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Differentiation of Creative Mathematical Problems for Primary School Students

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ABSTRACT
The purpose of the study is to reveal a method that will help arrange creative mathematical problems for the development of creative competences of the basic school students. The main method here is modeling of creative mathematical problems taking into account the complexity levels of the tasks in accordance with the systemic scale and the requirements for the formulation of creative tasks in basic school. The article presents author's approaches to the differentiation of creative mathematical tasks for basic school students in accordance with the systemic scale, which were formed by adaptation of creative problem solutions classified in terms of their degree of difficulty and the quality of the obtained results, considered in the theory of inventive problems solving. The author proposes a system of requirements for the creative mathematical problem such as the contradiction in the condition of the problem, the sufficiency of the condition, the rectitude of the question, the independence of facts, the completeness of information, and scientific consistency. The system of requirements allows to preserve the didactic value of the proposed mathematical problem. As a result of experimental research and experiential teaching using creative mathematical tasks, the proposed differentiation and the system of requirements for the condition were successfully tested. That contributes greatly to the development of creative competencies of students in the basic school and their ability to solve creative math problems. Practical use of creative mathematical problems makes it possible to increase schoolchildren's interest to study mathematics and show interdisciplinary connections with various disciplines, e.g., informatics, chemistry, biology.
Keywords: mathematical education, children, creative tasks, the systemic scale

INTRODUCTION

Updating the requirements of modern society to the personality changes its paradigm: flexibility, the ability to formulate new ideas, originality of thinking in solving problems that arise in the process of vital activity increases the value of a person. Today, this aspect is poorly reflected in scientific research on education within the school subject. A creative person easily adapts to new conditions, finds ways to overcome the difficulties encountered, and achieves higher labour productivity. Among the tasks defined in federal and regional educational standards, for example, in the Federal State Educational Standard for Basic General Education, which was approved by order No. 1897 of the Ministry of Education and Science of the Russian Federation on December 17, 2010, there is one that requires the need of upbringing an individual with a developed intellectual potential, contributing to the development of creative competencies of students (Ministry of Education and Science of the Russian Federation, 2010). This is on the one hand. On the other hand, the peculiarity of the educational process arrangement is the

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State of the literature

- Updating the requirements of modern society to the personality changes its paradigm: flexibility, the ability to formulate new ideas, originality of thinking in solving problems that arise in the process of vital activity increases the value of a person. This aspect is poorly reflected today in scientific research on education within the school subject.
- In the literature on the theory and methodology of mathematical education, the problems of the creative competence development for the mathematics study of the students in main school are poorly investigated.
- The overwhelming majority of research in mathematical education is aimed at teaching subject knowledge and skills, while the potential of school mathematics can be used to develop the creative competencies of students.

Contribution of this paper to the literature

- We suggest using creative mathematical tasks in the basic school which take into account differentiation of complexity and requirements for formulating the conditions of these tasks. Their goal is the development of the creative competence of students.
- The systemic scale developed through the adaptation of creative task solutions classified according to their degree of difficulty and the quality of obtained results, which were considered in the theory of solving inventive problems by G. S. Altshuller, were used for the first time.
- To preserve the didactic value of a mathematical task when it is reformulated into a creative one, we suggest testing the condition of the task on the correspondence with the system of requirements: a contradiction in the condition of the task, the sufficiency of the condition, the rectitude of the question, the independence of the facts, the completeness of information and scientific consistency.

centralization of efforts around the subject being mastered. But, for example, among the aims identified in the Concept of Mathematical Education Development in Russia, the unified goal of school mathematical education is defined-the development of student's personality on the subject, personal and creative levels by means of Mathematics (Concept of Mathematical Education Development in the Russian Federation, 2013). The indicated items focus on the need to develop creative competence of students in the study of school subjects.

The problem of creativity development as an ability for inventiveness attracted close attention of researchers since the nineteenth century. Increased interest in creativity development was due to a conditional division of thinking into divergent and convergent, proposed by Gilford (1967; 1969). Programs for the development of creative thinking established on the basis of his theory, are in great demand in developed countries, and are used in modern educational systems. In the opinion of Episheva and Krupich (1990), a specific feature of the intellect is, first of all, a generalized cognition ability to create and solve problems. It is the tasks in mathematical education that are used as means of submission, consolidation and verification of material learning. Using creative mathematical problems at the lesson allows students to learn alternative solutions and choose the best results, thereby to promote the development of creative competencies.

The creative mathematical tasks at the lesson are primarily educational tasks. Educational creative task satisfies the following criteria requirements: latency, uncertainty, availability and semantic context presence. The degree of certainty for the educational creative task content determines the situation of intellectual and creative activity formation: orientation, search, transformation and integration. But taking into account the level of intellectual and creative activity development of a particular student, the teacher should change the intellectual and creative potential of the educational task. Potentials of creative tasks can be determined by differentiating their complexity. There is no differentiation for the complexity of creative mathematical problems in the psychological and pedagogical literature. In addition, enriching the educational task in mathematics with the creative component for the preservation of the value of the subject learning, it is necessary to have a formalized set of requirements for the condition of the given task that is not studied in mathematical and methodological researches.

Aims and objectives of the study

The purpose of the study is to identify a method of formulating creative mathematical tasks for the development of creative competencies of the basic school students. The author's approaches to differentiation of creative mathematical problems for the basic school students according to the systemic scale are obtained through the adaptation of creative task solutions classified by their degree of difficulty and the quality of the results obtained, and are considered in the theory of the inventive problem solutions by Altshuller (2004). It is also important to describe the requirements for the conditions of creative mathematical tasks obtained in parallel with subject learning results.

LITERATURES REVIEW

The importance of creative activity in mathematics and in teaching mathematics was emphasized by outstanding mathematicians Arnold (2002); Gnedenko (1979); Courant & Robbins (1967); Poincare (1983); Khinchin (1989); and others. The need to arrange creative activity in the teaching of mathematics in secondary school and supplementary mathematical education was noted by specialists in teaching methods Balk (1969); Gusev (2003); Episheva & Krupich (1990); Poya (1991); Schwarzburd (1964); and others.

The analysis of psychological-pedagogical and mathematical-methodical literature shows the consideration of creative mathematical tasks at the lesson primarily as educational tasks.

Sriraman (2009) considers creativity as one of the key skills of a specialist in mathematics. He also examines the problem of mathematical creativity results aesthetic harmonization (Liljedahl & Sriraman, 2006).

Rosli et al. (2015) describes studies showing the difficulty in solving mathematical problems on the creative level among mathematics teachers. According to his data, difficulties arose at the stage of communication and interpretation of the obtained results.

Craig (2016) considers the theory of structural level as one of the creative competencies; developing means to decrease arising difficulties of students in solving mathematical problems with the help of heuristic strategies. Moreover, this creative strategy allows us to teach the student the ways of mathematical problems solving.

In the field of natural science education, issues of improving the evaluation of creative problem solving are considered through the use of language technologies and computer training methods. It is more rational to use open questions or tasks for the evaluation of creative solutions to problems (Nohda, 1988). Automated classification schemes for open questions are analysed in Wang, Chang & Li, 2008.

According to the results of Devecioglu-Kaymakci's (2016) research among the creative competencies, it is necessary to pay attention to the ability to interpret. The method of interpretation used in the lessons of mathematics does not only increase student's progress in studies but also improves skills in scientific research. For this purpose, the proposed analogies should be well planned and deployed for teaching. The number of exercises in textbooks suggesting an interpretation, and the transition between concrete and abstract operational concepts should be increased. As a special case of these results, the approaches to the development of thinking with analogies as the basis for creative mathematical thinking is considered in Holyoak & Thagard, 1995.

Particular attention is paid by a number of researchers to the fact that the emphasis on the creative competence development can worsen the subject learning results. For example, students studying the subject by intensified program, may show learning results lower than other students (Cheng & Ou, 2017).

Clement (2008) considers processes based on imaginary simulation modeling as the basis for development mechanism of creative competencies.

From the point of view of Vygotsky (1996), training is not a development; but correctly organized training of the child leads to mental development, brings to life a number of such development processes that are impossible beyond the training. Training is, therefore, internally necessary and universal at the moment in the development process of the child: not natural, but historical features of a man. This can serve as confirmation of the need for creative development of the student through the learning of the school subject.

Silver's (1997) studies show that creativity can be viewed as an orientation or inclination to mathematical activity that can be widely spread among students in a basic school. Creative mathematical tasks are considered to expand the students' abilities in relation to the main aspects of creativity: smoothness, flexibility and novelty. A number of studies pay attention to the need for "learning creatively" rather than "teaching creativity" (Bolden, Harries & Newton, 2010).

The introduction of mathematical creativity in the educational process is discussed in the works of a number of foreign scholars (Savic et al., 2017; Pehkonen, 1997). Other researchers have found the conditions for the formulation of a mathematical problem that were most effectively resolved by the students. For example, a task containing numerical information is solved more quickly (Leung & Silver, 1997).

MATERIALS AND METHODS

Methods of research

The following methods were used to carry out the research: analysis of psychological, pedagogical and mathematical methodological literature on the research topic, analysis and generalization of the teachers' and own experience in conducting math classes in basic school, the method of thought experiment, forecasting, systematization and summarizing of facts, designing, analysis of the results of educational activities, development and application of educational materials in school education, diagnostic techniques, pedagogical experiment.

Experimental research base

Experimental work is carried out:

- by conducting experimental teaching of mathematics in the basic school and instructing teachers on materials developed by the author (Gorev & Utemov, 2014). The total number of trainees from 2009 to 2016 was 287 pupils of grades 5–6;
- in the framework of educational courses to prepare for the creative competition "Sovionok", schoolchildren were trained with the help of the following courses: "Heuristic methods of thinking and activating creativity" (Gorev & Utemov, 2010), "Sovionok's school: on the way to creative thinking "(Gorev & Utemov, 2011), "Sovionok's Magic dreams" (Gorev & Utemov, 2012), "Expedition to the world of creativity" (Gorev & Utemov, 2013), "Creative walks under the stars" (Gorev & Utemov, 2014), "Sovionok's exciting voyage" (Gorev & Utemov, 2015), "Sovionok's significant events" (Gorev & Utemov, 2016). 639 students of 5–6 grades took part in the experiment;
- in the form of reports and speeches at scientific conferences and seminars of various levels, including international publications in scientific articles reviews and scientific-methodical periodicals.

Stages of research

The research is conducted in three stages.

At the first stage the state of the studied problem in the theory and practice of teaching in the school education was investigated. For this purpose the study and analysis of psychological, pedagogical, mathematical and methodological literature on the researched problem, observation and analysis of mathematics teachers' work experience were carried out in order to study the creative mathematical problems used in 5–6 grades and variations of their complexity level.

At the second stage, methods of formulating creative mathematical tasks for the development of basic school students' creative competences were developed. The selection of tasks for the course was carried out that resulted in ten workbooks for students and in the format of a manual for the course (Gorev & Utemov, 2014). There, an approach to the differentiation of the complexity of the creative mathematical tasks is defined and the requirements to their conditions are described.

Simultaneously with the second stage *the third stage* has been and continues to be implemented, during which the author and his followers-teachers of mathematics in the schools of the Kirov region and other regions of Russia-conduct experimental teaching of mathematics with the use of creative mathematical tasks in 5–6 grades.

RESULTS

The complexity levels of creative mathematical tasks

To determine the complexity levels of creative mathematical tasks, let us consider the classification of the solutions of the creative tasks according to their difficulty degree and the quality of the obtained results by Altshuller (2004). To make this possible, we select five levels of problems.

First level. We use those means which are directly intended for this purpose; the ready solution for the prepared task is used.

Task 1. A traveller Jack cannot get to England in time – there is no passing ship. And if he is late, he will lose a bet and a lot of money. Jack has to hire a beautiful steamer with wooden superstructures and, without a moment's hesitation, goes on a voyage. England is already within his reach but, unfortunately, the steamer runs out of coal – and the engine stops working. Where can they take fuel in the sea?

The solution of the problem is at the first level. Instead of coal, the wooden parts of the steamer were burnt in its furnace. The ship arrived on time.

Second level. We selected one of the few alternative solutions to the problem, which is also chosen from several possible.

Task 2. A small turtle likes crawling around the house, getting under furniture, hiding in the corners, but it is not always possible for it to get out of such places. The owner is very worried when he cannot find it on the spot. Think of the way how to determine the place where the turtle hides.

Solution of the problem is at the second level. We will attach a bell to its shell; when the turtle moves, we will hear where it is.

Third level. The original task is changed, the usual solution is changed.

Task 3. Paint all the colors of the rainbow, and you have only one simple pencil at your disposal.

The solution of the problem is at the third level. Find a stable association of the color with the object and draw it. For example, if you draw an orange then everyone will understand that the color is orange.

The fourth level. A new task and a new solution have been found.

Task 4. Every day new medicines are synthesized in the world. All of them must be tested. The drugs' actions are tested on different animals usually. But it is a long and expensive procedure, and we need great quantities of the substance. What is the best way to check new medicine when you have a very small quantity synthesized? How can you check if they act at all?

Solving the problem is on the fourth level. A check on sensitivity for new drugs is often carried out on spiders. Under the influence of medicine, we can easily detect their erroneous actions: the web design is an accurate report about the functional state of the spider's nervous system. Even with negligible medicinal doses, they begin to weave "wrong" webs.

Fifth level. A new problem is found, a new principle is established suitable for solving not only this but also other tasks and problems.

Task 5. When manufacturing a grinding tool, small diamond grains having the forms of pyramids must be arranged, but not in chaos, they must be in a certain order with the point up. What is the solution?

The solution of the problem is on the fifth level. The solution may be connected with the use of a magnetic substance in grains of a strong magnet. And the idea of using an intermediary – a magnet – is very fruitful in scientific and technical creativity.

It is worth noting that there is not a proper task in educational creative subject tasks at first. It is necessary to formulate it from the problem situation that arises before a student. The identified problem can be solved at different levels of difficulty. Most creative task solutions are those of the first three difficulty levels. The task solution of the fourth and the fifth levels more often belong to scientific field and not to applied subjects, so at first we need to make a subjective discovery and then rely on the new scientific knowledge to solve the task. Having analyzed the difficulty levels of solving problems, we propose a classification according to their complexity. The creative mathematical problem is formulated on the basis of system analysis of naturally or artificially created problem situation. Thus, to determine the level of complexity, the idea of systematization is used. See **Table 1.**

We should note that the higher is the complexity level of creative mathematical problems according to the systemic scale, the higher it manifests the level of creative competence of students.

Requirements for the formulation of a creative mathematical task

It is important to describe the requirements for the conditions of creative mathematical tasks while ensuring parallel achievement of subject learning results. As part of our study, we propose to underline six requirements that are important in the training activity.

The formulation of a creative mathematical task should be interesting to the student, without losing didactic value of the problem at the same time. Within the framework of the study, we found and tested three main requirements for the formulation of this task.

1. *Education* is the social and pedagogical process. The process is movement, so the question arises about its driving forces. The well-known Soviet specialist in didactics, M. A. Danilov (1960), concluded that the main driving force of the educational process is contradiction. The contradiction in the condition of the task is the main requirement for an open task.

Task 6. Ancient people did not have clock. How did they manage to orientate themselves in time?

We should note that the task is not interesting, because there is no contradiction in the condition. There is nothing that contributes to the formation of internal desire to solve it. We reformulate the condition of the task taking into account the requirement of contradiction presence.

Task 7. The ancient people did not have clock. But shepherds always knew when to release cattle and when to drive animals back. And when to return home in the afternoon saving cattle from the scorching sun. How did shepherds know the right time?

There is a hidden contradiction in the formulation of the task: they could not know time without a clock, but they always returned on time.

It turns out to be a kind of formula: I NEED – I CAN / I CAN NOT - I WANT / I DO NOT WANT

The contradiction lies between the requirements of the curriculum "must" and the student's level of ability "I can / I can not"; besides, it is also between his ability "I can / I can not" and the learning motives "I want / I do not want". The requirement for the presence of contradiction makes it possible to provoke the student’s interest to the task (Kedrov, 1969).

Table 1. Levels of complexity of creative mathematical problems in accordance with the systemic scale

Level	Conditions	Task example
First level	The uncertainty of parameters; result, method, technology, means are defined in the condition	Imagine that you need to buy number plates. The apartment number is 429. But there is no plate with number 9 in the shop. *Decision*. Turn over the plate with number 6
Second level	Uncertainty of means that support technology; result, method and technology are determined in the condition	Often a carrier of rabies among wild animals is a fox. To prevent the spread of this dangerous disease, foxes in Europe were mercilessly killed for a long time. Finally, the vaccine against rabies was invented but you cannot force foxes to take the tasteless vaccine. What do we do? *Solution*. In the baits made of fish and fat, the capsule with the vaccine is put. They are placed in the habitats of foxes. Possessing a fine sense of smell, they easily find baits and eat them together with the vaccine. After one such mass action in Switzerland, rabies in animals was almost completely eradicated.
Third level	Uncertainty of technology (a set of scientific effects associated with each other), on which the method is based; method and result are determined in the condition	At the premiere of one of his plays, Bernard Shaw came out in intermission on the stage and addressed the audience: "Well, how do you like the play?" The startled audience did not immediately find the answer. And only one of them cried out: "Nonsense!" The situation is complicated. What should Bernard do? *Solution*. Shaw politely bowed to him and replied with a charming smile pointing to the public: "And I am of the same opinion, but what can we both do against the masses?"
Fourth level	Uncertainty of the result achievement method determined in the condition	The Kingdom of Tonga is a small island state in Oceania. It is located not far from the hundred and eightieth meridian. One of the Constitution issue says that Sunday is the day off. However, about thirty percent of the population are Seventh-day Adventists. According to their rules, Saturday is the day off. Hence, there are many everyday life problems. It is also unacceptable by neither of religious nor of economic reasons to make two days off. What is the way out? *Solution*. Tonga is located near the hundred and eightieth meridian that is the date changing line. And on the other side of this line is Western Samoa. So Tongan Adventists live according to the Samoan calendar. And when all other inhabitants of Tonga have Sunday, Adventists have their rest on Saturday. The Tongans have been living this way for more than half a century.
Fifth level	Uncertainty of purpose or the result in the condition	During the Second World War, there was a Yugoslavian government in exile in London. The King of Yugoslavia Peter the Second with his family lived in the apartments of Clarigis. The wife of the 20- years-old Peter the Second, Queen Alexandra, expected the birth of the Crown prince. But according to the Yugoslavian law of succession, the king must necessarily be born in the territory of his country. Peter the Second and courtiers were in a panic: the heir cannot become a king. And then there was no way to return to the territory of Yugoslavia. What must they do? *Solution*. The head of the British government Winston Cherchille found a way out. He obtained a special permission from the parliament which declared the number 212 of "Clarigis" hotel to be the Yugoslavian territory on the birthday of Prince Alexander for 24 hours. This happened on July 17, 1945.

In Hegel's philosophy, an important role is played by the concept of dialectics, namely, contradiction (negation) is the root cause of development (Hyme, 2006). By requiring the presence of a contradiction, we model the learning development of a child trying to overcome it.

2. In addition to the hidden contradiction, the condition of the task must contain all the data necessary for its solution, requiring no special knowledge. Sufficiency of the condition is the second requirement for creative mathematical tasks. Uncertainty of the condition means comprehension and supplementation of the task condition. The student is required to find in the literature the information necessary for solving it, and the information obtained in the formulation of the task and the information required for the search must be sufficient for understanding the problem and solving it.

Task 8. And what about finding the volume of irregular shape bodies? Propose a method of calculation and give some examples.

This is a creative task, but it is problematical to use such a task for educational purposes. To solve it a student must know or guess about the way to measure the area of irregular bodies. Let's reformulate it.

Task 9. The scientists of Ancient Greece and Rome were able to find area of irregular figures. For example, for calculating the area of arable land they mentally superimposed a few squares on the figure trying to cover it at most. Then the area of arable land was equal to the sum of squares area, and they knew how to calculate the area of a square. And what about the finding the volume of irregular shape bodies? Suggest a method of calculation and give some examples.

This formulation of the task makes it possible to interest even the students who are lagging behind in the learning of the material. After fulfilling the task it is easier to formulate methods for body volume measuring. Therefore, the sufficiency of the condition is an important requirement.

The condition of the task may be insufficient but logically follow from the formulation. A student uses his logical and abstract thinking imagining the missing data. The sufficiency of condition is the point that will support the interest of the student that arise after the contradiction. Putting the task with the formulation beyond the student's understanding at the given moment will reduce the level of learning motivation.

3. A problem containing the contradiction and sufficiency of a condition is formal if a student incorrectly interprets the question to the task. Therefore, the correctness of the question is also a necessary requirement for the formulation of creative mathematical problems.

Task 10. In the city you can often observe large flocks of birds flying at high speed. And how can you determine their meaning? Explain.

It is not clear what is required: to determine the way of birds' calculation or their speed? This condition contains an incorrect question.

We transform the task by formulating the correct question.

Task 11. In the city you can often observe large flocks of birds flying at high speed. It is not possible to calculate directly the number of birds in the flock – there are too many of them and the speed is high. Suggest a method that allows to determine the number of birds in the flock accurately.

This task can be called an educational creative task. We can easily find the answer to it, if we carefully read the beginning of the task condition: "the speed is high". If the speed is what prevents the calculation, you will have to find a way to "stop" them. For example, by taking a photography.

If the sufficiency and correctness conditions are requirements that the experienced teachers intuitively put in the condition of the task, a hidden contradiction does not often occur in educational tasks, although it is contradiction that characterizes the level of student's ability to solve educational tasks by himself.

In addition to the basic requirements for educational tasks, additional ones can be presented.

4. Independence of the facts mentioned in the formulation. Independence of facts makes it possible to intensify contradiction, to expand the range of the search for the answer, and eliminate the recurring facts in the formulation (Sidorchuck, 1998).

5. Completeness of information. The information provided in the task condition and the information available at a given moment (during a lesson, a circle, while doing homework, etc.) must be complete for solving the task. The condition can meet the sufficiency requirements for finding some solution, but the condition information will be incomplete to formulate several solutions and choose among them the most optimal.

6. Scientific consistency. The condition of the task, its solution and its answer must be correlated with scientific conceptions that have been theoretically substantiated (typical for all disciplines of the mathematical cycle).

Thus, we have identified the requirements for the formulation of creative mathematical tasks:

1. *the presence of internal contradiction in the condition of a task*: the main driving force of the learning process are contradictions;
2. *sufficiency of the condition*: the condition of the task must contain all the necessary data to solve it;
3. *the correctness of the question*: the student should not have difficulties with the correct interpretation of the task question;
4. *the independence of the facts mentioned in the formulation*;
5. *completeness of information*;
6. *scientific consistency*.

DISCUSSIONS

The analysis of psychological, pedagogical and mathematical-methodical literature shows the consideration of creative mathematical tasks at the lesson as educational tasks.

Any educational task must have certain criteria-based limits for its evaluation. Educational creative task meets the following criteria-based requirements: latency, uncertainty, availability and semantic context presence. The degree of certainty of a creative task content determines the situation of intellectual and creative activity development: orientation, search, transformation and integration. However, studies on the theory and methodology of teaching mathematics do not consider the intellectual level of a particular student and creative activity development correlated with the educational task proposed by a teacher. To take it into account, it is necessary to determine a way of differentiating the complexity of a creative mathematical task. In our opinion, this approach to differentiation of creative mathematical tasks can be used for the basic school students in accordance with the systemic scale obtained through the adaptation of the classifications for creative task solutions by the degree of their difficulty and the quality of the received results, considered in the theory of “inventive problems solving” by G. S. Altshuller. The discussed issue here is the opportunity to inject the fourth and the fifth levels of creative mathematical tasks to the educational process for the mass school.

Another issue being discussed is the tendency to go away from the subject matter in creative tasks composition. The results of our research concerning six requirements for the conditions of creative mathematical tasks may be useful here because they provide parallel achievement of subject learning results.

CONCLUSION

As a result of the analysis of various viewpoints on the problem of developing students’ creative competencies for high results achievement, we proposed methods of formulating creative mathematical tasks for primary school students. The methods solve two problems arising in teaching mathematics aiming to increase the influence on creative development of the personality. The problem of determining the complexity level of creative mathematical tasks is resolved with the help of differentiation in accordance with the systemic scale obtained through the adaptation of classifications for creative tasks solutions by their degree of difficulty and the quality of the received results, considered in the theory of “inventive problems solving” by G. S. Altshuller (2004).

The problem is that there are no requirements for the conditions of creative mathematical task that allow to preserve the subject value of teaching mathematics. It is resolved by considering six requirements for the task conditions revealed in the course of experimental teaching: contradiction in the task condition, sufficiency of the condition, correctness of the question, independence of facts, completeness of information, and scientific consistency.

Thus, the described methodical ways (levels of complexity and requirements for the creative mathematical tasks conditions), allow to build a purposeful and controlled system for the development of creative competences of students.

RECOMMENDATIONS

The materials of the article can be useful in practical terms for mathematics teachers of the basic school, additional mathematical education instructors who try to increase the level of their students' development significantly so they could help master their creative results for the mathematical material during school education.

A promising direction for the proposed methodological approaches is the development of criteria for evaluating creative mathematical tasks, which are connected with the complexity levels and a detailed description of complexity at other levels of education to build a succession of methodical approaches.

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