглянуто задачі. Ці методи замутити розумову діяльність учнів, допомагає розширити форми необхідних структурно функціональні групи Пошук, надає допомогу в побудові оптимальних варіантів вирішення завдань.

**Ключові слова:** творче мислення, трансформація, стратегії, конструктивно-технічних задач, вирішення завдань, ускладнення.

### РЕШЕНИЕ КОНСТРУКТИВНО-ТЕХНИЧЕСКИХ ЗАДАЧ В УСЛОВИЯХ ДЕФОРМАЦИИ ИХ СОДЕРЖАНИЯ

*Л. В. Березова*

**Аннотация.** Задачи, вопросы и практические задания, является эффективным дидактическим способом, который делает активной творческой деятельности человека. Конструктивное мышление осуществляется при решении творческих задач. Анализ творческих развития технического мышления и особенности Конструктивно-технического решения задач. Творческое мышление-это поиск и открытие чего-то нового, для творчества, нужно владеть способностью самостоятельно и критически мыслить. Исходя из основных направлений, сформированных методами стратегии решения задач решение. Трансформация стратегии решения конструктивно-технической задачи с использованием осложнений является.

В статье рассматривается применение методов информационно недостаточности и запрет. на основании решения учащимися конструктивно-технических рассмотрены задачи. Эти методы замутить мыслительную деятельность учащихся, помогает расширить формы необходимых структурно функциональные группы Поиск, оказывает помощь в построению оптимальных вариантов решения задач.

**Ключевые слова:** творческое мышление, трансформация, стратегии, конструктивно-технических задач, решение задач, осложнении.

### РОЗВ'ЯЗУВАННЯ КОНСТРУКТИВНО-ТЕХНІЧНИХ ЗАДАЧ В УМОВАХ ДЕФОРМАЦІЇ ЇХ ЗМІСТУ

*Л. В. Березова*

**Анотація.** Задачі, запитання та практичні завдання, є ефективним дидактичним засобом, який робить активної творчої діяльності людини. Конструктивне мислення здійснюється при вирішенні творчих завдань. Аналіз творчих розвитку технічного мислення і особливості Конструктивно-технічного рішення завдань. Творче мислення-це пошук і відкриття чогось нового, для творчості, потрібно володіти здатність самостійно і критично мислити. Виходячи з основних напрямів, сформованих методами стратегії вирішення завдань рішення.