

“Emotion-Lab” a novel educational model for the development of Emotional Intelligence in children

a proposal by the Institute of Cognitive Sciences
and Technologies National research Council of Italy, ISTC-CNR
and Italiacamp organisation



Emotional Intelligence

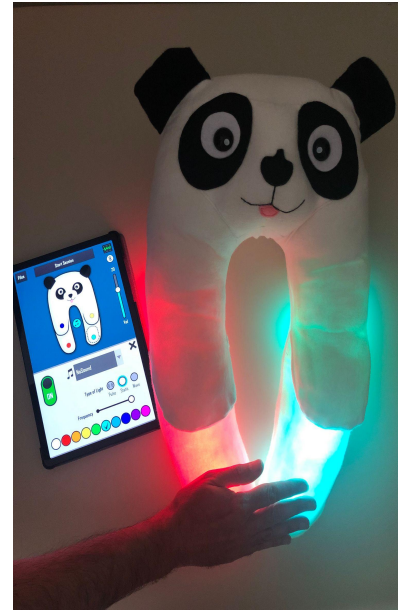
Emotional Intelligence (EI) is the ability to recognise and manage one's own and other's feelings.

It is a key competence in children: emotionally intelligent kids, capable of effectively understanding emotional expressions, tend to build healthy relationships and empathise with others.

School teachers know this is an important educational challenge, since the acquisition of this competence can help to reduce, as a side effect, the phenomena of social discomfort and bullying.

Here we propose Emotion-Lab, a technology-based educational model which aims to support the development of EI in children, exploiting the engaging features of a smart, soft toy.

The interactive smart toy Panda PlusMe



Panda PlusMe is a smart, soft toy, originally designed by ISTC-CNR researchers to foster social interaction in autistic children*. When touched on the sensorised paws, it produces sensory feedback (coloured lights, sounds, vibrations) which can be customised through an App**.

* See the European projects “PlusMe” (www.plusme-h2020.eu/) and IM-TWIN (<https://im-twin.eu/>)

**See videos at this link: <https://im-twin.eu/video/>

Emotion-Lab proposal



In Emotion-Lab, Panda PlusMe has been adapted by pedagogists from Italiacamp to activities with neurotypical children, in a new educational scenario beyond the original application in autism intervention.

Emotion-Lab proposal



Through a teacher-guided path, 44 children aged 8-10 years from the primary school I.C. *Alberto Sordi* (Rome), were involved in group activities, where they, playing with *PlusMe*, have been led to:

- become more aware of their emotional states;
- learn to understand the emotions of others;
- learn to express their own emotions.

The path consisted of six 1-hour “episodes” (one per week), each one with a specific goal.

Two teachers from the school kindly collaborated with the researchers, helping students in their interaction with researchers and in achieving the project's objectives!

The “Episodes”

- **Episode 1, “A new friend”.** Children became familiar with the pandas, assigned them a name and place them in the classroom.
- **Episode 2, “In search of emotions”.** Children shared the emotions of an experience they had, then they selected a specific emotion and programmed *PlusMe* (by selecting a combination of sensory outputs) to express it.
- **Episode 3, “Little explorers of emotions”.** Each class was divided into 3-participants groups. In turn, each child shared the emotions of their experience while 2 children programmed *PlusMe* to represent that emotion with sounds, lights, and vibrations. At the end, the teacher invited the children to reflect on the importance of listening to and understanding proper and others’ emotions.
- **Episode 4, “New discoveries”.** The activity with *PlusMe* continued, exploring new emotions. Through guided dialogue, the teacher helped children to reflect on the following themes: (a) everyone experiences emotions in a very personal way; (b) sometimes we filter others’ emotions through our own experiences.
- **Episode 5, “Me, others, us”.** Based on what emerged in the previous episode, the children were invited to delve into their own emotional experiences and compare them with others. The toy was used in order to facilitate the expression of these feelings and their awareness.
- **Episode 6, “Dear friend, I write to you”.** The children wrote a letter to *PlusMe* about the experience shared together and discussed what was learned about emotions.



Results

The atmosphere has been very collaborative and participative in all the interventions; children and teachers have shown interest and willingness to get involved. The educational proposal was therefore embraced with joy, and the multisensory stimuli provided by the pandas added an extra dimension to the internalisation of the conveyed emotional contents.

We report some highlights of the children's experience with the pandas:

- the caressing moments at *PlusMe* were very intense. Someone took the panda very gently, hugged and cuddled it. The kids waited patiently for their turn but with curiosity and anticipation.
- The moment of assigning colours, sounds, and vibrations to the various panda paws (through the App), relative to an emotion that emerged from the group, saw the children in great collaborative excitement: everyone fervently verbalised their proposal. In the end, the decision on the assignment of the various interactions was approved by the majority.

We report the main emotional discoveries by the children:

- Recognition of their own and others' emotions through channels other than verbal ones, using the pandas as a mirror and metaphor for what was experienced.
- Discovery that everyone experiences and expresses their emotions in a completely personal and unique way, even though some emotional traits may be shared.

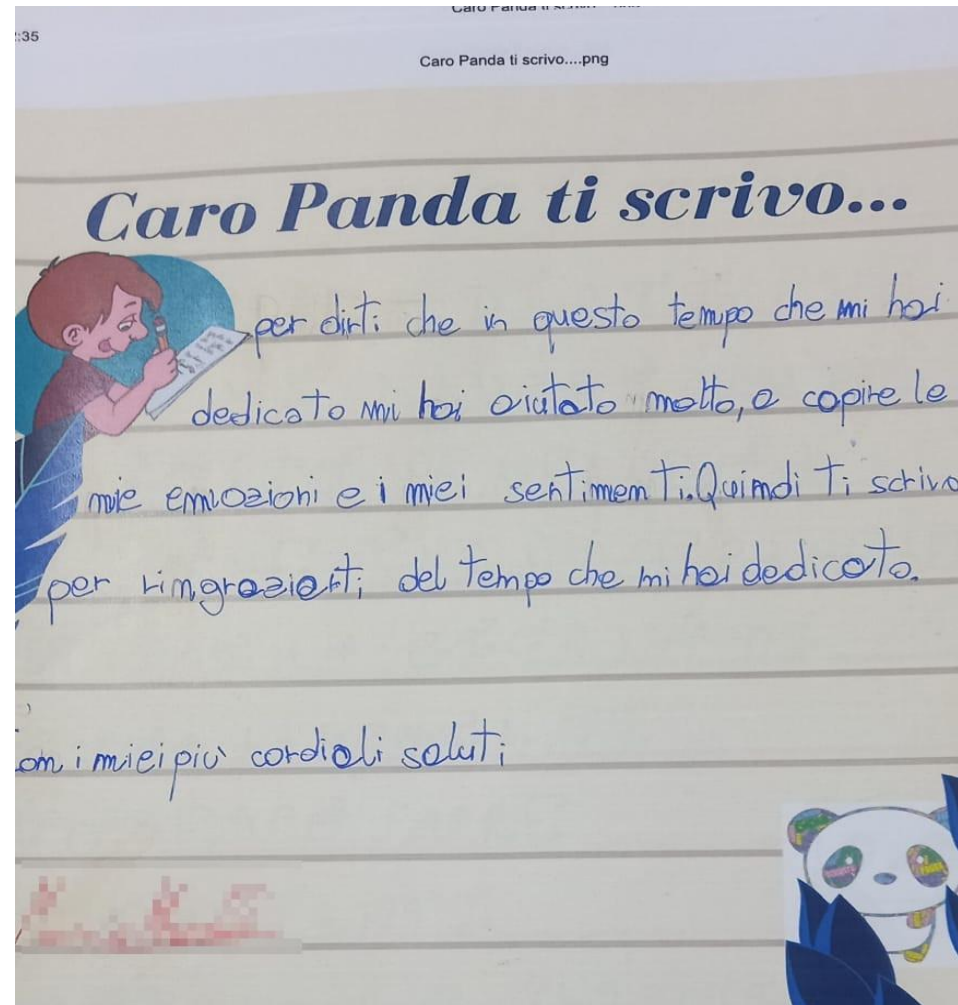
The open letter to panda

AT THE END OF THE INTERVENTION, THE CHILDREN WROTE AN OPEN LETTER TO THE PANDAS, TO TELL THEIR EXPERIENCE.

WE PROVIDE SOME EXAMPLES OF ANSWERS:

- "I COULD ASSOCIATE EACH EMOTION WITH A SOUND AND A COLOR";
- "I WAS ABLE TO SHARE WHAT I KEPT INSIDE";
- "IT MADE ME UNDERSTAND THAT EMOTIONS NEED TO BE EXPRESSED";
- "TALKING ABOUT OUR EMOTIONS HELPED ME A LOT",
- "I FELT ALL THE EMOTIONS ENTER ME WHILE THE PANDA LIT UP AND VIBRATED".

OVERALL, THIS APPROACH LED TO A NEW RELATIONSHIP BETWEEN CHILDREN AND TEACHERS, ALSO FAVOURED BY THE INTERACTIONS WITH *PLUSME*, WHO CONVEYED THE EMOTIONS THAT EMERGED DURING THE ACTIVITY, THROUGH THE SENSORY FEEDBACK, IN A NEW AND STIMULATING HARMONY.



Conclusion

Emotion-Lab used *PlusMe* as a mediator of emotions. Its interactive features allowed the kids to visualise (through colours and sounds) their emotional experience. The preliminary results show how the panda was used by the children as an extension of themselves, which helped them to bring out what they felt. ISTC-CNR and Italiacamp aim now to replicate the experience in additional schools.

A scientific article about the study has been published at the International Conference Interaction Design and Children - IDC '24, with the title:

The use of Transitional Wearable Companion toys to promote children's emotional intelligence: the Emotion-Lab program

DOI: <https://dl.acm.org/doi/10.1145/3628516.3659370>

Applicants' expertise

The **Institute of Cognitive Sciences and Technologies, National Research Council of Italy - ISTC-CNR**, is a multidisciplinary research institute, with expertise in Cognitive Sciences, Linguistics, Psychology, Philosophy, Robotics and Artificial Intelligence. One line of research, relevant for the Emotion-Lab proposal, is the development of interactive smart toys, designed to encourage the social competences in neurotypical and neurodivergent children. ISTC-CNR is part of the National Research Council, the largest public research body in Italy.

www.istc.cnr.it/



Italiacamp is an Italian organization, involved in projects promoting social and economic impact, with a particular reference to activities in the field of education and learning. In this context, Italiacamp is committed to developing innovative didactic and educational models within the STEAM approach, harnessing emerging technologies and new methodologies to enhance learning experiences and cultivate critical thinking. Italiacamp collaborated with ISTC-CNR on the Emotion-Lab, a pilot study aimed at promoting children's emotional intelligence.

<https://italiacamp.com/en/>



Team

- Beste Ozcan, PhD in Design and Innovation, ISTC-CNR. Designer of PlusMe.
 - Valerio Sperati, M.A. in Psychology, ISTC-CNR. Software and hardware developer of PlusMe toy.
 - Massimiliano De Luca, M.A. in Electronic Engineering, INM-CNR. Developer of PlusMe electronics.
 - Alessandro Pecora, PhD in Physics, IMM-CNR. Developer of PlusMe electronics.
 - Massimiliano Schembri, PhD in Psychology, ISTC-CNR. Developer of PlusMe software.
 - Gianluca Baldassarre, PhD in Computer Science, ISTC-CNR. Lab supervisor.
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- Riccardo Santilli, Head of Humanities Domain at Italiacamp. Instructional Designer and Consultant;
 - Clara Sardella: M.A in Pedagogy, Italiacamp. Developer of the experimental protocol with children.
 - Claudia Di Marco: PhD in Psychology, Italiacamp. Evaluation methodologies and data analysis.
 - Martina Porcelli: M.A in Psychology, Italiacamp. Psychology supervision.
 - Jasmine Miozzi: M.A in Pedagogy, Italiacamp. Support for the experimental activity
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- 44 children and 2 teachers from the primary school I.C Alberto Sordi in Rome (Italy)

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contacts:

valerio.sperati@istc.cnr.it
r.santilli@italiacamp.com

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