Volume-2 | Issue-6 Available online @
https://procedia.online/index.php/philosophy

Procedia
of Philosophical and Pedagogical Sciences

Shaping the Creativity of Primary School Students by Solving Problems with Mathematical Patterns

Djurakulova Adolat Khalmuratovna
Termez State University Department of Primary Education, adolatdjurakulova@gmail.com

Abstract. In order to somehow teach a student a rule, it is necessary to encourage a creative process such as solving a problem or coming up with a new way of solving it. The article deals with several ways of solving the problem aimed at forming the creative activity of primary school pupils by solving problems related to the search for mathematical regularities in the process of teaching mathematics.

Key words: primary school, mathematics, teaching process, mathematical laws, problem solving, creative activity, education.

INTRODUCTION.

Nowadays, the concept of teaching as a transmission of knowledge, skills and abilities to students is becoming insufficiently effective. Contemporary education is characterized by a rethinking of pedagogical values, so the formation of a person's creative qualities, the need and opportunity to go beyond the boundaries of what is being taught, is brought to the forefront.

Modern society requires not only performers, but also people who work creatively. At the heart of learning is the development of the child. It is important not just to impart certain knowledge to him, but also to develop his mental capabilities, not to let the little that is inherent in him fade away.

One of the most important areas of development in the school system is education that is oriented towards the maximum development of the individual in accordance with his or her characteristics, individual possibilities and aptitudes.

Our main task, therefore, is to encourage young people to acquire knowledge, to make them active, to show them the importance of mathematical knowledge for all practical activities and to train them to think creatively, which is so necessary in our time for every professional.

The problem of inclusion of creative activity in the learning process of primary schools' students arose in connection with the need to intensify learning. The issue also relates to the need to build up experience of creative work from an earlier age, as the opportunity to develop does not remain unchanged.

LITERATURE REVIEW AND METHODS. Psychologists note that up to 70% of a growing person's personality traits develop and manifest themselves before the age of 7-8. During elementary schooling, first in play and then in learning activities, the essential forces of the growing person are revealed, and the core of the personality is formed. It is well known that everything a child learns at this age remains for life.

It is effective to motivate the learner to a creative process, such as solving a problem or inventing a new way of solving a problem, in order to explain and teach the law fully in one way or another. In doing this research, it is not difficult to see that the child is essentially repeating the actions performed by the scientist in the research process. It is not, of course, a full-fledged scientific work, but it is a unique, substantially simplified form[2,78].

This explains the attention of scientists to initial learning, as it is here that the question of the direction in which personal development will continue is resolved.

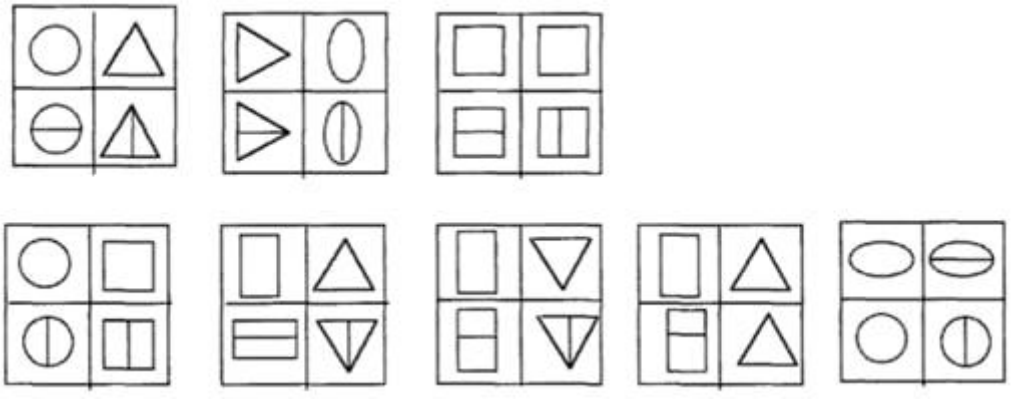
Consider the specific task of looking for patterns in terms of the formation of certain skills.

As noted in the previous chapter, the creative activity of younger pupils includes skills such as analysis, synthesis, generalization, comparison, concretization, abstraction.

Let's find out if our choice of pattern search tasks as a means of shaping the creative activity of young pupils is correct.

For example, let's take the task of searching for a common feature.

Task#1.



A B V G D

In order to solve this problem, the pupil has to do the following:

1. Analyse the problem by comparing the shapes inside the squares.
2. Connect (synthesize) the features identified by analyzing the figures within each individual square.
3. Making abstractions from concrete figures, generalize the knowledge we have on all the squares of the problem: a) they are congruent vertically and are equally oriented; b) there is a horizontal line (segment) inside the bottom left figure; c) inside the bottom right figure there is a vertical line (segment).
4. Concretize the knowledge obtained through synthesis and generalization for each figure

inside the squares of the second row.

5. The square, the figures inside which will correspond to all selected features, should be considered as the answer to the question of the problem.

The above points represent a scheme of solving problems on finding common features. It clearly shows that when solving pattern finding problems (we will not give schemes for solving all types of problems), there are such methods of mental activity as analysis and synthesis, generalization and concretization, comparison and abstraction.

RESULTS. We can make the assumption and further conclusion that solving tasks for finding patterns significantly affects the development of the abovementioned skills of mental activity. Of course, it is impossible to bring analysis and synthesis, generalization and concretization, comparison and abstraction up to the level of skill which is characteristic of an adult within the primary school. However, as our research shows, solving the proposed tasks makes a big step in the right direction (which will be illustrated in the description of experimental teaching).

As mentioned above, it is ineffective and unreasonable to form creative activities of younger pupils without a differentiated approach to pupils. Therefore, the same pattern finding tasks cannot be offered to all pupils. For this reason, we propose the use of the coefficient of constructing a task as a peculiar characteristic of pattern-finding tasks with geometric content.

But before defining the meaning of the term "construction factor" of a task, we shall note the following.

Psychologists have shown, and practice confirms, that small children (and not only them) are freer to operate with fewer objects, easier to orient in constructions of this or that kind, containing fewer elements. Therefore, it would be natural to draw the following conclusion: it is much easier for a child to work on linear construction tasks than on tabular construction tasks, because the first kind of task has three or four elements, while the second has nine or more. Consequently, it is more expedient to offer the younger pupils linear construction problems first, and then the tabular one.

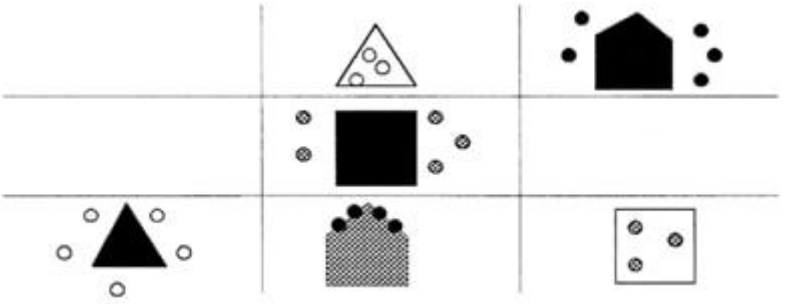
Variable features in tasks with geometric content may be as follows:

1. shape;
2. colour;
3. orientation;
4. positioning;
5. size;
6. Quantity, etc.

These indicators (the number of changing features and the number of different changes) were used in determining the coefficient of constructing a problem because they are the ones relied on by a pupil when solving any of the pattern search problems. This is evidenced by the above scheme for solving a common feature problem.

Let's show the definition of the constructional coefficient of a problem using an example (a

"nested" table-filling problem):



Task # 2.

This problem uses the following changing features:

1) shape of the figure (triangle, square, pentagon);
2) colour of the figure (white, black, grey);
3) number of circles (three, four, five);
4) location of the circles (inside, on the border, outside the figure);
5) colour of the circles (white, black, gray).

By weak pupils, in terms of predisposition to creative activity, we mean such children who are practically unable to carry out the creative process. All pupils of primary school age need tutelage from the teacher when it comes to creative activity (and not only that). However, pupils in this group require more attention than others. This is either due to neglect on the part of parents, and then the teacher, or due to some minor mental disorder. In order to avoid that, it is necessary to give as much time and attention as possible to this group of students. For this reason, we propose to limit the pattern-finding tasks for them to those with a construction coefficient of four.

At the same time, pattern-finding tasks with geometric content are aimed at developing general patterns, while pattern-finding tasks with arithmetic content form and develop both general patterns and special (mathematical) patterns[3, 153].

OBSERVATION. By general regularities we mean regularities of analysis, synthesis and generalization, which are the main specific regularities of thinking.

Let us give one example to each group of typing (it will be true for all tasks on searching for regularities built on any material).

Tasks for determining sequences.

Task # 3. Continue the series.

1. 2,5,8, 11,...

Once you see that each subsequent number increases by 3, you may continue the series as long as you like, repeating the table of additions of three.

When solving sequence problems, constant observation by the teacher is required, as the pupils will miss something when solving them on their own. This is especially the case with problems in which the numbers change in more than one way:

7, 9, 8, 10, 9,...,... (Grade 1).

The first number should be added to 2 and the second one should be subtracted from 1, thus continuing the row. When asking pupils to solve such problems, the teacher runs the risk that the series will either increase by 2 or decrease by 1. A test is therefore compulsory.

Tasks to identify transformations.

Task #4. 5+3=3+5, 4+6=...

In order to solve the problems of this group you have to see and understand what kind of transformation is taking place, in order to transfer it to the next pair of numbers (or one number).

The following problems are suggested for the second grade for knowledge of the multiplication table.

- Tasks to find a common feature.

Task#5. 3 - 8=... 4 - 6=... 8 - 3=... 5 - 4=...

9 - 8=... 6 - 4=... 8 - 8=... 7 - 9=...

Highlighting the common feature - the result of all the products is 24, students should solve all the examples of the second row before answering the question of the problem. The task is relevant when reinforcing the whole multiplication table.

Sequence problems.

Task #6. 2*3=..., 4 - 3=..., 6*3=...,...

Multiplication table by 3, the first multiplier in each successive product is multiplied by 2.

The following problems could be proposed for the third grade.

- Tasks for determining sequences.

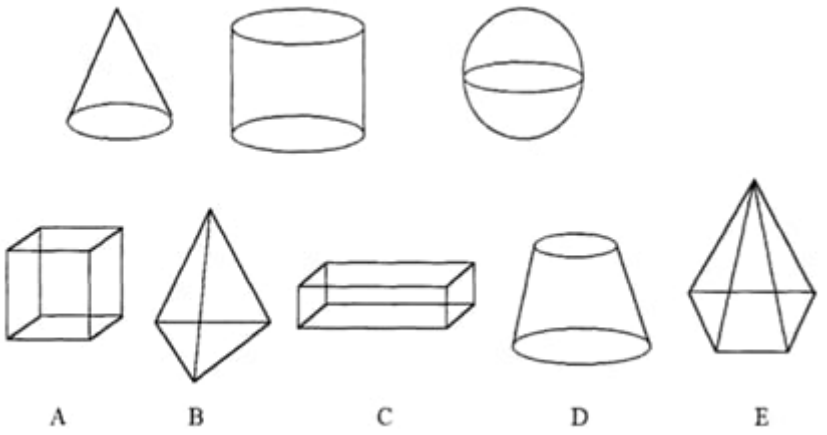
Task #7. 110 - 2=..., 220 - 2=..., 330 - 2=...,...

Calculate the product of two numbers, the second factor of which is a constant, and the first one is multiplied by 110. The multiplication of a multi-digit number ending in zero by a single-digit number is repeated.

The above pattern finding problems show the versatility of their use. In the same way they may be composed on the material of other subjects. It is possible to use some types of pattern finding tasks in higher grades, not limited to the primary school level.

For example, for acquaintance with bodies of rotation, the following task for finding a common feature may be useful:

Task # 8.



CONCLUSION. Thus, pattern-finding tasks can be used as a means to develop the creative activity of younger pupils because in the process of solving them such skills as analysis and synthesis, comparison and abstraction, concretization and generalization are developed[4, 38].

Zadachas to search for regularities with geometrical content are distinguished by the coefficients of constructing a task which are a specific characteristic of this type of task and are determined by the number of changing features and the number of different variations. The division of tasks according to their constructional coefficients determines the possibility of a differentiated approach to pupils who are divided into groups in terms of predisposition to creative activity.

Literature

1. Abdullaeva B.S., Jo'raeva D.SH., Djurakulova A.X. Matematika o'qitish metodikasi. O'quv qo'llanma. – T.: TO'RON- IQBOL, 2020. – бет 220.
2. Джураева Д.Ш. Бошланғич синф математика дарсларида ностандарт масалаларни мулоҳаза юритиш усули билан ечиш Замонавий таълим. Тошкент 2016, №9, 51-56-б.
3. Djurakulova A.X., Salomova B. Pedagogical Prerequisites for the Formation of Creativity of Elementary School Pupils. Vital Annex: International Journal of Novel Research in Advanced Sciences (IJNRAS). -xorijiy ilmiy jurnal, 2022-yil. http://innosci.org
4. Маслова С.В. Изучение элементов геометрии в начальной школе / Школьное математическое образование: вопросы содержания и методов: Тезисы докладов. - СПб.: Образование, 1995. - С. 41.
5. Джуракулова А.Х. Возможности дифференцированного подхода к учащимся при решении задач на поиск математических закономерностей -issn: 2181-0427, 2022-yil. Www.journal.namdu.uz.
6. Гайбуллаев Н.Р. Практические занятия как средство повышения эффективности обучения математике.-Т.:Ўқитувчи, 1989.-243 с.