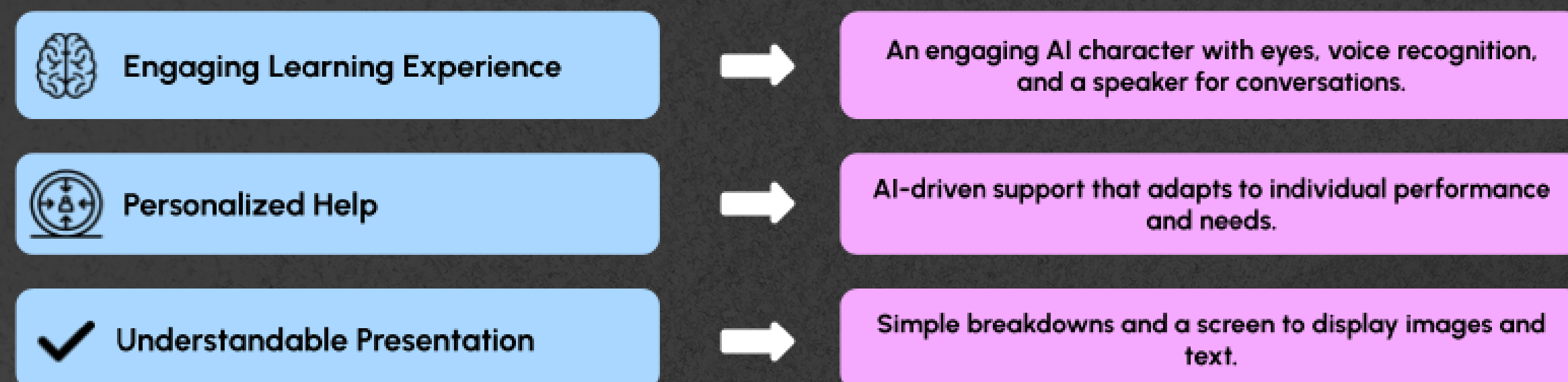
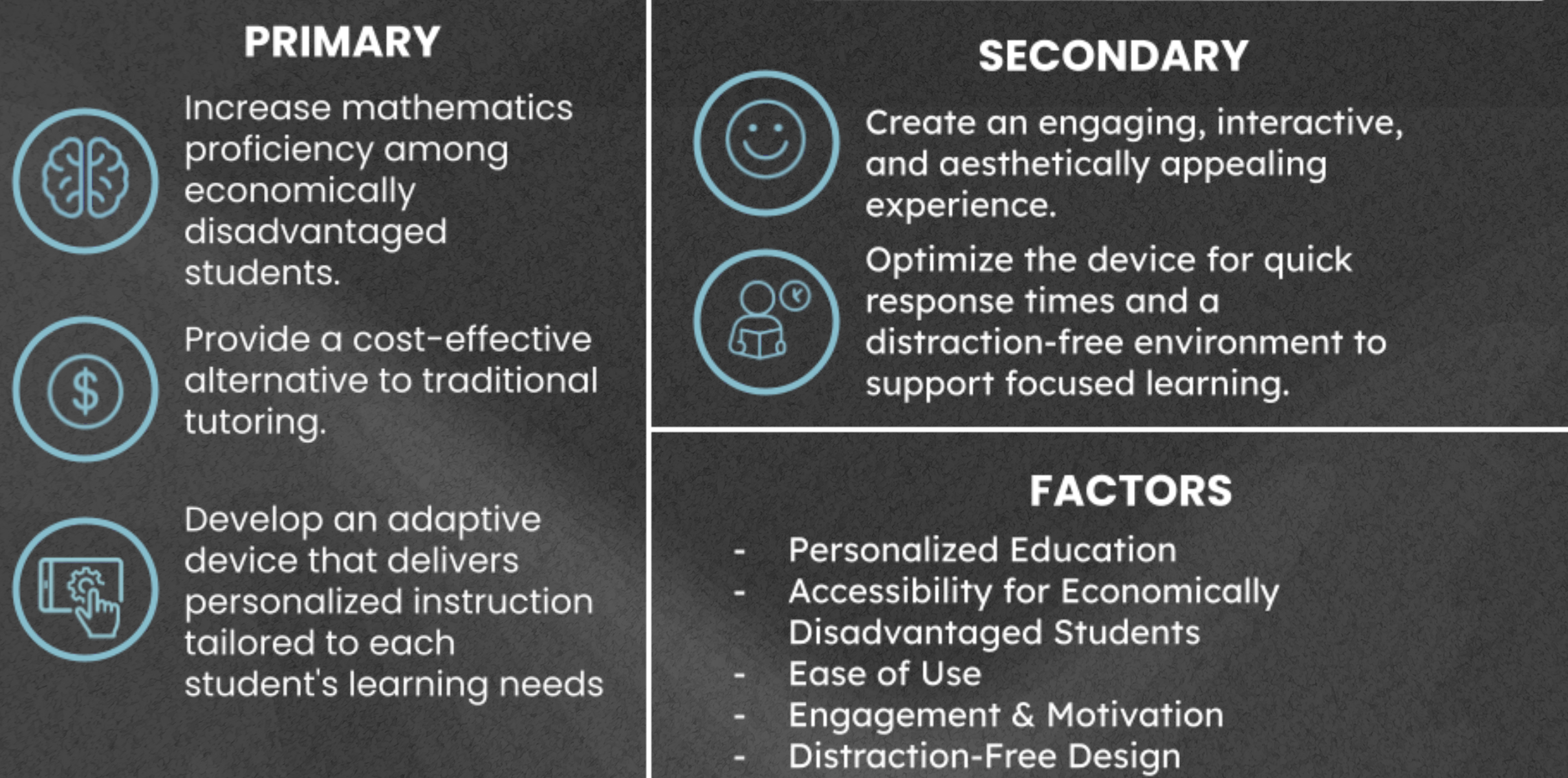


## User Requirements

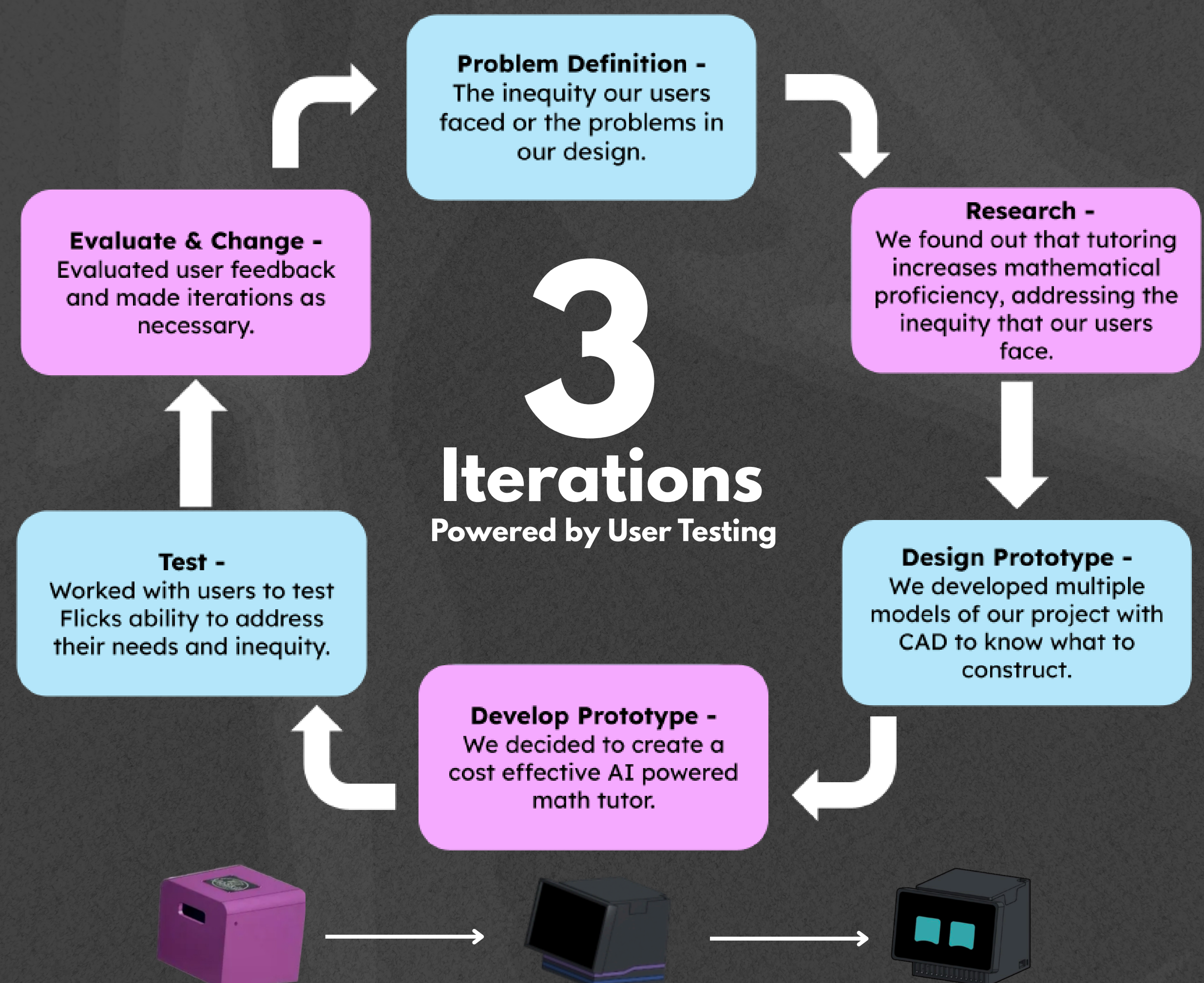
Established using user data and interviews, where students stated they needed a personal and engaging experience.



## Objectives



## Design Process



## Citations

Kohlimoos, L., & Steinberg, M. P. (2024, May). *Contextualizing the Impact of Tutoring on Student Learning: Efficiency, Cost Effectiveness, and the Known Unknowns*. Accelerate.

<https://accelerate.us/wp-content/uploads/2024/05/Accelerate-Research-Report-Efficiency-and-Cost-Effectiveness-1.pdf>

Montgomery County 2023 - 2024 School Report Card. (2024). Maryland State Department of Education.

<https://reportcard.msde.maryland.gov/Graphs/#/ReportCards/ReportCardSchool/1/E/1/15/XXXX/2024>

Student, H. W. M. S. (2025, June 4). [Personal interview].

Ashrit Mandava | Rian Ganesh | Sameer Singh | Summit Lu  
Hallie Wells Middle School | Dustin Deem | Clarksburg MD | JHU APL

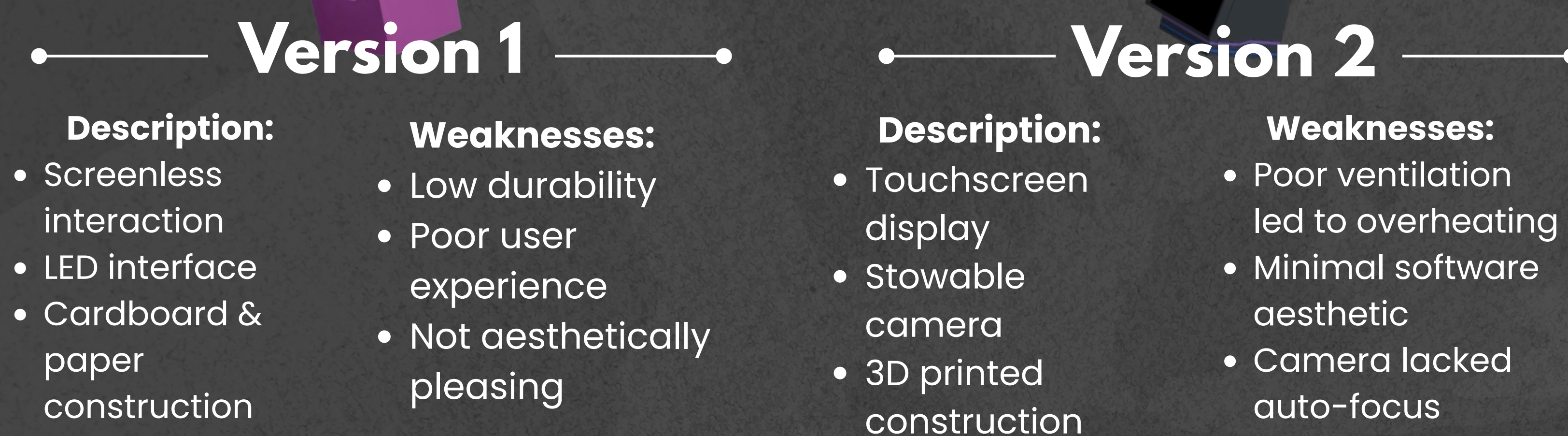
# Flick

AI Math Tutoring with the Flick of a Switch

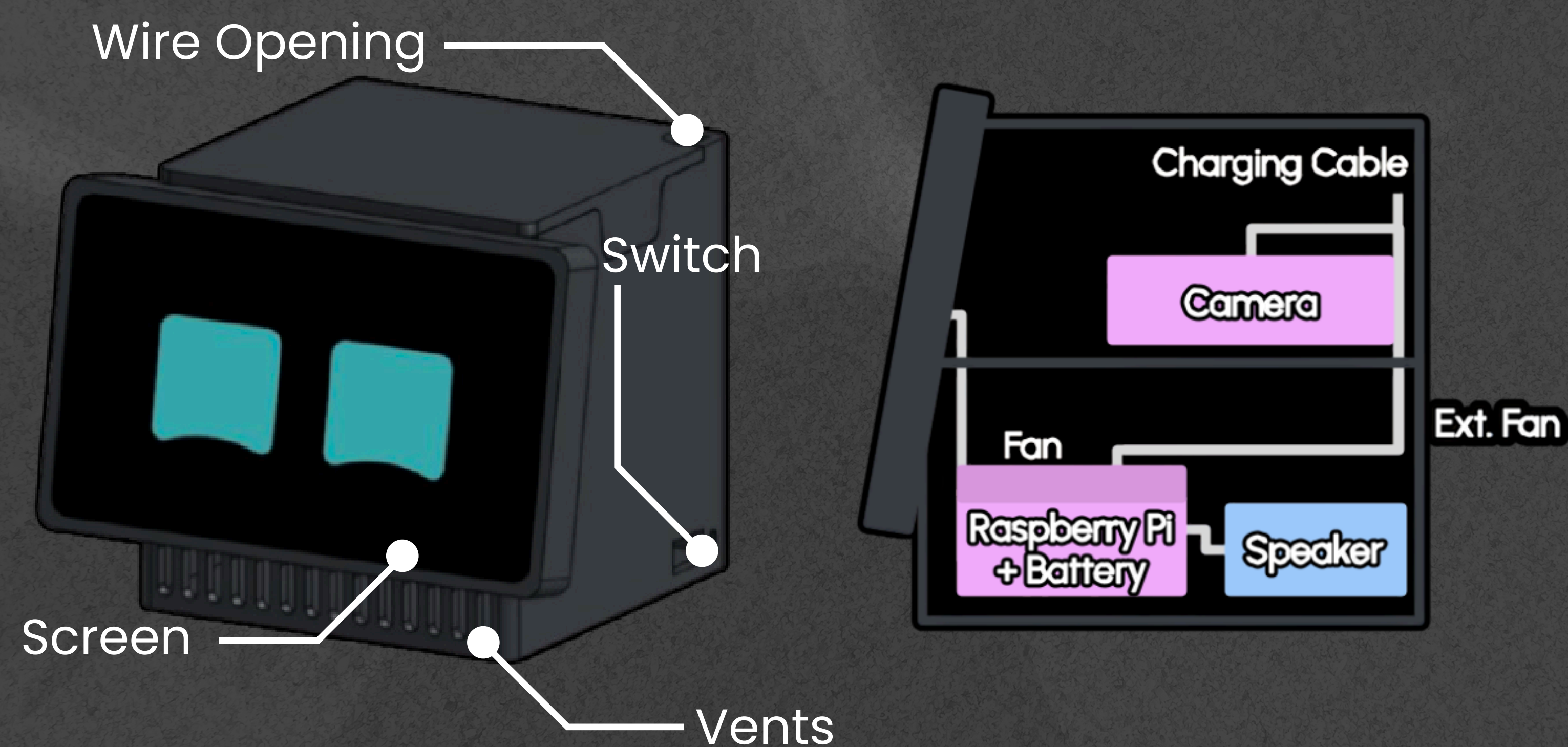
## The Problem

Economically disadvantaged students struggle mathematically, with only **8.7%** being proficient (MSDE, 2024). Tutoring can help address this (Kohlimoos & Steinberg, 2024), but remains unaffordable, hindering SDG 4.5, equitable education.

## Prototypes



## Final Iteration



### Overview:

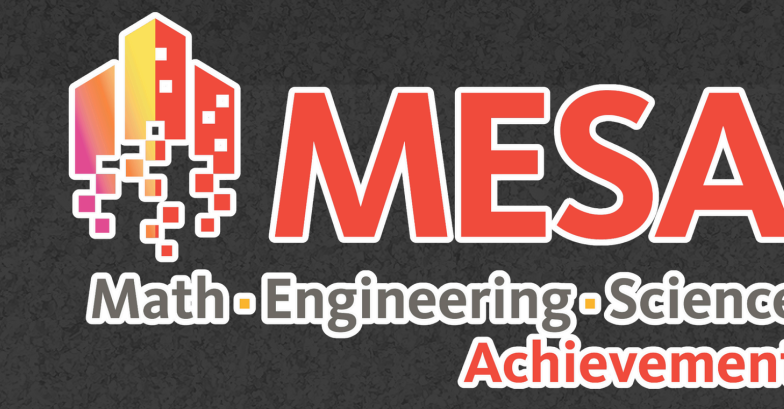
Flick is an AI powered alternative to tutoring to assist low-income students in mathematics via the fun AI character, a camera to take pictures, a speaker to initiate conversations, and a screen to visually explain concepts. Its audio can be slowed or sped up. We not only made a functional project, but an aesthetically pleasing, user friendly and engaging AI-powered tutor.

### Improvements:

- More engaging
- Faster response time
- More user-friendly
- Better hardware

### New Features:

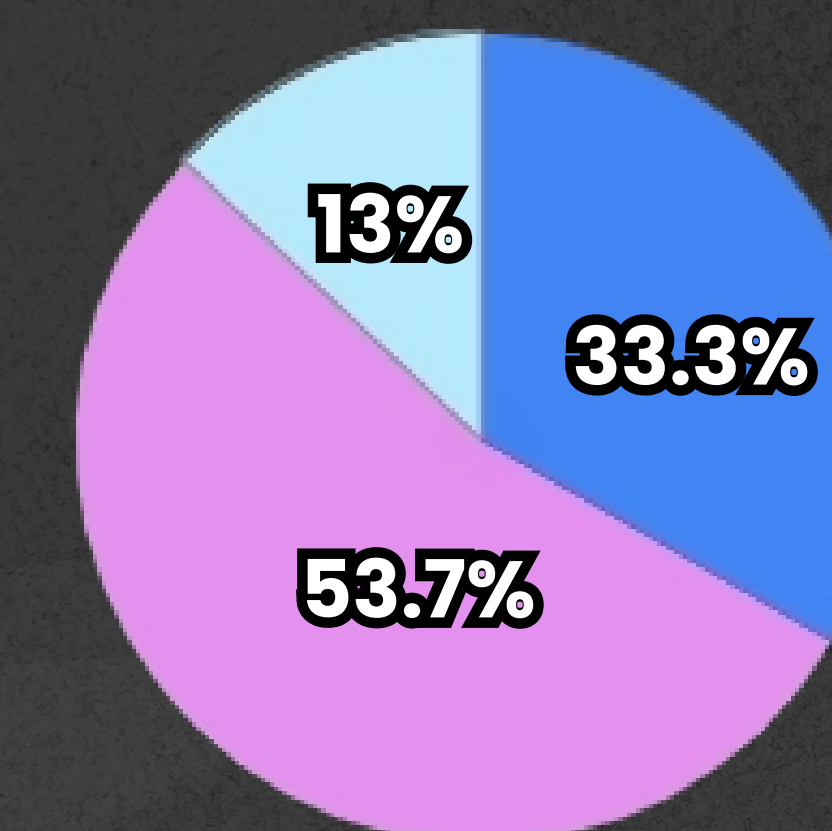
- Neural Voice
- Efficient Image Scraper
- Camera Reverse Renderer
- Effective Cooling System



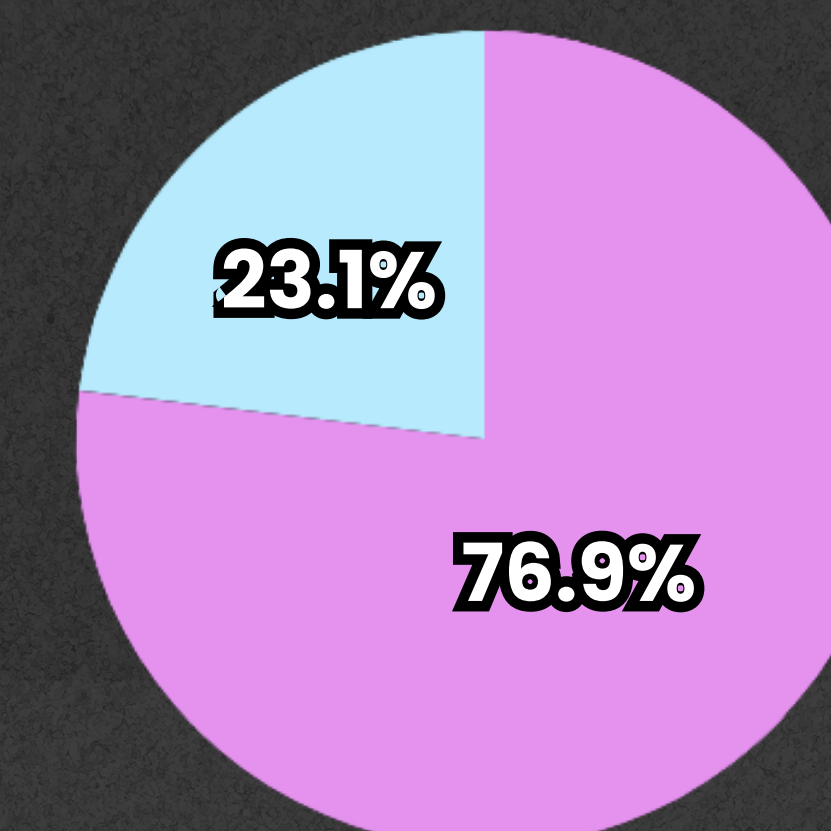
## User Data

To understand student needs, we surveyed 123 middle school students about their experiences with math and personalized education. **66.7%** reported struggling with math, and **76.9%** favored personalized education. Based on this data, we created an interactive, AI-powered tool that offers tailored support, visual explanations, and on-demand help.

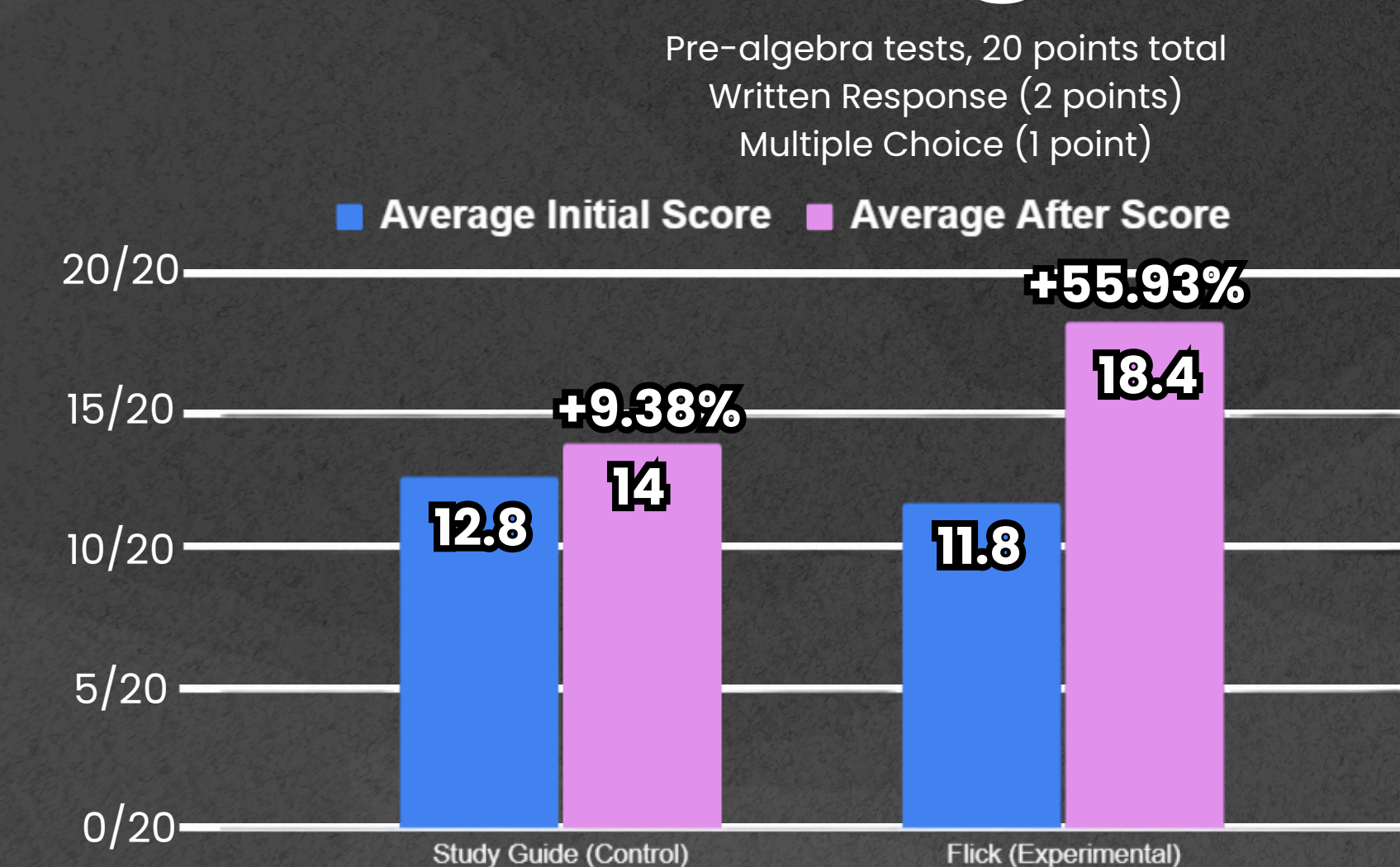
**Do you struggle or have you struggled with math in the past?**  
● Never ● Sometimes ● Often



**Can personalized education support your mathematical proficiency?**  
● Yes ● No

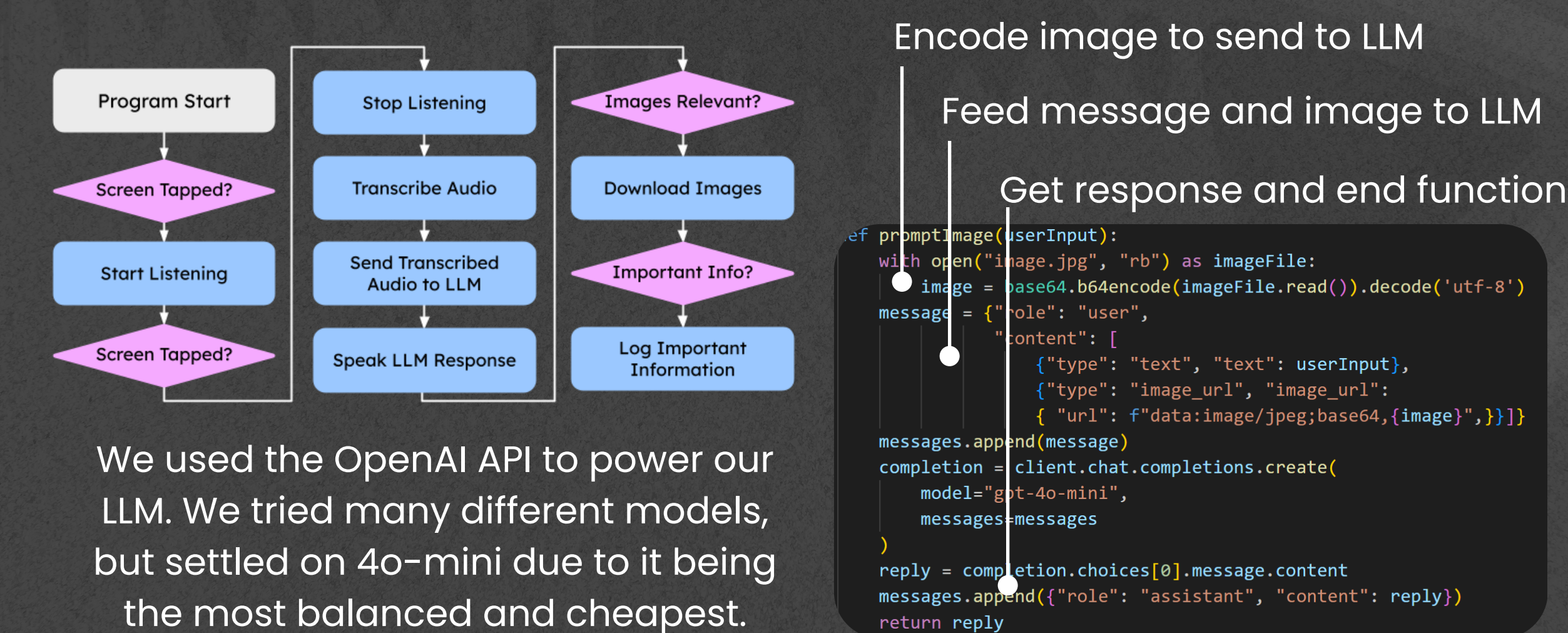


## Testing Data



We gave 10 pre-algebra students an initial test about a new topic with minimal background knowledge. Following this, five studied only using a learning guide, while five used Flick and a learning guide. On the post-study test, Flick users improved **46.55%** more than their counterparts.

## Programming



## Results

User testing has confirmed that Flick helped students learn, providing a personalized AI-powered tutor available anytime. It was able to effectively explain concepts, provide visual cues, and output precise feedback utilizing the camera. Students using Flick improved by **46.55%** more than those who only used traditional methods.

## Conclusion

Flick successfully meets all targeted user requirements by offering a durable, cost-effective, and engaging AI-powered learning experience. It such as improved ventilation for prolonged usage, an autofocus camera, external charging ports, and easy-to-use power switch

## Future

We aim to integrate additional academic subjects to broaden Flick's capability beyond mathematics. Planned upgrades include expanded content interactivity, multilingual interaction, and continuous improvements driven by ongoing user testing and feedback.