



Cap sur l'école inclusive  
en Europe



## Pedagogical sheet

### Computer -assisted education for the formation of mathematical concepts in autism children

#### Section of the module /E

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#### **General Description**

Pervasive developmental disorders are characterized by serious and widespread deterioration of various areas of development: reciprocal social interaction skills, communication skills or the presence of stereotyped behaviors, interests and activities. Most people with autism also suffer from mental retardation. The use of multiple nonverbal behaviors (face-to-face, facial expression, body gestures) can dramatically degrade to regulate social interactions and it may be impossible to relate to others. Depending on the level of development, there may be a lack of spontaneous research to share the joy, interests or achievements with others, perhaps a lack of social or emotional reciprocity.

For autistic students, mathematics is one of the most difficult disciplines in the curriculum. These students have great difficulty understanding and using mathematical concepts, remembering previous knowledge or making correct and consistent mathematical reasoning. Thus, considering the impact of current technologies, it is important that these students have access to an effective mathematical education to progress and even regain self-confidence.

#### **Global Definition / Brief Description of Content:**

This activity aims to:

- develop appropriate environmental representations
- use in multiple contexts successive objects or associated numbers according to given rules
- identify and name the figures
- build contexts to allow students to apply learned mathematical concepts and check identified solutions
- train computer skills or reinforce certain concepts already acquired.
- make calculations and identify the correct results
- solve problems using arithmetic operations

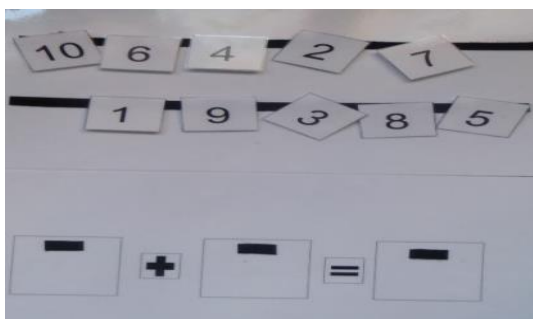
**Principles and theoretical foundations:** Computer-based training is a modern method in the category of rationalization of learning and teaching, ensuring better collaboration between the student and the teacher, becoming a moderator or a mentor. the learning activity. The use of the computer to develop mathematical concepts for autistic students allows the transmission and assimilation of new knowledge in an attractive way for children. Therefore, learning is more efficient. Children learn to play by being able to quickly find solutions and make decisions to solve their problems. The computer is a training medium that keeps the child's active attention throughout the learning process.

**Instruments:** The use of computer-based math lessons has been shown to be effective not only in improving the performance of these students, but also in enabling them to learn with more pleasure, to become more persevering and to have greater confidence in their students capabilities. Playing the children's favorite activity is at the same time an effective way to educate them. That's why we considered that using the computer in math lessons was another way to learn to play for the child. Thus, the learning process is more exciting and enjoyable through the computer, with the enthusiastic participation of students. In mathematics lessons, we have considered some aspects, because this method of computer-assisted learning is really useful for students. The less the screen is agglomerated, the better, because students with intellectual disabilities are easily distracted if they are attacked by too much stimuli at the same time. Incidentally, a screen that is too full diverts attention from the mathematical concepts or techniques presented. The resolution methods presented should be similar to those used in the classroom, as many students are disoriented if the workload received has a different form from the one they are used to. The differences should be explained very clearly and students should be helped in case of confusion.



### Presentation of the methodology:

For example, to develop the concept of number, we used an educational **software** in which the child is invited to a "Mysterious Journey to the Library" in which he offers several variations of the game. Students can consolidate their knowledge by solving the tasks they have received. The character asks the child to analyze the image on the screen, compare the shape and size of the books by visual correspondence, and then match the correspondence in shape, color, size or place it in turn on the shelves of the library, respecting the numerical order. The individual images are presented in turn and the student must call either the overall image presented to him when he is wrong or the knowledge he has acquired previously. The game works interactively, the computer advises him to think carefully and encourages him to try again if he is wrong. The right answers are rewarded with shouts of joy, applause and praise, as he correctly placed the books on the shelves. During the game, the child can choose any of the steps presented with the mouse or repeat certain sequences to get to know and understand all the mathematical concepts contained in the game in a fun and interactive way.



### Evaluation

Using the computer keys, students learned the numbers more easily and they now solve simple addition and subtraction problems in a way they really like.

At present, out of the six students with Autism Spectrum Disorders in the 9th grade, three are able to solve addition and subtraction operations with 0-1000 numbers, two students can use mathematical concepts 0 - 10, and one student was able to sort objects only by size or group them by shape and color. All students have a representation of geometric shapes, colors and sizes.

We noticed that the joy of solving a task by themselves makes them more motivated and the students started to show the initiative to solve mathematical calculation exercises or solve problems. We have also seen an improvement in the ability to focus attention, even in some children who are not involved in other activities. Using the computer, students were able to form a cognitive and efficient environment, independent and autonomous, in their own rhythm, a wide range of mathematical concepts.

## **Bibliography**

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