

The Ongoing Adventures of the Robot Study Companion

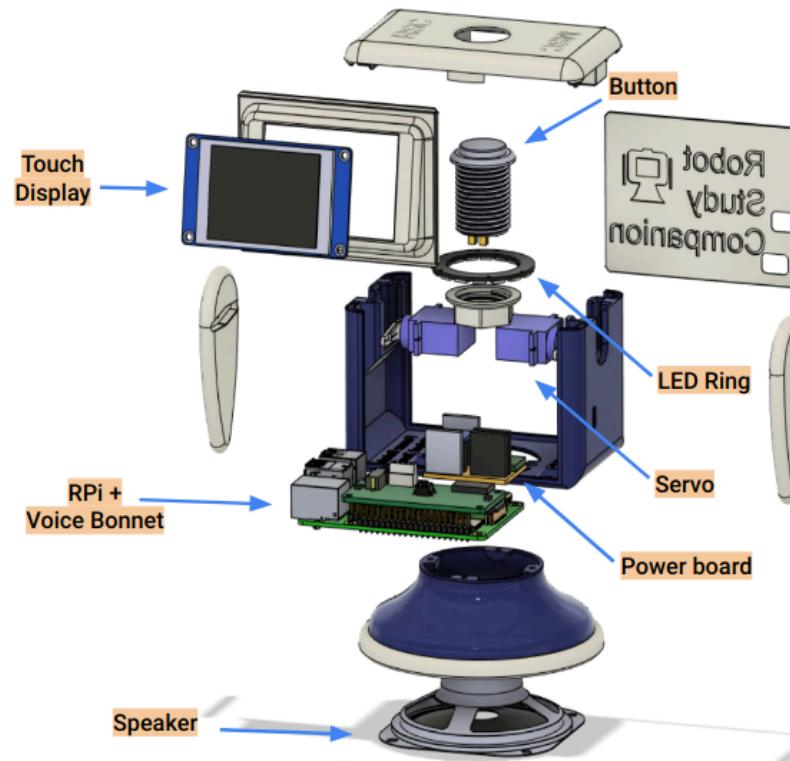
Author: FARNAZ BAKSH

Recent technological advancements have demonstrated the potential of **AI-driven study tools** to enhance student engagement and **personalised learning** experiences.

However:

- Existing social-educational robots are expensive, proprietary, and difficult to customise.
- Students need real-time, **adaptive learning support**, especially in underserved regions with limited resources.
- There is a lack of **accessible, open-source tools** for embodied AI learning.

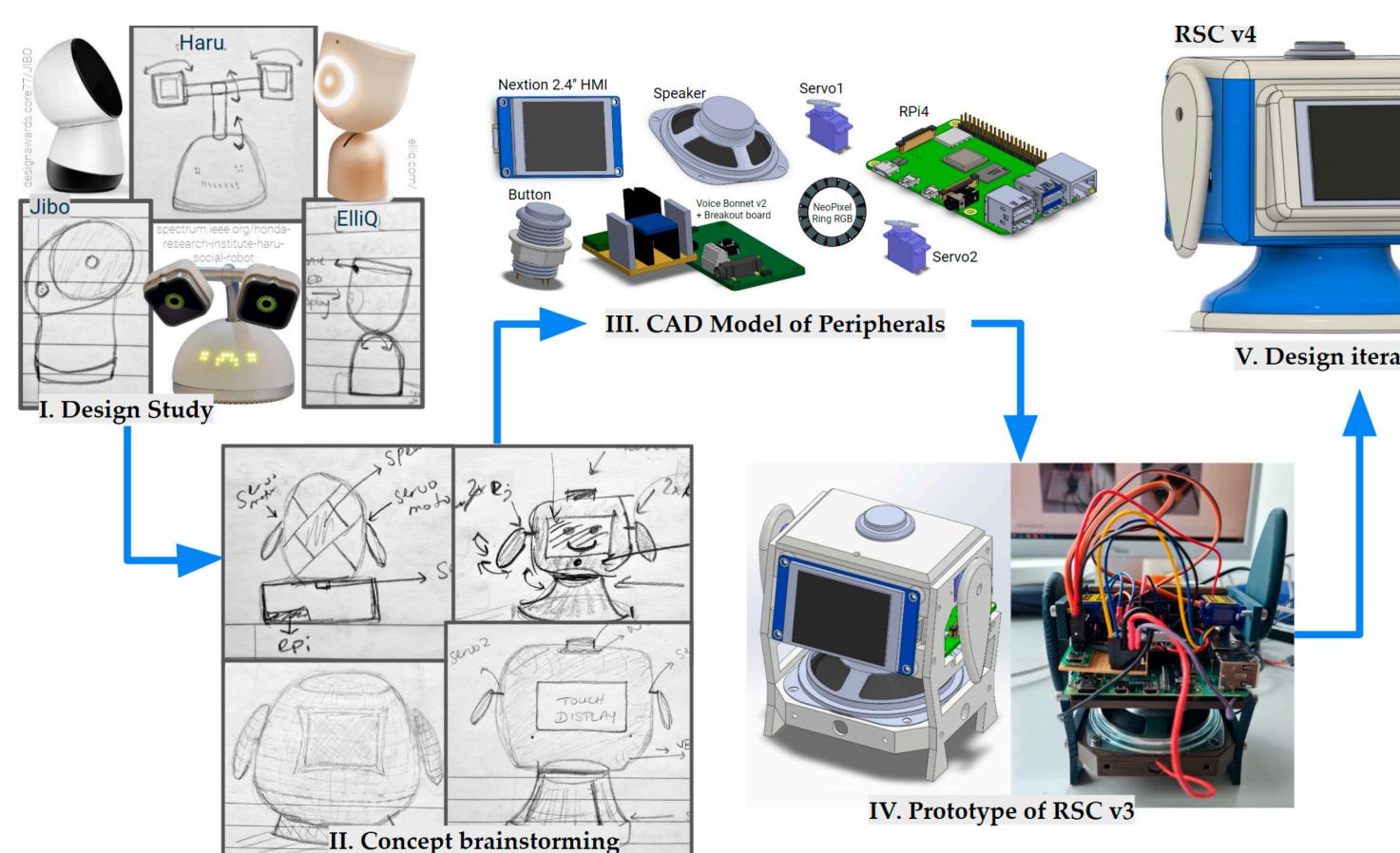
At the University of Tartu, we are developing an open-source, low-cost social **Robot Study Companion (RSC)** designed to enhance university students' learning experiences through **multimodal interactions** (speech, visuals, touch, gestures) [1].



Global deployment map of the RSC across university campuses.
Students interacting with local built RSC (v4) during study (left).

We are developing the RSC through an iterative design cycle and usability testing, drawing on various research and design methods in human-robot interaction (HRI). Ongoing user studies across global campuses employ mixed methods approaches and multiple data collection tools.

We invite researchers to explore, adapt, and co-develop the RSC platform to support diverse educational needs worldwide.



RSC Iterative design process: from initial concept study to current prototype (version 4) [1].

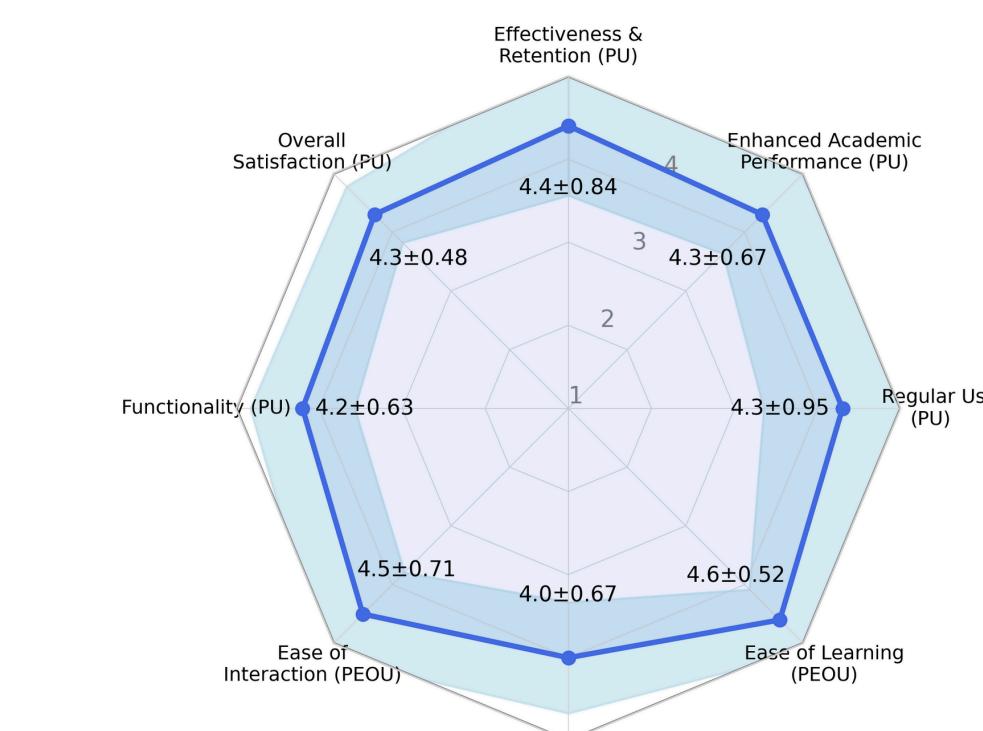
Join us in shaping the next generation of open, interactive, affordable educational tools.

robotstudycompanion.github.io



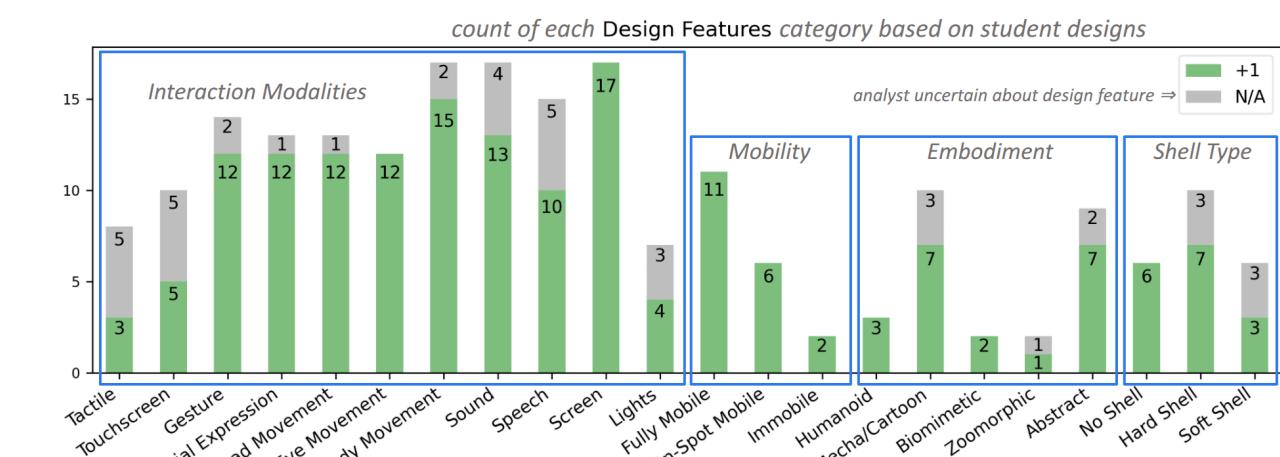
Research & Design Methods

- **Iterative prototyping:** developing multiple hardware/software versions [1].
- **Participatory design** workshops with students [2].
- **Global user testing** across different university campuses [3].
- **Mixed methods evaluation:** surveys, interviews, interaction logs.



Preliminary Technology Acceptance Model (TAM) profile insights from students (N=10) interacting with the locally replicated RSC (v4) in Guyana.

30 design features compared, counted, analysed...



Aggregate robot design features, designed by students (N=19) in Guyana. Nearly all (17 of 19) prefer multimodal interaction (e.g. movement, voice & visual feedback), consistent, e.g., with preferences from students from Germany [2].

Reference:

- [1] Baksh, F., Zorec, M.B., Kruusamäe, K. (2024) Open-Source Robotic Study Companion with Multimodal Human-Robot Interaction to Improve the Learning Experience of University Students. *Appl. Sci.* 2024, 14, 5644. doi.org/10.3390/app14135644
- [2] Baksh, F., Zorec, M., Kruusamäe, K. (2024). Designing Social Robots for Learning: HRI Participatory Design Workshop. In: Innovative Technologies and Learning. ICITL 2024. Lecture Notes in Computer Science, vol 14786. Springer. doi.org/10.1007/978-3-031-65884-6_22
- [3] Baksh, F., Jackson, I., Jackson, I., Zorec, M. (2025). University Students' Acceptance of a Robot Study Companion. *Robotics in Education. RiE 2025* [Forthcoming]