COS20001-COS70004 USER-CENTRED DESIGN

REVIEW CASE STUDY

SWINBURNE UNIVERSITY OF TECHNOLOGY

UCD CASE STUDY REVIEW SESSION

A CASE STUDY FOR PRACTICING YOUR UCD KNOWLEDGE AND SKILLS

Make My Own Meals

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SWINBURNE UNIVERSITY OF TECHNOLOGY

This is a review session.

In this review we will go over the Project tasks with a new case study.

This session will be run in Collaborate Ultra in our normal lecture time.

Use the Canvas Quiz to contribute answers to the discussion before the lecture.

INTENDED LEARNING OUTCOMES

**COS20001-COS70004
USER CENTRED DESIGN**

Apply an evidence-based approach to software requirements elicitation and specification.

Analyse software context of use (i.e., users, tasks and system environment) using a variety of models to identify user requirements.

Design and build a prototype user interface according to software requirements and usability design principles.

INTENDED LEARNING OUTCOMES

**COS20001-COS70004
USER CENTRED DESIGN**

Apply a variety of usability evaluation methods to evaluate and iterate user interface design solutions.

Describe and apply guidelines for professional practice in the ethical treatment of human research participants.

Implement and reflect on strategies for working in small groups.

UCD CASE STUDY REVIEW SESSION

A CASE STUDY FOR PRACTICING YOUR UCD KNOWLEDGE AND SKILLS

These activities have been designed to reflect the knowledge and skills you need to know for this unit. They is NOT representative of the type of questions in current final test.

This is designed to be an interactive session.

Post your answers live during the collaborate session or complete the **UCD Exam Case Study Questions** Canvas before the lecture.

UCD CASE STUDY REVIEW SESSION

A CASE STUDY FOR PRACTICING YOUR UCD KNOWLEDGE AND SKILLS

UCD Exam Case Study

- project brief
- scenarios
- interview transcripts
- screenshots
- descriptions of usability evaluation method and results

Project Brief

Every year thousands of university students leave their home to study. Many leave home without any practical cooking skills and live in situations with limited cooking facilities and utensils. This can lead them to buy expensive restaurant meals or take away food instead of cooking for themselves. This can result in students needing to work more to pay for their food. In addition, purchased meals are can be very unhealthy. Thus, the simple problem of not being able to cook, can lead to students doing poorly at university.

Make My Own Meals (MMOM) is an app designed to help uni students with limited cooking skills prepare healthy, quick and easy meals with basic kitchen facilities.

The aim of the *MMOM* is to increase the nutritional and financial health of Good Learning University students. *MMOM* is being developed by SwinSoft. The client is *Good Learning University*.
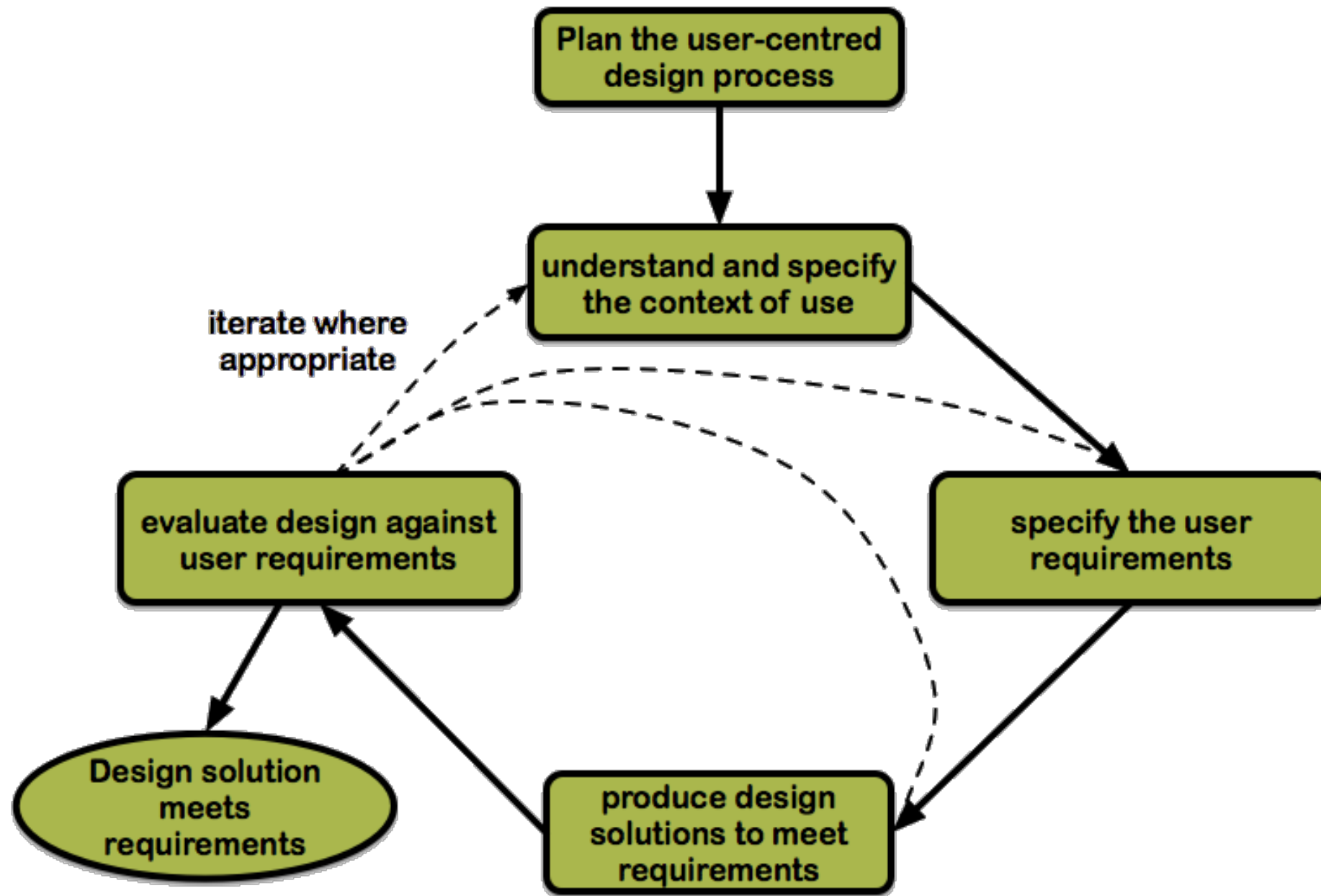
A1

USER-CENTRED DESIGN PROCESS AND PRINCIPLES

RELATED TASKS:
- **PROJECT BRIEF**

Do you understand UCD Process and Principles?

Do you understand the definition of Usability?

A1
USER-CENTRED DESIGN PROCESS AND PRINCIPLES

RELATED TASKS:
- **PROJECT BRIEF**

The principles of User-Centred Design:
- the design is based upon an explicit understanding of users, tasks and environment
- users are involved throughout the design and development
- the design is driven and refined by user-centred evaluation
- the process is iterative
- the design address the whole user experience
- the design team include multidisciplinary skills and perspectives

A1

USER-CENTRED DESIGN PROCESS AND PRINCIPLES

RELATED TASKS:
   · **PROJECT BRIEF**

Usability is the extent to which a product can be used by specified users, to achieve specified goals, with effectiveness, efficiency and satisfaction in a specified ~~context of use~~ (environment).

A1 Activity

At the start of the project SwinSoft gathered ideas from team members to help them plan the project.

The following ideas were put forward in regards to following UCD Principles in the project:

Team Member	Suggested Activity
Dean	Concentrate design efforts on developing a high fidelity version of the prototype
Sam	Conduct multiple usability evaluations on low fidelity prototypes at the uni cafe
Mary	Interview members of the following user groups: • uni student • chef • nutritionalist • novice cook

To what degree do the activities follow UCD principles and what if any changes could be made to improve the activity?

A2

RESEARCH CONTEXT OF USE AND ETHICS

RELATED TASKS:
- **INTERVIEW AND ETHICS**

What research methods can be used to help elicit and identify requirements?

How do you conduct a good Interview that follows ethical guidelines?

- selection of participants
- informed consent
- interview questions
- interview location
- data handling

A2 Activity

Does this method follow good interview techniques and ethical guidelines?

What if any improvements would you make?

Ref	Method
1	Participants were recruited from a university facebook group. To quality for the interview they had to be studying at university.
2	Participants were interviewed in a unused class room. It had good lighting and was quiet.
3	The interviewer was dressed appropriately, brought appropriate equipment and administered informed consent correctly.
4	The following questions were asked:
4.1	How many times a week do you cook, or do you mostly eat out?
4.2	Do you find cooking easy?
4.3	Would you like easy meal suggestions?

A3 AND A4
SPECIFY CONTEXT OF USE AND WRITE REQUIREMENTS

RELATED TASKS:
- **USER MODEL**
- **FLOW MODEL**
- **TASK MODEL**
- **REQUIREMENTS**

Write a good requirement
- based on data -> traceable
- clear and unambiguous
- labeled and numbered

A3/A4 Activity

Review the following quotes.

Write one or more requirements based on the quotes.

Ref	Quote
1	One recipe I was trying to make needed me to 'whisk the eggs'. I'm like, what is that about? I looked it up and saw you needed a whisk to whisk... I didn't even know what a whisk was let alone have one. I mean I wasn't going to buy one just to make the recipe.
2	I've mostly lived in share houses, I don't really keep a set of cooking stuff. I rely on what is in the house already. I mean I've bought stuff before for the kitchen, but you know someone else breaks it, or takes it with them when they leave the house. Its not worth it, it costs a lot to replace stuff.
3	I didn't know how to cook when I left home. My mum gave me a cookbook before I left, but it was a bit too fancy for me. I didn't have the money to buy half of the ingredients.
4	It's so expensive to eat out, but I don't know where to start to cook my own stuff. I mean two-minute noodles are about all I can do.
5	I've tried to do some cooking, but you know, getting the ingredients together is a pain. Even when I get motivated and look up a recipe, I get stuck when I don't have the ingredients for most of them.
6	When I'm at the shops I end up just buying ready meals because they look easy. I just don't know what fresh foods I should buy to make a meal at home.
7	Sometimes I do get around to buying fresh food, but then I never use it before it goes off.

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2 Cooking Help

2.1 Glossary of terms

The user shall be able to access information about key cooking terms. [ref 1]

Rationale: Users may not be familiar with some cooking terminology. Having to look up a term outside of the app may prevent them from trying a recipe.

Ref	Quote
1	One recipe I was trying to make needed me to 'whisk the eggs'. I'm like, what is that about? I looked it up and saw you needed a whisk to whisk... I didn't even know what a whisk was let alone have one. I mean I wasn't going to buy one just to make the recipe.

2 Cooking Help

2.2 Utensil Substitution

The user shall be provided with alternate utensil options for less common utensils. [ref 1]

Rationale: Users may not have some utensils. Providing substitutions will allow them to try a recipe.

Ref	Quote
1	One recipe I was trying to make needed me to 'whisk the eggs'. I'm like, what is that about? I looked it up and saw you needed a whisk to whisk... I didn't even know what a whisk was let alone have one. I mean I wasn't going to buy one just to make the recipe.

2 Cooking Help

2.3 Utensil Explanation

The user shall be provided with short guides about cooking techniques. [ref 1]

Rationale: Users may not be familiar with some cooking techniques. Having to look for help outside of the app may prevent them from trying a recipe.

A3/A4 Activity

Review the following quotes.

Write one or more requirements based on the quotes.

Ref	Quote
3	I didn't know how to cook when I left home. My mum gave me a cookbook before I left, but it was a bit too fancy for me. I didn't have the money to buy half of the ingredients.
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1 Meal planning

1.1 Pre-loaded recipes

The system shall contain a data base of suitable pre-loaded recipes. [ref 3, 4,6]

Rationale: Users may not have time or motivation to go hunting for appropriate recipes. Pre-loaded recipes should suit student lifestyle (e.g.,cheap, quick, easy)

Note: As the user becomes more confident they will need the option of adding recipes of their own choosing.

Ref	Quote
4	It's so expensive to eat out, but I don't know where to start to cook my own stuff. I mean two-minute noodles are about all I can do.
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7	Sometimes I do get around to buying fresh food, but then I never use it before it goes off.

1 Meal planning

1.2 Search for meals

The user shall be able to search for meals based on criteria such as ingredient type, cuisine type, time to prepare, ease of preparation etc. [ref 4,5, 7]

Rationale: Users have different cultural, dietary, skill level preferences and should be able to exclude meals that don't meet their preferences

A3 AND A4

SPECIFY CONTEXT OF USE AND WRITE REQUIREMENTS

RELATED TASKS:
- **USER MODEL**
- **FLOW MODEL**
- **TASK MODEL**
- **REQUIREMENTS**

How do you explicitly specify and document context of use?

- user model
- work flow model
- task model - HTI

A3/A4 Activity

Review the following quotes.

Write a **persona** based on the quotes.

Ref	Quote
1	One recipe I was trying to make needed me to 'whisk the eggs'. I'm like, what is that about? I looked it up and saw you needed a whisk to whisk... I didn't even know what a whisk was let alone have one. I mean I wasn't going to buy one just to make the recipe.
2	I've mostly lived in share houses, I don't really keep a set of cooking stuff. I rely on what is in the house already. I mean I've bought stuff before for the kitchen, but you know someone else breaks it, or takes it with them when they leave the house. Its not worth it, it costs a lot to replace stuff.
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A3/A4 Activity

Draw a **flow model** for a uni student making a meal at home.

Use the quotes to help you identify breakdowns.

Ref	Quote
1	One recipe I was trying to make needed me to 'whisk the eggs'. I'm like, what is that about? I looked it up and saw you needed a whisk to whisk… I didn't even know what a whisk was let alone have one. I mean I wasn't going to buy one just to make the recipe.
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7	Sometimes I do get around to buying fresh food, but then I never use it before it goes off.

A3/A4 Activity

Draw a **flow model** for a uni student making a meal at home.

No interview data provided for this practice activity: Instead use this this Usage Scenario...

Six months ago, Frank moved out of home to be closer to Uni. Frank left home with much cooking experience. His mum gave him a cook book and a very basic set of kitchen utensils (e.g., pots, a fry pan, a chopping knife, vegetable peeler..). When he first got his new place he did try a few recipes. But he found it frustrating. First he tried browsing for recipes in the book. However, he often didn't have the ingredients in his fridge or cupboard and so gave up. Sometimes he tried looking up things to make with the ingredients he already had, but he would find a recipe only to discover he didn't have something else on the list or it was too complicated or took too long to make. Some recipes listed utensils that he didn't have (e.g., a whisk) or were expensive (e.g., food processor, mixer). Others mentioned cooking techniques he wasn't familiar with (such as 'cream butter and sugar', sauté) and it was too much trouble to go searching up how to do things.

When he did try to plan ahead he found some of the ingredients were expensive, or he forgot to buy the right things at the supermarket. Often he would buy some fresh ingredients, but not get around to using them and they would go off. Mostly it was just easier to order out or buy a ready made meal. But that was expensive and not always a healthy option.

A3/A4 Activity

Build a **hierarchical task inventory model** for making a meal with a specific ingredient (e.g. eggs) from a traditional cook book.

Assume the user does not have all the ingredients before they start.

No interview provided for this practice activity: You will need to use your own experience, or perhaps look up a recipe...

https://www.jamieoliver.com/recipes/eggs-recipes/simple-cheese-omelette/

A3/A4 Activity

Build a **hierarchical task inventory model** for making a meal with eggs (e.g., a cheese omelette) from a traditional cook book.

Assume the user does not have the ingredients before they start.

Frank wants to make a quick and easy health meal with eggs. He gets out his cook book and starts browsing, but there are so many recipes without eggs, so he goes to the index and looks up eggs. He looks at a few and finally finds one that appeals - a cheese omelette. He checks the cupboard and fridge for the ingredients and finds that he is missing cheese. He is disappointed that he can't make the recipe now, but the recipe sounds so nice he decides to go out and get some cheese next time he shops. He puts cheese on his shopping list. Next time he shops he gets some cheese and is ready to make the omelette. First he gets out all the ingredients, then the utensils. When its all ready he starts to follow the recipe (i.e., crack eggs into bowl, beat with fork, turn on fry pan, put oil in fry pan, add eggs, cook, add cheese...). After it is done he turns it out onto a plate and eats it!

A3/A4 Activity

Build a **hierarchical task inventory model** for making a meal with eggs

- Make a meal with specific ingredient
- Choose recipe to make
  - Get cook book
  - Search for ingredient recipe
    - Check index of cook book for ingredient
    - Get page number/s
    - Look up recipe
  - Check if suitable
    - Check skill level
    - Check ingredients
    - Check utensils…
  - Decide on recipe
- Get ingredients
  - Identify ingredients required
  - Check kitchen for ingredients
  - Make shopping list for missing ingredients
  - Purchase ingredients
- Prepare food
  - Get out ingredients
    - get eggs
    - get butter
    - get cheese
  - Get out utensils
    - get bowl
    - get whisk
    - get pan
  - Follow recipe to cook meal
    - …
- Put food on plate

A3/A4 Activity

Build a **hierarchical task inventory model** for making a meal with eggs
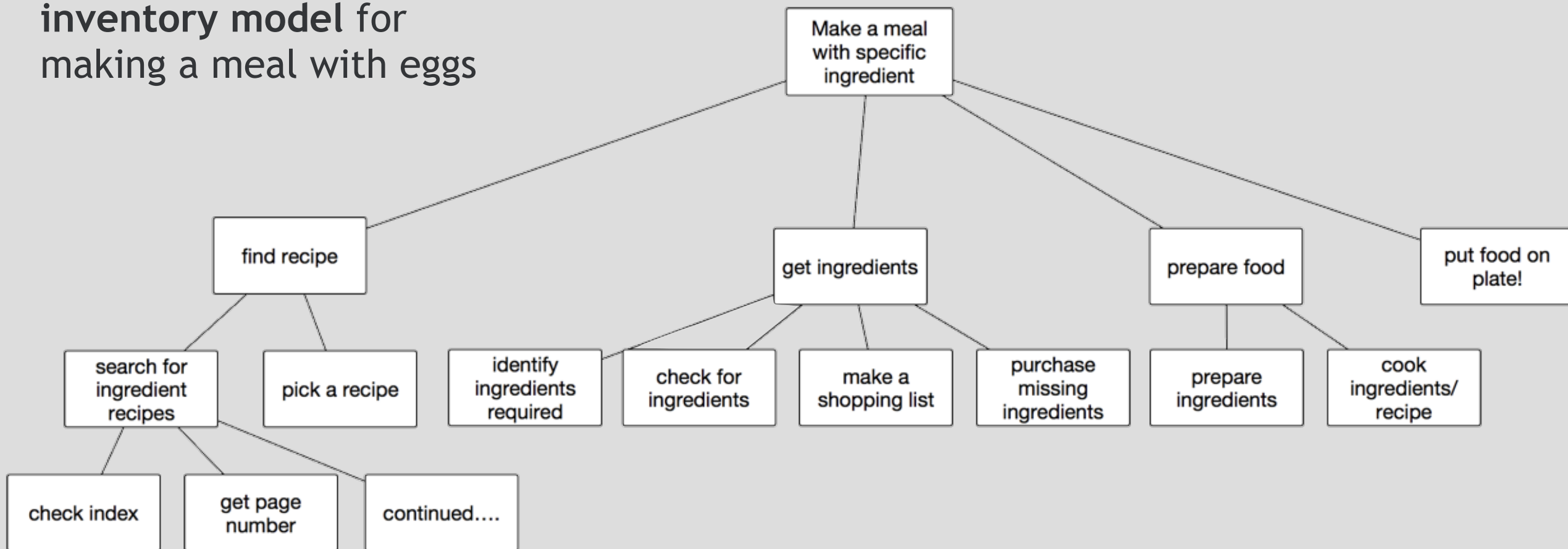
A5
WRITE USABILITY REQUIREMENTS

RELATED TASKS:
- **TASKS AND USABILITY REQUIREMENTS**

Write a good usability requirements

- specifies context of use
- measurable
  - measuring instrument
- metrics

A5 Activity

Review your functional requirements for A3/A4.

Write a set of usability requirements for effectiveness, efficiency and satisfaction.

Write measurable **usability** requirements for:

- effectiveness
- efficiency
- satisfaction

The requirement must relate to the following user statement:

Participant: Sometimes I do get around to buying fresh food, but then I never use it before it goes off. I need to find an easy recipe with that ingredient.

1 Meal Planning
1.3 Find a recipe according to ingredient
The system shall enable the user to find a recipe based on 1 ingredient. [ref X]
Rationale: Users may have limited ingredients, or an ingredient they need to use before it it goes off.
Note: NA

User Role	Usability Goal	Measuring Instrument	Metric	Target
Student living away from home	Effectiveness - recipe search	Task: Find three easy recipes that use chicken.	Unassisted task completion	
Student living away from home	Effectiveness - recipe search	Task: Find three easy recipes that use chicken.	Total number of errors	
Student living away from home	Effectiveness - recipe search	Task: Find three easy recipes that use chicken.	Total number of assists	
Student living away from home	Efficiency - recipe search	Task: Find three easy recipes that use chicken.	Average task completion time	
Student living away from home	Satisfaction - Perceived ease of use	Task: Find three easy recipes that use chicken. Post-task rating scale	Average task difficulty rating (very easy - very hard on 5 point scale)	
All	Satisfaction - Overall User	System Usability Scale (SUS)	Average SUS score	

B1

PROPOSE DESIGN SOLUTIONS TO MEET REQUIREMENTS

RELATED TASKS:
- **CONCEPTUAL DESIGN**

Can you effectively communicate your design solution idea?

- write a design scenario
- draw a storyboard
- draw high level wireframe/s

B1 Activity

Write a Design Scenario for a proposed solution to the design problem.

Design Scenario 1: Get a list of recipes

Helen is a Swinburne University student taking a break between lectures. She wonders what she might have for dinner. Eating out is becoming too expensive so she gets out her laptop and opens MakeMyOwnMeals (MMOM) to look for some suggestions for tonight's dinner. With MMOM's help she has a list of quick and simple recipes that might suit her.

Design Scenario 2: Make a ingredients list

Helen looks at the list of recipes generated by MMOM. One looks ok, so she clicks it for a complete list of ingredients and instructions. The instructions sound easy. There are a few ingredients that she doesn't have. The MMOM automatically makes a shopping list for her she heads to the shops.

B2
UNDERSTAND DESIGN GUIDELINES - EXPERT REVIEW

RELATED TASKS:
- **COMPETITIVE ANALYSIS**
- **PROTOTYPE DESIGN**
- **INSPECTION EVALUATION**
- **ITERATIVE DESIGN**

Can you review a user interface design using design guidelines/heuristics?

- identify possible problems with a user interface design and justify using design guidelines/ heuristics

B2 Activity

Review the prototype use interface, identify three usability issues.
Make sure you refer to design guidelines.

Figure 1

Search Settings page. User accesses this page after tapping on search icon in bottom menu

The user can add a meal type to the search (e.g., Indian) and an ingredient type (e.g., fish)

Search Settings
- ⊕ Add a meal type ›
- ✓ Indian
- ⊕ Add an ingredient ›
- ✓ Fish
- Lunch
- Quick and Easy
- Breakfast
- Dinner
- Snack

Figure 2

Recipe Information Page. User has searched for Breakfast and Quick and Easy.

The user can remove a search filter by tapping ✖

The user can end the search by tapping on ✖

✖ Breakfast ✖ Quick and Easy

Scrambled Eggs

Ingredients | Method | Utensils

Description ▲	Qnt ↕	Measurement	Got ▼
Eggs Free Range	2		○
Butter	2	tsp	⊙
Salt	1	pinch	⊙
			⊕

The user selects items that they aready have. Unselected items will be added to the shopping list.

The user can add items to the ingredient list using ⊕

Vegemite on Toast

Figure 1

A

B — The user can add a meal type to the search (e.g., Indian) and an ingredient type (e.g., fish)

Search Settings

⊕ Add a meal type ›
✓ Indian
⊕ Add an ingredient ›
✓ Fish

C

Lunch
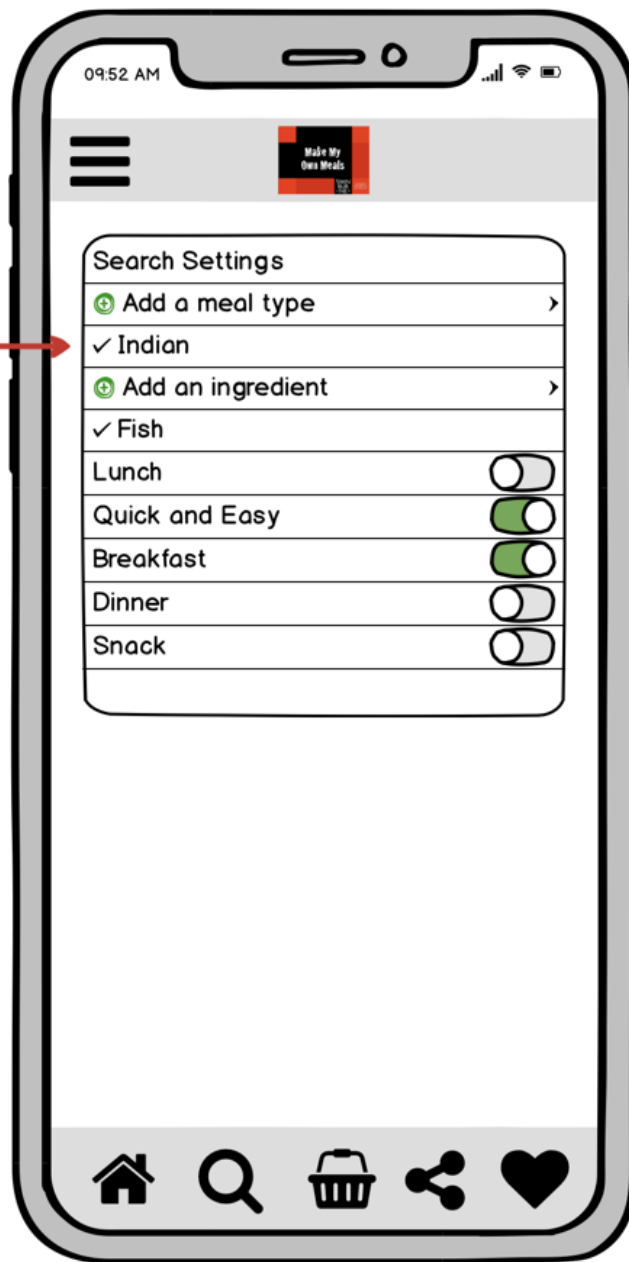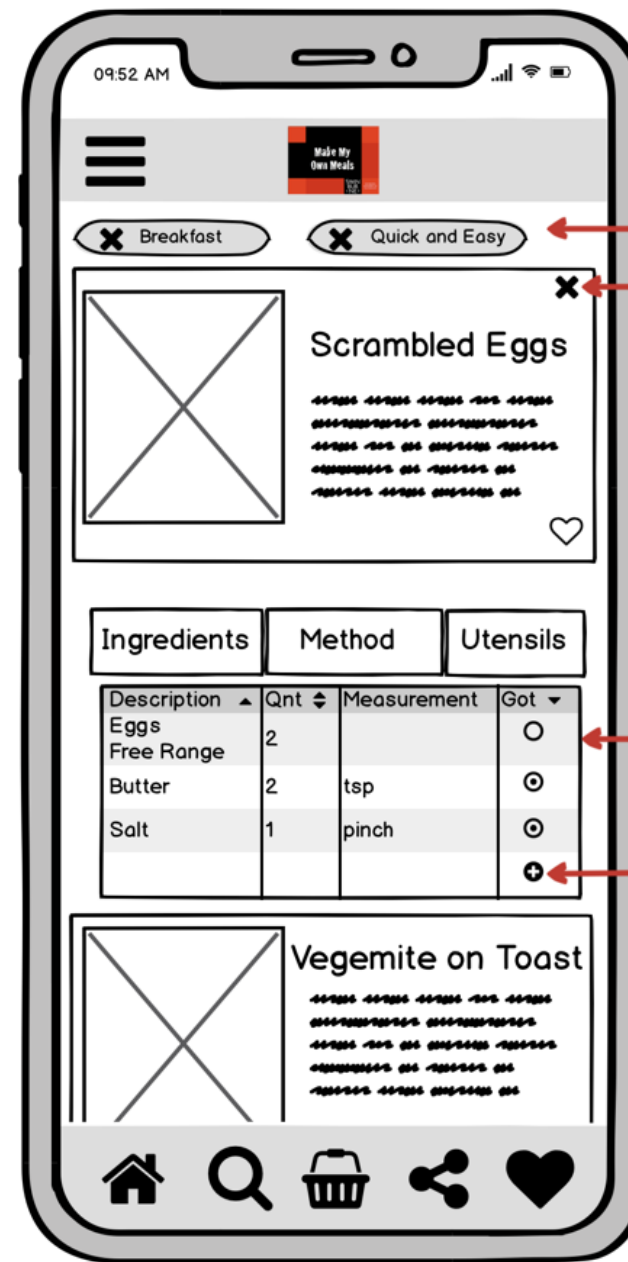Quick and Easy
Breakfast
Dinner
Snack

D

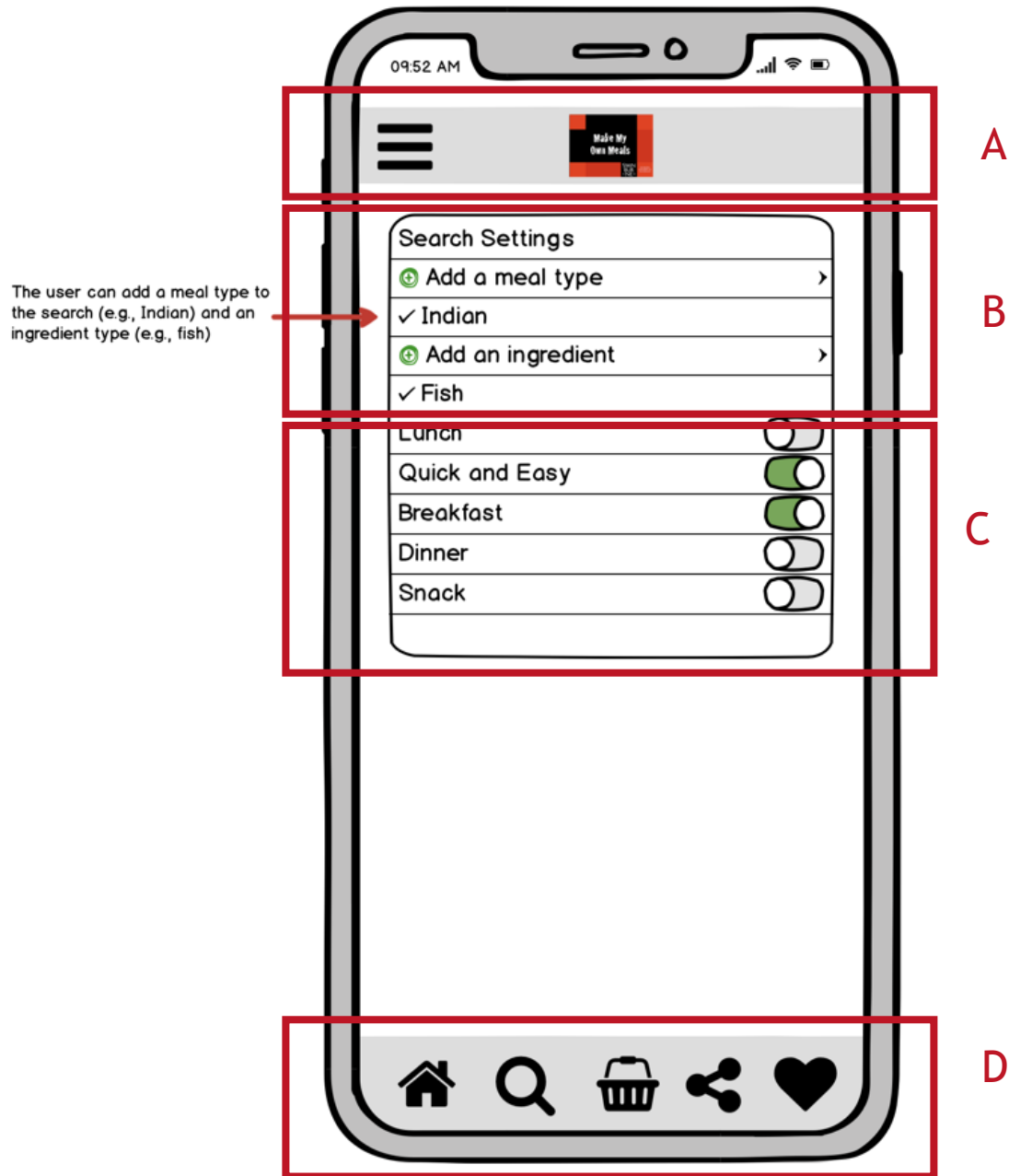**Figure 1**

Search Settings page. User accesses this page after tapping on search icon in bottom menu

Figure 2

E — The user can remove a search filter by tapping ✖

✖ Breakfast   ✖ Quick and Easy

The user can end the search by tapping on ✖

F

Scrambled Eggs

G

| Ingredients | Method | Utensils |

Description ▲	Qnt ⬍	Measurement	Got ▼
Eggs Free Range	2		○
Butter	2	tsp	◉
Salt	1	pinch	◉
			⊕

The user selects items that they already have. Unselected items will be added to the shopping list.

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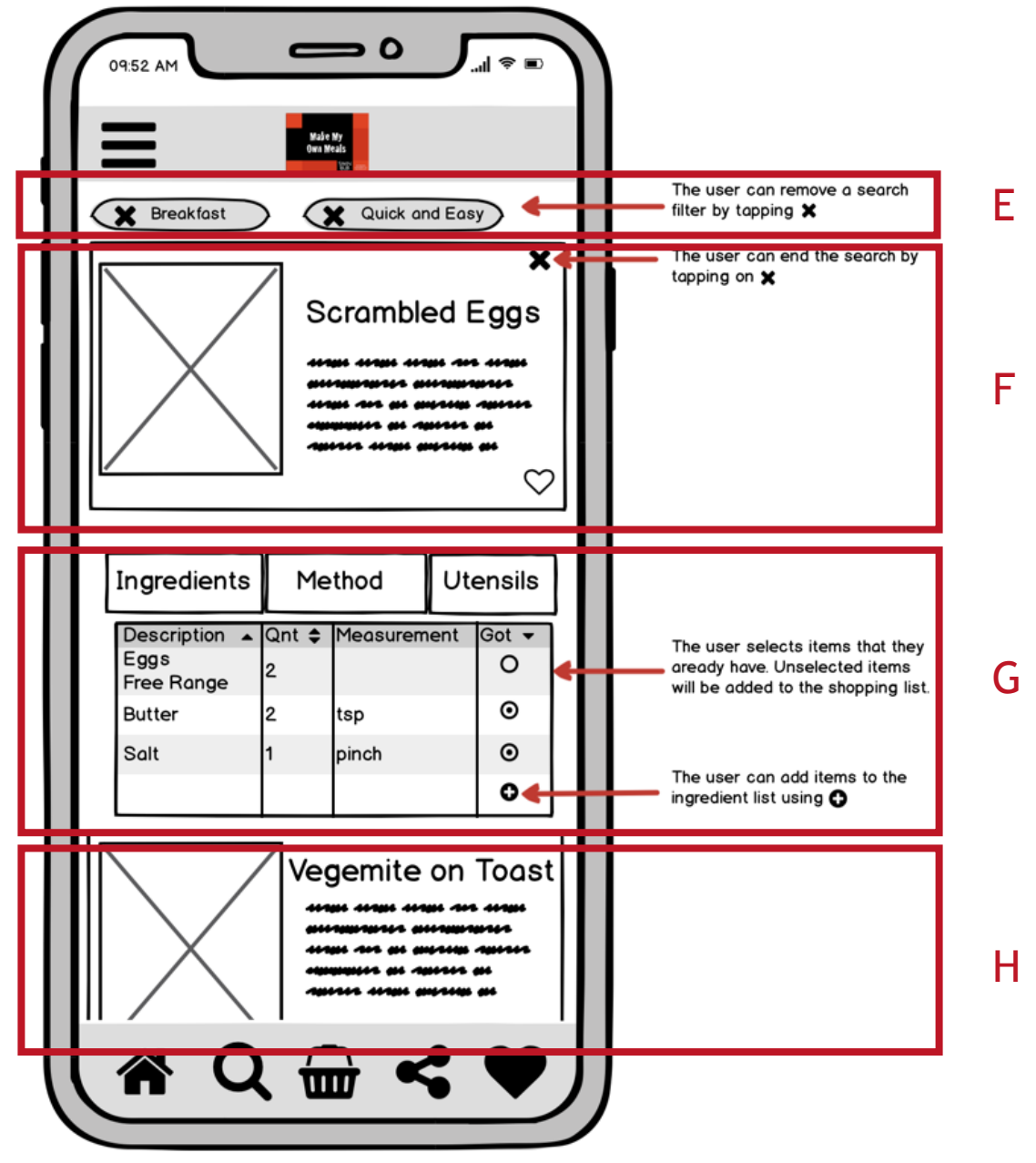
H

Vegemite on Toast

Figure 2

Recipe Information Page. User has searched for Breakfast and Quick and Easy.

B3
DESIGN USER INTERFACE

RELATED TASKS:
- **PROTOTYPE DESIGN**
- **INSPECTION EVALUATION**
- **ITERATIVE DESIGN**

Can you re-design a user interface to remove user interface design problem?

- re-draw a user interface design to fix a user interface design problem while maintaining existing functionality

B3 Activity

Re-design the prototype user interface to fix one or more usability problem.

C1

USABILITY EVALUATION METHODS

RELATED TASKS:
- **EVALUATION METHOD**
- **INSPECTION EVALUATION**
- **USABILITY EVALUATION**
- **LECTURE MATERIAL**

Are you familiar with a range of usability evaluation methods?

- formative vs summative evaluations
- inspection vs observational evaluations
- pros and cons of different methods

What evaluation methods are good for which situations?

C1 Activity

The team has developed an interactive paper prototype. What kind of usability evaluation method would be good to use on a paper prototype? Justify your answer.

C2, C3 & C4
USABILITY EVALUATION METHODOLOGY

RELATED TASKS:
- **EVALUATION METHOD**
- **INFORMED CONSENT AND QUESTIONNAIRES**
- **TASKS AND USABILITY REQUIREMENTS**

Can you prepare and conduct a good usability evaluation?

- Can you write tasks suitable for a usability evaluation?
  - doesn't instruct the user how to use the user interface or bias their response
  - gives the user a meaningful task to do
  - has a clear success criteria

C2 Activity

What is wrong with this task?

Task 1:

MMOM is your easy meal planner. If you have chicken in your fridge, and want a quick and easy meal, simply go to the search menu (🔍) and then Add an ingredient. You will also need to make sure that you have selected 'Quick and Easy'. Return to the home page to get many nutritious meal options!

C3 Activity

The team is worried about the shopping list feature. Write a a usability evaluation task to test the shopping list feature.
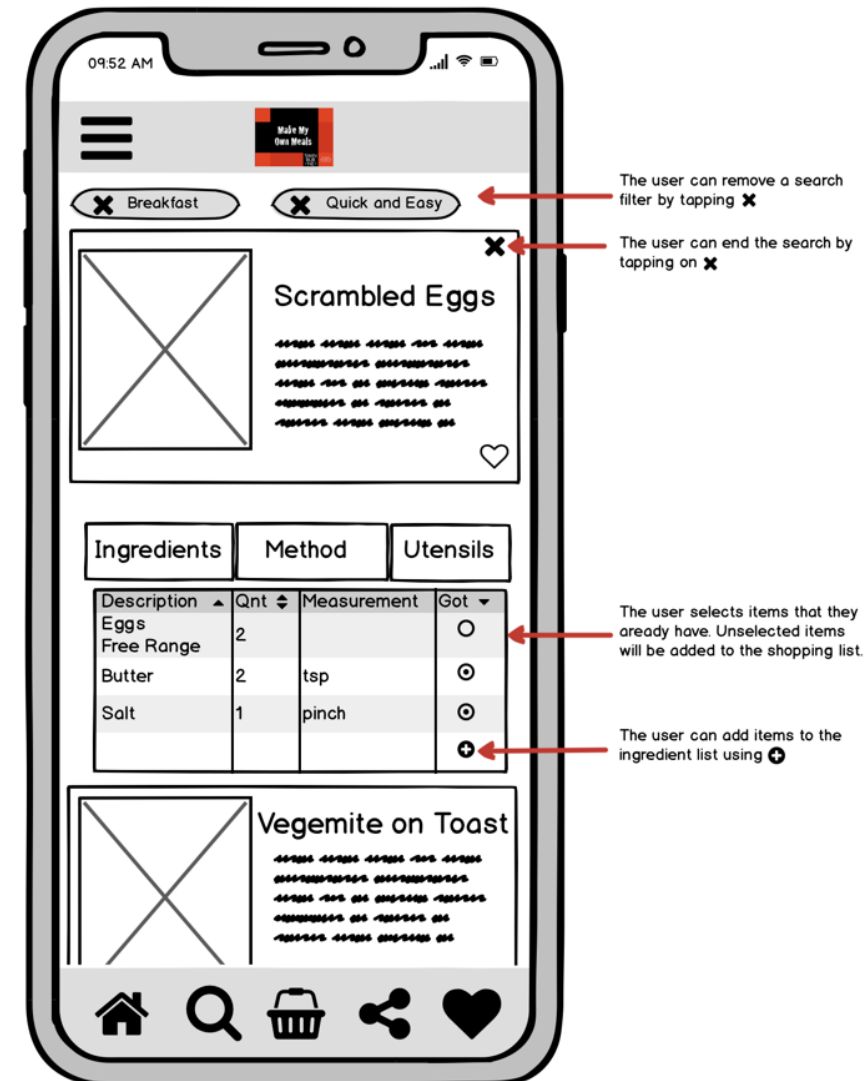

The user can remove a search filter by tapping ✖

The user can end the search by tapping on ✖

The user selects items that they aready have. Unselected items will be added to the shopping list.

The user can add items to the ingredient list using ➕

Figure 2
Recipe Information Page. User has searched for Breakfast and Quick and Easy.

C2, C3 & C4
USABILITY EVALUATION METHODOLOGY

RELATED TASKS:
- **EVALUATION METHOD**
- **INFORMED CONSENT AND QUESTIONNAIRES**
- **TASKS AND USABILITY REQUIREMENTS**

Can you prepare and conduct a good usability evaluation?

- Can you write a good demographic questionnaire to identify representative users?
- Can you use questionnaires to measure satisfaction?
- Do you know how to interact with a participant during an evaluation?

C4 Activity

1 Write a set of three demographic questions for a usability evaluation of *MMOM*.

C4 Activity

1 Write a set of three demographic questions for a usability evaluation of *MMOM*.

Key user characteristics?

- Uni-student

- Living away from home

- Novice cook

C4 Activity

1 Write a set of three demographic questions for a usability evaluation of *MMOM*.

Which option best describes you?

☐ full time university student

☐ part time university student

☐ not a university student

Which option best describes you?

☐ sharing a residence with immediate family (e.g., parent/s)

☐ sharing a residence with non-family members (e.g., other students)

☐ living in a residence on your own

☐ Other (please describe):_____

C4 Activity

1 Write a set of three demographic questions for a usability evaluation of *MMOM*.

How often do you eat ready made meals (e.g., frozen pizza)?

☐ never

☐ 1-2 times a week

☐ 3-4 times a week

☐ 5-7 times a week

How often do you cook from a recipe?

☐ never

☐ 1-2 times a week

☐ 3-4 times a week

☐ 5-7 times a week

C4 Activity

2 List three ways of measuring satisfaction in a usability evaluation. Give an example of each.

C4 Activity

2 List three ways of measuring satisfaction in a usability evaluation. Give an example of each.

Difficulty ratings

Open questions

- about specific parts of interaction

- most liked/disliked

Satisfaction questionnaire

Recommend to a friend

C4 Activity

3 Briefly discuss the use of *think aloud* in usability evaluations.

4 What should you do if some asks "What do **I** do here?" or "What is this for?" during an evaluation?

C5

USABILITY EVALUATION RESULTS

RELATED TASKS:
- **EVALUATION RESULTS**

Can you analyse and interpret the results of a usability evaluation?

- Can you summarise of effectiveness, efficiency and satisfaction measures according to CIF guidelines?

- Can you prioritise usability problems based on data and severity ratings?

C4 Activity

The following are some of the results obtained on a usability evaluation conducted with 10 participants on a MMOM prototype. Which problem/s should the team fix first and which can be left until later?

Justify your decision.

C4 Activity

Task 1 Find three quick and easy recipes to make a Chinese meal containing chicken.

80% of participants were able to find meals meeting the search criteria (target 90%),

- 1 participant only searched for ingredient, the meals they found were not in the easy or quick categories

- 1 participant asked for help with selecting more than one search criteria

when successful it took participants, on average, 1 minute 20 seconds (target 1 minute)

the average task difficulty rating was 2 (high = 5, low = 1) (target 2)

C4 Activity

Task 2 Create a shopping list for a vegetarian meal you are planning to cook for your friend

You currently have the following ingredients:

- **potatoes**
- **pasta**
- **fish**
- **zucchini**
- **eggs**
- **carrots**

70% of participants were able to select a vegetarian meal (target 100%)

- 2 participants selected a recipe with fish, and another with chicken

there were a total of 10 errors in the shopping lists (3 including items on the list they didn't need, and 4 missing ingredients that they needed) (target < 2)

when successful it took participants, on average, 8 minutes (target < 3 minutes)

the average task difficulty rating was 4 (high = 5, low = 1) (target 2)

UCD CASE STUDY REVIEW SESSION

A CASE STUDY FOR PRACTICING YOUR UCD KNOWLEDGE AND SKILLS

Good Luck on the Test!