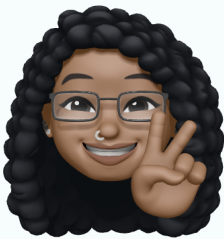


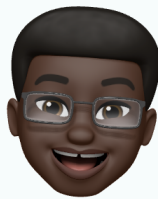


BudgBuds

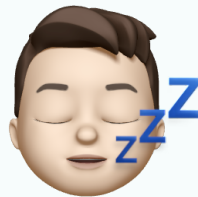
WHERE YOU DONT HAVE TO BUDGET ALONE



Raagavi R



Habeeb J



Jacob L



Melvin J

Problem & Solution Overview:

- **Problem:** People who regularly spend in social groups are often unable to regulate their expenses and give in to social pressure.
- **Solution:** An app supplemented by social accountability, for these groups to collectively budget for activities that require communal spending, while factoring in individual financial means.

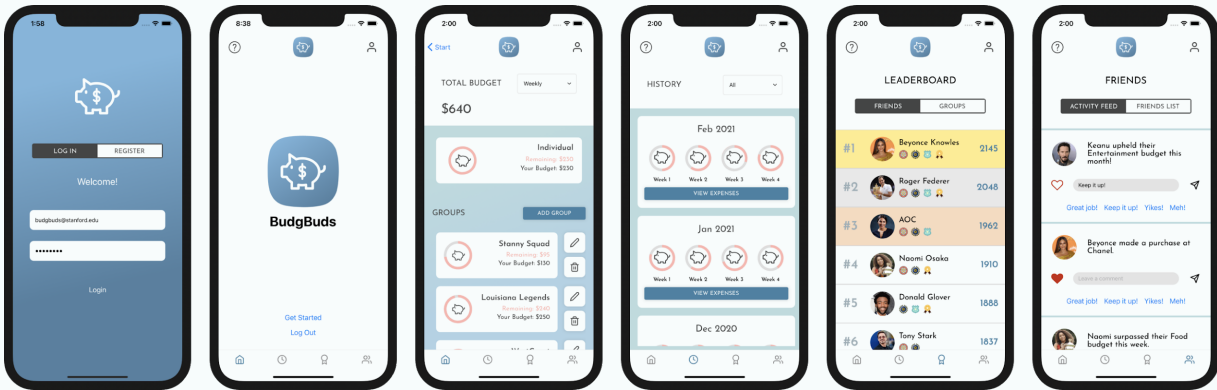


Figure 1: Design Overview

NEEDFINDING INTERVIEWS

The initial steps of our project involved needfinding interviews with the intention of narrowing in on a problem domain that might require an app-driven solution. For this purpose, we interviewed several acquaintances of various ages, ranging from 20 to 65, and backgrounds - students, entrepreneurs, working professionals and more - being as vague as possible with our questions in order to have them direct the interviews towards discussions about potential challenges that they face in their daily lives. Some of our questions included:

- Can you walk me through a day in your life?
- Why and how did the pandemic affect your work habits?
- Has the move to being online changed your lifestyle within the past year?

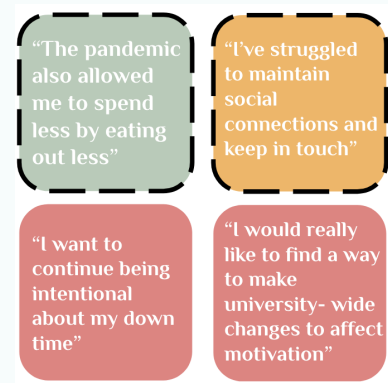


Figure 2a: Selections from our empathy map

We were able to collect quotes and answers into three main categories of finance (green), motivation (pink), and maintaining social connections (yellow). We then isolated the tidbits from these interviews that were particularly insightful and relevant for potential users across diverse backgrounds and eventually arrived at the following findings that we then categorized into informative insights we gained and user needs that those insights indicated.

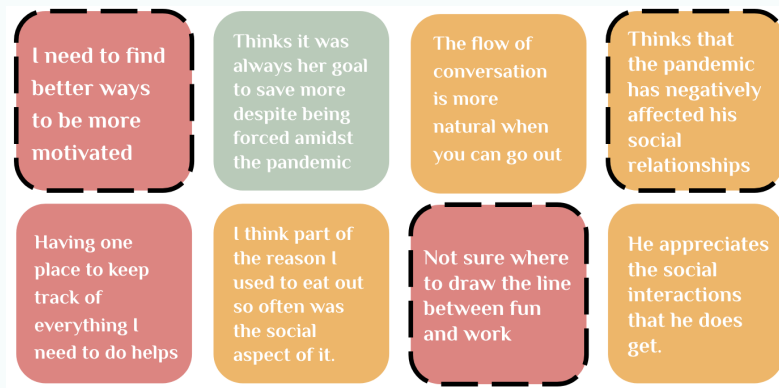


Figure 2b: More selection from our empathy map

- | | |
|---|---|
| <p>1 INSIGHT: There is an increasing gap between what someone wants to do and what they actually do.</p> | <p>NEED: A way to bridge the gap and synchronize their thoughts with their actions.</p> |
| <p>2 INSIGHT: People want to maintain social interaction.</p> | <p>NEED: A way to interact across distance in a way that doesn't seem forced (spur of the moment interactions)</p> |
| <p>3 INSIGHT: People are happier to spend less but they struggle with self control when not guided in the right direction.</p> | <p>NEED: Techniques to actively modify financial habits and assist in budgeting, not just by tracking expense history but also by intercepting impulsive spending.</p> |
| <p>4 INSIGHT: Communication has become a larger goal and has made it harder for people to enforce a strict work-life separation.</p> | <p>NEED: Having a way to provide that definition between work and not work, and still being able to communicate with colleagues and loved ones more.</p> |
| <p>5 INSIGHT: Small businesses hiring people recently laid off due to the pandemic, can benefit both parties and support economic growth.</p> | <p>NEED: A way to easily and cheaply expose small businesses to potential hires, and vice versa.</p> |

POVS & EXPERIENCE PROTOTYPES

Point of Views (POVs) & How Might We's (HMWs)

- The POVs we generate are listed in the dashed boxes.
- The blue HMWs are the ones we chose to develop further into experience prototypes.

1

We met a recent graduate working in finance in NYC,
we were surprised by how much a person we had always considered to be motivated was struggling with motivating himself during the pandemic.

* * *

It would be game-changing to give students and employees an easy and sustainable way to boost self-motivation in professional and academic settings now and after the pandemic.

HMW...

- use gamification to make people motivated.
- encourage people to tackle small wins first to build momentum for the rest of the day.
- make it easy to feel productive and use that as a way to kickstart productivity on a larger scale.
- record tangible results related to uninteresting work and use them to prompt self-motivation.
- make tedious tasks more interesting to encourage self-motivation.

2

From the same recent graduate we met,
we were also surprised by how aware he was about his motivation levels even though he struggled to act on it.

* * *

It would be game-changing to provide a way for students and employees to follow up their awareness with tangible actions.

HMW...

- use the pomodoro technique to minimize distractions / fight procrastination.
- create awareness of problems with users' work habits and help them actively remedy the problems.
- use social accountability to get people to do their own work.
- reduce distractions to facilitate better work ethic.

3

We met a SaaS platform small business owner.
we were surprised by the fact that he doesn't think of one-off purchases as coming out of his disposable income when budgeting.

* * *

It would be game-changing to keep track of how occasional purchases affect disposable income.

HMW...

- HMW clearly demonstrate the positive and negative effects every purchase can have on a user's financial situation, especially in the long-term.
- leverage social interactions to manage people's financial habits.
- use gamification to manage people's financial habits.
- create awareness of problems with users' financial habits and help them actively remedy the problems.

4

From the same small business owner we met, **we were surprised** that he was able to hire part-time workers (working at 20% capacity) that were still able to accomplish 70% of the tasks a full-time worker would have achieved.
* * *
It would be game-changing to allow part-time workers to continue increased productivity with fewer hours post pandemic.

HMW...

- HMW allow people to work in high energy bursts of extreme productivity.
- HMW deter people from slowly working on things.
- HMW help people work in a way that is productive to the company as well their minds and bodies.
- HMW show people how to plan their time at their workplace such that they put in less time but the same amount of effort.

5

We met a junior at UC Berkeley majoring in a competitive course, **we were surprised** that she knew she wanted to budget but wasn't sure how to start budgeting.
* * *
We also met a junior at the University of Toronto majoring in business, **we were surprised** that he tried to budget but didn't find himself being held accountable for his spending habits.
* * *
It would be game-changing to help college students be responsible with their finances by teaching them basic financial literacy and holding them accountable to any limits they set.

HMW...

- leverage social interaction to teach college students how to budget
- use gamification to teach college students how to budget
- introduce young people to the principles of budgeting without overwhelming them.
- increase financial literacy without heavily affecting everyday needs and necessities.
- not only assist people in budgeting but also keep them accountable to the budget they create.

Solutions

Solution 1

An app that helps people prioritize doing smaller tasks earlier in the day by ranking priority of goals for the day and using that momentum to encourage them to want to be productive with their remaining work.

Solution 2

Find consistencies in users' spending habits that can be improved upon and suggest steps to do so by providing customized tips and prompts to match the user's daily habits, financial status, location and other factors.

Solution 3

An app for social groups to collectively budget for periods that involve social activities that require communal spending.

Experience Prototypes

Prototype 1

We used a google form and have them write 5 things they wanted to do that day. Then we had a follow up form to check how they felt the rest of the day after completing those 5 tasks.



Assumption

people feel more motivated after completing several small tasks.

What worked: The participant did feel that completing smaller tasks motivated them to finish larger ones

What didn't work: It didn't test for accountability so there was no way to track progress

Prototype 2

Ask a user if there's a recurring purchase they make and ask how much they think it costs in a year. Calculate how much that purchase would add to in a year and compare. Research "better" options and see their response to the suggestions.



Assumption

People are not making the most financially sound purchases and they are not aware of how much they spend daily and the effects it has.

What worked: Some people are indeed unaware of the extent of their spending habits and we were able to make them aware of it.

What didn't work: The participant was indifferent to the effect of compounding expenses.

Prototype 3

Used a google form asking for individual budget on generic spending categories and generated a group budget. We had a follow up google form afterwards asking how they felt about the process and whether sticking to the group budget would be realistic



Assumption

People want to budget in groups

What worked: The group were able to effectively budget and stick to it

What didn't work: Group struggled with setting realistic budgets

DESIGN EVOLUTION (few pages)

Chosen Solution

We ended up combining solution 2 and 3 to create an app for social groups to collectively budget for activities that require communal spending, while simultaneously factoring in individual financial means. As there is inherently a social aspect when forming group budgets, we wanted to leverage that by incorporating elements of gamification and social media to help users maintain their budgets.

As we noticed a growing number of college students and new graduates moving in with friends, we realized that behavioral change in the realm of personal finances and sustainable financial habits was an important problem space to work in. Specifically, several people we interviewed in the needfinding process seemed to experience similar challenges in that they often struggled to define the distinction between social activity and sustainable financial practices, resulting in them making unsustainable purchases due to unintentional social pressure from friends or family. The need to collectively overcome this social pressure seems to have been unaddressed in the technological space thus far, and the potential incorporation of gamification and social media made this solution the ideal candidate for an app targeting behavioral change in our target demographic.

Initial Sketches

We chose the first design with the piggy bank icons while integrating some of the ideas from the other sketches. We liked the piggy banks as a representation of saving money in a way that could bring nostalgia to our users. For some, the idea of budgeting may be daunting or cumbersome, so we reasoned that a simpler and intuitive interface that also had friendly/nostalgic elements may offset some of these negative feelings.

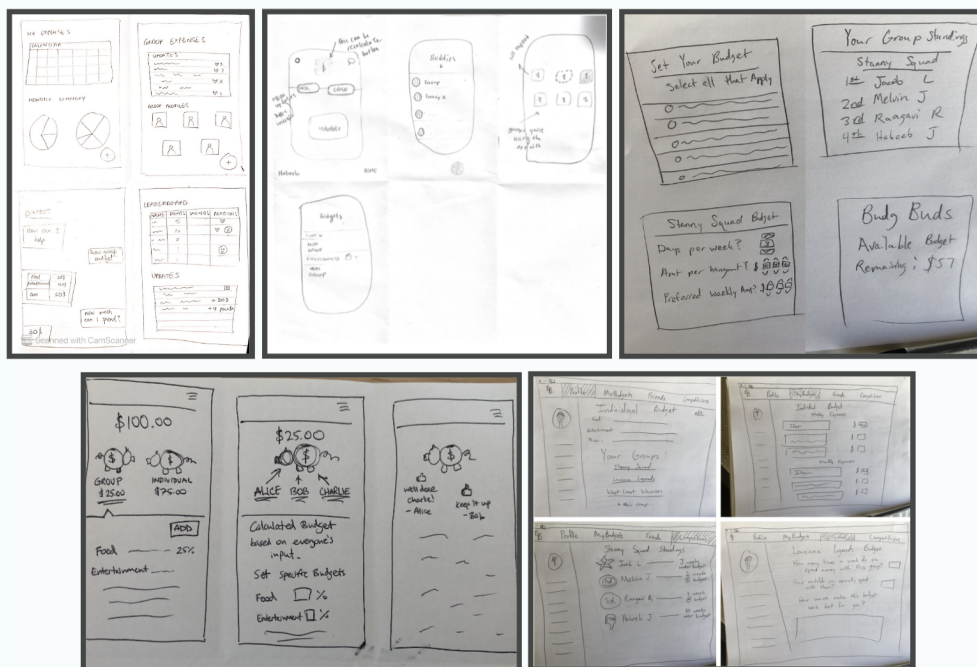


Figure 3: Initial design sketches

Low-fi Prototype

We designed our prototype on paper, displaying all the screens that a user would need access to in order to complete the tasks described. We included additional screens not related to the tasks we had at this point. After designing on paper, we took a scan of each screen and uploaded them to Figma, where we used Figma's prototype tools to make hand-drawn components clickable and redirect participants to the appropriate pages.

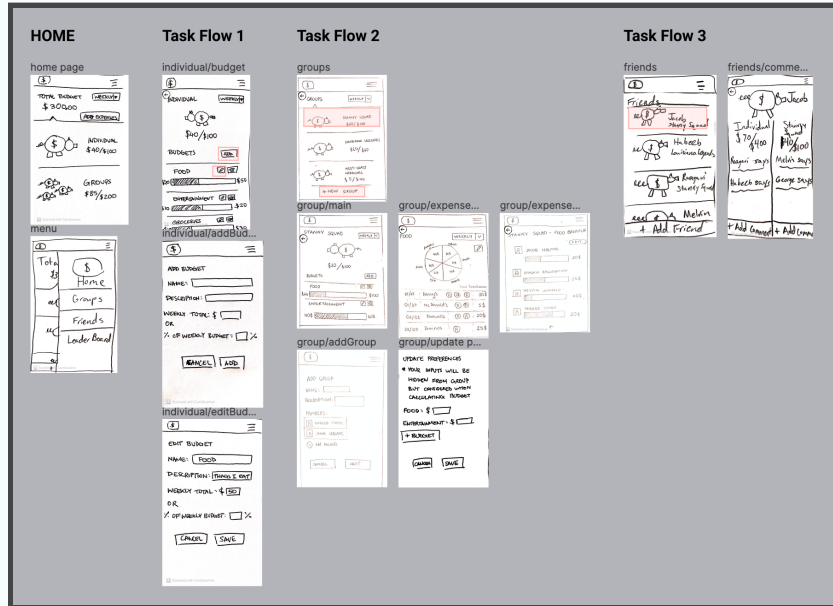


Figure 4: Low-fi Prototype

Med-fi Prototype

We used Figma for our medium-fidelity prototype and used the iPhone as well as Android as our target platform.

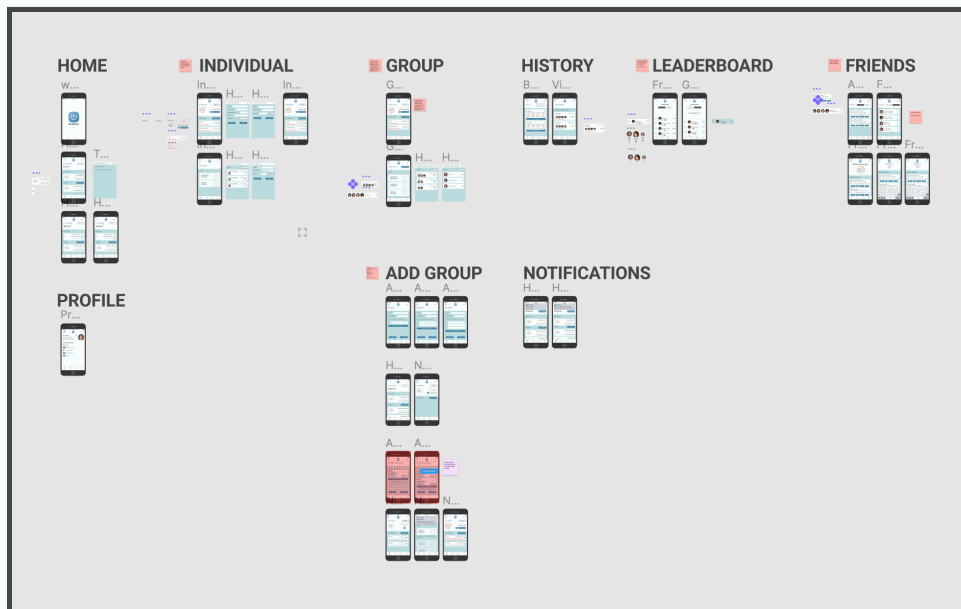


Figure 5: Med-fi Prototype

Hi-fi Prototype

We used React Native and XCode to develop our high fidelity prototype to create a cross-platform prototype.

Task 1 (simple): create an individual budget.

We selected this task as the “simple” task because we assume most users have created personal budgets before, either with a different application or manually using tools such as Microsoft Excel.

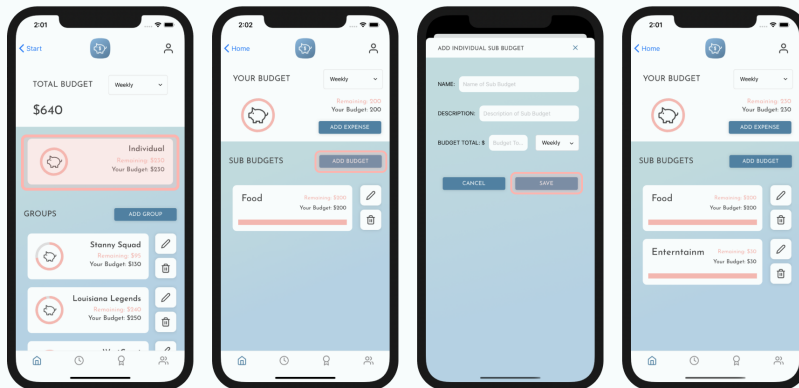


Figure 6: Hi-fi Prototype task #1

Task 2 (moderate): create and edit a group budget.

We selected this task as the “moderate” task because creating group budgets may be new to some users yet there are similarities between managing an individual budget and managing a group budget.

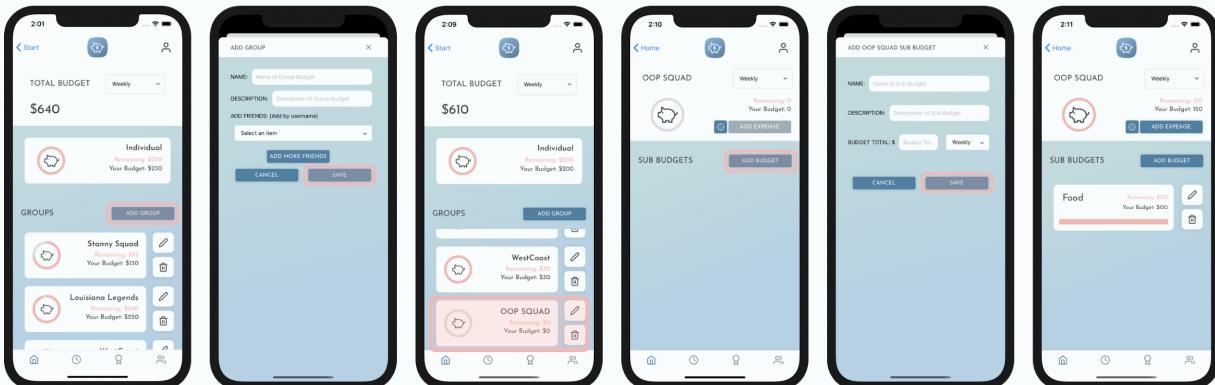


Figure 7: Hi-fi Prototype task #2

Task 3 (moderate): find who spent the most on food.

We selected this task as our second “moderate” task because the task is intuitive, (to leverage social accountability in groups, there has to be increased visibility), however it may not be something users are used to doing.

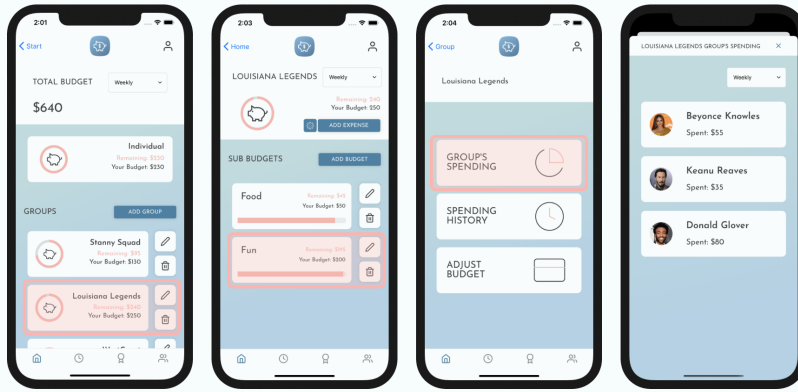


Figure 8: Hi-fi Prototype task #3

Task 4 (complex): give your close friend, Keanu, encouragement.

We selected this task as our “complex” task because budgeting is typically done individually, and as personal finances are often a sensitive topic, finding a balance between giving encouragement and respecting everyone’s privacy is critical.

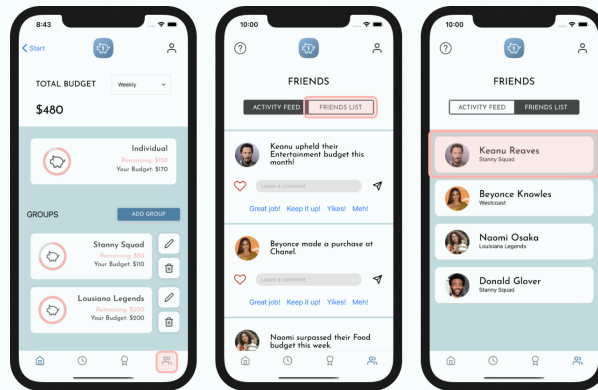


Figure 9: Hi-fi Prototype task #4

Lo-fi Prototype → Med-fi Prototype: Major Design Changes

Change #1: Hamburger Menu

The first major design change revolved around our use of a hamburger menu. As the hamburger menu hides the contents of the menu bar, when we did user testing, they often overlooked it and instead focused on what was immediately available to them. Hence, we decided to replace the hamburger menu with a universally accessible navigation bar to make key options visible at all times.

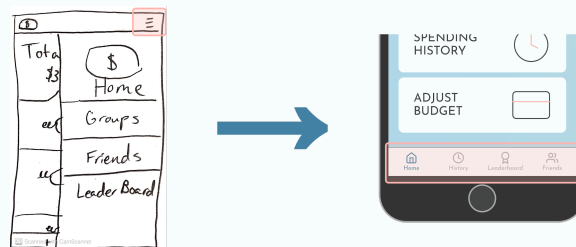


Figure 10: Major Design Changes - Replaced hamburger menu with tab navigation bar

Change #2: Tabs

The next major design change we implemented had to do with our use of a clickable pie-chart. The pie-chart had two purposes, one to give a quick overview of a group budget breakdown, and the next as a button to lead to a more detailed group budget breakdown. After recognizing the slight redundancy, and also noticing some confusion around the expense record (shown below the pie-chart), we decided to use an intermediate page with explicit tabs that would help reduce confusion for the user.

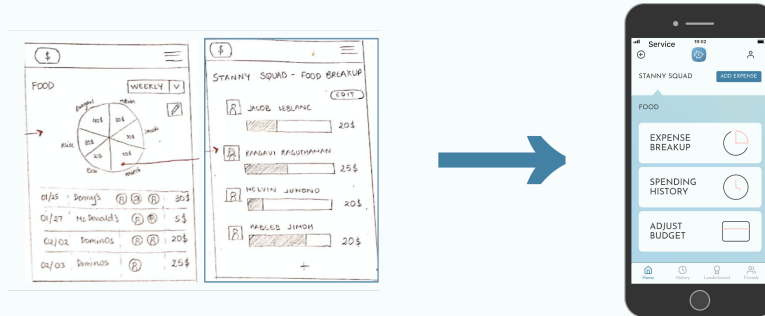


Figure 11: Major Design Changes - Divided up information into tabs

Change #3: Progress Bars

Related to the previous design change, we noticed that use of the pie-chart to show total spending and cost distribution was not as effective as we hoped. We decided to replace it with budget-specific progress bars instead as they were more readable and potentially more visually appealing.

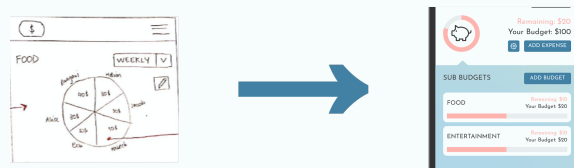


Figure 12: Major Design Changes -Converted pie charts to progress bars

Change #4: Leaderboard

Our final major design change had to do with our complex task. Specifically we became aware that users may need more intrinsic motivation to get them to encourage their close friends on their budgeting progress. We decided to implement several initiatives. The largest of which is a leaderboard to integrate elements of gamification. A point system is assigned whereby the more you save (relative to your set budget), the more points you get. Friends can compete on point systems and encourage others when they're struggling to get points or when they're particularly on a roll. Furthermore, the leaderboard system will assign badges to users depending on some budgeting-related accomplishments.

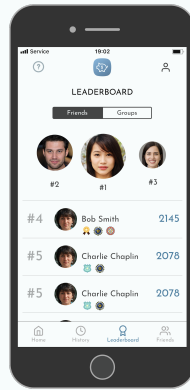


Figure 13: Major Design Changes - added a "Leaderboard" page

Med-fi Prototype → Hi-fi Prototype: Major Usability Problems Addressed

Heuristics w/ Severity 3 Violations

Note: we didn't receive any heuristic violations of severity level 4

1

VISIBILITY OF STATUS

Notification System

Violation: If an item demands action, for example the need to enter a personal budget into a group budget that was created, there is no way to know about it unless the user decides to go to that specific budget.

Didn't Fix: Due to time limitations we were unable to implement this in our hi-fi prototype. However we recognized this as an important issue and within our med-fi prototype. ensured the notification system allowed the user to follow a trail through the app starting from the home page

Leaderboard System

Violation: The leaderboard system lacked clarity on how it's tracked/what is being tracked.

Fix: We added descriptions to all badges. This can be seen by clicking on any user profile on the leaderboard screen.

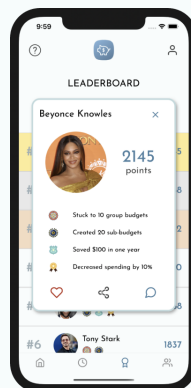


Figure 14: Heuristic Evaluations - Change in Leaderboard Page

3

USER CONTROL

Editing Group Information

Violation: Users cannot unfriend or delete friends.

Violation: The user has no way to remove a group from their list of groups. This can be a problem if the user wants to quit a group, or created a group by accident.

Violation: Users are not allowed to edit group names or group members after a group has been created.

Fix: Added a settings button within each group that can handle editing all friend and group information. Additionally, on the main page we added an edit icon next to each group widget that performs the same function as the settings button within the group.



Figure 15: Heuristic Evaluations - Change in Group Settings Capabilities

4

CONSISTENCY & STANDARDS

Violation: The “Friends” tab at the bottom is not exactly consistent with what is shown to me when we first click on it, as we expect to see a list of friends instead of a sort of feed.

Didn't Change: We believed in terms of frequency, people would more likely want to see how their friends are doing on the app with their budgeting goals rather than their list of friends on the app. Additionally, this is a way of emphasizing encouragement of individual achievements with budgeting.

6

RECOGNITION NOT RECALL

Profile

Violation: In the sub-budget menu, as well as the leaderboard top three, you can only see the Profile picture of the other users, but no names. Users might not remember who the user is, especially if their profile picture is not their face.

Fix: Made profile pictures clickable and expandable and/or displayed names next to their pictures

7

EFFICIENCY OF USE

Friend List

Violation: The “Friend List” does not seem to have any particular order of displaying friends. Furthermore, it might be hard to find a friend if the user has lots of them.

Fix: Friends displayed in alphabetical order of their first names.

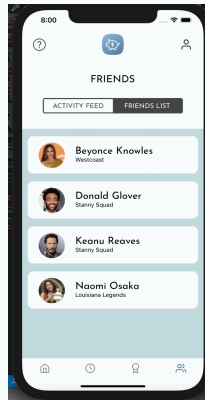


Figure 16: Heuristic Evaluations – Change in “Friend List” ordering

Budget Breakdown

Violation: In “Total Budget Breakdown,” present the information in a table (like Microsoft Excel). The current format makes it difficult for the user to access the needed information right away.

Didn't Change: The excel-like format would be overwhelming and would detract from the feel of the app.

10

HELP & DOCUMENTATION

FAQ

Violation: There is no documentation page / FAQs page if the user does not understand a specific page, button, feature or how to complete some task. For example, “expense” and “budget” could be confusing for some users.

Fix: Provide an FAQ help button at the top right of most pages. This provides general documentation on how to manage budgets and complete other tasks on the app.

Further Changes

These are the major severity 1 and 2 violations we fixed.

- Clarified the language throughout the app to make sure it was easier to understand who the remaining money and total budget was specified for.
- We added a done button to the top of each popup or “modal” to make it clear how to exit this additional page.
- Allowed users to enter weekly, monthly, or biweekly budget amounts to give them more freedom when determining budgets
- Made the formatting overall more consistent throughout the app.

An additional change we made occurred in task flow #2 (create and edit a group budget). In the med-fi representation we had it so that after creating a group you would automatically input information about the group sub-budgets. We believed it would be easier to let the user know the status of the app by breaking up this process into more concrete steps. Therefore, we decided that after a user created the group and added their friends, it would take them back to the home screen where they would see their added group. After that they could enter the group they just made and input the sub-budgets for that group.

FINAL PROTOTYPE IMPLEMENTATION

Developer Tools



FIGMA

Benefits

- Has a toolkit for components, equipped with templates.
- “Components” allow for quick editing that results in universal changes.
- Ability to create clickable and realistic UI elements, allows testing of flow.
- Collaborative platform which allowed us to make changes asynchronously.

Limitations

- Hard to keep track of elements after a large number have been added.
 - Challenging to create animations.
-



**REACT
NATIVE**

Benefits

- Cross Platform but similar enough to base React.
- Easy to import libraries.
- Easy to create and re-use components.
- Easy to test through expo.

Limitations

- No design layout like Android Studio so styling can be difficult.
 - Error messages are not always clear.
 - React Native changes frequently and is not backwards compatible.
-



GITHUB

Benefits

- Effective version control.
- Support for merging, branching and individual contribution.
- Easy storage and sharing of common code.

Limitations

- No live updates (ex: Google Docs) leading to several merge conflicts.
-



XCODE

Benefits

- Easy to use iPhone simulator as a virtual device.
- Virtual device is compatible with expo.

Limitations

- Devices often crash with undiagnosable errors.
 - Does not support testing for Android.
-



Benefits

- Highly simplified login feature that handles backend processing.
- Extensive and sustainable storage abilities.
- Free (initially) and easily accessible API.

FIREBASE

Limitations

- Limited support for iOS features.
- Doesn't work in the countries that don't allow Google.

Wizard-of-Oz Techniques

After adding a group and subsequently setting up your group's sub-budgets, you must wait for group members to accept the budgets and add their weekly preferences. Since sub budgets need to be approved by all group members before a budget is set, we manufactured this process so that no other users were necessary.

Hard-Coded Data

We hard-coded individual and group budgets to provide an example of what your home screen and subsequent interactions would look like with budgets.

We have also hard-coded instances where we show expenses and expense history. This is to give further context between how the relationship between budgets and your spending is shown via the app.

Lastly, we hard-coded a list of friends and their budget-related activities to show the types of interactions enabled by the platform. This also led us to hard-code a leaderboard consisting of friends and groups, with both a badge and point system to integrate elements of gamification.

SUMMARY & NEXT STEPS

Main Takeaways

We designed BudgBuds to remove the kind of social pressure that leads to overspending in groups and instead leverage social accountability to help people stick to their budgets. We began the quarter with a broad focus of Behavior Changes for Everyday Life, and followed the design thinking process to narrow our focus and adjust where necessary. The design thinking process was particularly useful in helping structure our thoughts and insights, as well as encouraging us to gather more information used to polish our ideas and iterate. With the help of the design thinking process as well as other course concepts, we were able to start broad, hone in on a problem we think is important, and design a high-fidelity prototype that addresses the problem.

Future Work

Due to the time constraints of the project we were not able to implement functionality related to changing time periods (users should be able to use the dropdown to view their daily or monthly budget as opposed to only a weekly budget). Additionally, we were unable to implement our notification system for when a new group was added. We were also not able to include one of our planned UI features where users can swipe left on the budget or sub-budget cards to edit and delete each.

Moreover, a key feature we did not include in this high-fidelity prototype is integrations with third-party applications that track expenses. Such applications could include mobile banking applications, or financial technology applications such as Venmo.