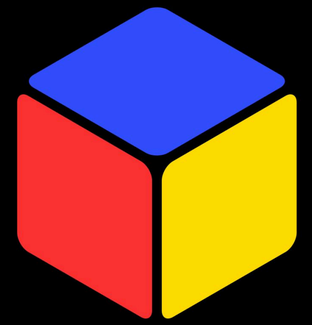
CUVE

{Concentration Unit for Variable Efforts}



Jaywoong Jeong x IPD

Final Presentation June 14th 2025

Theme: **Sensory Augmentation**

“Turning Abstract Time into a Sensory Experience”

“How can we transform the **abstract concept of time** into a multi-dimensional and **intuitive experience** that enables people to **manage** it effectively?”

The Problem

Why a New Timer?

Time is Abstract

It’s imperceptible, lacks a dedicated sensory organ , and flows in one linear direction, making it difficult to manage intuitively.

Existing Physical Timers are Not Enough

Often too simple, offering basic countdowns without tracking multiple tasks.

Applications are Distracting

Force you to use your most distracting device, creating a conflict of interest. This can lead to the tool itself becoming the distraction.

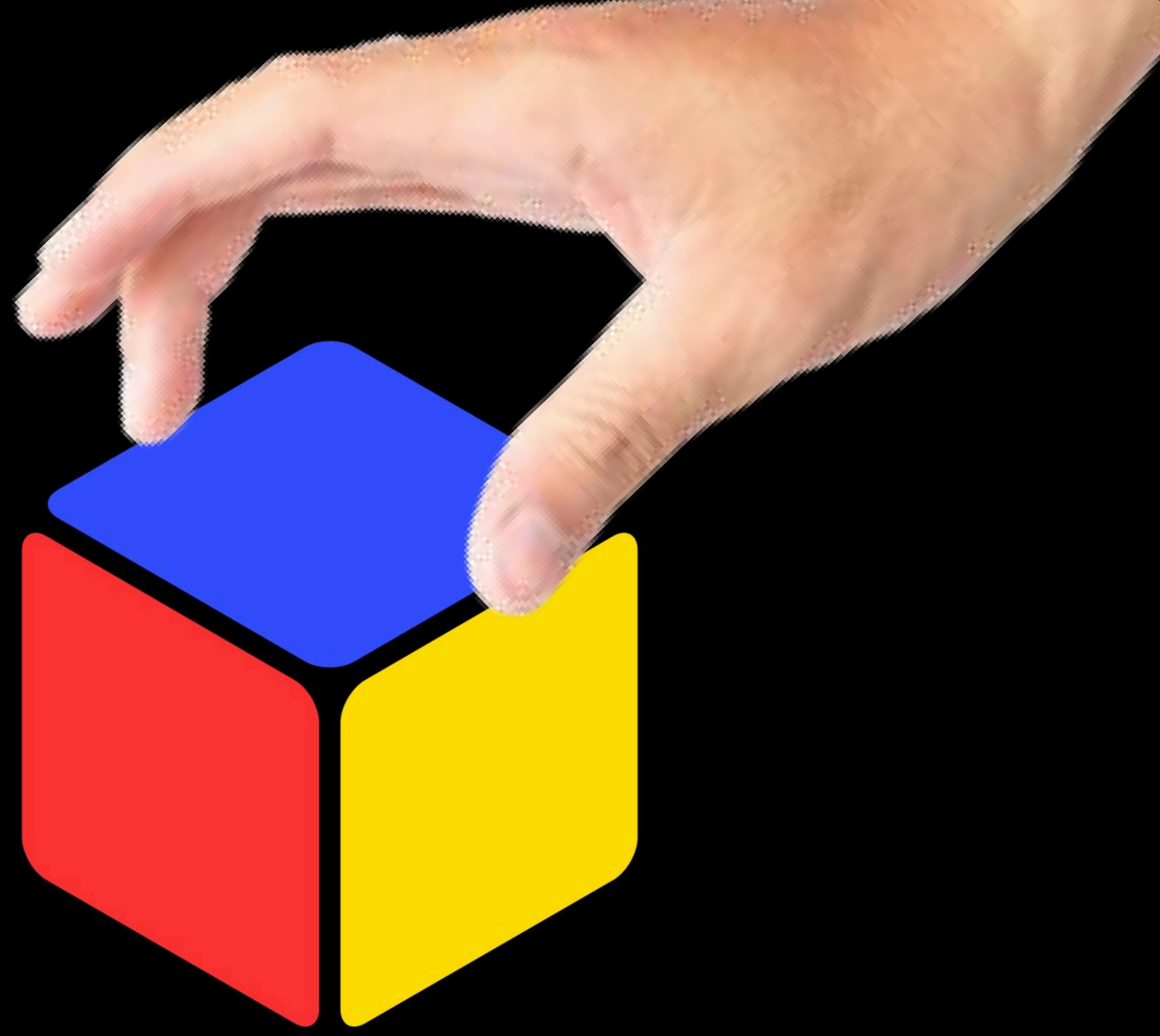
The Solution: **CUVE**

Core Idea:
To seamlessly merge the intuitive part of a physical object with the analytical power of a software application.

How It Works

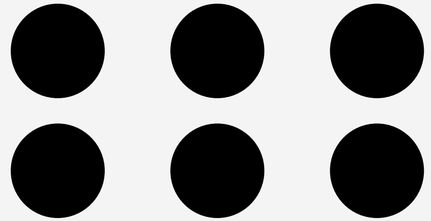
#1: Intuitively track and switch between tasks simply by flipping the physical cube.

#2: All time data is automatically synced to the mobile app for visualization and analysis.

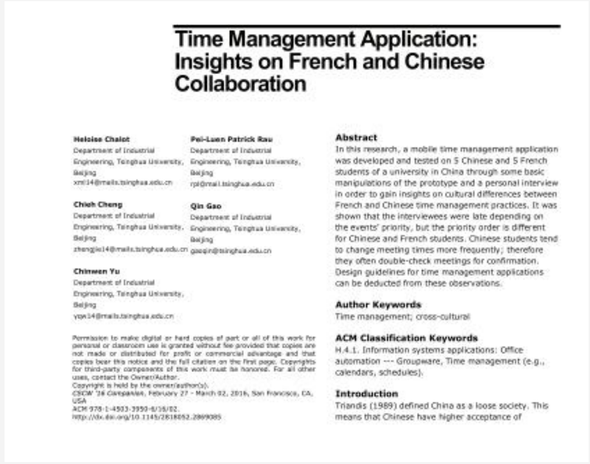


Grounded in Research & User Needs

- **User Interviews (N=6)**
  - **Tangible interaction** to aid mental context-switching between tasks.
  - Potential Target: **High school Students, Exam-Takers(수험생)**
  - The ability to track activities, suggesting a need for different shapes.



- **Academic Research (11 peer reviewed academic paper)**
  - **Time Management**:
    - To be useful, tools must be flexible and not impose a rigid structure.
    - Tool should be open to active user interaction.
  - **Data Visualization**:
    - Well-designed visualizations can foster self-awareness and improve self-regulated learning skills.



Time Management Application: Insights on French and Chinese Collaboration

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Abstract
In this research, a mobile time management application was developed and tested on 5 Chinese and 5 French students of a university in China through some basic manipulations of the prototype and a personal interview in order to gain insights on cultural differences between French and Chinese time management practices. It was shown that the interviewees were late depending on the events' priority, but the priority order is different for Chinese and French students. Chinese students tend to change meeting times more frequently; therefore they often double-check meetings for confirmation. Design guidelines for time management applications can be deducted from these observations.

Author Keywords
Time management; cross-cultural

ACM Classification Keywords
H.4.1. Information systems applications: Office automation --- Groupware, Time management (e.g., calendars, schedules).

Introduction
Triandis (1989) defined China as a loose society. This means that Chinese have higher acceptance of

Prototype Evolution: From Idea to Product

Phase 1: Web based Prototype

Validated the core interactive concept with a conceptual UI prototype.

Phase 2: MDF Cube + React Native App

Tested physical interaction and core hardware, using the MPU-6050 sensor for orientation detection.

Phase 3: 3D Printed + Swift App

Achieved the final aesthetic form and usability, alongside a refined mobile application.

Demo

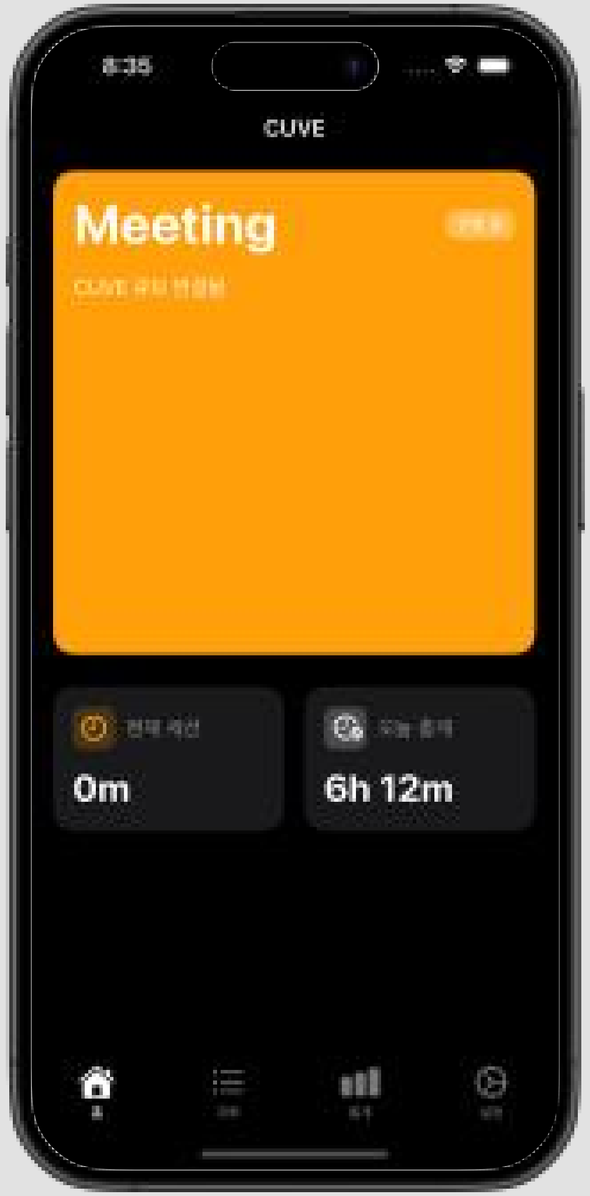
Final Demonstration

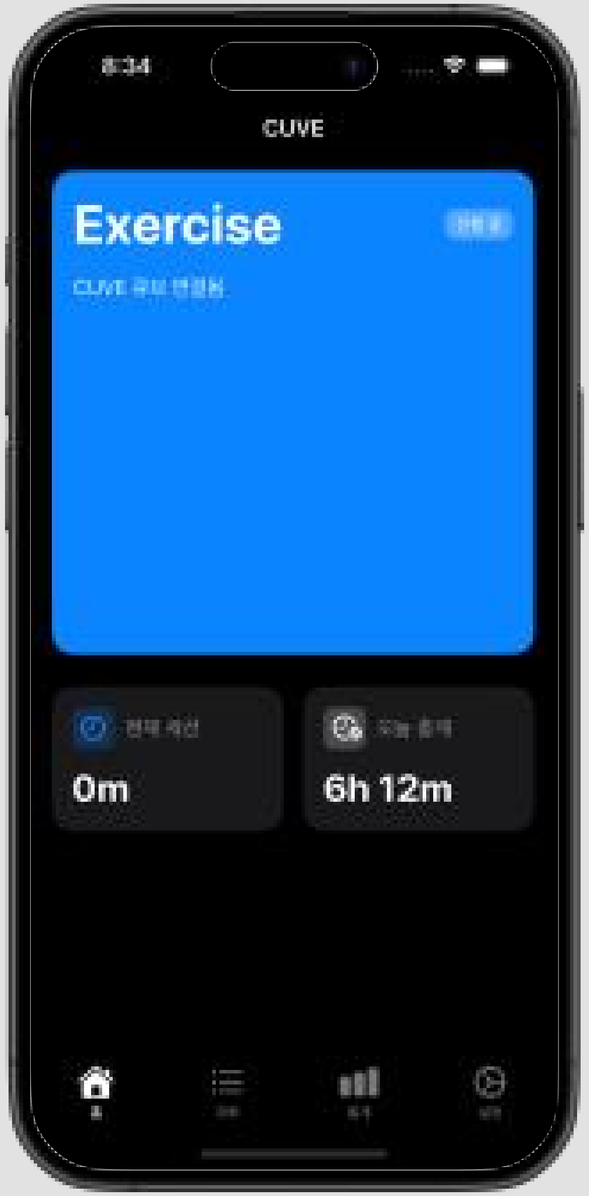
Video+ Live Demo

Visualization

Home View

- The design directly resembles the faces of the physical CUVE.
- This creates a seamless and intuitive connection between the hardware and the app, which was a core project goal.





Visualization

Daily View

- This view logs time per task and session, providing the foundational data for all analysis.
- This granular data is the essential first step for Self-Regulated Learning (SRL), as it allows users to accurately monitor and reflect on their daily performance.

Visualization

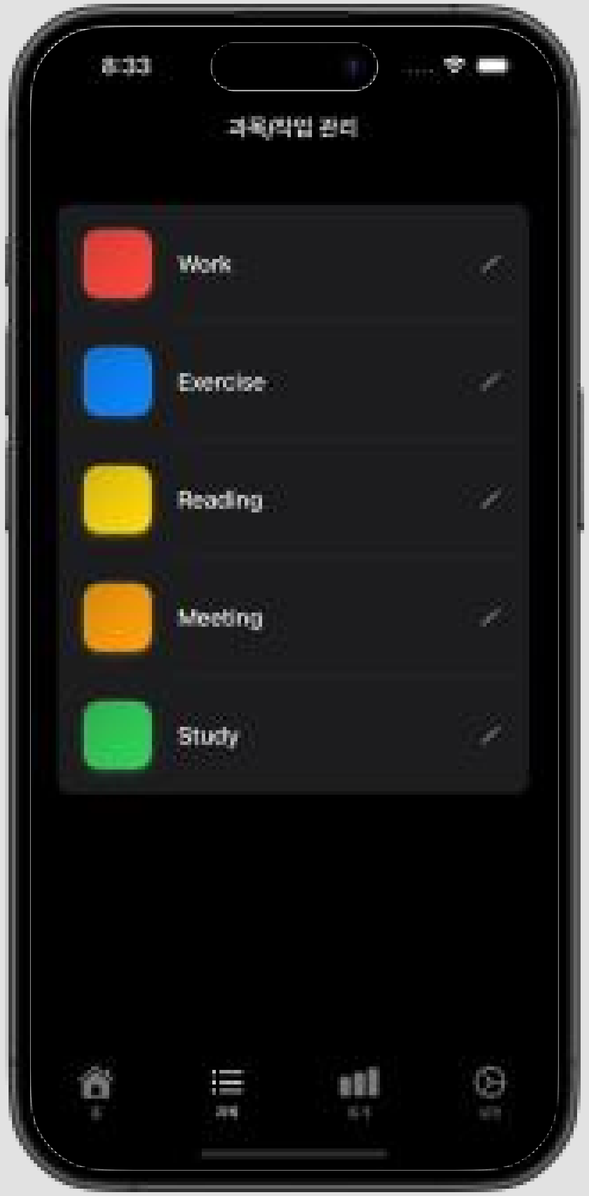
Weekly View

- This view uses familiar visuals like stacked bar graphs and donut charts to display weekly trends and task distribution.
- According to research, using well-designed, simple visualizations is key to promoting the self-awareness and reflection needed to improve time management skills.

Visualization

Monthly View + Task Manage

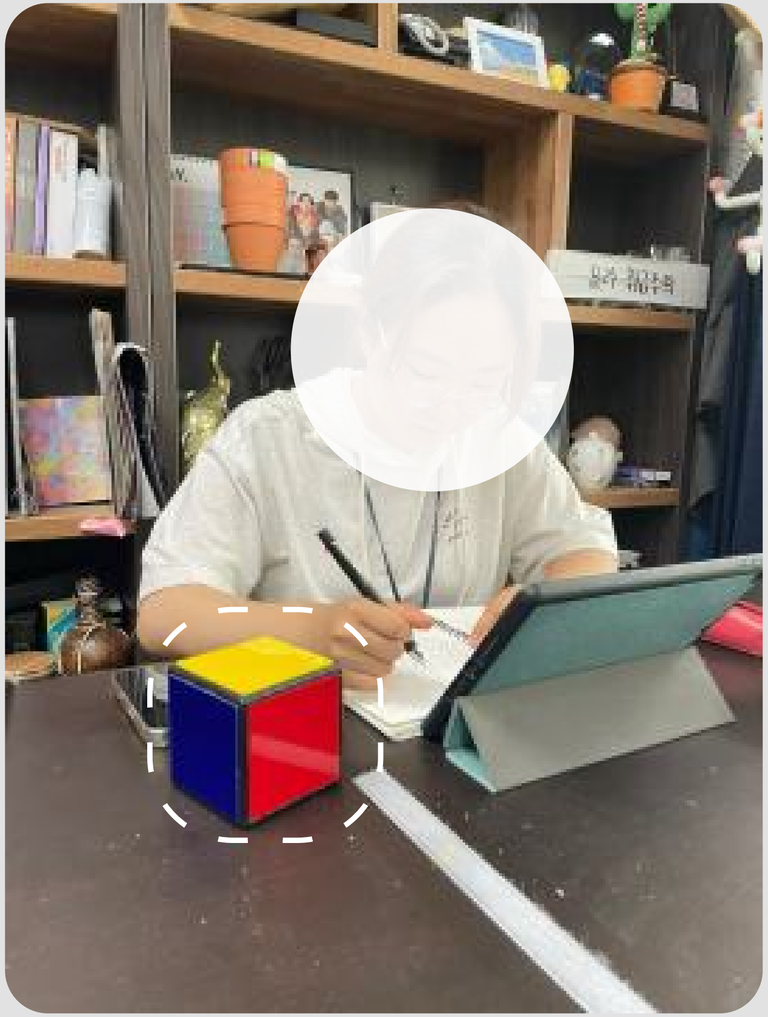
- A simplified heatmap displays usage patterns across the entire month, showing a user's consistency at a glance.
- This feature addresses a common limitation in existing tools by helping users intuitively understand long-term patterns, a specific need identified in research



Deployment

I let my friends use my product

Date: 6/9
Baseline: Dretec Timer
Comparison: YPT



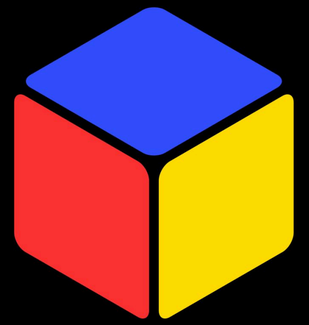
User Feedback & Conclusion

- **Key User Feedback:**
  - Users (my friends) consistently praised the intuitive switching tasks and the stress-free, accumulative approach to time tracking.
  - But some of them still filled distracted by laptop, desktop environment, or iPad.
  - *“It was great that studying has been done without phone, while having time recording and analysis.”*
- **Conclusion:**
  - It bridges the critical gap between intuitive physical interaction and powerful data-driven insights, empowering users to truly take control of their time.

Future Plan

- **App Store Deployment**
  - Refine the app's UI for commercial release, focusing on stability and intuitive design.
  - Execute the submission process for a public launch on major platforms, including the Apple App Store and Google Play Store.
- **Intellectual Property Protection**
  - Conduct a comprehensive prior art search to confirm the novelty and patentability of the integrated hardware-software system.
  - If the system is deemed unique, proceed with filing a patent application to protect the core intellectual property.
- **Advanced Hardware Prototyping**
  - Develop an advanced prototype that improves upon the current 3D-printed model, focusing on better design tolerances and durability.
  - Explore scalable manufacturing methods, such as injection molding, to prepare the hardware for potential mass production.

Thank you!



Reach out to me if you have questions.
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Issues (but ~~Solved~~)

- **May 28: Critical Failure**
  - The main screen failed to power on due to an unstable voltage supply.
- **May 29: Power System Resolved**
  - Replaced a faulty boost converter and stabilized the circuit. The screen is now fully functional.
- **May 31: Latency Discovered**
  - A significant lag was found between flipping the cube and the timer starting, causing inaccurate time logs.
- **June 2: Latency Resolved**
  - Optimized the firmware with an interrupt-based system, achieving an instantaneous response.
- **June 4: Bluetooth Stabilized**
  - Fixed an intermittent disconnection bug by adjusting BLE parameters and improving the app's reconnection logic.
- **June 6: SwiftUI Crash Fixed**
  - Resolved a critical UI crash by refactoring the app's state management code.
- **June 8: Stability Achieved**
  - All major known hardware and software bugs were resolved. The prototype is now stable and ready for user testing.
- **Follow-up Issue:**
  - A charging circuit failure with the lithium battery was discovered during user testing on June 9. This is the current top priority.