Robobimbi

June 3, 2021

A project to study the introduction of educational robotics in preschools

ROBOBIMBI is a project born from the collaboration between **Fondazione Bruno Kessler (FBK)** and the **Trento Province Federation of Kindergartens (FPSM)** with the aim of ~~studying the possibility of introducing~~ ational robotics in Federation member preschools to

"Robobimbi", explains **Ornella Mich** with [FBK's i3](#)

[intelligent interfaces and interaction Research Unit](#), "is a great opportunity for girls and boys in Trentino preschools, which favors the discovery of the fascinating world of robotics and coding. Educational robotics is an effective and fun way to start developing computational thinking and digital skills, skills that have now become essential in almost all professions, as well as in day-to-day life."

"It is when they are young that children dream big", stresses **Alessandra Potrich**, with [FBK's Research and Innovation for Education Unit](#), "and they tackle difficult and complicated topics in a creative and barrier-free way. Walking them through their adventures lay important foundations for their future development".

The first phase of the project focused on the mental representations related to "robots" in children aged 3 to 6. The results of this part of the research lay behind the design of training courses for preschool teachers who see the application of coding and robotics as innovative tools to support the social construction of learning.

"The Robobimbi research", says **Camilla Monaco**, head of the Research and Training Unit of the T[rento Province Federation of Kindergartens](), "represented a precious opportunity for our system to understand what kindergarteners know about and what they think of an area as current – and at the same time unsettling – as robotics".

"From a research-action perspective", explains **Tiziana Ceol**, coordinator of the Predazzo division of the [Trento Province Federation of Kindergartens]() "Robobimbi was an experience that modified, transformed, enriched the educational and teaching practices of the participating schools, especially in the part relating to the group survey. In fact, talking about robots, drawing them in a collaborative way, meta-reflecting on what was graphically produced and how it came about are all experiences that – in themselves – allow children to build new ideas and representations and keep "thinking hard", as Ludovica Muntoni puts is".

The specific training contexts were designed not just by the four researchers – Ornella Mich and Alessandra Potrich for FBK, Tiziana Ceol and Camilla Monaco for FPSM – but it was the result of a participatory process, characterized in turn, by an approach of research-intervention, that was led by a group of teachers from three schools associated with the Federation (Tesero, Povo and Riva del Garda "Sant'Alessandro"), who had participated in the ROBOBIMBI research. These teachers have tried to introduce some elements of robotics in the educational-didactic experiences of a small guided group, collecting precious observational data in order to design effective training trajectories within a socio-constructivist theoretical-methodological framework in which the Federation is rooted.

The first training course began in December 2020 and involved the entire Circolo di Valsugana and Primiero, made up of 11 Federation member preschools. The complex situation linked to the Covid 19 pandemic, which prevented face-to-face meetings, did in no way stopped the training process. Implementation methods have been rethought, in order to allow compliance with all current regulations, alternating remote training with self-training sessions based on materials and instructions suggested by the research group.

The journey began with a creative robotics lab, during which the teachers first designed and then built their own robot, starting from reused material (plastic bottles, caps, tinfoil, colored cardboard). The main purpose of this activity was to start considering robotics as a tool in education.

The results of this activity were surprising, both with for the involvement of teachers, and for ROBOBIMBI's complexity and the wealth of the "creative robots" they designed and built. Unlike what usually happens, therefore, the first remote training meeting came after a self-training experience (the creative robotics laboratory) that the teachers had appropriately documented.
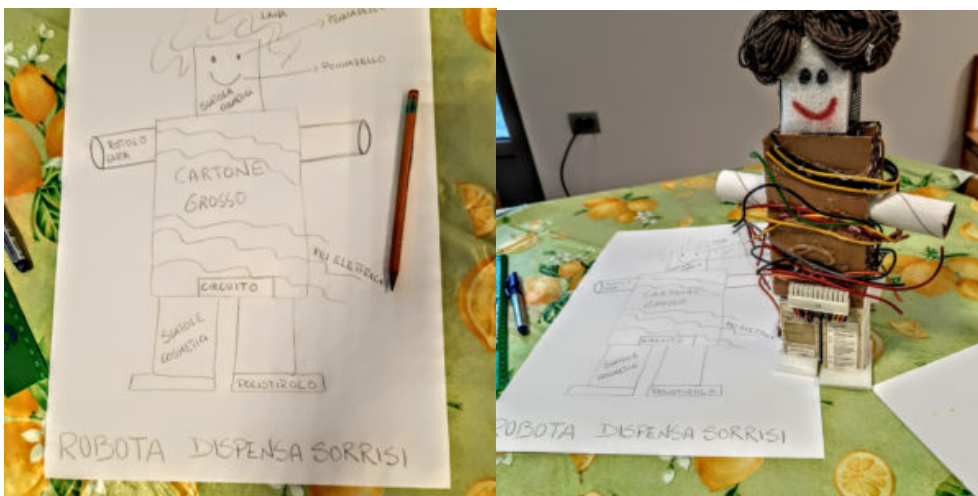
I   The concerns and considerations brought up during the

experience of creative robotics contributed to making the following meetings (again online) even more fruitful, allowing the participants to start becoming familiar with terms such as "robot", "sensor", "actuator", "programming". In particular, they were able to experience what it means to program with Scratch Junior, a software application developed by MIT research, which allows users to learn coding by designing stories and video games. An essential issue from the educational point of view is that the initial experience of creative robotics has prompted, in some schools, reasoning, reflections and "robotic messing" that saw the involvement of the children: the robots built by the teachers made their way into the classrooms and represented some possible tools to start building collective reasoning on robotics.

Teachers were then able to start exploring robotic kits provided by the Federation. In particular, they worked with BeeBot, Cubetto and Lego WEDO, which are among the best tools in the world for educational robotics with preschoolers.
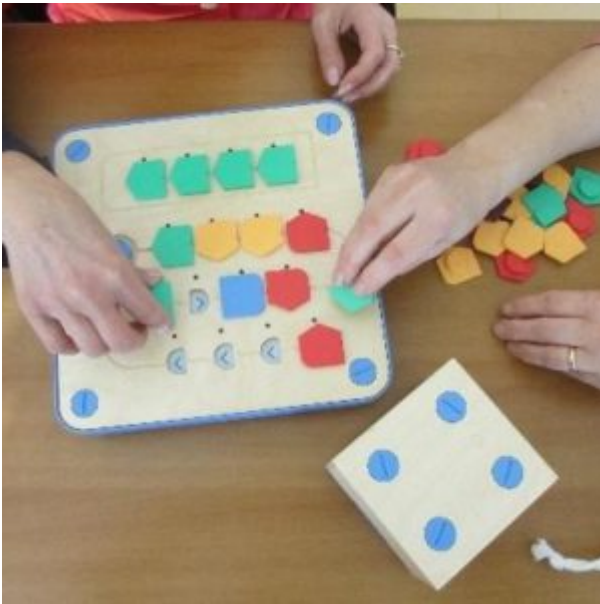
After adults became acquainted with these tools, being walked through them and being supported by the collective reflections built during training sessions, schools started to envisage initial forms of approach involving children, always with a view to considering the kits as "material and cultural tools"at the service of social learning processes, such as co-design, co-construction of narratives, participation.

The first year of this training course has just ended with a number of design "tests" by some teachers who, with the help of the research group, have envisaged new ways to integrate robotics and coding into the learning experiences to be offered to children, in small guided group situations.