

Assignment 5: Low-Fi Prototyping

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arbor

Grow your good times.

Problem/Solution Recap

Problem

People do not have an **efficient** and **dedicated** method to recall past positive memories.

Proposed Solution

A **virtual** tamagotchi-style **garden** where you can plant and revisit good memories in the form of trees.

Overview

1

Sketching
Explorations

2

Interface/
Rationale

3

Prototype
Construction

4

Prototype Task
Flows

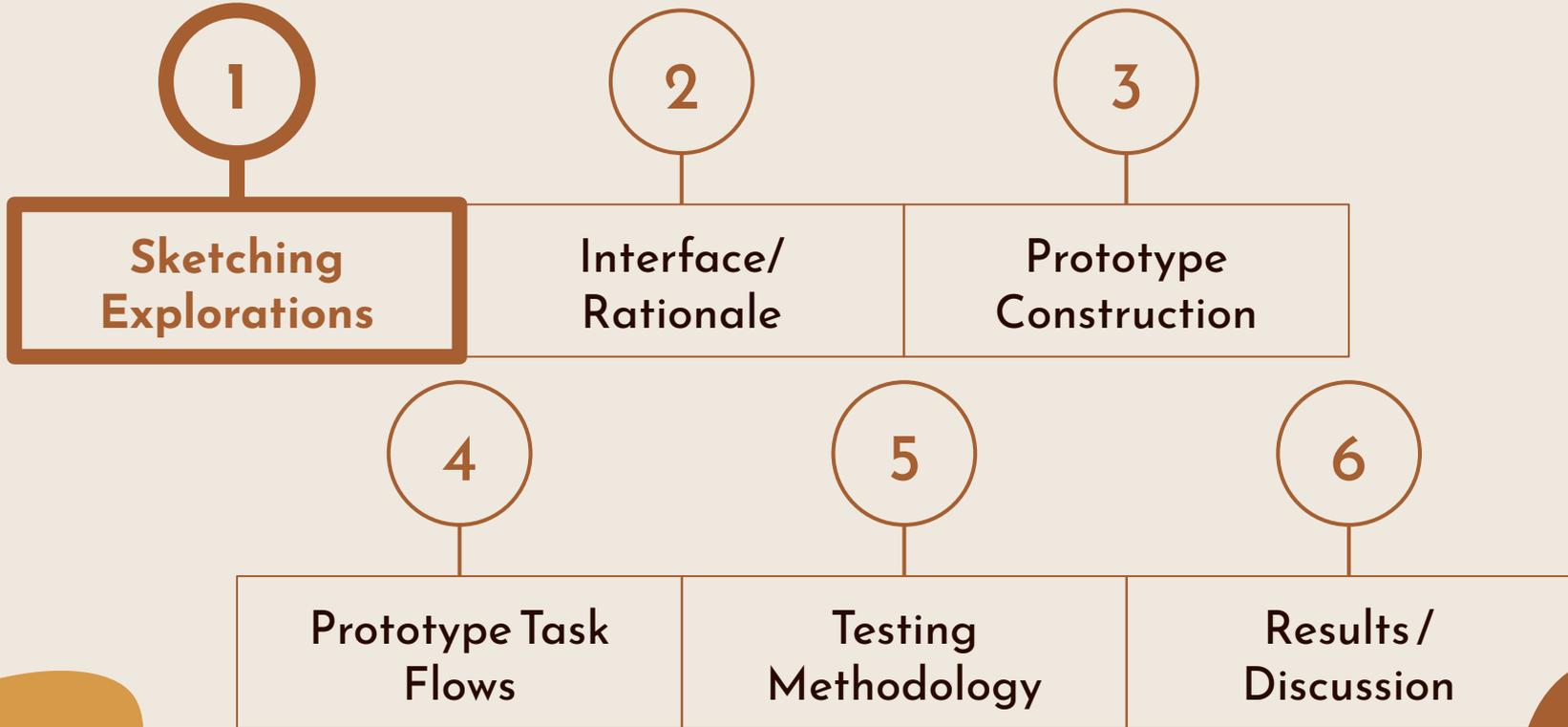
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Testing
Methodology

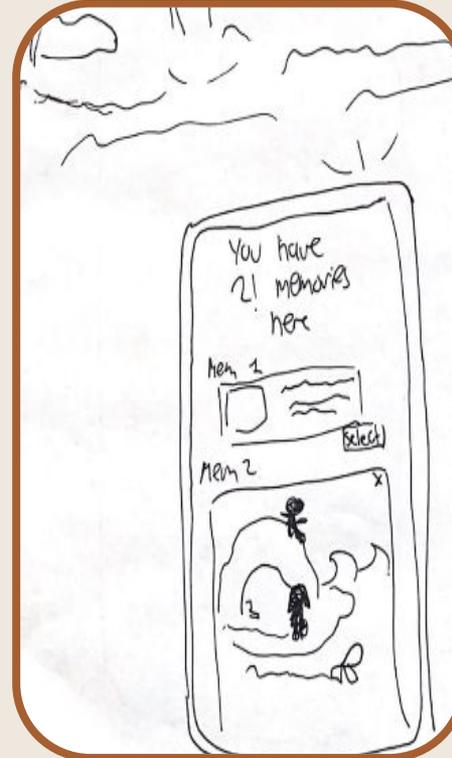
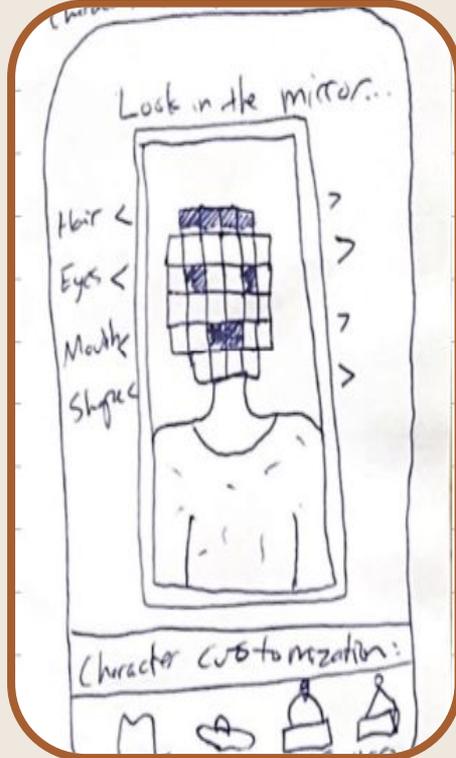
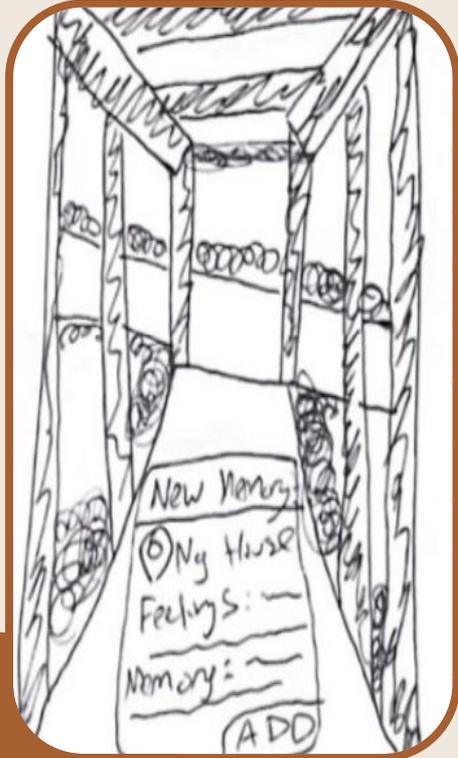
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Results/
Discussion

Overview



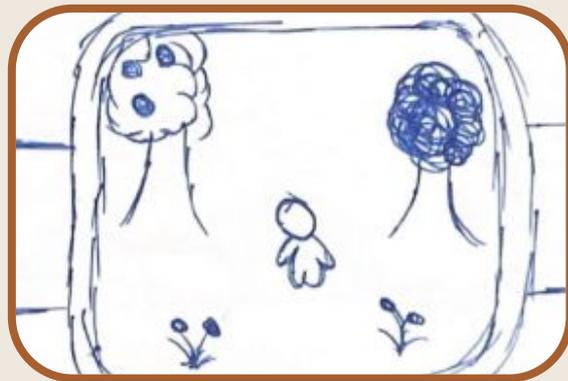
Augmented Reality Sketches



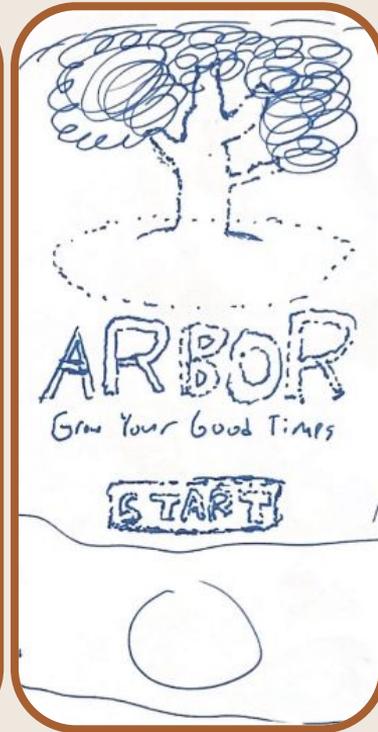
iOS Mobile Sketches



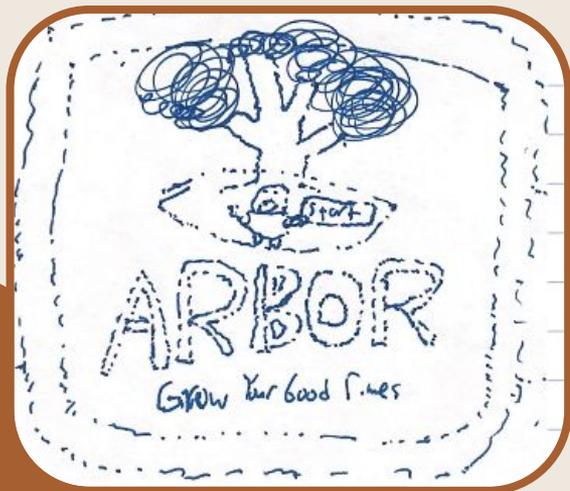
Wearable Sketches



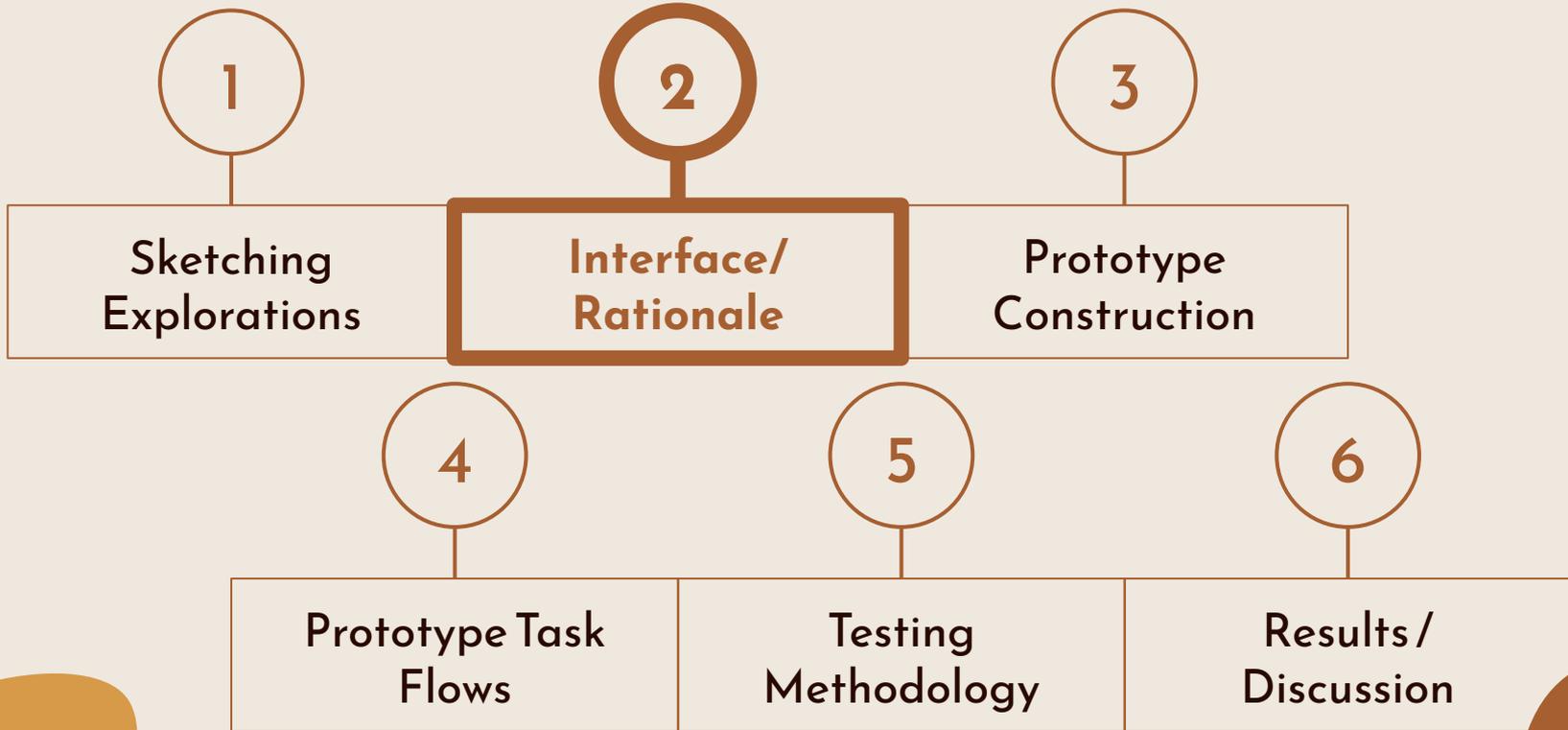
iOS Mobile Realizations



Wearable Realizations



Overview



Wearable vs Mobile

Pros

- Simplified, minimalist user interaction/interface
- Very easy and guaranteed on-person reminders
- Novel app medium

Cons

- Limited screen size, less immersive
- Less storage space to hold all user input
- Lack of detailed recording capabilities

Wearable vs Mobile

Pros

- Larger, more detailed and immersive display
- More storage space to hold all user input
- High quality video, picture, and audio recording capabilities

Cons

- Arbor's reliance on multimedia could lead to high storage costs
- Oversaturated mobile app market leads to visibility competition

So Why Mobile?



Although a wearable design via watch would have been unique to explore, the **limited screen size** and **lack of widespread smart watch accessibility** would severely limit interactions with the app.

Mobile has more **global users**, a **bigger screen**, and **more storage**. This is vital as the app must take in all user-inputted information, along with making documentation easy.

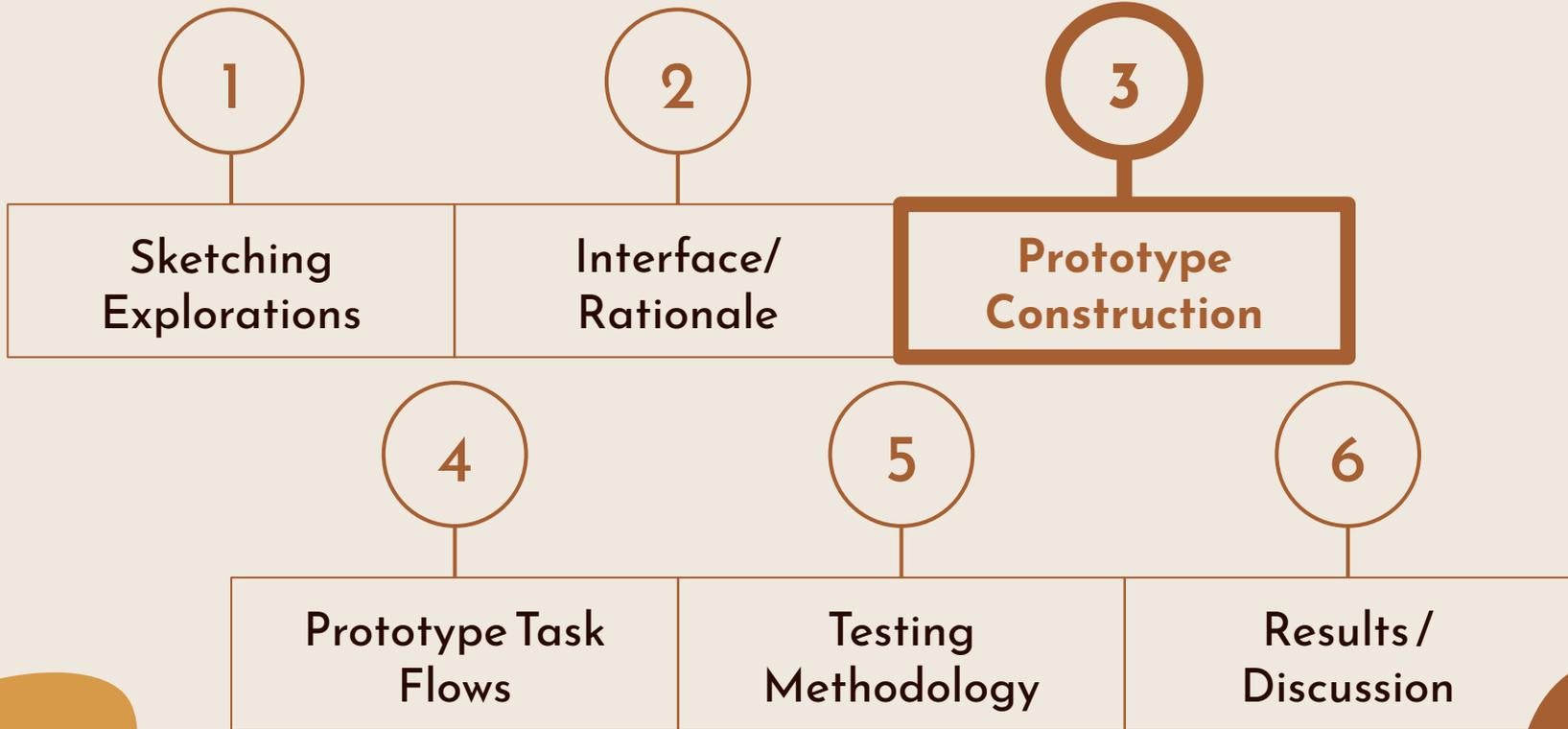
Data

- **171 million** smartwatches have been sold in 2022
- **1.39 billion** smartphones sold in 2022.
- Only **21%** of users use smartwatches to interact with documentation/photos.
- **73%** of users use smartphones for the same activity.

By choosing mobile, we increase the accessible market of our app **over tenfold**.

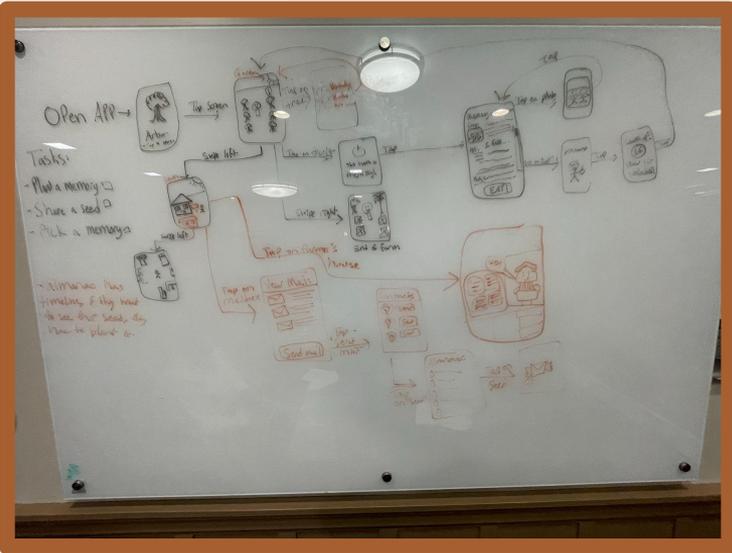
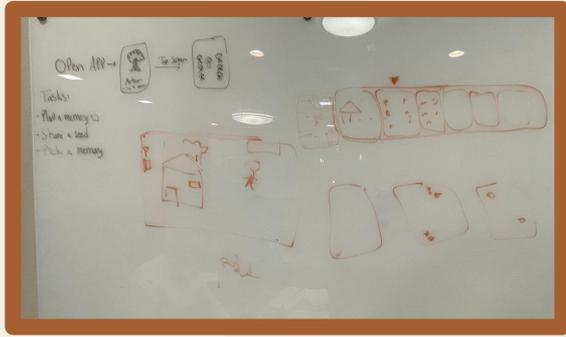
Mobile phones have a better interface for the **goals** of Arbor, and its intended use is **done more** by phone users

Overview



Construction

We used **whiteboard** and **markers** to brainstorm general designs + interactions before narrowing down based on what we agreed was most *feasible*, *intuitive*, and *fun*.

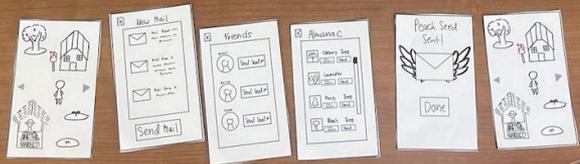


Construction

Using **Goodnotes**, all screens and widgets of the prototype were **drawn**

Screens were then **printed** and **cut** out.







“Swiping” mechanism to move through main land.

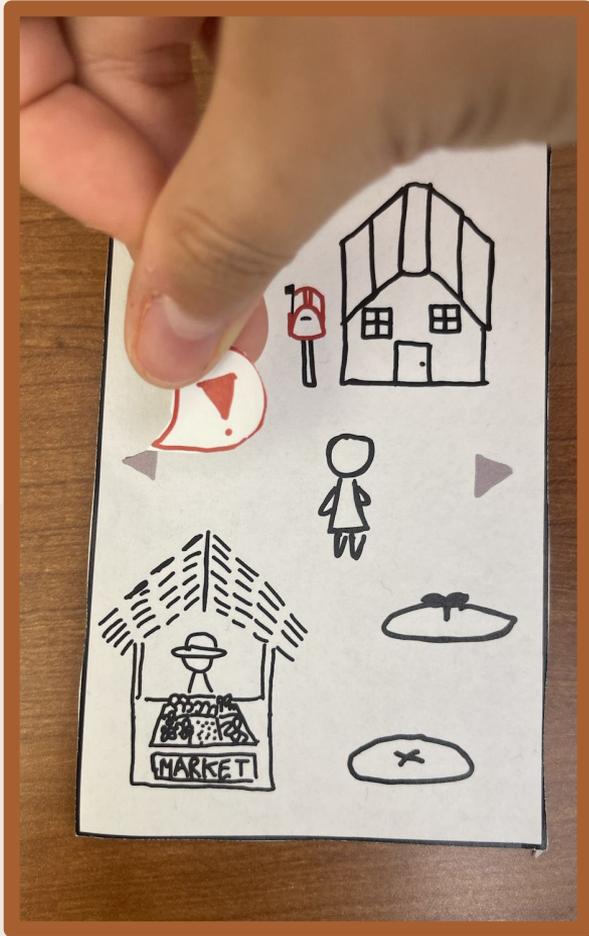
Tapping on arrows also transitions screens

Tapping mechanisms for all character “actions”

i.e.:

- Character-to-object interactions
- Buying
- Selecting any option on-screen





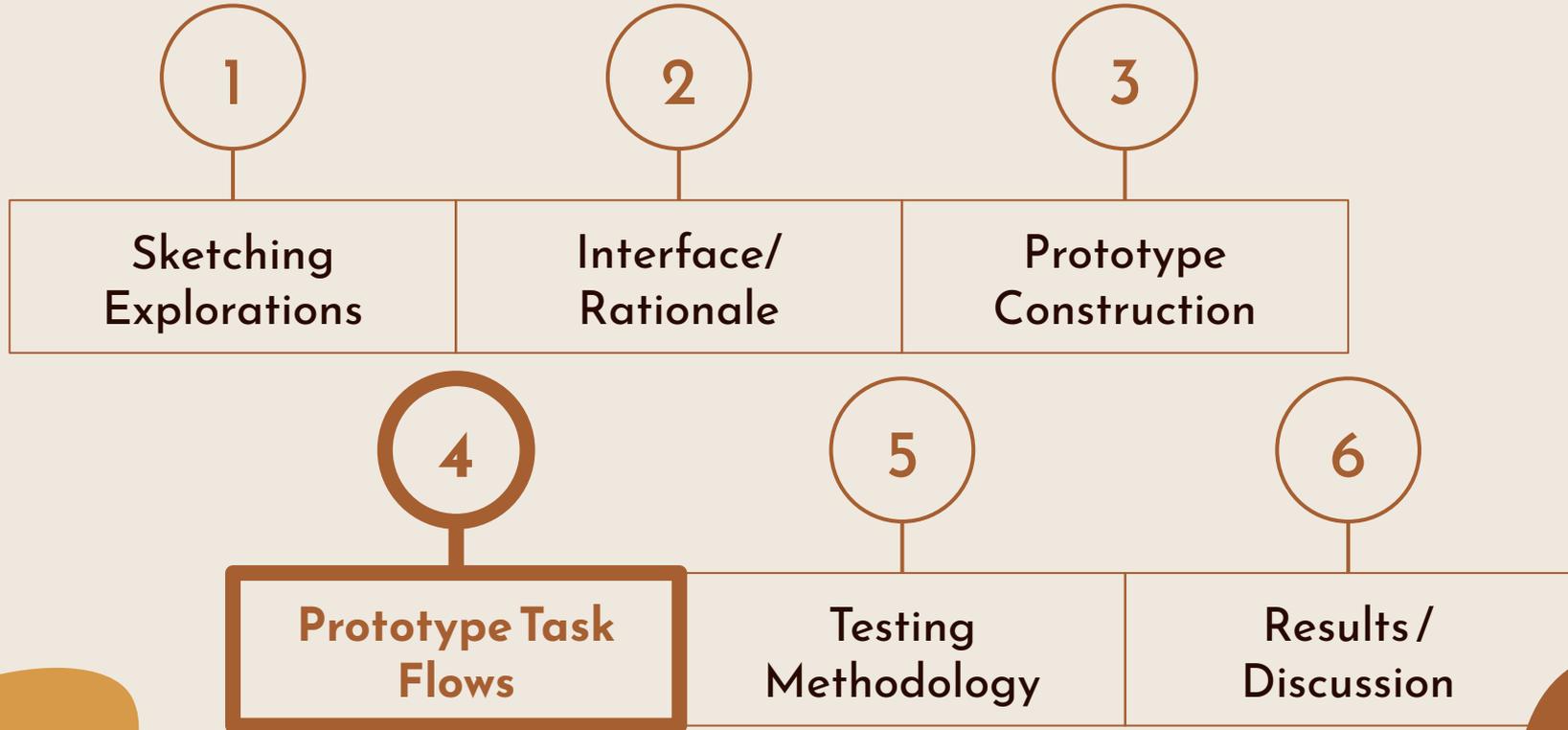
Widgets added live to display notifications/new tasks

However participants interacted with the “front” screen, the next paper screen resulting from their actions will be slid in front.

They then interact with that new “front” screen.



Overview



Text Legend

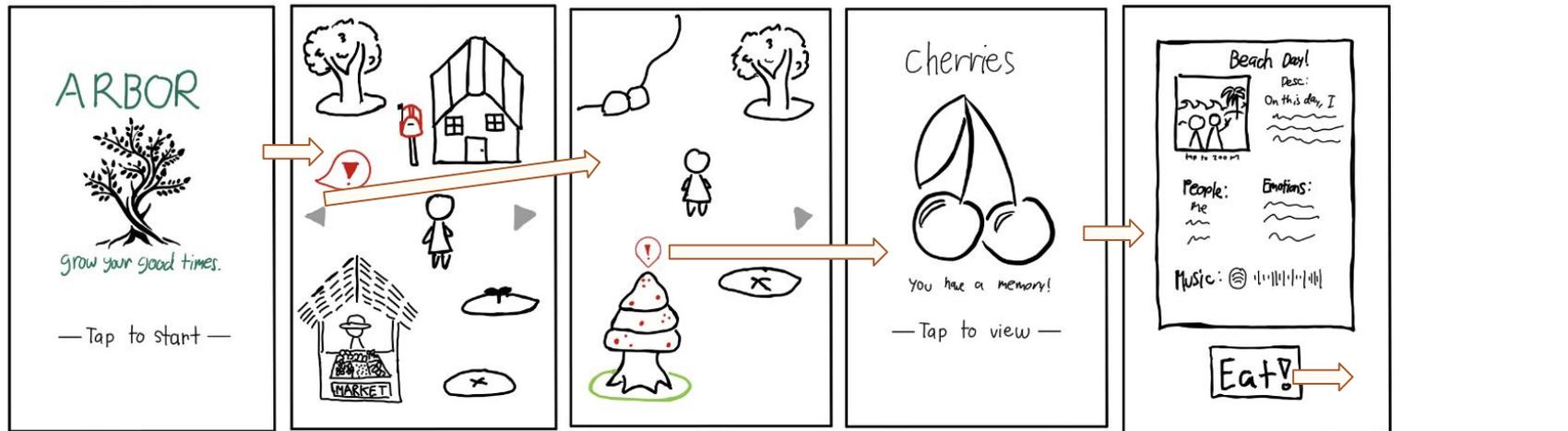
Red: Screen Title

Purple: Interactions

Blue: Annotations

Arrows:  What to click  What it leads to

Simple Task: Viewing a Memory (1/2)



Loading Screen

Tap anywhere on the screen

Opening Screen

Tap on arrows to view other parts of the garden

(X) spots mark what areas are available for planting new seeds & (i) spots show where user attention is needed

Garden Extension Screen

tap on plants with notifications

users are able to tap of plants that have bloomed to review their memories

Fruit Pop-Up

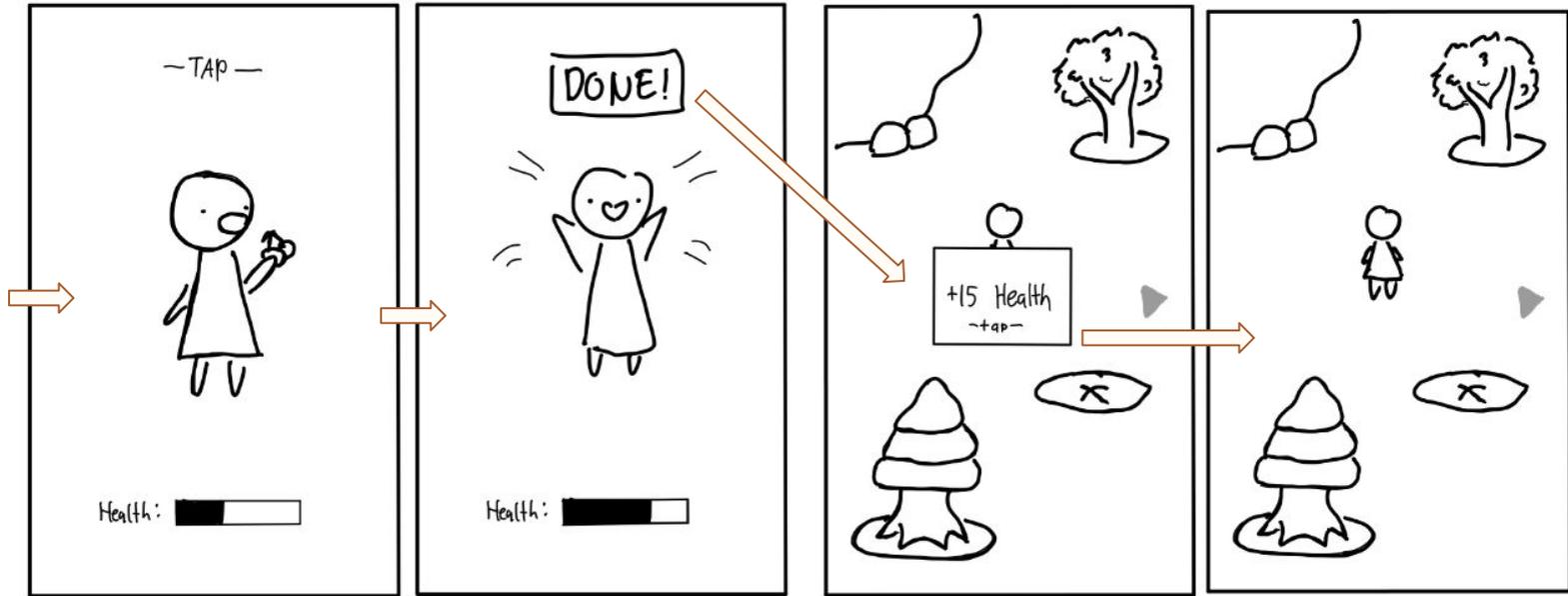
Tap anywhere on screen to review memory displays fruit from plant

Memory Review

Scroll features for interacting w/ the memory plus tap on eat to move to the next screen

users are able to review different media associated w/ their memory, including images, video, event descriptions, emotions felt & music

Simple Task: Viewing a Memory (2/2)



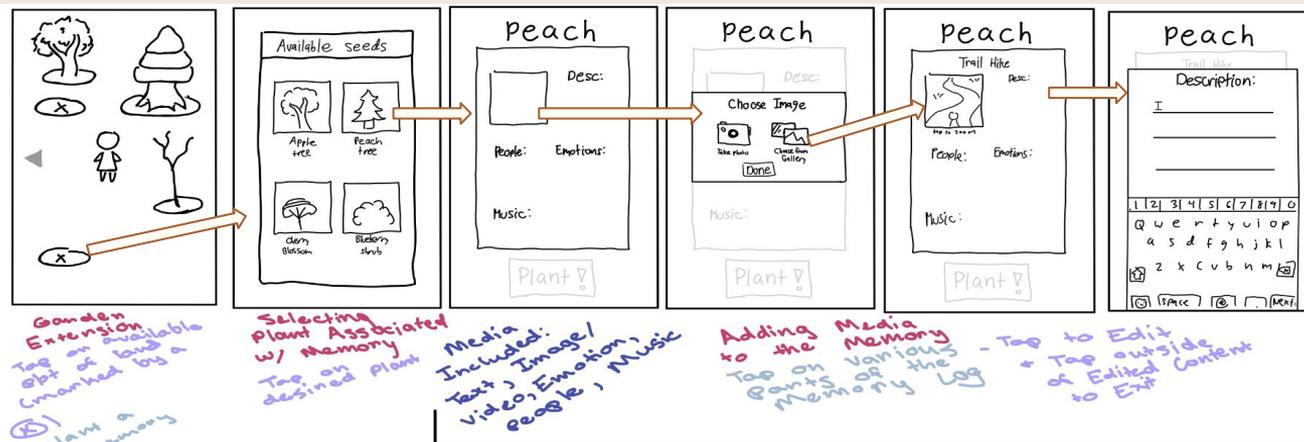
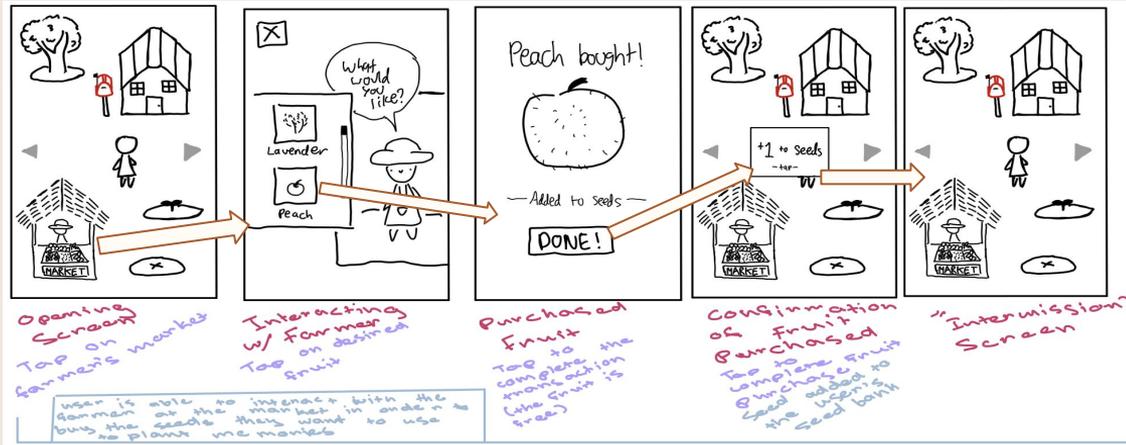
Eating
Animation
Tap anywhere
uses consumes
fruit

Eating
Animation
Completion
Tap anywhere
Health screens

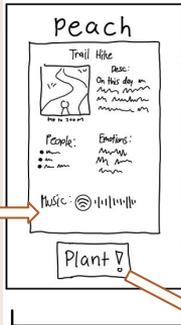
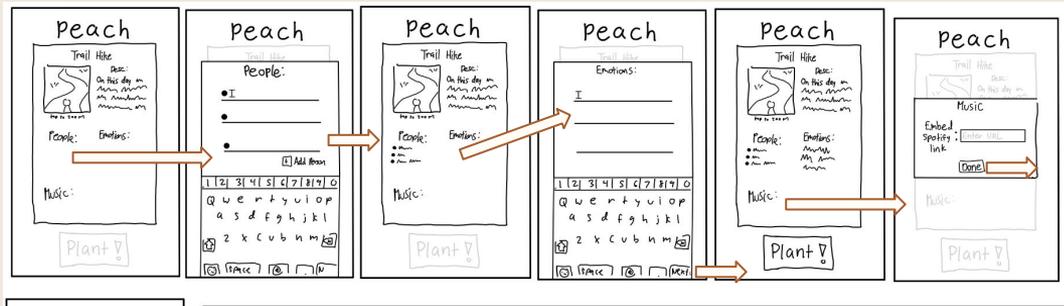
Eating
concludes;
Health
Increases
Tap anywhere

Task
Complete

Mod. Task: Logging a Memory (1/2)



Mod. Task: Logging a Memory (2/2)



Media Included:
Text, Image/
Video, Emotion,
people, Music

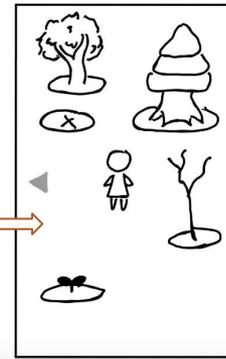
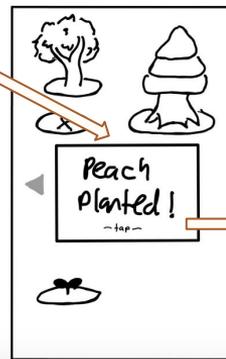
Adding Media
to the Memory
- Tap to Edit
- Tap on the
Points of the
Memory Log

- Tap to Edit
- Tap outside
of Edited Content
to Exit

Media Adding cont.

Final Screens

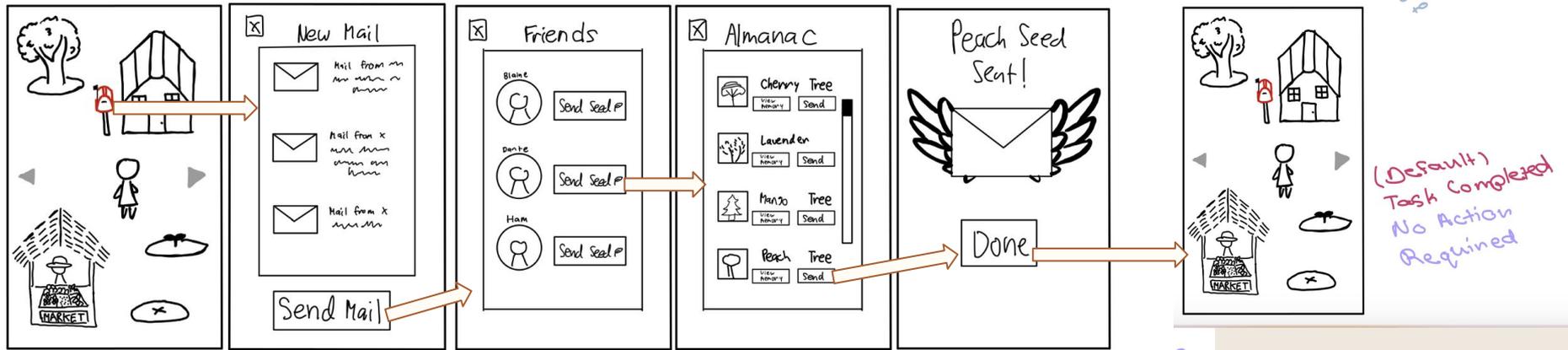
Memory
Planted
Confirmation
Tap to
Confirm
Task
Completion



(Default)
Task Completed

No Action
Required
viewer will
be able to
review the
memory once
the sapling
has grown

Complex Task: Sharing a Memory (1/2)



Garden Extension
 Tap on Mailbox
 Allows users to send memories to others

Mail
 Tap on mail or tap on button
 Users can either view the seeds sent from other users or send seeds to other users

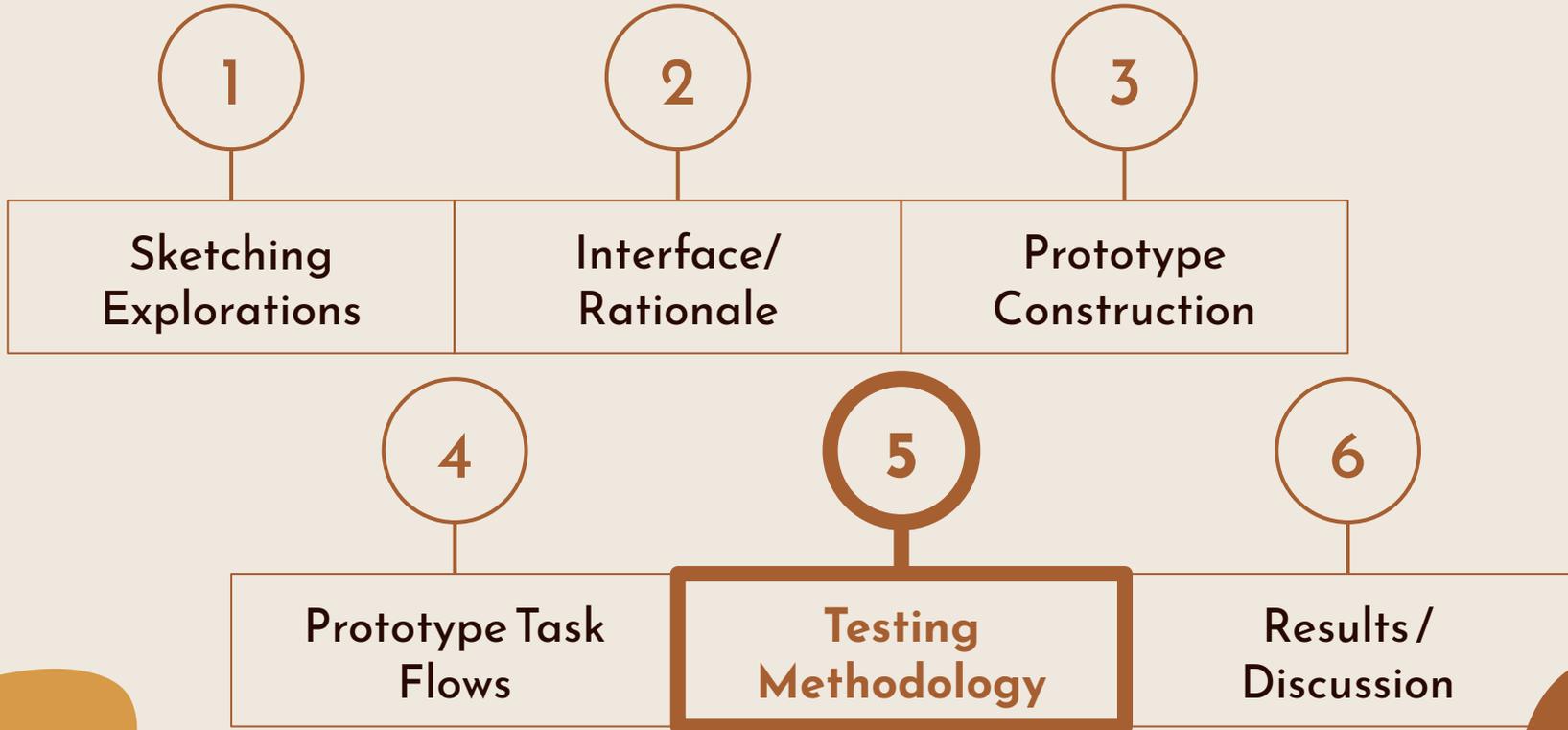
Contacts
 Tap on Contact
 Choose a contact to send a seed to

Choose seed
 tap to view memory or seed
 almanac contains memories and the seeds w/ associated w/ them, user chooses which memory

Mail Sent
 Tap Anywhere

(Default)
 Task Completed
 No Action Required

Overview



Pre-Testing Procedure

- 1 We went to Downtown Palo Alto, walked around and randomly asked individuals if they'd be willing to volunteer to participate in our test.
- 2 We aimed for a diversity of participants, but were limited by who had the time to help.
- 3 Dante, Melody, and Blaine alternated roles (greeter/facilitator, computer, observer) and used a script of questions (see appendix).

Example Task Prompt

In this game, **positive memories** are stored in the **form of fruit** in the garden. For your first task, could you please **harvest an available fruit** and review its memory?

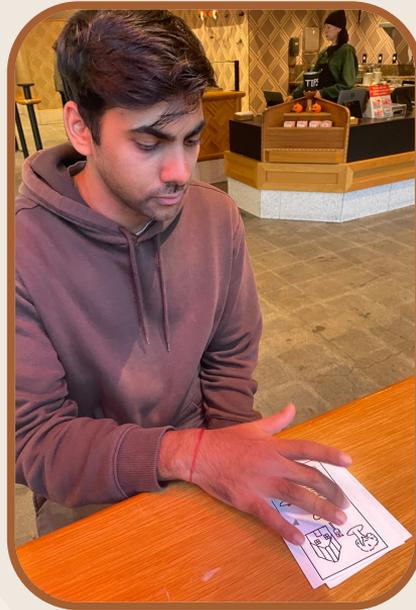
Meet the Users

P1



UCLA Graduate
Age 22

P2



Berkeley Graduate
Age 23

P3



Bay Area HS Senior
Age 17

P4



Stanford Student
Age 21

Three Key Measurements

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1. Time to Complete Task

of minutes for each participant to complete each task.

*Used to **assess difficulty/** efficiency of task flows.*

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2. Critical Incidents Log

Log of negative events scored on a scale of 0 to -3, where 0 is no issue and -3 is a usability catastrophe. Can be summed to create a CI index (CII) for each participant.

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3. Qualitative User Feedback

User thoughts on process in general, emotions raised, overall level of satisfaction.

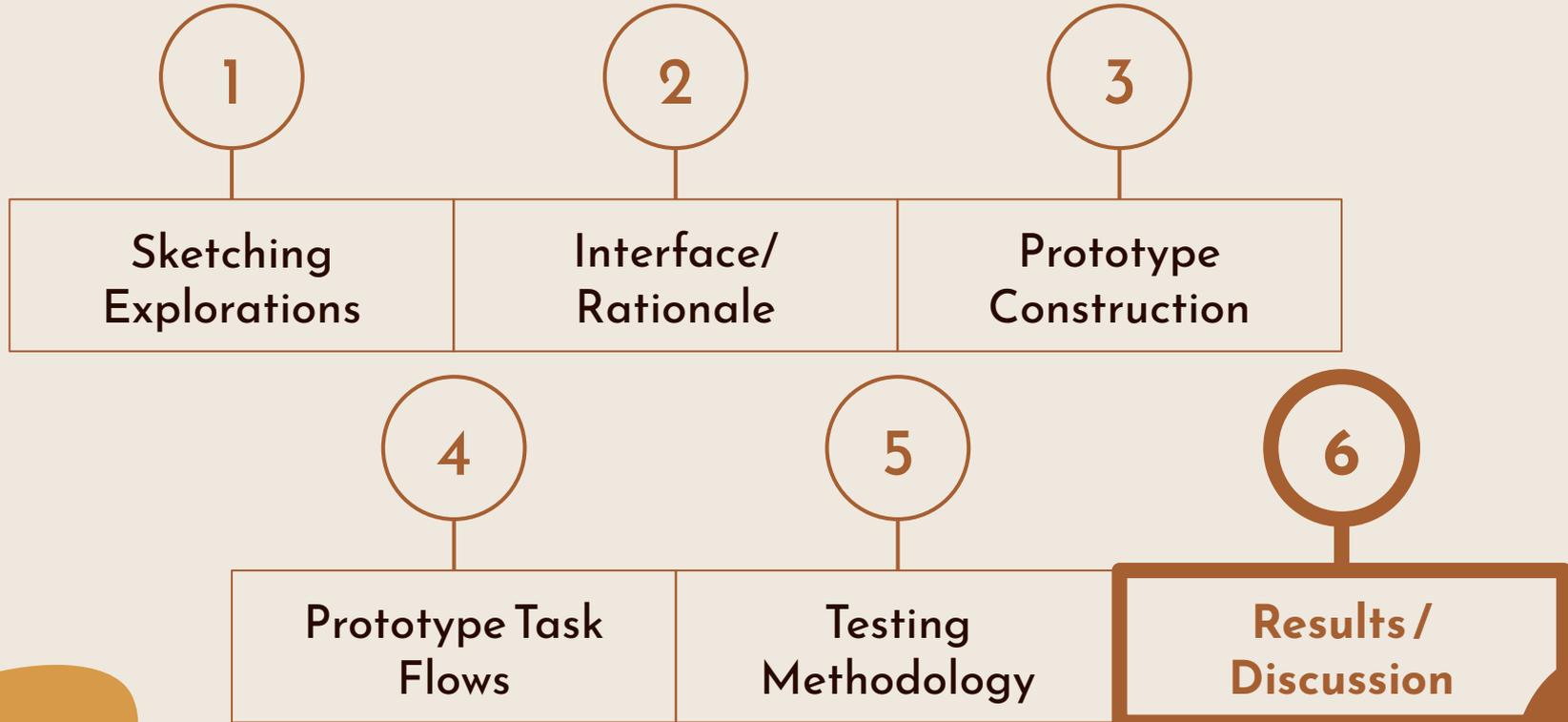
Our Useability Goals

- Under 1 minute for simple task on average
- Under 2.5 minutes for moderate task on average
- Under 5 minutes for complex task on average
- No more than **one** major CI per participant
- CII score >-5 per participant on average

Our ***Secret*** Goal

Is it fun?

Overview



Testing Results

The Big Picture

1 Navigation and task flow was **generally intuitive**, and did not require tutorial or instructions.

Participants had **difficulty differentiating** which elements of the UI could be interacted with.

2

3 Our complex task generally took the **longest time** and lead to the most negative critical incidents.

Critical Incidents per Task

Critical Incident	P1	P2	P3	P4
Difficulty moving the character	-3	0	0	-3
Clicked on tree with no fruits	-1	-1	-1	0
Clicked on rocks/decor	0	-1	0	0
Thought mailbox was part of house	-3	-3	-3	-3
Clicked on exclamation immediately	0	0	0	0
Couldn't figure how to plant seed	0	0	0	-3
Thought mailbox was for recieve	-2	-2	0	0
Thought you couldn't choose seed	-1	0	0	0
Total Sum (CII):	-10	-7	-4	-9

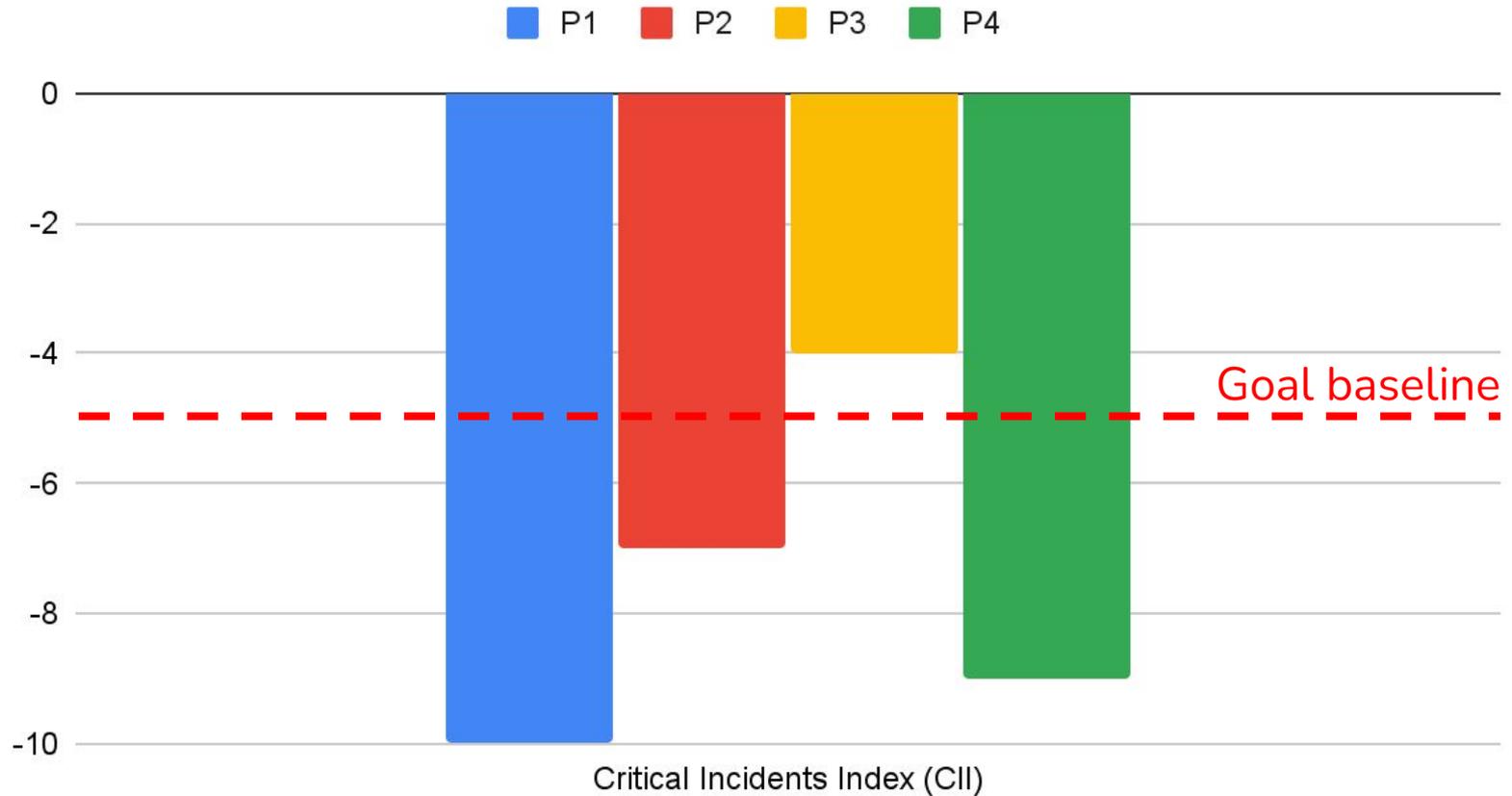
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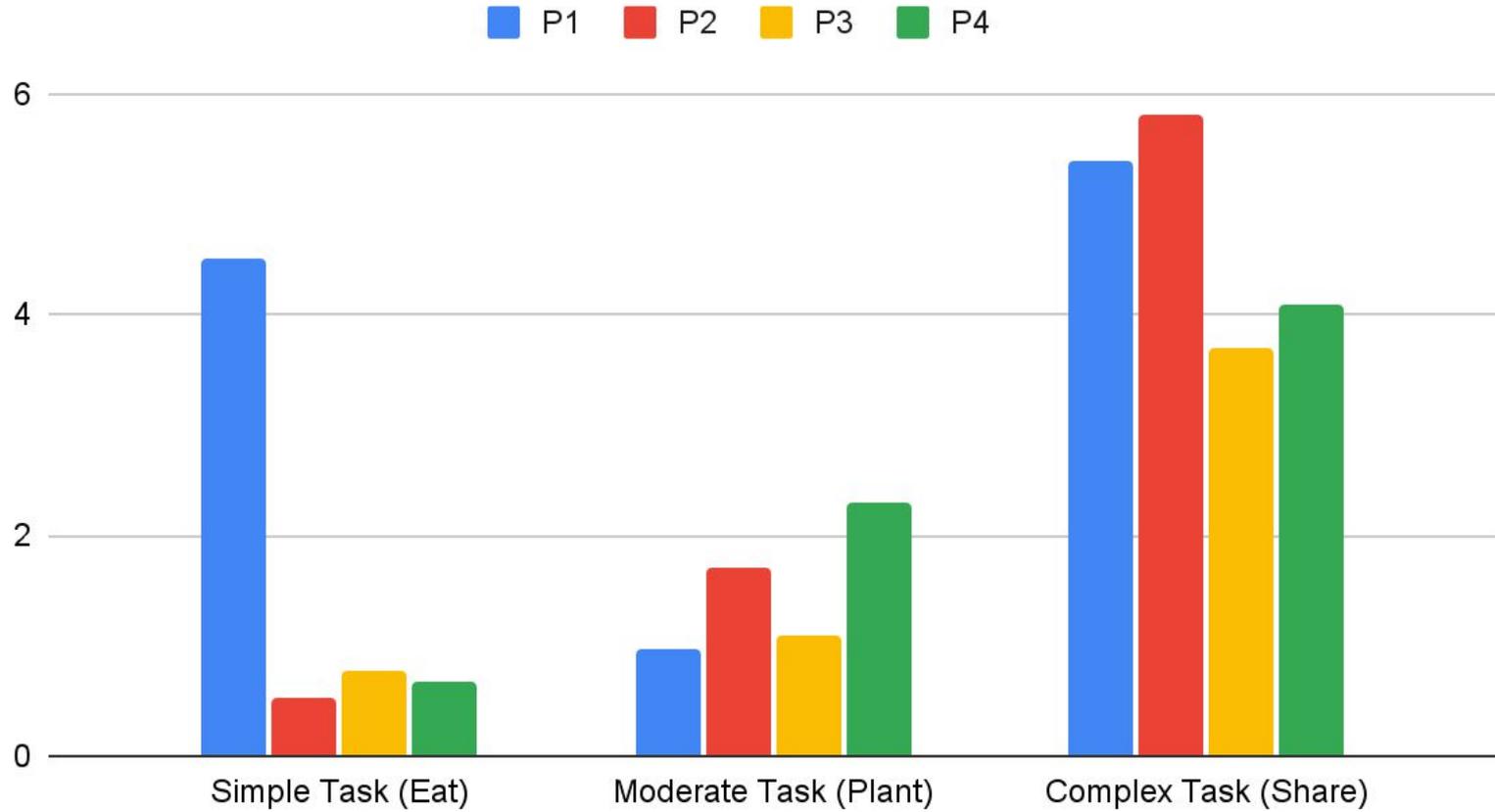
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Critical Incidents Index (CII) per Participant

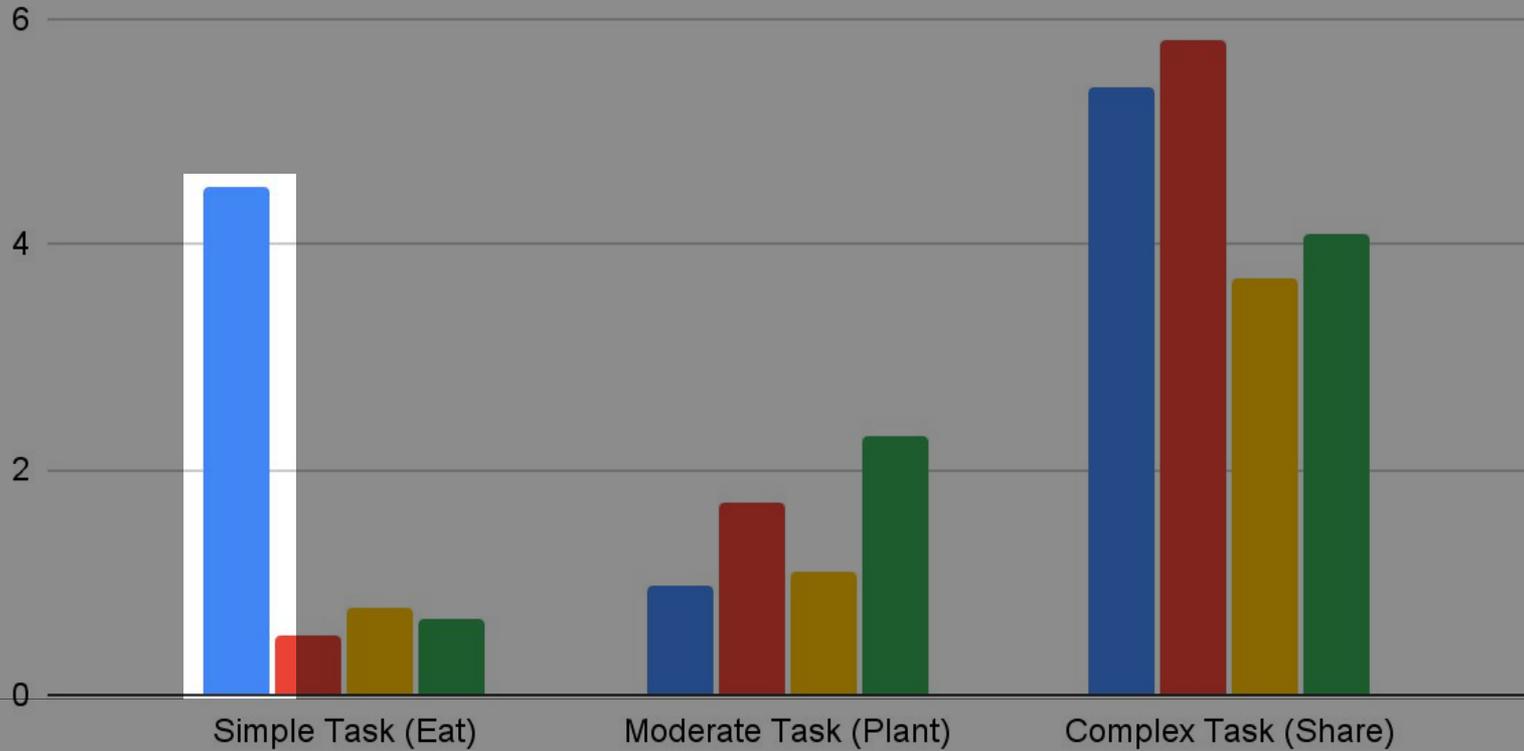


Time (mins) per task



Time (mins) per task

P1 P2 P3 P4



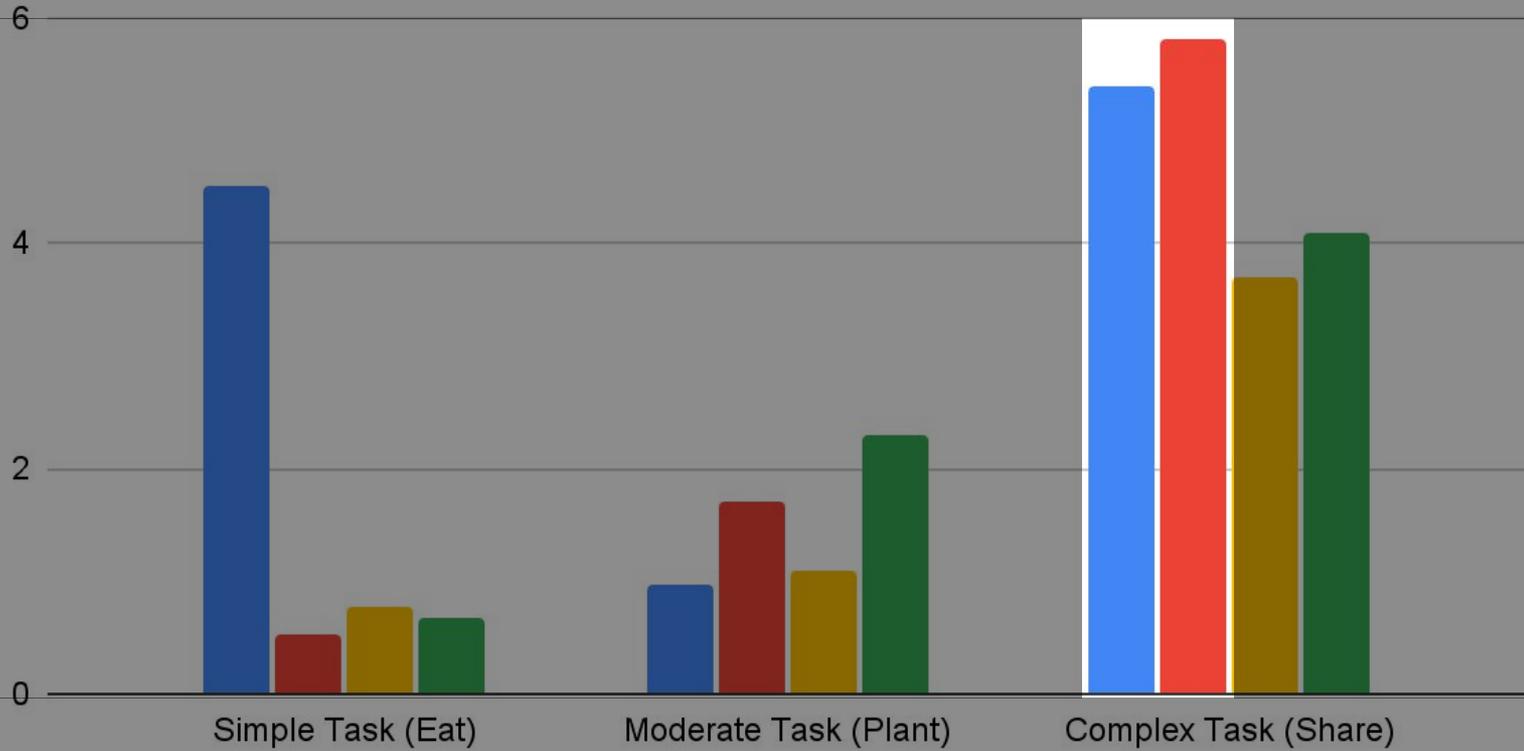


Market Side Quest

During the simple task (eat a fruit), P1 went to the market to buy a peach, because it was **unclear** how to obtain fruit.

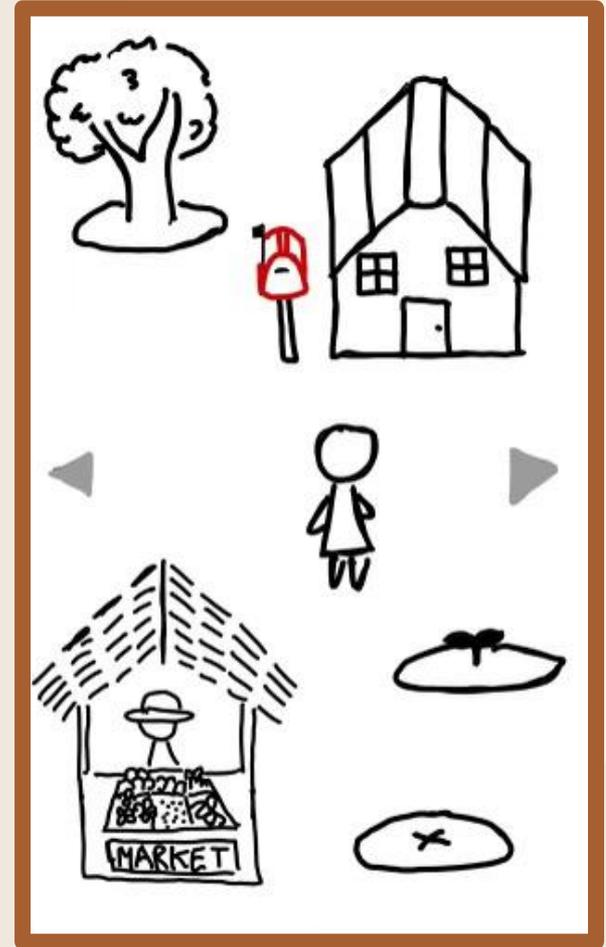
Time (mins) per task

P1 P2 P3 P4



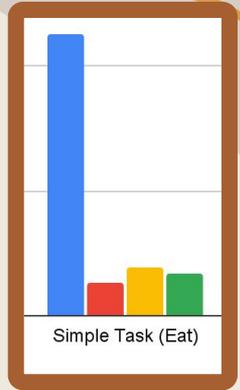
Gestalt Psychology

Due to their close proximity, participants grouped the mailbox in with the house. As a result, they tapped on the house during the complex task.

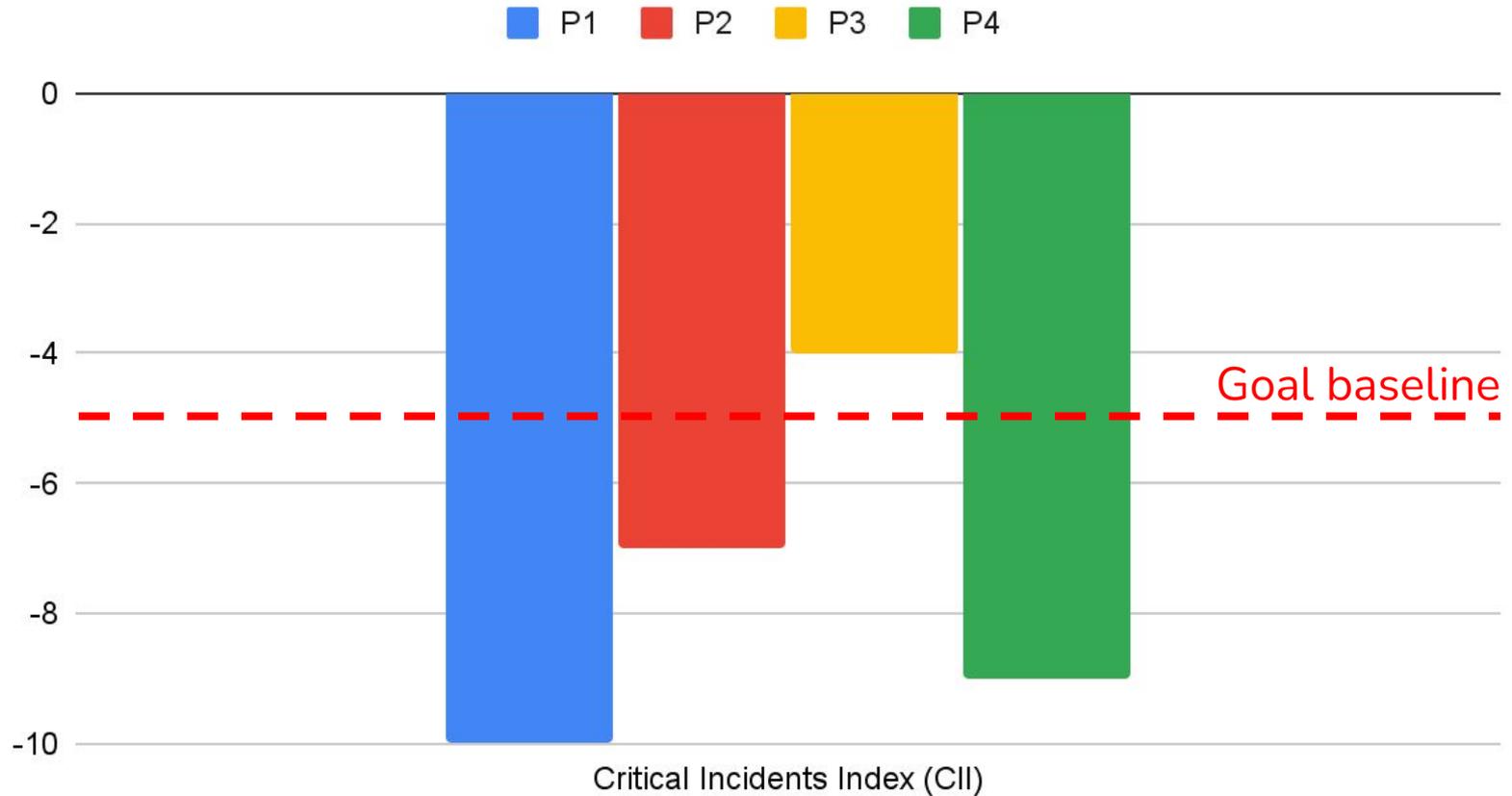


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- ☑ Under 5 minutes for complex task on average
- ☒ No more than **one** major CI per participant
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Critical Incidents Index (CII) per Participant



Our *Secret* Goal

Is it fun?

- 4/4 participants remarked (unprompted) that the UI **was fun** to interact with! Also:

“Cute”

“Intuitive”

“Enjoyable”

Discussion

Testing Implications

- Most actions are fairly intuitive.

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- Most actions are fairly intuitive.
- Seeds and fruits get mixed up.
- It is unclear what is “clickable” and what is not.
- Mailbox is not associated with outgoing mail.
- The mailbox is too close to the house to be recognized as distinct.

Main Areas for Improvement

- 1 Change farmer's market to be selling **seeds**, not fruits themselves.
- 2 Use color, 3-D, and shadows to make clickable objects **pop on screen**.
- 3 **Remove mailbox**, and use an **envelope icon** instead. Add exclamation mark when mail arrives.

Limits of Testing

- Could not test the user's emotional response to viewing an actual past memory.

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- Could not test the user's emotional response to viewing an actual past memory.
- Didn't give user much opportunity to customize/grow fond of their character.
- Low-Fi medium limited ability to test aesthetics.
- Could not get a sense for how long it would take for user to become fluent with interface.

Questions?

APPENDIX

Wearable Full Pros/Cons

Pros:

1. Seamless integration with the user's daily activities
2. Simplified, efficient user interactions
3. Could access health data
4. Very easy and convenient to access
5. Harder to misplace (since user wears it daily)
6. Less expensive than mobile
7. Can produce a more present reminder for the user to interact with the application, contributing to higher rates of user engagement

Cons:

1. Limited screen size, less immersive
2. Less storage space
3. Lack of detailed video/picture recording capabilities
4. Smaller user base/less accessible
5. Limited battery life and less functional capability given the processing power of a phone compared to the watch, affecting the seamless integration of the application

Mobile Full Pros/Cons

Pros:

1. Advanced display contributes to a visually appealing interface encouraging users to spend more time within the app.
2. Allows for seamless storage and display of multimedia memories.
3. Larger user base
4. High quality video, picture, and audio recording capabilities
5. Typically interface for similar games

Cons:

1. Complexity may lead to difficulty navigating the app.
2. Reliance on multimedia content can lead to data consumption and extensive storage usage issues.
3. More expensive than wearable
4. Less constant accessibility as users are more likely to frequently check a watch in comparison to a phone

Links to Low-Fi Prototype

Task Flows:

Full-sized Screen Drawings:

<https://drive.google.com/file/d/1hkCerE5yylyuPm4D6pwGk9C3bq7bmIj4/view?usp=sharing>

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Full Greeting Procedure/Script

1. Are you a Stanford student?
2. Would you be willing to help out with demoing the prototype for a new app?
3. *Ask for consent form.*
4. *Explain what a paper prototype is and introduce garden premise of app. Demonstrate thinking out loud and interfacing with paper as though it were a phone.*
5. In this game, positive memories are stored in the form of fruit in the garden. For your first task, could you please harvest an available fruit and review its memory?
6. In this game, you record memories through planting seeds. For your second task, could you please buy peach seeds and plant them somewhere in the garden?
7. For your final task, could you please mail peach seeds to a friend?
8. In general, how did you find the experience?
9. What, if anything, did you find difficult?
10. What are some emotions you felt while interacting with this prototype?
11. Which task was the easiest? Hardest? Why?
12. What do you think could be improved about this UI? What worked for you?
13. Before we wrap up, is there anything else you'd like to let us know about your experience?
14. Thank you so much for your participation! Have a great day.

Data Sources

- <https://www.demandsage.com/smartwatch-statistics/#:~:text=173%20million%20smartwatches%20were%20shipped%20worldwide%20in%20the%20year%202022.>
- <https://www.pewresearch.org/internet/2011/08/15/how-americans-use-their-cell-phones/>
- <https://www.statista.com/chart/10783/use-cases-for-smartwatches/>
- [https://www.statista.com/statistics/263437/global-smartphone-sales-to-end-users-since-2007/#:~:te
xt=In%202022%2C%20smartphone%20vendors%20sold,to%201.34%20billion%20in%202023.](https://www.statista.com/statistics/263437/global-smartphone-sales-to-end-users-since-2007/#:~:text=In%202022%2C%20smartphone%20vendors%20sold,to%201.34%20billion%20in%202023.)

