# CODING AND THE EDUCATIONAL ROBOTICS LABORATORY

**Learning by doing** - First Second and Third year Intermediate School
**Assisi3**

### The Main Methodologies

I divided students into groups during the subsequent activities proposed. First of all, thanks to a mixed approach, (at the same time), theoretical and practical, students built "The smart city of Moway" where you can see illuminated tunnel, the flashing light. They studied the various components of Moway, Mbot and LegoMindstorm EV3 robots. We discussed together about their components, their most important differences and programming softwares with a slightly different iconic interface. The second classes projected some tracks and one maze in which here they are driving Moway robots on the road.

They used the different languages of these softwares, like Scratch and the various flowcharts of Moway, to calculate algorithms and draw some geometric figures like square, rectangle , triangle, and so on.

They built and programmed EV3 ; first using the core pieces and then the additional pieces, some robots were then customized by the children by inserting different sensors and actuators. The laboratory ended with the creation of numerous of EV3 Robots , tracks for the rescue line in view of future Robocup Junior races.



*Good Morning everybody...*

I'm a teacher of Technology and these are my students of the First Second and Third Intermediate School. We are here today to show you our work inside the experimental educational robotics laboratory in which ==didactics== become "==laboratory didactics=="; the teaching strategy is based on ==learning by doing== and the leader becomes a "==facilitator==" and the students are at the center of the activities. A non-chaotic and fragmented activity focused on a goal, the resolution of a problem proposed whitin the lab in the various targeted activities, closely related to learning and the growth of skills and competences in children. The idea was to create an educational robotic laboratory similar to a strong growth path where the kids are guided and motivated to device, outline, illustrate and document a concrete, rigorous and artistically

The multicolor track is linked to the KA2 projects, it will be based on the construction of an ancient Roman and Greek game where boys and girls have to race with Bee and Blue Bot in a dice throwing game where the aim is to knock down the tower and make the little balls inside roll as far as possible along the track and obtain the highest score.

The programming with Scratch led us to the creation of **video games** and **storytelling**. And here we have some examples of them they are working on this "Monster Gnam Gnam" but here we have a small video game for you with a sprit that wants to keep the key without the witch. later if you want you could play with it.

They are working in a **story telling** in which is possible combine maths to solve some mathematical algorithms and arrive at the final section in which you could win asking to some questions like these.

They are very able to combine the different script and sprits and screenplays I really think that they are very able to calculate with colors visual blocks the correct algorithm and make some simple videogame like that.

free design, in which ideas and passions, and irrational aspiration have been expressed. So students realized a series of products in which the same young people developed concrete operational skills by using a whole set of equipment that School provided for us and that you can see here. During the various activities proposed students created from Scratch, putting themselves to the test by making circuits, tracks, gadget, models and self-assembled robots, using Lego Mindstorm EV3. They used dedicated programming softwares for each of the robot used (LegoMindstorm EV3- Moway - Mbot ) then they became familiar with circuits, partly with sensors and actuators especially for the cube in the third classe's track. In this lab, our students are the creators of their own and personal "imagined operation". In this laboratory Robotic Technology is the most important aspect not only for the evocative aspects but especially the emotional potentials that it can generate both in the single student and in the group (Emotional Robotics). The pivots of this laboratory are robots with the related mental manipulation of algorithm that we can find in the flowchart programming or in the formal abstraction of the logical path characterizing the scientifically studied behavior of the on-track robot. The main methodologies that I use during this wonderful experience are: research action, group work and cooperative learning, the exploitation mistakes, meta-cognition.

My first classes planned the concept of these games and realized them combining the various cardboard tiles, linked

My students realized a circuit with a conductive paint reproducing the plan of the most important and ancient and famous Greek Architect Hippodameus of Miletus that created the Hippodameus area divided into some squares.

They represented some small square buildings into the city and realized the various houses with simple materials, they created a small circuit with these components: LEDs, some Light Dependent Resistors, Transistors, Battery Clips and some 9V Batteries. Our students Made some paper houses that light up in the dark! The Voltage Village contains all the materials you need to make some glowing paper houses using this black bar conductive  Electric Paint and the origami's technic.

together. During this work they organized the theory, projected the quiz cards and calculated the different algorithm to arrive at the end of the game with some smiley Blue Bot and Bee Bot. The different theme that they selected before are: recycling and re-use of material, the letters of the Italian and English alphabet. In this the two groups have to find all the letter in their personal word in their cards, calculate the algorithm and program the blue bot to finish the game. One of the group win when their BlueBot travel the right way and arrive without mistakes.
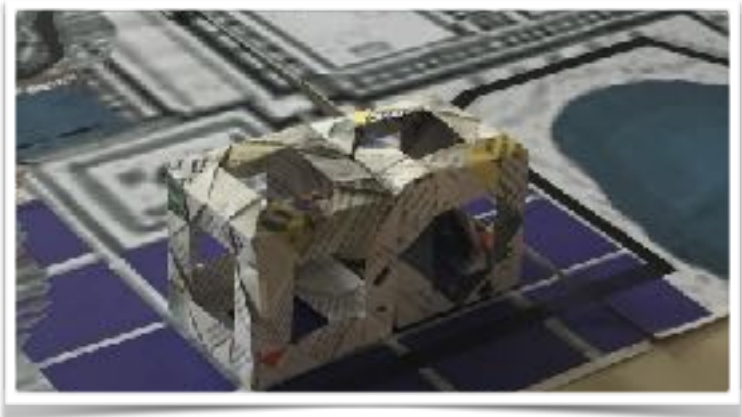


Since september we have used puzzles and cardboard to produce these "Robotic Worlds": The power of geometry , The tourist  that want to travel Italy finding the most important monuments or relevant Architectural building They printed the obstacles of the game,  with 3D Printer. We have the space and Peter Pan and the value of money.