

## Multifactorial approach to preparing Russian young people for a future profession

### Многофакторный подход подготовки российской молодежи к будущей профессии

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#### Abstract

This article examines the theory and practice of a multi-level system of continuous innovative education. The pedagogical system of multilevel continuous creative education is considered in detail, and sufficient creative pedagogical methods are put forward for the formation of creative thinking and the development of students' creative abilities. Creative approach provides teachers and students with intellectual tools for the formation of creative systems thinking, teaches them to look at the world systematically and manage thought processes. Innovative teaching methods in the continuous formation of a multilevel system of creative thinking provide the basic principles of teaching by changing the structure of the lessons and implementing their original content. Using them, it is possible to significantly accelerate the solution of a pressing problem in Russia: formation of a creative personality of students.

**Keywords:** creativity, creative thinking,

#### Аннотация

В данной статье рассматриваются теория и практика многоуровневой системы непрерывного инновационного образования. Подробно рассматривается педагогическая система многоуровневого непрерывного творческого образования, выдвигаются достаточные творческие педагогические методики для формирования творческого мышления и развития творческих способностей учащихся. Инновационные методы обучения в непрерывном формировании многоуровневой системы творческого мышления обеспечивают основные принципы обучения за счет изменения структуры уроков и реализации их оригинального содержания. Используя их, можно значительно ускорить решение актуальной в России проблемы - формирование у учащихся и студентов творческой личности.

**Ключевые слова:** креативность, творческое мышление, педагогические технологии, научно-технический прогресс, психологическая нагрузка, дидактические принципы,

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pedagogical technologies, scientific and technological progress, psychological relief, didactic principles, imaginations and fantasies, propaedeutics, motivation, divergence, su-field analysis.

## Introduction

At the head of all scientific and technical achievements is a man, an integral part of the Universe. Here there is a main contradiction in the development of civilization: on the one hand, scientific and technological progress is necessary for a person to improve his living conditions, on the other hand, scientific and technological progress destroys nature and threatens the destruction of civilization. How can this contradiction be resolved while the last chance of survival remains? Creativity of young people, morally and spiritually educated and possessing knowledge, will save civilization.

Today, the state of the environment is a shocking factor undermining the health of the younger generation. A lot of people consider the rapid scientific and technological progress to be the culprit of this situation. The people, in their irrepressible desire to conquer nature, use this powerful force, they cause irreparable damage to nature. The "green lungs" of the Earth are rapidly shrinking, and forests and natural filters, ozone layer, are being destroyed. The Earth's rotation rate began to change. The anthropogenic movement of huge water from the equator to high latitudes is changing the climate. The great destruction of nature is a catastrophe caused by various accidents and unlimited increase in energy consumption.

Scientists argue that people in the foreseeable future will burn coal, oil, gas and pollute the environment for a long time.

An important factor in the development of scientific and technological progress should and can be a moral standard for improving technology, for it is morality that is the basis of human existence. What is observed in society today? At present, moral and spiritual deficiency is endlessly decreasing, crime, drunkenness, drug addiction and other undesirable phenomena are growing. One of the main reasons is that some people have not been able to fully demonstrate their ability to self-realization as a person.

We can assert that public morality is determined by the process of self-realization, and self-realization depends on how free a person is in

воображения и фантазии, пропедевтика, мотивация, дивергентность, вепольный анализ.

self-expression and how independent and creative this process is.

What should be the educational model? First of all, the upbringing of the future person and the upbringing accompanying him will ensure a high level of morality realized in the artificial objects he creates: structures, technologies, etc. Secondly, it is necessary to create innovative system for training young people at all levels of the educational chain, focusing on these goals. The development of technology should be aimed not at blind conquest or transformation of nature, but at its restoration and protection. Thirdly, many problems should be solved in the same way as nature: without waste. It is necessary to develop a wide range of specialists with a high degree of ecological culture, ecological thinking, capable of calculating the impact of decisions made on the natural environment in the coming decades and centuries. In addition, the environmental friendliness of the solution, adherence to high ethical standards should be beneficial to individuals and enterprises.

The existing traditional system of education, including university education, is not focused on educating primitive thinkers capable of creating intellectual products that are governed in an ethical environment and ensure the survival of civilization.

Now, a unique opportunity has been created to implement this idea, improve the moral and physical health of the country and increase the overall creative potential of society and the country.

The panacea is creativity in the broadest sense. There is personal purification and enlightenment in creativity, which acts as a force that guides a person to all possibilities, creates environmental and social useful ideas for their active implementation. Creativity is a powerful source of accumulation of positive emotions, which, as philosophers, psychologists and educators have shown, helps to increase human potential and longevity.

Scientists have proven that every mentally normal person is essentially a creator. Creativity

is not the lot of the elite, but a biological need that is often not recognized by the individual.

All this requires a special approach to the development of the student's personality through all links of the sequential educational chain: from kindergarten to university and beyond.

The search for creative non-traditional solutions is possible with the help of such a new science as a modern approach to creativity. Russian scientists and teachers accumulated experience in theoretical creativity and innovative pedagogical methods of teaching young people of different age groups.

In particular, the theory of inventive problems, developed by the outstanding Russian scientist, engineer-inventor G.S. Altshuller, is widely popularized, improved and introduced into practice (Altshuller, 1979).

### **Theoretical Basis**

Intellectual tools and mechanisms for solving problems of the theory of invention are universal and applicable to all areas of knowledge using the theory of solving the problems of invention as a science, discovering the laws of development of technological systems and turning them into tools for solving complex problems, while simultaneously solving the global problem of mankind: survival of civilization. Our planet suffers from the fact that people are increasingly rebuilding it for themselves. The methods of the creative theory of solving creative problems will allow not only accelerating progress without disturbing the environment, but also to predict, prevent accidents, disasters and eliminate their consequences (Tikhonov, 2020).

We need a multifactorial approach to understand the nature of preparing young people for their future careers and life in new social conditions. This is reflected in the programs of educational institutions and is focused on teaching and upbringing, first of all, on developing the creative abilities of pupils and students, creating real conditions so that they can feel like a person, showing responsibility for their actions and future activities (Ospennikova, 2002). This is achieved by the direct involvement of students in creative activities and educational work, which is based on the purposeful disclosure and development of creative potential and interests, creating conditions for maximum self-realization of future specialists and of particular importance

are creative activities and creative communicative environment (Novikov, 2003).

### *Prerequisites and basic principles of multilevel continuous creative education*

Pedagogical research related to the formation of the structure of engineering thinking and the development of students' creative abilities in university practice prompted the author to think about the need to find out why the reproductive program of the cognitive activity of students at all levels of the traditional education system is so firmly rooted. It turns out that one of the reasons is the mistake of the teacher-researcher when choosing the subject of research. This led to serious methodological errors and subsequent errors and underestimations in popular teaching practice (Zinovkina, 1987).

This idea was used in scientific works by Russian scientists-teachers and A.M. Novikov officially confirmed this. He revealed that the object of didactic and methodological research for quite a long time was the process of formation of knowledge, abilities and skills, which is the biggest blunder of all Russian pedagogy. Now we are talking about the need for pedagogy aimed at personal development, which significantly changes not only the direction and content of pedagogical research, but also the entire educational practice (Novikov, 2003).

It is not surprising that international pedagogical research conducted in the field of natural sciences shows that students in Russia have an encyclopedic amount of knowledge, but at the same time they have the lowest indicators (in contrast to other countries participating in the experiment) in the ability to use this knowledge in standard situations and practically zero in solving non-standard problems (Kovaleva et al., 2004).

It should be emphasized that new educational model requires new educational goals focused on the development of the personality, formation of its creative qualities, which requires new methods, development of new teaching principles and adjustment of traditionally existing, new developments, adaptation to new goals, creative and innovative teaching methods. They should include, as an organic whole, the provision of computer support in the form of computer intelligent systems, technical means of stimulating creativity and development of creative abilities (intellectual warm-up, puzzles made in the form of material objects such as

metal, wood, plastic, etc., objects that amaze the imagination, causing surprise).

Until the last decade, there was a strong opinion that it is enough for a university teacher to understand his subject well and transfer this knowledge to a student so that the student eventually learns to think for himself, but the practice has proven that this is not the case.

Educational research shows that few graduates are able to solve job challenges after college. The main quality of graduates is not ready for this and cannot independently and creatively solve almost any real problem.

Therefore, for the comprehensive training of future specialists, in addition to transferring the foundation and core of knowledge, it is necessary to specialize in teaching students and students to think in a general way of creative thinking.

Only in the interaction of these two processes we can qualitatively prepare a modern specialist for creative activity, who can easily adapt to rapid changes in production and information technology, live and work in such difficult conditions.

But it is not easy to teach students to think, develop non-standard ideas and implement them. This means that it is necessary to teach them, first of all, effective ways of creative activity: creative methods and theories of solving creative problems.

Here we can say that an effective method for solving the theoretical problem of invention was born in Russia, and no country has a sufficient amount of literature and specialists capable of teaching students. It should be used to enhance the creativity of students.

It is also necessary to teach students to overcome the psychological inertia of thinking, that is, to overcome the stereotypes imposed by traditional education and accumulated life experience; it is necessary to develop creative imagination and teach methods for its development. Without a highly developed imagination, it is impossible to imagine the expected result of a creative solution, even with all the intelligent tools and mechanisms of creative methods.

The development of creative imagination and thinking is a long process, therefore, in order to achieve a satisfactory result, it is necessary to start from childhood.

Therefore, there is a need for a multi-level system of continuous and creative education, which will become one of the elements of the education system at all levels.

### Methodology

A multilevel system of continuous creative education, including all levels of education (preschool institutions, schools, stadiums, vocational education institutions in primary and secondary schools, universities and postgraduate vocational education institutions) (Tikhomirov, 2006).

The strategy for the implementation of such education provides for the introduction of a central training module on the topic "Development of creative imagination" and creativity. The module brings together all disciplines studied by educational institutions on the basis of "development of creative imagination" and creative methods. The proposed strategy is used to develop and implement creative teaching methods (Zinovkina & Khokhlov, 1995).

Here, an important factor in the system is the continuity of the creative development of students, as well as a system-forming element: creative activity of students in the learning process. A distinctive feature of the system of continuous formation of creative thinking is that the student and the studied object of learning become the subject of creativity, while the educational material (knowledge) on the mastered topic becomes the subject of the realization of some creative goals.

The multilevel system of continuous creative education for the formation of creative thinking includes (Shlenov et al, 2005):

- development of creative imagination and fantasy;
- theory of the development of a creative personality;
- continuous development of creative thinking and development of the creative abilities of students;
- strategic creative education in preschool institutions;
- school strategy for creative education;
- strategic creative education in institutions of primary and secondary vocational education (continuous technological development of creative thinking and the development of students' creative abilities);

- university of strategic creative education (continuous formation of creative engineering thinking and development of students' creative abilities) (Utemov et al., 2013);
- strategy for postgraduate professional development that improves the creative skills of teachers and specialists;
- computer foundations of technical creativity and intellectual thinking;
- engineering creative basis and support for computer intellectual thinking (Gareev et al., 2013).

The goal of each subsystem of continuous formation of creative thinking is to form in the educational process the main characteristics of the creative personality of a student: creativity, spirituality, intelligence, professionalism, strengthening moral and physical health, ensuring self-development, self-discipline and self-realization (Zinovkina, 2013).

The system of continuous formation of creative thinking not only provides university graduates with all the means, tools and mechanisms of all engineering creativity for further creative engineering activities, but also prepares them for a moral and creative lifestyle.

As a result, the likelihood that graduates will continue to improve them after leaving school increases by an order of magnitude.

These creative tools are necessary not only for the work of a young specialist-graduate of the university. For the teachers of various departments of the university: humanitarian, general scientific, general technical and special, the system of continuous formation of creative thinking is preparation and testing, an inexhaustible source of educational and creative tools, and therefore, starting with the training of specialists-consumers of knowledge and moving on to the preparation of active ones, creative professionals.

## Results and discussion

In our case, it is not easy to look 30 years ahead, to see the outlines of new teaching principles, to abandon the rapid success of modernizing the old system and give priority to the dubious many and unknown, at that time to replace the traditional one, the most striking thing is that even if the traditional system is significantly outdated and worn out, has exhausted itself, without any hope of creative success, the outdated system continues to absorb the lowest level of teaching

improvement, it is impossible to restore it. There are social reasons for this. There is no point in talking about them here, it does not matter.

This system is the center of student, academic and team training for group identity. Teaching students the way of creative activity and providing them with experience in solving real creative engineering problems through the inclusion of their active creative activity in the educational process, through co-creation with teachers: through the implementation of the "intellectual warm-up" system and creative tasks, formation of a system of creative technical thinking and the development of engineering skills and development of creative abilities. More and more complex systems of creative assignments with elements of research require students to independently formulate problems and conduct independent searches for additional knowledge necessary to solve creative problems; the content of the development stage, which ensures the formation of a system of creative thinking (general directions, structural activities, heuristic games, algorithmic block diagrams, problem situations, practical stages and dialogues with computer heuristics), provides the creation of "original tasks-algorithmic means of presentation and presentation of educational information". These are integrated algorithms, system block diagrams, algorithms, problem cases, graphical models of structural units and machine parts, system information, "core" of educational information topics, new organizational forms: laboratories and computer workshops, including heuristic dialogues "student-computer" on the basis of calculated machine components, new forms of examinations, forms of heuristic dialogues-games to the materials of production activities and examination recommendations, practical exercises using computers, etc. (Zinovkina & Gareev, 2000).

At the moment, the situation shows that the center of the system is not the abstractness of the average student, but the amount of knowledge and personal approaches, and further consideration of the psychological characteristics of the student's personality, his personal style, orientation towards communication in the educational process (including communication with a computer in a creative group), more and more attention in the educational process is paid to the use of multimedia teaching technologies. Considerable attention is paid to game development, game theory and their technologies (Semenova & Slepukhin, 2013).



Based on the results of the promotion of new concepts of teaching and innovative technologies, as well as the results of research by educational scientists and psychologists, developers of theories for solving the problems of invention, it is necessary to use the pedagogical foundations of a multi-level system of continuous creative education in the learning process at all levels of education. The goal of this holistic pedagogical system is the constant formation of a systemic, multi-screen creative thinking and the development of the creative abilities of students, and as a result, the development of a creative personality (Zinovkina, 1999).

The secondary goal of the system is the formation in the learning process, first of all, of divergent thinking and the upbringing of creative qualities.

The creative technology of the system of creative thinking is constantly being formed, aimed at unraveling the thoughts of special education students with a positive emotional background, friendly creative educational environment and organizational forms (up to the exam), freedom of thought in the classroom, freedom of students' choice of creative tasks and project leadership, principles of teaching co-creation, extensive use of the principle of competition and the principles of teaching "Docendo discimus" ("While teaching, we learn ourselves"), etc.

However, in the changing socio-economic conditions of the country, the prospects for the entry of the Russian education system into the world educational space, the avalanche-like growth of scientific and technical information, computer technologies, information technologies and their rapid aging, the development of telecommunication networks on a global scale, rapid changes in production technology and the acceleration of the necessary scientific and technological progress, among other characteristics, first of all, required the creative preparation of modern people for life and work in such difficult conditions. Therefore, a person must prepare the entire education system for them. Thus, scientific and technological progress and the requirements of modern society force the education system to immediately change its teaching principles and thereby change teaching methods, although 30-year-old pedagogical forecasts not only require this, but also provide the necessary ways, methods and means (Tikhomirov, 2006).

Analysis of these requirements and educational pedagogy shows that the most acceptable should be multi-level continuous creative education, the ultimate goal of which is the formation of a high degree of mental and physical health, a creative personality through the educational process at all levels of education (preschool education, school, primary and secondary vocational education, higher, postgraduate education) (Tarakanova, 2016).

The subsections are listed below in the order of continuous formation of the basic pedagogical principles that are inherent in the entire system of creative thinking through creative and innovative pedagogical techniques in the learning process: diagnostic principles for individual students and study groups, principles for the development of their own intellectual activity, for the formation of creative thinking, for theory creative thinking, developed on the principles of a standardized program, for co-creation, for teaching the method of creative problem solving, experience of accelerated assimilation, for complexity, for problematic and algorithmic topics, for a positive emotional background, for method of creative problem solving with the theory of artistic topics, for formation systems thinking, for conformity to nature of the decisions made, for communication, for "Docendo discimus", for democratization of the educational process, for competition, for continuous support of computer intelligence for the development of creative thinking and creative abilities of students (Zinovkina, 1998).

Innovative teaching methods in the context of the continuous formation of a multi-level system of creative thinking ensure the implementation of the above basic principles of teaching by changing the structure of lessons and their original content: for example, the structure of a double creative lesson (as an option):

1. Motivation is a carefully selected system of original surprise items that can surprise students. This block provides motivation for students to learn and develop curiosity;
2. Content contains course materials for training courses and provides the formation of systems thinking and the development of creative abilities;
3. Psychological relief is a system that achieved through exercises to coordinate the development of the cerebral hemispheres, through automatic training, through sports and emotional-play systems, dramatization, etc.;
4. Puzzle is an increasingly complex system of puzzles, embodied in real objects, realizing

an original, ingenious idea in design. The puzzles are age-adapted to provide incentives and inclusiveness for students in the classroom to develop creativity and spatial imagination;

5. Intellectual warm-up is an increasingly complex system of tasks aimed at developing students' motivation, divergence, logical thinking and creativity;
6. Support for computer intelligence provides: motivation and development of thinking, system of more and more complex computer puzzle games, adapted to the age of the student and transition from an external plan of action to an internal plan;
7. Summary that provides feedback to students on the course and give a high-quality and emotional assessment of the course. This does not mean that we should completely abandon reproductive training. It is just that his share in training should be kept to a minimum.

The transition to a new scheme is very difficult. It is necessary to introduce a general cycle of mastering the course on creative methods: science of methods and techniques (cunning, bold and unexpected) for solving creative problems.

A creative approach provides teachers and students with intellectual tools for the formation of creative systems thinking, teaches them to look at the world systematically and manage thought processes. In addition, the presentation of knowledge should be such that students understand it. For this purpose, the authors have developed a presentation in the form of the considered algorithm and presentation of basic educational information (Lukmanova et al., 2018).

When organizing such an educational process, the most important factor in ensuring its effectiveness is the continuity of creativity in education at all stages.

The system includes all main links of the educational chain and is a super system in relation to the education system of ordinary schools

This program for different schools can be adjusted, but in any case, all programs will have something in common that unites them: this is the general cycle of mastering the course "Fundamentals of the methodology of creativity and computer intellectual support for thinking", which is organically connected with the

humanities and natural sciences and becomes a systemic education (Zinovkina, 2012).

The central block is a cycle of disciplines based on the foundations of the method of creativity and computer intellectual support, based on the theory of inventive problem solving. At the same time, the study of the foundations of creative methods is the following (Mikhailov et al., 2014):

1. In elementary school (1-4 years), including propaedeutic classes, taking into account age-related psychological characteristics, they study the subject of "development of creative imagination and fantasy". Systematic dialectical approach to propaedeutics is carried out, and psychological conditions are created for students to accept tasks. The course is structured in such a way that at first the child's personality is studied with the help of approved psychological and pedagogical tests. In the future, classes alternate with methods and techniques for the development of entertaining and creative imagination and imagination, as well as with motivational methods (methods aimed at increasing cognitive activity and interest in learning), methods of developing a person's creative abilities and creative qualities, in particular with ensuring the need for self-development.
2. In addition, in the middle class (5-9 years), on the basis of the subject of "development of creative imagination and fantasy", intellectual means and mechanisms of modern creative methods (in particular, the theory of solving creative problems) are studied, which ensures the development of systemic creative thinking. The tools of the theory of solving inventive problems are transferred to subject areas, initial information is given on the theory of the development of a creative personality, laws of systems development, principles of sub-field analysis and various effects (physical, chemical, mathematical, etc.) (Novikov, 2003);
3. In the senior grades (10-11 years), on the basis of "development of creative imagination and fantasy" and formation of systematic thinking, the complex use of theoretical tools for solving creative problems (taking into account the profile of training) is being worked out (Tikhomirov, 2006). The need for research work is being raised.

It should be emphasized that the elements of the method are used in the disciplines of primary, secondary and higher art education in the humanities cycle and within the natural cycle, involved in the theory of the development of a creative personality. This is achieved through continuous training in the use of elements of creative methods in all areas of knowledge, which expands the erudition of students and gives them the opportunity to test the universality of creative methods in practice. In essence, this means not a declared, but a practical transition from the school of knowledge to the school of thinking (Zinovkina & Gareev, 2000)

### Conclusion

As we can see, the multilevel system of continuous creative education is increasingly strengthening its position not only in Russia. It is also in demand abroad. Now teachers of schools and other educational levels need to prepare for changes in pedagogical thinking, since modern pedagogical activity is a process of constant development of the creative potential of the student's personality (Zinkevich, 2012).

Time has proven its clarity and relevance. It contributes to the development of multilevel continuous and innovative education.

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