

Sprout: Using a **Garden Metaphor** to Visualize and Support **Customizable** and **Collaborative** Health Tracking



Garden Metaphor

Customizable

Collaborative

Pape Sow Traore



Thesis Committee



Liz Murnane (advisor)



Lorie Loeb



Tim Tregubov



Table of Cloudtents



What's personal informatics
all about? 😊



What is...

personal informatics

self-tracking

What is...

personal informatics

self-tracking



What is personal informatics?

A class of systems and tools  that allows us to **collect** and **reflect** on **personal data**.

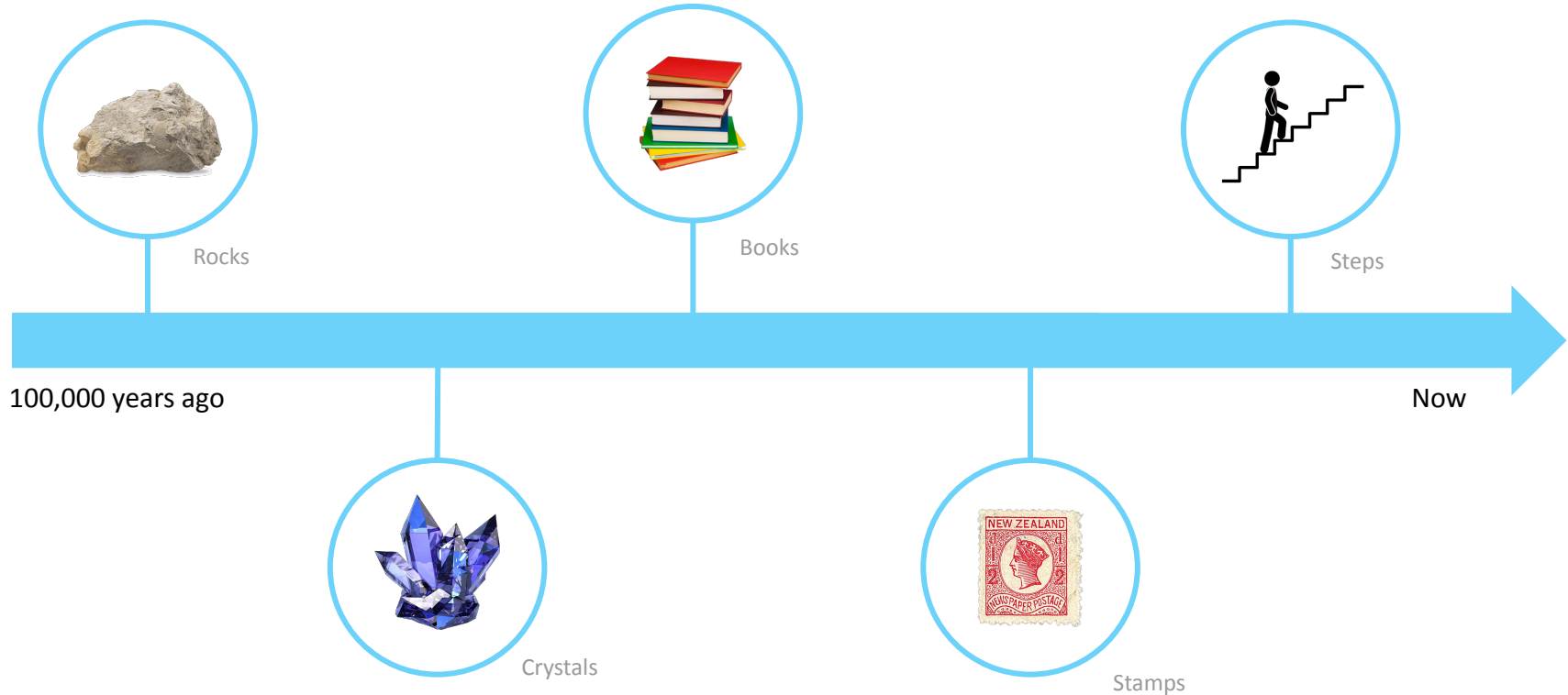


Smartwatches

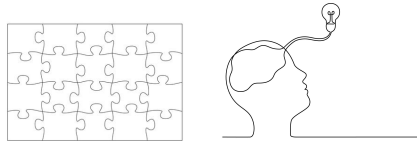


Smartphones

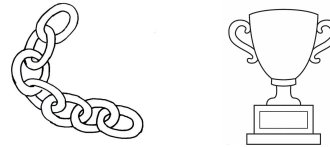
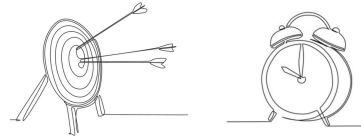
We love to collect things



Personal Informatics

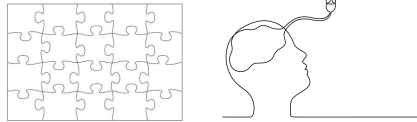


Stages of tracking



Styles of tracking

Personal Informatics



Stages of tracking



Styles of tracking

How do people actually track?

The tracking process involves **5 iterative stages** (Li, 2010).

Stages	Description
Preparation	<i>"Because of X, I will track Y using Z."</i>
Collection	<i>"It's time to collect Y data using Z"</i>
Integration	<i>"I need to process and transform the collected Y data"</i>
Reflection	<i>"I can now visualize the Y data"</i>
Action	<i>"I am going to do to do A,B,C"</i>



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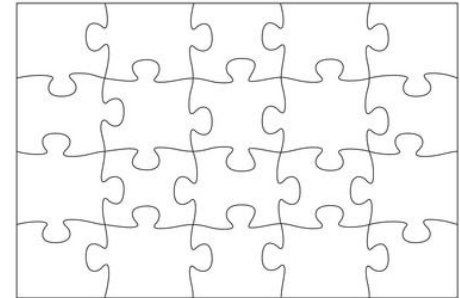
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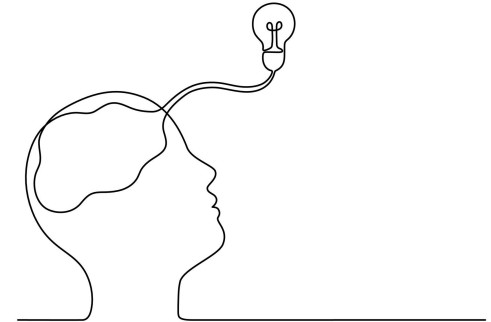
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MY RESEARCH



Personal Informatics



Personal Informatics



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They are **5 styles of personal tracking** (Rooksby, 2014).

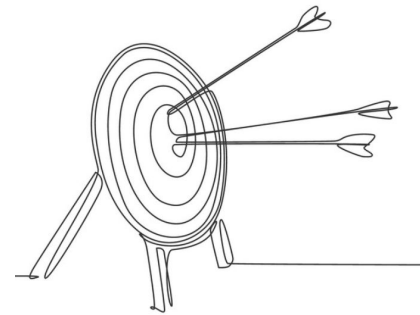
Style	Description
Directive	<i>"I want to achieve goal X"</i>
Documentary	<i>"I want to know how I do over time"</i>
Diagnostic	<i>"I wonder if there is a connection between A and B"</i>
Earn prizes	<i>"I want to win Z"</i>
Obsessive	<i>"I just love numbers"</i>



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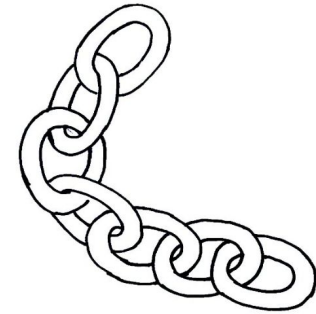
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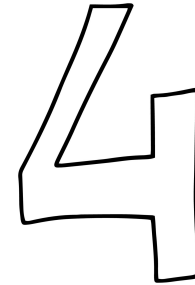
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So... what's the problem?



...they are not doing the trick for everyone

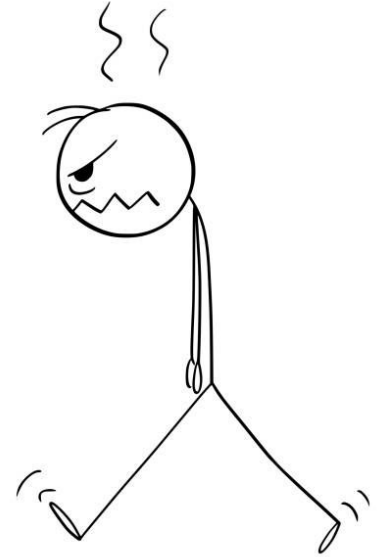


Three main limitations

*"I am not a **numbers** person."*

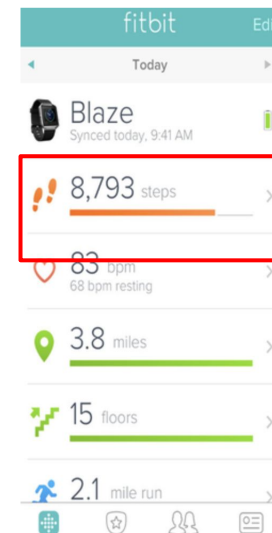
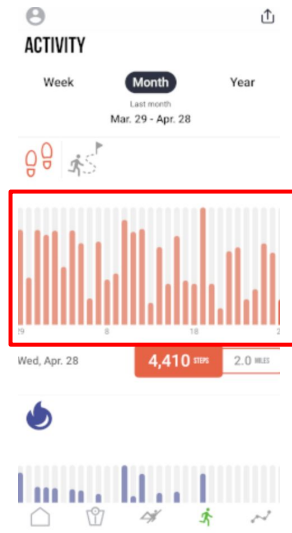
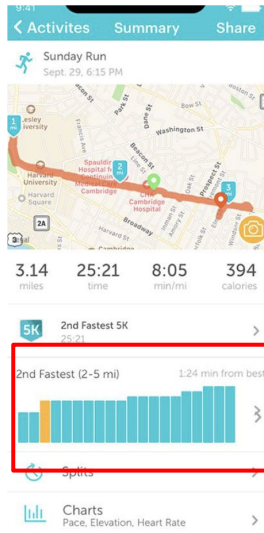
*"I cannot **customize**."*

*"I feel so **alone** or **guilty**."*



“I am not a *numbers person*.”

Many people find **quantitative** feedback **confusing** 😞, **overwhelming**, and **demotivating**.



“I cannot *customize*.”

Even self-tracking tools with **qualitative feedback** provide a **generic experience**, having the **same data representation** for all users.



Ubifit Research Study



Flora App

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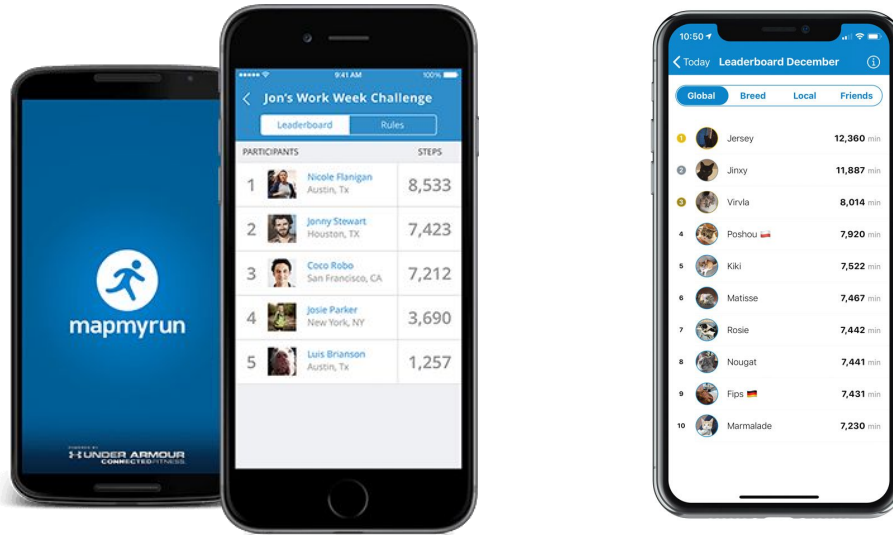
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Flora App

*“I feel so **alone** or **guilty**.”*

Conventional tools are designed with a **single-user perspective** rather than supporting more collective personal informatics practices.



Our solution: *Sprout*

A self-tracking application that supports more experiences for health management.

, , and



Our solution: *Sprout*

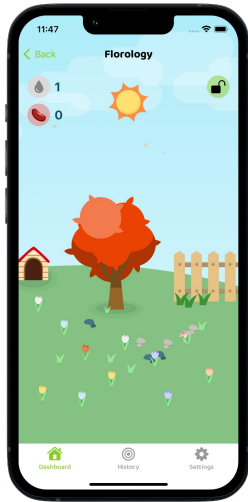
A self-tracking application that supports more **qualitative**, , and experiences for health management.



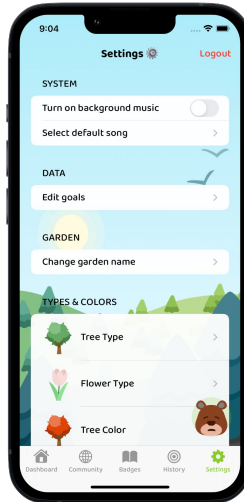
Qualitative

Our solution: *Sprout*

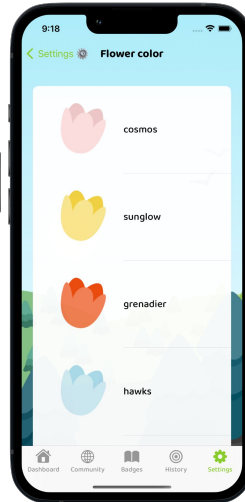
A self-tracking application that supports more **qualitative**, **customizable**, and experiences for health management.



Qualitative

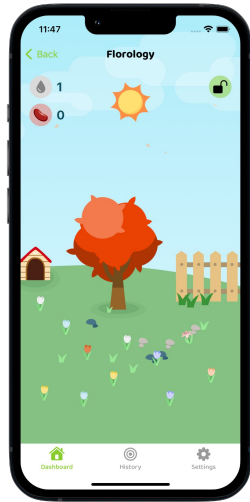


Customizable

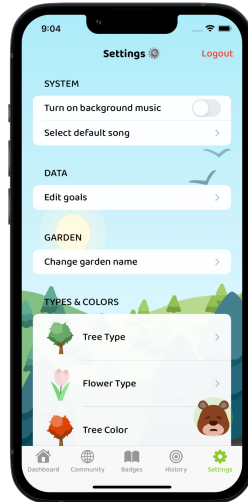


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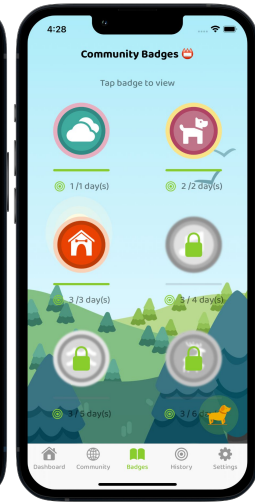
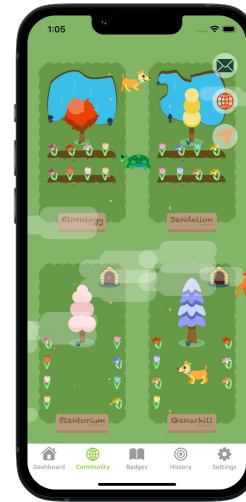
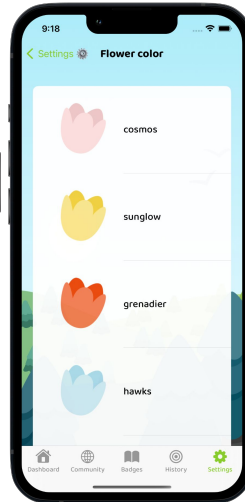
A self-tracking application that supports more **qualitative**, **customizable**, and **collaborative** experiences for health management.



Qualitative



Customizable



Collaborative

Let's talk to people first.



What we wanted to know...

what do they track

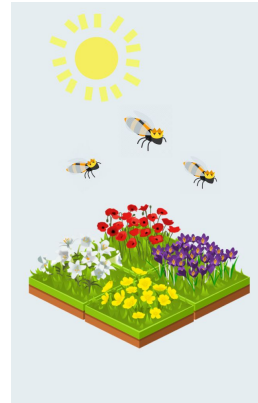
why do they stop tracking

what do they want to see

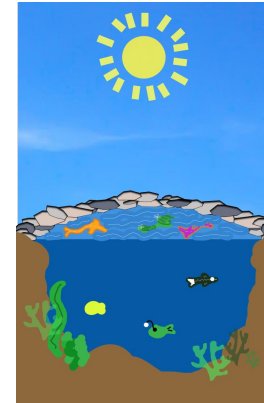


Exploring preliminary design concepts

- Using **nature theme**
- Each element in the scene represents **piece of information** user is tracking
- Brainstormed different nature scenes



Garden



Pond



Beach

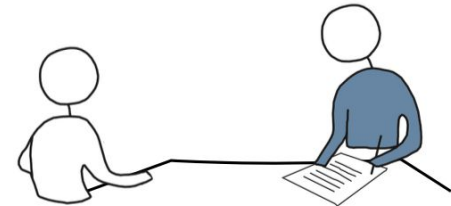
Interviews setup

Participants

- N=8
- 4 male, 4 female
- 20-24 years old

Format

- Semi-structured
- In-person
- 20-45 minutes



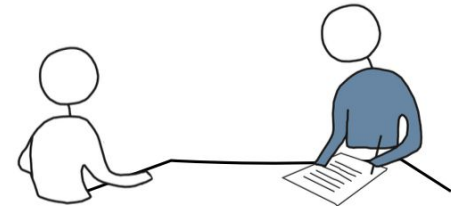
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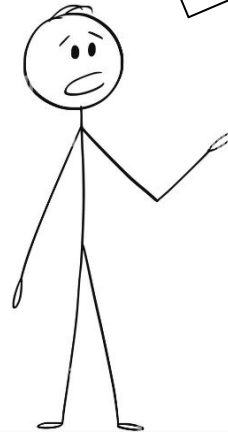
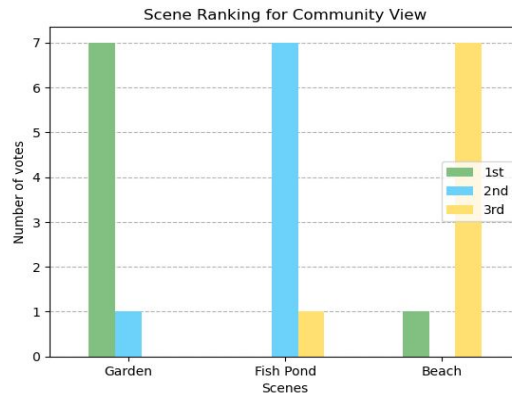
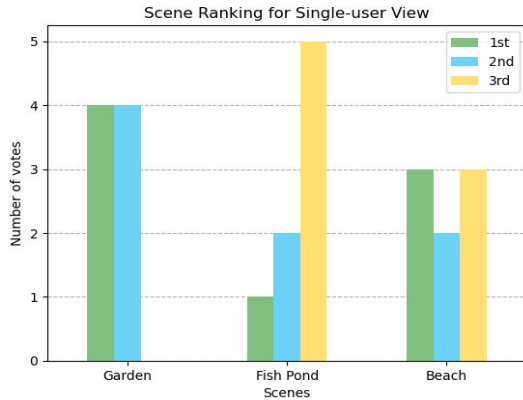
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What they want to see

People preferred the **garden scene**

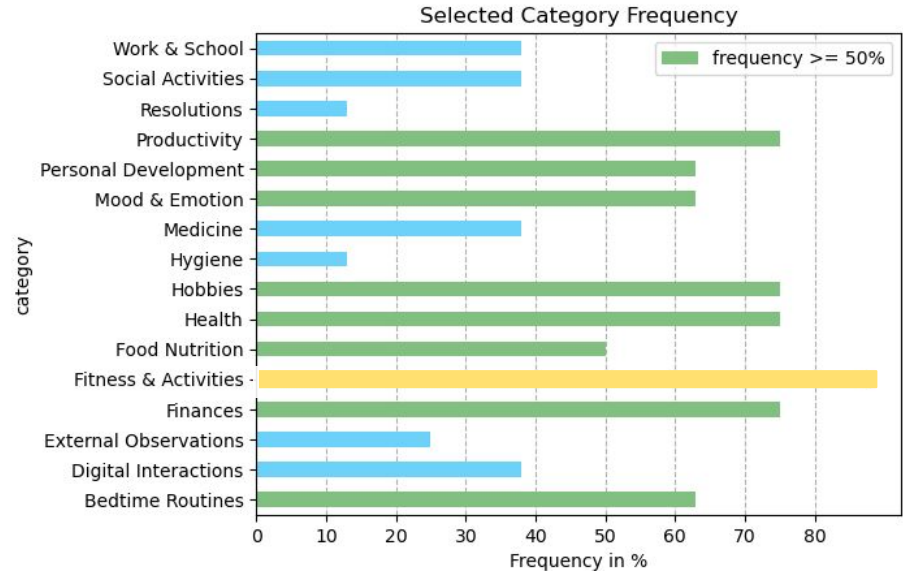
- Personal connection
- Familiar with idea of community garden



*"I connect garden with **growth**... it makes sense... trees and plants are things that can **grow**" (P2)*

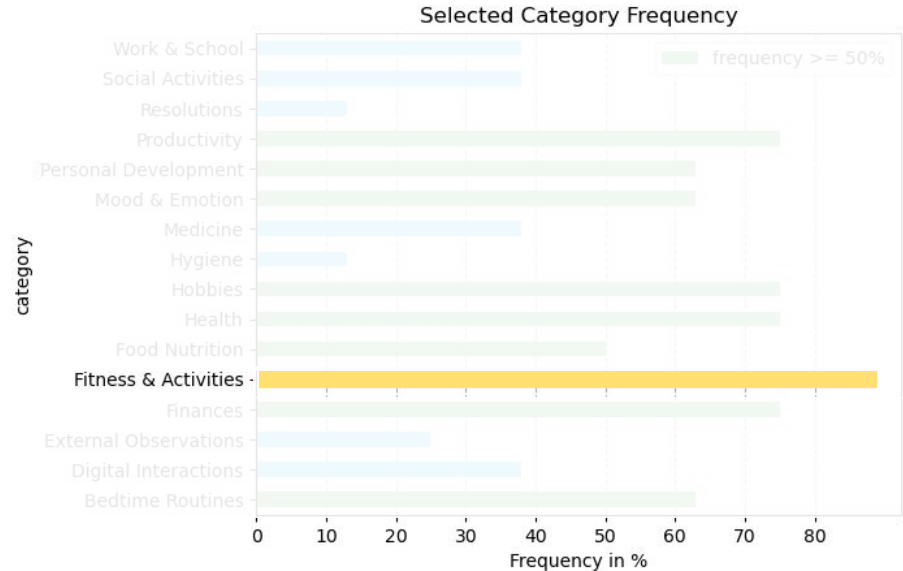
What they track

Data related to **fitness and activities** were the most popular options



What they track

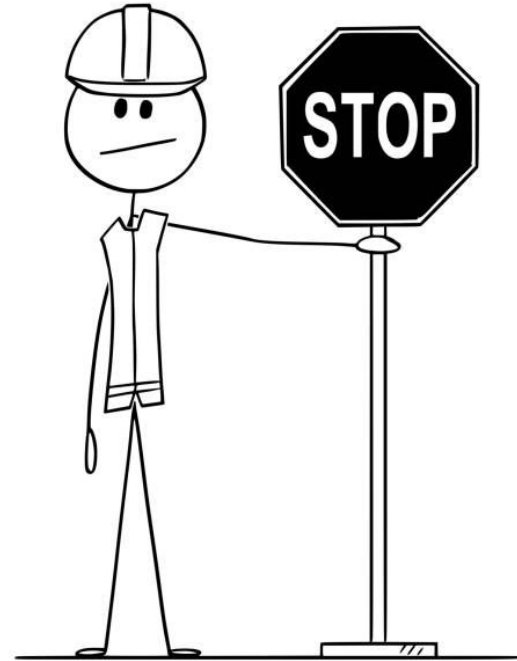
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Why do they stop tracking

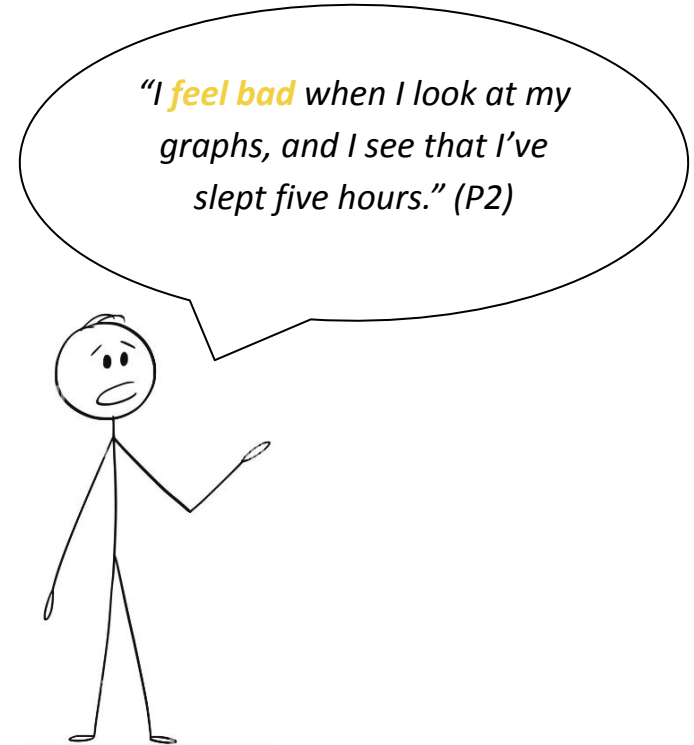
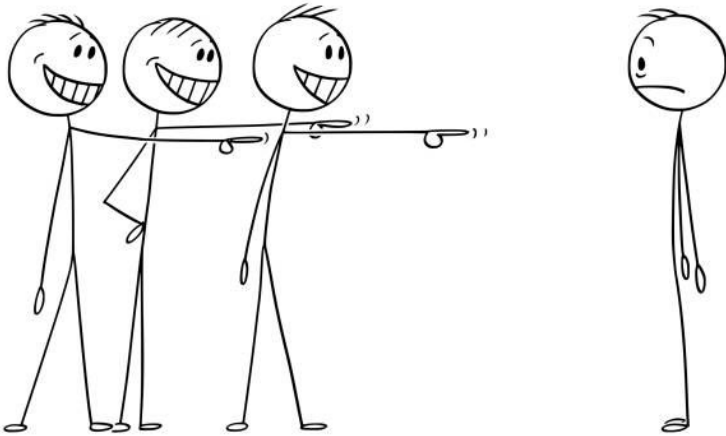
We identified **3 main barriers**:

- Negative feelings
- Wrong data displayed
- Exhausting input system



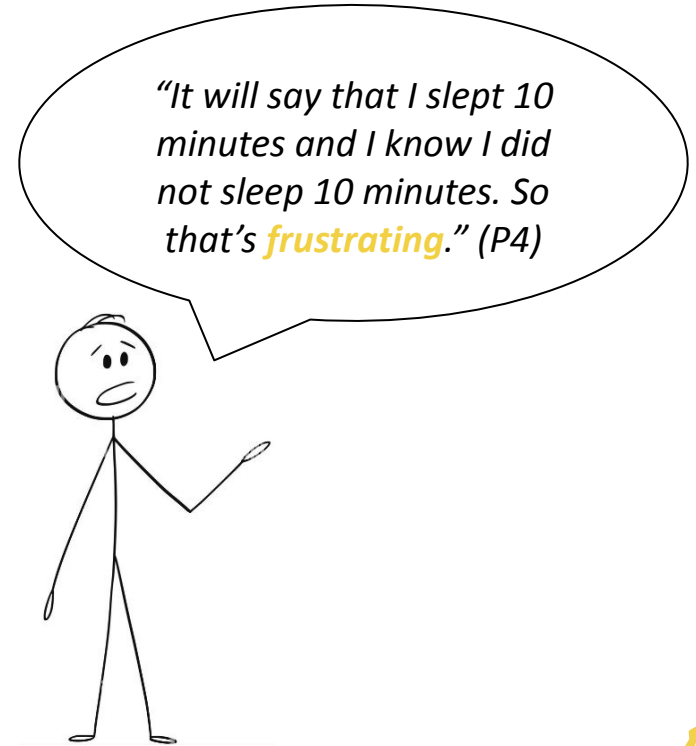
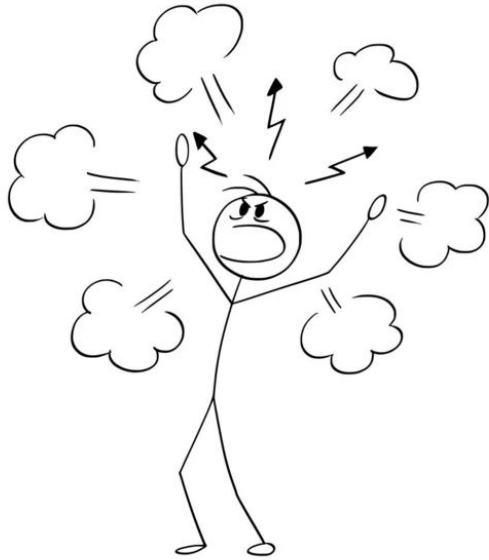
Why do they stop tracking

Negative feelings (e.g. guilt)



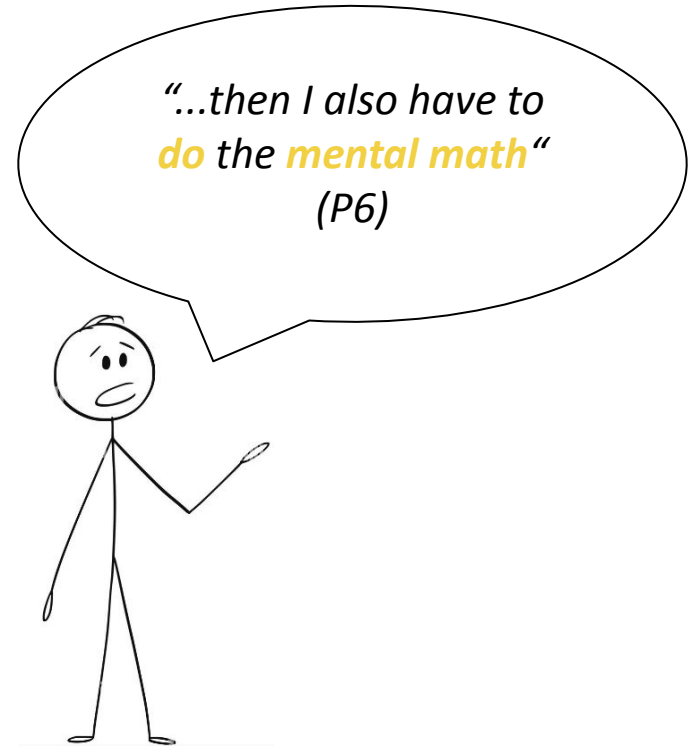
Why do they stop tracking

Tools displaying wrong information (e.g. frustration)



Why do they stop tracking

Exhausting input system



Design guidelines

We derived and applied **6 principles** to **create Sprout**.



Style	Description
Flexibility	App should support different styles of tracking
Customizability	Users should have the ability to determine what they want to track and how to see it
Familiarity	Design features should be familiar to users
Passive Tracking	Data tracking should be automated by default but still allow for manual input
Social Influence	App should provide features that foster a sense of community among users
Privacy	Data representation and social features should be anonymous by default

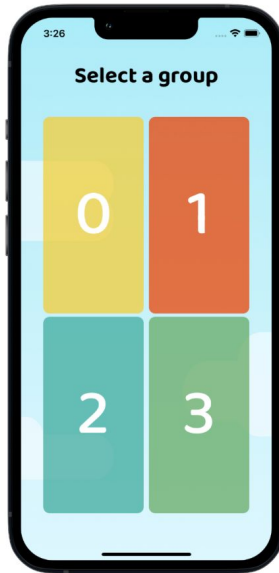


Let's create *Sprout*.

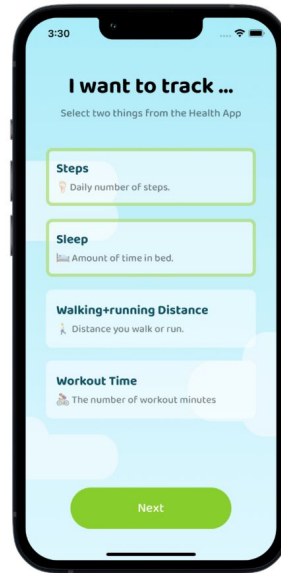


Onboarding

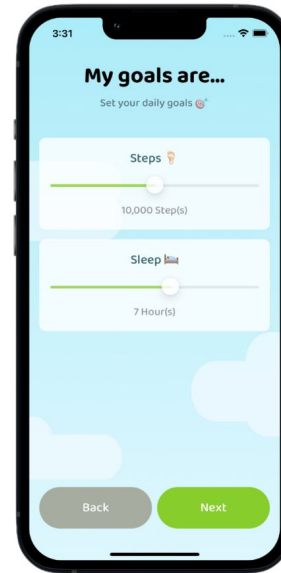
Thank you Mira for designing of *Sprout* 🙏



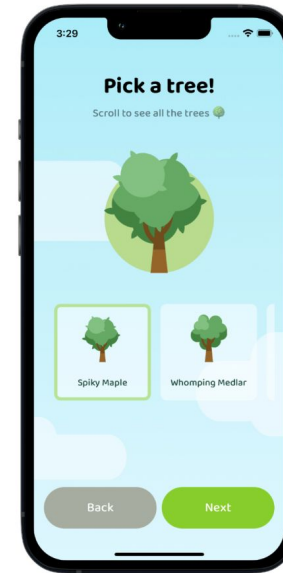
(a) Groups representing different experimental conditions



(b) Select which data to track via Apple Health



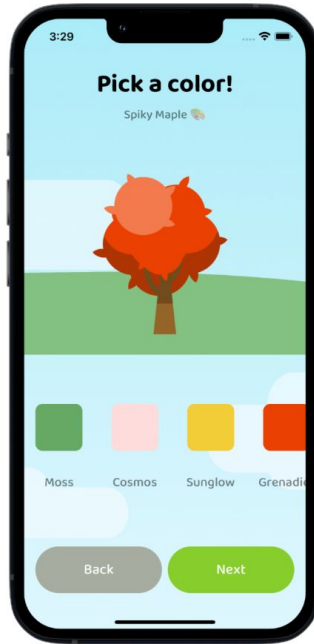
(c) Set daily goals for the two data selected



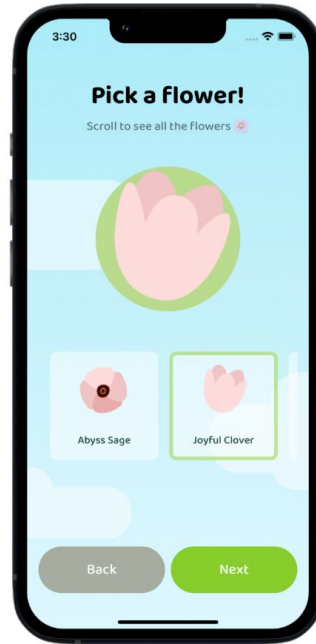
(d) Select tree type out of a list of 8 trees

Qualitative
Customization
Social

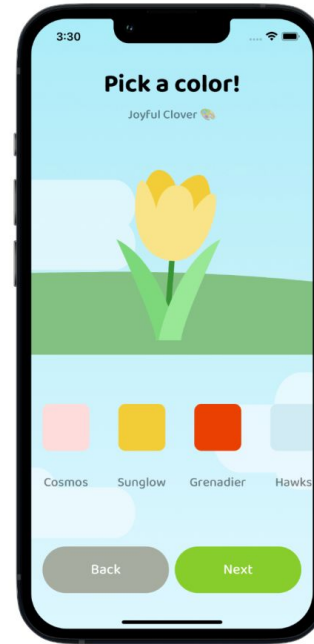
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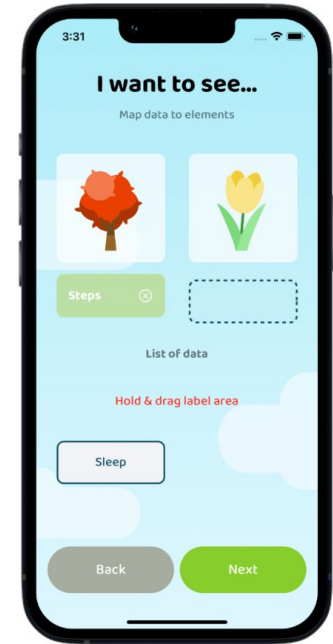
(e) Select tree color out of a list
10 colors



(f) Select flower type out of a list
3 flowers



(g) Select flower color



(h) Map each data to either tree
or flower

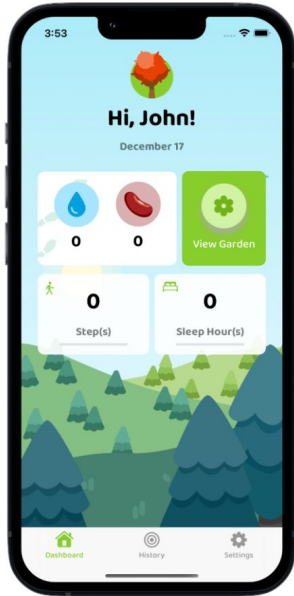
Qualitative
Customization
Social

Types and colors of trees

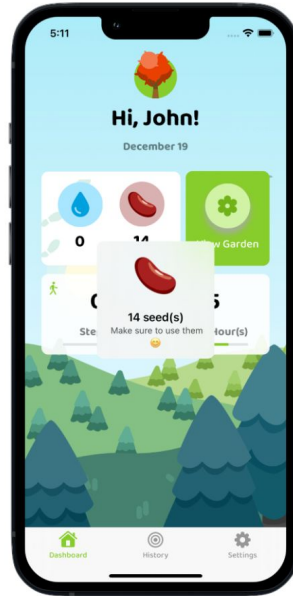


Figure 1.2. Examples of trees and colors; the first word corresponds to the color

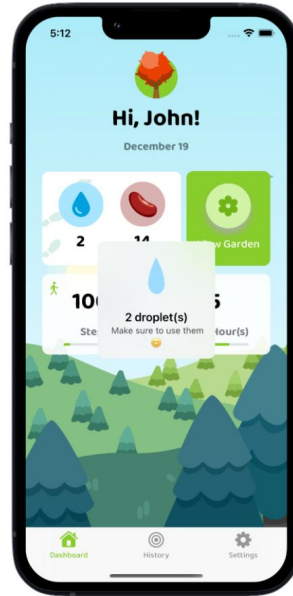
Earning droplets and seeds



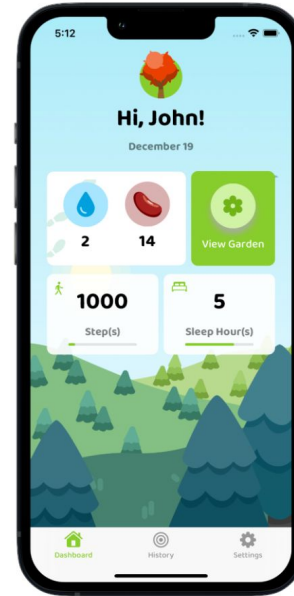
(a) User opens the application



(b) Sleep is updated, and seeds are awarded to the user



(c) Step count is updated. Droplets are awarded to the user



(d) Updated values are displayed on the dashboard

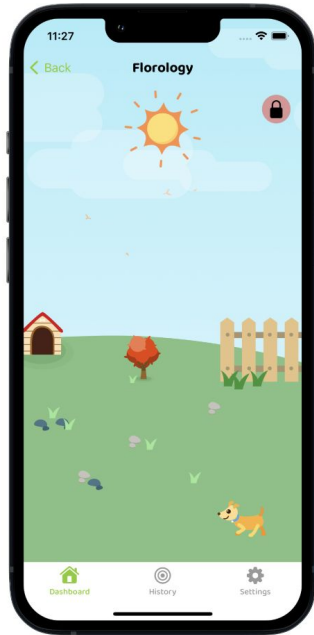
Qualitative

Customization

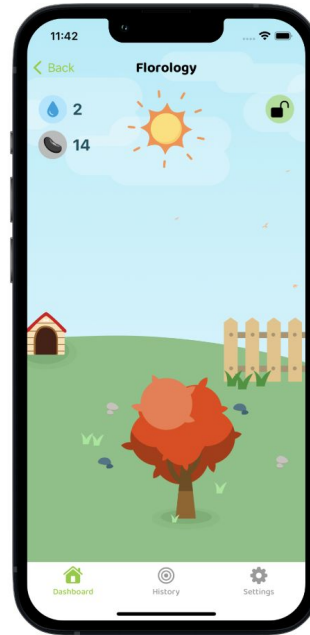
Social



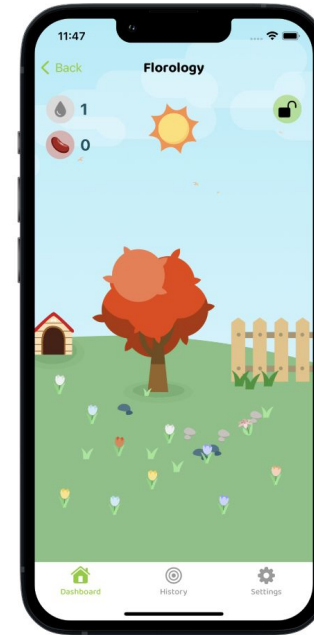
User garden



(a) Closing lock and small moving tree



(b) Opening lock; selecting droplets and growing tree size



(c) Selecting seed and planting flowers

Qualitative
Customization
Social

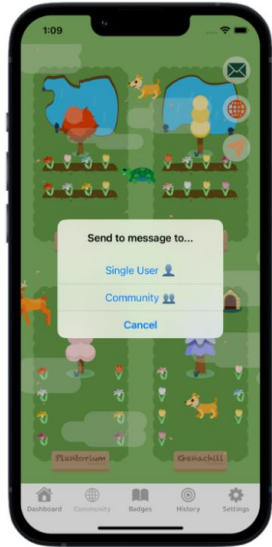
Community garden



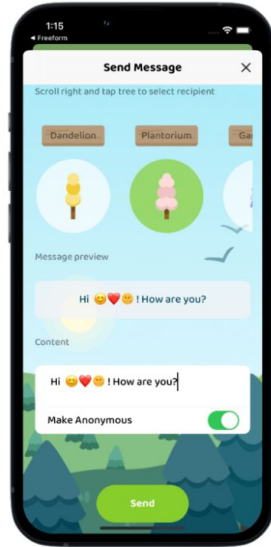
Qualitative
Customization
Social



Community messages



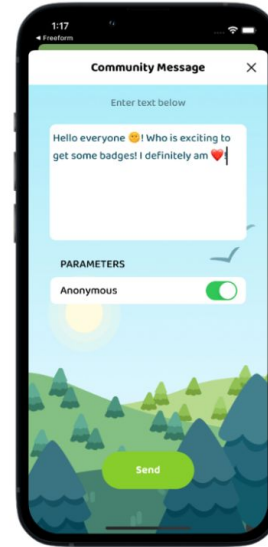
(a) Select message type



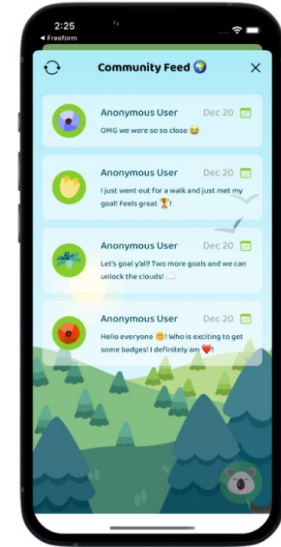
(b) Select the recipient, write content, and choose whether anonymous



(c) Switch between received and sent messages



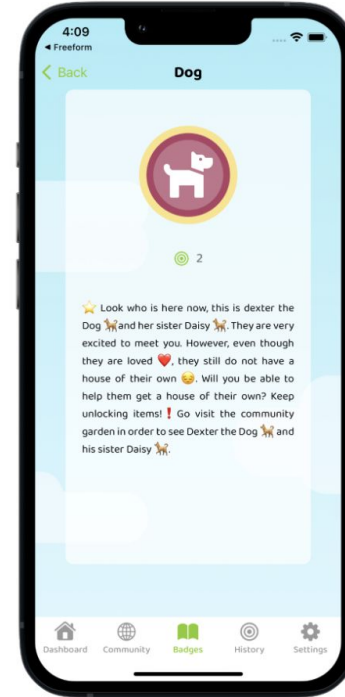
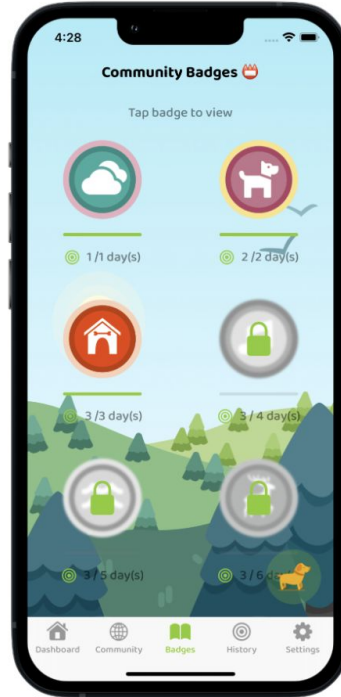
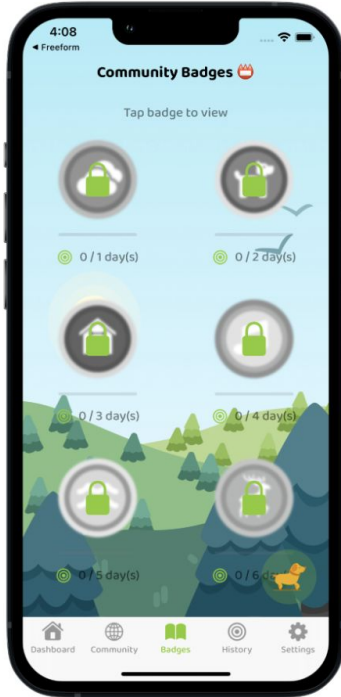
(d) Write content of group message and choose whether anonymous



(e) User can view community feed

Qualitative
Customization
Social

Community badges



Qualitative

Customization

Social



Community badges



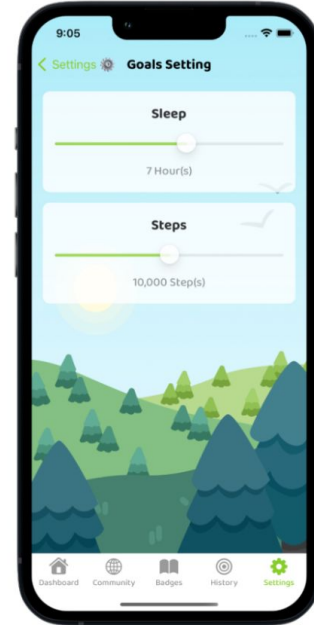
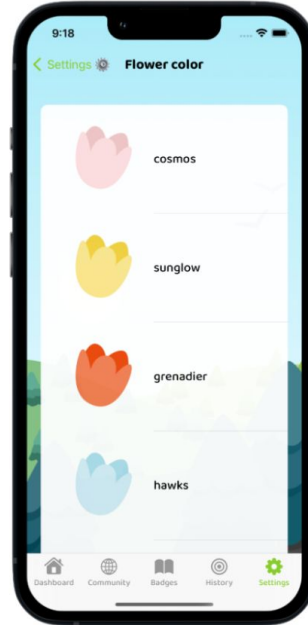
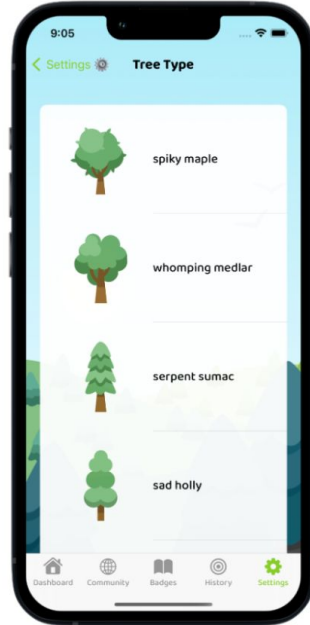
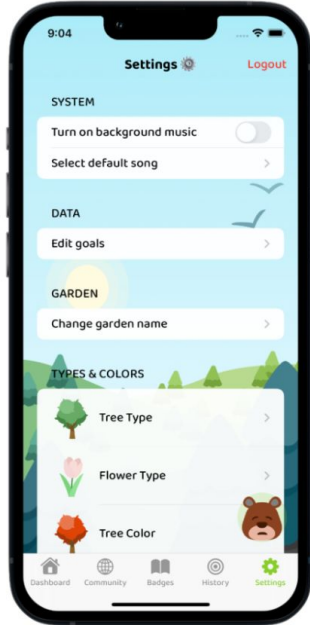
Qualitative

Customization

Social



Customization

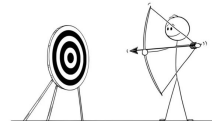


Qualitative
 Customization
 Social



What do people think of *Sprout* ? 🤔





Deploying *Sprout*

Goal: Understand people's experiences with *Sprout* in everyday life and validate our approach.

~~Behavior change?~~

Not yet because still in the *early stages*.

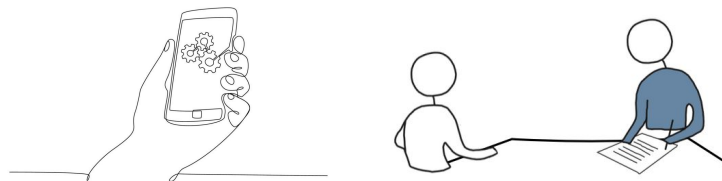
Deploying *Sprout*

Participants

- N=22
- 6 male, 16 female
- 18-44 years old

2 week field trial

- Pre/post study interviews & surveys
- Logs of screen views, messages, etc



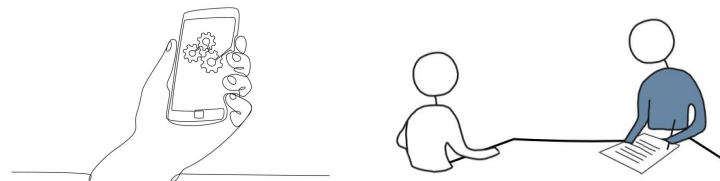
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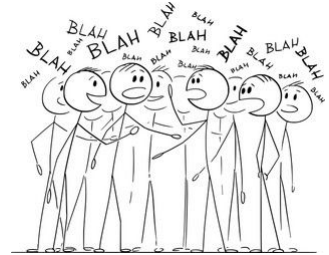
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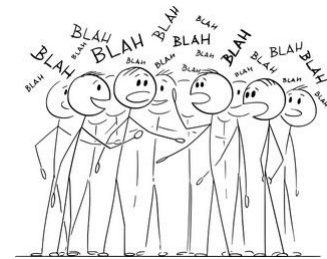
Study groups

- Between subjects 2 × 2 design (4 conditions)
- Variables: **social** × **customization**



Study groups

- Between subjects 2 × 2 design (4 conditions)
- Variables: **social** × **customization**



	Social	No social
Customization	G1 (6) ● ●	G3 (5) ●
No customization	G2 (6) ●	G4 (5)

What did we learn? 🔍



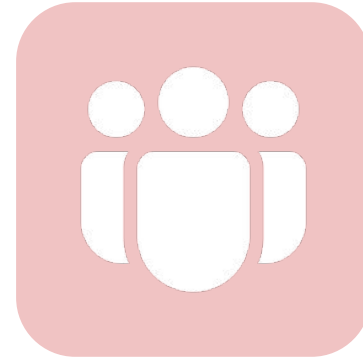
Deployment Findings



Qualitative



Customizability



Social features

Deployment Findings



Qualitative



Customizability



Social features



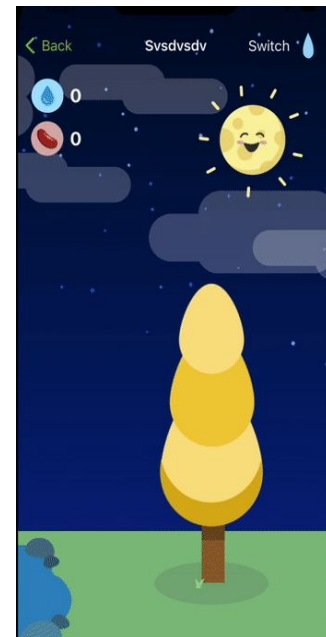
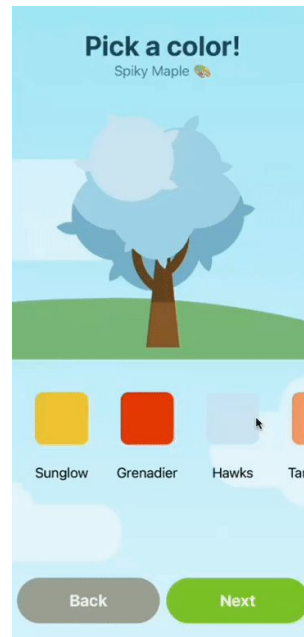
Qualitative themes can create a **fun** and **playful** experience.

Participants found *Sprout* to be...

- fun (**76%**)
- enjoyable (**88%**)
- entertaining (**76%**)

Participants enjoyed...

- the use of droplets & seeds to show progress
- planting trees and flowers

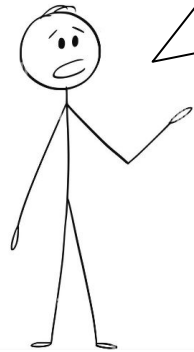


Thank you DALI Animation
for the animations 🙏



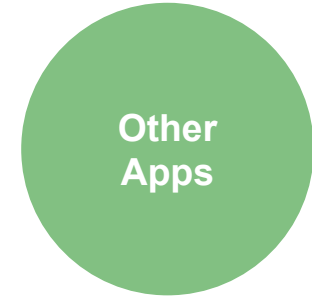
Some people use **multiple** types of **visualizations**.

Some users found **Sprout** as a tool that would **complement** existing tools.



*"I don't think the purpose should be to replace those numbers. This [Sprout] is a **good augmentation of those numbers.**" (P22)*

Sprout



Deployment Findings



Qualitative



Customizability



Social features

Deployment Findings



Qualitative



Customizability



Social features



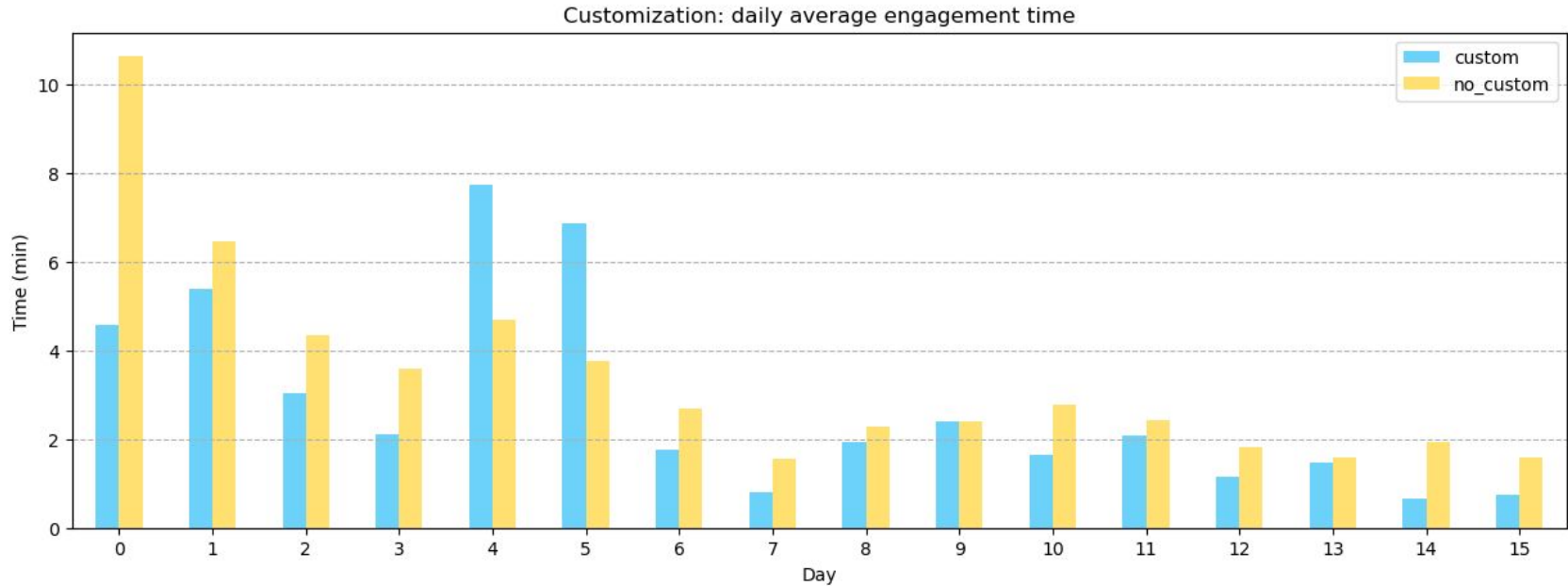
Customization did **not** have a significant **impact**

- Customization features were used **26 times** by 6 different participants.
- Picked options they liked the most during onboarding.
- Same as **changing wallpaper** on phone.
- **Not many options** to choose from after.



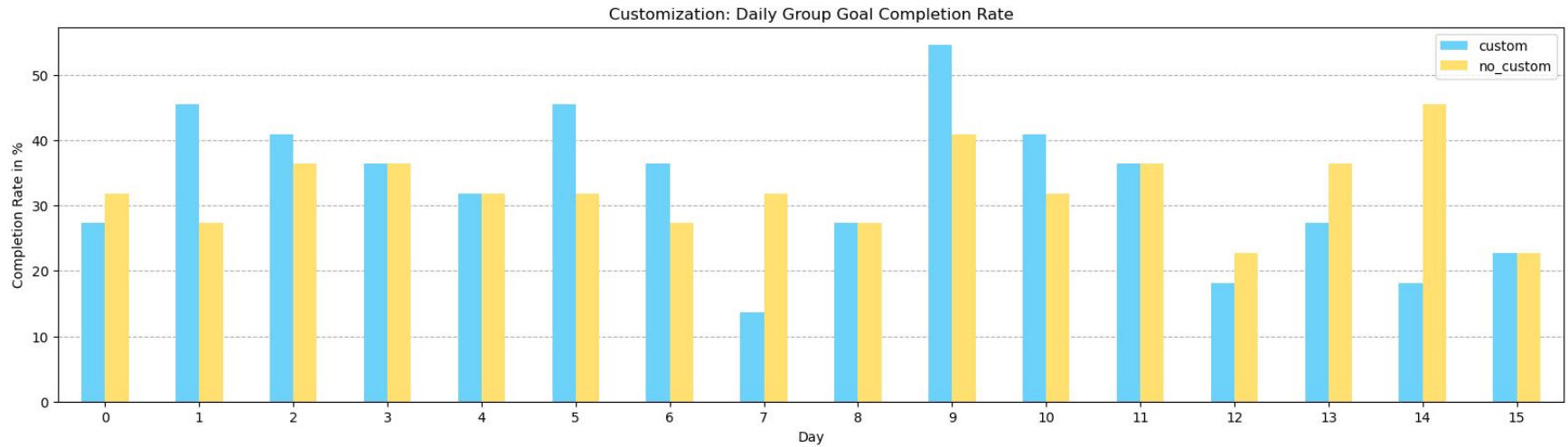


Customization did **not** impact engagement.





Customization did **not** impact goal completion.





People want **social features**.

People in the **non-social** conditions **requested social features** to be included in the future.



Deployment Findings



Qualitative



Customizability



Social features

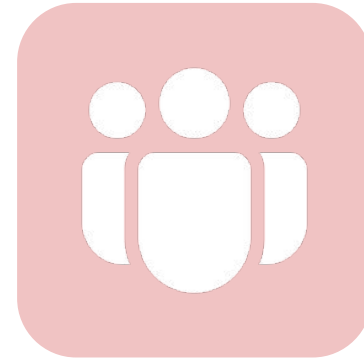
Deployment Findings



Qualitative



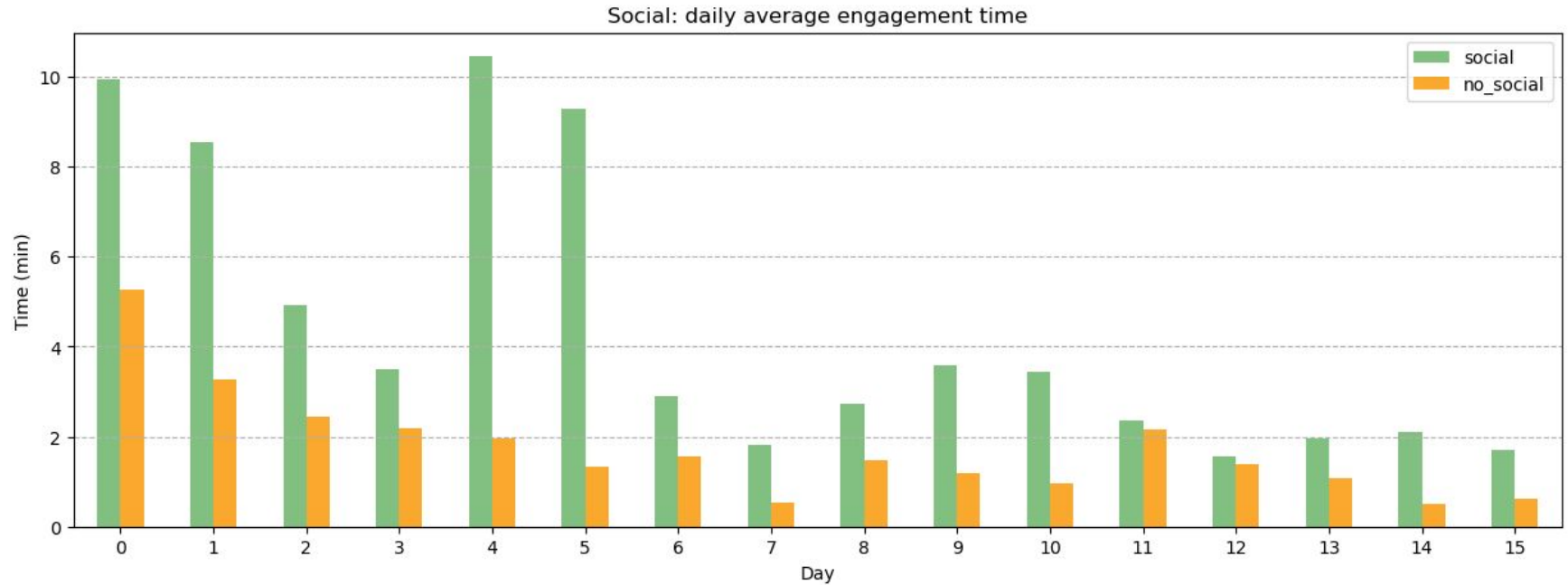
Customizability



Social features

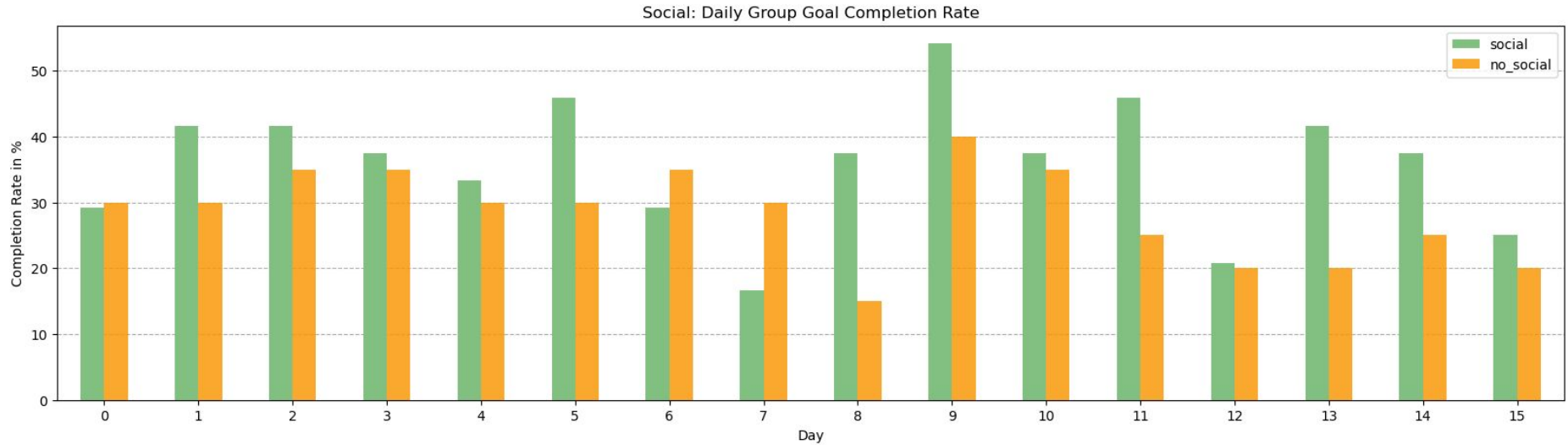


Social features increased engagement.





Social features increased goal completion.





Cooperation can have negative impacts.

- **Lack of participation** from others can lead to...
 - frustration
 - tracking abandonment

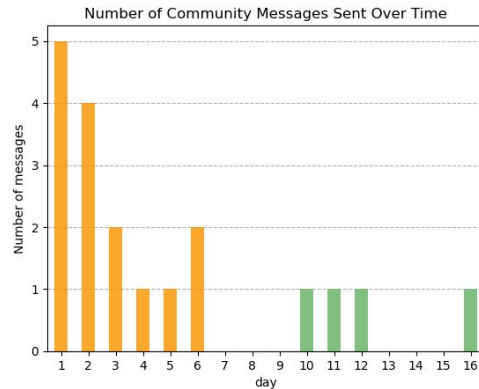




Users do **not** want to be fully **anonymous**

19 group messages but **only 1 DM**.

- Participants did **not** want to **send DMs to strangers**
- Fear of being seen as odd by others



“There is **not much to talk about**, because you **don’t** really **know them** that well...”(P9)

“...**random people**... we **didn’t know** anything about **them**” (11)



Helping future designers... 



Design Takeaways



Metaphors plus numbers



Flexible customization options




Optional social inclusion

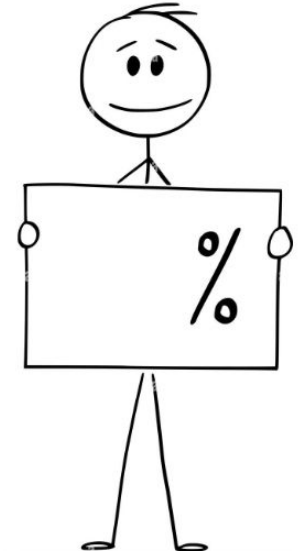




Metaphors plus numbers

Use metaphors but numbers can still be beneficial:

- Combination of metaphors + animations = 
- Numbers can still be useful based on **questions users ask** about their data (e.g. over time)

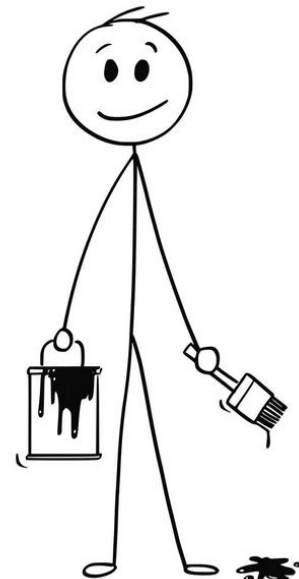




Flexible customization options

Provide a wide range of customization options:

- **Enough features** to allow users to **personalize** their **experience**
- **Increase** in sense of **ownership**

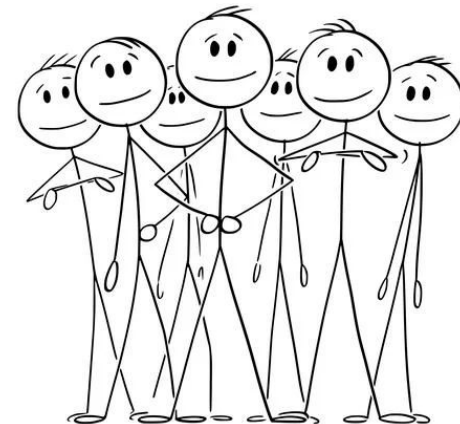




Optional social inclusion

Include friends but do not force social interaction:

- **Social** features are **not** for **everyone**.
- Enable users to **connect** with **people** they **already know**



Where is *Sprout* headed? ✈️



Future Work

- Longer study to accurately measure impacts of customization
- More customization options
- Allow people to track with friends
- More sensitive data (e.g. mental health, with patients)



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- More customization options
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Daniel Westphal



Hannah Doris

Acknowledgements 🙏



Acknowledgements

- Committee (Liz, Lorie, Tim)
- Labmates at the Empower Lab
- DALI Family
- Family (dad, mom, brothers)
- All the students that worked on the project
- And so many others...



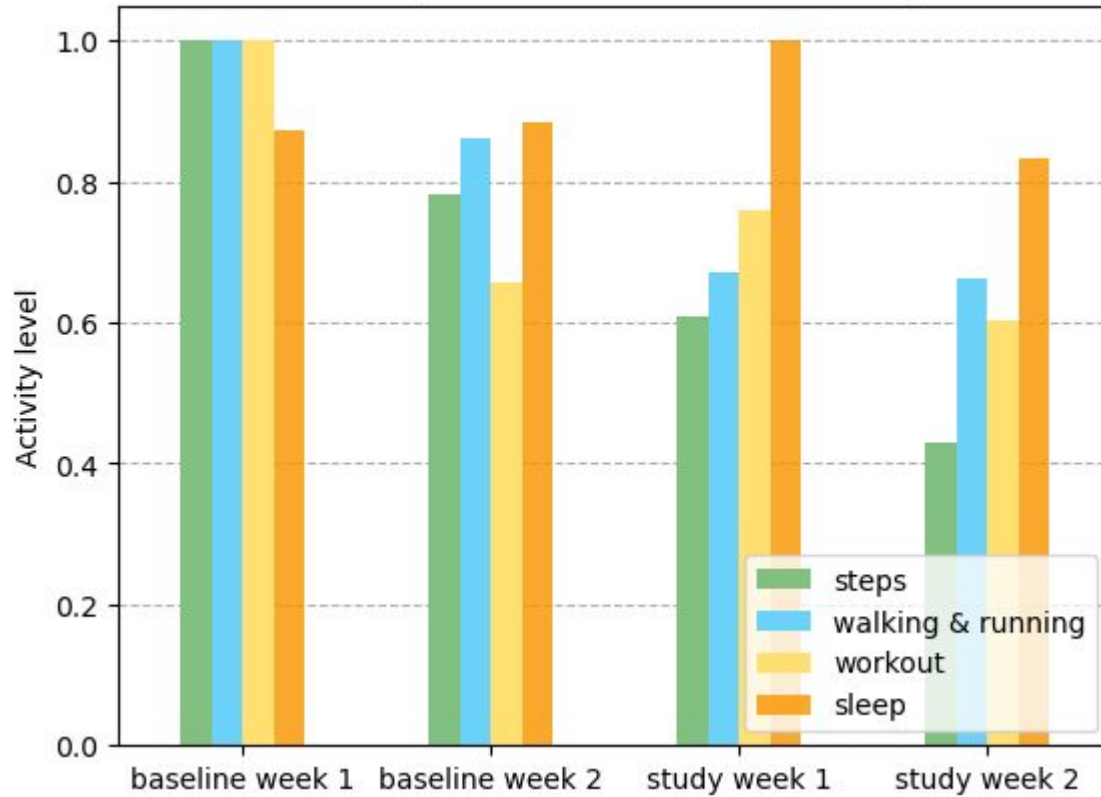
Thank you! 😊



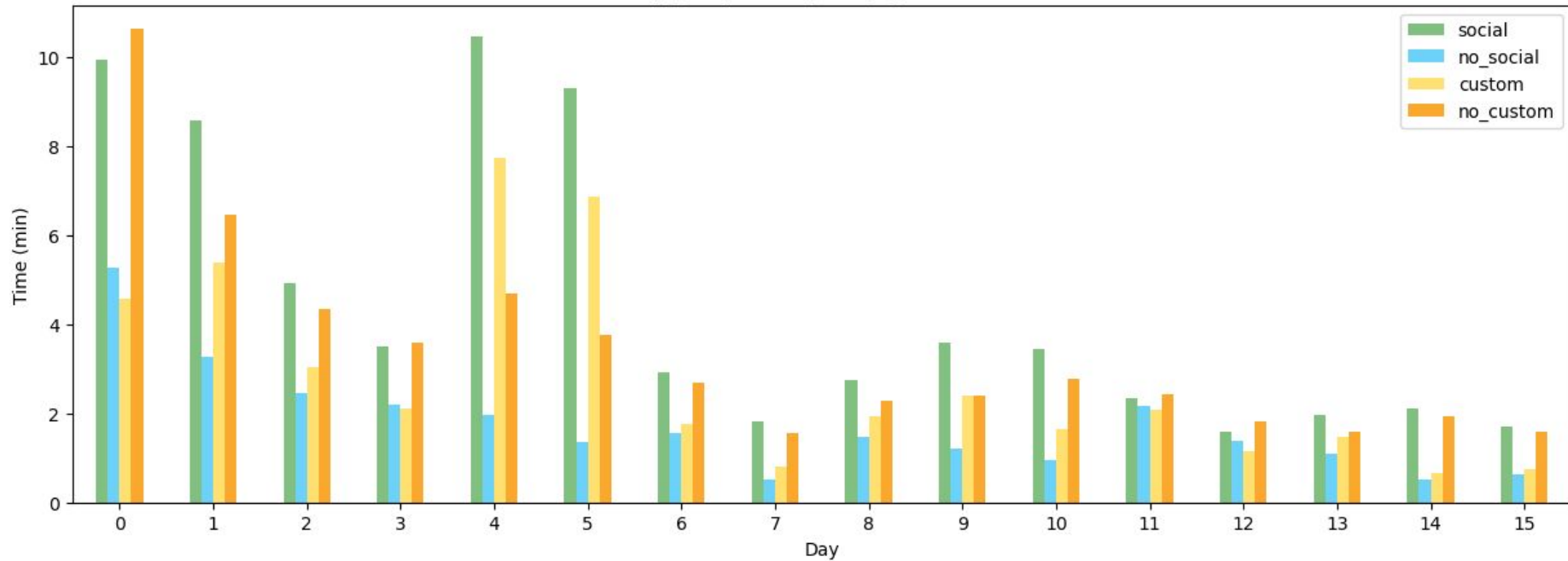
Appendix



Activity Level Before and After Study



Daily group average engagement time



Percent Goal Achievement Rate Over Time

