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ESSbots: Designing emotionally supportive swarm robots for remote social connection

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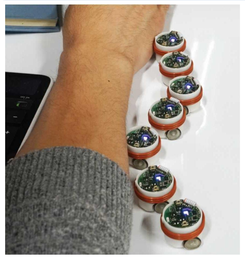
Introduction

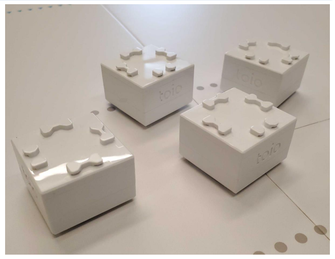
Early adolescent friendship plays an important role in childhood development, and offline social networks have a positive association with mood, self-esteem, and lack of loneliness [1,2]. Yet teenagers increasingly rely on online communication platforms to connect with their friends, which lack many of the important benefits of in-person interaction, such as robust emotional expression and affective social touch [3].

To address some of the shortcomings of group online communication, we explore the design of ESSbots, a new kind of physical social media that takes advantage of swarm robots' *tangibility*, *multiplicity*, and *agency* to promote meaningful, embodied, and emotional connection among remote teen friend groups.

Methods

We conducted two exploratory workshops to broadly assess our idea, and we are currently conducting a series of iterative participatory design workshops with teenagers to understand how teens conceptualize ESSbots, how they want to communicate and use them, and how we can make creating custom robot behaviours accessible and engaging to teens.





Left: Zooids [4] (photo retrieved from [5]), used in exploratory workshops.

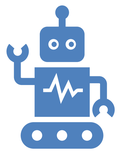
Right: Sony Toio robots, used in the main workshop series.

Workshop Series Structure

Each workshop follows the same iterative approach:

Themed workshop with:
- Group discussion questions
- Demos
- Interactive design activities

Post-workshop analysis:
- Minimal collaborative data coding



Prototype iteration:
- Robot behaviour improvement
- Robot control improvement

Results

Exploratory Workshops

- ESSbots best communicate emotions, social closeness
- Combinable behaviours create layered meaning (actions, parameters, swarmness)

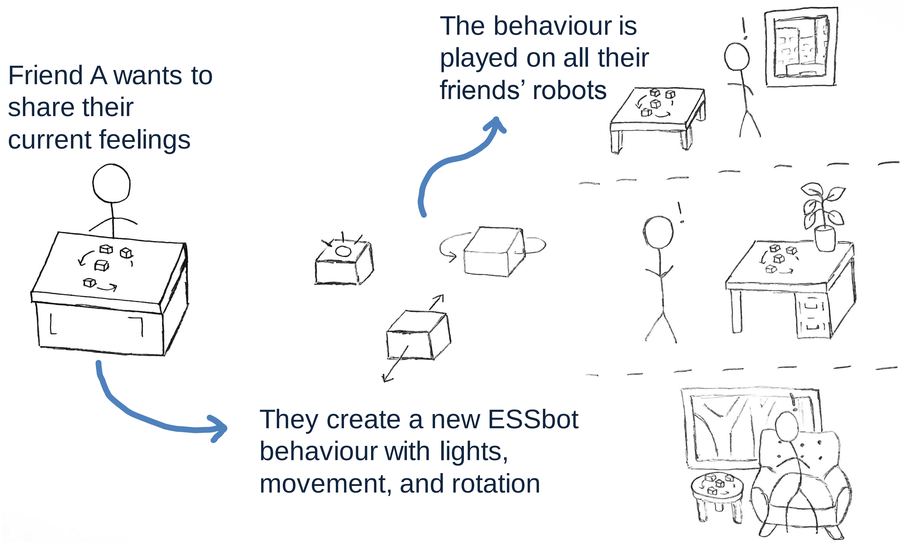
Workshop Series 1: Conceptualizing ESSbots Communication

- Conceptual model generated from exploratory workshop consistent with workshop 1 results
- Natural mapping between behaviour type (action) and parameters or control

Workshop Series 2: Customization and Control

- Situational context influences both robot behaviours and desired control method
- Access to both simple behaviour presets and highly customizable robot programming is desirable

ESSbots Example Use Case



Discussion

Participants found ESSbots most compelling for situations where they would be unable to see their friends in person (e.g., they live in a different country), and want to feel closer to them. ESSbots are also best suited for sharing simple messages, and thus may work best when integrated with other social tech modalities.

Conclusion and Future Work

ESSbots show promise as a supplemental social technology to support affective, embodied communication. We will continue to iterate on our prototype based on participant feedback, and we plan to conduct two more workshops to explore the social dynamics of using ESSbots within a remote friend group and evaluate a final prototype for the ESSbots system.

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Acknowledgements

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