

grove

Final Report

CS 147 Winter 2022
Easing Life Transitions
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Value Proposition & Team

Value Proposition

Cultivate your post-grad community.

Team Members and Roles

Amelia W.: User Researcher and Mobile/Web Developer

Chris M.: User Researcher and Mobile/Web Developer

Jasmine R.: User Researcher and UX Designer

Tiffany L.: User Researcher and UX Designer

Problem & Solution Overview

After leaving their college communities, post-grads are suddenly faced with the often-overwhelming challenge of building and retaining friendships amidst a sea of new connections. Grove's mission is to give post-grads the tools to turn new connections into deeper friendships as they navigate their post-college communities. Grove allows post-grads to focus on the enjoyable and exciting aspects of building community by simplifying the stressful aspects of inviting, planning, and following up with new friends. Through a platform that automatically suggests activities for post-grads to do with their new acquaintances and allows users to document fun memories, maintain regular correspondence, and hang out regularly, Grove helps ensure that new friendships deepen into lasting friendships without the anxiety that currently accompanies post-grad community building.

Needfinding Interviews

In our needfinding process, we interviewed a total of eight people across the U.S. and beyond, all of whom were in various stages of the post-grad transition, from those in their senior year of college to those who have already transitioned to their post-grad lives. We sourced our interviewees through word-of-mouth and conducted them remotely via Zoom. In particular, we interviewed four current seniors who are exploring career paths in academia, consulting, and technology, two post-grads who are navigating the move to a new geographic location, and two post-grads who are balancing their work and social lives in their new communities.

Each of our interviewees occupy different social environments and are exploring different post-grad paths, especially our extreme user, Enrique, who recently graduated but is already renovating his own house.

Following our interviews, we constructed both individual and consolidated empathy maps (Figures 2 and 3) that allowed us to step into our interviewees' shoes and better understand their actions, thoughts, and emotions regarding the life transition of leaving college. In reviewing interview notes and empathy maps, we discovered three key learnings.

First, our interviewees expressed the sense of being utterly overwhelmed by all of the possibilities and decisions to be made about post-grad life. Many people reported feeling swamped in making open-ended career plans after four years of the structure and schedule of college classes. Enrique, a post-grad living in Arizona, lamented that the "set menus" that his college offered for post-grad plans didn't really fit him and his priorities, which left him scrabbling to cobble together his career plans all alone without resources. Amanda, a Yale senior looking for jobs in the tech industry, said: "I wish I'd had exposure to more applicable fields that I could have pursued that weren't just in my college's academic department. Now I'm just self-researching my career options on Google."

Another major stress factor in the transition out of college was navigating the uncertainties of post-grad life during the transition. People talked about their fear of the unknowns of what life after college would actually look like. What would the environment of their workplace be like? How would they spend their time in a completely new place? Beyond imagining their post-grad lives, several interviewees mentioned feeling like they were missing key knowledge about all the to-do's of transitioning from college. For example, Shivansh, a recent grad, mentioned having to deal with a lot of tasks and additional hurdles as an international student that he didn't know about before, which added immense stress to his post-grad transition process.

Finally, we heard people mention the deep emotional distress of leaving behind the tight-knit, pre-defined structure of their college communities. Our interviewees expressed the need to build community in new and unfamiliar places post-grad: they highlighted how much easier it is to form deep friendships in college, and the subsequent dissolution of their college community as everyone graduates and deals with an onslaught of differing responsibilities.

In particular, Mihir, a college senior and international student, expressed anxiety about not having people to do general recreational hobbies like bar-hopping or hiking as he looks ahead to moving to a different coast post-graduation. Rachel, who graduated from college last June, noted that she couldn't quite relate to her friends who were still in college because she was in a different stage of life, and though she was meeting a ton of new people at work, she didn't feel close to them because they were either older than her or she only knew them in a professional context. As such, Rachel yearned for the deep friendships she had with her college friends but felt disconnected to her post-grad social circles. Shivansh, a recent college grad, also emphasized the difficulty of building a community from scratch after graduation (Figure 1). He noted how hard it is to know where to begin in building a community post-grad because in college, there already are so many established communities that people can just join.



Shivansh
Recent Duke Grad, Consultant,
International
Zoom (30 min) interview

*"In college, you're **subscribing** to a community rather than **building** a community from scratch post-grad."*



Figure 1. Shivansh, a recent Duke grad and international student, highlighted the difficulty of leaving the structured social communities of college and having to start from scratch after graduation.

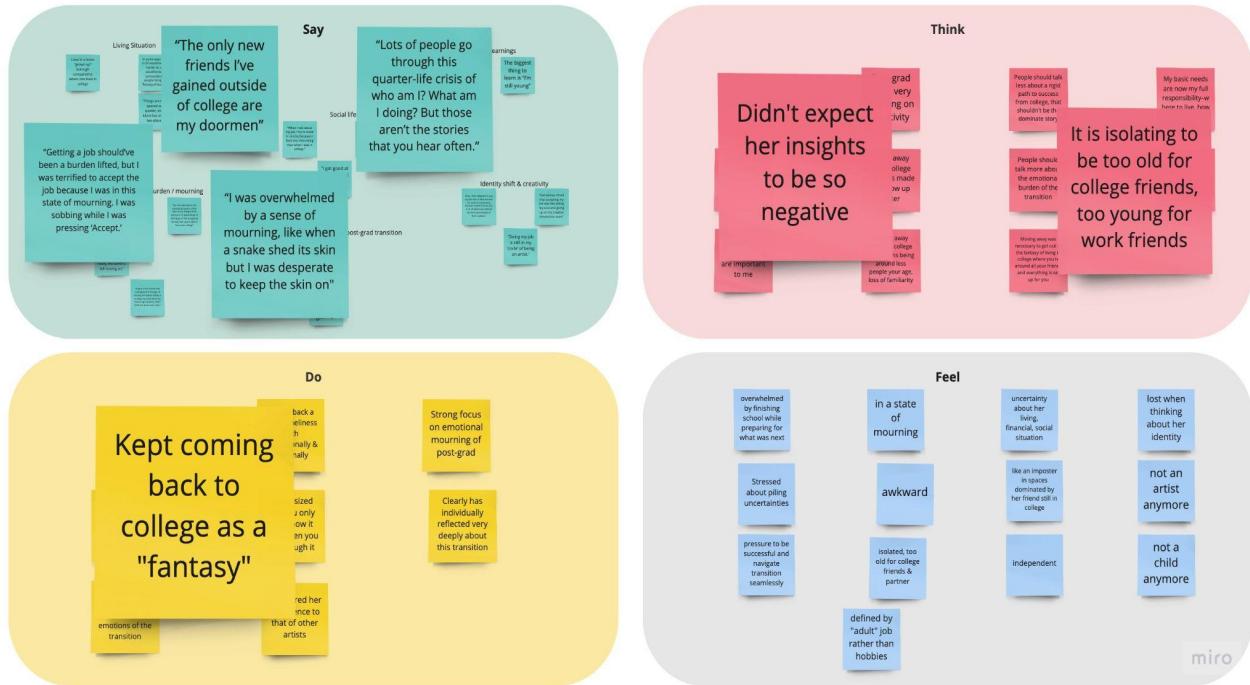


Figure 2. Empathy map for Rachel, a recent post-grad living in New York. She reflected on how tough the post-grad social transition is and her lack of community after leaving college.

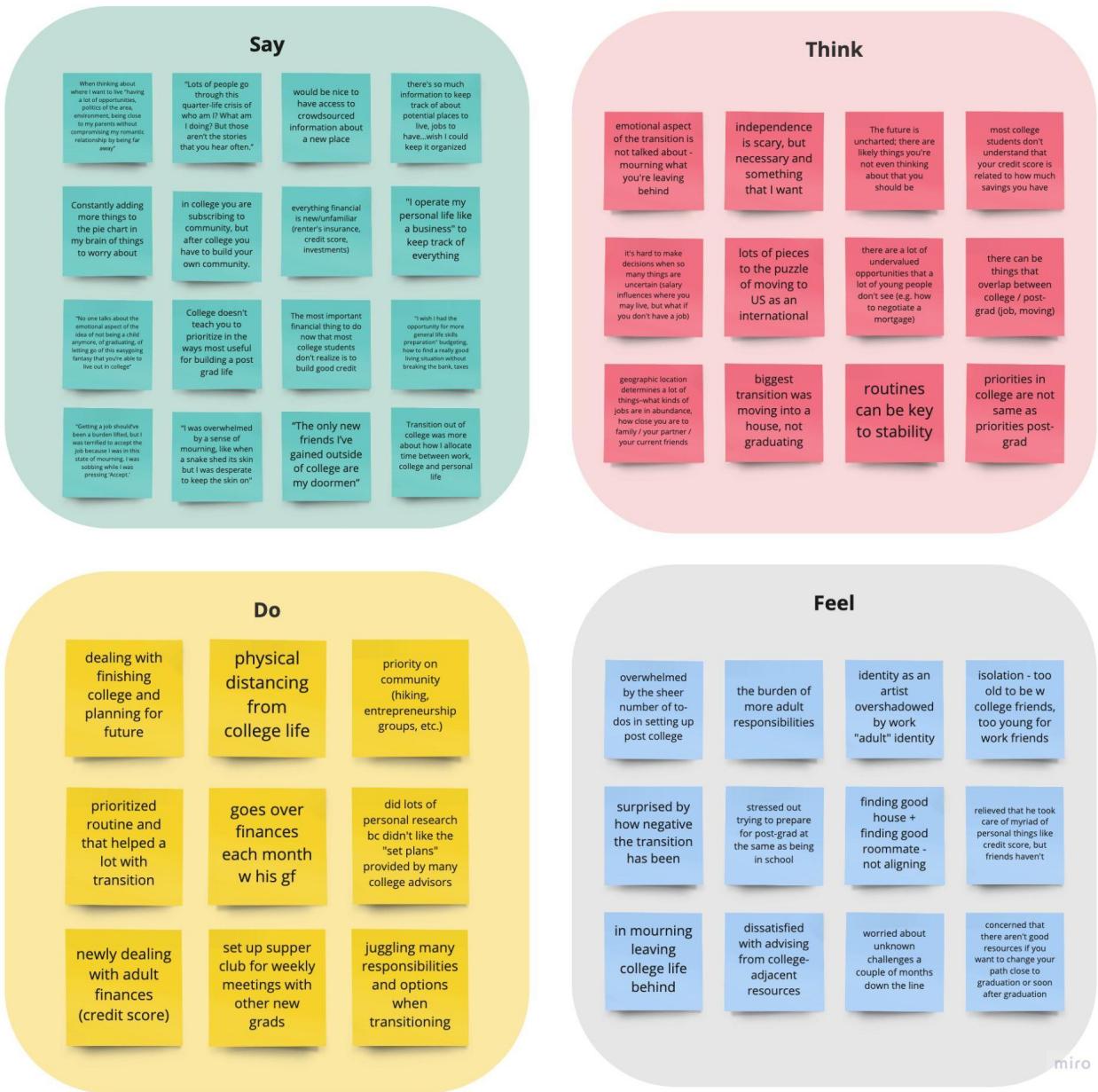


Figure 3. Consolidated empathy map for four of our interviewees, with emergent themes of anxiety in finding post-grad communities, as well as the tension of wanting to feel prepared but also feeling overwhelmed by everything to do.

Point of Views & Experience Prototypes

Following our needfinding process, we extracted three of our most insightful interviews and brainstormed possible solutions. To do this, we began by generating a Point-of-View (POV) statement for each interview. POV statements help to concisely reframe a problem based on user needs and insights, consisting of four parts: who we met, what we were surprised to notice in interviewing them, a hypothesis drawn from the surprise, and an insight that can be expanded upon later in designing a solution (the “game-changer”). For each “game-changer” of the POV statements, we brainstormed 10-15 How-Might-We statements (HMWs) to help us dig deeper into how we could turn the game-changing insights from our POV statements into solutions. Next, we selected our most promising HMW for each POV, came up with a solution to address the HMW, and designed an experience prototype for each solution in order to quickly test the assumptions embedded within those initial solutions. Below are our three POV statements, along with a sampling of the HMWs that stemmed from each POV, the proposed solutions for our most compelling HMWs, and the experience prototype for each proposed solution.

Point of View for Enrique

- **We met** Enrique, a recent ASU graduate in accounting and new house owner; now working as a financial controller at a mid-sized startup.
- **We were surprised to notice** that he felt dissatisfied with resources to plan out his less-conventional career path and post-college plans.
- **We wonder if this means** that the “set menus” (i.e., post-college pathways presented by college counselors and advisors) did not reflect his priorities as a homeowner, strong saver and investor.
- **It would be game-changing to** expose college students to more unconventional college and post-graduate paths.

Inspired by Enrique: How Might We...

- ...give college students the skills and tools to map out potential decisions and priorities of their post grad paths?
- ...help people identify unexpected options that they might not be considering

for their career?

- ...help Enrique meet other students going down the same post-graduate paths as him?
- ...reduce the pressure from external sources on students to take well defined paths?

Solution and Experience Prototype Inspired by Enrique

Enrique's feelings of being overwhelmed by all of the different career possibilities and decisions to be made in the post-grad transition inspired our first experience prototype, Comparing Pathways. Our solution was to help people like Enrique connect with others who were a few steps ahead of them in different post-graduate pathways. The assumption we wanted to test was whether comparing and contrasting different pathways would make people less overwhelmed by their post-graduate decisions.

To test this assumption, we compiled information about educational background and career interests from Jake, a current college junior studying accounting. We then created a portfolio of LinkedIn profiles of people who were at various later stages in their careers, ranging from recent post-grads to older individuals. We ensured that each selected profile shared a similar educational background to Jake, but varied greatly in career paths. We sent the portfolio of LinkedIn profiles for Jake to look over, and then followed up with a few questions about the profiles. Some questions we asked include:

- Which profile(s) were the most helpful? The most unhelpful? Why?
- Do you feel less/the same/more overwhelmed about your post-graduate plans?
- Which person would you most want to connect with and why?

Jake reported feeling less overwhelmed after looking at the profiles, confirming our assumption that learning about different post-graduate pathways decreases the feeling of being overwhelmed about post-graduate plans. Jake shared that seeing concrete examples of possible career trajectories reassured him that his first job would not be his entire career. Surprisingly, he reported that his *confidence level* in post-graduate plans did not change after seeing the profiles, even though he felt less overwhelmed. To him, seeing all these pathways was not as valuable as feeling a strong connection with one profile. He mused that he might be

more confident about his post-graduate plans if he could more deeply engage with one profile he felt particularly drawn to rather than browsing many at once.

Point of View for Mindy

- **We met** Mindy, a UCSB Senior simultaneously exploring job and grad school opportunities.
- **We were surprised to notice** that Mindy cares more about people's day-to-day life/social experiences rather than their overall views of their job or grad school program.
- **We wonder if this means** that the lack of ability to actually visualize herself in any of the post-grad paths she's considering makes her indecisive about her next steps.
- **It would be game-changing to** give Mindy an honest look into the day-to-day lives, social interactions, and experiences of people pursuing the paths she's considering.

Inspired by Mindy: How Might We...

- ...give students an honest, approachable look into the daily lives of people who have the jobs/post-grad paths that they are interested in?
- ...connect Mindy with individuals who are in the same positions / programs she's interested in?
- ...give Mindy the experience of walking into a local coffee shop or hangout area of a community or area that she's interested in?
- ...help Mindy find meaning in her post-grad pathway regardless of what day-to-day life is like?

Solution and Experience Prototype Inspired by Mindy

Our second solution was inspired by Mindy's habit of scoping out a new place by examining its everyday ambience, combined with insights from our interviews about the daunting unknowns surrounding what day-to-day post-grad life would be like. Our solution was to allow people to imagine spending a day with someone living in a city they're interested in moving to post-grad in order to get a sense of what a typical day looks like there. The assumption we wanted to evaluate was

whether knowing a local peer's routine actually gives people more knowledge of what their lives could look like in that place.

In order to test this assumption, we created an experience prototype, Day In Your Future City, for which we obtained typical weekend day schedules from four post-grads living in Washington, D.C. We then gave the schedules to Yasi, a current college senior moving to Washington, D.C. this year after graduation, to show her what a typical day in D.C. might look like for a post-grad.

This experience prototype confirmed our assumption that access to other post-grads' schedules provides a unique "local lens" into a city. In addition, Yasi shared that this prototype "contextualizes what's possible in the city." However, she did not feel that this prototype was personalized enough for her. She mentioned that she will have a demanding job, and so while she was stoked about doing the given weekend routines, she felt it wouldn't be realistic for her lifestyle. In addition, Yasi is vegetarian and was worried about the accessibility of the food options mentioned in these schedules. For this prototype to be truly useful to her, the provided routines needed to be more practical and applicable to the day-to-day of her life specifically.

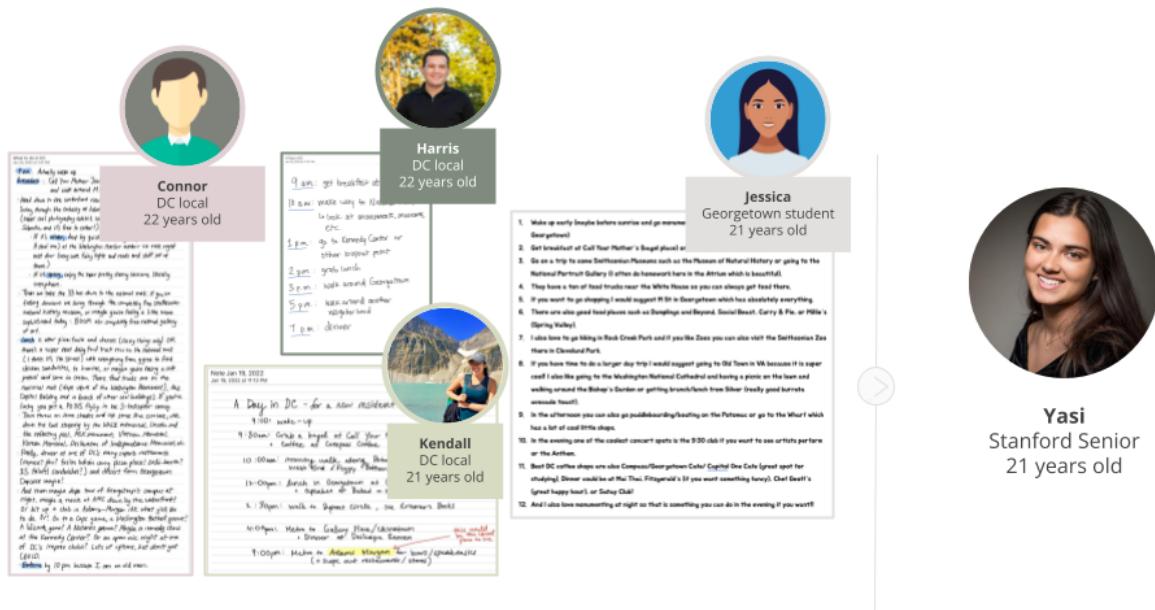


Figure 4. Photos of daily routines written by D.C. locals for our second experience prototype, Day In Your Future City.

Point of View for Mihir

- **We met** Mihir, a Senior and international student at Virginia Tech who is moving to San Diego after graduating to become a chip engineer.
- **We were surprised to notice** that Mihir is less worried about finding communities for niche activities like hang gliding and aviation than for finding communities to participate in more generic recreational activities (e.g., bar-hopping, hiking).
- **We wonder if this means** that he feels overwhelmed by the challenge of finding a tight community when there are a large number of people who could share his interests.
- **It would be game-changing to** increase Mihir's ease in finding and deepening friendships from more casual activities beyond his niche hobbies.

Inspired by Mihir: How Might We...

- ...help Mihir turn casual friendships into lasting friendships?
- ...emulate the ease for Mihir in finding niche hobby friends in more generalized recreational settings?
- ...help create an intentional community based on values and interests rather than recreational activities?
- ...make the community of people with his same generic interests seem smaller and more easy to navigate?

Solution and Experience Prototype Inspired by Mihir

Our final solution and experience prototype was inspired by Mihir's desire to find community through casual recreational activities, as well as the common anxiety expressed throughout our needfinding interviews about leaving college social communities and not knowing how to build post-grad social circles. To address this need, we brainstormed a solution to create events that a group of people want to do that align with all of their schedules. The assumption we needed to test was that people would be more willing to hang out with acquaintances if they didn't have to do the planning.

We tested this assumption via our third experience prototype, Hassle-Free Hangouts. We asked our participant, Ellena, to give us the names of three individuals she wanted to get to know better, in addition to obtaining her calendar

for the week. We then created events for Ellena and each individual she listed to do together. We texted the generated events to Ellena and asked her to accept or decline each event.

This test confirmed our assumption that people are more likely to hang out with individuals they don't know as well if there is a plan already in place for them. There was a lot of excitement around attending the majority of the curated events. However, Ellena noted that one of the individuals that she listed did not live close to her, so the in-person activities that we curated were not fitting. In addition, activities were not always personal enough in terms of cost and personal preferences.

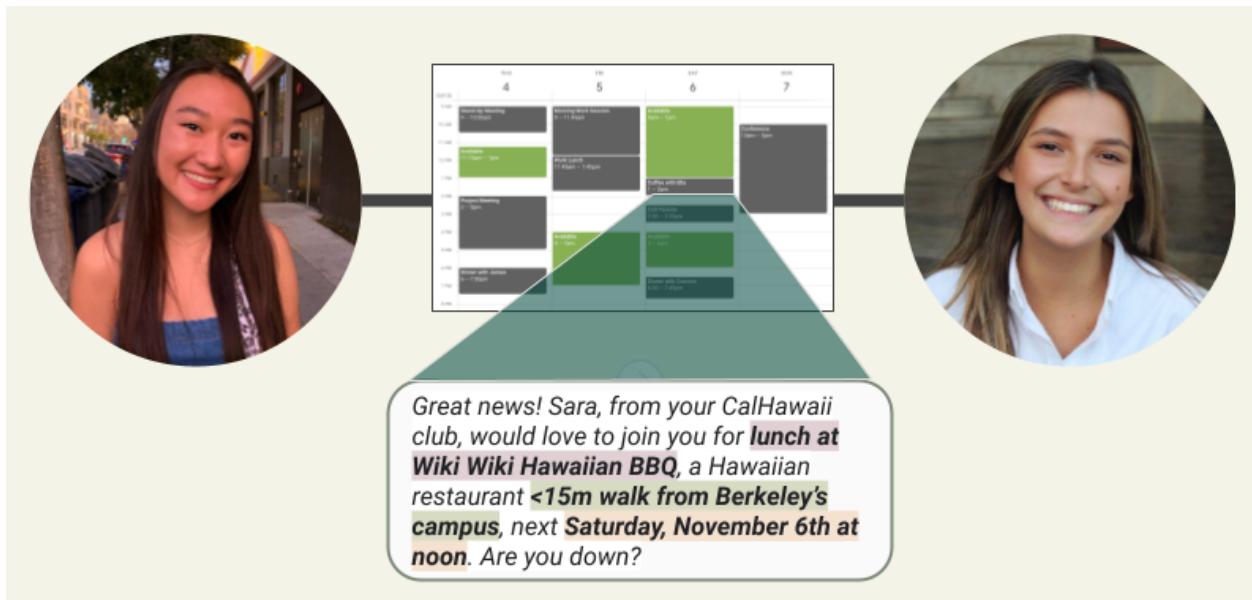


Figure 5. Photos showing our third experience prototype: *Hassle-Free Hangouts*.

Design Evolution

Final Solution

From testing our experience prototypes, we noticed that people in the post-grad transition greatly value meaningful one-to-one connections that help ground them in their post-college communities. In Experience Prototype 1, our participant found it more valuable to find and connect with one profile that he was particularly compelled by rather than perusing many profiles. In Experience Prototype 2, our participant loved how personal it was to get a glimpse of another

post-grad's daily routine, and actually wanted access to routines of post-grads even more similar to her in lifestyle and identity. In Experience Prototype 3, our participant was excited to deepen her friendship with another individual through a pre-planned hangout. This yearning to form meaningful connections with other people after leaving the structure of college, expressed throughout all of our experience prototype tests, informed the solution that we converged upon.

Ultimately, our final solution gives post-grads the tools to turn new connections into deeper friendships by generating weekly hangouts, providing tools to create and reflect on special memories, and simplifying the stressful aspects of inviting, planning, and following up with new friends.

Task Selection

Based on our solution, we identified the following key tasks in our app. These include a mixture of simple tasks, which are common tasks performed by all users, moderate tasks, and complex tasks that are performed by "power users."

Task 1: Simple

Our first simple task is: ***set your weekly hangout preferences and then accept a hangout that aligns with those preferences.*** We selected this task because it is one of the main functions that the app must support. Users must successfully set preferences for types of activities to do, number of hangouts, friends to focus on, etc., so that they can successfully receive auto-generated hangouts that align with their preferences and allow them to deepen a friendship with someone else.

Task 2: Simple

Our second simple task is: ***set your hangout preferences with a specific friend.*** We selected this task because a user must be able to set an intentional cadence of communication and hangouts with a specific person on the app. Thus, this task is essential for achieving a core goal of the app, which is to deepen a particular friendship after an initial connection.

Task 3: Moderate

Our moderate task is: ***plant an activity: post an activity that you want to do.*** In our needfinding, one of our participants emphasized his anxiety about finding people to do recreational activities with. Thus, we chose this task because while it involves more user input, it helps address the scenario of wanting to do a particular activity but not knowing who to do it with.

Task 4: Complex

Our complex task is: ***reflect on a hangout: upload photos and rate location/activity.*** While not strictly necessary, the in-app functionality of reflecting on a past hangout and documenting fun memories adds another layer of intentionality to the user experience. Allowing users to upload photos from hangouts helps users visualize the growth of their budding friendships, and rating the location and activity of the hangout helps the app improve and further personalize future auto-generated hangouts.

Initial Design

After setting the key tasks that encompass the main functionality of the app, we began our design by drawing numerous sketches (Figure 6) and storyboards (Figure 7) inspired by our needfinding and ideation. We explored how our solution could be enabled by different technological mediums like a VR app, a mobile app representation, a native tablet realization, a wearable and an AR app. Our sketches helped determine the key flow of our app, which we fleshed out through storyboards for those designs. Below are some samples of our initial sketches and storyboards:

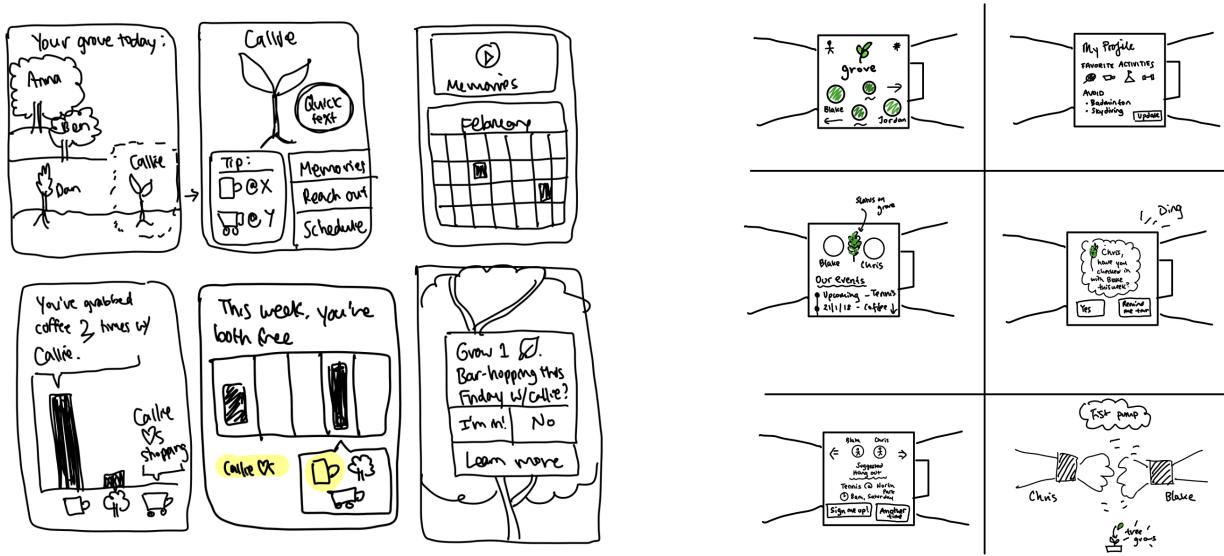


Figure 6. Sample of some sketches of the app imagined on a native mobile app interface (left) and as a wearable (right).

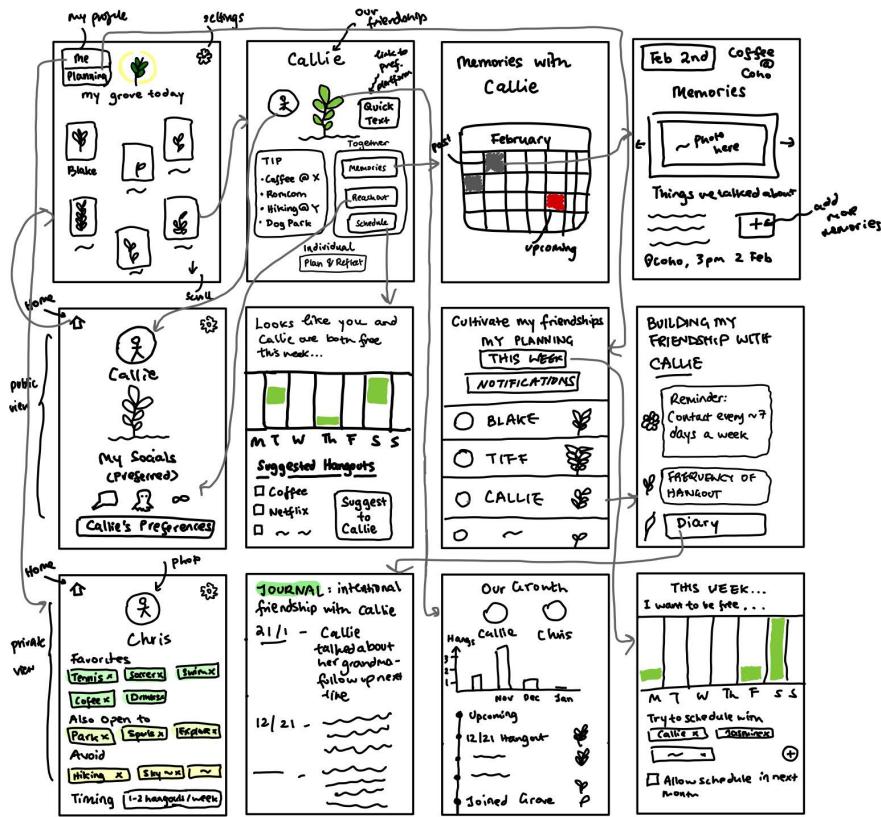


Figure 7. Storyboard for the mobile app that walks through tasks like seeing your grove of friends, seeing your friendship and memories with a specific friend, and setting preferences for automated hangouts.

Lo-fi Prototype

Creation

Following our sketching and storyboarding, we created a lo-fi prototype in Figma, a web-based interface design tool. This prototype supported the four main tasks of the app but excluded tangential features like logging in or creating an account. Because showing people high-fidelity designs can reduce the quality of usability testing feedback by losing track of the big picture, we elected to make our prototype as basic as possible. We hand-sketched the screen elements, using no color other than in our logo, and adding scribbles or “...” for non-critical text. In addition, the entire prototype is hard-coded, with functionality limited to clicking and selecting.

Key Screens



Figure 8. Key screens from our lo-fi prototype. Full task flows of our lo-fi prototype can be found in the appendix.

Lo-fi Prototype: Usability Testing

Methodology

To get feedback on our initial lo-fi prototype, we conducted usability tests via Zoom with four participants that we recruited through word-of-mouth. Three of the participants were current college seniors, and one participant had just graduated with her bachelor’s degree. The participants were from all around the U.S., pursuing different post-grad paths that ranged from academia to consulting.

During the test, we asked participants to participate in the “think-out-loud” method to verbalize their thoughts as they perform tasks, allowing us to immediately register each participant’s thought process as they interacted with our

app. We asked participants to share their screen as they went through the app, as well as to keep their cameras on and positioned close to their faces so we could capture their emotions and expressions and easily identify places of satisfaction or confusion.

Results: Task Execution

All of our participants successfully completed all four key tasks. While they were able to complete the tasks under a specified amount of time (<1 minute for simple tasks, <1.5 minutes for our moderate task and <2 minutes for our complex task), we noticed a few places of confusion and frustration, as well as some unexpected user actions. Our *medium task 3* of planting an activity (posting an activity you want to do) felt intuitive to our participants.

However, our *simple task 1* of setting hangout preferences caused some confusion, as some participants weren't sure where they ought to go in order to update their activity settings from the home screen. Some participants tried clicking on "My Profile" because of their intuition that updating settings was tied to a profile page. Others tried to click the gear button on the top right corner because of the association between the gear icon with settings, while another participant tried to click on the "Plant an activity" button to try to update her activity preferences. Most participants completed *medium task 2* of planning the cadence of deepening a specific friendship without missteps, except for one participant who clicked on the general settings gear icon instead of finding the specific friend first. Finally, our participants successfully completed *complex task 4* of reflecting on a past hangout, but a few expressed confusion about going back and forth between various screens in order to update different aspects of their reflection. We then analyzed our interview notes in order to get a better understanding of common trends.

Results: Key Strengths and Weaknesses

Generally, our users expressed enthusiasm about the app concept and mentioned the relevance of the various tasks in addressing their anxieties about building meaningful community after graduation. The concept of the app was clear to all participants: users understood the plant metaphor representing budding friendships, as well as the association between the growth of plants in the app and the strengthening of a friendship. One user even commented: "This is so cute! So,

my grove is kind of like a plant nursery of friends." As great as it was to hear our participants express excitement about the app, their questions and confusions were also extremely helpful for us to hone our app design.

We noticed that users had four main areas of confusion while navigating through the app. The first was that they found it difficult to differentiate between static settings that ought to be updated infrequently (e.g. user's email or profile picture) versus dynamic settings that ought to be updated regularly (e.g. weekly hangout preferences), as the buttons associated with these different settings were scattered across various screens and confusing to find. Secondly, some participants felt a little lost about what certain features had to do with the ultimate goal of deepening a friendship. For example, when setting their preferences regarding a specific friend, one participant expressed confusion about the slider bar labeled "Communication Reminder Frequency." This slider bar was meant to give users the option to set how frequently they'd like to receive reminders to reach out to a particular friend. However, the wording was convoluted to the participant, who remarked: "What exactly does frequency of communication reminders mean? I'm not sure what that has to do with deepening a friendship." In addition, some participants expressed that it was difficult to find to-do action items. They noted that they might not see to-do items like accepting a pending hangout or completing a reflection for a recent hangout, as they had to go through the intermediate step of navigating from the home screen to the My Hangouts screen before they could see those to-do's. Finally, while some participants loved the intentionality of reflecting on past hangouts in order to improve their experience next time, other participants expressed apprehension and confusion about the purpose of reflection. One participant asked: "Is this reflection anonymous? I don't want my friend to see this." Another participant commented: "I worry that pushing users to over-analyze their friendship might actually put too much pressure on it. It could even be a little harmful." With these insights in mind, we redesigned our app to make it more straightforward and intuitive for our medium-fi prototype.

Major Design Changes: Lo-fi Prototype to Medium-fi Prototype

Clarified Distinction between Static and Dynamic Settings on Home Screen

As mentioned above, our app features two types of settings for users to update: (1) static settings that we intended users to update infrequently such as

profile information, and (2) dynamic settings that we intended users to update frequently such as (a) their weekly hangout preferences and (b) number of times they'd like to see a particular friend per month. In our lo-fi prototype, (1) could be accessed from the settings gear, (2a) could be accessed from "Me" or "My Profile", and (2b) could be accessed by clicking on a particular friend. Users found the distinction between all of these settings and how to navigate to updating them confusing, and felt the screen had too many cluttered elements.

In our revised design, we worked to make the distinction between settings more clear. We added a hamburger menu to access static settings to match industry convention, and a home bar for users to update dynamic settings. Navigating to updating a dynamic setting navigation is made clearer by forcing the user to go through auxiliary pages associated with each setting. For example, if a user wants to update their settings for a particular friend, they will first navigate to the "Friends" screen. If a user wants to update their hangout preferences for the week, they will first navigate to a new "Me This Week" screen, detailed in the next section.

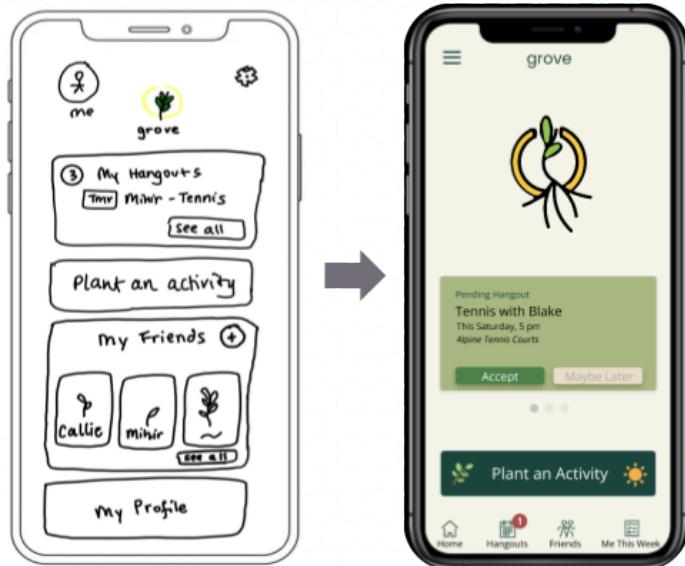


Figure 9. Home screen evolution: lo-fi to medium-fi. Differentiated user tasks more clearly in a less-cluttered design.

Created New Me This Week Page for Updating Preferences

Our intention with our original profile screen was to have a place for users to input preferences to inform hangouts generated by the app. This includes a

user's favorite activities, times they're generally available to receive hangouts, and how far they're willing to travel from home for hangouts. The name "My Profile" on other platforms is typically associated with static settings, things users are changing less frequently like their username, password, and personal information. As users will likely update their hangout preferences more frequently than these static settings, it was confusing that these were on a My Profile page. We had all of the preferences able to be updated in one view, which users found to be cluttered. Lastly, users found the distinction between where to update individual preferences (favorite activities, availability, etc.) versus preferences associated with a friend (i.e., how often they'd like to hang out with a particular friend on the app), unclear.

To address feedback on our original profile screen, we created a new Me This Week page for users to update their weekly hangout preferences. Language on this page, including "Me" and "I", makes it clear that this is the place for the user to update *individual* preferences. This distinguishes actions on this page from updating preferences associated with a friend on the app. Lastly, to simplify the initial view, we added popups for changing preferences in each category—activity, availability, location—rather than having all of the fields to change visible at once.

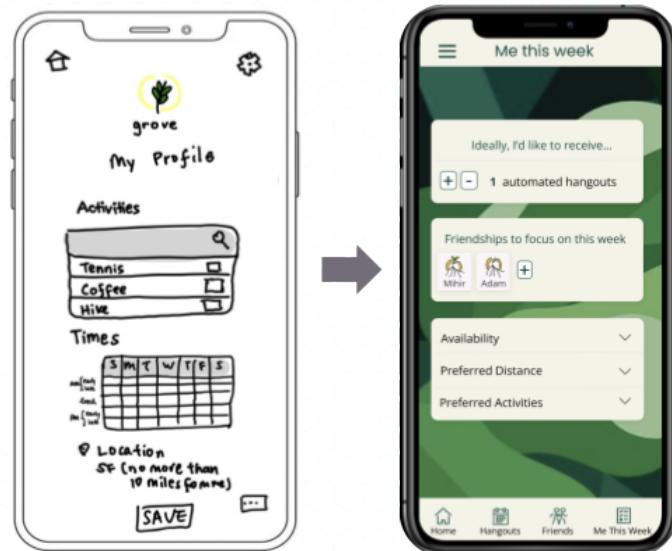


Figure 10. Profile screen evolution: lo-fi to medium-fi. Added clear language to establish this page as a location for updating Individual preferences.

Modified Language on Friend Screen to Lower Stakes of Relationship

We created a friend screen where users can see information on and update preferences for a particular friend on the app. The main feature of this page is for users to update a “hangout frequency” to inform the number of hangouts the app will generate for the user and that friend. Users found the language “hangout frequency” confusing. Increasing “frequency” of a friend felt sterile and not clearly tied to deepening a friendship with that person.

In our updated design, we clarified the language for setting hangout frequency preferences with a friend. “Ideally, I’d want to hang out with Callie” makes it clear that this number is referring to the number of times the user wants to hangout with Callie, their friend on the app.

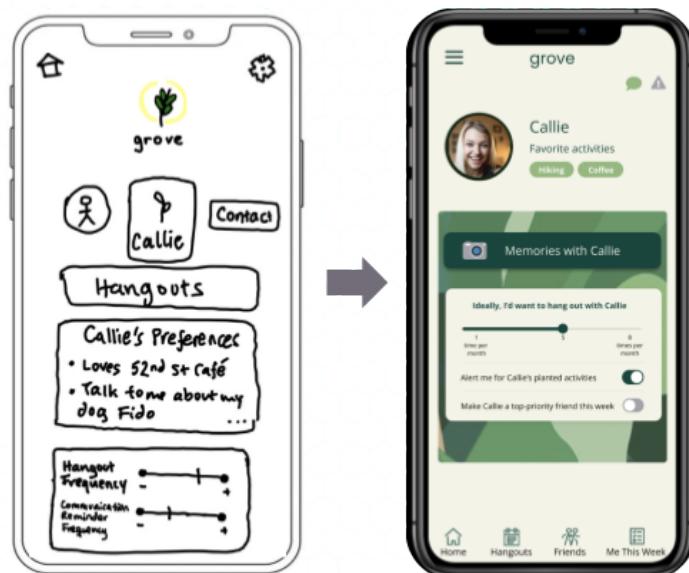


Figure 11. Friend screen evolution: *lo-fi to medium-fi. Updated language surrounding hangout frequency to ease confusion.*

Reimaged My Grove Layout to Boost Creativity

The My Grove screen allows the user to view all of their friends at once and navigate to particular friend screens. In our feedback, we got an overarching comment that none of our screens were novel in layout, and that there was room for creativity. Thus, we worked to come up with a more creative layout for the My Grove screen. We went from a traditional, simple grid-layout to making each friend look like leaves on a plant. This out-of-the-box layout furthered the plant metaphor associated with our app.



Figure 12. My Grove evolution: lo-fi to medium-fi. Created a new layout to further plant metaphor and enhance visual creativity.

Revised Reflection Flow to Focus on Positivity

We created a series of screens for users to reflect on hangouts they participate in. Users reflect on the hangout itself, the interaction with the friend the hangout was with, and the location and activity of the hangout. This is to both inform Grove of what hangouts they should plan in the future for the user, and for users to be able to look back on memories from their past hangouts and visualize their growing friendships.

We received the greatest amount of negative feedback on this reflection cadence. Users found reflecting on an activity uncomfortable; it felt weird to analyze a hangout. Some users worried that if the hangout went poorly, forcing them to think about this fact could result in feeling negatively about the friendship itself. Users also worried that the reflection was not anonymous, concerned that friends may be able to find out if they indicated they didn't like a hangout with them. Lastly, users found the amount of things to reflect on overwhelming. It made the hangouts feel high stakes and it was not clear how the information would be used to inform future hangout generation in the app.

In our revised design, we removed aspects that felt like the user was reflecting on a friend entirely. The only part of the reflection that is associated with a friend that we kept was the option to upload a photo from the hangout. This, in conjunction with making the upload photos button take up a larger portion of the

screen, worked to encourage reflecting on positive aspects of a hangout rather than overthinking it. We also cut what the user is reflecting on to inform future hangout generation. Users now only reflect on the location and activity of a hangout, based on how they felt about these aspects. This simplified reflection based on emotions works to lower the stakes of the reflection task. Reflecting on how the user *felt* about a hangout is less stressful than saying they definitely did or did not like it.



Figure 13. Reflection flow evolution: *lo-fi* to *medium-fi*. Removed screens and some reflection tasks to lower stakes of hangouts.

Deepened Plant Metaphor Usage on Plant an Activity Flow

The Plant an Activity page is for users to create their own hangouts on the app for other friends to accept. Users found the layout to be boring as it looked like a traditional form. We worked to come up with a more creative layout that further played on the plant metaphor, staying true to the name of the screen. To do so, we turned the single screen into a longer flow, with each step of the process of

planting an activity (choosing an activity, a location, a time, and friends to make the hangout available for) appear to be a step in planting an actual plant (digging a hole, planting seeds, watering the seeds, watching the plant grow under the sun).



Figure 14. *Plant an Activity evolution: lo-fi to medium-fi. Expanded flow across multiple screens to further plant metaphor and enhance user experience.*

Major Design Changes: Medium-fi Prototype to Hi-fi Prototype

After we built our medium-fi prototype, a few of our peers conducted a heuristic evaluation of our prototype in order to uncover usability issues. They evaluated the prototype along thirteen heuristics (see appendix) and compiled a report that included 47 violations that ranged in severity level from 1 to 4. We first addressed major violations, those of severity 3 or 4, before addressing minor violations of severity 1 or 2. The most notable design changes are detailed below, organized by screen and severity of violations addressed. Images of our full task flows from our medium-fi prototype can be found in the appendix.

Me this Week: Addressing Major Violations

- **H10. Help and documentation (Severity 3)**

- **Problem:** "I" statements on Me This Week led to confusion around how strictly the app would honor a user's preferences when generating hangouts.
- **Solution:** Added a note at the top of the screen that lets users know Grove will do its best to honor their indicated preferences, but it's not guaranteed.

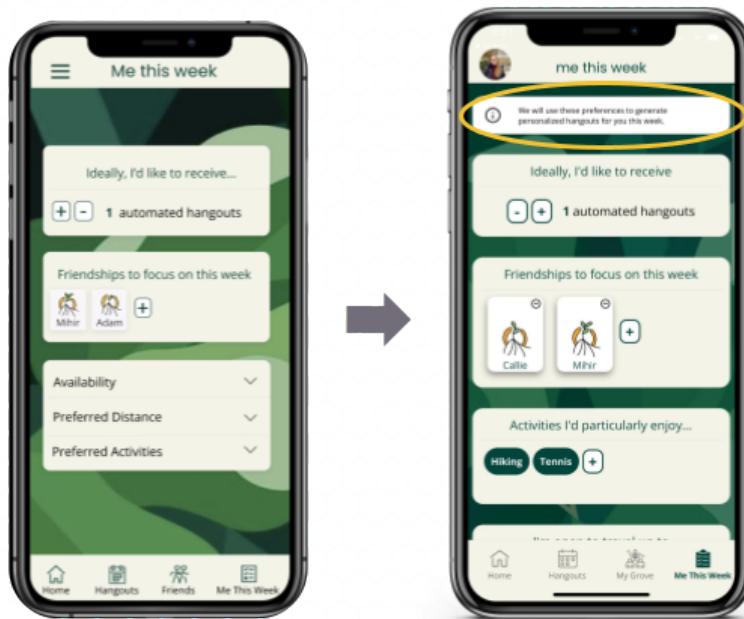


Figure 15. *Me This Week evolution: medium-fi to hi-fi. Major design changes alleviate confusion around Grove's use of preferences to generate activities.*

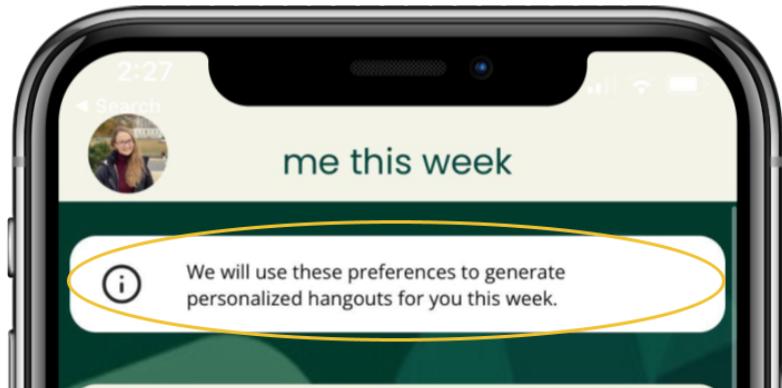


Figure 16. *Close up of added info card to clarify how preferences are used by Grove.*

Me this Week: Addressing Minor Violations

Smaller changes to Me This Week to address minor violations ensured consistency throughout the app and with industry convention. For instance, we moved the "+" for adding a top-priority friend and activity to your preferences to the right-hand side of selections to match industry standard. We added "-" to the top of each friend card so users could remove friends from being top-priority friends.

To make selections easier for users to view, we made fields into separate cards instead of nested drop downs. The scrollable screen ensures the screen is never cluttered, a critique from our lo-fi prototype user tests. For the availability selection, we made the card look like When2Meet for a more recognizable convention.

Lastly, we added an "Update Preferences" button to the bottom of the screen that is grayed out until the user makes a change, and green when the user has updated their preferences. This provides feedback to the user that they have done an action correctly. We implemented a similar style save button across other pages in the application.

Hangouts: Addressing Major Violations

- **H11. Accessible (Severity 3)**

- **Problem:** On the past hangouts page, where users can reflect on and view past hangouts, "Reflect" and "View" buttons failed color different and color contrast tests.
- **Solution:** Modified the colors of the buttons to ensure greater contrast between the button color and text color.

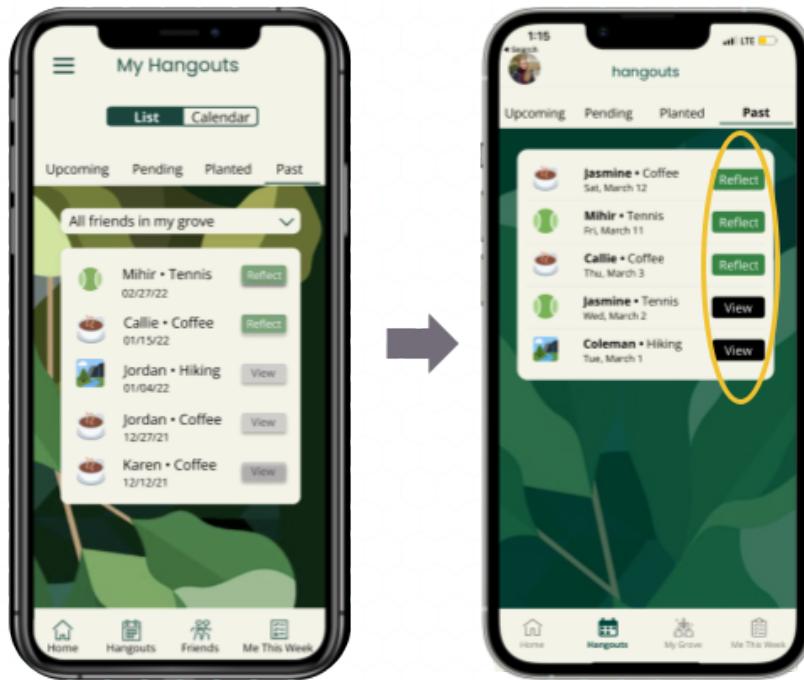


Figure 17. Hangouts evolution: medium-fi to hi-fi. Major design changes adjust colors on Reflect and View buttons to increase contrast.



Figure 18. Close up of new Reflect and View buttons on hangouts page in hi-fi.

Hangouts: Addressing Minor Violations

To address minor violations, we changed the background of the screen to be in a color palette that more closely matched the rest of the app. We originally wanted to add variety among the backgrounds for a more interesting visual effect, but this was not well-received in our evaluation. In addition, we added a place for the user to be able to edit an activity that is upcoming or planted from the activity screen. The intention is that users would be able to decline upcoming hangouts they've already accepted if they are no longer interested in or able to make the hangout, or edit an activity they've planted (change the activity, location, date, time, or friends able to accept the activity) before it's accepted by someone in their grove.

My Grove: Addressing Major Violations

- **H8. Aesthetic and minimalist design (Severity 4)**

- **Problem:** Scattered layout for the My Grove addressed critiques of our lo-fi prototype layouts being too simple and boring, but it was found to be too confusing and did not clearly enhance the design.
- **Solution:** Went back to a simplified grid layout with a vertical scroll that more closely mimicked our lo-fi prototype. Kept the plant background (with minimal number of colors for simplicity) to keep some visual interest from the medium-fi iteration of this screen.



Figure 19. *My Grove evolution: medium-fi to hi-fi. Major design changes adjusted background and layout for a more sleek visual design.*

My Grove: Addressing Minor Violations

We referred to friends in the app inconsistently—the friends page was titled “My Grove”, but to navigate to this page the user had to click on “Friends” in the home bar. Thus, we standardized all related languages to “My Grove” across the app.

Reflection: Addressing Major Violations

- **H13. Value alignment (Severity 4)**

- **Problem:** Although we implemented design changes in our medium-fi prototype in an attempt to alleviate concerns around hangout reflection information being shared with friends, it was still unclear what information was just for you, conflicting with our intended value in privacy.
- **Solution:** Added text clarifications to make it extremely clear that the reflection is just for the user to see.

Reflection: Addressing Minor Violations

Some of our prototype's minor violations surrounded confusing language in the reflection flow. To address this, we changed "Reflect" to "How did you feel about this hangout?" to make it super clear that the user is reflecting on their emotions towards particular aspects of the hangout. This worked to more explicitly justify the use of an emoji rating scale. In addition, we added a few features to provide the user with more flexibility and feedback during the reflection process. This included the option to delete photos you've added to the app, and a save button to let the user know when their photos, captions and ratings have been acknowledged by the app.

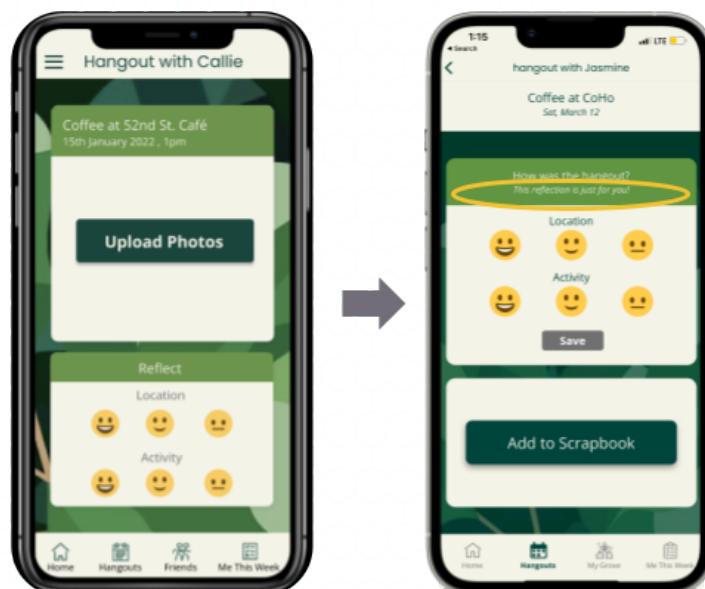


Figure 20. Reflection evolution: medium-fi to hi-fi. Major design changes adjusted background and layout for a more sleek visual design.

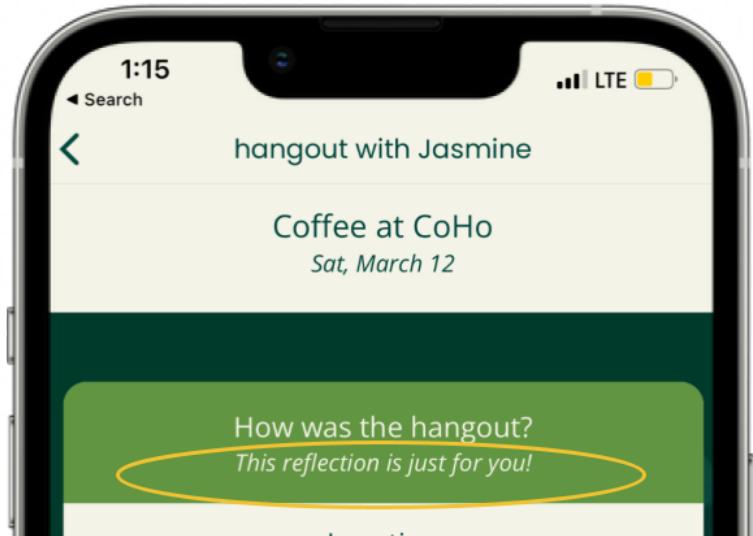


Figure 21. Close up of new text to alleviate privacy concerns surrounding reflection task.

Plant an Activity: Addressing Major Violations

- **H3. Consistency and standards (Severity 4)**
 - **Problem:** Users could not edit an activity once they've planted it.
 - **Solution:** Added an additional final screen before planting the created activity that allows users to edit their selections.
- **H4. Consistency and standards (Severity 3)**
 - **Problem:** Input fields were not in the same place so users found it confusing to type in different places for each part of the flow.
 - **Solution:** Made each selection area larger and centered in the screen.
- **H10. Help and documentation (Severity 3)**
 - **Problem:** No options for input fields made users unaware of how specific they should be in choosing an activity, location, and time.
 - **Solution:** Provided clear options for each of the selection areas.

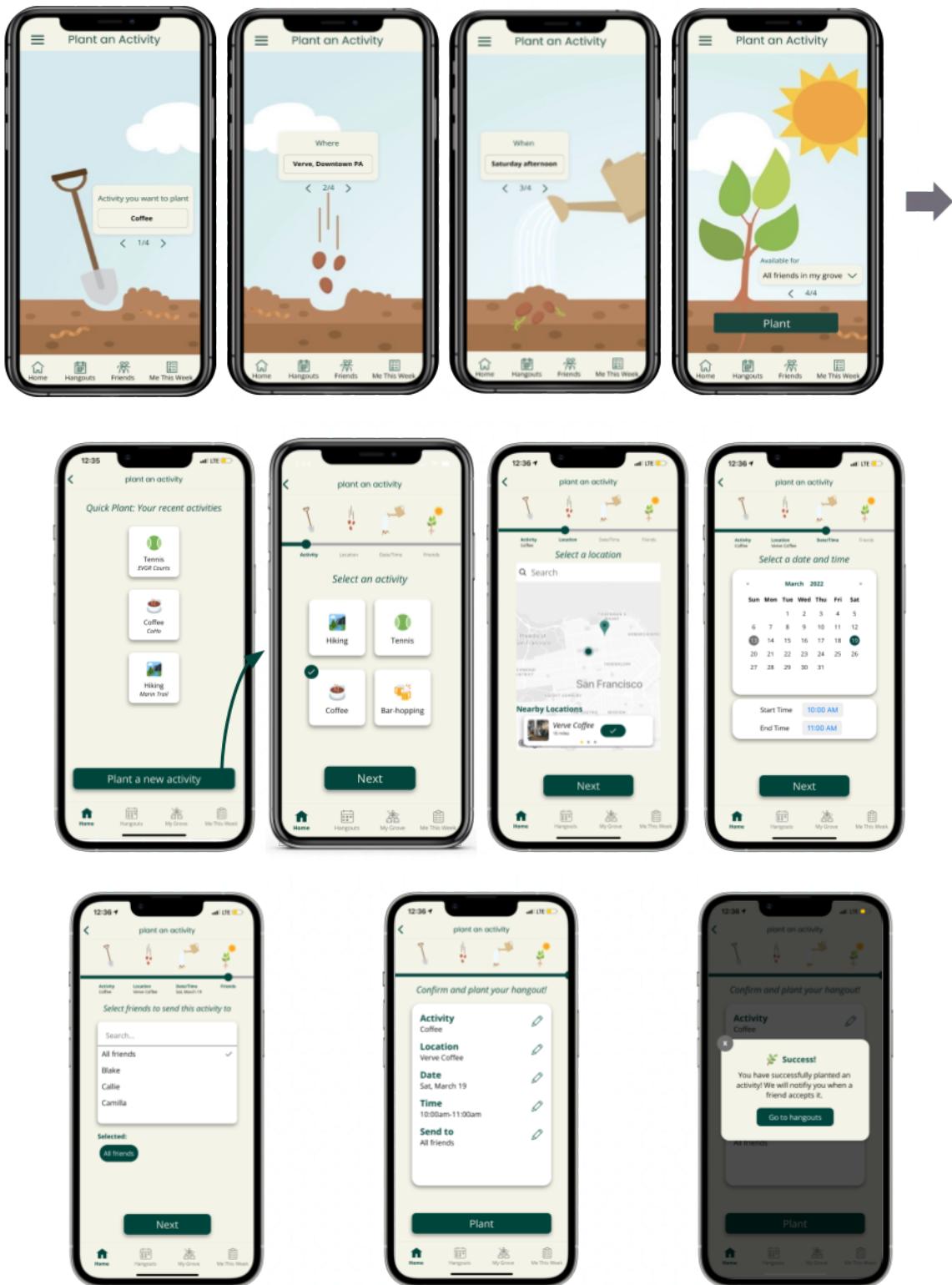


Figure 22. Plant an Activity evolution: medium-fi to hi-fi. Major design changes added clear choices for each step and flexibility for user to edit selections before planting.

Plant an Activity: Addressing Minor Violations

In our medium-fi iteration of the plant activity flow, we attempted to make the screens more visually interesting by making it seem like the user was planting an actual plant by going through the steps of “planting an activity”. While evaluators like the usage of the plant metaphor, backgrounds were found to be confusing. Thus, in our hi-fi prototype, we made the style of the screens mostly cream and put the icons associated with planting a plant at the top of the screen. This upheld our original way of implementing the plant metaphor in this flow, while not making the aspect too visually distracting.

As users found the flow to be long, particularly for activities they are planting frequently, we added the option for users to plant an activity they’ve recently done in addition to the option to plant an entirely new activity.

To provide the user with more positive feedback, we added a progress bar that shows the user where they are in the flow as well as their current selections. Lastly, we implemented a “Next” button at the bottom of each screen that is grayed out until the user has made a valid selection.

Addressing Additional Minor Violations

We made a few design changes addressing violations that stretched across multiple screens. This included increasing text size to improve readability, standardizing drop shadows and capitalization across elements, and adding back buttons to screens not accessible from the home bar to differentiate sub-screens from main screens. We also added a few features to match industry standard, such as moving all iterations of “Accept” buttons to the right of “Maybe Later” (decline) buttons, bolding the icon on the bottom bar in a distinct color to make it easier for users to see where they are in the app, and swapping the hamburger menu out for a profile picture as it leads to a profile page.

Hi-fi Prototype

As detailed above, we built our hi-fi prototype incorporating design changes from our heuristic evaluation. Below are the task flows as reflected in our high-fi prototype:

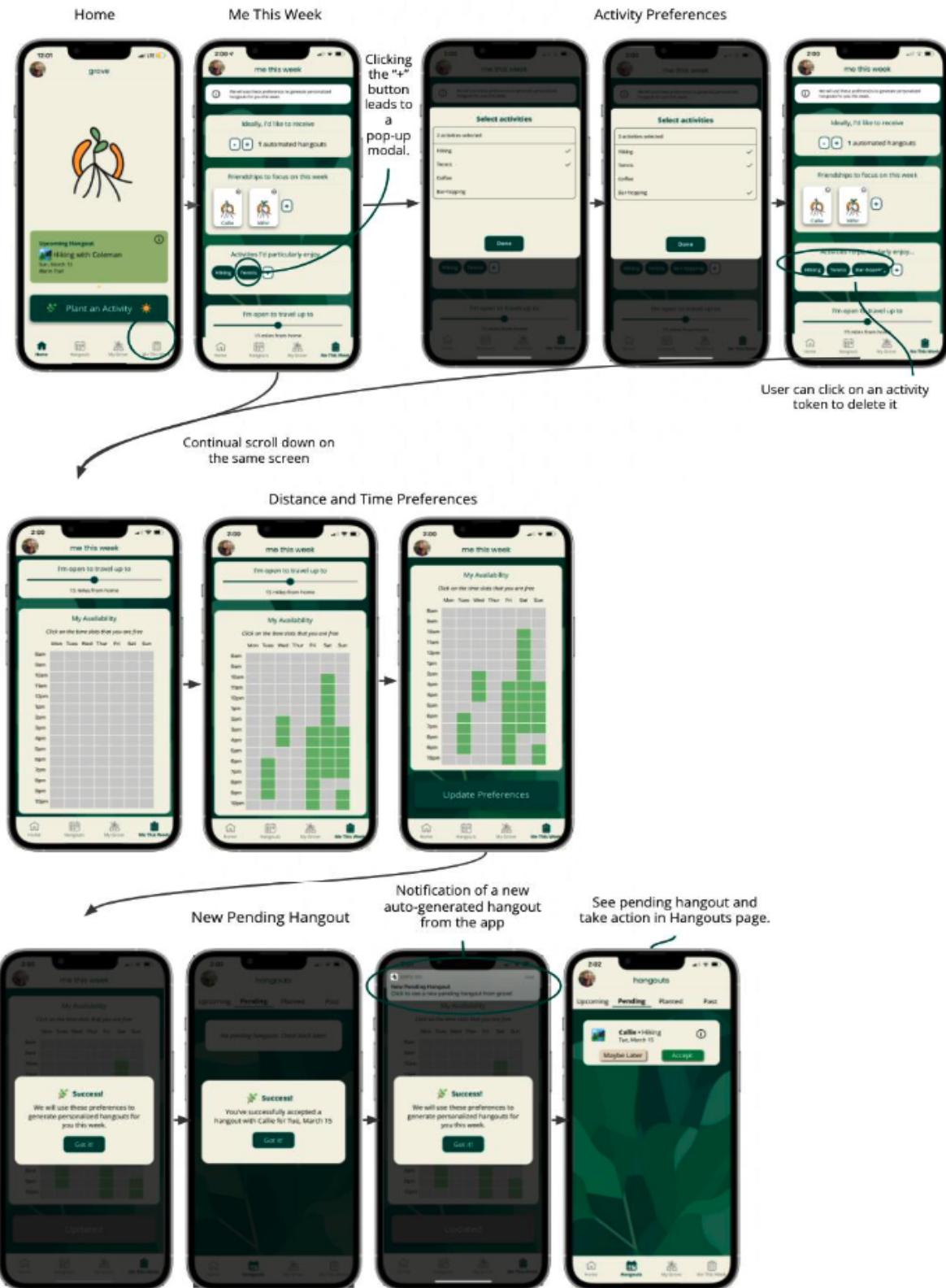


Figure 23: Flow for setting your weekly hangout preferences and then accepting a hangout that aligns with those preferences (task 1).

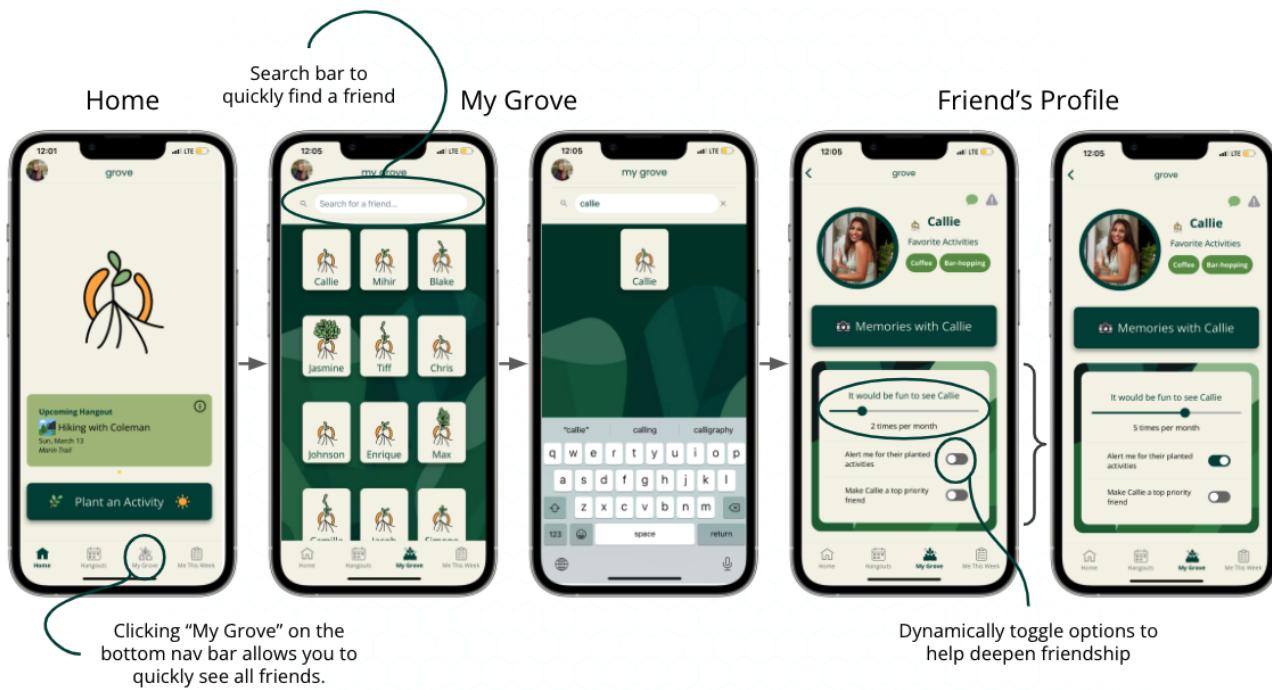


Figure 24: Flow for planning an intentional cadence of future communication and hangouts with specific individuals in your grove (task 2).

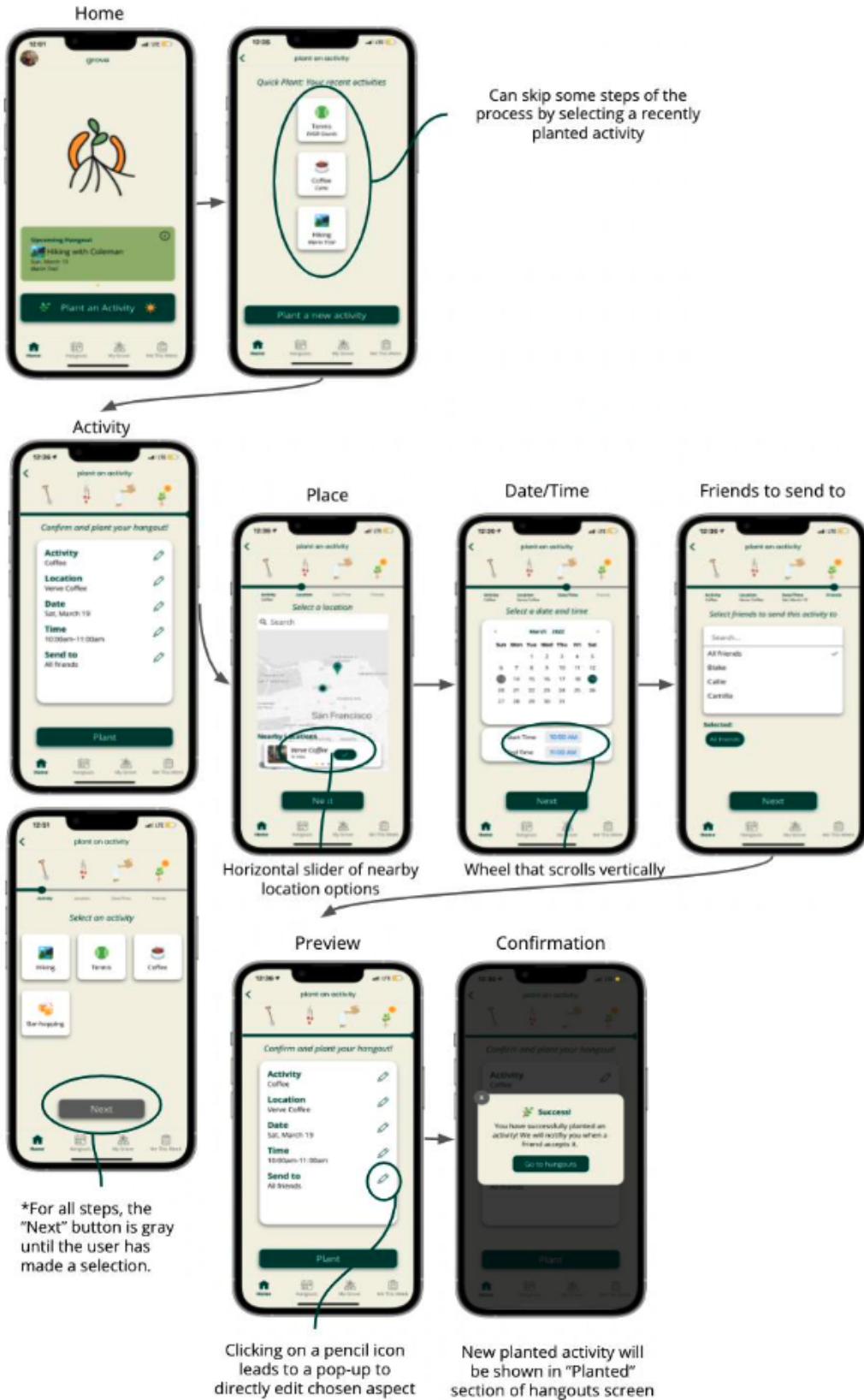


Figure 25: Flow for planting an activity—posting an activity that you want to do (task 3).

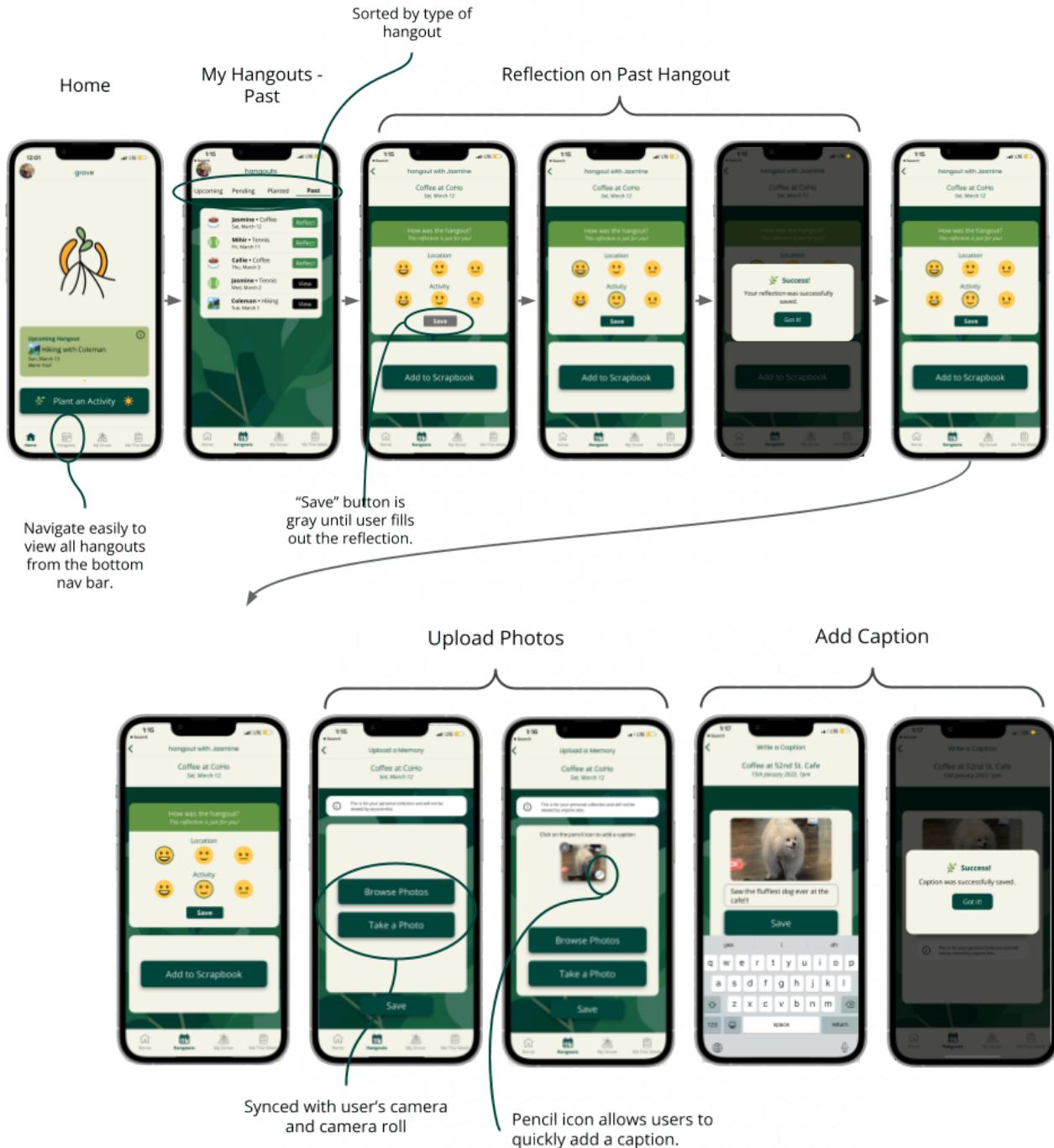


Figure 26: Flow for reflecting on a hangout: uploading photos and rating location/activity (task 4).

Values in Design

All throughout the process of designing the app, from the initial sketches to the final high-fi prototype, we wanted to be intentional about the values that we were encoding into our design. Design decisions are indicative of the social values of the designers, and we used the values in the design framework in order to shape our app design to resonate with a wide range of users and their use cases in context. We identified six main values to embed into our product features listed below.

Identified Values

Consistency

An important value of the app is consistency in following up on new friendships. For example, we implemented a sprout icon for each friend in the app that dynamically “grows” as a user hangs out more with that particular friend (Figure 27). This design choice incentivizes users to follow up with new friends and use the app more consistently to plan regular hangouts, as users can make their friends’ plant icons sprout and grow larger over time by using the app more.

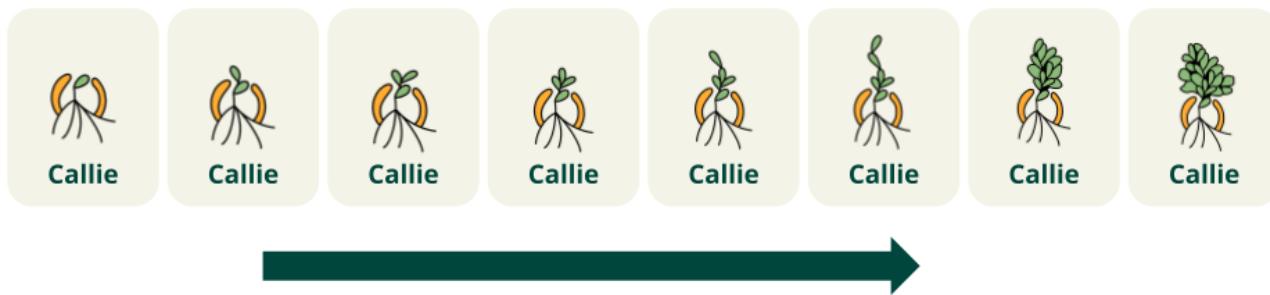


Figure 27. Evolution of a friendship over time, represented in the app by a growing sprout icon.

Respect

Respect new acquaintances and friends through meaningful contact and planning. In order to encode respect for others into the app, we do not offer any functionality that may induce disrespectful interactions between users on the app, such as rating another person. The app keeps things positive by only allowing users

to rate locations and activities, as well as encouraging people to add positive memories with their friends to their scrapbook.

Authenticity

Another crucial value is being authentic to oneself and one's interests and desires is key to building meaningful friendships with others. To address this value, we designed the app to include many options for personalization: in taking users' activity preferences and their feedback about their previous activities into account, the app tailors its generated activities to help users feel great and comfortable in their skin when hanging out. We also decided to design each friend profile to be focused on friendship rather than a standalone personal profile. The only personal information on each profile is the profile photo and the user's favorite activities. Everything else on a friend profile, from the "Memories" button to the preferences box, is related to the user's friendship with their friend. The minimal standalone information on each profile thus reduces the pressure on users to curate their profiles as they might do on social media platforms like Instagram or Facebook.

Intentionality

Intentionality is another significant value of the app: we wanted users to reflect on and actively plan how they wanted to build a friendship. We encoded this value with our functionality that allows users to think about and select the specific friendships they want to intentionally grow per week. In addition to selecting friends to focus on in the Me This Week screen, users can also navigate to any individual friend in their grove and change the frequency of their hangouts with the friend, as well as choose to receive notification alerts for when their friend plants an activity that they want to do.

Privacy

Being mindful of user data that is stored in the app and shared with others is important. We embedded privacy in the final design of the app by clearly stating to the user what types of data are just for them: whenever the user uploads any photos to their scrapbook, the app displays an info box that clarifies that any uploaded photos will not be shared with anyone else in the app. In addition, there are very few options to include information that users might not want other people

to see: for example, because users are asked to explicitly reflect only on the location and activity of a past hangout, they are never prompted to rate anything interpersonal that may elicit feelings of awkwardness or anxiety. Lastly, each user profile includes only a profile photo and preferred activities in order to preserve personal privacy.

Healthy Use of Technology

We want to promote healthy technology usage that empowers friendships without being the sole form of interaction between users. By auto-suggesting a diverse range of activities like tennis, bar-hopping, and coffee, the app actively encourages people to meet in person as opposed to virtually. In addition, the app does not provide any tasks for users to complete during a hangout—the app only receives user input before and after a hangout so that they can immerse themselves fully in having fun and getting to know a friend during a hangout.

Conflicting Values

Considering these six main values led to value conflicts, which often arise due to value pluralism, or the recognition that different values often matter equally to us. We identified two main value conflicts for our app and strove to address these conflicts in a conscientious and responsible way.

Respect vs. Consistency

Optimizing for consistency in following up on new friendships can conflict with respecting the other user's boundaries. For example, what if one person wants to hang out more often than another person? To address this potential conflict, we crafted the language of our app very carefully to set the expectation that each user's preferences would be taken into account but not guaranteed to be fulfilled. For example, the app text accompanying the slider that users toggle to set their preferred frequency of hangouts with a specific person is "It would be **fun** to see [friend] [number] times a month." In addition, when setting their weekly preferences, users are prompted to set their preferred number of hangouts with "Ideally, I'd like to receive [number] automated hangouts." The use of words like "Ideally" and "It would be fun to..." indicates to users that while their preferences are taken into consideration, they are not guaranteed. This way, the app ensures that every user's

boundaries and preferences are equally respected. We also implemented a block/report button for every user profile so that if anyone behaves inappropriately or disrespectfully, a user can cease all communication immediately.

Respect vs. Intentionality

While reflecting on a recent hangout with a friend can help users be more intentional about cultivating the friendship, it may also lead to over-analysis of a friendship or an unnecessarily critical evaluation of a new friend. We preserve respect for others in the app while encoding intentionality by framing all user actions that involve other users in a positive, growth-oriented manner. We use language like “It would be fun to” and “Friendships to focus on” so that users stay focused on the positive, fun elements of building friendships. The app still promotes intentionality in building friendships by prompting users to upload and add captions to photos from hangouts, but it never allows users to reduce other people or interactions with other people to a rating on a scale.

Final Prototype Implementation

We utilized a variety of applications and techniques to build our hi-fi prototype: a functioning mobile application. Details of this technical implementation process are below.

High-fi Prototype Creation

We built our prototype primarily using React Native, Redux, and Expo. Our development team chose React Native because it allowed us to quickly build a cross platform application and due to extensive previous experience with the framework. Using Redux allowed us to handle state management across all components in the app in an intuitive manner. Expo gave us a development environment so that we could easily test our code on actual devices and share progress with our team. In addition, we used Github for code collaboration and version control, Figma to workshop and easily visualize design changes, and Notion to track task completion.

Hard-Coded Data & Limitations

We were able to implement all 4 primary tasks of our application. Since all of these tasks occur in the context that a user already exists and has friends on the platform, our prototype operates under the assumption that a user has already created an account and added several of their friends. Because of this, we decided to hard-code several of these initial components of a user's profile. This includes:

- The user profile image, name, favorite activities and other profile information
- The user's friends, their images, names, and favorite activities
- Several upcoming, planted, and past hangouts that the user has already accepted, created, or completed

Another important part of the app that was hard-coded was the activity and location search functionality. A completed application would support users with a wide range of activity preferences, but for the purposes of this prototype, we limited the activity selection to be between four activities: Tennis, Hiking, Coffee, and Bar-hopping. We also did not have the technical bandwidth to implement full integration with external apps like Google Maps and Google Locations in order to support the complete "Choose a location" feature that allows users to type in any location in the search bar and look up any location on the map. Instead we built a basic integration with Google maps and hard-coded a few sample locations (ex: "Verve Coffee", "Marin Hiking Trail") to give the illusion that this feature does exist.

"Wizard of Oz" Techniques

One fundamental backend component of our app is the algorithm that automatically generates weekly hangouts for their users based on their and their friends' weekly preferences. As our prototype only worked in the context of one demo user, and because we didn't have the technical bandwidth to build out this full AI algorithm, we used a "Wizard of Oz" technique to give the illusion that this algorithm exists in the backend. This illusion works by simply creating a notification and generating a new pending hangout with a mock friend for a user based on the user's selections in "Friends to focus on this week" and "Preferred activities for this week" on the Me This Week screen. As soon as the user clicks "Update Preferences",

this "Wizard of Oz" pending hangout is automatically created and added to their list of activities.

Summary & Next Steps

Key Learnings: Design Thinking Process

This quarter, we learned a great deal through the design thinking process about designing truly usable and appealing products. Three core learnings detailed below stand out to us.

Empathize with Real Users

Firstly, we learned how crucial it is to listen and empathize with real users at every step of the design process, from needfinding to usability testing and more. Interfacing directly with people was immensely valuable in understanding their needs and desires, and so many key features of our app were designed and implemented as a direct result of people's expressed needs. For example, we designed the Plant an Activity feature after hearing people's frustration at knowing what activities they wanted to do but not knowing who to do them with. We landed upon auto-generated hangouts in order to reduce the anxiety that post-grads were currently experiencing when trying to get to know someone new, and so on.

Utilize Robust Testing and Evaluation Techniques

Our second key learning from the design thinking process is the importance of using different types of user testing and evaluation for getting truly robust and diverse design feedback. User feedback from usability testing of our low-fi prototype, for example, yielded different types of insight compared to the results of heuristic evaluations of our medium-fi prototype. Our usability tests helped us streamline the flow of each task, while the heuristic evaluations helped us workshop the effectiveness of important screen elements like button size, in-app text, and error handling.

Iterate Intentionally and Consistently

Finally, we learned about the power of iterative design and consistent testing at every stage of the design process. Looking back at the first few sketches of our tasks and mapping our journey from that to the final high-fi prototype, we can clearly see the connection between our design choices and our insights from iterative user testing.

Key Learnings: Easing the Post-grad Transition

Through developing Grove, we learned a lot about what elements of creating friendships post-grad are most important. In college, people build friendships over 4 years of living, working, and studying with their peers. After graduating, post-grads are suddenly away from these close friends and have to start building friendships from scratch without the shared structure of college. Though post-grads ultimately want to build friendships of similar depth to their college friendships in their new communities, we found that putting too much pressure on new friendships could be detrimental to these relationships. It is important that building new friendships feels low-stakes and natural.

Our initial designs focused too heavily on helping post-grads deepen friendships as quickly as possible—asking users to reflect on multiple aspects of their hangouts and relationships to optimize how and with whom they spend their time with in the near future. This led to users overthinking the relationships, and feeling overwhelmed by the pressure of making their friendships “successful” after only a few interactions. Due to this, our final design works to help post-grads deepen friendships without putting too much pressure on these new relationships. This balance is extremely important for post-grads navigating making new friends in their new communities. Thus, we worked to achieve this in our design through minimal reflection task items and focusing on positive aspects of a friendship.

Future Work

There are multiple directions we would like to take this project going forward. On the implementation side, we would like to expand the domains of activities offered on the app and increase integration outside of the platform (e.g. through calendar and contacts integration). Additionally, we want to make the “low-stakes” interaction of adding someone on Grove a joyful and seamless

experience so we would want to design a simple friend addition process, perhaps with haptic features. We would also like to implement the stable matching algorithm which generates hangouts for friends on the app.

On the design side we'd like to explore further how our app could make users even more empowered in growing a friendship: perhaps scrapbooks of memories could combine to form albums that the friends could share with each other. Additionally, there are multiple edge cases to be explored: e.g. how do I give people automated suggestions if others on the app are not prioritizing me? How do we balance wanting to hang out and grow friendships more with how busy a user is in general? Exploring these questions through further user research could deepen the impact and long-term usability of the app.

Final Remarks

Thank you for coming along on Grove's design journey. Creating this project was an incredible experience—from conducting needfinding interviews, to brainstorming solutions, to developing and iterating on our final product. To see additional details on our design process and try our final prototype, check out <https://hci.stanford.edu/cs147/2022/wi/projects/EasingLifeTransitions/grove>.

Finally, we want to thank Professor Landay and our Course Assistant Morgan Zagerman for their expertise and support throughout this process.

Appendix

Low-fi Prototype: Task Flow Screens

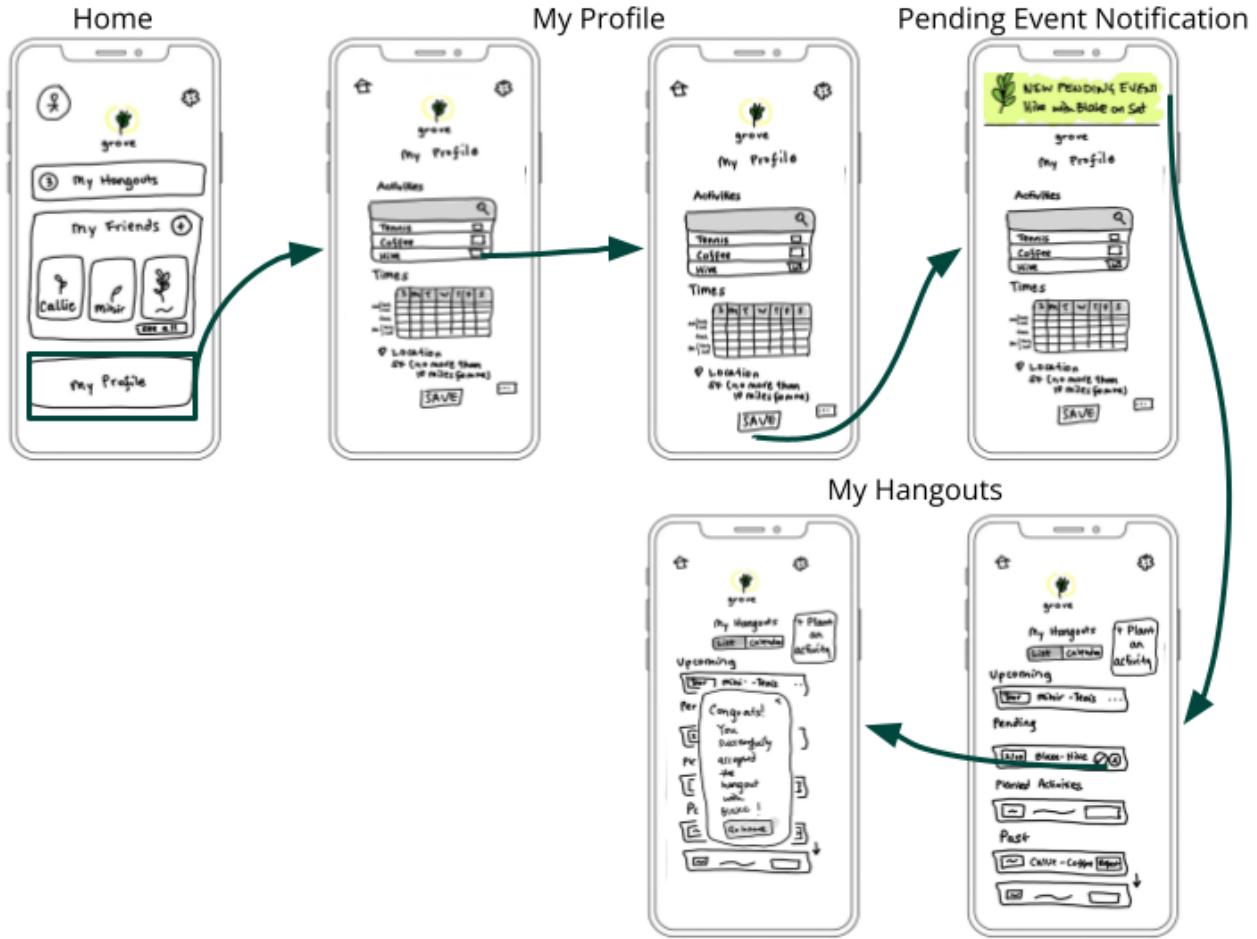


Figure 28: Flow for setting your weekly hangout preferences and then accepting a hangout that aligns with those preferences (task 1).

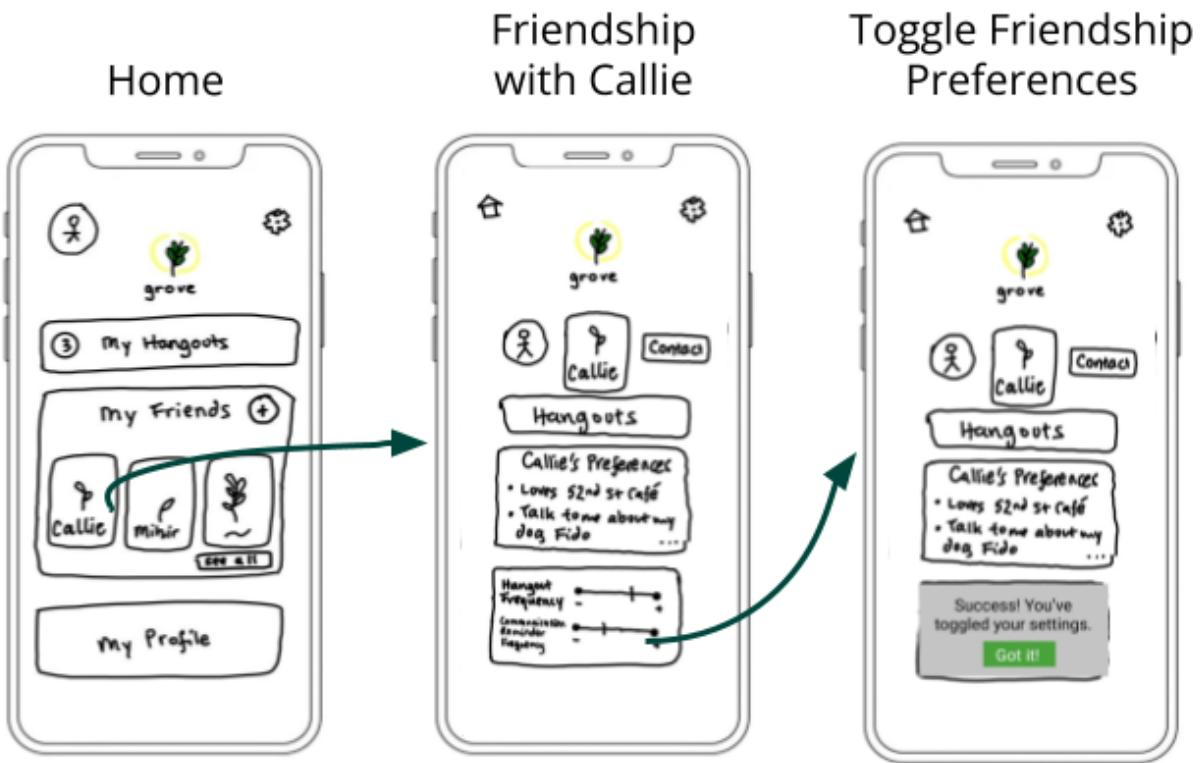


Figure 29: Flow for planning an intentional cadence of future communication and hangouts with specific individuals in your grove (task 2).

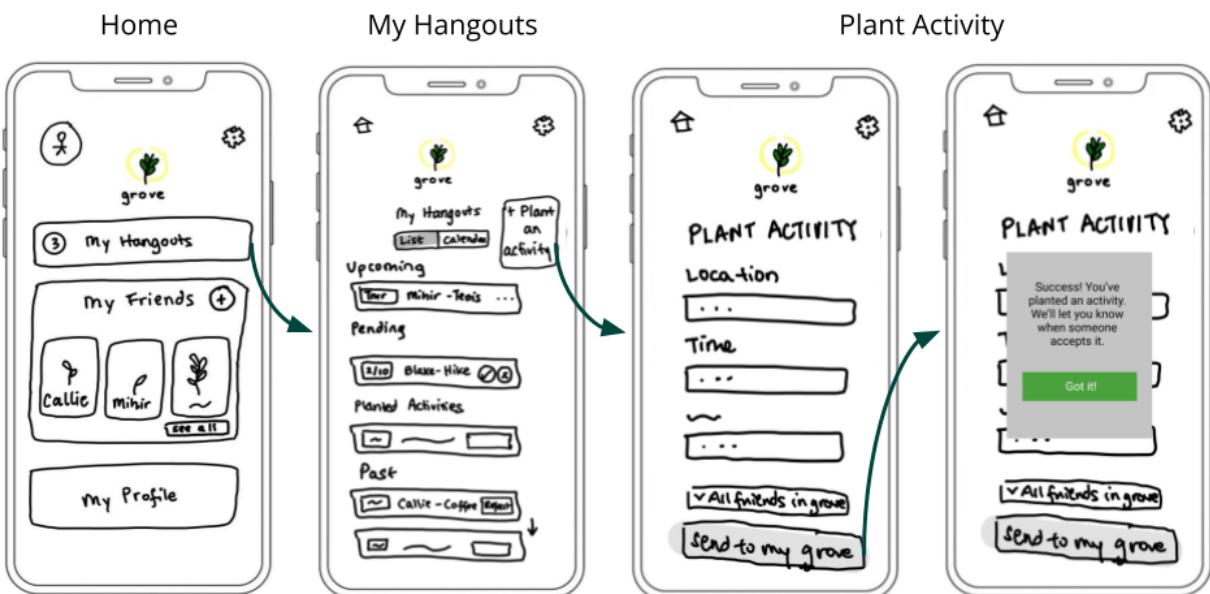


Figure 30: Flow for planting an activity—posting an activity that you want to do (task 3).

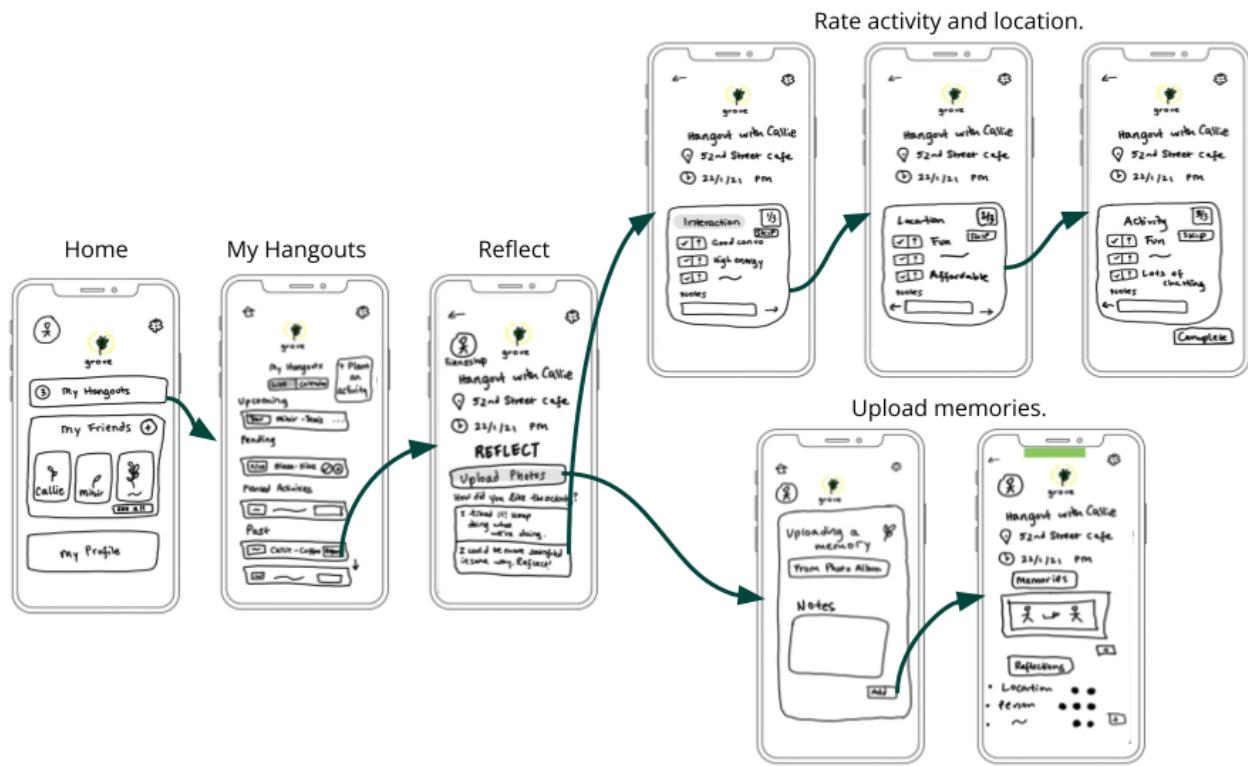


Figure 31: Flow for reflecting and reporting on the successfulness of a hangout across various aspects - activity, location, person (task 4).

Medium-fi Prototype: Task Flow Screens

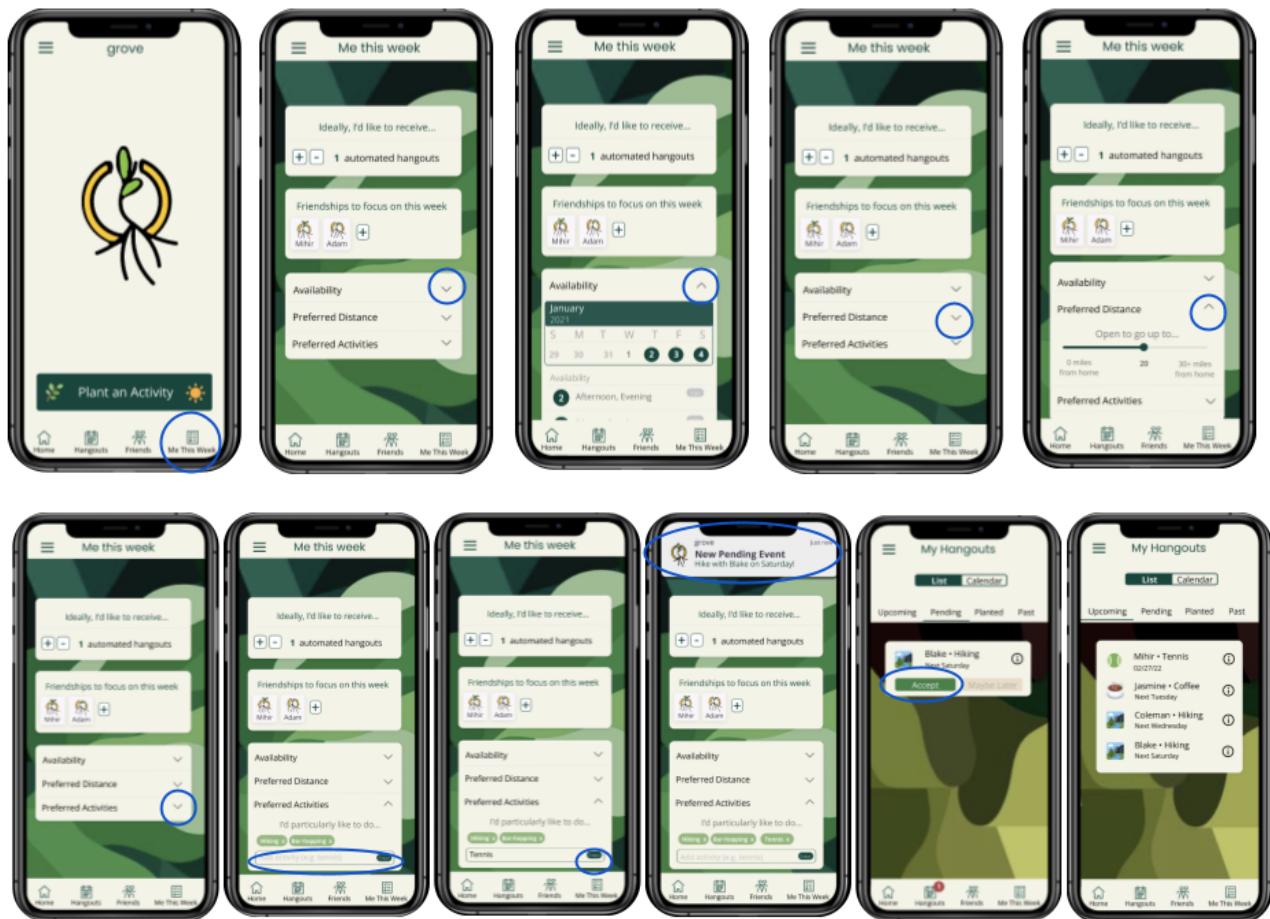


Figure 32: Flow for setting your weekly hangout preferences and then accepting a hangout that aligns with those preferences (task 1).



Figure 33: Flow for planning an intentional cadence of future communication and hangouts with specific individuals in your grove (task 2).

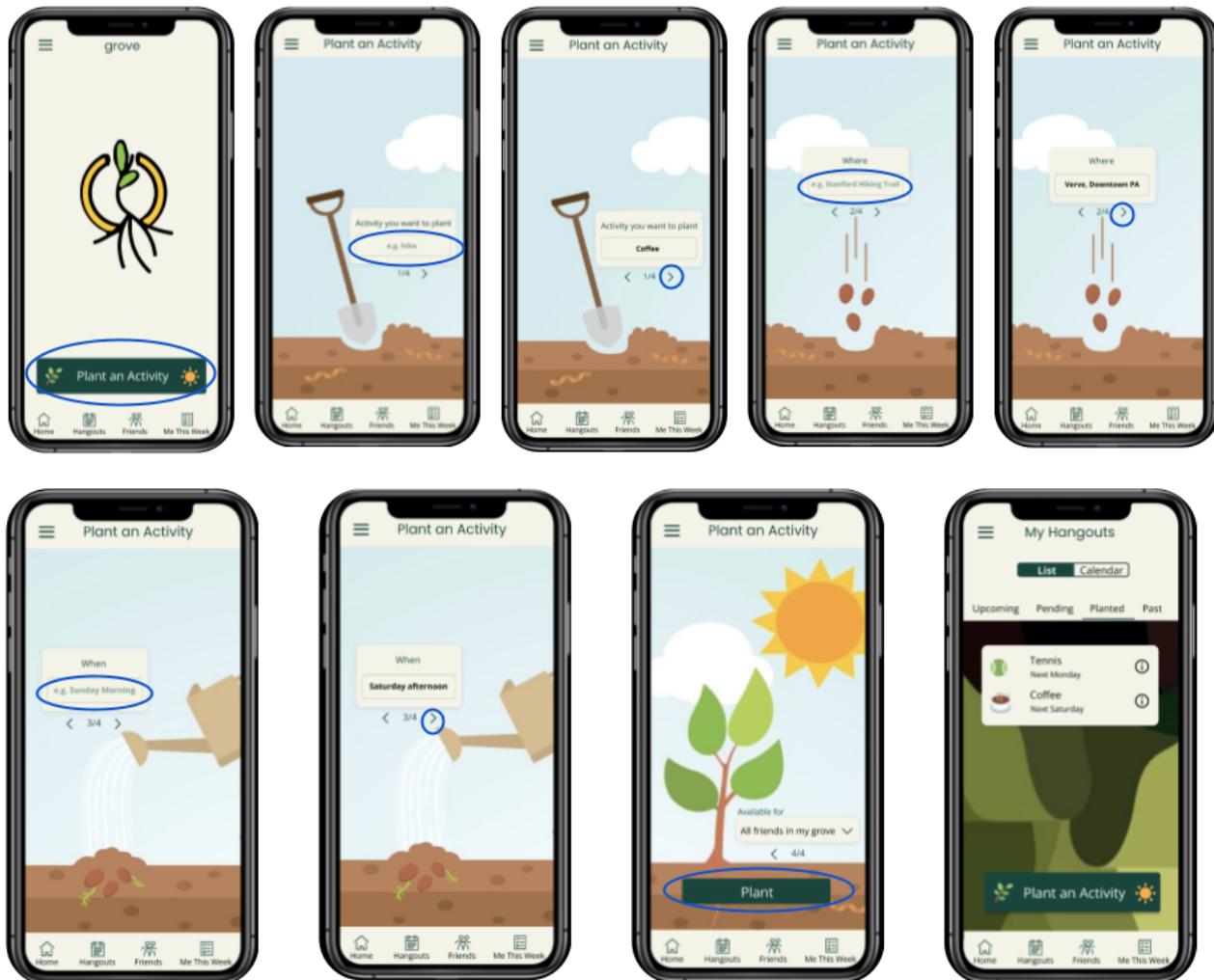


Figure 34: Flow for planting an activity—posting an activity that you want to do (task 3).

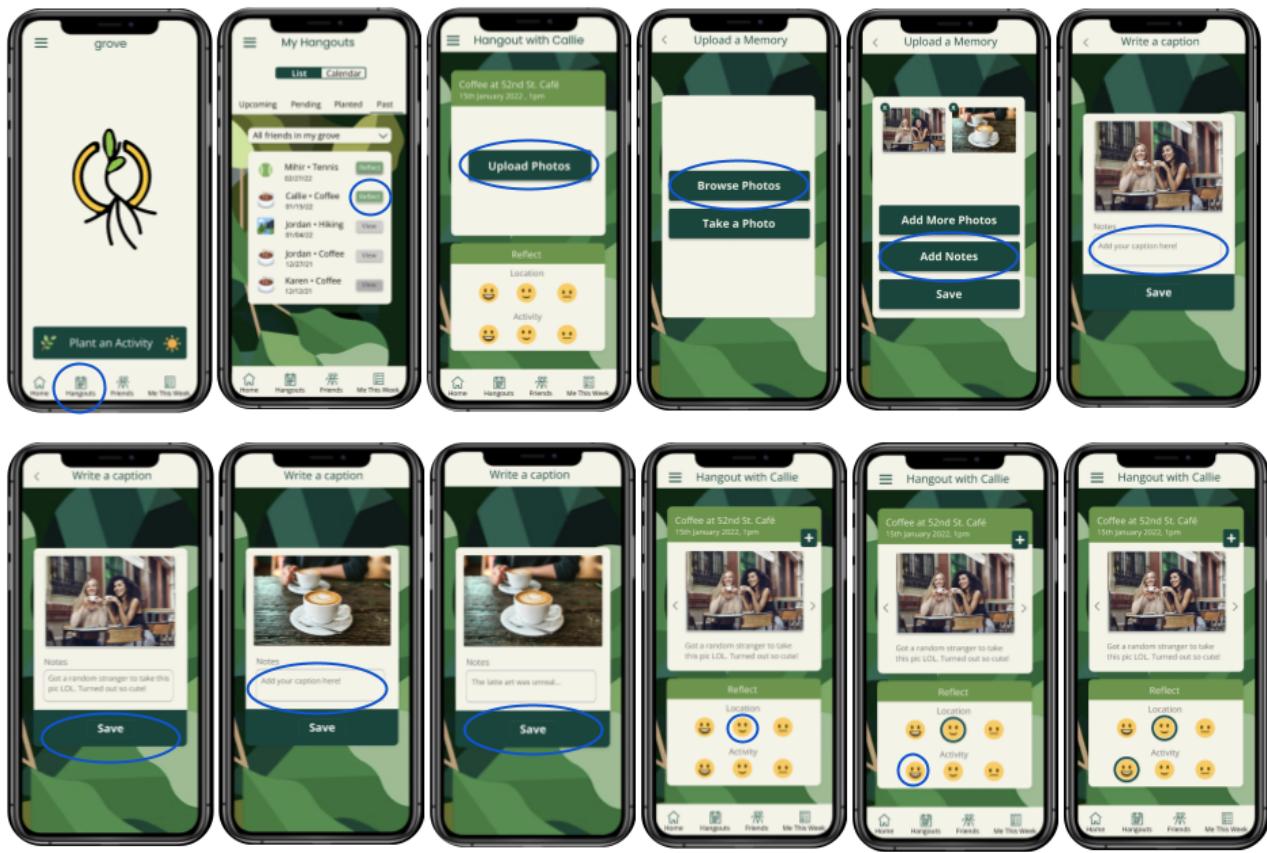


Figure 35: Flow for reflecting and reporting on the successfulness of a hangout across various aspects - activity, location, person (task 4).

Hi-fi Prototype: Additional Screens

We created some additional screens to enhance the experience of our prototype for the user that are not featured in our core task flows. Details of such screens are below.



Figure 36: Home screen when you have a pending hangout. As accepting or declining a pending hangout is a highly important user task, it is featured at the top of the home screen if it exists. If multiple pending hangouts exist, items are shown in a carousel.



Figure 37: Info icons appear next to all hangout cards on home screen and hangouts screen. When you click on the icon, a card appears with more details on the hangout.



Figure 38: User profile screen.



Figure 39: On the friend screen, user can click Memories with [friend] button which takes them to a version of the past hangouts page, filtered by past hangouts with that particular friend.

Thirteen Usability Heuristics, adopted from Nielsen (2nd version)

- **H1. Visibility of system status:** The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.
- **H2. Match between system and the real world:** The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.
- **H3. User control and freedom:** Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.
- **H4. Consistency and standards:** Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.
- **H5. Error prevention:** Even better than good error messages is a careful design which prevents a problem from occurring in the first place. Either eliminate error-prone conditions or check for them and present users with a confirmation option before they commit to the action.
- **H6. Recognition rather than recall:** Minimize the user's memory load by making objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable when appropriate.
- **H7. Flexibility and efficiency of use:** Accelerators -- unseen by the novice user -- may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.
- **H8. Aesthetic and minimalist design:** Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.

- **H9. Help users recognize, diagnose, and recover from errors:** Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.
- **H10. Help and documentation:** Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.
- **H11. Accessible:** Users can interact with the system using alternative input methods. Content is legible with distinguishable contrast and text size. Key information is upfront and not nested for screen readers. Purely visual or auditory content has text-based alternatives for users with low vision and low hearing.
- **H12. Fairness and inclusion:** Users shouldn't feel that the design is not made for them. The design should meet all users' needs equally and prevent the reproduction of pre-existing inequities. It should not create additional burdens for members of disadvantaged populations.
- **H13. Value alignment:** The design should encode values that users can understand and relate to. Conflicting collateral values should not emerge when the user interacts with the product. Encoded values should match users' values in a broad set of use-contexts.