TEACH MATH THROUGH MANIPULATIVE MATERIALS TO STUDENTS WITH AUTISM SPECTRUM DISORDER

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Mathematical competence should be taken as a principle that favors the pillars of knowledge, since it allows students to acquire the ability to develop and apply mathematical reasoning to solve various everyday problems.

AUTISM SPECTRUM DISORDER (ASD)

Teaching mathematics should be taken as a functional approach that allows students with ASD to develop in the educational context and in situations of their daily life in which the use of mathematics is necessary.
The aims of education are the same for all, regardless of the disadvantages that children could have. Children encounter different obstacles on their way and sometimes, the obstacles are so enormous that the distance they will travel cannot be very long, but any progress is significant.

Using didactic material in the teaching of Mathematics can help students with ASD to work attention, perception, intelligence, language, memory and thought. So, they facilitates students' abstraction and the acquisition of logical-mathematical components used in life. In turn, it creates motivation focused their attention and interest in the activity and provides an easy adaptation to the level of development that the student presents. Another benefit, it is the availability when interacting with peers, through observation and imitation when working in groups, simultaneously allowing to complement the limitations in communicative behavior that characterize these students.
Their use also has difficulties for teachers: it is a challenge, they must have exhaustive knowledge and training of its use in mathematics and it implies precise planning of the work. If this is not treated in this way, the ASD student may have inappropriate behaviors, trying to attract attention of others, restricting their social relationships or preferring being alone.

EXAMPLE: "The ladybird spots"
1º Primary education
Goals: Learning the concept of odd and even numbers up to 99.
It will be support by pictograms. The student with ASD will see the drawing of a ladybird with many black spots. In the middle of the ladybird, a card with a number from 1 to 99 will be placed, the teacher will put the number of black spots corresponding to this number. In the lower part of the ladybird, there is a box with two holes in which the black spots can be inserted only two by two. After, it will be checked if there is any black spot left on the ladybird without removing. Next to the box, there will be a table with two columns, even and odd, in which the student will place the card with the main number in the corresponding place in the table.

EXAMPLE: "The owl and its chicks"
2º Primary Education.
Goals: Understand the intuitive concept of multiplication as the sum of equal addends; Learn the multiplication tables.
The didactic material is made up of an egg cup with ten holes and an owl. There will be multiple figures of owl chicks whose function will be to represent multiplication as the sum of addends. The figure of the owl chicks represents the multiplicand, the egg cups are identified with the multiplier and the product would be the result of adding all the owl chicks. All this process must be guided by oral communication between teacher and student and accompanied by pictograms.
Another variant of didactic material it is made up of a board in which, in the upper part, the figure of an owl appears again in addition to the multiplication table that is going to be worked on. In the lower part, the multipliers from 1 to 10 will be reflected in a fixed way, and the multiplicand will vary depending on the table that you want to practice. In the part corresponding to the product of the multiplication, a base will be found on which the results of the algorithm will have to be placed from plugs that contain said results.

EXAMPLE: "THE DAIRY COW
3º Primary Education.
Goals:
- Concept of fraction.
- Parts of a fraction, numerator and denominator.
- Ordering of simple fractions with the same denominator.

We have the figure of a cow from which it extracts milk, which we keep in bottles divided into equal parts, with lines that will mark how full it is. Thus, if a bottle has three lines that divide it into equal parts, we introduce a "milk" token and it would be verified that it reaches the first line, so the 1/3 cap will be put on the bottle (one third), then another "milk" card will be added and the 2/3 (two-thirds) cap will be placed and then one more "milk" card will be inserted, observing that the bottle is full, the 3/3 cap will be placed (three thirds). Next, the student will have to pass a "milk" token to the other bottle, filling up to 1/3 of it, then the same with 2/3, and answering the amount of milk that left in the first bottle. To do this, cards will be used in which the numerator and denominator terms can be read.

CONCLUSIONS

With the implementation of these materials, we highlight the importance of connecting the learning of content with educational situations based on the game and motivational aspects, to promote positive motivation towards learning mathematics. These materials are absolutely adaptable to the year, the content, the cognitive development, and the learning rhythm of each student, allowing them to achieve a deep knowledge of the mathematical contents as well as learning through manipulation and experimentation.
The proposed materials are self-made, they can be adapted to the restricted patterns of tastes and interests of students with ASD, which favors their motivation and interest in both the material itself and the content. The selected mathematical contents are adjusted to the first courses of Primary Education, which has allowed us to reflect the importance of creating a solid base of certain contents.

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