ACQUIRING MATHEMATICAL ELEMENTS BY JUNIORS: A PREMISE FOR A BETTER INTEGRATION IN THE 1ST GRADE

ÎNSUŞIREA ELEMENTELOR DE MATEMATICĂ DE CĂTRE PREŞCOLARI - CONDIŢIE A UNEI BUNE INTEGRĂRI ÎN CLASA I

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Abstract: *In this paper we analyse, on the ground of a research on an experimental group of 30 children aged 6-7 and enrolled in Preparatory groups A, B, and C of the Kindergarten No. 23 in Timişoara (România) the cognitive mathematical behaviour shaped while attending kindergarten, as a premise for future assimilation. In order to study the level of development of the children's mathematical abilities and skills – counting, making up multitudes, additioning and subtracting, and identifying geometrical shapes – we applied six written tests, recording the score for each child and assessing each child's activity. Analysing test results, we could see that some of the tested children that encountered difficulties made mistakes because of lack of attention, while the other ones need supplementary work from the teacher, the choice of the most efficient methods to make understanding easy and to make children properly learn the mathematical elements necessary in the 1st grade.*

Rezumat: *Lucrarea analizează, pe baza unei cercetări, efectuate asupra unui grup experimental de 30 de copii, cu vârsta cuprinsă între 6-7 ani, de la grupele Mare-Pregătitoare „A" ,Mare-Pregătitoare„B" şi Mare-Pregătitoare „C", de la Grădinița cu P.P. nr. 23 din Timişoara, comportamentul cognitiv matematic format în grădiniță, premisă pentru asimilările viitoare. În vederea studierii nivelului de dezvoltare a capacităților şi deprinderilor matematice ale copiilor: de a număra, de a forma mulțimi, de a efectua operații de adunare şi scădere, de recunoaştere a figurilor geometrice, s-au aplicat 6 teste scrise pe fiecare înregistrându-se rezultatele activităților copiilor şi acordându-se câte un calificativ. Analizând rezultatele testelor, s-a constatat că unii dintre copiii testați, care au întâmpinat greutăți, au greşit din neatenție, iar pentru ceilalți este necesară o muncă suplimentară din partea educatoarei, alegerea celor mai eficiente metode pentru înțelegerea şi însuşirea corectă de către copii a elementelor matematice necesare în clasa I.*

Key words: *cognitive mathematical behaviour, abilities and skills, mathematics*
Cuvinte cheie: *comportament cognitive mathematic, capacități şi deprinderi matematice.*

INTRODUCTION

The testing of juniors' ability of operating mathematically has been made to show in what measure juniors have the proper mathematical cognitive behaviour as a premise for future assimilation.

Studying the objectives of the mathematical activities in kindergarten for the four age categories we could see that they are structured in accordance with the new conception of studying mathematics in primary school. In this study we show in what measure children attending the last year in kindergarten has assimilated the mathematical elements he will need in the 1st grade.

Hypothesis of the research: Following the tests we applied, we suggest the following hypothesis to demonstrate: mathematical activities in kindergarten aiming at acquiring mathematical elements – number-quantity-figure, ordinal numbers, space positions, composing

and decomposing numbers, geometrical figures, additioning and subtracting – are activities that set the basis of a good integration of juniors in the 1st grade in the field of mathematics.

Sample structure: In order to carry on this study, we have chosen an experimental group of 30 children aged 6-7 and enrolled in the Preparatory groups A, B, and C from the Kindergarten No. 33 in Timişoara (România).

The tests were applied during the morning programme of the children, in the Science-mathematics sector. We only tested part of the children in each of the three preparatory groups. The juniors tested over 6 days attended kindergarten daily, and having taken part in all mathematical activities during the four years in kindergarten. They are children with optimal physical development, children that come from organised families that have taken care of not exempting them from kindergarten activities for family reasons.

In the testing of the children we have cooperated with the teachers of each preparatory group, which made the testing a very efficient research.

MATERIAL AND METHOD

In order to study the level of development of the mathematical abilities and skills of the children – counting, making up multitudes, additioning and subtracting, identifying geometrical figures – we applied six written tests developed on the ground of the mathematical activities curricula for kindergarten.

RESULTS AND DISCUSSION

On each test we mentioned the results of the children's work and assigned each child a grade.

Test No. 1: Asks the children to make up elements of the same type, to count the elements of each multitude, and to find the figure corresponding to the number of elements in each multitude.

Test No. 2: Asks the children to count from 1 to 10 using the cardinal numerals and to find the place of each element in a series of elements.

Test No. 3: Asks the children to decompose and compose a natural number, using different signs and drawings.

Test No. 4: Asks the children to colour all the items in the image that are located in the upper part and to circle the items in the lower part of the image.

Test No. 5: Asks the children to make additions and subtractions and to use the icons < and > between two numbers.

Test No. 6: Asks the children to colour the rectangles and the circles in the image in red, the squares in yellow, and the triangles in green.

In order to assess the tests, we assigned the following grades:

- V. W. = very well, when the test is solved correctly;
- W. = well, when there is a single mistake;
- P. = poor, when the test is not solved correctly.

The grades are ranked from 1 to 3, as follows:

V. W. = 3 points;

W. = 2 points;

P. = 1 point.

Other methods we have used are active-participative methods: explanation, conversation, and exercise.

Objectives

O_1 = to make up multitudes of elements of the same type and to relate the number of elements to the corresponding figure;

O_2 = to know the ordinal numeral and to find the place of each element in a series of elements,

O_3 = to compose and decompose in two parts a natural number, using different drawings and signs;

O_4 = to perceive without hesitation different space positions: up, down, in the middle, on the left, etc.

O_5 = to make additions and subtractions using different items and to use without difficulty arithmetic symbols and their sense;

O_6 = to identify geometrical figures (triangle, square, rectangle, circle).

Analysing and processing data

- 20 children, i.e. 67% of the total number of children tested, got the maximum 18 points;
- 3 children, i.e. 10% of the total number of children, got 17 points;
- 6 children, i.e. 20% of the total number of children, got 16 points;
- 1 child, i.e. 3% of the total number of children, got 15 points.

Analysing the test results of the 30 children, we can say the following:

- only 3 of the 30 children tested made a single mistake;
- 5 of the 30 children tested made 2 mistakes;
- 1 of the 30 children tested got 'well' in three of the six tests;
- 1 of the 30 children tested got a single 'poor'.

Analysing the test results, we can see that all the tested children from preparatory groups that made mistakes made them because of lack of attention, while the children that do not know the mathematical elements tested, they need more work from the teacher.

The teacher, through the methods and techniques she uses, will be able to investigate the children and to discover the lacks and misunderstandings intervening in the child's individual work. All she needs is patience and the choice of the most efficient methods to explain the mathematical elements children need to know to integrate in the 1st grade.

CONCLUSIONS

- understanding the concept of natural number, making up multitudes, getting familiarised with natural numbers and with their corresponding figures, knowing the meanings of the mathematical signs +, -, and = help the children compare numbers easily and solving number operations;
- having good independent work skills practiced since junior school, particularly through the use of independent wok cards: the solving of these cards prepare the school activity consisting in solving independently exercises and problems, both in class and at home;
- ensuring a good space orientation eases orientation in school, in the class, at the blackboard, on the sheet of the copybook or of the books, eases writing and reading (always done in our culture downwards and from the left to the right);
- knowledge and skills acquired through mathematical activities should be consciously applied in all the other activities any time it is about correlating knowledge;
- due to the concentric system of teaching mathematics, it is necessary to apply tests for the understanding and acquiring of knowledge at the end of each activity, as lack of knowledge hinders the understanding and acquiring of future knowledge: to do so, there have to be a permanent activity of recovering knowledge, organised in small groups or individually.

If the junior have all these knowledge, abilities, and skills, then we can be confident that young schoolchildren will never know failure, and that they will easily adapt to school requirements in the field of mathematics.

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