



1. НАУКА – ПРАКТИЦІ



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THE CONCEPT OF CREATIVITY INTO THE XXIst CENTURY: ONE EQUATION, UNKNOWN DEGREES

Summary.

The article states that creativity as a process, creative thinking for decades are in the field of scientific interests of many researchers. Today we have a number of different approaches to the interpretation of the essence of the creative process and understanding of its psychological mechanisms. Another vector in the space of scientific interests of researchers who are studying the creative process is the task of measuring and encouraging efforts in creative problem solving. Equally relevant is the problem of stimulating the development and implementation of creative potential of individuals. Some researchers find out a connection of a positive mood with the solution of creative problems, stating its convention. In general, according to the results of the analysis, the connection between positive mood and the level of the solution of the creative task has been proved. The analysis also shows the interest of researchers in the behavior of gifted children in the proximal zone. In general, it is concluded that the question of the essence of the creative process and its motivation can give the status of some of the most relevant scientific interests of the past decades. Along with them, it is undoubtedly possible to put research on certain aspects of scientific, technical, organizational and artistic creativity. In particular, the scientific discovery for a long time was due to the positions of existing theories. Some researchers offer a new approach to explaining the scientific discovery in which the tool plays a leading role. Other researchers highlight several aspects of creative work as part of a rational way to use the method of random research. It analyzes a number of processes that can be grouped under the obvious functionality. Most authors of scientific thinking publications emphasize the role of symbolic recombinations as sources of creativity. At the same time, the important role that the assimilative processes can play in the scientific activity is lost. In the analysis, it was concluded that studies on teaching inventiveness with the involvement of adolescents appear not often. Regarding organizational creativity, it is assumed that the use of the ability to think quickly, flexibly and originally allows negotiators to develop creative solutions, to find a compromise, and to maximize the overall benefit. The connection between creativity and success in the negotiation process is complemented by the dyadic nature of the negotiation situation. In the analysis analyzed also a number of aspects of artistic creativity. In general, it is concluded that one of the false concepts of creativity, which is common among teachers, is the idea that creativity is inherent in only a small number of students.

Key words: *creativity; talent; testing; additional educational services; thinking; creative potential.*

Creativity as a process, creative thinking are in the sphere of interests of many explorers. For today there is a variety of different approaches to explanation the pith

of creative process and understanding its psychological mechanisms. Dialectical approach, suggested by J. Piaget in an implicit form, noticeably exudes among them.



One of the articles [1] challenges the widely accepted myth that Piaget did not research the concept of creativity in his theoretical interpretation of the brain development. Indeed, using his own explanations, Piaget inquires an opportunity of using the dialectical approach for interpretation the pith and psychological mechanisms of creativity. This approach is dynamic in its nature. It is worthy of note that this explanation does not focus on Piaget's theory, but uses his interpretation of mechanisms for development (assimilation and accommodation). By this way, the integration of the components of creative thought is explored as the key to thinking processes in general.

The task of measurement and encouraging of efforts in Creative Problem Solving (CPS) is another in the sphere of scientific interests of researchers, who study the creative process. The following publication [2] accumulates theories and results the investigation of the nature of CPS process, cognitive and personal qualities of individuals that are good in CPS, analyses methods of CPS, the development of CPS skills by training with the aim of elevation the understanding and ability to measure, and also to enhance individual CPS efforts. According to the investigation, the whole CPS process becomes clear, when meaningful convergent and divergent of thought draw to continuous alternation. Another conclusions as for the CPS nature and individuals, who make it well. They are outlined, discussed and united in the theory, according to which creatively solved problems differ in complexity, necessity of knowledge, the number of necessary convergent and divergent ideas. It is also predicts that those who solve problems with different approaches and abilities, working plans etc., will suit demands for solving partial problems better.

The problem of stimulation and realization the individual's creative potential is no less actual. I. Pufal-Struzik investigates [3] the connection between a need for such stimulation among pupils of senior school and their creativity in problem-solving. The important connection was found between a need for variational stimulus (adventure, novelty, risk) and cognitive flexibility and complexity, non-conformism and spontaneity, and also tolerance to cognitive incompatibility.

For ten-months studying of bachelors at the business college (16 students), following famous theories of creativity, the special educational program and didactical materials [4] were made and final levels of creativity were measured before and after studying, using the instruments Urban and Jellen TCT-DP. Then these indicators were compared with the same in the control group (11 persons). Students' IQ was measured by using the tests Raven Standard Progressive Matrices, and their interest was defined by structural interviews. The results of the experimental group had shown the growth of creativity. Moreover, the development of individual components of creative thinking, measured during the experiment, had shown the structure and dynamics of creativity. Several components were more variational and were the subject for the external influence (an emotional mark, a view on the problem in perspective), others seem to be more

independent. At the same time as other components can be reviewed as permanent cognitive strategies of creative individuals. Furthermore, the results of this research have shown that IQ does not correlate with the level of creative abilities.

Another publication [5] shows two positions that explore a positive mood and its connection with solving creative problems. In the first case, presence of connection between the positive mood and solving creative problems is reviewed. In the second case, this connection is stated as conditional. This research previously inquires one possible restriction as for the first position. The Weisberg's assumption that the positive mood helps not the quality of ideas, but productivity was confirmed. The mood scale (on the basis of self-reports) had three positions: positive, negative and awakening. The tasks for divergent thinking helped to define speed, flexibility and originality of thinking and also usefulness of ideas. In general, the results of the research have shown that there is a perfect theoretically predicted connection between the positive mood and the level of solving a creative task. At the same time, the positive mood is significantly connected with the factor of the number of ideas, but not with the factor of their quality.

The analysis shows the researchers' interest in the behaviour of gifted children in the proximal zone. In one of the investigations intellectual (on the basis of IQ) and age differences of the behaviour of children from 4 to 8 years in this zone are reviewed. Each participant of the research was proposed to learn, transform and summarize the strategy of solving the puzzle Tower of Hanoi. Speed, efficiency, solving accuracy, and also the necessary measure of support were analyzed herewith. Multiple analysis of variance with data for each task was also done. It was explored that the advantages of individuals with high IQ were not so gradual as the advantages of the chronological age. The advantages were the most obvious in studying and summarizing of the tasks. During the research it was fixed the cases, when children with high IQ created their own challenges in the tasks with no challenges (complicated the tasks) or became boring. Taking into accounts the results, two practical consequences are obvious: in the classes, where children are grouped on the basis of chronological criteria, the range of educational potentials is a serious challenge for teachers; children's studying may become worse, when they are proposed the same curriculum as for their ordinary contemporaries.

To sum up, the problem of the pith of creative process and its motivation can be defined as one of the most actual in the sphere of scientific interests of the last decades. The investigations of different aspects of scientific, technical, organizational and artistic creativity are definitely beside them.

A scientific discovery was explained from positions of existing theories and some other aspects for a long time. The researchers [7] propose a new approach of the explanation of the scientific discovery, where the instrument plays the main role. They name such approach as the



instrument-theory, heuristics of the scientific discovery. In this article the authors develop the function of the statistic tools, moving to the computer and its influence on the psychological theorization. They also demonstrate that computers have become standard laboratory instruments, and it has led to the fact that in a certain approach they were reviewed as a model of the intellect.

In the following article [8] there are several aspects of the creative work as a part of rational in order to use the method of the occasional research. At the same time, a range of processes that can be grouped by the obvious function is analysed. The previous views are illustrated by the research of the creative work of J. Piaget and his ideas as for creativity, based on the unpublished interviews and other sources. Special attention is payed to an example of metaphors and other figures of thinking that play an important role in Piaget's thinking.

Most authors of publications concerning scientific thinking, emphasize on the role of the symbolic recombinations as the sources of creativity. At the same time, the important role that presymbolic processes can play in the scientific activity, is missed. The article [9] proves that such relative neglect is a partly conditioned mistaken model of explanation dominant in the scientific literature. In this article the model of explanation for dynamic physical systems, based on analogy, is grounded. For example, some M. Faraday's works are described and analyzed by using dynamic approaches in an informal manner. In general, the results prove W. James' thought of an opportunity to use unclear formulations in the psychological activity.

Intellectual sources of K. Popper's psychology found out crucial for his next refusal of psychology in the scientific researches. In 1928 K. Popper finished his doctor's work under the guidance of the psychologist and psycholinguist K. Buhler. K. Popper's thesis concerned the problem of methodology in psychology of thinking. For his thesis, K. Popper chose the problem that was central in the research sphere, with which K. Buhler was connected, and also tangent to the work of the psychologist and initiator of the Wurzburg school O. Kulpe. In the article [10] the works of Kulpe and Buhler are discussed and a curve of intellectual recession from Kulpe to Buhler and to Popper is demonstrated. It is worthy of note that the first important philosophical K. Popper's work was just partly published (it was the book "The Logic of Scientific Discovery" published in German in 1935 and reprinted in English in 1959); other parts of this work (printed only in 1979) show K. Popper's transformation from the psychologist with strict tendency to philosophy into the philosopher of science with the basic education of the psychologist. The author of the article also proves that the elements taken by K. Popper from psychology, which he knew well, created the basis for his refusal to investigate discovery and "black case" of scientific creativity.

Investigations of studying inventing together with teenagers appear not often. The research in the article [11] includes evaluation of intensive summer program of inventing and design, finished by the pupils in a year

before a scientific publication. The data, got by using qualitative methods, were structured, and the general and special topics were missed. At the end of the program the pupils stated that a group work and practical peculiarities of the course provided the most important results during the next school year. Some pupils emphasized on the career meaning and also intellectual and interpersonal roles of introducing the results during inventing. In general, the pupils' conclusions after one-year studying gave an additional support for the previous conclusions that the pupils understand the presentation as a strictly evaluating process.

Ph.R. Phelps and others [12] describe the conception of the innovative opportunities implementation for the pupils of the state Virginia (the USA) that were identified as gifted in technical creativity or other spheres. The approach combines professional technical education, programs for gifted people, career education and the guidance of the partnership problem with the aim of encouraging the gifted pupils to follow proposals in professional technical education; giving more information and practice of the potential career; overcoming of artificial differences between the professional technical and general education. In this scientific work the following problems are discussed:

- 1) advantages of the approach for pupils, teachers, parents and society;
- 2) procedures of identification and detection of gifted children;
- 3) means of educational environment arrangement for providing educational needs of gifted pupils during studying of technical creativity;
- 4) problems in the sphere of staff provision, and also using people's support.

The next research [13] makes an assumption that use of ability to think quickly, flexibly and originally let participants of negotiations make creative decisions, find a compromise and maximize a common benefit. The connection between creativity and success in the negotiation is added by dyadic nature of a conversational situation. The results show that although additive creativity of both members of the conversational dyad is an important prerequisite of the integrative common benefit, a higher individual indicator of creativity of participants of the conversational dyad is even a more important prerequisite of the common benefit. It means that a highly creative individual is enough to understand the potential for the integrative common result. This research proves that the indicators of Graduate Management Admission Test are the important factors of the integrative common benefit. In general, the results connect the theoretical work of P. Torrens and other researchers of creativity with the art of negotiations.

There are grounds to state that there is no common view on the musical talent like the internal or acquired individual's characteristics even among specialists. One more analysis of the statistic data concerning musically gifted pupils, their parents and teachers, added different sets of characteristics for an each group [14].



these sets describe pupils as those who achieved the success thanks to internal gifts and hard work. Although these gifted pupils describe family members and friends as people who prevent their musical development. Parents, vice versa, describe their children as those who have an ordinary level of the internal talent, and just they make a contribution in achievements of children, encouraging them in the family and by friends. In this research teachers explain the pupils' musical talent by the internal talent, hard work and studying. Differences in these describing approaches surprise, but coordinate with the research, which supposes that individuals often attribute to themselves certain results, emphasizing on their influence on the process of achieving the result.

R. Person [15] reports the results of the searching and describing investigation of a training process of musical singers at the bachelor level. This research was based on studying a process of collaboration between the famous professor-organist and his six students. The data received by the observation, informal interviews and questionnaires. The object of the research was the maestro's role in an educational institution and the educational strategy used by this professor of an informal pedagogical training. The previous results allow to suppose that there are clear conceptions for the west music art how a teacher of artistic performance of music should behave. This circumstance makes students reproduce the strict and intensive procedure like something positive and necessary. The maestro's role seems to be more oriented on the result than on a person. Because students, feeling lack of confidence and independence, can work badly under such care. In general, the author summarizes that the potentially negative maestro's role can be avoided, if to pay more attention to the pedagogical training in the music education at the higher level.

Two researches [16], made from constructivist and structuralist points of view, can be reviewed on the subject of their complementarity for understanding the development of gifted young artists. The first research is based on the theory of neo-Piazhe and focuses on a progress of gifts to represent dimensional relations of 4, 6, 8 and 10 years children. The children, identified as gifted, demonstrated certain awareness in using the perspective in their works, but differed in new presentations of space, exploited for the first time. Connected with the age, the progress in getting the gift to describe the perspective supports a general factor in the development, while gifts, unique for the artistic sphere, support the relevance of inclusion such specific characteristics to the models of the development of the gift. The second research mainly consists of the structuralist thoughts, combine postformal vision of mechanisms for finding and solving a problem by young artists at the age from 13 to 18 years.

During last decades the researchers pay attention to problems and peculiarities of the development of individual's creative potential in the section of educational levels and forms.

The scientific search [17] is done as a part of a long scientific investigation of giftedness by Russian and

German scholars (Moscow-Munich Longitudinal Study of Giftedness) and is based on the multidimensional conception of giftedness. It was selected 73 first-graders (7–8 years) among 650 pupils by a two-step procedure, using the teacher's control list and Russian version of the test KFT, the tests of intellectual abilities and creativity. The control group of the same age consisted of 76 random pupils. The groups were testified by the same methods in 1991, 1992 and 1993. The changes of intellectual abilities, creativity, motivation and other personal characteristics were investigated. The significant differences between gifted and non-gifted individuals were noticed in the intellectual spheres; there were not any gender differences in the cognitive sphere, although teachers considered girls to be more gifted than boys; the connection between cognitive and personal factors was set, but it was not quite stable. In general, the results confirmed that gifted pupils need a special support and studying.

The authors of the following research [18] described the components of creative courses at the college level and showed the importance of these components for studying creativity. The teachers of the college creative courses were invited to fix a limit to which educational parameters are reviewed as important for studying creativity. With this aim, using content-analysis of educational programs of creativity at the college, the toolkit was made. The results of this article are discussed among five directions of studying creativity, such as: social climate, personal features, general theories and models, internal processes, variables, connected with the final result.

The influence of an active rest on creative achievements of highly intellectual individuals is seldom explored. Including highly intellectual adults (246 persons), retrospective evaluation of an active rest frequency, a special profile of using free time [19] for more successful individuals was compared with less successful. The author of the research states that highly intellectual, successful individuals spend more free time on the activity with the aim of self-realization, such as: hobbies, creating music, sport lessons in adolescence and in older age. Being elder, they also attend lessons, which need intellectual efforts more often. In general, the results can be interpreted in the sphere of cooperation "expert-beginner", an approach of problem-solving in creative thinking, and also according to the development of youth's identicalness.

The results of a biographical questionnaire, proposed to 65 inventors, who work in the mine industry, were compared with the results of the control group, which consisted of men with the same age, education, labour experience, and who did not use a chance to show the inventiveness in their professional activity. The following parameters were taken into account: health and physical state; family life; financial status; educational status; the presence and development of interests; professional career. Among family parameters the primary characteristics of both parents were defined as crucial, such as age, education, a kind of the professional activity, parents relations, family atmosphere created by parents, and also the methods of children upbringing. Empirical data demonstrate that certain parents features



who are inventors, stimulate the development of their children's creativity, while certain features of parents of the control group slow down creative tendencies of their children [20].

The teachers' preparation for the development of the pupils' creative potential was, is and will be one of the main exploratory problems in the sphere of creativity for a long time. The analysis of the teaching and educational needs, the nature of high abilities and creativity provokes the authors to think about cognitive or mental abilities [21]. They are presented in school educational materials in the context of the accessibility of the content and didactic methods. As a result, the researcher recommends that the theory of critical thinking will be a signpost at school practice. Because of the fact that it is difficult to use the new methods, when the teachers' educational practice is completely didactically valid, it is proposed to change the teachers' studying with the aim of the introducing of new tendencies. The results show the evidence of such approach, when the teachers can use their experience, which is a challenge for highly skilled pupils. Those who study (pupils and students) say about the motivation and the appropriateness of such experience.

One of the mistaken conceptions as for creativity, spread among the teachers, is the thought that creativity concerns only a small number of pupils. It leads to underestimation of the influence of the school and society on the creative process. Programs of the development of creativity [22] have the main aim – to level teachers' negative convictions in their own creative abilities, introduce basic conceptions of creativity and how to use them in the school environment. Several researches were made to investigate the influence of this program on the teachers' abilities to think creatively and their behaviour in the classroom. The results of the research [22] proved that the program is effective for the development of the teachers' creative thinking and learning the skills connected with creative thinking.

One more scientific article [23] starts from the review of teachers' preparation for studying the gifted individuals. Then the author describes the one-year project aimed at the development of creativity of bachelors (future teachers) at the University of Ostrava (the Czech Republic). The results were compared with the students' one, who studied the traditional educational program and under other conditions. According to the previous results, the special program for the students' development of components of creativity was created, in order to continue autonomously in future. The final reviews showed intense growth of creativity and other advantages for the development of the gifted individuals.

Conclusions. Decades of the research of creativity, creative thinking and creative potential allowed to formulate and ground theoretically a variety of conceptions and approaches for understanding the named facts. Although the practical realization of the results of theoretical searches remains at the level of initiative programs for the development of gifted individuals' creativity in summer schools or camps for the rest and creative youth development. Is it realized almost without

a centralized country's support, without adapted and standardized methods for the gifted children's diagnostics and selection, a system of teachers' and scientific pedagogical employees' training and retraining for the work with gifted and talented youth. It also should be mentioned a lack of the programs for a support and development of gifted and talented youth in the high educational establishments that leads to the ignoring of creative abilities in the professional activity.

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Волошук І.С., Шуленок О.С. Концепт творчості на порозі XXI століття: одне рівняння, невідомих декілька.

Анотація.

У статті розглянуто зарубіжні дослідження, які присвячені проблемі сутності творчості та розвит-

ку творчих здібностей обдарованих індивідів на зламі століть. Акцентовано на факторах, які стимулюють розвиток креативності та реалізації творчого потенціалу в процесі розв'язування задач. Наявні дослідження проаналізовано крізь призму особливостей творчого процесу в науковій, технічній, організаційній і художній творчості.

Ключові слова: творчість; талант; тестування; додаткові освітні послуги; мислення; творчий потенціал.

Волошук І.С., Шуленок А.С. Концепт творчества на порозе XXI века: одно уравнение, неизвестных несколько.

Аннотация.

В статье рассматриваются зарубежные исследования, посвященные проблеме сущности творчества и развития творческих способностей одаренных индивидов на рубеже столетий. Акцентировано на факторах, которые стимулируют развитие креативности и реализации творческого потенциала в процессе решения задач. Имеющиеся исследования анализируются через призму особенностей творческого процесса в научной, технической, организационной и художественном творчестве.

Ключевые слова: творчество; талант; тестирование; дополнительные образовательные услуги; мышление; творческий потенциал.

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