

Designing an AI-Powered TUI for Toddler Emotional Communication & Co-Agency

Silvia Ferrando - University of Genova - silvia.ferrando@edu.unige.it

Eleonora Ceccaldi - University of Genova - eleonora.ceccaldi@dibris.unige.it

Educators in pre-kindergarten seek systems to introduce toddlers (24-36 m.o.) to **Socio-Emotional Learning (SEL)**. This work presents the co-design of a **Tangible User Interface (TUI)** that utilizes **Affective Computing** to bridge the gap between physical expression and emotional literacy.

AI-Powered Prototype

The system uses a camera-projector setup to create an interactive drawing environment. Unlike traditional screens, this TUI focuses on the physical act of creation to bridge the gap between movement and emotion.

Questions:

How to co-design with toddlers?

How to let toddlers give their feedback?

Gameplay:

1. Establishing a link between a specific color and a feeling, the toddler chooses a color based on their current emotional state.
2. The child interacts with the drawing surface using physical tools.
3. An RGB-D camera captures the drawing process. AI detects movement features (speed, stroke fluidity).
4. The system suggests a feeling based on these analyzed movement patterns, facilitating a feedback loop

Co-agency

The interactive, mutually supportive relationships that help learners progress toward valued goals.

Contextualization: not just "shared decision-making" but "educational practices in motion": the toddler leads the interaction through bodily engagement.

Inclusive Learning: Everyone involved is considered a learner

Physicality: Co-agency is supported by the TUI's design, allowing the child to control the pace and direction of the activity.

