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FORMATION OF QUANTITATIVE REPRESENTATIONS IN PRESCHOOL CHILDREN IN THE PROCESS OF MATHEMATICAL GAMES

Ostanov Kurbon[1], Mardanov Eshim Murotovich[2] ,Kadirov Jasur[3]
Achilov O'tkir[4], Totliyev O'lmas[5]

Abstract*: the article analyzes various approaches to the content and methods of forming quantitative representations in preschool children, as well as the technology of forming the ability to group objects (2-6 years), the formation of ideas about the multiplicity and unity of objects (from 3 to 5 years), the formation of the ability to distinguish 1 and a lot of objects in the environment (from 3 to 4 years), the formation of the ability to compare 2 groups of objects by quantity, by establishing a one-to-one correspondence (from 3 to 6 years) the content of the training methodology eniya counting of objects (4 - 6 years), teaching methods ordinal account (4 - 6 years), and provides recommendations for their implementation in practice.*

Keywords*: technology, quantity, representations, skills, objects, multiplicity and singularity, counting, order count.*

I.INTRODUCTION

Analyzing various approaches to the content and methods of forming quantitative representations in preschool children we note that they propose to consider the number as a property of equal sets, and suggests introducing the number to children, as with some idea. Children get acquainted with the myths about numbers, with ancient images of numbers, listen to the corresponding musical intervals, look for objects and phenomena in the surrounding world that correspond to each number. Theatrical fairy tales about each number are offered to children.

[1] *Candidate of Pedagogical Sciences, Associate Professor, Department of Probability Theory and Mathematical Statistics, Samarkand State University, Samarkand*

[2] *Candidate of Pedagogical Sciences, Associate Professor, Department of Theory and Methods of Preschool Education*

[3] *Candidate of Pedagogical Sciences, Associate Professor, Department of Theory and Methods of Preschool Education*

[4] *Assistant of the Department of Theory and Methods of Preschool Education University, Samarkand*

[5] *Assistant of the Department of Theory and Methods of Preschool Education University, Samarkand*

Preschoolers portray the number in productive activities (sculpt, draw, make applications on the topic of number). Some manuals (for example, Maria Fiedler [1]) offer a different image of a number other than numbers. With the help of Kewisiner sticks (colored numbers), it is possible to form ideas about the number as a quantity. Colored numbers are stripes or columns of different lengths, different colors, and both the length and color are not chosen randomly. The unit has a length of 1 cm; two - 2 cm; ...; ten - 10 cm. 1 - white; 7 - black, 2, 4, 8 - blue, blue, violet (multiples of 2), 3, 6, 9 - yellow tones (multiples of 3), 5, 10 - red; orange (multiples of 5). With the help of these sticks, children, not knowing the numbers, can learn all the arithmetic operations, making one number from the others. Unfortunately, the Kewisiner sticks are not divided into unit intervals, and by the appearance of one stick it is impossible to immediately tell what the number is.

Montessori [2] at one time proposed the following didactic material for the formation of quantitative representations: - colored rods (divided into single segments), golden counting material (yellow beads scattered (units), 10 beads (tens) per rod; per plate assembled - 10 tens (one hundred); 10 plates assembled into a cube (thousand)). GlenDoman [3] suggests that from childhood, children remember any quantities differently located in space (using dots and circles). Moreover, children by "grasping" the number can remember all arithmetic operations.

In order to correct the mistakes encountered (in some programs and manuals for parents and caregivers), the following should be taken into account: in preschool years, you cannot start with oral tasks, but rather with dramatic tasks, and then illustration tasks. As the second term or deductible, it should first be important that the children and carers do not forget to raise the question in the tasks, and it is also important to ensure that the children calculate and not carry out simple counting. It must be remembered that the result of the operation on numbers is the number, and the result of the operation on sets is the set.

At the first stage, the formation of the ability to group objects (2-6 years) is first taught to group according to one attribute, while all other signs should be absent or not essential for children. The sign by which the grouping of objects is proposed is complicated with age (color – name – size – form – quantity – characteristic functions). For example: put all the cars on the lower shelf, and the dolls on the upper (by name): children have geometric figures of the same color, but of different shapes, it is necessary to build towers from cubes (or cylinders). [4-13]

At the second stage, children are taught to group according to two or three or more signs. Moreover, objects should differ only in these characteristics or other signs should be insignificant. For example: take red large cubes for construction (and the figures differ in shape, color, size); build a chain so that the figure differs in size and shape.

When learning to group objects according to a pattern, signs are not verbally indicated, objects should differ in several ways, children themselves must find common signs and carry out grouping. For example: bring such toys to the table.

At the last stage, children are taught grouping according to a given attribute. Items differ in several ways, but only one is indicated. The easiest signs are color and name. The most complex are the functions of the subject. For example: name objects of the shape of a circle; Collect and wash toys that can be washed.

The formation of ideas about the multiplicity and singularity of objects (from 3 to 5 years). With children, exercises or games are held in which it is shown that the set consists of individual elements. Children are shown how the multitude is formed and how the multitude is divided into separate elements. [14-23]

For a start, a lot of homogeneous objects are taken. The emphasis is on the words: “How much?”, “Many”,

"One", "Not a single one". For example: children collect leaves, the teacher selects uniform leaves according to the number of children and says: I have many leaves. - How many leaves do I have? (A lot.) I give out one at a time. You alone, you alone, you alone. Leaves become less and less. I have not one left. How many leaves do you have? (Alone.) How much do I have? (No one.). I collect leaves: one from you, one from you, one from you. I am getting more and more leaves. Again I have a lot of leaves. How many leaves do I have? How much do you have left?

Such an exercise is carried out with different types of objects several times. Later this problem is solved with heterogeneous sets. At the age of 5 - 6 years, children are shown that it is possible to group objects according to different signs, without taking into account insignificant signs. For example: objects of different colors and different shapes. Children should count objects of the named form. Usually children count separately objects of each color. The teacher teaches you to take into account only a given sign, not paying attention to others. For example: count how many blue pieces (you need to count both circles and squares).

In the process of formation of skills to distinguish 1 and many objects in the environment (from 3 to 4 years) at the first stage, one and many objects are located on different planes (2 different tables, 2 hoops). Questions and tasks: show where one, and where many; how many objects are on the red stripe, and how many are on the blue?

One and many objects are interspersed on the same plane (bunnies and 1 squirrel). Questions: which items are many, and which one, how many bunnies, how many squirrels?

At the third stage, an exercise is proposed where many objects are enclosed in one object (one tree, and there are many leaves on it; one aquarium - many fish).

In the fourth stage, one and many objects are not limited by either planes or a single object. Children must mentally unite them in a group. For example: one doll per chair, carpet, closet, and a whole lot of dolls. Games at all stages (the difference is only in the location of visual material): for example, "Travel" or "Train with stops" (The teacher finds out how many objects are at the station. If the children answered all the questions, they go to the next station).

When developing the ability to compare 2 groups of objects by quantity, by establishing a one-to-one correspondence (from 3 to 6 years), there are 6 methods for establishing a one-to-one correspondence: overlapping (younger age), application younger age); pairing (younger and middle age); connection by arrows (middle age); the use of a mediator set (older age); account (middle-senior age)

Overlay. Visual material: cards with depicted objects (3-5 pieces), the distance between the objects should be equal to the objects themselves, for the overlay are given small objects that should be connected with the drawings within the meaning. You need to start with a problem situation. "Does all the butterflies have enough flowers? whether we have equal butterflies and flowers. "

METHODOLOGY

The teacher lays butterflies with his right hand from left to right exactly one butterfly on one flower. Staying on each pair, he draws attention to the fact that there is one butterfly sitting on each flower, that we do not

put a butterfly between the flowers, we leave an empty space. “We have as many butterflies as there are flowers, each butterfly had a flower, butterflies and flowers equally, the same number. Will I match butterflies and flowers? ” After demonstrating the application of the overlay, we give the children exercises in which they learn to compare 2 groups of objects by quantity using this technique.

Application. Cards with two stripes are used. On the top are objects, and the bottom is empty. For the application, items are selected that are suitable in meaning.

The methodology of learning to receive the application is based on the knowledge of the children of the reception of the overlay. For example, on the top strip we spread mushrooms. Then we create a situation: the leaves fell on the mushrooms. We put the leaves on the mushrooms and find out whether they are equally divided. Then we pull each leaf in succession onto the lower strip: “the wind blew”. Under each fungus lies only one leaf. There are empty spaces between the leaf. “Am I right now the leaves and mushrooms?” If under one mushroom there is one leaf, then the mushrooms and leaves are equally divided. ”

Exercise: Put as many leaves on the lower strip as on the upper fungi. If the children find it difficult, then we divide the card into cells with vertical lines or you can draw arrows from objects of the upper strip to the lower.

Pairing. This technique is similar to the application, but no cards are used. Used objects related to each other in meaning. First, we arrange the objects in a row. For example, we treat dolls with sweets. Further not necessarily in a row (it is possible in a circle). The teacher finds out whether, for example, squirrels and bunnies are equally divided. To check the answer, you need to put one squirrel about one bunny.

Connection by arrows. Children are invited to a situation in which they cannot take advantage of the tricks they know (Drawn a cake and children. “Will there be enough for every child a piece of cake?”). In the figure, we connect one child with one piece of cake. If there were no extra children left, then it was enough for everyone.

The use of multiple intermediaries. We create a situation when you cannot use the techniques known to children. For example: on one side of the kindergarten, trees grow, on the other - too. Where do more trees grow? We use a set of intermediaries - pebbles. We lay out one pebble under one tree. First, under the objects of one set, then under the objects of the second set. We conclude about the equality or inequality of objects in quantity.

Each of these techniques is given in two stages. First, we form the idea of the relation of equality (“equally”) in children, for this we take equal sets. And at the second stage, we form the idea of the relationship “more” and “less”. The concept of “more” is explained through the word “superfluous”, and “less” - through “not enough”.

Before teaching children counting (4-6 years), it is necessary to create situations in which children are faced with the need for the ability to count.

Learning the account is based on a comparison of two groups of subjects in quantity. First, the educator conducts the counting process himself, and the children repeat the final number after him. The independence of the number of objects from other attributes of objects is shown. Then the teacher teaches children the process of counting and introduces the formation of each number, teaches you to compare adjacent numbers. First, children are taught to count within 3, and then within 5, then 10.

When learning to count up to three at the first stage, the teacher offers the children two groups of objects arranged in two parallel rows, located one under one (bunnies and squirrels). Questions: how many bunnies (squirrels)? Are bunnies and squirrels equal? Next, one item is added to one of these sets (a bunny rode). Is squirrels and bunnies right now? How many were, how many bunnies became?

The teacher himself leads the counting process ("One, two, three." He passes the hand over the whole set. "Only three bunnies"). Children follow the counting process and repeat the final number - "three". Another squirrel is added. Is now bunny and squirrel? How many squirrels have become?

The teacher considers squirrels (one, two, three; only three squirrels). Coordinates nouns and numerals in gender and number. Children see that the numeral "three" is a common indicator of the number for bunnies and squirrels.

At the second stage, teaching the children the counting process, the educator encourages them to adhere to the following rules: coordinate each numeral with one subject and one movement; coordinate the numeral and noun in the gender, number, case "; after each numeral, the noun is not repeated (so that the counting process goes abstractly); after the last numeral is called, it is necessary to circle the entire group of objects with a circular gesture and name the final number "; naming the total number, we pronounce the corresponding noun; the account must be kept with the right hand from left to right (so that children have a stereotype); instead of the numeral "one," one cannot say the word "once" to answer the question "how much?"

Consider how to show the formation of a number (for example, the number 3). It is necessary to rely on comparing two sets by quantity. Questions: How many squirrels? (two) How many bunnies? (two). Add one bunny. How many bunnies are there? How old was it? How much did you add to make 3? How to get the number 3? (We must add one to two, we get 3).

In the future (after the children learn to count to four), it is necessary to show the formation of the number 3 by reducing the set by one. Thus, the formation of each number is shown in two ways, by increasing and decreasing the set by 1.

Methods of teaching counting subjects (4 - 6 years). Using a problem situation, it is necessary to show the difference between the counting process and the counting process.

Count - this means determining how many total elements are in the set. Count - select the specified number of elements from the set. The rules of counting and counting are the same, however, when teaching counting, special attention should be paid to the following rule: the numeral should be called only for 1 moment of movement.

Types of counting exercises: sample counting (as many); first, the sample is given in close proximity, and then at a distance; counting by the named number (or the figure shown); older children are invited to remember 2 adjacent numbers and count 2 groups of objects (from the basket count 2 apples and 3 pears); draws attention to the fact that children remember how many objects need to be counted (we ask children to repeat the above numbers).

Methods of teaching an ordinal account (4 - 6 years). First, children are offered preparatory exercises (with several types of visual material), which show that to answer the question "how much?" it is necessary to use the numerals “one, two, three”, i.e. quantitative. It doesn’t matter in which direction the counting is conducted and how the objects are located in space. To consolidate, exercises are carried out in which it is determined: which object is located. For example: in the process of familiarization with geometric shapes: “What is the name of the figure that stands in third place?”.

Then it is shown to the children in which quantitative cases are used, and in which ordinal numbers. Exercises are offered in which we ask two questions: "How many?" and “Which one?” We keep track of which numerals children use. We explain in which case, which numbers must be pronounced. Children are led to the conclusion that in order to determine how many objects they use a quantitative account, and in order to determine the place of an object among others, an ordinal account is used. In addition to such exercises, it is important to create situations in everyday life and games in which children would see differences in the use of quantitative and ordinal counts. For example, in the game “Theater”, we specify what the number on the ticket means: how many places are there or what is the specified place.

Types of exercises: determine the number of the specified subject; name the item at the specified number.

The game "What has changed?" (It turns out where the toy is located. The command “Eyes are sleeping.” Is given. Then the teacher changes the location of the toy. After the words “eyes opened”, it is suggested that those who noticed the changes raise their hand and answer: which toy was in order before, and which is now).

Familiarization with the numbers (3 - 5 years), with the name and appearance of the numbers goes under the age of four years, and after learning to count children are introduced to the essence of numbers. At the beginning, the teacher in various situations introduces the children to the name and appearance of the numbers (during the walk, he draws attention to the numbers of houses, cars, page numbers). The teacher reads poems that describe the appearance of the numbers. Then, as soon as the children have learned to count within the appropriate limits, they need to be introduced to the essence of each digit in sequence. It is proposed to indicate in the group the number of objects in different ways: the corresponding number of counting sticks, the corresponding numerical card, and, finally, using numbers.

You can invite children to consider a table where the same number of different objects are drawn and they are all indicated by one digit.

Children are led to the fact that the same number of objects is always indicated by the same number. The difference between the concepts of “number” and “digit” is a number — an icon or picture with which you can write a number or indicate the number of objects. It must be understood that a number is not only represented by a number. You can introduce children to Roman numbering - the image of a number with the help of drawings or to propose colored numbers - Kewizer's wands.

Exercises to consolidate the essence of numbers: select a figure for the corresponding set; create (find) a group of objects corresponding to the number of figures shown. Games: "Find a Couple" (Lotto). "Find your house."

Acquaintance with the number 0. Children are offered 3 saucers: on one - 3 objects, on the other - 5, on the third - not a single one. Please indicate with numbers the number of objects in each saucer. Children can figure out that they should put “0” on an empty saucer. If the children find it difficult, the teacher reads a poem about “0”: A figure like the letter “O” is “zero” or “nothing”. And then we explain that the absence of objects is also denoted by a number, this is the number "0".

Acquaintance with the image of the number 10. It is necessary to show the children that the number 10 is represented using the two digits "1" and "0". For fixing, the same games are suitable as for other numbers. In games and exercises include 0 and 10.

Conclusions. Training in the division of subjects into equal parts (4 - 6 years). In classes on the visual activities of children, they learn to divide flat symmetrical objects (starting from a square) into 2 equal parts by bending without cutting. It is necessary to bend so that the angles coincide, the sides, the bend line is ironed, the object is unbent. Questions: how many parts? Are the parts equal? (check using overlay) What is more: part or whole? Then they learn to divide into 4 equal parts, bending 2 times in half (the same questions). At the last stage (the end of the middle and the beginning of the older age) learn to divide into 2 (4) equal parts by bending and then cutting. The teacher explains that if we have two equals to grow, then each of them is called “half” or “one second (1/2)”, and if we get four equals to grow, then each of them is called “quarter” or “one fourth (¼). "

Children are taught to divide objects into 8 and 16 equal parts in a similar way. We bend three times in half - we get 8 parts, 4 times in half - 16 parts. Questions and explanations are the same as for dividing into 2 and 4 equal parts. It is important to draw the attention of children that if we divide the subject into 2 (4) unequal parts, then they cannot be called halves (quarters). It will be just two (four) parts.

Teach children to divide voluminous objects into equal parts. There are two methods for dividing a volumetric object into equal parts: by eye or by using an intermediary measure. Finding out which part is larger, you can take a strip of paper, attach it to a voluminous object, cut it off at the place where the object ended, bend it in half, iron the fold line, attach to the voluminous object, and cut this object along the fold line of the strip.

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