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DESIGN ENGINEER PORTFOLIO

MAYLI JONES

Research | Design | Iterate | Create

2026

About Me

Aspiring Product Design Engineer

I am a second-year Design Engineering student at Imperial College London, particularly interested in developing physical products through CAD, simulation and hands-on prototyping. I enjoy taking ideas from initial concepts through detailed design, 3D printing, testing and refinement.

My approach combines technical development with an understanding of how people interact with products. User feedback, ergonomics and design psychology help me create outcomes that are not only functional, but intuitive and well considered.

Mayli Jones

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Outside Engineering

Outdoors
Canyoning,
Coasteering, Hiking

Sports
Indoor Bouldering
and Swimming

Music
Piano (Grade 8), Violin (Grade 8)
Drums and Singing

Additional
Part-time tutor in Maths, Science and English
Fluent in spoken Mandarin Chinese

MindMeter

Measuring the Unmeasurable

The Challenge

Create an interactive mechatronic product using resourceful design, simple electronics and a range of engaging mechanical movements.

The Solution

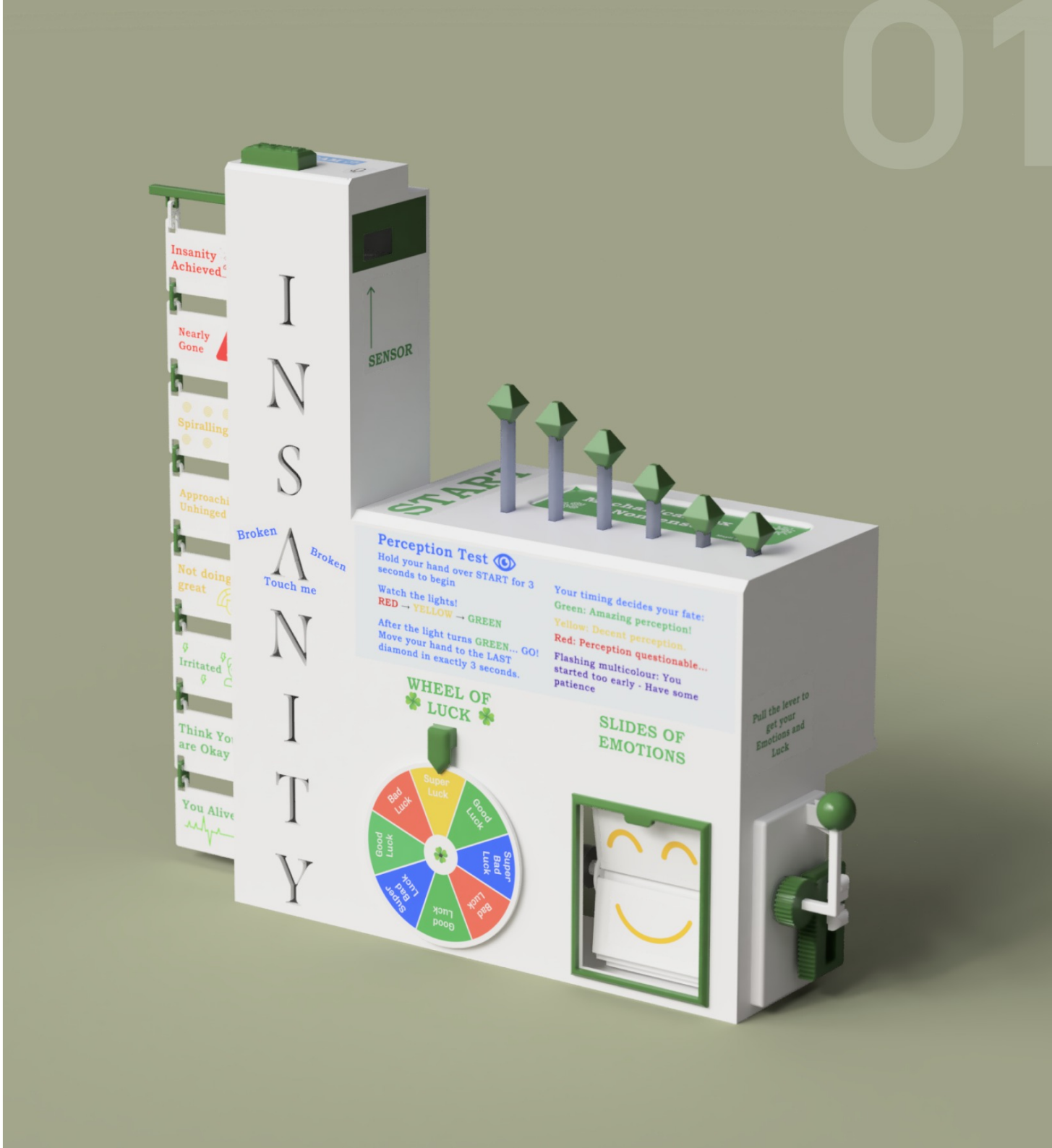
A playful machine that measures sanity, perception, luck and emotion through sensors, lights and interactive mechanical games, creating a varied user experience.

My Role

- Developed the full CAD model and mechanical systems
- 3D printed, finished and assembled the prototype
- Integrated electronics through soldering and wiring

Key Skills

CAD | 3D Printing | Rapid Prototyping | Arduino | DFA | Electronics Integration | Mechanical Design | C++ | Soldering



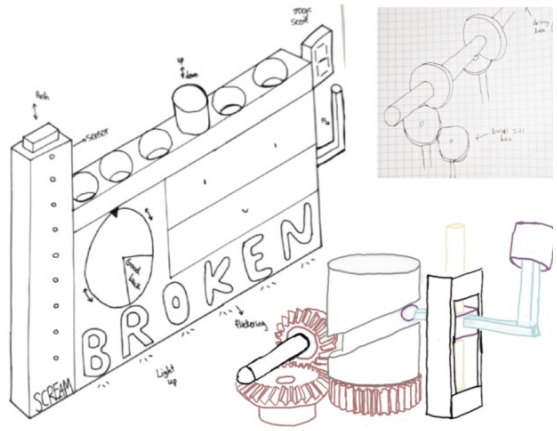
Development Journey

Mechanisms into Motion:

The project developed through rapid prototyping, CAD iteration and repeated trial and error. Rather than following a fixed design from the start, each mechanism was built, tested and refined as we learned how the different moving parts behaved in practice.

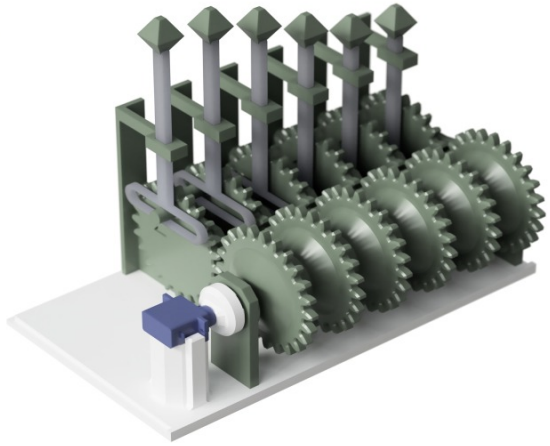
CAD helped us explore gear trains, linkages and internal layouts before manufacturing, while physical prototypes revealed issues with friction, alignment and reliability. These findings guided each new iteration, allowing the mechanical and electronic systems to gradually develop into one integrated interactive machine.

Concept Development



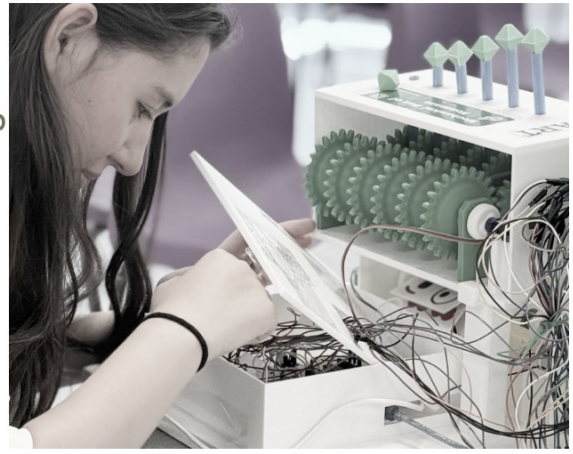
Explored and combined interactive mechanism ideas through sketches.

Mechanical Design



Refined gears, linkages and moving assemblies through CAD and prototypes.

Electronic Integration



Soldered and integrated Arduino, sensors, motors and LEDs.

Public Presentation

Presented and demonstrated at GERF and the 2026 Open Day to visitors.

MindMeter

Sound-Responsive Tower
A push button activates the microphone, which measures sound level and changes the LEDs from green to red.

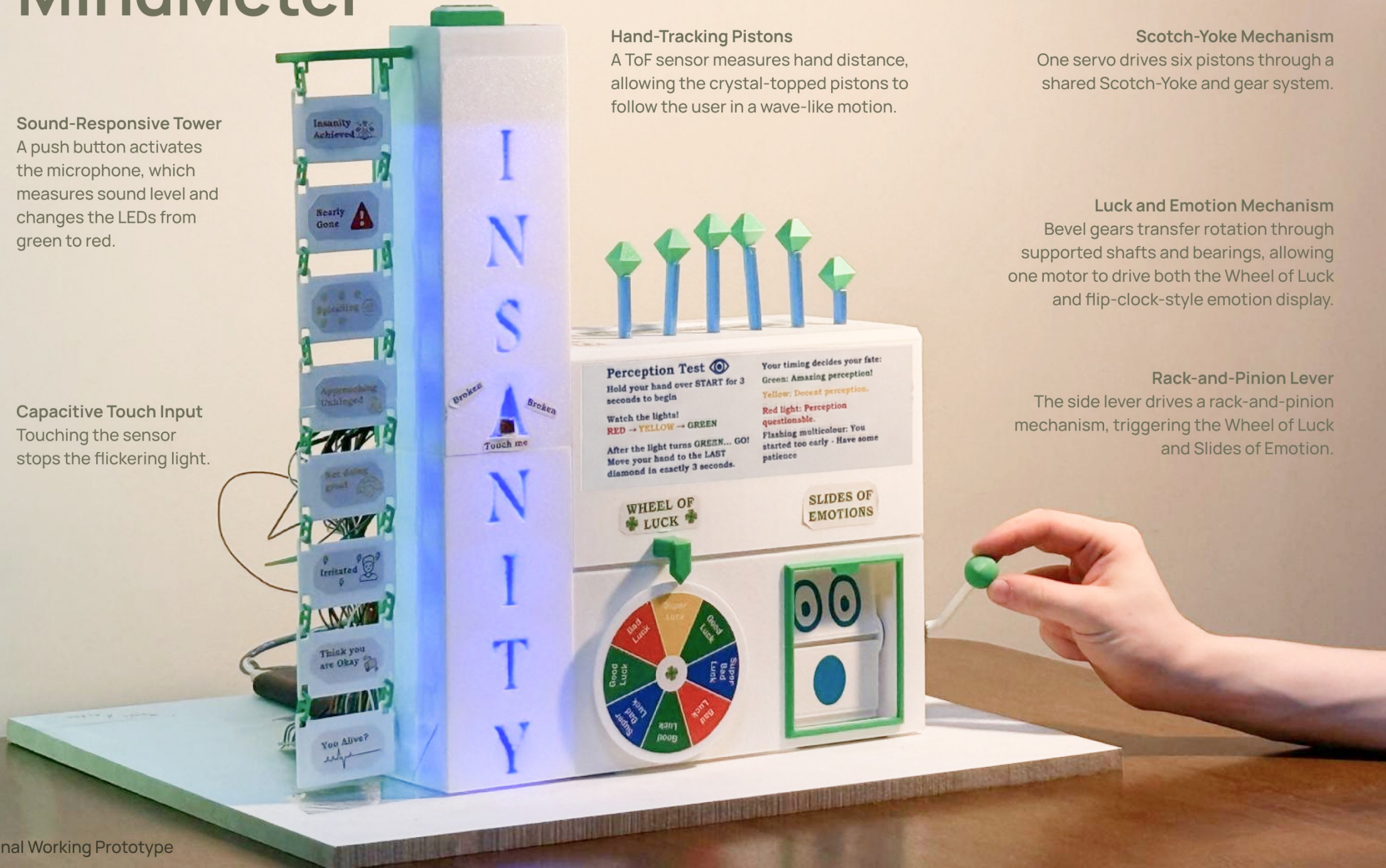
Capacitive Touch Input
Touching the sensor stops the flickering light.

Hand-Tracking Pistons
A ToF sensor measures hand distance, allowing the crystal-topped pistons to follow the user in a wave-like motion.

Scotch-Yoke Mechanism
One servo drives six pistons through a shared Scotch-Yoke and gear system.

Luck and Emotion Mechanism
Bevel gears transfer rotation through supported shafts and bearings, allowing one motor to drive both the Wheel of Luck and flip-clock-style emotion display.

Rack-and-Pinion Lever
The side lever drives a rack-and-pinion mechanism, triggering the Wheel of Luck and Slides of Emotion.



Final Working Prototype

SwivelCut

Cardboard Made Even Easier

The Problem

Cardboard prototyping in DT GCSE often depends on craft knives or specialist machinery, making the process unsafe, inconsistent and difficult for students without CAD experience.

The Solution

SwivelCut follows a student's hand-drawn path to produce cleaner cardboard cuts, making prototyping safer, more accurate and accessible without requiring CAD knowledge.

My Role

- Led CMF, branding and visual direction
- Planned and conducted all user testing and early research
- Produced technical drawings and prototypes

Key Skills

CAD | Rendering | Rapid Prototyping | User Research | Technical Drawings | Videography | DFM/DFA | User Testing

Development Journey

Research to Reality:

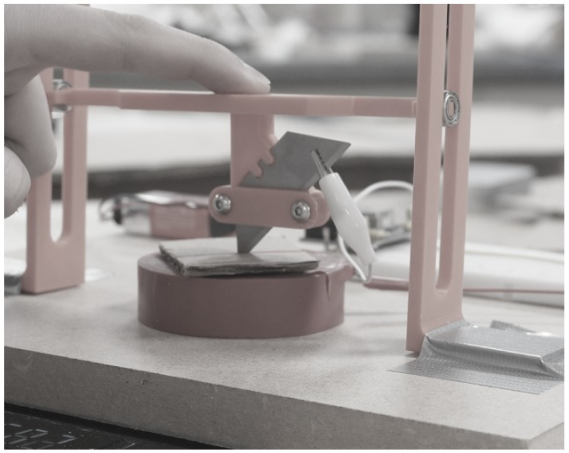
The design was developed through user research, engineering analysis and iterative prototyping. Interviews with teachers and students identified key issues around safety, accessibility, accuracy and confidence when cutting cardboard in school workshops.

Force testing defined the mechanical requirements, while repeated prototypes refined the arm movement, cutting head, controls and clamping system. Alongside the product, I developed the packaging, user guides, technical drawings and DFMA strategy, while also exploring branding, market positioning, costing and retail viability. Final user testing then validated the setup process and highlighted further opportunities for improvement.

User Research

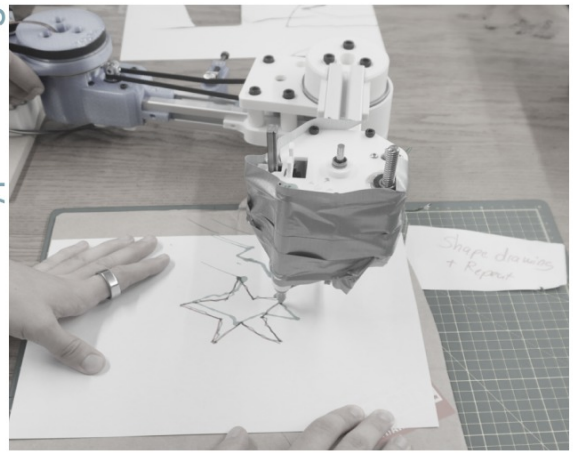
Interviews helped identify issues with safety, accessibility and confidence.

Force Calculations



Piercing and drag tests established the required motor torque and belt ratios.

Prototype Testing



Belt tension, pulley ratios and geometry were refined to improve accuracy.

User Testing

Classroom testing refined setup, clamping, controls and head changes.

SwivelCut

Simplified Controls
Physical buttons and status LEDs provide clear feedback without requiring a screen or CAD interface.

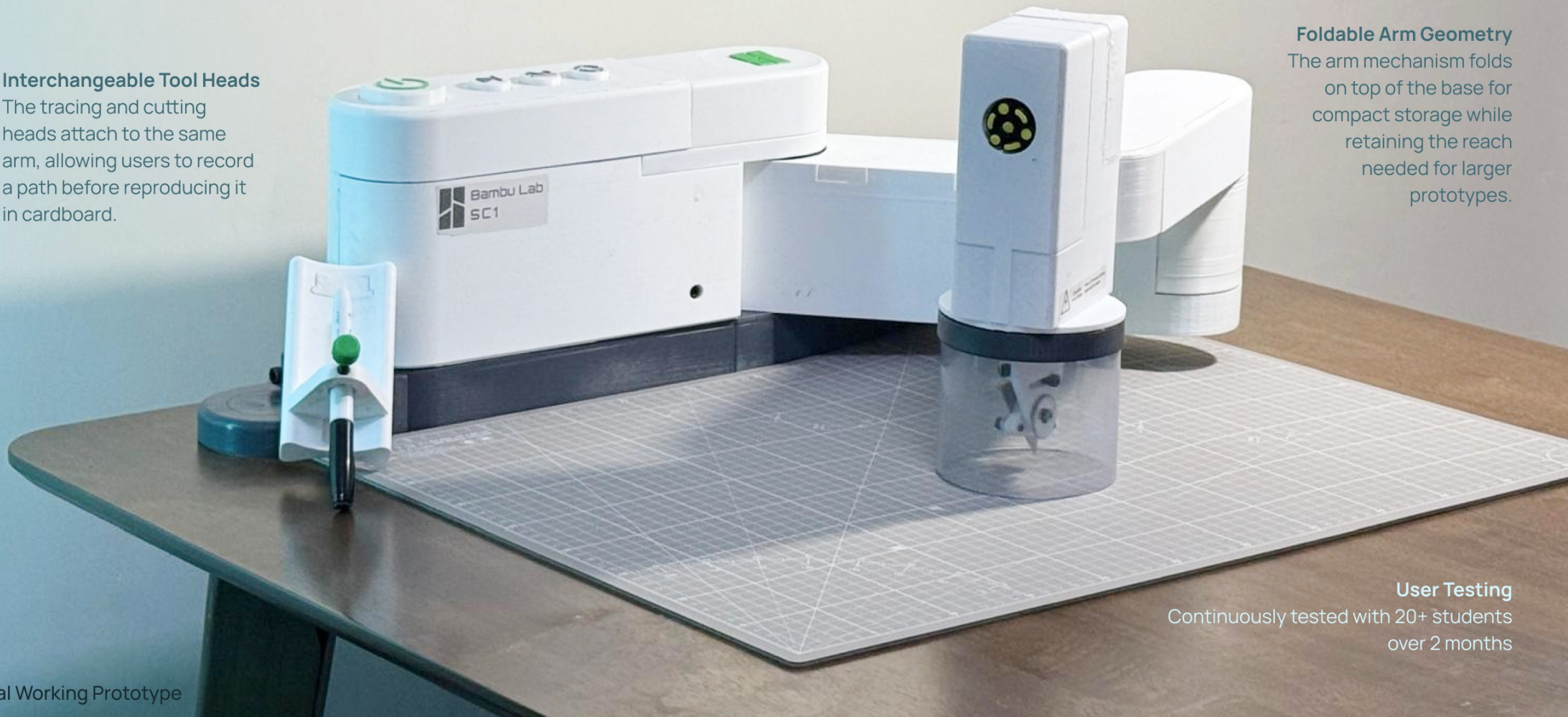
Stabilisation and Repeat
Smooths the recorded path to better match the user's intent, and can replay it for consistent batch cutting.

Belt-Driven Arm System
Timing belts transfer motor movement through the articulated arms, providing controlled motion across an A3 working area.

Integrated Safety System
Movement and resistance monitoring stop the machine if unexpected forces or movement are detected during use.

Interchangeable Tool Heads
The tracing and cutting heads attach to the same arm, allowing users to record a path before reproducing it in cardboard.

Foldable Arm Geometry
The arm mechanism folds on top of the base for compact storage while retaining the reach needed for larger prototypes.



User Testing
Continuously tested with 20+ students over 2 months

Final Working Prototype