Final Project Submission
One-Armed Team

Project Team

- Anita Ruangrotsakun (she/her) – lead
- Eric Slyman (they/them) – HCI/People
- Emily Arteaga (she/her) – Researcher
- Aaron Rafter (he/him) – Technical Writer
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Final Facets

Hand and Arm Mobility

One arm/hand ……………………………….…………………….………………….. Two arms/hands

Weight Bearing Load

<5 lbs per arm ……………………………………………….…………………….. >= 15 lbs per arm

Level of Adaptation

Low …………………………………………………………………….……………….. High

Level of Foresight / Planning Ahead

Low …………………………………………………………………….……………….. High

Personas

Underserved Persona – Will/Willow

Will, man, 35 years old

Background Knowledge and Skills

Will is a college counselor and war veteran who lives in Portland. He loves his job, playing with his dog, and hosting dinner parties with his friends. One of the most important

things to him is showing people that they can overcome difficult situations. He lost his arm while serving in the military, but is now thankful to be an inspiration to young minds.

Foresight Level – High Foresight

- Will must plan ahead of time for each day, sometimes even each week. He is a highly organized person and he thinks through how he will tackle various challenges due to having only one arm. **[18]**
- In terms of cooking, Will must plan when he wants to cook and allocate extra time for completing the various steps.[1] When following a recipe, he thinks through the various steps ahead of time in order to avoid difficulties while in the middle of cooking.[2]

Physical Capabilities

Arm and Hand Mobility: Low Mobility

- One of Will's arms was amputated, and the other arm is fully functional.[3]
- He often uses other body parts, such as his elbows, shoulders, or mouth, to help him with daily tasks.[4]

Weight Bearing Load: Low Load

- Will can comfortably carry up to 5 pounds with his functional arm.
- He's gotten used to carrying around a backpack with his laptop and everyday items. **[3, 4, 9]**

Attitude Towards Adaptations

Level of Adaptation: Many Adaptations

- Will needs to figure out new ways of getting things done with one arm, even if it involves using unconventional tools and methods. **[3, 5, 7, 8, 12, 15, 16, 17]**

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[1] One of our interviewees mentioned that she cooks once a day, around 5 times a week. She follows recipes, but it takes double the time to cook. "With one hand it becomes difficult, it is around 20 minutes more". **[3]**

[2] One of our interviewees mentioned they plan ahead of time, before getting into the middle of cooking. Stuff like "this requires a lot of chopping" and "I need to use a can opener." **[1]**

[3] We are assuming no other major disability as that has been the experience we have observed from our interviewees and sources. One source's interviewee specifically mentioned that "There is nothing wrong with my brain; it is my hand that is missing!" **[1, 2, 3, 10]**

[4] One of our interviewees mentioned using "lots of using elbows, knees, and teeth" in order to accomplish day to day tasks, and in one of the videos we saw an example of someone without an arm carrying bags with his mouth **[1, 6]**

Mainstreamer Persona – Leo/Leona

Leona, woman, 25 years old

Background Knowledge and Skills

Leona is a newly graduated lab technician who lives in Seattle. She likes walking in the rain and exploring the lakes in and around Seattle. She is a big foodie, but doesn't cook much at all. She loves coffee and trying new foods, usually foods that were recommended to her by her international friends. She's noticed her budget is strained by eating out a lot and wants to cook more, but isn't sure where to start.

Foresight Level: Low Foresight

- Leona often goes out for spontaneous meals with friends and prefers to improvise day-to-day.
- Her attempts at home cooking have been a few steps short of disastrous: while they remained some definition of edible, she's not happy about the results. Leftover food or ingredients often goes bad, and she's still straining her food budget.

Physical Capabilities

Weight Bearing Load: High Load

- Leona is an active person, and she has no problem carrying heavier items (at least 10 pounds).

Arm and Hand Mobility: High Mobility

- Both of Leona's arms and hands are fully functional.

Attitude Towards Adaptations

Level of Adaptation: Few Adaptations

- Leona does not need to make many adaptations to do day-to-day tasks.

One-Armed Mag Cognitive Walkthrough – Underserved Persona – Use Case 3

Selected use case: level of adaptation / techniques

1. **What is the overall scenario or use case you are walking through?**

Willow wants to adapt a recipe based on the tools and techniques that are accessible to her before she begins cooking.

2. **What is the subgoal?**

Catalog the available kitchen tools.

3. **Will Willow have formed this subgoal as a step towards the overall goal? Why?**

☐ *Yes*	☐ *Maybe*	☐ *No*
Which, if any, of Willow's facets did you use to answer the question?		
Hand/arm mobility, Weight bearing load, Foresight/planning ahead, Level of adaptation		
Foresight/planning ahead, Level of adaptation	*Foresight/planning ahead, Level of adaptation*	*Foresight/planning ahead, Level of adaptation*
Why?		
Willow plans ahead so she will probably look for the tools she has available at home in order to prepare them to cook the recipes. Also, for level of adaptation, maybe there are tools she needs to avoid to make recipes faster and efficient.	She will likely think about different tools but not see anything in the interface to confirm that this might be supported to pursue in terms of actions.	Willow may not see a clear indicator on the screen of a way to catalog her kitchen tools, so she may not think of this subgoal at all

4. **What is the action you wish Willow would take next?**

Select the camera tool to take a photo of her kitchen tools.

5. [Before the action] Will Willow take this action? Why?

☐ *Yes*	☐ *Maybe*	☐ *No*
Which, if any, of Willow's facets did you use to answer the question?		
Hand/arm mobility, Weight bearing load, Foresight/planning ahead, Level of adaptation		
	Foresight/planning ahead	*Foresight/planning ahead*

	Hand/arm mobility	Hand/arm mobility
	Why?	
	The camera is a prominent button that's easy to click and Willow may be curious to know what it does and how taking a picture can relate to adapting the recipe	No because it's unclear what the camera is for and the "edit recipe" button is an attractive alternative option for adapting the recipe Low hand mobility means it may be difficult to click elements, so she clicks the "easiest" to click element.
	What in the UI helped/confused <persona> in this step?	
		having 2 buttons there could be confusing for Willow, and probably pick the "edit recipe" one.

6. [Before the action] How will Willow interact with the product? (Touch, voice control, other)

Detailed list of interaction methods for <persona> to achieve the action
Large clickable camera button Voice assisted screen navigation to the camera button
Which, if any, of Willow's facets did you use to answer the question? Why?
Hand/arm mobility, *Weight bearing load,* *Foresight/planning ahead,* *Level of adaptation*
Hand/arm mobility: will interact using touch - try to touch the buttons available. Level of adaptation: will interact by voice activation control - saying "hey chef" + command

7. **[After the action] Will Willow think they are making progress towards the overall goal? Why?**

⬜ *Yes*	⬜ *Maybe*	⬜ *No*
Which, if any, of Willow's facets did you use to answer the question?		
Hand/arm mobility, *Weight bearing load,* *Foresight/planning ahead,* *Level of adaptation*		
Foresight/planning ahead, *Level of adaptation*		
Why?		
Willow is greeted. There will be buttons of confirmation like "Update recipe"		

What in the UI helped/confused Willow in this step?		
The presence of common camera control options and the ability to scan the room with the camera view. The presence of the "update recipe" and "learn how to use it" buttons.		

8. What is the subgoal?

Learn how to use a specific tool.

9. Will Willow have formed this subgoal as a step towards the overall goal? Why?

☐ *Yes*	☐ *Maybe*	☐ *No*
Which, if any, of Willow's facets did you use to answer the question?		
Hand/arm mobility, *Weight bearing load,* *Foresight/planning ahead,* *Level of adaptation*		
Hand/arm mobility *Level of adaptation* *Foresight/planning ahead*		*Level of adaptation* *Hand/arm mobility*
Why?		
Willow could have been recently disabled and just bought a gadget that was recommended to her but she doesn't know how to use it yet. Thus she would likely want to see some examples of how to use it in her day to day cooking.		Willow may be experienced with various types of adaptations and assume the information they have about different tool uses is already sufficient for completing her task.

10. What is the action you wish Willow would take next?

Click "Learn how to use it" button

11. [Before the action] Will Willow take this action? Why?

☐ *Yes*	☐ *Maybe*	☐ *No*
Which, if any, of Willow's facets did you use to answer the question?		
Hand/arm mobility, *Weight bearing load,* *Foresight/planning ahead,* *Level of adaptation*		
Hand/arm mobility, *Foresight/planning ahead,*		

Level of adaptation		
Why?		
The "learn how to use it" button is clearly labeled and Willow is motivated to learn how to use the tool before she ends up in the middle of a recipe.		
What in the UI helped/confused <persona> in this step?		
The "learn how to use it" button		

12. [Before the action] How will Willow interact with the product? (Touch, voice control, other)

Detailed list of interaction methods for <persona> to achieve the action
Touch the button (we probably want to make these resizeable / customized to what she needs) Voice control: "hey chef, I want to learn how to use this"
Which, if any, of Willow's facets did you use to answer the question? Why?
Hand/arm mobility, *Weight bearing load,* *Foresight/planning ahead,* *Level of adaptation*
Willow says "How can I use this tool?" Willow will try to click the "learn more" button, but it may be too small

13. [After the action] Will Willow think they are making progress towards the overall goal? Why?

☐ *Yes*	☐ *Maybe*	☐ *No*
Which, if any, of Willow's facets did you use to answer the question?		
Hand/arm mobility, *Weight bearing load,* *Foresight/planning ahead,* *Level of adaptation*		
Foresight/planning ahead, Level of adaptation		
Why?		
Yes, Willow will find videos of people using the specific tool, so she will be able to follow and know in which cases to use it. These videos will also help her plan new recipes with knowing how to use the tool.		
What in the UI helped/confused Willow in this step?		
Yes, it helped find video tutorial to follow		

14. What is the subgoal?

Tune the recipe based on the discovered techniques / available tools

15. Will Willow have formed this subgoal as a step towards the overall goal? Why?

☐ *Yes*	☐ *Maybe*	☐ *No*
Which, if any, of Willow's facets did you use to answer the question?		
Hand/arm mobility, Weight bearing load, Foresight/planning ahead, Level of adaptation		
Hand/arm mobility, Weight bearing load, Foresight/planning ahead, Level of adaptation		*Hand/arm mobility, Weight bearing load*
Why?		
Yes, Willow may see the tutorial and find a suitable technique that works with her one-armed situation and will want to incorporate that into her recipe next		No because Willow likes to plan ahead, if it looks like using the tools for the recipe will take a lot of time and effort, or if it goes beyond her weight bearing she will avoid it.

16. What is the action you wish Willow would take next?

Click the back arrow at the top of the app

17. [Before the action] Will Willow take this action? Why?

☐ *Yes*	☐ *Maybe*	☐ *No*
Which, if any, of Willow's facets did you use to answer the question?		
Hand/arm mobility, Weight bearing load, Foresight/planning ahead, Level of adaptation		
Why?		
		Clicking the back arrow back tracks from the current subgoal and is unintuitive
What in the UI helped/confused <persona> in this step?		
		Back arrow at top of page

18. [Before the action] How will Willow interact with the product? (Touch, voice control, other)

Detailed list of interaction methods for <persona> to achieve the action
Touch the back button (which is pretty small right now) Voice control to go back to the previous screen

Which, if any, of Willow's facets did you use to answer the question? Why?
Hand/arm mobility, Weight bearing load, Foresight/planning ahead, Level of adaptation
Hand/arm mobility: touching the button for going back Level of adaptation: saying "hey chef" + command

19. [After the action] Will Willow think they are making progress towards the overall goal? Why?

☐ **Yes**	☐ **Maybe**	☐ **No**
Which, if any, of Willow's facets did you use to answer the question?		
Hand/arm mobility, Weight bearing load, Foresight/planning ahead, Level of adaptation		
Why?		
Yes, because she could see the "Update recipe" button		No, because Willow returned to a previous screen state and feels like she's losing progress
What in the UI helped/confused Willow in this step?		
Yes, helped because of the label of the buttons		

20. What is the action you wish Willow would take next?

Click the "update recipe" button.

21. [Before the action] Will Willow take this action? Why?

☐ **Yes**	☐ **Maybe**	☐ **No**
Which, if any, of Willow's facets did you use to answer the question?		
Hand/arm mobility, Weight bearing load, Foresight/planning ahead, Level of adaptation		
Why?		
Yes, it appears to be the most obvious next step to complete the subgoal of updating the recipe		
What in the UI helped/confused <persona> in this step?		
The "update recipe" button is clearly labeled		

22. [Before the action] How will Willow interact with the product? (Touch, voice control, other)

Detailed list of interaction methods for <persona> to achieve the action
Touch the "update recipe" button Voice control: "hey chef, update the recipe"
Which, if any, of Willow's facets did you use to answer the question? Why?
Hand/arm mobility, Weight bearing load, Foresight/planning ahead, Level of adaptation
Hand/arm mobility: touching the button for update recipe Level of adaptation: saying "hey chef" + command

23. [After the action] Will Willow think they are making progress towards the overall goal? Why?

☐ Yes	☐ Maybe	☐ No
Which, if any, of Willow's facets did you use to answer the question?		
Hand/arm mobility, Weight bearing load, Foresight/planning ahead, Level of adaptation		
Why?		
	Things will change on the recipe, so if Willow was familiar with the recipe, she may notice these changes. However, there is no specific callout to make her aware of modifications.	
What in the UI helped/confused Willow in this step?		
	No message or callout to indicate that the recipe has changed	

Debrief

Observation: We decided not to count the special question about interaction, because it's more of a brainstorming step rather than a bug-finding step.

Count your answers:
1. How many questions (forms) did you answer? (# of blue forms + # of light orange forms + # of dark orange forms) excluding the interaction questions? = __12__ questions/forms (denominator) *2. How many of the questions (forms) in item 1 had EITHER a "no" or "maybe" answer?*

= __7__ questions/forms (numerator 1)

*3. How many of the questions (forms) in item 2 had "no"/"maybe"s that were **tied to facet(s)***

= __4__ questions/forms (numerator 2)

Percentage of usability issues

= *numerator 1 / denominator*

= _____7/12_____= 58%

Percentage of One-Armed-inclusion issues

= *numerator 2 / denominator*

= _____4/12_____= 33%

One-Armed Mag Cognitive Walkthrough – Mainstreamer Persona – Use Case 3

Selected use case: level of adaptation / techniques

1. What is the overall scenario or use case you are walking through?

Leona wants to adapt a recipe based on the tools and techniques that are accessible to her before she begins cooking.

2. What is the subgoal?

Catalog the available kitchen tools.

3. Will Leona have formed this subgoal as a step towards the overall goal? Why?

☐ Yes	☐ Maybe	☐ No
Which, if any, of Leona's facets did you use to answer the question?		
Hand/arm mobility, *Weight bearing load,* *Foresight/planning ahead,* *Level of adaptation*		
		Foresight/planning ahead, *Level of adaptation*
Why?		
		Foresight and level adaptation are low for Leona. She wouldn't even think of it because cooking is something she does without much thought or adaptation

4. What is the action you wish Leona would take next?

Select the camera tool to take a photo of her kitchen tools.

5. [Before the action] Will Leona take this action? Why?

☐ Yes	☐ Maybe	☐ No
Which, if any, of Leona's facets did you use to answer the question?		
Hand/arm mobility, *Weight bearing load,* *Foresight/planning ahead,* *Level of adaptation*		
Why?		
	She might click on the camera button for cataloging because it's a prominent option and	

	there does not appear to be anything else that would offer the cataloging feature	
What in the UI helped/confused Leona in this step?	
	Large camera button	

6. [Before the action] How will Leona interact with the product? (Touch, voice control, other)

Detailed list of interaction methods for Leona to achieve the action
Touch - Click the "camera" button
Which, if any, of Leona's facets did you use to answer the question? Why?
Hand/arm mobility, *Weight bearing load,* *Foresight/planning ahead,* *Level of adaptation*
Level of adaptation - Touch is the most straight forward interaction and there is no motivation to adapt in a different style. Hand/arm mobility - Fully functional arms and hands to use the app's default feature (click button)

7. **[After the action] Will Leona think they are making progress towards the overall goal? Why?**

☐ *Yes*	☐ *Maybe*	☐ *No*
Which, if any, of Leona's facets did you use to answer the question?	
Hand/arm mobility, *Weight bearing load,* *Foresight/planning ahead,* *Level of adaptation*	
Why?	
She now has access to the camera and can take photos of the kitchen and her tools		
What in the UI helped/confused Leona in this step?	
Camera screen appears with all the usual camera functionality		

8. **What is the subgoal?**

Learn how to use a specific tool.

9. **Will Leona have formed this subgoal as a step towards the overall goal? Why?**

☐ *Yes*	☐ *Maybe*	☐ *No*
Which, if any, of Leona's facets did you use to answer the question?	
Hand/arm mobility, *Weight bearing load,* *Foresight/planning ahead,* *Level of adaptation*	

She might have gotten a new tool or just is curious to learn more about a tool she already has, so yes this would be a necessary step towards her goal		
Why?		

10. What is the action you wish Leona would take next?

Click "Learn how to use it" button

11. [Before the action] Will Leona take this action? Why?

☐ *Yes*	☐ *Maybe*	☐ *No*
Which, if any, of Leona 's facets did you use to answer the question?		
Hand/arm mobility, *Weight bearing load,* *Foresight/planning ahead,* *Level of adaptation*		
Hand/arm mobility		
Why?		
It's a clearly marked button with obvious outcomes (learning how to use a tool) The button is easily clickable for someone who is dexterous.		
What in the UI helped/confused Leona in this step?		
Large button that says "learn how to use it"		

12. [Before the action] How will Leona interact with the product? (Touch, voice control, other)

Detailed list of interaction methods for Leona to achieve the action		
Touch the button (we probably want to make these resizeable / customized to what she needs)		
Which, if any, of Leona's facets did you use to answer the question? Why?		
Hand/arm mobility, *Weight bearing load,* *Foresight/planning ahead,* *Level of adaptation*		
Level of adaptation - Low adaptation goes with the "default" Hand/arm mobility - Fully functional arms and hands to use the app's default feature (click button)		

13. [After the action] Will Leona think they are making progress towards the overall goal? Why?

☐ *Yes*	☐ *Maybe*	☐ *No*

Which, if any, of Leona's facets did you use to answer the question?		
Hand/arm mobility, Weight bearing load, Foresight/planning ahead, Level of adaptation		
Why?		
Yes because she will see videos with tutorials on how to use the tool		
What in the UI helped/confused Leona in this step?		
List of videos and tutorials becomes available		

14. What is the subgoal?

Tune the recipe based on the discovered techniques / available tools

15. Will Leona have formed this subgoal as a step towards the overall goal? Why?

☐ Yes	☐ Maybe	☐ No
Which, if any, of Leona's facets did you use to answer the question?		
Hand/arm mobility, Weight bearing load, Foresight/planning ahead, Level of adaptation		
Why?		
Yes because she sees the "update recipe" button and wants to use the camera functionality to try out this feature		

16. What is the action you wish Leona would take next?

Click the back arrow at the top of the app

17. [Before the action] Will Leona take this action? Why?

☐ Yes	☐ Maybe	☐ No
Which, if any, of Leona's facets did you use to answer the question?		
Hand/arm mobility, Weight bearing load, Foresight/planning ahead, Level of adaptation		
Why?		

		Clicking the back arrow back tracks from the current subgoal and is unintuitive
What in the UI helped/confused Leona in this step?		
		Back arrow at top of page

18. [Before the action] How will Leona interact with the product? (Touch, voice control, other)

Detailed list of interaction methods for Leona to achieve the action
Touch the back button (which is pretty small right now)
Which, if any, of Leona's facets did you use to answer the question? Why?
Hand/arm mobility,   *Weight bearing load,*   *Foresight/planning ahead,*   *Level of adaptation*
Level of adaptation - Low adaptation goes with the "default"   Hand/arm mobility - Fully functional arms and hands to use the app's default feature (click button)

19. [After the action] Will Leona think they are making progress towards the overall goal? Why?

☐ *Yes*	☐ *Maybe*	☐ *No*
Which, if any, of Leona's facets did you use to answer the question?		
Hand/arm mobility, *Weight bearing load,* *Foresight/planning ahead,* *Level of adaptation*		
Why?		
Yes, because she could see the "Update recipe" button		No, because Leona returned to a previous screen state and feels like she's losing progress
What in the UI helped/confused Leonna in this step?		
Yes, helped because of the label of the buttons		

What is the action you wish Leona would take next?

Click the "update recipe" button.

[Before the action] Will Leona take this action? Why?

☐ *Yes*	☐ *Maybe*	☐ *No*
Which, if any, of Leona's facets did you use to answer the question?		
Hand/arm mobility, *Weight bearing load,*		

Foresight/planning ahead, *Level of adaptation*		
Why?	
Yes, it appears to be the most obvious next step to complete the subgoal of updating the recipe		
What in the UI helped/confused Leonna in this step?	
The "update recipe" button is clearly labeled		

[Before the action] How will Leona interact with the product? (Touch, voice control, other)

Detailed list of interaction methods for Leona to achieve the action
Touch the "update recipe" button
Which, if any, of Leona's facets did you use to answer the question? Why?
Hand/arm mobility, *Weight bearing load,* *Foresight/planning ahead,* *Level of adaptation*
Level of adaptation - Low adaptation goes with the "default" Hand/arm mobility - Fully functional arms and hands to use the app's default feature (click button)

[After the action] Will Leona think they are making progress towards the overall goal? Why?

☐ *Yes*	☐ *Maybe*	☐ *No*
Which, if any, of Leona's facets did you use to answer the question?	
Hand/arm mobility, *Weight bearing load,* *Foresight/planning ahead,* *Level of adaptation*	
Why?	
	Things will change on the recipe, so if Leona was familiar with the recipe, she may notice these changes. However, there is no specific callout to make her aware of modifications.	
What in the UI helped/confused Leona in this step?	
	No message or callout to indicate that the recipe has changed	

Debrief

Observation: We decided not to count the special question about interaction, because it's more of a brainstorming step rather than a bug-finding step.

Count your answers:

1. How many questions (forms) did you answer? (# of blue forms + # of light orange forms + # of dark orange forms) excluding the interaction questions?

$$= \_\_12\_\_ \text{ questions/forms (denominator)}$$

2. How many of the questions (forms) in item 1 had EITHER a "no" or "maybe" answer?

$$= \_\_5\_\_ \text{ questions/forms (numerator 1)}$$

*3. How many of the questions (forms) in item 2 had "no"/"maybe"s that were **tied to facet(s)***

$$= \_\_1\_\_ \text{ questions/forms (numerator 2)}$$

Percentage of usability issues

= numerator 1 / denominator

= _____5/12_____= 41.67%

Percentage of One-Armed-inclusion issues

= numerator 2 / denominator

= ____1/12_____= 8.33%

One-Armed Mag Cognitive Walkthrough – Underserved Persona – Use Case 1

Selected use case: hand mobility

What is the overall scenario or use case you are walking through?
Willow wants to follow a recipe from start to end in a screen that adapts through her needs.

What is the subgoal?

Tune the layout of the screen by increasing the size of the buttons

Will Willow have formed this subgoal as a step towards the overall goal? Why?

☐ *Yes*	☐ *Maybe*	☐ *No*
Which, if any, of Willow's facets did you use to answer the question?		
Hand/arm mobility, Weight bearing load, Foresight/planning ahead, Level of adaptation		
Level of adaptation Hand/arm mobility		*Level of adaptation*
Why?		
Given a high level of adaptation Willow will use the voice control to let the app know she wants to increase the size of the buttons		Given the lock button for the adjustable buttons it shows as locked by default so Willow may not realize she can resize the buttons with that

- What is the action you wish Willow would take next?

Click the lock button to unlock

- ○ [Before the action] Will Willow take this action? Why?

☐ *Yes*	☐ *Maybe*	☐ *No*
Which, if any, of Willow's facets did you use to answer the question?		
Hand/arm mobility, Weight bearing load, Foresight/planning ahead, Level of adaptation		
Level of adaptation Hand/arm mobility		
Why?		

Because Willow has a fairly high level of adaptation and can figure out the usage of the button resizers		Because the lock button is not very clear on how it can be used to resize the screen.
What in the UI helped/confused Willow in this step?		
The indicator arrows when unlocked help indicate how to resize		The lock button is not very clear on how to resize.

○ [Before the action] How will Willow interact with the product? (Touch, voice control, other)

Detailed list of interaction methods for Willow to achieve the action
Touch, voice control
Which, if any, of Willow's facets did you use to answer the question? Why?
Hand/arm mobility, *Weight bearing load,* *Foresight/planning ahead,* *Level of adaptation*
Hand/arm mobility: touch for unlocking the button Level of adaptation: voice activation will probably work for Willow

○ [After the action] Will Willow think they are making progress towards the overall goal? Why?

⬜ *Yes*	⬜ *Maybe*	⬜ *No*
Which, if any, of Willow's facets did you use to answer the question?		
Hand/arm mobility, *Weight bearing load,* *Foresight/planning ahead,* *Level of adaptation*		
Foresight/planning ahead, *Level of adaptation*		
Why?		
Willow will feel she did progress based on the color activation and the arrow on the right showing		
What in the UI helped/confused Willow in this step?		
The change in colors of buttons, Changing from locked to unlocked, having arrows next to the lock to show users that they can drag and resize.		

● What is the action you wish Willow would take next?

Drag the resize button up

- ○ [Before the action] Will Willow take this action? Why?

☐ **Yes**	☐ **Maybe**	☐ **No**
Which, if any, of Willow's facets did you use to answer the question?		
Hand/arm mobility, *Weight bearing load,* *Foresight/planning ahead,* *Level of adaptation*		
Level of adaptation *Hand/arm mobility*		
Why?		
Because Willow has a fairly high level of adaptation and can figure out the usage of the button resizers		
What in the UI helped/confused Willow in this step?		
The indicator arrows when unlocked help indicate how to resize		

- ○ [Before the action] How will Willow interact with the product? (Touch, voice control, other)

Detailed list of interaction methods for Willow to achieve the action
Touch
Which, if any, of Willow's facets did you use to answer the question? Why?
Hand/arm mobility, *Weight bearing load,* *Foresight/planning ahead,* *Level of adaptation*
Hand/arm mobility: drag for resizing the button

- ○ [After the action] Will Willow think they are making progress towards the overall goal? Why?

☐ **Yes**	☐ **Maybe**	☐ **No**
Which, if any, of Willow's facets did you use to answer the question?		
Hand/arm mobility, *Weight bearing load,* *Foresight/planning ahead,* *Level of adaptation*		
Foresight/planning ahead, *Level of adaptation*		
Why?		
Willow will feel she did progress because the buttons got bigger		

What in the UI helped/confused Willow in this step?		
The change in the size of the buttons is clear while dragging		

- What is the action you wish Willow would take next?

Lock the resize button

  ○ [Before the action] Will Willow take this action? Why?

☐ *Yes*	☐ *Maybe*	☐ *No*
Which, if any, of Willow's facets did you use to answer the question?		
Hand/arm mobility, *Weight bearing load,* *Foresight/planning ahead,* *Level of adaptation*		
	Level of adaptation	*Hand/arm mobility* *Foresight/planning ahead*
Why?		
	Willow might not realize that she has to lock the buttons again to use it	Because she has high planning ahead, she will like to go the actually doing the recipe and since the resize is done, she will mark that as complete
What in the UI helped/confused Willow in this step?		
	The lock button is unlocked but not clear that it has to be locked again to use.	The lock back again is not very clear that it needs to be pushed again

  ○ [Before the action] How will Willow interact with the product? (Touch, voice control, other)

Detailed list of interaction methods for Willow to achieve the action
Touch
Which, if any, of Willow's facets did you use to answer the question? Why?
Hand/arm mobility, *Weight bearing load,* *Foresight/planning ahead,* *Level of adaptation*
Hand/arm mobility: touch for locking

  ○ [After the action] Will Willow think they are making progress towards the overall goal? Why?

☐ *Yes*	☐ *Maybe*	☐ *No*
Which, if any, of Willow's facets did you use to answer the question?		
Hand/arm mobility, *Weight bearing load,*		

Foresight/planning ahead, Level of adaptation		
Foresight/planning ahead, Level of adaptation		
Why?		
Willow will feel she did progress based on the color deactivation and the arrow on the right not showing		
What in the UI helped/confused Willow in this step?		
The change in colors of buttons, Changing from unlocked to locked.		

What is the subgoal?

Finishing following the recipe using the resized buttons

Will Willow have formed this subgoal as a step towards the overall goal? Why?

☐ *Yes*	☐ *Maybe*	☐ *No*
Which, if any, of Willow's facets did you use to answer the question?		
Hand/arm mobility, Weight bearing load, Foresight/planning ahead, Level of adaptation		
Level of adaptation Hand/arm mobility		
Why?		
Given a high level of adaptation Willow will use the voice control to let the app know she wants to go to the next steps or clicking the buttons		

- What is the action you wish Willow would take next?

Click the "Next" button

- ○ [Before the action] Will Willow take this action? Why?

☐ *Yes*	☐ *Maybe*	☐ *No*
Which, if any, of Willow's facets did you use to answer the question?		
Hand/arm mobility, Weight bearing load, Foresight/planning ahead, Level of adaptation		
Level of adaptation		*Level of adaptation*

Hand/arm mobility		
Why?		
Willow will be able to see the apparent 'next' button and be able to understand that it will take her to the next step		Because of her high level of adaptation, she can use "Hey chef" and then next
What in the UI helped/confused Willow in this step?		
The "Next" button is very clear		

○ [Before the action] How will Willow interact with the product? (Touch, voice control, other)

Detailed list of interaction methods for Willow to achieve the action
Touch, voice control
Which, if any, of Willow's facets did you use to answer the question? Why?
Hand/arm mobility, Weight bearing load, Foresight/planning ahead, Level of adaptation
Hand/arm mobility: touch for going next Level of adaptation: voice activation will probably work for Willow

○ [After the action] Will Willow think they are making progress towards the overall goal? Why?

⬜ **Yes**	⬜ **Maybe**	⬜ **No**
Which, if any, of Willow's facets did you use to answer the question?		
Hand/arm mobility, Weight bearing load, Foresight/planning ahead, Level of adaptation		
Foresight/planning ahead, Level of adaptation		
Why?		
Willow will feel she did progress because the next screen is presented with the continuation of the steps		
What in the UI helped/confused Willow in this step?		
The UI will move from the current step to the next step showing Willow that the button did take her to the next step.		

Debrief

Observation: We decided not to count the special question about interaction, because it's more of a brainstorming step rather than a bug-finding step.

Count your answers:

1. How many questions (forms) did you answer? (# of blue forms + # of light orange forms + # of dark orange forms) excluding the interaction questions?

$$= \_\_10\_\_ \text{ questions/forms (denominator)}$$

2. How many of the questions (forms) in item 1 had EITHER a "no" or "maybe" answer?

$$= \_\_4\_\_ \text{ questions/forms (numerator 1)}$$

*3. How many of the questions (forms) in item 2 had "no"/"maybe"s that were **tied to facet(s)***

$$= \_\_2\_\_ \text{ questions/forms (numerator 2)}$$

Percentage of usability issues

= *numerator 1 / denominator*

= _____4/10_____= 40%

Percentage of One-Armed-inclusion issues

= *numerator 2 / denominator*

= ____2/10_____= 20%

One-Armed Mag Cognitive Walkthrough – Mainstreamer Persona – Use Case 1

What is the overall scenario or use case you are walking through?
Leona wants to follow a recipe from start to end in a screen that adapts through her needs.

What is the subgoal?

Tune the layout of the screen by increasing the size of the buttons

Will Leona have formed this subgoal as a step towards the overall goal? Why?

☐ *Yes*	☐ *Maybe*	☐ *No*
Which, if any, of Leona's facets did you use to answer the question?		
Hand/arm mobility,		

		Weight bearing load, Foresight/planning ahead, Level of adaptation
		Hand Mobility
	Why?	
		Because she has a high level of hand mobility she will not do it

- What is the action you wish Leona would take next?

Click the lock button to unlock

  - [Before the action] Will Leona take this action? Why?

☐ **Yes**	☐ **Maybe**	☐ **No**
Which, if any, of Leona facets did you use to answer the question?		
Hand/arm mobility, Weight bearing load, Foresight/planning ahead, Level of adaptation		
		Hand/arm mobility
Why?		
		Because of her high level of hand mobility she will not need to resize the buttons
What in the UI helped/confused Leona in this step?		
		Leona does not see a purpose in resizing the buttons and therefore will not take this action

  - [Before the action] How will Leona interact with the product? (Touch, voice control, other)

Detailed list of interaction methods for leona to achieve the action
Touch, voice control
Which, if any, of Leona's facets did you use to answer the question? Why?
Hand/arm mobility, Weight bearing load, Foresight/planning ahead, Level of adaptation
Hand/arm mobility: touch for unlocking the button Level of adaptation: voice activation will probably work for Leona

  - [After the action] Will Leona think they are making progress towards the overall goal? Why?

☐ **Yes**	☐ **Maybe**	☐ **No**

Which, if any, of Leona's facets did you use to answer the question?		
Hand/arm mobility, Weight bearing load, Foresight/planning ahead, Level of adaptation		
Why?		
Leona will feel she did progress based on the color activation and the arrow on the right showing		
What in the UI helped/confused Leona in this step?		
The change in colors of buttons, changing from locked to unlocked, having arrows next to the lock to show users that they can drag and resize.		

- What is the action you wish Leona would take next?

Drag the resize button up

  - [Before the action] Will Leona take this action? Why?

☐ *Yes*	☐ *Maybe*	☐ *No*
Which, if any, of Leona's facets did you use to answer the question?		
Hand/arm mobility, Weight bearing load, Foresight/planning ahead, Level of adaptation		
Why?		
	She will see the activation and try to see what is it for.	
What in the UI helped/confused Leona in this step?		
	Sees the arrows next to the lock and will maybe drag with the intent to make the buttons bigger.	

  - [Before the action] How will Leona interact with the product? (Touch, voice control, other)

Detailed list of interaction methods for Leona to achieve the action
Touch
Which, if any, of Leona's facets did you use to answer the question? Why?
Hand/arm mobility, Weight bearing load,

	Foresight/planning ahead, *Level of adaptation*	
Hand/arm mobility: drag for resizing the button		

○ [After the action] Will Leona think they are making progress towards the overall goal? Why?

☐ *Yes*	☐ *Maybe*	☐ *No*
Which, if any, of Leona's facets did you use to answer the question?		
Hand/arm mobility, *Weight bearing load,* *Foresight/planning ahead,* *Level of adaptation*		
Why?		
Leona will feel she did progress because the buttons got bigger		
What in the UI helped/confused Leona in this step?		
The change in the size of the buttons is clear while dragging		

● What is the action you wish Leona would take next?

Lock the resize button

○ [Before the action] Will Leona take this action? Why?

☐ *Yes*	☐ *Maybe*	☐ *No*
Which, if any, of Leona's facets did you use to answer the question?		
Hand/arm mobility, *Weight bearing load,* *Foresight/planning ahead,* *Level of adaptation*		
		Foresight/planning ahead
Why?		
		No because is not her main concern, she is spontaneous, so she will not pay attention to it
What in the UI helped/confused Willow in this step?		
		The lock back again is not very clear that it needs to be pushed again

○ [Before the action] How will Leona interact with the product? (Touch, voice control, other)

Detailed list of interaction methods for Leona to achieve the action
Touch

Which, if any, of Leona's facets did you use to answer the question? Why?
Hand/arm mobility, Weight bearing load, Foresight/planning ahead, Level of adaptation
Hand/arm mobility: touch for locking

○ [After the action] Will Leona think they are making progress towards the overall goal? Why?

☐ *Yes*	☐ *Maybe*	☐ *No*
Which, if any, of Leona's facets did you use to answer the question?		
Hand/arm mobility, Weight bearing load, Foresight/planning ahead, Level of adaptation		
		Foresight/planning ahead
Why?		
	Resizing the buttons will maybe help them in clicking through the steps to help them to finish the recipe.	Because she is spontaneous, she will think it didn't have anything to do with her following a recipe
What in the UI helped/confused Leona in this step?		
	The resized buttons	

What is the subgoal?

Finishing following the recipe using the resized buttons

Will Leona have formed this subgoal as a step towards the overall goal? Why?

☐ *Yes*	☐ *Maybe*	☐ *No*
Which, if any, of Leona's facets did you use to answer the question?		
Hand/arm mobility, Weight bearing load, Foresight/planning ahead, Level of adaptation		
Why?		
Given that Leona wants to learn how to cook, following a recipe using the buttons		

● What is the action you wish Leona would take next?

Click the "Next" button

○ [Before the action] Will Leona take this action? Why?

☐ *Yes*	☐ *Maybe*	☐ *No*
Which, if any, of Leona's facets did you use to answer the question?		
Hand/arm mobility, *Weight bearing load,* *Foresight/planning ahead,* *Level of adaptation*		
Hand/arm mobility		
Why?		
Leona has high mobility so she will use the 'next' button and be able to understand that it will take her to the next step		
What in the UI helped/confused Leona in this step?		
The "Next" button is very clear		

○ [Before the action] How will Leona interact with the product? (Touch, voice control, other)

Detailed list of interaction methods for Leona to achieve the action		
Touch		
Which, if any, of Leona's facets did you use to answer the question? Why?		
Hand/arm mobility, *Weight bearing load,* *Foresight/planning ahead,* *Level of adaptation*		
Hand/arm mobility: touch for going next		

○ [After the action] Will Leona think they are making progress towards the overall goal? Why?

☐ *Yes*	☐ *Maybe*	☐ *No*
Which, if any, of Leona's facets did you use to answer the question?		
Hand/arm mobility, *Weight bearing load,* *Foresight/planning ahead,* *Level of adaptation*		
Foresight/planning ahead, *Level of adaptation*		
Why?		
Leona will feel she did progress because the next screen is presented with the continuation of the steps		
What in the UI helped/confused Leona in this step?		
The UI will move from the current step to the next step		

showing Leona that the button did take her to the next step.		

Debrief

Observation: We decided not to count the special question about interaction, because it's more of a brainstorming step rather than a bug-finding step.

Count your answers:

1. How many questions (forms) did you answer? (# of blue forms + # of light orange forms + # of dark orange forms) excluding the interaction questions?

   = __10__ questions/forms (denominator)

2. *How many of the questions (forms) in item 1 had EITHER a "no" or "maybe" answer?*

   = __5__ questions/forms (numerator 1)

3. *How many of the questions (forms) in item 2 had "no"/"maybe"s that were **tied to facet(s)***

   = __4__ questions/forms (numerator 2)

Percentage of usability issues

= *numerator 1 / denominator*

= _____5/10_____ = 50%

Percentage of One-Armed-inclusion issues

= *numerator 2 / denominator*

= _____4/10_____ = 40%

Use Case 1: Hand Mobility / Recipes

Figma File Link:
https://www.figma.com/file/uyo2iA1CBdfPDHi5rj8t5N/Recipes?node-id=0%3A1&t=NswoGzEFyOikXb5Y-1

Interactive Figma Prototype:
https://www.figma.com/proto/uyo2iA1CBdfPDHi5rj8t5N/Recipes?node-id=2%3A2&scaling=scale-down&page-id=0%3A1&starting-point-node-id=2%3A2
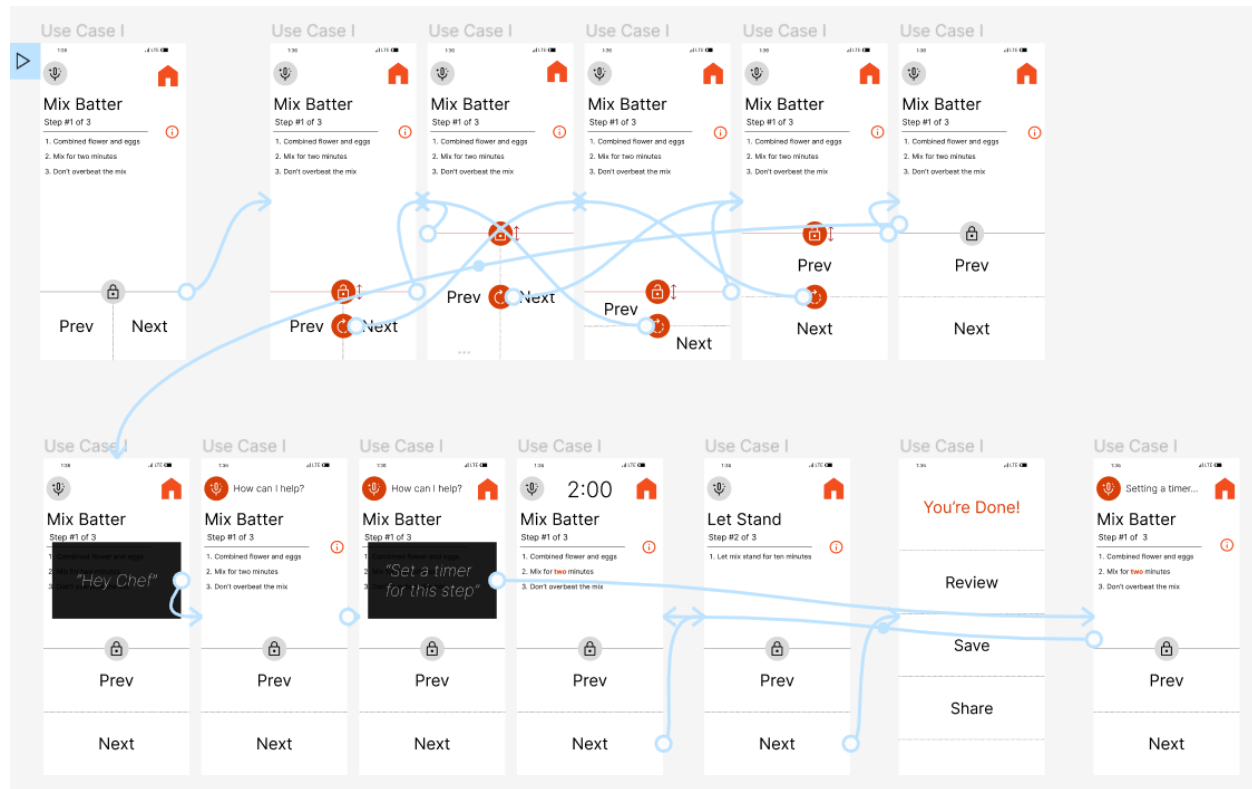
Facet: Hand Mobility

Use-Case/Scenario: Following along with a recipe

Concept(s): Resizable buttons, voice assistant

Full Use-Case (Underserved): *"I am trying to follow a recipe. I need to follow the step by step recipe, holding pans while scrolling through my phone. I don't know how to keep up with the recipe and dirty hands, or hot pots. So, I need to stop what I am doing, wash my hand, or turn the heat low, and grab my phone to scroll it down to the next step."*

Full Use-Case (Main-Streamer): "*I am trying to follow a recipe. I need to follow the recipe step by step, holding pans while scrolling through my phone. I don't know how to keep up with the recipe and dirty hands, or hot pots. So, I need to stop what I am doing, wash my hands, or turn the heat low, and grab my phone to scroll it down to the next step.*"

Description

- *Resizing buttons:* People will need to interact with the app to progress recipes while cooking and may not be able to use their dominant hand to do so. Allowing the navigation buttons to be resized means that users can still click the button without dexterous finger mobility, by using elbows, etc.
- *Locking button resize:* Prevent erroneous changing of button sizes while actively cooking. This will be frustrating for all users but especially for one-armed users who may be unable to recover from this failed state while cooking. Users tend to want to complete all setup before cooking, and therefore can set and lock size before beginning.
- *Voice assistant:* Additional app navigation while cooking may be difficult. Often, this can be something as simple as setting a timer. Users can engage with a voice assistant by saying "hey chef" then instruct it to help with these difficult steps by saying something like "set a timer for this step"
- *Recoverable states ("Prev", "Review Recipe"):* Likelihood of misclicks is higher for the inclusive population. We ensure that there's always a way to return to the previous state after navigating to a new recipe stage or finishing the recipe.

Screen Annotations

Screen 1: Resize buttons and their position
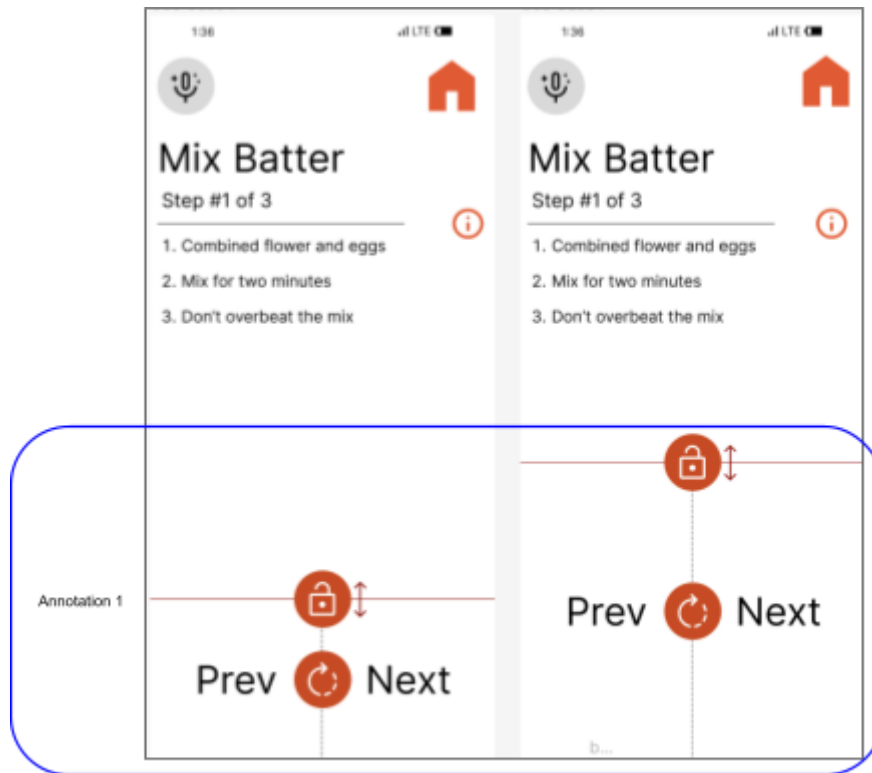
Annotations
1. The main feature here is the resizeable and rearrangeable previous and next buttons. This feature mainly addresses the hand and arm mobility facet because we discovered that people from our underserved population often used non-hand body parts more often to interact with daily objects, including phones, and we wanted to provide the flexibility for our app to adapt to their needs. This flexibility can also help people from our mainstream population who want larger buttons.
   a. I like the idea of changing the size of a button if the person is cooking. To extend this, I think it could be beneficial to design a "planning" mode versus a "cooking" mode, which would change the size of the buttons and potentially the visible options **[Design Gallery Feedback]**
   b. I had to learn to use it [phone] with one hand. **[6]**
   c. I couldn't rotate my left wrist at first, so I had to rotate entire arms to type, it was very tedious and tiring **[2]**
   d. I use my phone when I am cooking. I like scroll down with the elbow **[3]**
   e. Lots of using elbows knees and teeth **[1]**

Screen 2: Lock button state

Annotations
1. The main feature on this screen is the ability to lock the size of the previous and next buttons into place to avoid accidental resizing. It is also implicit that the screen will stay unlocked and on throughout the duration of the recipe steps to also prevent issues with returning to the app at exactly some specific screen. This was suggested to us during the design gallery and we agreed it was also an important part of addressing the hand and arm mobility facet.
    a. Implement some sort of screen timeout avoidance, so the users phone doesn't lock while following a recipe. If someone with one arm is following a recipe and the phone locks its going to be super frustrating having it lock after 1min of inactivity. **[Design gallery feedback]**

Screen 3: Voice assistant
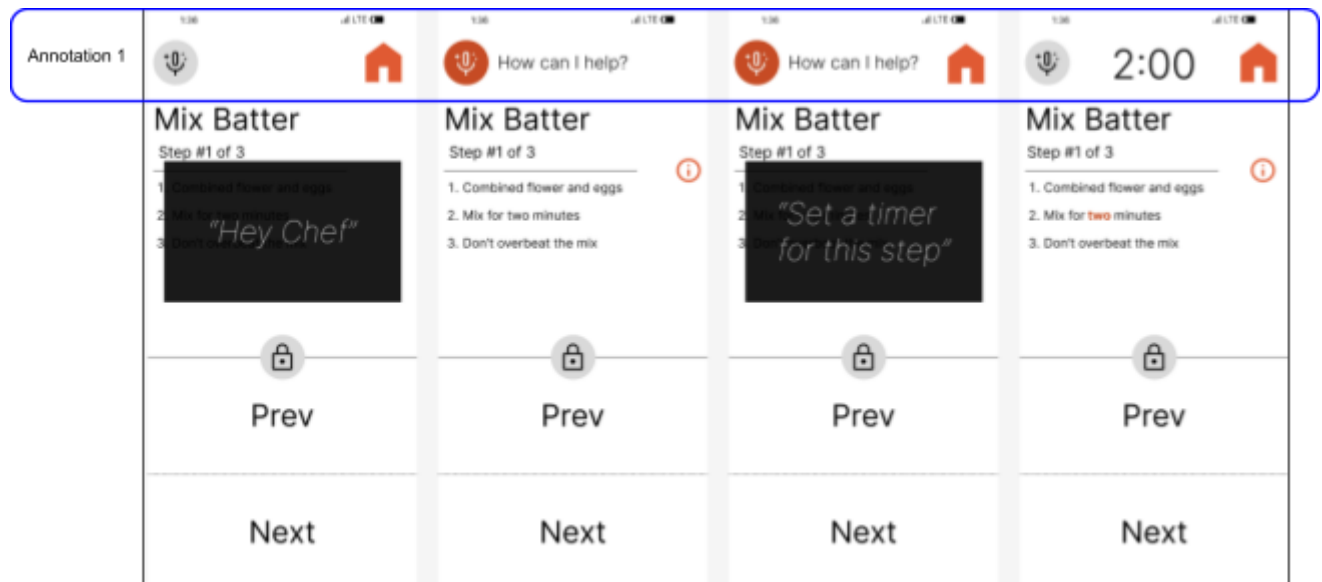
Annotations

1. The main feature of this series of screens is the voice assistant, which is a hands-free interface that can help both Will and Leona step through the recipe, read out instructions, and start timers. Such a hands-free feature makes our app accessible to people with low hand and arm mobility while also being a convenience in the kitchen for our mainstream population.
    a. A timer to play the next video/audio/text instruction after the timer is up will be a handy tool so the user does not need to interact with the phone/tablet screen to move onto the next step. For example, if the instruction says to cook the pot in high heat for 5 minutes, then the next set of instructions will be auto-given after the internal timer of 5 minutes is up. **[Design Gallery Feedback]**
    b. This can be an alternate way of stepping through a recipe **[Design Gallery Feedback]**
    c. Balance the automatic timer idea with user preferences **[Design Gallery Feedback]**
    d. Nice feature for having voice assistant to set timer (eliminates the need to use hand when they are handling ingredients or cooking). **[Final Presentation Feedback]**
    e. I appreciate the addition of voice control to move back and forth between instruction. It reduces the need to change page with your hand. **[Design gallery feedback]**

Screen 4: Finish and review

Annotations
2. Through our user research, we learned that people from our underserved population have a high level of foresight because they need to think through their actions ahead of time to avoid getting stuck in a situation they can't back out of. We provided the "Review" button to allow a way for Will to fully step through a recipe before committing to actually executing it. Additionally, previous screens showed a home button that would allow people to exit the recipe steps early if they wanted to go back to the main page before reaching the end.
    a. When following a recipe, think about it ahead of time, before getting into the middle of cooking. Stuff like "this requires a lot of chopping" and "I need to use a can opener. **[1]**
    b. Since there's a lot of pages that the users need to go through to get to their main goal, I think having a method for them to immediately go back to the main page could be helpful (like some apps allows the users to click on the logo to go back to the main page). **[Presentation feedback]**
3. We received feedback during our design galleries to include a social aspect where people can share the recipes they've modified or annotated with each other, which can be helpful for connecting people with similar levels of hand/arm mobility and weight bearing load. This provides a way for them to share a common aspect of day-to-day life: preparing food.
    a. I think there should be a social component to the app. The basic functionality is nice, but how are you going to keep population new recipes if users cannot share/post recipes? **[Design gallery feedback]**
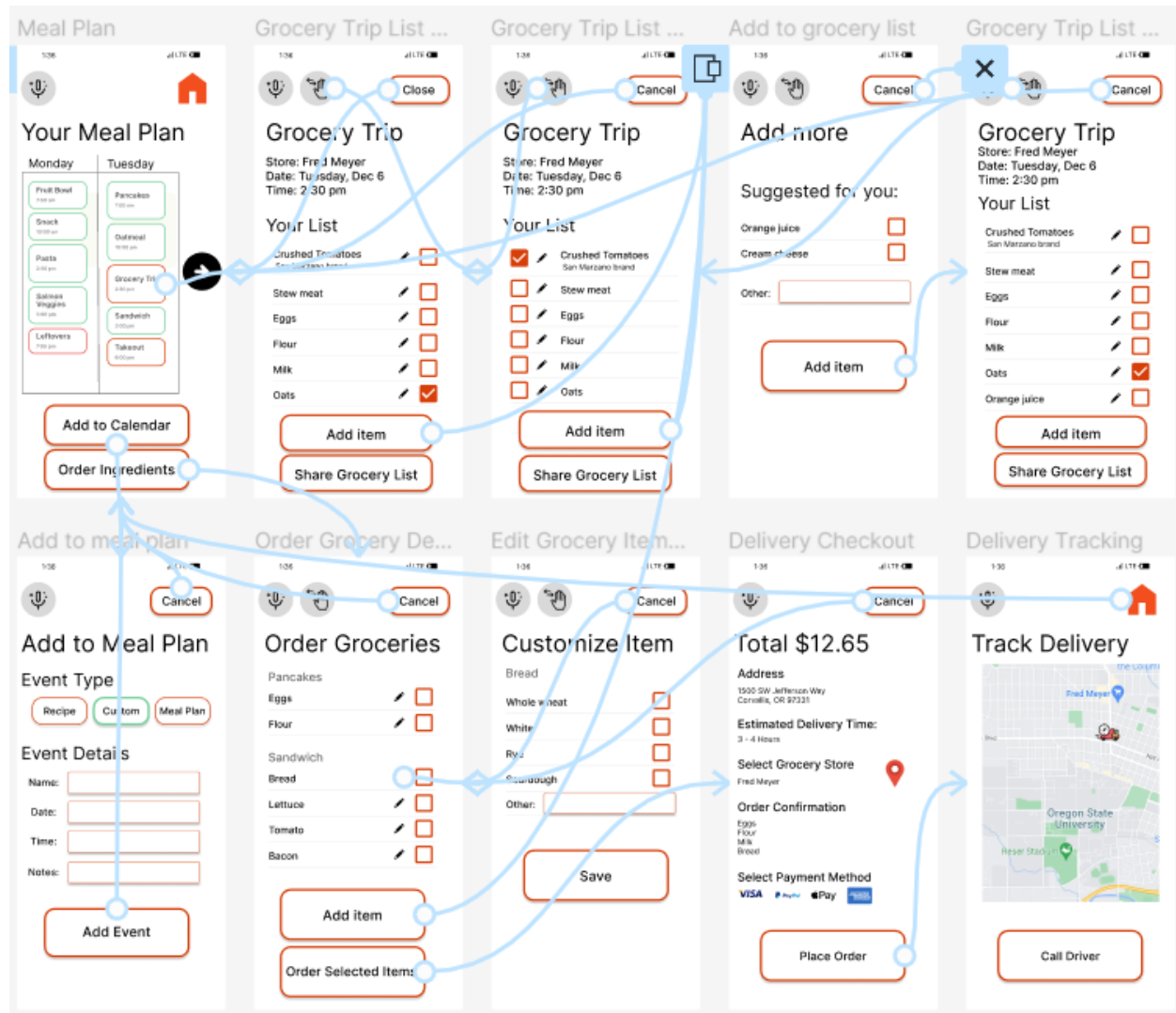
Screen 5: Hint box on first time using recipe app
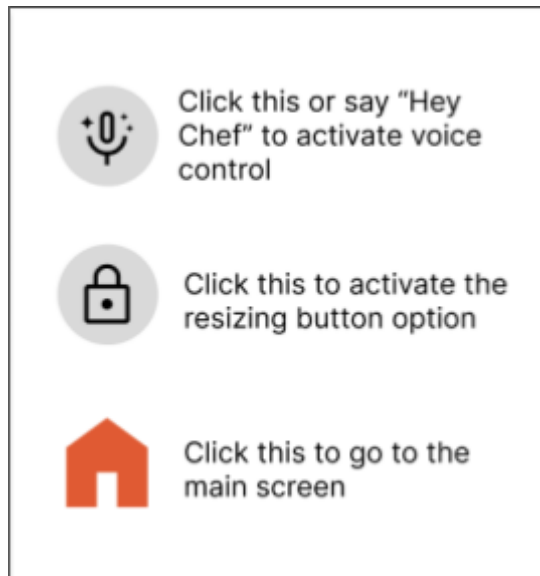
Annotations
1. Based on design gallery feedback and user research, we realized that not all icons and interactions will be universally known to people from both our populations. We added this pop-up screen to provide some initial information about what the different icons mean.
    a. Some long-term temporary disabilities have unique challenges. Stuff like figuring out voice controls are not as obvious and take experience. **[1]**
    b. One thing I can suggest would be including a Home button on each flow even if you're focused solely on the specific use case **[Final Presentation Feedback]**
    c. Adding a help icon or a pop-up for the lock button could be helpful as it's not very clear (maybe a pop-up for the first time the lock icon is clicked) **[Final Presentation Feedback]**

Use Case 2: Foresight / Groceries

Figma File Link:
https://www.figma.com/file/Med88QOXTNypHjCnGeVkqA/Groceries?node-id=0%3A1&t=Yt8Y9f
rDnFQYjz4u-1

Interactive Figma Prototype:
https://www.figma.com/proto/Med88QOXTNypHjCnGeVkqA/Groceries?node-id=1%3A292&scali
ng=scale-down&page-id=0%3A1&starting-point-node-id=1%3A292

Facet: Foresight

Use-Case/Scenario: Planning out and buying ingredients for a recipe

Concept(s): "Google calendar" meal planning, Delivery w/custom prep options

Full Use-Case (Underserved): "*I need to shop for the items to use in my recipe. This includes, 1) creating the shopping list, 2) inventorying the items I already have and, 3) going to the store to buy other items. I need to be able to simultaneously update my list as I open drawers while inventorying items I already have, and while pushing a cart or carrying a basket through the store.*"

Full Use-Case (Main-Streamer): "*I need to shop for the items to use in my recipe. This includes, 1) creating the shopping list, 2) inventorying the items I already have and, 3) going to the store to buy other items. I need to be able to simultaneously update my list as I open drawers while inventorying items I already have, and while pushing a cart or carrying a basket through the store.*"

Description

- We chose to move forward with the "google calendar" meal planning idea combined with the custom delivery idea we received during one of the earlier design galleries.
- We collected many quotes from our research related to how tedious and difficult preparing ingredients and grocery shopping can be.
  - I am not doing cutting or heavy lifting **[3]**
  - I avoid any food prep that requires many steps **[3]**
  - Pre-packaged foods that can be stored for a long time has proven to be a lifesaver **[2]**
  - Buying a lot more pre-chopped, pre-shredded etc. things. Costs more than normally expected. Avoided buying things that are big and bulky **[1]**
- We integrated a way for the app to automatically compile a list of ingredients and to order selected groceries directly through the app.
- Additionally, the app offers a more traditional way for people to pull up a list, customize it, and use it while shopping in person or hand it off to a caretaker who will shop for them.
- We think these features will help both our underserved and mainstream personas be more intentional about what groceries they want to buy and for what reason.
- We designed the meal plan screen to be similar to a calendar overview with the ability for people to customize their meal plan for the next several days. Customizing the recipes that are on the calendar will automatically update the shopping list. An easy in-app tool for visualizing a meal plan and gathering a list of required ingredients helps people with both high and low foresight.

Screen Annotations

Screen 1: Meal Plan

Annotations
1. We received several pieces of feedback during design gallery 2 regarding making the voice assistant feature available throughout the app. We agreed that it was a good idea as voice-activated navigation and controls throughout the app could be especially beneficial to Will due to his low hand and arm mobility.
    a. Add voice options across all areas of the app. **[Design gallery feedback]**
    b. Good progress, voice assistant integration is a great addition. One suggestion would be to consider using the voice assistant to navigate around the app, that way we can avoid screen interaction. **[Design gallery feedback]**
2. Based on Dr. Burnett's suggestion during one of the design galleries, we added a home button which would lead to the homepage of this app, but we did not prototype that screen as it wasn't a major part of any of our use cases.
3. The meal plan is presented in a calendar view with each block representing one recipe or food-related plan (e.g. "leftovers", "takeout", "grocery trip"). Through our research, we learned that cooking and other day-to-day tasks often take much more time for our underserved population, so we made the sizes of the calendar items reflect the relative amount of time someone would spend on each item. This addresses both the hand and arm mobility and foresight facets as it allows people to plan out their week and meal plan with a way to visually see how long each event will take. The time durations can be

manually set or they can be estimated by the app, which learns over time how long it generally takes the user to complete each item.

   a. This could apply to the calendar part because available time for cooking generally varies by the day, but we could also have a more tailored time estimation for recipes based on the user's level of disability/adaptability (time estimation could even be an AI feature that learns more about recipe time as user cooks more). **[Design gallery feedback]**
   b. I follow recipes, it takes double the time when I am cooking. With one hand it becomes difficult, it is around 20 minutes more **[3]**
   c. I think another valuable filtering value could be overall prep and cook time. For example, sometimes I only have 15 or 30 minutes to cook, whereas some recipes require a few hours. **[Design gallery feedback]**
   d. The mono-mano life is more manageable than you might think. If you were to tie one hand behind your back and go through your day, you could accomplish just about everything. It takes longer, but it can be done. **[4]**

4. Instead of cluttering the screen with too many days and calendar items, we added this button for users to be able to see additional days in their meal plan. This also allowed us to make all of the buttons and calendar items larger, providing a greater surface area for people to click on, which can be especially beneficial for Will as he may not always use his hand to tap on things on his phone.

   a. Avoid having the screen look too cluttered. **[Design gallery feedback]**
   b. I use my phone when I am cooking or doing something else. I like watching something I use one finger to scroll down or the elbow. **[3]**

5. The "Add to calendar" button provides a way to add a new item to the meal plan calendar. People can select from a list of food-related events, recipes, or select an entire meal plan according to some templated theme or custom saved meal plan. The button is large to address Will's low level of hand and arm mobility.

   a. They can also add a proper diet plan for people to make them feel that the recipe are just not anything that is easy to cook with one hand but also healthy **[Design gallery feedback]**

6. The "Order Ingredients" button will automatically compile the ingredients from the recipes that are currently in the meal plan and offer a way to order selected ingredients through the app. This feature is helpful to both Will and Leona, but can be especially useful for Will as he has much lower hand and arm mobility and weight bearing load, which can make it difficult for him to buy heavy or bulky items at the grocery store.

   a. For heavy things choose delivery **[9]**
   b. Additionally the delivery to the door concept is also a good idea and I wonder if additional delivery update information could be beneficial to add into the design. The more information available on delivery, the more the individual can plan to be available and ready. **[Design Gallery Feedback]**

Screen 2: Add to Meal Plan

Annotations
1. Again, the voice assistant was integrated across the app.
    a. Add voice options across all areas of the app. **[Design gallery feedback]**
2. People can select the type of event they want to add to their meal plan calendar. Currently, the "custom" option is selected, which provides three fields that accept text input. The "recipe" option would provide a selection of recipes to add, and the "meal plan" option would provide people's saved meal plans as well as templated meal plans with tags such as "healthy" or "vegetarian" (as suggested during a design gallery). This feature addresses the foresight facet that supports both Will and Leona in helping them create their meal plans.
    a. They can also add a proper diet plan for people to make them feel that the recipe are just not anything that is easy to cook with one hand but also healthy **[Design gallery feedback]**

Screen 3: In-person Grocery Shopping List (Right and Left Hand Versions)
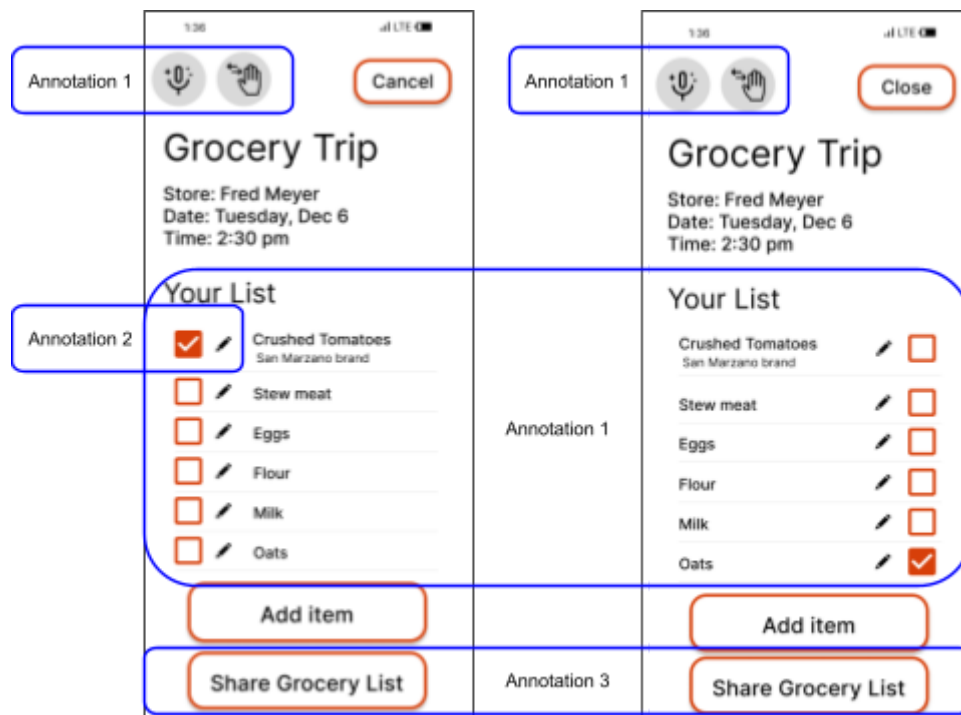
Annotations
1. In addition to the voice assistant integration, we also received feedback regarding hand dominance as an aspect of hand and arm mobility so we added an extra button to this screen for swapping hand dominance. For left handed people, the checkboxes will appear on the left, while they will appear on the right for right handed people. This feature will help both Will and Leona as they each will have a preferred hand dominance.
   a. I think the team should also look at situations for left handed mainstream users who have issues with many tools designed to favor mostly right handed users. **[Presentation feedback]**
   b. I think it was great! I would also consider which arm is available. Is the disabled arm the person's dominant arm? Additionally, many left-handed people learn to work within a right-handed world, so if they lose their right hand's capabilities, even though their left hand is their dominant hand, there might be concerns on if the app works for their left hand. An example would be making sure that buttons that need to be pressed are easily reachable by left or right thumb since their thumb will be starting on different sides of the touchscreen. **[Presentation feedback]**
   c. Good overall, Maybe more information focusing on how things are designed if they lose their dominant hand or people who are left handed would have made it even better. **[Presentation feedback]**
2. During one of our design galleries, Dr. Burnett suggested we incorporate a method for annotating the grocery list as that is a common thing that people do when creating shopping lists. **[Design gallery feedback]**

3. The "share grocery list" feature allows for exporting the grocery list so that Will or Leona's partner, caretaker, or friend could receive the list and go to the store on their behalf. This feature was added based on design gallery feedback as well as user interviews in which our interviewees mentioned that their family and friends would also help them out, including with grocery shopping.
    a. During one of our design galleries, Dr. Burnett also suggested we add such a feature as it's a common thing that people do. **[Design gallery feedback]**
    b. Husband and child are doing something extra every day (opening jars, squeezing face ointment) **[1]**
    c. At the store, I can grab things with one hand, but things that require both hands (heavier items for example), I need to ask my friend to get it for me **[2]**

Screen 4: Order Grocery Delivery

Annotations
1. Again, the voice assistant and hand dominance selection options are available to address the hand and arm mobility facet. The swap hand dominance button will flip the checkboxes to the other side of the screen. The voice assistant can help with achieving any of the tasks available on this screen (e.g. adding an item to the list, editing an item, navigating to different buttons, etc).
2. We made the checkboxes larger to make them easier to select, addressing the hand and arm mobility facet. We also added the pen icon to allow for annotation of the individual list items.

      a. It would also be great to add an option to expand a description of the instructions in case certain tasks are complicated or require equipment that they don't have. **[Design gallery feedback]**

      b. One suggestion: rather than using small checkboxes, use a large checkbox to make selection easier. **[Design gallery feedback]**

      c. Additionally, the toggle checkbox for use-case 2 shopping could be too small for the target audience. **[Design gallery feedback]**

3. We added this button to allow people to add items to their shopping list that weren't automatically scraped from the recipes in the meal plan. This way, people can use the app to order all of their groceries and other miscellaneous items without needing to switch apps and pay for a totally separate order.

      a. It would be awesome to allow users to order ingredients that aren't just in the recipe because this could then be a one stop shop for users to get groceries too. This would also be helpful in case they have a dietary restriction that you didn't consider or isn't very common. **[Design gallery feedback]**

4. The two buttons at the bottom of the screen are large in order to provide the greatest surface area for tapping, addressing the hand and arm mobility facet. We figured it would be most convenient to offer a way to order groceries through the app so that people with low mobility and low weight bearing load wouldn't have to go to the store if they are unable to shop on their own.

Screen 5: Customize Item

This is the screen that appears when someone clicks on the pen icon next to one of the grocery list items.
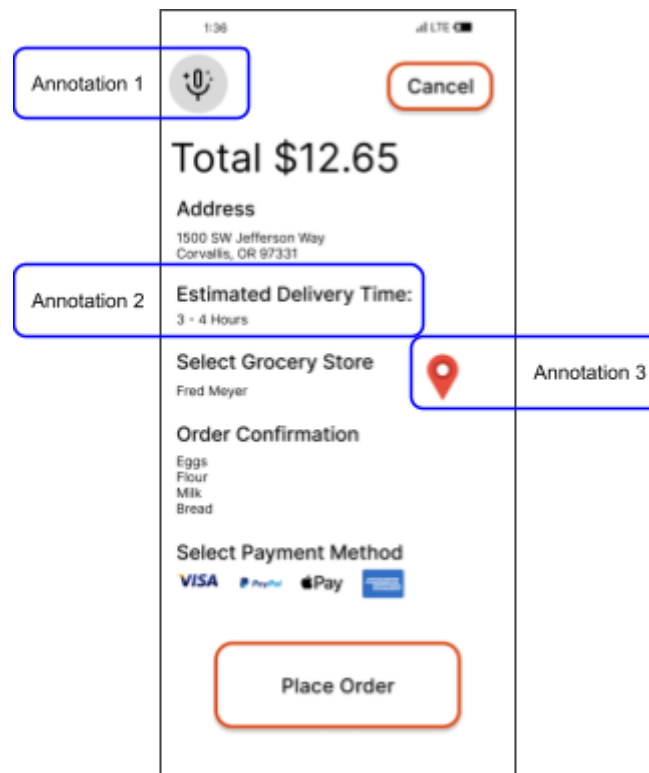
Annotations
1. Again, the voice assistant and hand dominance selection options are available to address the hand and arm mobility facet. The swap hand dominance button will flip the checkboxes to the other side of the screen. The voice assistant can help with achieving any of the tasks available on this screen (e.g. adding an item to the list, editing an item, navigating to different buttons, etc).
2. We added an "other" option for people to write their own notes when customizing or annotating a grocery list item. This is a common task that people do and we received design gallery feedback suggesting this feature.
   a. The prototype so far looks amazing! My only feedback would be to add "other" in the section where a user can change their ingredient to something else if there's no available option that they'd like to choose. Great job! **[Design gallery feedback]**

Screen 6: Add Grocery Item

Annotations
1. Again, the voice assistant and hand dominance selection options are available to address the hand and arm mobility facet. The swap hand dominance button will flip the checkboxes to the other side of the screen. The voice assistant can help with achieving any of the tasks available on this screen.
2. We added a section for suggested items that people may want to add to their grocery list to make it easier to add items that are typically also added to their grocery lists (as

remembered by the app's AI feature). This can save people time and effort from typing out the specific items they want every time, especially if it's something they add to every order. This feature helps address the hand/arm mobility and foresight facets.
3. We added an "other" option for people to specify what they want to add to their list in case it's not one of the suggested items. This lets people add non-ingredient items to their list too in case they want an all-in-one delivery order placed through the app.
    a. It would be awesome to allow users to order ingredients that aren't just in the recipe because this could then be a one stop shop for users to get groceries too. This would also be helpful in case they have a dietary restriction that you didn't consider or isn't very common. **[Design gallery feedback]**
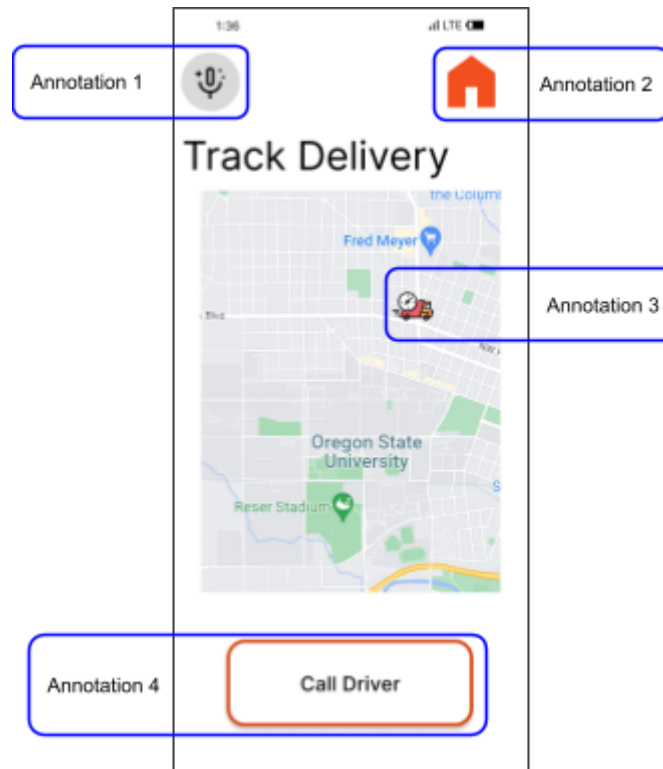
Screen 7: Delivery Checkout

Annotations
1. Again, the voice assistant is available to help with accomplishing any of the available tasks on this screen.
2. We included the estimated delivery time on this screen to provide people with a sense of when to expect their groceries and when to be home (in case they are out and about). This feature addresses the level of foresight facet.
    a. Additionally the delivery to the door concept is also a good idea and I wonder if additional delivery update information could be beneficial to add into the design. More information on the delivery, the more the individual can plan to be available and ready. **[Design gallery feedback]**
3. People can click on this map icon in order to select a grocery store they wish to order from, thereby saving them time from looking up a store or nearest store location in

another app while also being more friendly to people with low hand and arm mobility as they can accomplish the selection with two taps rather than typing out an address.

Screen 8: Delivery Tracking

Annotations
1. Again, the voice assistant is available to help with accomplishing any of the available tasks on this screen.
2. We added the home icon to provide a single-click way for people to return to the homepage of the app after they have placed their delivery order.
   a. This feature was recommended to us b Dr. Burnett during one of the design galleries in order to minimize the number of back buttons that would need to be pressed to return to the main screen. **[Design gallery feedback]**
3. Similar to DoorDash and Uber, we provided a way to preview the delivery driver's current location. Providing real-time updates about the state of the grocery delivery can help Will and Leona plan for when they should be at the door to receive their order, thereby helping to address both of their foresight facets.
   a. Additionally the delivery to the door concept is also a good idea and I wonder if additional delivery update information could be beneficial to add into the design. More information on the delivery, the more the individual can plan to be available and ready. **[Design gallery feedback]**
4. We provided a way to call the delivery driver if it's necessary to communicate an emergency or to help the driver find the correct location for dropping off the groceries. It can be especially useful for Will as he has low weight bearing load and hand/arm

mobility, so it can be more convenient for him to call the driver to let them know they'll have to help carry the groceries to some requested destination.

Use Case 3: Level of Adaptation / Techniques
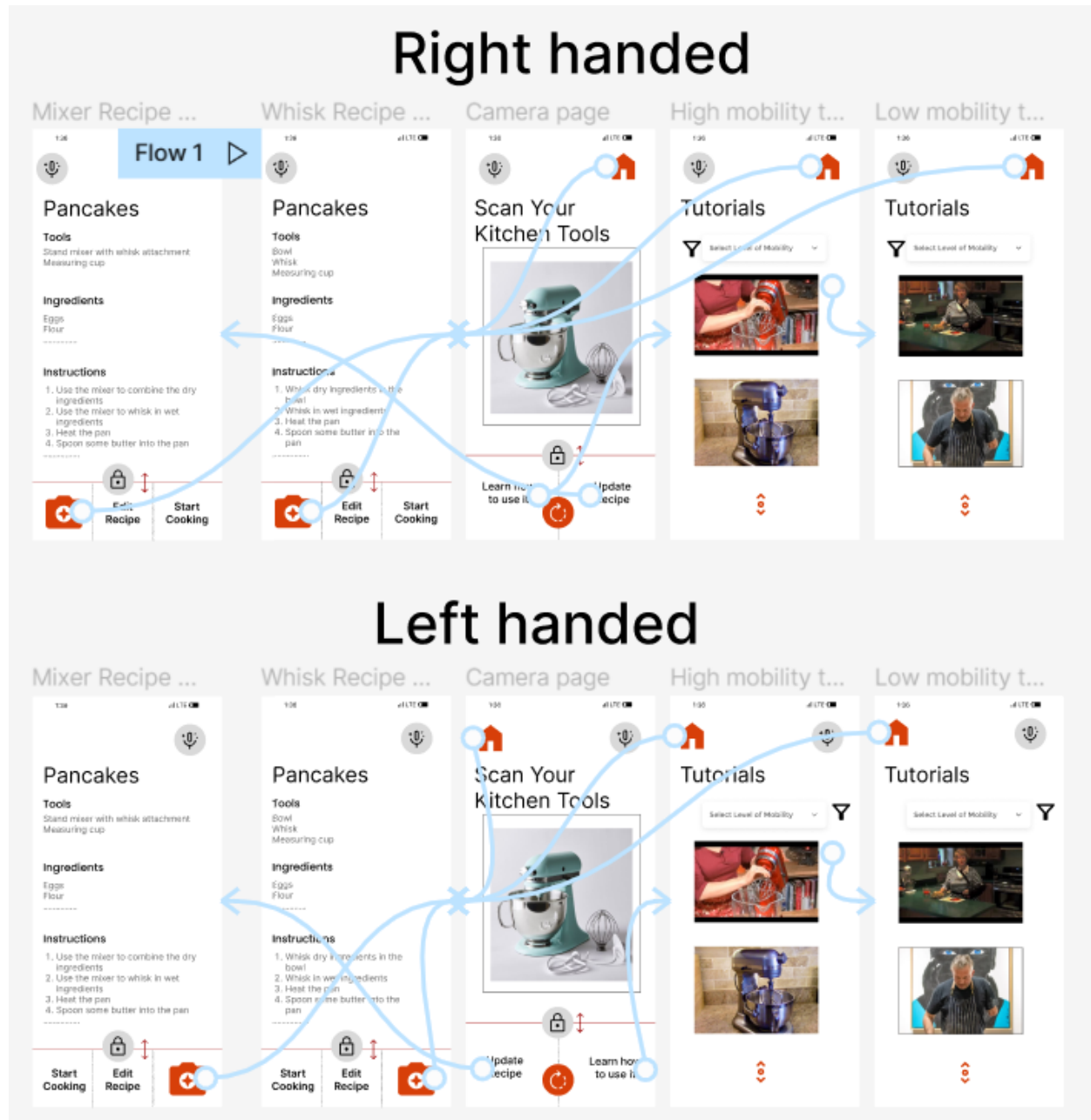
Facet: Level of Adaptation

Use-Case/Scenario: Finding techniques and alternative tools for different kitchen tasks

Concept(s): Take a picture of kitchen tools with phone to see techniques, Categorization by level of adaptation, Dropdowns for customize tools

Full Use-Case (Underserved): "*I'm preparing the ingredients before cooking and need to know the correct techniques for chopping vegetables, breaking down meat, etc. I need multiple technique options based on the tools I have access to and alternatives based on physical ability (e.g., how do I peel a carrot with one hand?)*"

Full Use-Case (Main-Streamer): "*I'm preparing the ingredients before cooking and need to know the correct techniques for chopping vegetables, breaking down meat, etc. I need multiple technique options based on the tools I have access to.*"

Description

- The first main feature of this sketch is to allow users to edit the recipe tools, ingredients, and steps according to what the user wishes.
  - For example, the original recipe may include whole carrots but the user can edit it to say chopped carrots because they bought them pre-chopped.
- The second main feature of this sketch is the ability to take a picture of the tools the user has in their kitchen. After that, they have the option to view tutorials showing how to use a specific tool or cooking technique with what they have on hand, as well as the option to update the recipe based on the tools they have.
  - The explanations and video tutorials of the various techniques will be accessible to both our underserved and mainstream populations.
  - The ability to take a picture of the tools will make it more convenient for the user; they will not need to type or explain to the voice assistant what they have on hand.
- We chose these features based on feedback and quotes on how having different tools will be difficult to handle for cutting, frying, peeling, etc., especially for the underserved population and we wanted to provide a way for our users to learn different methods while not just dumping a bunch of tutorials on them that they didn't ask for or that aren't applicable to them.
  - When the user goes seeking out that information, then we will give them the resources necessary for learning how to use them.
- The ability to modify the recipe was based on design gallery feedback and the intuition that every kitchen is different and every chef does things in slightly different ways. Being able to customize the recipe so that it contains only the things that are relevant will be useful to both our underserved and mainstream populations.

Supporting Evidence

- *"I suggest to be more clear on the difficulty "Beginner/Intermediate/Expert" if it is for cooking, recipe, skill level with one arm, etc"* **[Design gallery feedback]**
- *"I would just recommend the left vs right handed orientation selector."* **[Design gallery feedback]**
- *"adding a 'zoom' functionality that can be activated by voice command. A lot of times when people are coming their phones are about 1-2 ft away from their face so it may be hard for some people to read instructions with smaller text."* **[Design Gallery feedback]**
- *"One suggestion would be to consider using the voice assistant to navigate around the app, that way we can avoid screen interaction."* **[Design Gallery feedback]**
- *"It could take some fine tuning, to identify the object and I recommend that the design allows for different types of help recommendations for one object."* **[Design Gallery feedback]**
- "Willow will not choose camera to update recipe, because it's unclear what the camera is for and the "edit recipe" button is an attractive alternative option for adapting the recipe.Low hand mobility means it may be difficult to click elements, so she clicks the "easiest" to click element." **[Underserved - Cognitive Walkthrough]**
- "Willow may be experienced with various types of adaptations and assume the information they have about different tool uses is already sufficient for completing her task."**[Underserved - Cognitive Walkthrough]**
- "Things will change on the recipe, so if Willow was familiar with the recipe, she may notice these changes. However, there is no specific callout to make her aware of modifications."**[Underserved - Cognitive Walkthrough]**
- "Willow could have been recently disabled and just bought a gadget that was recommended to her but she doesn't know how to use it yet. Thus she would likely want to see some examples of how to use it in her day to day cooking."**[Underserved - Cognitive Walkthrough]**
- "Willow will find videos of people using the specific tool, so she will be able to follow and know in which cases to use it. These videos will also help her plan new recipes with knowing how to use the tool."**[Underserved - Cognitive Walkthrough]**
- "Clicking the back arrow back tracks from the current subgoal and is unintuitive"**[Underserved - Cognitive Walkthrough]**
- "She might click on the camera button for cataloging because it's a prominent option and there does not appear to be anything else that would offer the cataloging feature " **[Mainstreamer - Cognitive Walkthrough]**
- "She might have gotten a new tool or just is curious to learn more about a tool she already has, so yes this would be a necessary step towards her goal"**[Mainstreamer - Cognitive Walkthrough]**
- "she sees the "update recipe" button and wants to use the camera functionality to try out this feature"**[Mainstreamer - Cognitive Walkthrough]**
- "she will see videos with tutorials on how to use the tool"**[Mainstreamer - Cognitive Walkthrough]**
- "Clicking the back arrow back tracks from the current subgoal and is unintuitive"**[Mainstreamer - Cognitive Walkthrough]**
- "Leona returned to a previous screen state and feels like she's losing progress by clicking back twice"**[Mainstreamer - Cognitive Walkthrough]**
- "Things will change on the recipe, so if Leona was familiar with the recipe, she may notice these changes. However, there is no specific callout to make her aware of modifications."**[Mainstreamer - Cognitive Walkthrough]**
- Variety of gadgets and strategies mentioned in our sources, but not everyone will know

about them or how to use them, so we can fill that gap and make cooking steps easier / less tedious

- My sister was suggesting me to buy an air fryer, so I don't have to stir or anything, just put it there. **[3]**
- Draining stuff after cooking. Would need to use a slotted spoon into a bowl, and that's too tedious **[1]**
- have used toaster oven, can pull it out onto door of toaster oven and cool before grabbing it **[1]**
- used a different cooking pan: taller sides **[1]**
- Dycem mats are also helpful for stabilizing the bottom of a mixing bowl. **[12]**
- Did you know there are one-handed rolling pins? **[12]**
- One of the most difficult things about living with one hand is not having an extra hand to stabilize an object while you work with it. To remedy this, get non-slip silicone pads and leave them on surfaces around your house such as kitchen counters, bathroom counters, nightstands and end tables. Then, whenever you need to open a jar or something else, you can use the silicone pad to hold it in place and prevent it from slipping. **[5]**
- One handed alternatives: Multi-choppers, pizza cutters instead of knives **[16]**
- Cutting asparagus first: rubber band around the cutting board, stabilize **[7]**
- To chop apples, put the rubber gripper on the cutting board, put the apple cutter down, push the apple down to secure, and use a knife to cut **[7]**
- She demonstrates how she overcame this challenge by wrapping a wide elastic band around the lids to help her grip while opening jars. **[17]**

- When following a recipe, think about it ahead of time, before getting into the middle of cooking. Stuff like "this requires a lot of chopping" and "I need to use a can opener. **[1]**
  - App should provide a way for user to scan through the steps and identify any potential trouble points. This is also where the customizable adaptability controls can come into play

- Taking the picture will help users with different techniques on how to use the tools, and/or customize the different ingredients available in the recipe based on the tools available in their kitchen.
  - I use a cutting board that sits on suction cups and has a lip and some spikes that can hold a slice of bread or a piece of fruit in place.**[4]**
  - One of the most difficult is cutting, I recommend some equipment such as a one-handed cutting board with clams, a hook to stabilize the food. **[7]**
    If you don't have the money to invest in this: paper clips, rubber bands corn curb holders, cutting board, rubbery jars bottles, knives, and court board. **[7]**
  - Cutting asparagus first: rubber band around the cutting board, stabilize the **[7]**
  - Big knives are better. **[7]**
    For shaving: take the jar lid opener, put the curb board on top, and attach them to the rubber band **[7]**
  - Place the carrot on top, and take the paper clips, push them through to give more stability. And shave! Rotate when is necessary. **[7]**
  - Use a skewer to cut the stem of the strawberries **[7]**
  - To chop apples, put the rubber gripper on the cutting board, put the apple cutter down, push the apple down to secure, and use a knife to cut **[7]**
  - For avocados: secure curb board, and cut in the middle **[7]**
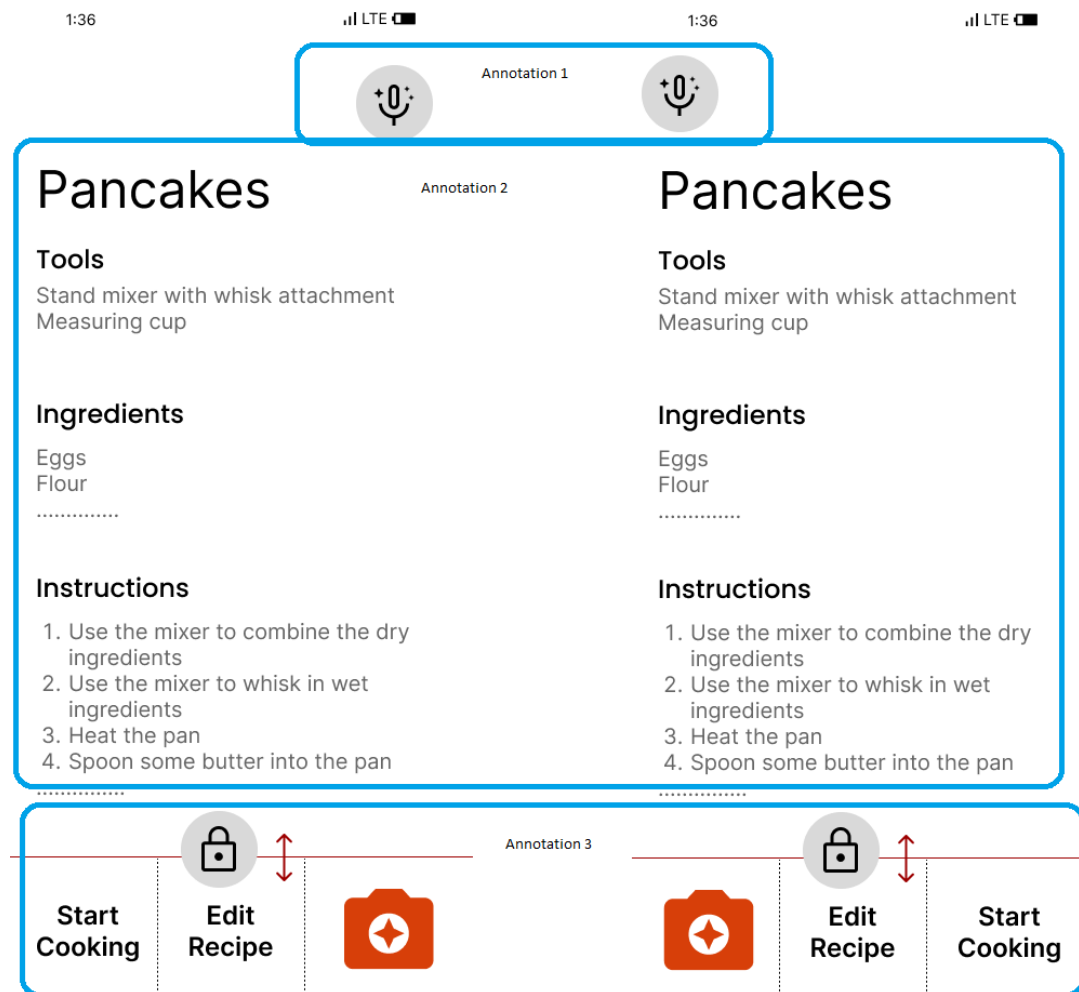
Screen Annotations

Screens 1: Mixer Recipe Overview
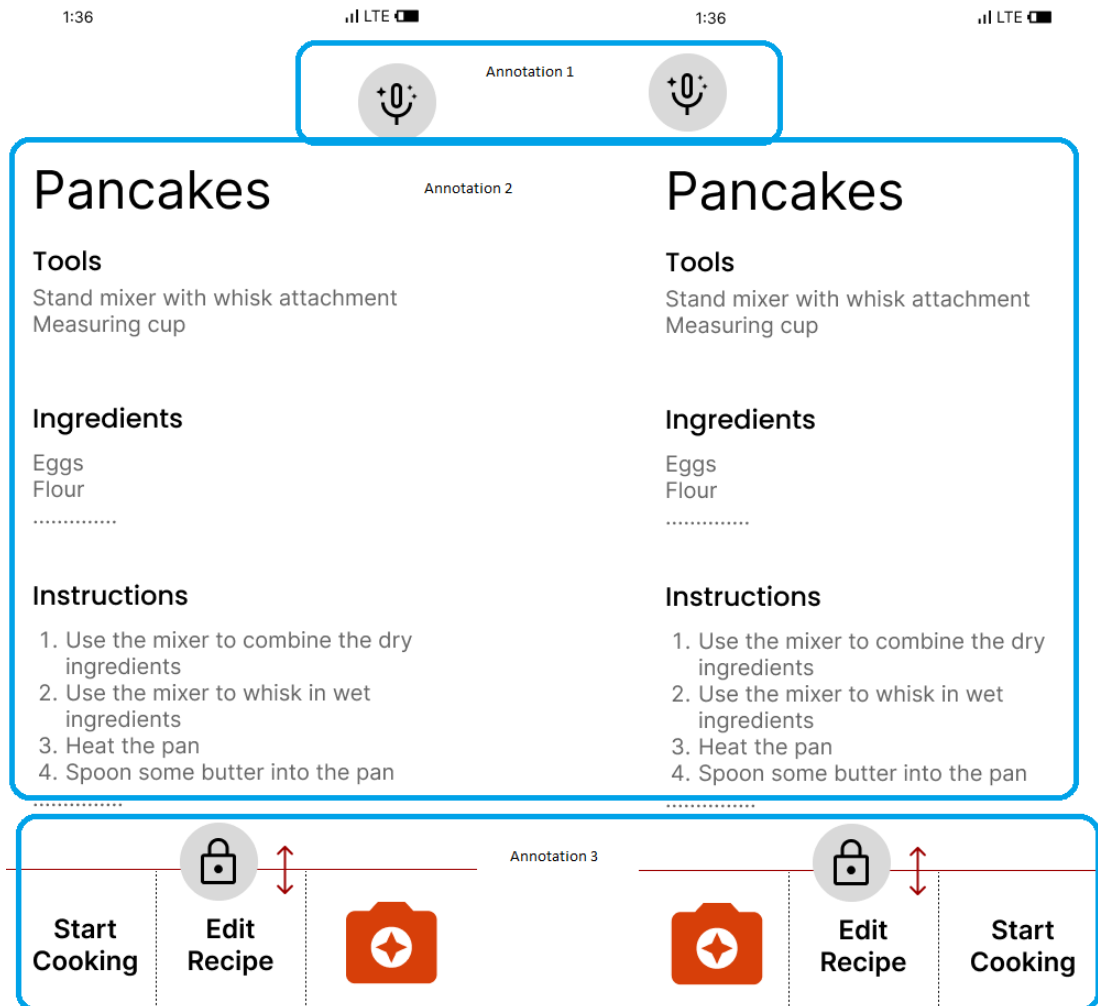
Annotations
1. Voice assistant button is readily available in a position comfortable to reach for left and right handed users. The voice command can help the user with any of the tasks on this screen.
   a. Add voice options across all areas of the app. **[Design gallery feedback]**
   b. Good progress, voice assistant integration is a great addition. One suggestion would be to consider using the voice assistant to navigate around the app, that way we can avoid screen interaction. **[Design gallery feedback]**
2. Adding a 'zoom' functionality that can be activated by voice command. A lot of times when people are coming their phones are about 1-2 ft away from their face so it may be hard for some people to read instructions with smaller text. **[Design Gallery feedback]**
3. I like the idea of changing the size of a button if the person is cooking. **[Design Gallery feedback]**
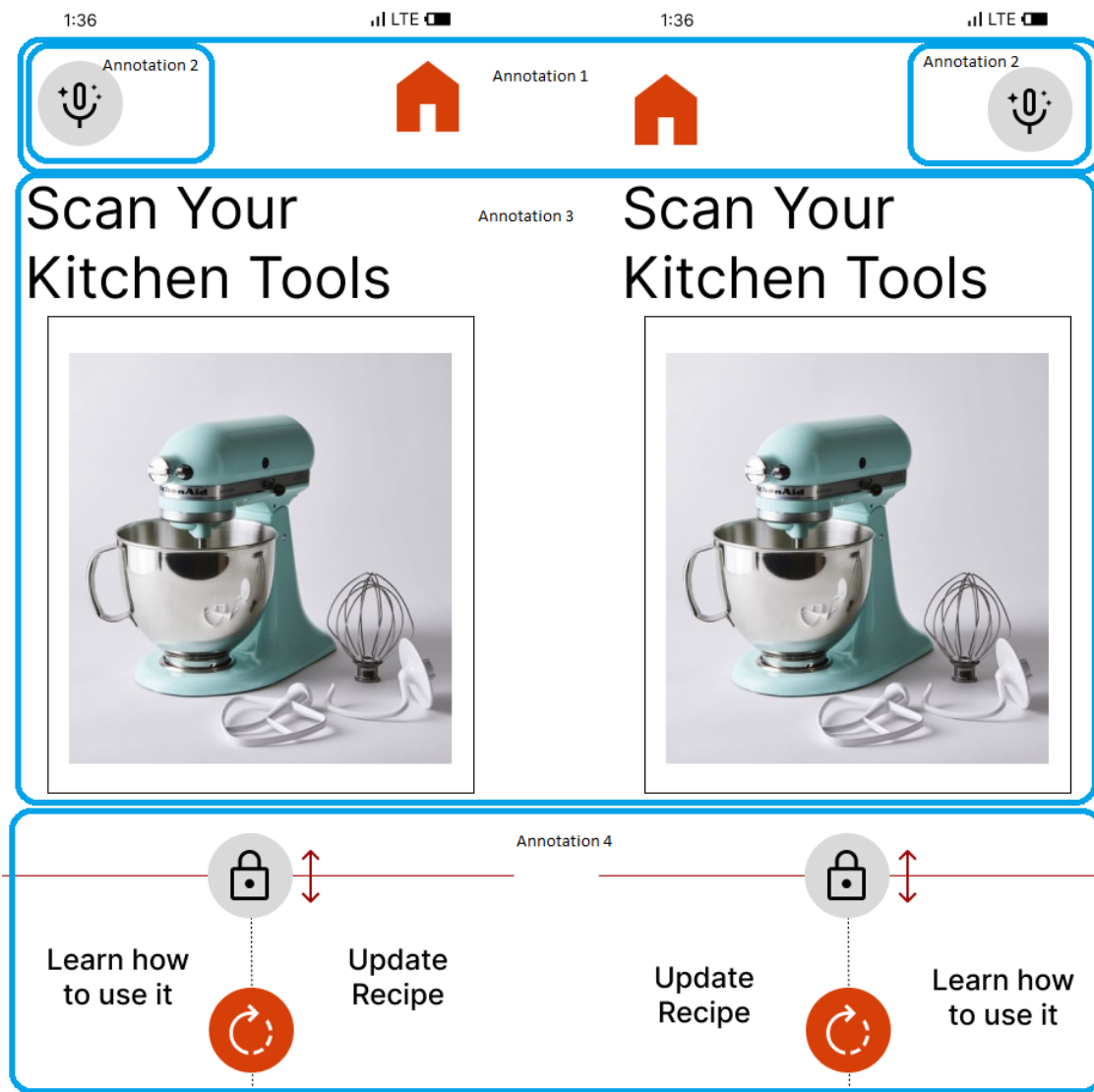
Screens 2: Whisk Recipe Overview

Annotations

1. Voice assistant button is readily available in a position comfortable to reach for left and right handed users. The voice command can help the user with any of the tasks on this screen.
   a. Add voice options across all areas of the app. **[Design gallery feedback]**
   b. Good progress, voice assistant integration is a great addition. One suggestion would be to consider using the voice assistant to navigate around the app, that way we can avoid screen interaction. **[Design gallery feedback]**
2. After updating the recipe, the new steps will have the tools available for the user listed in the order of use.
   a. Adding a 'zoom' functionality that can be activated by voice command. A lot of times when people are coming their phones are about 1-2 ft away from their face so it may be hard for some people to read instructions with smaller text. **[Design Gallery feedback]**
3. I like the idea of changing the size of a button if the person is cooking. **[Design Gallery feedback]**
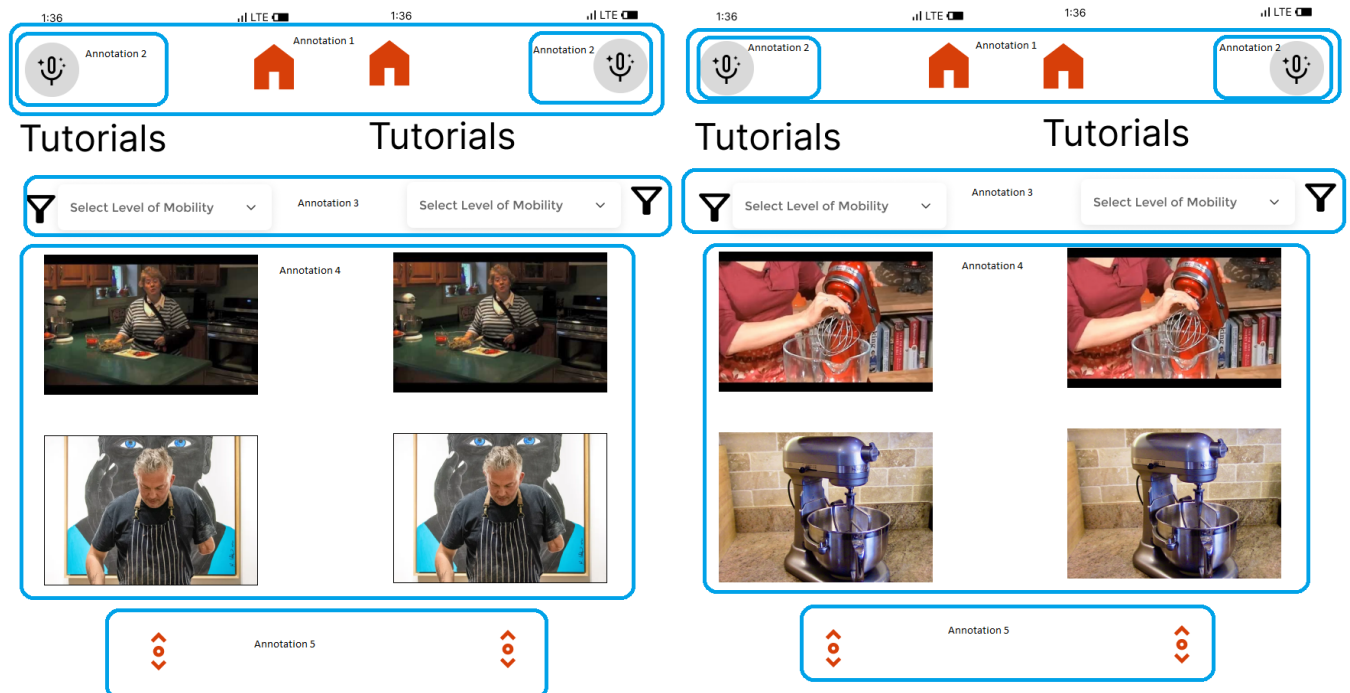
Screens 3: Scan Tools

Annotations
1. The home and voice command buttons switch location on the screen depending on the user's handedness, making it easier to operate one-handed.
    a. Make all use cases aesthetically consistent (same color palettes, fonts, icons, phone frames)
    b. Make the "x" icon into a home screen or button that says "close" or "go back to recipe" or something more informative **[Dr. B's feedback from a design gallery]**
2. Voice assistant button is readily available in a position comfortable to reach for left and right handed users. The voice command can help the user with any of the tasks on this screen. The home button makes it easier for users to navigate the app quickly, as they'll be able to return to the starting page with just one button.
    a. Add voice options across all areas of the app. **[Design gallery feedback]**

b. Good progress, voice assistant integration is a great addition. One suggestion would be to consider using the voice assistant to navigate around the app, that way we can avoid screen interaction. **[Design gallery feedback]**

3. Because different brands have different product appearances, I believe the one that takes photos and learns tool could be improved. It would be complacent for an underserved population to use the app if it consistently returned incorrect search results. I think if you have a scan function, that could scan the series number. It might be more useful. **[Final presentation feedback]**

   a. It could take some fine tuning, to identify the object and I recommend that the design allows for different types of help recommendations for one object.**[Design Gallery feedback]**

4. Switch buttons for "update recipe" and "learn how to use" **[Presentation feedback: For the screen with the mixer, I suggest the button for update recipe should be to the right as it is the call to action]**

Screens 4/5: Mobility tutorials

Annotations

1. The home and voice command buttons switch location on the screen depending on the user's handedness, making it easier to operate one-handed.

2. Voice assistant button is readily available in a position comfortable to reach for left and right handed users. The voice command can help the user with any of the tasks on this screen. The home button makes it easier for users to navigate the app quickly, as they'll be able to return to the starting page with just one button.

   a. Add voice options across all areas of the app. **[Design gallery feedback]**

b. Good progress, voice assistant integration is a great addition. One suggestion would be to consider using the voice assistant to navigate around the app, that way we can avoid screen interaction. **[Design gallery feedback]**
    c. On the slide with use case 3 demonstrating the videos, there is a filter that says "select level of mobility," but the drop down list below it has the same exact label, so it almost looks like a duplicate. Could these be consolidated into one drop down list? **[Final presentation feedback]**
3. Enabling users to easily switch between the different levels of mobility lets them survey what adaptations are offered for each half, so they can determine what level of assistance they desire.
    a. I suggest to be more clear on the difficulty "Beginner/Intermediate/Expert" if it is for cooking, recipe, skill level with one arm, etc **[Design gallery feedback]**
4. Tutorials for use of kitchen tools help users tailor their prep experience based on their level of hand mobility, helping users with differing levels of adaptation accomplish their goals. High mobility users may not have high levels of adaptation, and could be missing vital techniques, while low mobility users may need additional assistance in raising their level of adaptation. Catering to both here with specialized tutorials helps both parts of our underserved population.
    a. It could take some fine tuning, to identify the object and I recommend that the design allows for different types of help recommendations for one object.**[Design Gallery feedback]**
5. Large scrollbar ensures that users can easily navigate to more tutorials if they require more instruction.

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