Tim Wilson,
Barker College, Sydney, NSW, Australia

Cuddle & Comfort Chimp: An Innovative Soft Robotic Sleep Aid

ROBO025

Problem and Project Objectives

Poor sleep is a major contributor to adolescent health issues, associated with:

- Worsened mental health, including depression and poor decision making.
- Reduced immune system function, negatively affecting physical health.
- Trouble learning and retaining information - harming education.

48% of young people take more than **40 mins to fall asleep** more than once a week. **70%** of young people do not get the recommended 8 hours or more sleep. There are **no** clinically effective robot devices to help fall asleep, and few products are targeted to the adolescent age group.

Objective:

To design and create a prototype of a product that helps adolescents older than 6 years get to sleep faster and reduce their stress levels. The device needs to function unobtrusively, and make a positive impact on an individual's sleep.

Data Analysis and Results

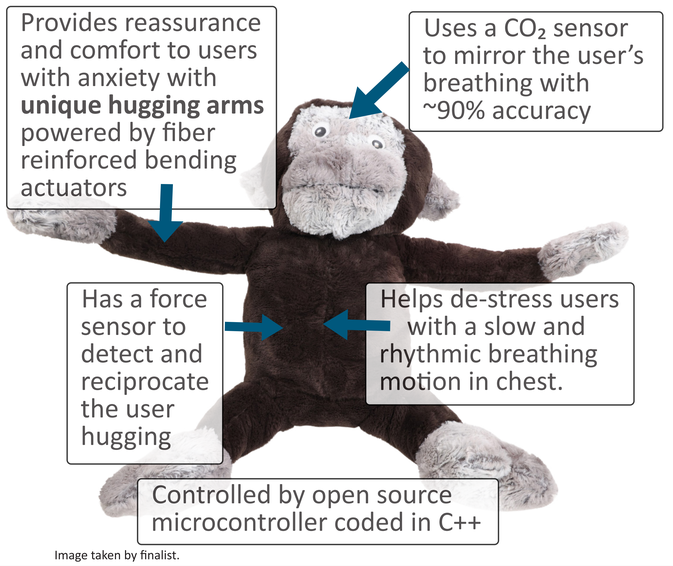
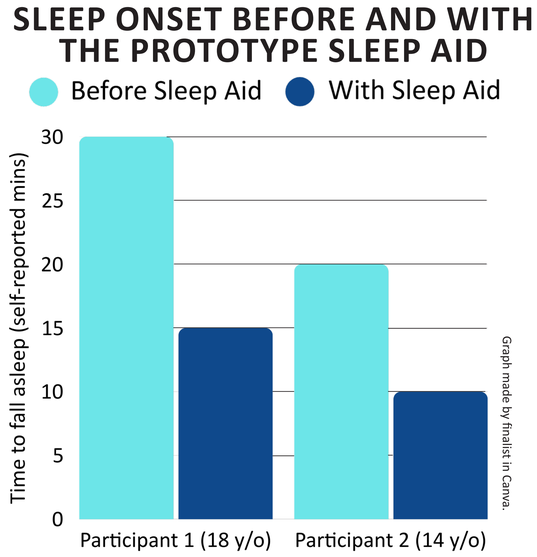


Image taken by finalist.



Prototype Design and Methodology

The prototype was designed through an iterative design process:

1. Empathise and define problem.
2. Research potential solutions for each functional element.
3. Sketch, create CAD models of potential solutions.
4. Create a range of physical prototypes.
5. Test and iterate upon design solutions.
6. Decide on final solution.
7. Manufacture prototype.
8. Test final prototype with users.
9. Evaluate, draw conclusions.

Image taken of finalist by finalist's parent, Alison Wilson.

Image taken of finalist by finalist's parent, Andrew Wilson.

Images were taken by the finalist, edited in Adobe InDesign.

All components and systems in the device were custom made by the finalist including the soft robotics, programming and sewing of the exterior.

Interpretations and Conclusions

Important Findings:

- Soft robotics offers an avenue of sleep aid technology that may enhance the effective Cognitive Behavioural Therapy (CBT) and reduce poor sleep onset.
- Preliminary results with adolescents suggest a **decrease in time to sleep** and a **relaxing effect** when using the prototype, highlighting the solution's potential.

Advancements on current options:

- **Only** sleep aid product with **arms that hug the user back**, a biomimetic breathing motion, and sensor integration.
- Identified **more positively** in its **aesthetic appeal** compared to leading sleep robot, Somnox - 79% higher in rankings by adolescent survey participants.

Future Improvements:

- Further overnight testing to clinically validate its positive impact on sleep onset.
- Design improvements, including quieter mechanisms and a washable cover.