

## INTRODUCTION

*“Name of the game Mathematics with application of the Mind robot”* is an educational and prosocial robotics game developed within the “Robotics versus Bullying” project, co-financed by the Erasmus + Program of the European Commission, Sub-program “Support for Policy Re-form”, Action “Forward-looking cooperation projects “(612872-EPP-1-2019-1-IT-EPPKA3-PI-FORWARD). The partnership of the RoBy project is made up of 11 organizations from 9 European countries: public organizations, associations, research centers, universities, industries. The Robotics versus Bullying (RoBy) Project promotes a holistic approach to learning through the use of robots, and peer cooperation as a tool to prevent bullying and promote social inclusion. This goal is achieved using robotics and digital tools. In addition, thanks to non-formal teaching and game-based activities, students aged 6 to 12 will improve their digital skills and modify their approaches to STEAM.

The educational robotics activities proposed by the RoBy project focus on the prevention of the bullying phenomenon. The robot is suggested as a tool to be used in groups, in order to improve social and communication skills in a creative, engaging, and non-judgmental environment. Working together, in a peer-collaboration, favors the development of a social environment in which bullying actions hardly find space, since the entire group of peers learn an attitude of care and protection towards all its members. The use of simple educational robots also proved useful in facilitating the inclusion of children with cognitive or behavioral difficulties and special educational needs in general.

For more information on the project and on the socio-psycho-pedagogical references on which RoBy’s educational model is based, you can visit the website [www.roboticsvsbullying.net](http://www.roboticsvsbullying.net)

## THE GAME - psycho-pedagogical references

Bullying can be seen in many situations at school and in group contexts and it is often difficult for an educator to get the people involved to bring out their experiences, or to find a way to deal with the subject using a language appropriate to the age of their students. The RoBy project partners developed the bullying prevention game as a tool for teachers to use in the classroom in order to develop pupils’ awareness of what bullying is and, experiencing its dynamics firsthand, engage the students in a series of behaviors as an antidote to these social dynamics.

*Identify the main objectives of the game in terms of what the children can learn individually and in relationship with each other. What attitudes they can develop. Describe the role of the teacher, from a pedagogical point of view, during the game.*

- Names and distinguishes simple 2D shapes
- Names, describes and groups 2D shapes according to their properties - sides and vertices
- Determines the properties of 2D shapes and to perceive the differences according to their properties (number of sides and vertices)
- draw 2D shapes including pentagons, hexagons, octagons

The teacher explains that while he is reading a riddle, the students should listen carefully and when they recognize their shape in the read riddle, they should pick up the card.

The teacher reads (one by one) the following riddles:

FOUR SIDES – TWO BY TWO THE SAME WITH STRAIGHT, CLEAN LINES AND FOUR CORNERS

THE SAME, DRAW A HOUSE AND A LIGHTHOUSE – LIKE.....RECTANGLE

LIKE THE SUN THAT WARMS THE WHOLE WORLD, LIKE A SCOOTER WHEEL, LIKE A BUTTON ON AN APRON WITH A WAIST, YOU REMEMBER, DON'T YOU, I AM.....

CIRCLE

Gradually, as the students discover the 2D shapes, the teacher draws them on the board, and the students, by giving instructions to the robot Roby, draw on a sheet.

While the robot Roby draws according to the given directions, the students are asked to think and say how many sides and vertices each 2D shape has

## **GAME DESCRIPTION**

*Introduce the game with a general description: age of the players, general aim of the game, etc.)*

The students are 9-10 years old

The general objective of the game is Recognizing, describing and drawing 2D shapes including pentagons, hexagons, octagons and a semicircle

## **Description of the robot**

*Describe the robot that can be used for this game.*

*Example for SuperDOC:*

The game has been designed for the educational Clementoni talking robot “Sapientino SuperDOC” (it can also be used with the robots Sapientino DOC and MIND Designer). The choice of this tool is due to the fact that this product does not have a gender characterization and is well received both by males and females, especially for the age group between 4 and 8 (but also for older children at their first experiences with educational robotics). The colors are lively and cheerful, the colored lights, the music, and the friendly voice involve children and keep their attention focused on the activity. The SuperDOC robot is programmable with the arrows above its head in a simple and intuitive way.

Previous experiments have shown how this robot is very useful in facilitating the inclusion of pupils with special educational needs.

### **Game content**

*List all the parts required for the game*

- Mind robot
- Pre-prepared robot movement map
- Presentation
- Drawing sheets
- Cards with 2D shapes
- Riddles
- A magic pouch
- Set of 2D shapes

### **Description of the board**

*Describe the game board and the different boxes.*

The board of the game is a blue base divided into squares. Some of the squares have a number, and some have objects made up of geometric shapes (eg a sailboat made up of a triangle and a quadrilateral or a Christmas tree made up of a triangle and a square...) On one of the fields in the middle is a starting field on which to place the robot.

### **Description of a game session**

#### **PREPARATION**

*Describe how the class is prepared for the game. How to define the division into groups, tips to allow the game to run smoothly from the start. How to prepare the platform material.*

The boards for the game and the movement of the robots are prepared in advance. Desks in the classroom are set up for working in groups. On each bench there is a platform for the movement of the robot and the robot Mind. There are also white sheets to draw on, and a felt-tip pen for the robot to draw with.

Students are divided according to their number and according to their knowledge. It is recommended that the groups are made up of students with different levels of knowledge, so that they can cooperate and help each other.

## **START**

*Describe how the game starts, what is distributed at the beginning of the game. How the exchange sequence takes place in cases where there is more than one player ...*

At the beginning, it is repeated orally with the students about geometric shapes (what are they called, what are they made of, how many sides do they have, how many angles do they have) They are given white sheets and the robot Mind on which the felt-tip pen is already placed

## **The Core of the Game**

*Describe the process and objective of the game.*

*Define any challenges and/or advantages that can be received by playing the game.*

The purpose of the game is to repeat and confirm the knowledge already acquired, to teach children to cooperate with each other, to help each other. Through the game, they will learn how to connect the knowledge they already have not only with mathematics in this case, but also with other subjects. They will also know how to listen to their friend, pay attention to the answer, correct it if necessary. All students in the group have the opportunity to express themselves. To handle the robot, to draw with it.

## **CONCLUSION**

*What happens at the end of the game session?*

*For example:*

At the end of the session, the groups tell each other the stories and then reverse the roles, choosing a new starting situation by extracting it from the deck of cards.

At the end of the game, each student in the group talks about the path along which the robot moved, to which field with which geometric shape it took him, how he (explains) gave him drawing instructions. It tells if what was drawn was correct. Then a representative from the groups ex-

plains how the activities in the group itself went. Did all the members cooperate, did they need help...

### **Variants**

*Once the game has been described in detail, it is possible to offer variations on the main version or simplifications to make the game more accessible to younger children or those with difficulties.*

### **Keywords of this didactic proposal:**

*For example:* STORYTELLING, CREATIVE PROBLEM SOLVING, PROSOCIAL VALUES, BULLYING, RoBy