



Recipal

Helping you cook recipes your way

CS 147 Winter 2022
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Introduction

Cooking is hard. What if you want to make Grandma's meatloaf recipe gluten-free, or your favorite pizza recipe lactose-friendly? It can be hard to make recipes your own, but you deserve to be your own chef. We at Recipal aim to make recipes smarter by allowing them to change with you.

Value Proposition

Helping you cook recipes your way.

Our Team



Andy H
Mobile Developer



Dax D
Prototype Designer



Star D
Prototype Designer



Kyle N
Mobile Developer

Problem and Solution Overview

Problem

People who cook can have difficulty finding recipes that align with their **dietary restrictions and preferences**. This difficulty can manifest as uncertainty as those people make **modifications** to recipes to fit their needs, consequently complicating the process of figuring out what **nutrients** are in the food they make and eat.

Solution

Recipal aims to help users **overcome uncertainty** about the recipes they are making by helping them understand **nutritional value**, **make modifications**, and **learn cooking techniques**. This application keeps track of personalizations and makes safety suggestions so that users can confidently explore new recipes. By making cooking fun and informed, Recipal creates a more welcoming and approachable cooking environment.



Needfinding Interviews

Everyone has their own particular relationship with food — whether that be within eating, shopping, cooking, or sharing practices. Before narrowing our focus around a particular practice, our team decided to explore several unique experiences in our 6 needfinding interviews. We aimed to find a diverse set of participants by diversifying gender, culture, and age. Participants came with different levels of dietary preferences and restrictions. Some of our “extreme user” interviews included a participant who has Diabetes Mellitus and a participant who is an amateur boxer. Finally, we discovered participants varied in cooking experiences from home cooking to food vending (see Figure 1). We conducted four virtual (Zoom) and two in-person interviews, providing consent forms before the interview began.

Some of the questions we asked in our interviewees included:

“What does your pantry look like?”

“Do you cook and can you walk me through the last time you cooked?”

“If so, what do you like most about cooking?”

“If not, can you walk me through your last meal?”

“Do you have any hot takes about food?”



Figure 1. Needfinding Interview with Food Vendor Participant



We specifically decided to focus on whether participants cooked themselves or not because this informed how we would continue the interview. To our surprise, one of the participants who didn't cook themselves began to recount their experiences with their spouse who cooks. Consequently, our direction began to take form around the cooking domain.

To synthesize our findings from our interviews, we created empathy maps (see Figure 2 for example empathy map) for 3 unique participants. This process helped our team go beyond what was said in the interview and begin inferring the core feelings and thoughts of our participants.

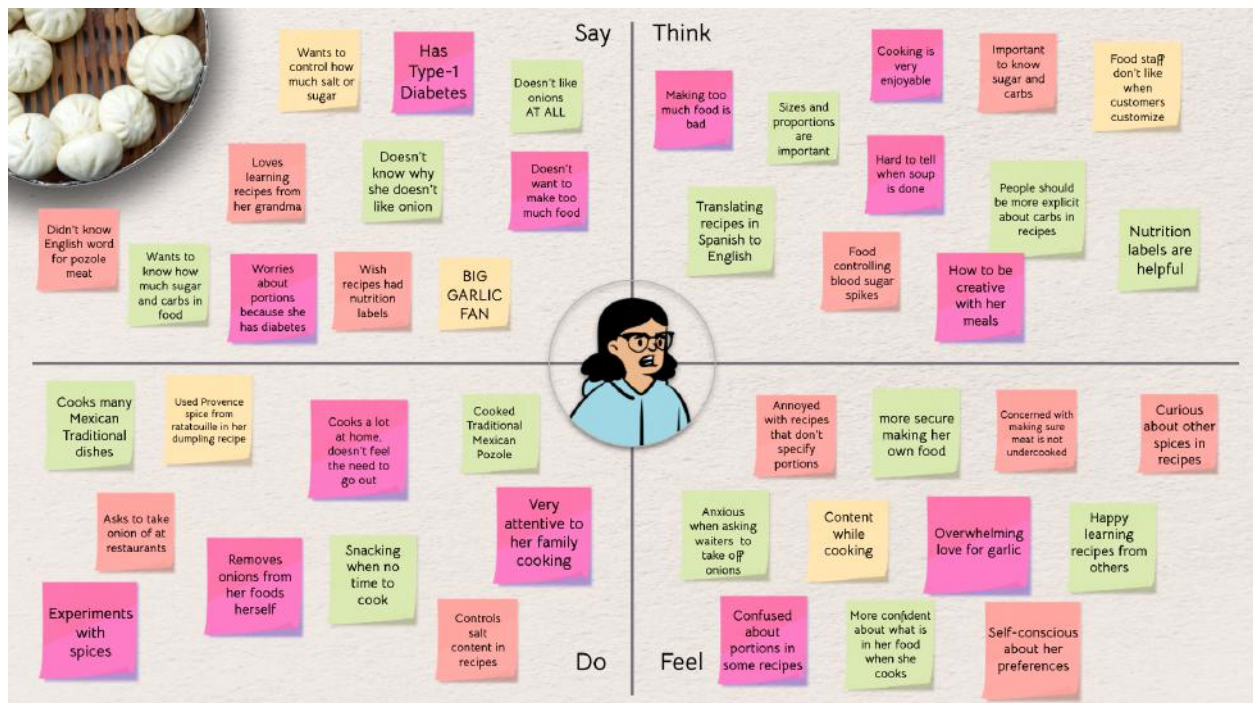


Figure 2. Empathy Map from Female Needfinding Participant

Finally, we were able to discover two common threads that weave all of our interviews together: agency/ownership and social identity. Regardless of cooking abilities, our participants shared with us their desire to have agency and ownership of their food whether that be by safely exploring new recipes or deciding the perfect meal times. One of our participants expressed that they felt more confident cooking their own food than letting others cook food for them. The perseverance of this topic made us conclude that agency and ownership may be just as important as the food itself. Secondly, people feel that food is a part of their social identity and use food to define themselves socioculturally. One of our participants felt that other people would



perceive them differently based on their food planning practices. In general, people feel deeply connected to their preferences and restrictions.

Through our findings, we began to brainstorm ways we can give people agency over their food preferences and allow them to embrace their social identity in regards to food.

Points of View (POVs)

We met Julia, a young female college student who carefully plans her meals to maximize the enjoyment she gets from eating.

We were surprised to find that even though she meticulously plans her eating schedule, she laughs off how important it is to her when sharing it with us.

We wonder if this means that Julia thinks being “too serious” about food is something to be embarrassed about, even though it’s what she likes to do.

It would be game-changing to normalize people taking pride in taking what they eat seriously.

We met Alyssa (Aly), a 20-year-old female who has Type 1 Diabetes and loves learning new recipes.

We were surprised to hear that in spite of her diabetes, she is unafraid to experiment with new recipes even if she doesn’t know the exact nutrition contents or how much she’s making.

We wonder if this means that although she wants to be careful, Aly does not want to let this uncertainty deter her from trying new things because she is willing to risk her health for something novel.

It would be game-changing to give people a way to manage uncertainty when experimenting in the kitchen.

We met Tyler, a male professional cook and amateur boxer who connects to his Filipino culture through food.

We were surprised to hear that he bought a pack of instant pancit (Filipino noodles) at the Asian supermarket because it reminded him of his mom, but still has not eaten the noodles after 4 weeks.

We wonder if this means he is driven to impulse buy cultural foods by nostalgia, but then forgets about them.

It would be game-changing to help people find sentimental value from food in a practical way.



How Might We...? (HMW)

Below is a sampling of the HMWs that stemmed from each POV. The HMWs highlighted in orange are those that we moved forward with and drew inspiration from when developing solutions.

Julia's POV

- How might we make scheduling food a social/communal activity instead of an individual one?
- How might we gamify the food planning process?
- How might we make meal planning a form of relaxation like playing an instrument?
- How might we make taking your food seriously something to be proud of instead of embarrassed by?
- How might we make the food planning process take less time?

Aly's POV

- How might we help people manage uncertainty safely in the kitchen?
- How might we provide people more accurate information about recipes?
- How might we make the risk of cooking an asset instead of an acceptable risk?
- How might we make portion size and nutrition contents less of a concern when cooking?
- How might we leverage group cooking to manage uncertainty when experimenting in the kitchen?

Tyler's POV

- How might we make going to the grocery store more like going to a museum?
- How might we let people enjoy the sentimental value of food without them buying real, perishable food?
- How might we help people remember what food they have in their inventory?
- How might we make it easier for people to connect with their culture through food?
- How might we make food into something that isn't eaten?



Top 3 Solutions

<u>How Might We...</u>	<u>Solution</u>
How might we make scheduling food a social / communal activity instead of an individual one?	→ An app focused on college students that collects all meal options at dining halls, nearby restaurants, etc. and lets people easily tap on what they plan to eat that day, using user-user similarity it will pair you up with someone to have your meals with.
How might we help people manage uncertainty safely in the kitchen?	→ An app where you put in your diet limitations, and it tracks and warns you as you add things to a recipe if you're close to your limits but otherwise lets you explore / A cooking companion app that watches as you cook and gives you safety suggestions as you modify the recipe
How might we make going to the grocery store more like going to a museum?	→ An AR app where you scan a food item and it will show you memories from your camera roll or social media that involve that food item . If you have friends on the app it will also show memories from their camera roll or social media that involve that food item.

Experience Prototypes

From each of these solutions, we constructed an experience prototype that tests the assumptions made in each of them.

Prototype 1: Bite Buddies	
Description: Profiles of people with diverse meal planning behaviors (e.x. Detailed planning vs. spontaneity) and food preferences (ex. Trying new things) were presented to the participant, who was questioned about their feelings towards the people. Participants were asked questions such as "How do you identify with these people?" and "How does seeing these plans make you feel about your planning?"	
Assumption: People use social perception as the guiding factor when planning their meals.	
<p>What Worked</p> <ul style="list-style-type: none"> Identifying with others led to more excitement about food planning 	<p>What Didn't Work</p> <ul style="list-style-type: none"> Participants did not want to get meals with strangers



	<ul style="list-style-type: none"> • Time constraints from classes and other responsibilities made it difficult to find shared availability • Participants tended to prioritize food over people in their planning
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Prototype 2: Cooking Companion

Description: The participant was instructed to follow an agreed upon recipe while being monitored by a prototype tester who would provide audio and visual feedback throughout the cooking process. An example of an event that warranted feedback was the participant deviating from the recipe by using a substitute ingredient.

Assumption: Having a cooking assistant closely monitoring users while cooking won't feel annoying or intrusive.

<p>What Worked</p> <ul style="list-style-type: none"> • Continuous checking-in created a fun, social dynamic • Participants did not find the assistant annoying or intrusive 	<p>What Didn't Work</p> <ul style="list-style-type: none"> • Checking-in didn't produce a change in the cooking process
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Prototype 3: Munching Memories

Description: People who were actively eating were asked to be participants. Those who agreed to participate would be asked to pull up the photo app on their phone and search for the food they were currently eating so that they could view photos of that food in their camera roll. They would then be asked how looking at those photos made them feel. Unfortunately no participants were willing to get out their phones.

Assumption: People are willing to pause an ongoing activity to look at pictures on their phones.

<p>What Worked</p> <ul style="list-style-type: none"> • Participants were willing to talk about food while eating 	<p>What Didn't Work</p> <ul style="list-style-type: none"> • No one was willing to stop eating to look at photos on their phone • Sharing personal photos felt intrusive
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Design Evolution

The Final Solution

How Might We...

How might we help people manage uncertainty safely in the kitchen?

Solution

→ An app where you put in your diet limitations, and it **tracks and warns** you as you add things to a recipe if you're close to your limits but otherwise **lets you explore** / A cooking companion app that watches as you cook and gives you **safety suggestions** as you modify the recipe

Regardless of one's cooking ability, people may have uncertainty about the recipes they are making—whether that be understanding nutritional value, making modifications, or simply learning techniques. Recipal is a personalized cooking companion who is meant to advise you based on your needs while also being good company in the kitchen.

Our corresponding experience prototype, "Cooking Companion", confirmed our assumption that having a cooking assistant closely monitoring users while cooking doesn't feel intrusive. Our testing participants found the continuous checking-in fun and dynamic, like having conversations with a friend. Although the verbal feedback we provided did not change how participants prepared their meals, we decided that Recipal should give more personalized feedback based on a user's needs. All in all, our team wants our users to feel safe and cared for using Recipal.

Three Tasks

After narrowing down our solution, we outlined three tasks to focus on for our Lo-Fi prototype user testing:

Task Description and Difficulty	Why We Chose The Task
<p style="text-align: center;">Simple</p> <p>Browse a database of recipes and select one.</p>	<ul style="list-style-type: none"> - This task is "simple" because it doesn't require user to input information by typing or tapping - Browsing recipes is one of the more frequent



	tasks and main features of our app
<p>Moderate</p> <p>Navigate through the steps of a recipe to completion, performing a basic modification.</p>	<ul style="list-style-type: none">- Moderate task builds upon simple task- Introduces user to making modifications- Examines user's interaction with spoon parasocial character
<p>Complex</p> <p>Input nutritional limits and navigate through the steps of a specified recipe, performing modifications that are accepted/rejected intelligently based on the user's nutritional limits.</p>	<ul style="list-style-type: none">- Complex task builds upon simple and moderate tasks- Tests user interaction across all the features of our app- Examines how users navigate and understand error messages- Introduces the user to making personalizations



Lo-Fi Prototype Gallery

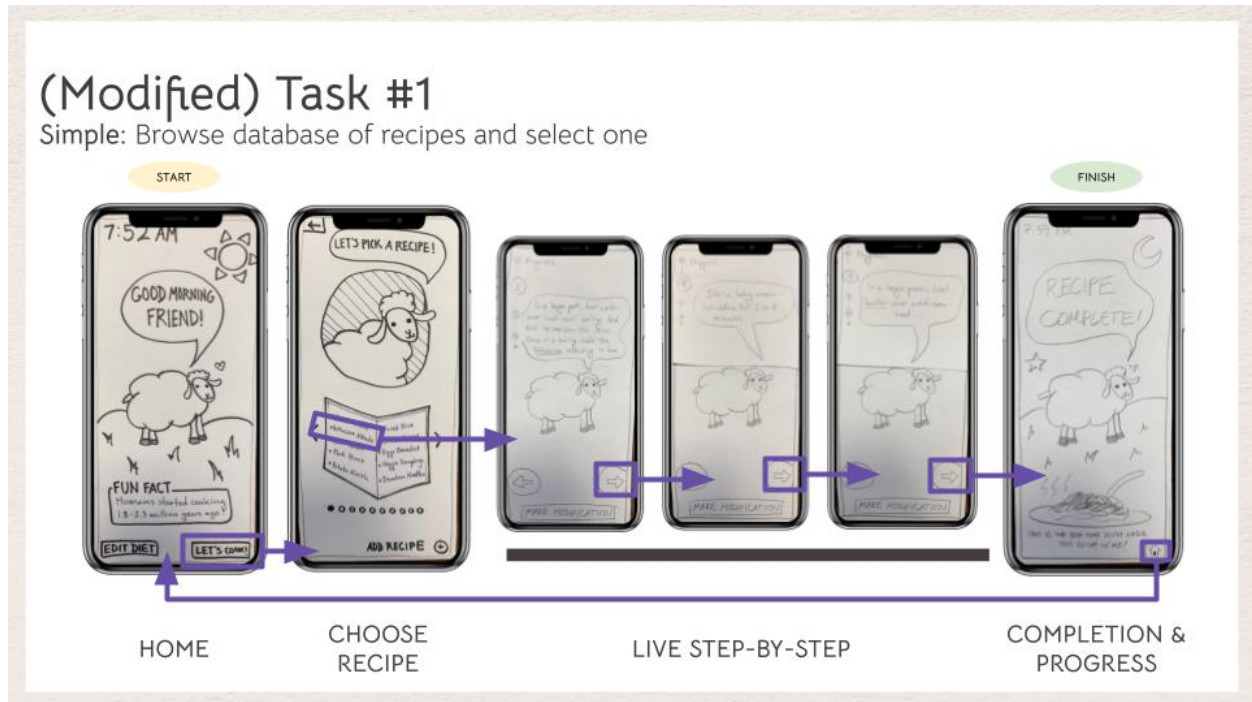


Figure 3. Simple task flow for Lo-Fi prototype

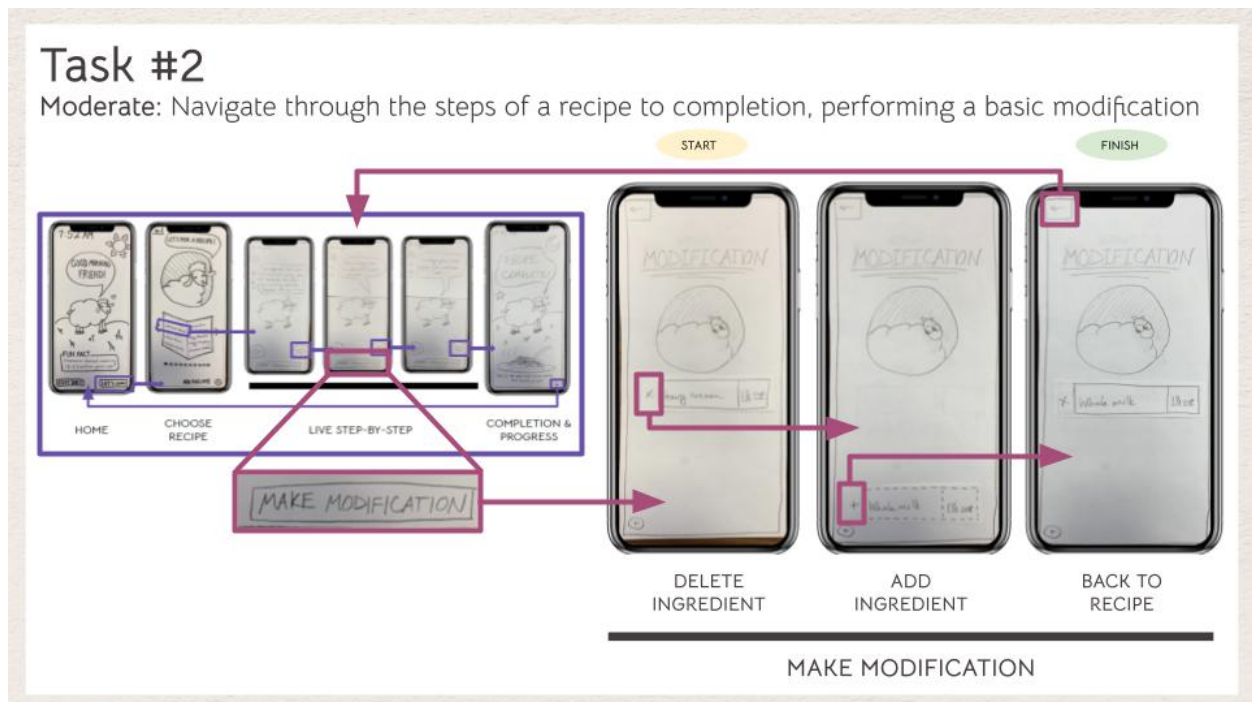


Figure 4. Moderate task flow for Lo-Fi prototype

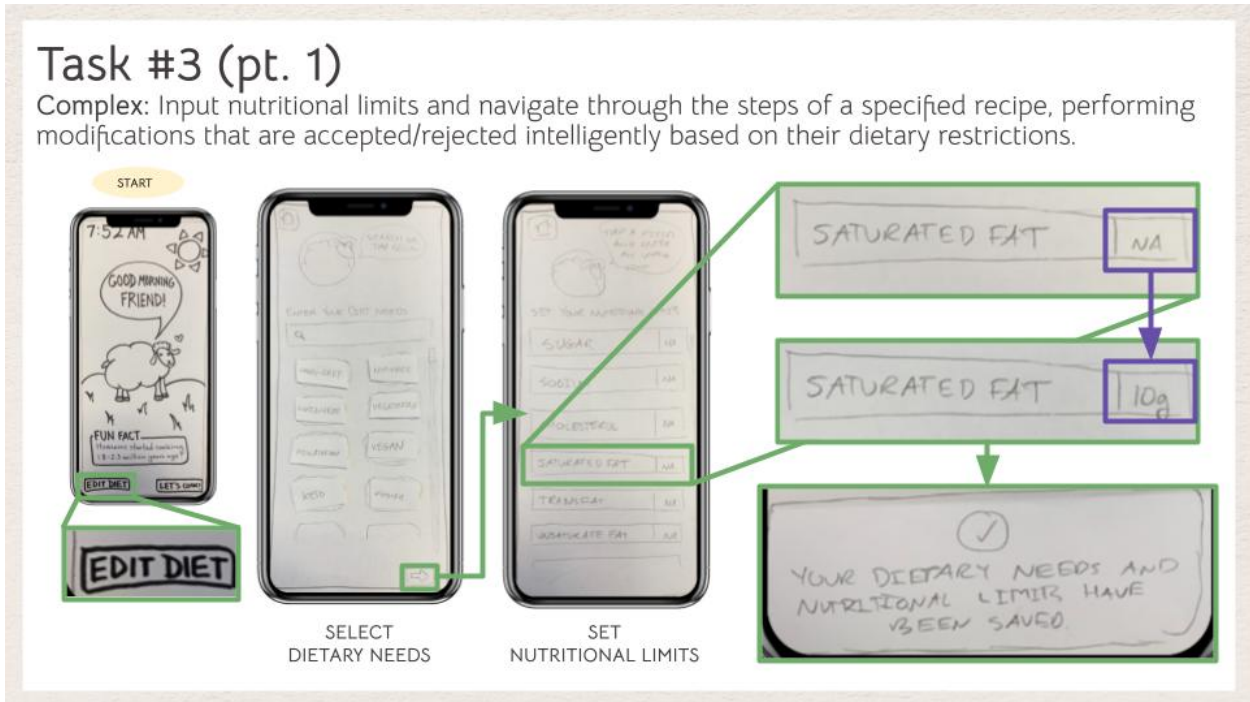


Figure 5. First part of complex task flow for Lo-Fi prototype

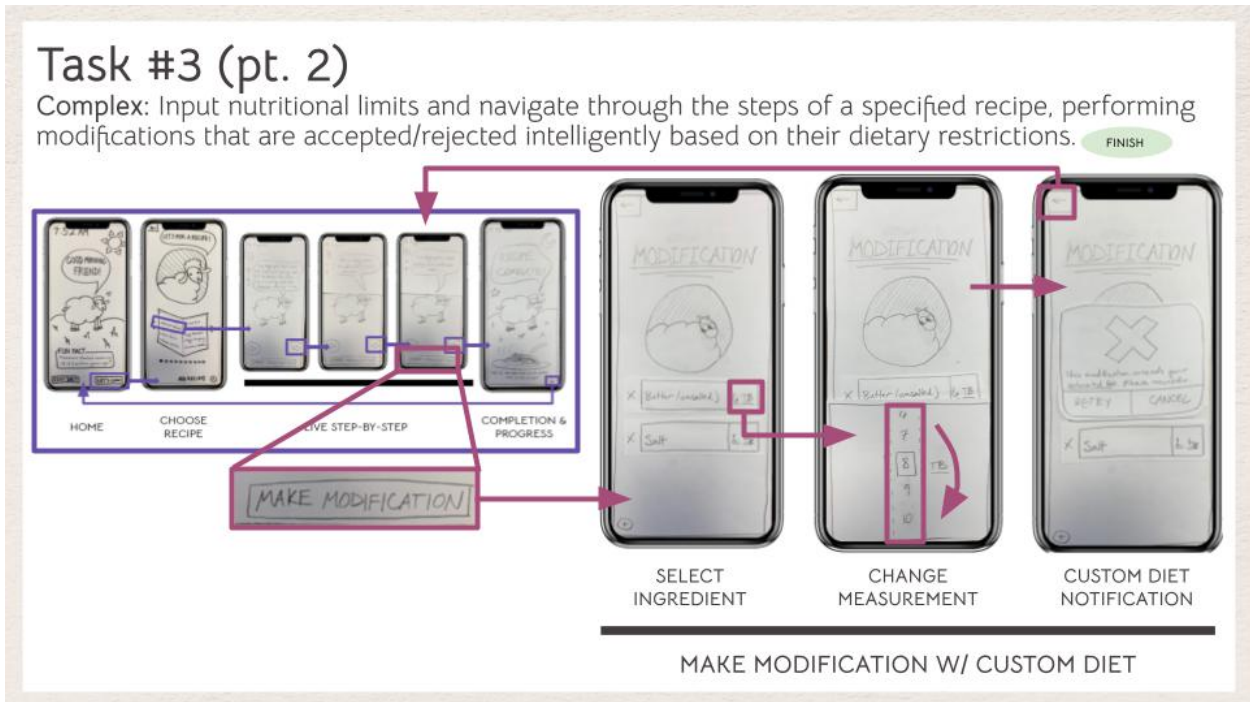


Figure 6. Second part of complex task flow for Lo-Fi prototype



Major Design Changes from Lo-Fi to Med-Fi

Our major design changes from our lo-fi sketches to our med-fi prototype can largely be grouped into three main categories: **refining personalization**, **adding an ingredients page**, and **restructuring modifications**. There are also branding changes and additional design changes that are not as major but still notable that have been documented in a supplementary table.

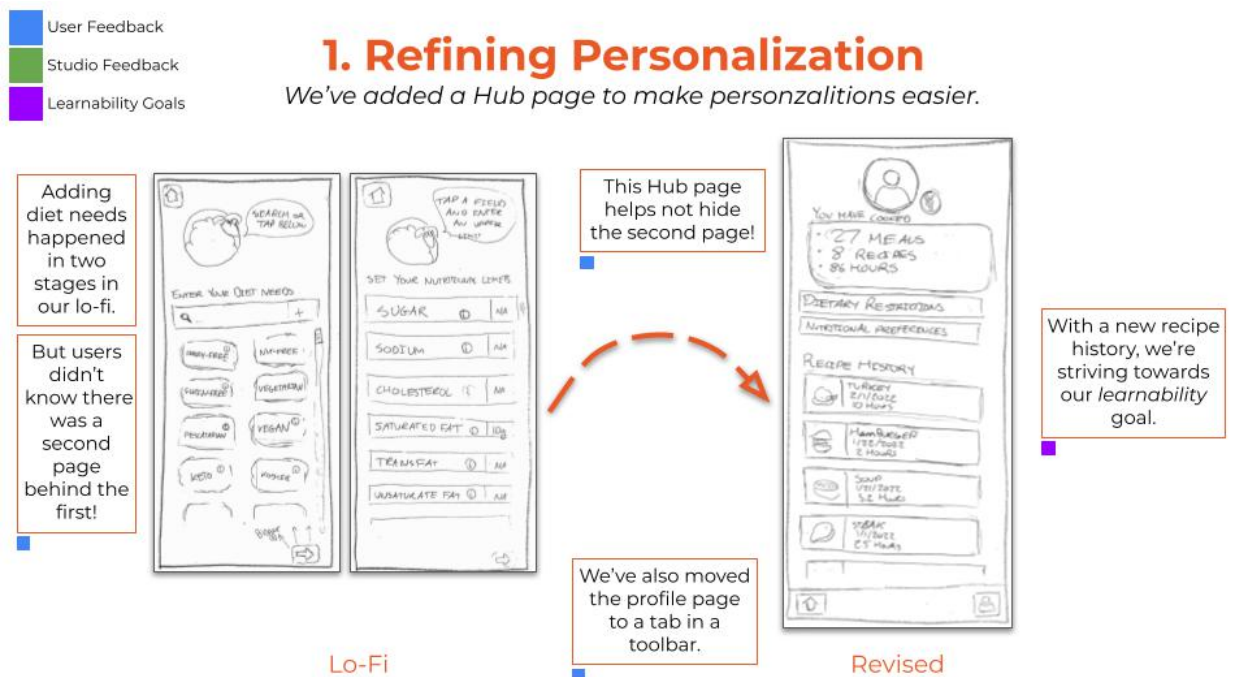


Figure 7. Revision outline and rationale for creating a profile hub screen

Me Profile Hub

Recipal offers users the opportunity to enter their dietary preferences into their profile so that meaningful suggestions can be made during the recipe selection and cooking process. As shown in the above diagram, our profile was initially made into two pages: one to indicate dietary preferences and one to indicate nutritional limits. However, in our prototype testing, we discovered that **users had trouble finding the nutritional limit page**. There was no label signaling the user that there is a second page to input preferences. Therefore, **we decided to provide a profile hub page** that has two buttons where users can clearly see that there are two pages and navigate to them (See Figure 7). Furthermore, the profile hub displays additional information and statistics about the



number of meals made, the number of unique recipes made, the number of hours the user has spent cooking, and the recipe history. We found it important to inspire and celebrate our users by displaying the progress that they have made using our app. This page is easily accessible as a tab in the toolbar.

Adding Information

Recipal is happy to offer users opportunities for personalization, however, our team discussed **making sure that personalizations are accessible to everyone** regardless of whether they know about dietary and nutritional restrictions. Consequently, for each dietary and nutritional restriction, **we have provided informational bubbles** that give a brief summary of what the restriction encompasses. Ideally, the app would lead users to reliable and expert sources if they would like more information. However, because of our limitations, users are given a short overview.



Figure 8. Revision outline and rationale for creating ingredients list screen

Adding an Ingredients Page

In the Med-Fi prototype, users could only access and modify ingredients during the recipe steps. Reasonably, we received user and studio feedback about **not being able**



to see the ingredient list at the start of a recipe. After discussing how people begin recipes, we realized that the majority of their experiences start with making sure that one has all of the proper ingredients. Our solution was to simply **add an ingredient list page before the start of the recipe steps** (See Figure 8). Users can not only view all of the ingredients, but they can make modifications before the recipe even starts. Our team decided to give the user more flexibility to decide where modifications can be made: at the start of the recipe or during the recipe.

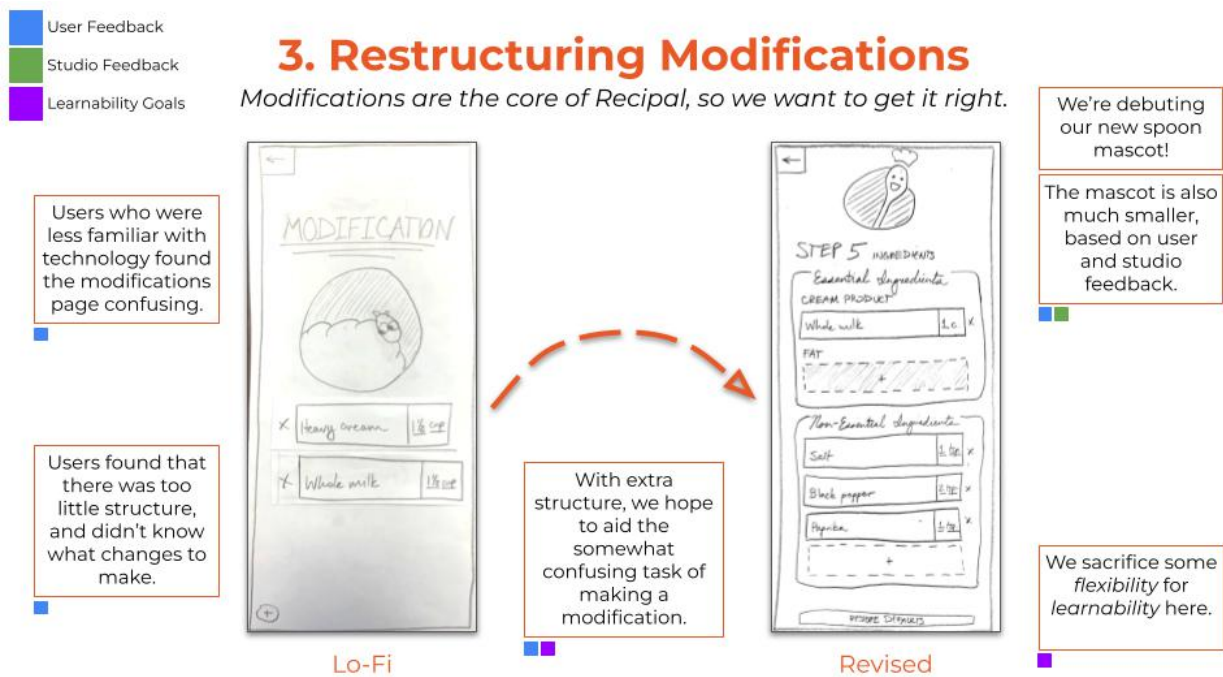


Figure 9. Revision outline and rationale for redesigning modification screen

Reorganizing Modifications

The modification features of Recipal are what make this recipe app unique. Therefore, our team wanted to include features that would make customizations quick and easy. In general, our participants who tested making modifications found deleting and adding ingredients to be intuitive. However, we found that **users wanted more guidance on what modifications could be made**. Consequently, we decided to **group the ingredients per step as essential and nonessential** (See Figure 9). If essential ingredients are modified, they **MUST** be replaced by a viable alternative or else Recipal deems that the recipe may not result in the desired outcome. Non-essential ingredients can easily be modified or deleted without changing the recipe drastically. To further



help define what essential ingredients are, each ingredient has a labeled category (e.g. cream or fat) that indicates the role of the ingredient in the recipe.

Error Prevention & Confirmation

Because the modification features in Recipal are quite consequential, we decided to add clearer and more useful error messages. Initially, users were able to add and delete ingredients freely without receiving much feedback. However, after user testing and discussion in our studio, quite a few **people mentioned wanting to save their modifications or receive confirmation for their changes**. We decided to add popup error messages that prompt whether the modification you made is correct. The recipe updates accordingly after the confirmation is made.

Toolbar

Although we did not focus on adding a toolbar in the Lo-Fi prototype, we decided to spend more time discussing **what are some of the most convenient actions users would want throughout the app**. Toolbars are very common features in many apps—so we decided to **design home and profile toolbar icons** for easier navigation to these pages. Users can now easily view their profile and return to the home page during any stage in the app.

Recipe Database

Our design for the recipe database was born out of a metaphor by representing the database as a recipe book. After testing participants with our Lo-Fi prototype, we discovered that **users had a difficult time reading the small recipe names** and navigating the recipe book with small arrows. Moreover, even though our participants enjoyed the parasocial character, participants wanted the size of the **image to be significantly reduced**. After implementing this feedback, we decided to provide a **scrollable recipe database** while still including the recipe book metaphor. Additional **visuals of the ingredients** were added throughout the app (on ingredients list, on recipe steps pages) to differentiate the ingredients more.

Branding Changes from Lo-Fi to Med-Fi

We had some significant branding changes in our project timeline (See Figure 10). We began with the clever 'Chef Shepherd', however, feedback from our peers indicated



that the name was hard to pronounce. Luckily, we found 'Recipal' to be more inviting. After settling on our current color scheme and value proposition, we decided to make the logo more personable by including our parasocial character and adding in our slogan.



Figure 10. Logo evolution from Lo-Fi, Med-Fi, and Hi-Fi prototypes

Med-Fi Prototype Gallery

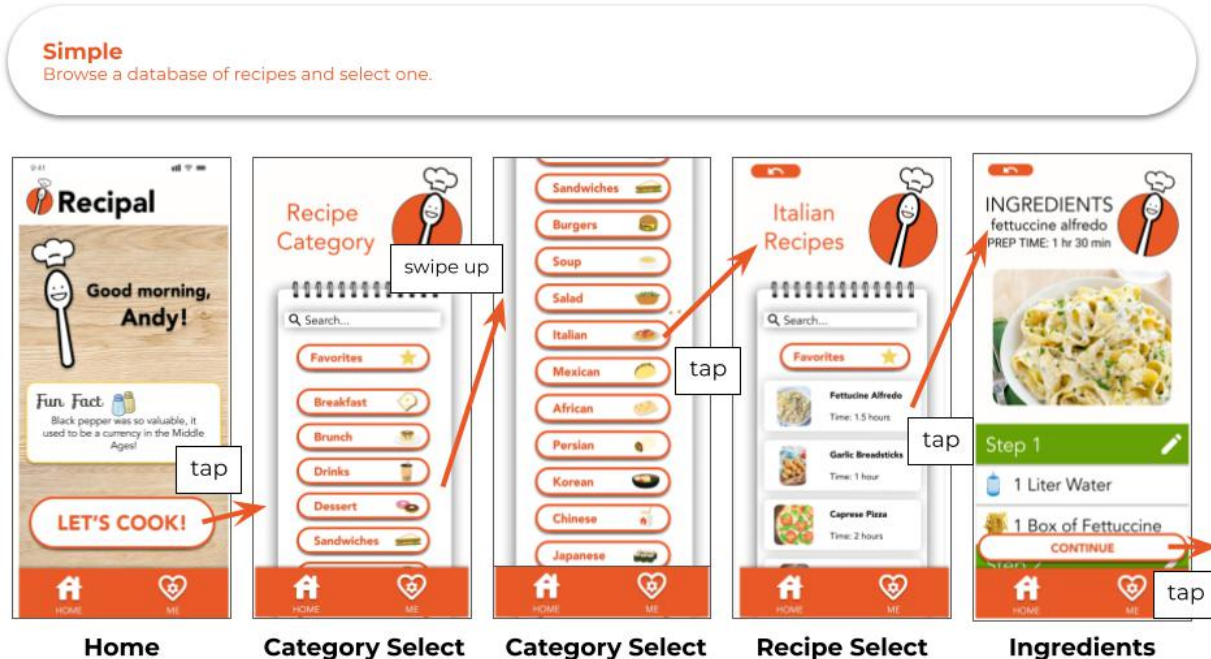


Figure 11. Simple task flow for Med-Fi prototype

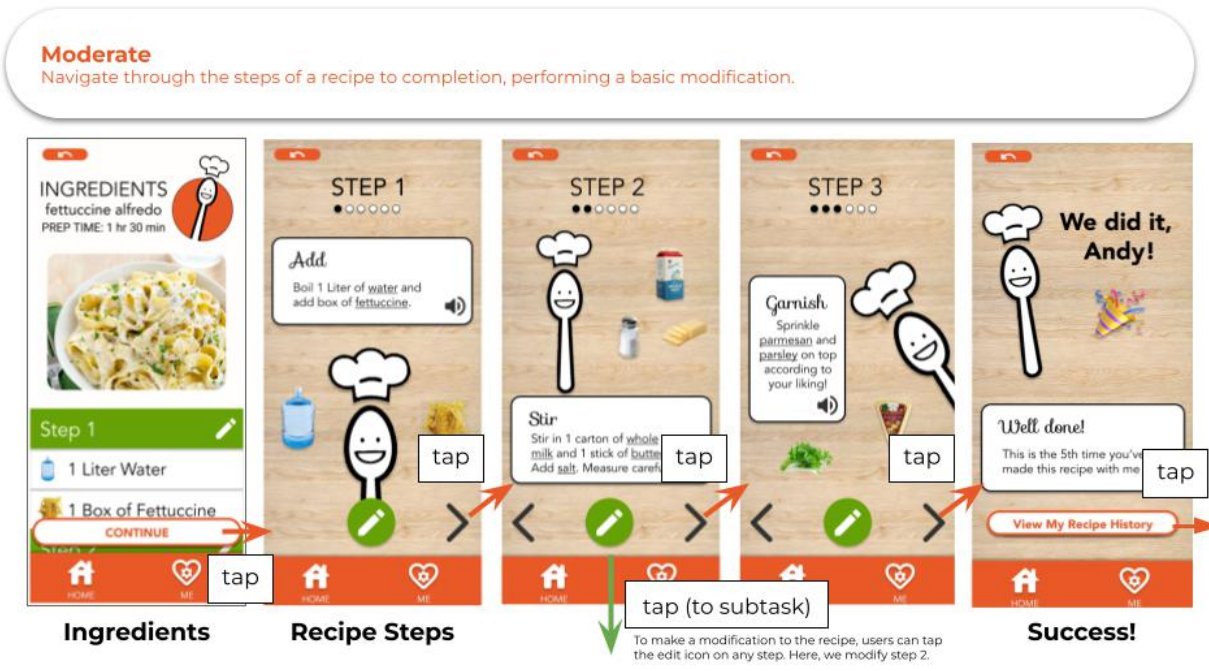


Figure 12. Overview of moderate task flow for Med-Fi prototype

Subtask: making a modification

This is part of the moderate task flow. Here, users modify the second step of the recipe.

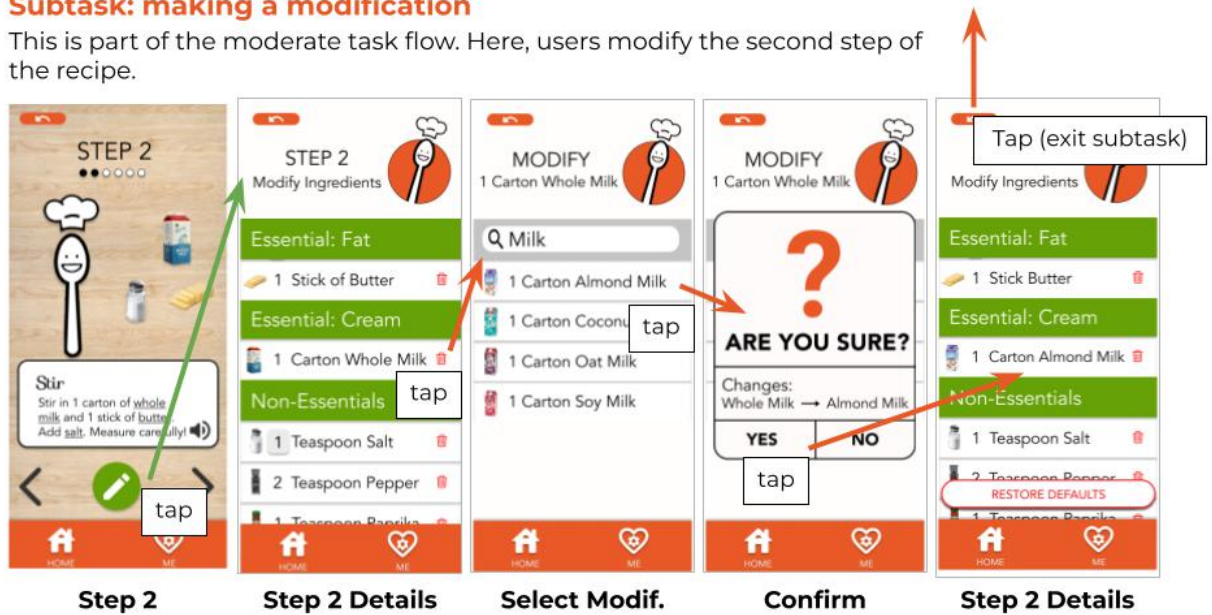


Figure 13. Subtask of moderate task flow for Med-Fi prototype



Complex
 Input nutritional limits and navigate through the steps of a specified recipe, performing modifications that are accepted/rejected intelligently based on the user's nutritional limits.

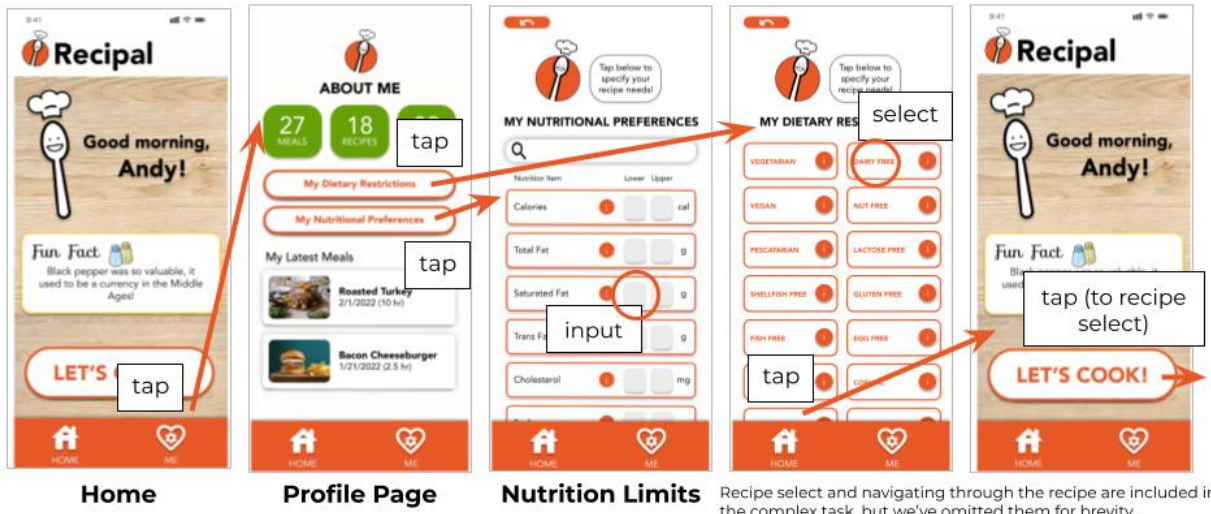


Figure 14. First part of complex task flow for Med-Fi prototype

Later: users' modifications are evaluated against their specified goals.

Here, a user tries to add too much salt, which exceeds their sodium limit.

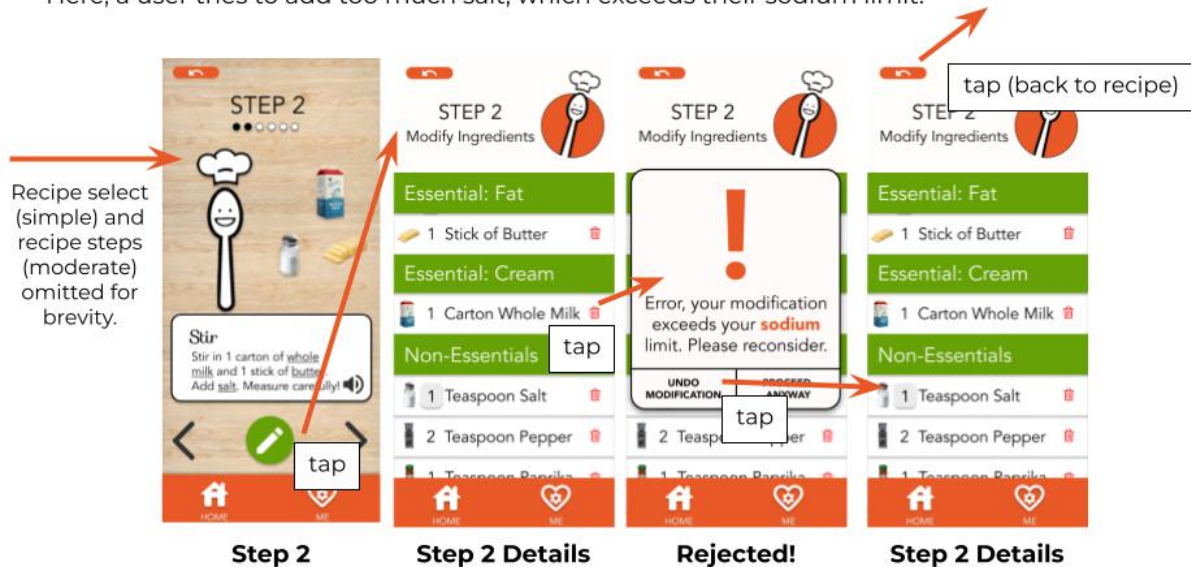


Figure 15. Second part of complex task flow for Med-Fi prototype



Severe Med-Fi Heuristic Violations

A panel of evaluators examined our med-fi prototype and reported heuristic violations they found. The following violations are those that were assigned a severity rating of 3 or 4, indicating that they require our attention and may necessitate changes. We’ve discussed how we fixed those violations as we moved from our med-fi to high-fi prototype, or provided reasoning for why we chose not to address them.

Heuristic Violations We **Fixed**

Severity	Type	Violation Description	Solution
3	H4 Consistency and Standards	The “back” button on the recipe progress page cancels the recipe and goes all the way back to the recipe select page instead of back to the previous ingredient page	Replace the “back” button on the recipe progress page with an X icon
3	H9 Help users recognize, diagnose, and recover from errors	When a user deletes an “essential” ingredient, there is no message alerting them that this ingredient is essential for the recipe and that they must add the ingredient back or choose an appropriate substitute	Add text that reads “This ingredient is required” to the empty spot when an essential ingredient is removed
3	H3 User Control and Freedom	When a user attempts to navigate out of the recipe steps, there is no indication that their progress is saved.	Add an alert that reads “Your progress will not be saved” upon user attempting to leave recipe steps
3	H8 Aesthetic and Minimalist Design	There is some inconsistency in fonts, particularly on the recipe steps screens—“Add” and other directives are in a different font	Use Avenir font for directives
3	H7 Flexibility & Efficiency of Use	On the recipe select and primary recipe screens, it could be helpful to display high-level information about the recipe, such as calories,	Add calories to the recipe select bubbles. On the ingredients page,



		difficulty, yield, or anything else that may play a role in recipe selection	add high-level detail: yield, calories, difficulty, time
3	H9 Help Users Recognize, Diagnose, and Recover From Errors	The error message that appears when modifying an ingredient quantity would violate a dietary restriction or nutritional preference doesn't state the exact nature of the violation. Additionally, nutritional limits are in daily values, which may not align with the needs of a user who is cooking individual meals using Recipal (See Figure 16).	Limits will be per-meal instead of per-day. Make error message more detailed to include what the exceeded limit was/how this modification exceeds it

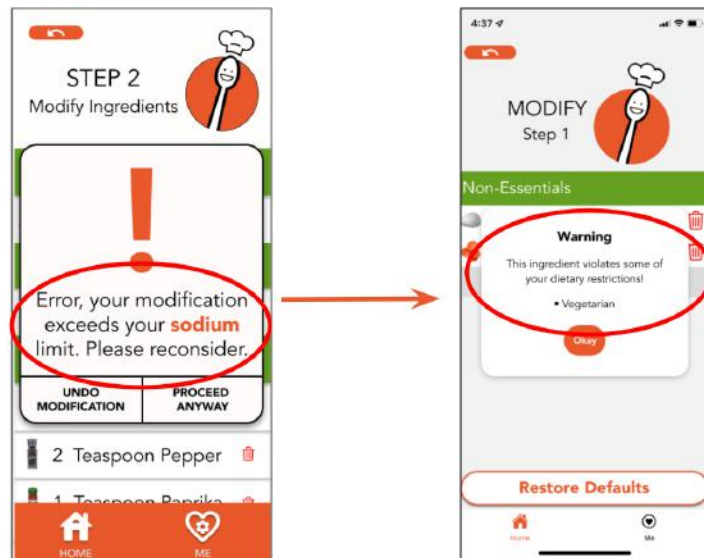


Figure 16. Screenshot of error message during modification

Severity	Type	Violation Description	Solution
3	H7 Flexibility & Efficiency of Use	The home page currently only displays a "fun fact" and a button to navigate to the recipe select menu. A page with this level of functionality doesn't seem to	Combine home page/recipe category select screens



		warrant having its own dedicated button	
3	H1 Visibility of System Status	When searching for recipes, it is currently unclear whether search results are filtered based on user dietary restrictions and/or nutritional preferences, or if the app will show the user all available recipes and expect them to make their own decisions (See Figure 17).	Still show recipes that violate the user's dietary restrictions, but with an exclamation/ alert bar. If the user clicks it, warning message displayed

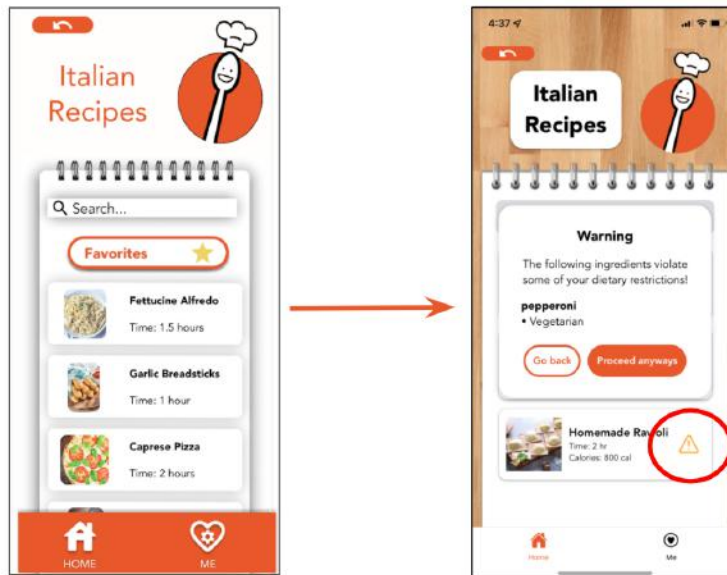


Figure 17. Screenshot of system visibility during recipe selection

Severity	Type	Violation Description	Solution
3	H3 User control and freedom	The user cannot go back to the recipe steps from the "Me" page	Let the user go to the Me page during a recipe, but if they try to modify diet/nutrition, display an error



			asking them to finish/close the recipe first
3	H3 User Control & Freedom	In the recipe steps pages, a series of dots visually represents where the user is in the recipe, but isn't functional as a way of navigating through each step. In long recipes, the limitation of tapping through recipes only linearly may become tedious for users referencing past/future steps	Implement functionality allowing the user to navigate recipe steps by tapping on dots
4	H3 User Control & Freedom	When modifying the quantity of ingredients, the user is given no visual prompt of how to change it. Additionally, there is currently no way to decrease the quantity (See Figure 18).	Create a way to modify the quantity of ingredients (both up and down) with natural visual cues for use

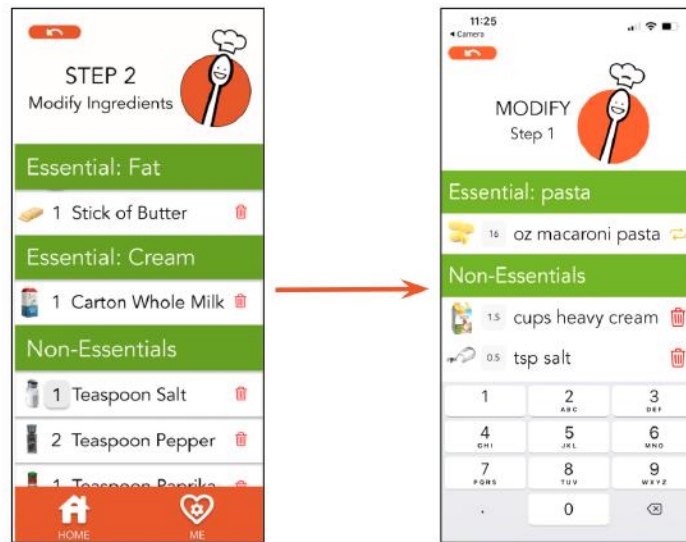


Figure 18. Screenshot of modification screen for editing ingredient values



Heuristic Violations We **Did Not Fix**

Severity	Type	Violation Description	Reason For Not Fixing
3	H2 Match between System and World	The user cannot change units to the measurement system they are familiar with.	After an attempt, it proved too difficult to add a customary/metric toggle on the Me page. We added a disclaimer about this to our Me page to ensure users didn't feel we'd forgotten them
3	H11 Accessible	The recipe select pages are purely visual and don't offer text-based alternatives for users with visual impairment	The recipe select pages actually do contain text, which can be read by screen readers. For the icons, we plan to provide alt-text
3	H7 Flexibility and efficiency of use	The user cannot save a recipe after they have modified it	We don't anticipate having adequate time or resources to implement this functionality in the given timeframe, as it would require each user to have their own account/data on the cloud

Additional Changes

Here we note some miscellaneous changes that came from studio feedback and group discussion:

- Added 'My Latest Recipes' for users to view recent endeavors and keep track of their favorite recipes
- Added statistics in profile about how many meals they have made, how many unique recipes they've tried, and how many hours they've spent cooking with Recipal (only based on cooking time)
- Made 'Fun Fact' bubble change to an assortment of different facts about food



- Removed colored borders from speech bubbles as an attempt to make design sleeker and more aesthetic
- Reduced drop shadows throughout, as they were deemed distracting for some participants in studio
- Added onboarding process in the form of account login
- Reduced size of error message popup to not take up the whole screen



High-Fi Prototype Gallery

Simple
Browse a database of recipes and select one.

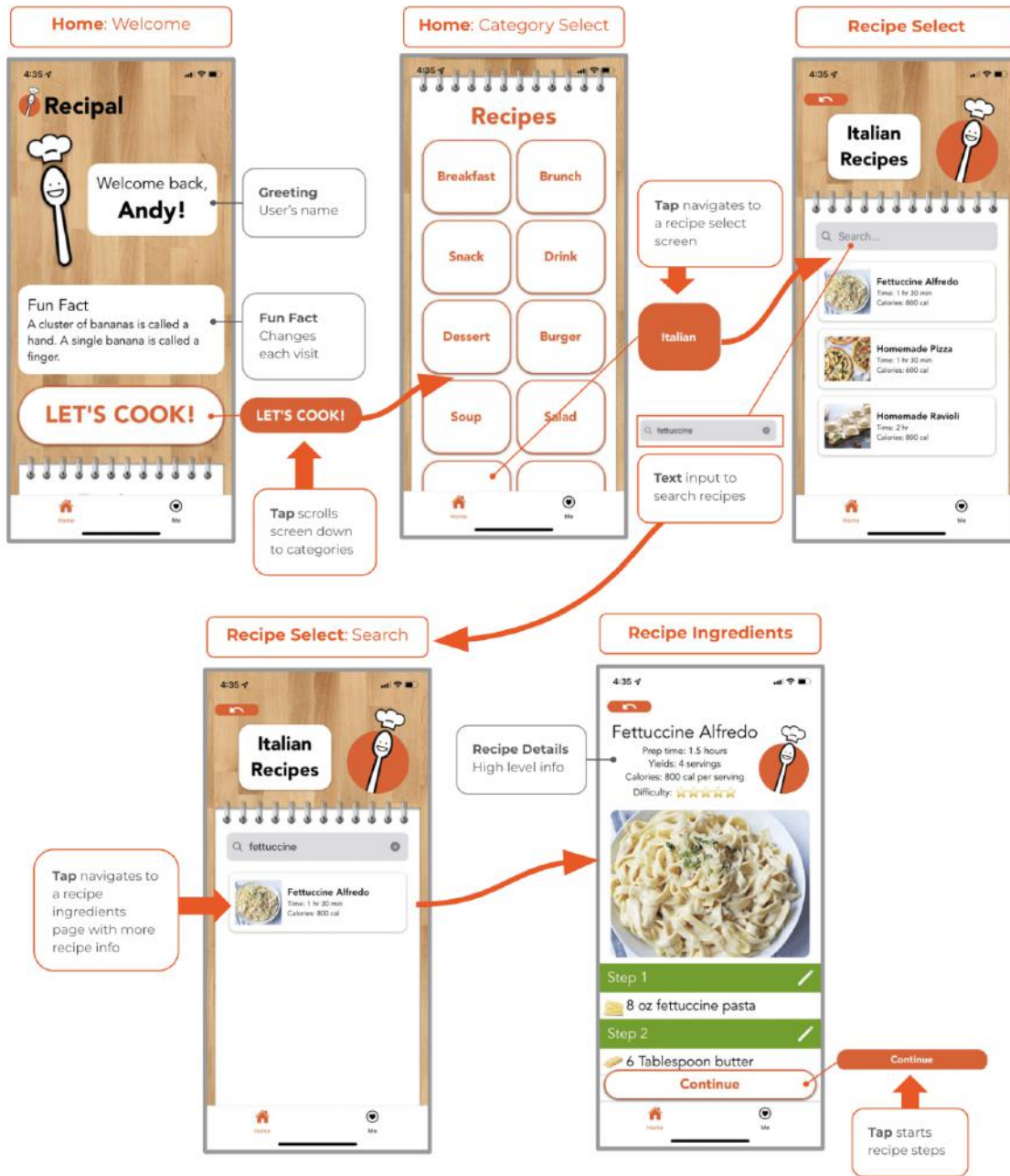


Figure 19. Annotated simple task flow for Hi-Fi prototype



Moderate
 Navigate through the steps of a recipe to completion, performing a basic modification

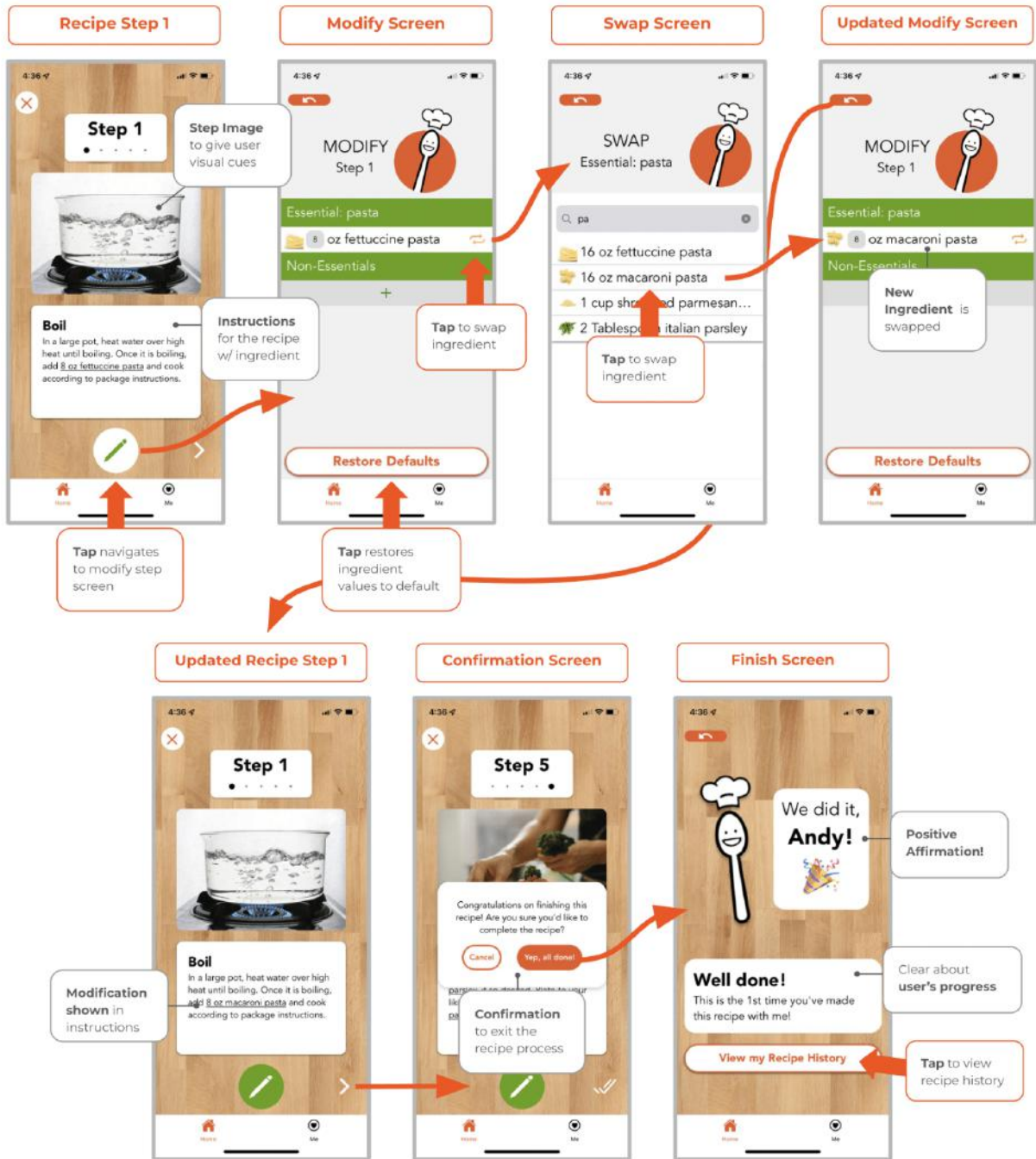


Figure 20. Annotated moderate task flow for Hi-Fi prototype



Complex
 Input nutritional limits and navigate through the steps of a specified recipe, performing modifications that are accepted/rejected intelligently based on the user's nutritional limits.

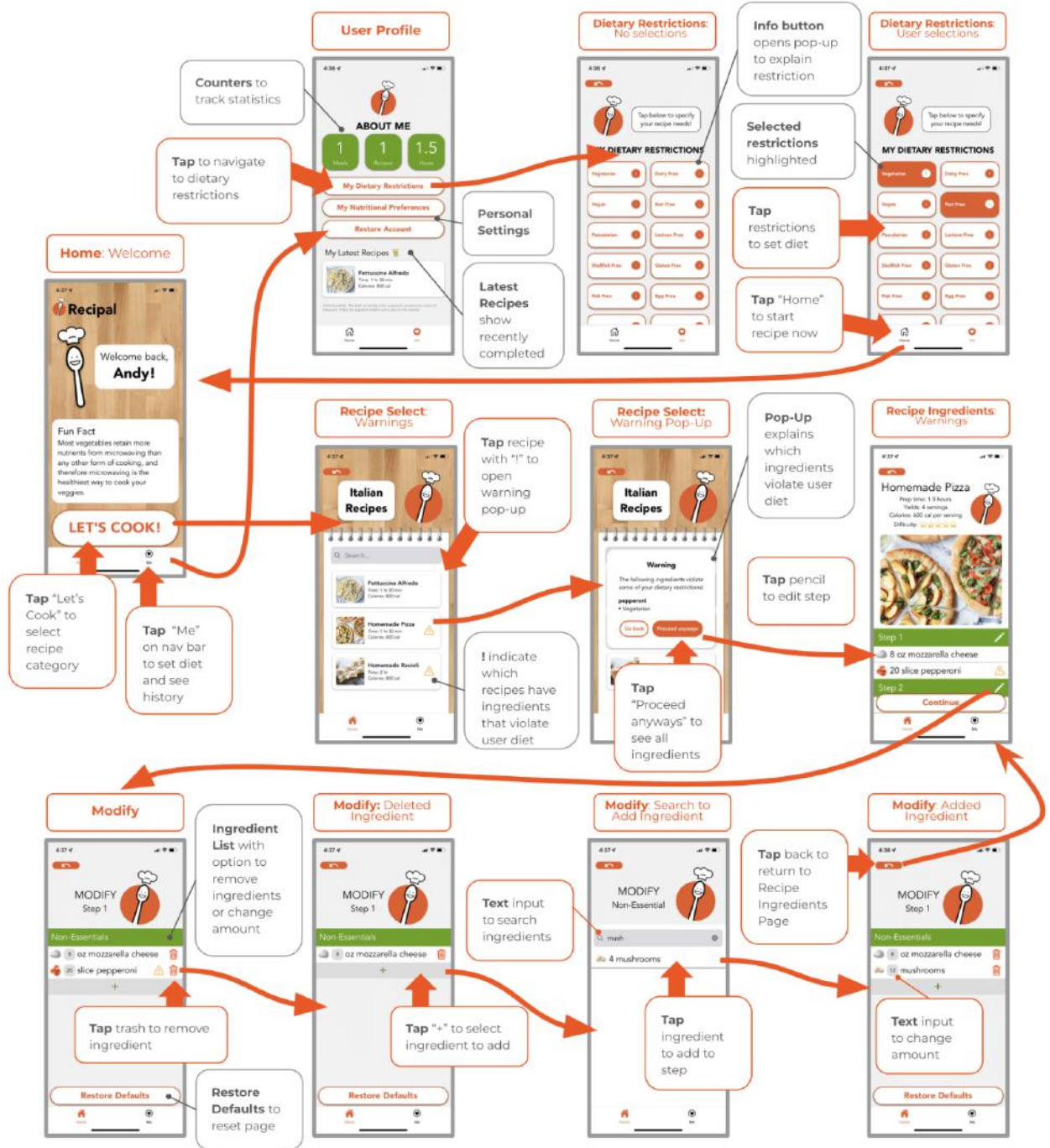


Figure 21. Annotated complex task flow for Hi-Fi prototype



Values in Design

Our Values		
Health	Inclusion	Wellness
Recipal promotes health by helping people cook meals that meet their individual nutrition goals.	We promote inclusion by recognizing that everyone eats uniquely and therefore can customize Recipal to their diet.	We also recognize that wellbeing is holistic and extends beyond nutrition. Therefore, we promote wellness via the social companionship that Recipal offers.

Values Embedded in Final Design

The following features help embed our values of health, inclusion, and wellness in our final design:

Health	Inclusion	Wellness
<ul style="list-style-type: none"> - The ability to swap out ingredients enables users to make healthy choices - Including caloric and other nutritional info about recipes also enables users to make healthy choices - Indications that alert the user when a recipe, ingredient, or modification would violate their nutritional goals (ex. icons, pop ups) help the user stay on track with their health 	<ul style="list-style-type: none"> - A wide variety of diets and nutritional limits for users to choose from when customizing their profile - Multiple accounts can be saved on one device, allowing more people to be included - The ability to proceed even after given a warning that something will violate nutritional goals affords users more flexibility 	<ul style="list-style-type: none"> - Our mascot Spoonie offers users social companionship, building the bond by remembering users' names and how many times they've cooked recipes together - The fun fact injects a playful element, which may interest and entertain users - Encouraging cooking can enhance wellness for users that destress through or find joy in cooking



Conflicting Values

In the medium-fi stage of our prototype, we discovered two instances of conflicting values—one between health and inclusion, and one between health and wellness. We’ve reproduced our analyses of these conflicts below and explained how we’ve addressed them in our final design or why it was challenging to address the conflicting values.

Health vs. Inclusion

Health might conflict with **inclusion**. It is difficult for a truly inclusive cooking app to adopt universal standards for what is “healthy” for all people. Health needs vary, and if we want to include all users, we have to take special care to consider what we promote as “healthy” or “unhealthy” to our users.



Even with this many diet categories, it’s difficult to capture everyone’s diet needs. What if someone is allergic to only red apples?

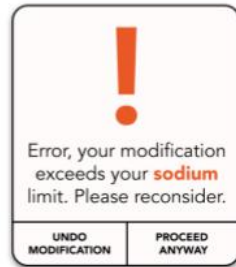
Figure 22. Dietary restrictions screen demonstrates health and inclusion conflict

It was a challenge to fix this conflict between health and inclusion because there are so many different permutations of diets and nutritional needs—it would be impossible to include robust support for every single one (See Figure 22). A possible way to remedy this would be to allow users to input custom diets, nutrients, allergies, and other needs. While this is not a functionality we included in our high-fi prototype, it is something we would be interested in developing if we were given the chance to further develop our app.



Health vs. Wellness

Health may also conflict with **wellness**. It might be appropriate for a person to occasionally cook meals that would be considered unhealthy if it contributes to their wellbeing. What if, for example, a person wants to make a meal that impresses their friends and family (wellness) but in the process might sacrifice taste for nutrition (health)?



It's difficult to make diet suggestions without knowing the context of users' decisions.

Figure 23. Modification warning popup demonstrates health and wellness conflict

We addressed this conflict between health and wellness by including more details in pop ups, empowering users to make more informed and deliberate choices about their diet (See Figure 16). Added indicators signal to users which specific ingredients in recipes violate their nutritional needs and highlight which restrictions are being violated, as well as to what extent they're being violated. With this enhanced precision of information, users can strike a finer balance between their health and wellness, allowing these values to coexist in harmony rather than conflict.



Final Prototype Implementation

Tools

We built Recipal using **React Native within the Expo framework** (we used the Expo platform for package management, testing, and exporting). Within React Native, our application was built using help from various **open-source libraries**; in particular, React Navigation was essential as an all-in-one navigation solution, React Snap Carousel formed the core of our recipe step task flow. For our user data, we relied on React local storage (this means that Recipal stores all of its data on users' devices). Finally, for collaboration, we used **Git**. As a whole, the tools described here were all essential during the development process, in particular the help of Expo, which simplified much of the early set-up process when it comes to deploying a cross-platform mobile app. However, these tools still had some limitations. In particular, the use of React Native local storage means that user info is not backed up on a server, and support for accounts is shallow (e.g. if a user's device is wiped, all of their data will be lost). Additionally, using the Expo framework limited the React Native libraries that we could use to only those compatible with the Expo ecosystem (though conflicts on this issue were rare).

High-Fi Limitations

Most interactions on our app are faithfully implemented: the user's modifications are all calculated against their inputted limits, and the user's dietary restrictions and recipe history are all functional. One exception to this was the **simplification of nutritional limits**, for which we adopted a per-ingredient model; in other words, we only calculate if a single ingredient exceeds the user's specific nutrient limits, not the recipe as a whole. This simplification was necessary due to the unmanageable complexity of the different combinations of ingredients that a user could input. Another simplification was **limiting units of measure to customary units**. This simplification was made due to the difficulty of managing two sets of data for two different systems of units (with regards to inclusion, we added a disclaimer about this to ensure users did not feel excluded by the absence of metric units).



Summary & Next Steps

Key Learnings About The Design Thinking Process

1. The Value of Iteration

Our app went through multiple rounds of ideation, design, and improvement that allowed us to enhance our product at each stage of development. The success of this iterative design process highlighted the value of seeking frequent feedback and learning how to effectively leverage that feedback for maximum growth.

2. User-Centered Design

When developing a product, opting for a user-centered approach helps to ground the design process in what matters most—creating something that effectively serves users and fulfills their needs. Involving users in every step of the design process ensures that design decisions benefit users rather than inconvenience or frustrate them.

Key Learnings About Augmenting Human Abilities

1. People are interested in learning and improving

Other projects that stemmed from the theme of augmenting human abilities enabled users to learn and improve. One app helped users explore a variety of creative hobbies, such as painting and playing an instrument. Another app assisted users with evaluating the ethical values of competing products so they could make more ethical consumption choices.

2. People have a desire to connect with others

Other projects also frequently connected users with others. One app connected users based on the compatibility of their music tastes. Another app connected users through the memories they shared about specific locations.

Key Learnings About Cooking

1. People want agency over their food

Through our needfinding, we discovered that when people have the power to make choices about their food, they feel more comfortable and confident about what they consume, especially if those choices are informed. It can be difficult to find accurate



information about food and recipes, so Recipal was designed with that desire for information in mind, empowering users to have agency over their food.

2. Food can play a large role in a person's identity

Another insight we gleaned from our needfinding is that food can play a large role in a person's identity, imbuing food with an emotional significance that goes beyond its nutritional value. For example, one interviewee connected with his culture through eating and cooking cultural food, and another interviewee discussed how food was meaningful to her because of the cooking experiences she shared with her family.

Next Steps

If our team had more time and resources to further develop our app, some additional features we would be interested in adding include:

- Allow users to add their own ingredients and recipes to the Recipal database
- Allow users to add their own custom diets, nutrients, and allergies
- Support the saving of modified recipes so users can more easily remake recipes they have modified in the past
- Support toggling between US customary units and metric units
- Expand the Recipal database with more recipes and ingredients