1 Medium Fidelity Prototype

The medium fidelity prototype is the first digital version of the application. It follows the research and initial conceptual design of the low fidelity prototype, while revising these concepts using the analysis of the first round of evaluations. The main sections of misunderstanding are from restaurant to comparison list, and comparison list to restaurant. To better understand the users and the usability of the app, this section additionally includes personas, scenarios and UX Goals. The prototype can be viewed here.

1.1 Revised Requirements/Conception Design

From the low fidelity evaluations the initial requirements and conceptual designs will be revised accordingly. This includes more detail to the design principles and system requirements.

System Concept Statement

The problem statement and high-level description of the outlined in the low fidelity prototype are still accurate for the next iteration, as well as the definition of mobile paradigm and instructing mode. However, whilst most of the metaphors were accurately chosen, there were several that either didn't align with the user's mental models or the defined design principles.

The following updated metaphors will be applied to this next iteration.

- Explore: map with location marker --→ compass
- List: bookmark --→ scales
- Deals: coupon --→ offer

Design Principles

The design principles were briefly identified for the low fidelity prototype. With the feedback from the user evaluations, there are several design principles that were not followed well enough.

- Give clear direction and guidance - Most users were unable or unsure of how to move from finding a restaurant to going there. In this next iteration there needs to be more focus by providing large actionable buttons.
- Be familiar - One of biggest confusions was with the word and icon choice for list. In this iteration this will be changed to scales and compare.
- Encourage collaboration - Users weren't aware that the recommendation system was based on word-of-mouth only, and so in this iteration the word friends will be added to be clear.

Additionally, two new design principle will be introduced in this iteration.

- Fluid navigation - Users weren't able to move smoothly back and forth between pages which added steps to their process.
- Immediate access to actions - Once reaching the comparison page, users wanted access to more action options then just directions. In this iteration they will be given additional

options readily available on the same page.

In order to satisfy these principles and those previously stated, the below will be taken into consideration for the prototype. Many of these design choices were made to follow the well documented industry standards outlined by material design. These standards are not only thoroughly researched to ensure the optimal user experience, but their popularity creates a sense of familiarity for users which greatly reduces cognitive load (especially in terms of memory, learning, and pattern and recognition).

- Colour
  - Consistent colour throughout: The primary colour, used for a majority of the application, is 'medium violet red'. This colour was selected as pink is calming, joyful and encourages creativity (Cherry, 2019), which aligns with the aim of wanting to users to enjoy the experience of choosing where to dine out.
  - Follow recognizable colour schemes: Variants of the primary colour are used in contrast to distinguish different elements and were chosen using the palette generator from materialdesign.io. The light variant is 'lavender blush' and is used to fill buttons when they are selected. This follows a monochromatic scheme which produces a soothing effect and is easy on the eyes (). By using specific colours this also assists with reducing cognitive overload using gestalts theory of similarity.

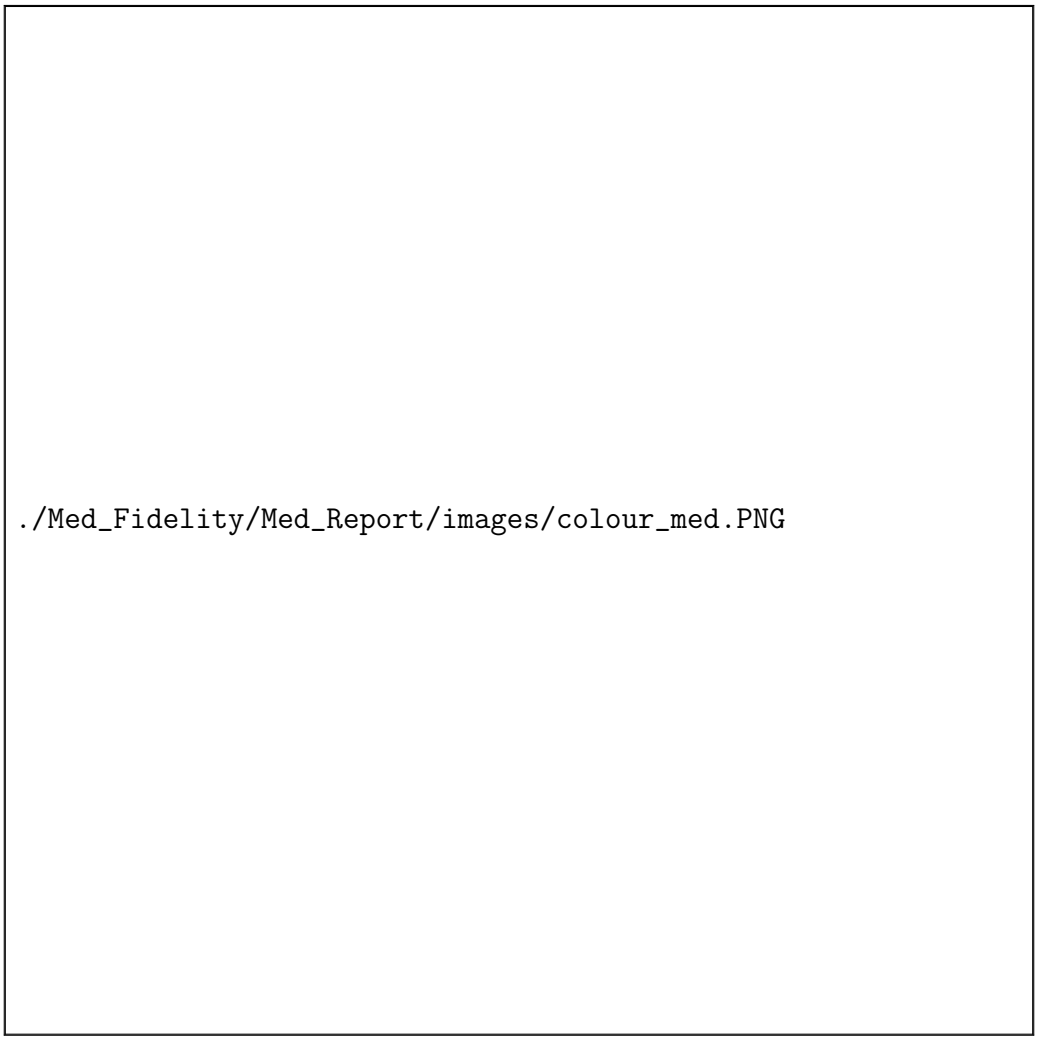

Figure 1: Colour Palette - Medium Violet Red

- Typography
  - Use popular font: The only font used throughout the app is 'roboto'. It is the default

font for Android and many Google services (Jackson, 2020). The colour of the font is either the primary, white or grey depending on the background.

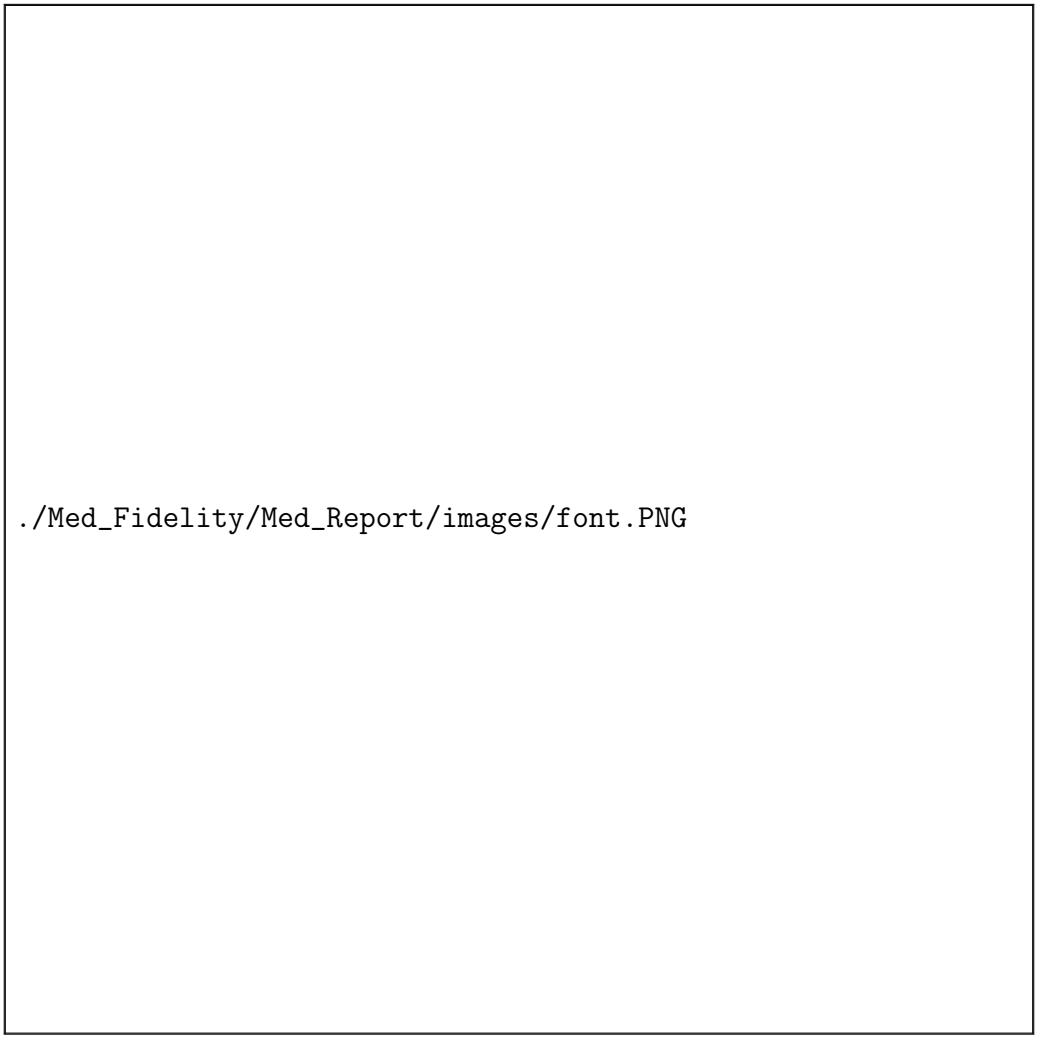

Figure 2: Font - Roboto

- Iconography
  - Use industry standards metaphors: The appearance of the icons is in-line with material design where possible. Some of these icons take advantage of closure in Gestalt's theory (users complete borders themselves). The only icon that had to be sourced elsewhere was the scales for the compare feature.

./Med_Fidelity/Med_Report/images/material_icons.PNG

Figure 3: Icons - Material Design

- States
  - Hierarchical visuals (colour, text) - Titles and buttons should be large and primary coloured, to contrast against other elements to allow quick access.
  - Highlight active interfaces - Ensures tabs are coloured when selected to make it clear to users the current page they are on.
- Navigation
  - Bottom navigation bar - Provides access to 3-5 top-level destinations. This allows quick movement between screens.
  - Navigation tabs - Used within the restaurant hierarchy to replicate the bottom bar to enable later navigation but for peer related content.
  - Elements are consistent and locked - Follows Gestalts Theory of continuity.
  - Access to desired buttons - Offer clear affordances, less movement between pages
  - Large buttons lose to action - Reduced errors and wasted time as per Fitts law.
- Communication
  - Icons accompanied by small text - Although selected icons should be popular metaphors,

added text helps to reduce the cognitive load and assist first-time users.
  - Avoid jargon - Everyone should be able to understand any text used throughout the application. For example LIST was not clear and has been amended to COMPARE.
- Space
  - Dropdown/hidden menus - Proximity Gestalts theory of proximity to show the options are related to one another. This promotes customisation and reduced cognitive load by allowing user to only see what is relevant to them.
  - Keep interface elements to a minimum - Reduces the amount of space taken on the screen so overcrowding doesn't occur. White space is a friend.
  - Overlays - When elements are selected use an overlay with action buttons as proximity indicates these action are related to the selected.
- Time
  - Minimise user input - Stepping through should be quick and since on mobile typing only increases frustration and so should only be when absolutely required.
  - Don't overload with options - Hicks law makes it clear that users only want a select number of options to choose from.

System Requirements

From the initial research there were six system requirements identified that were implemented in the low fidelity prototype. For this next iteration, the first three requirements will remain the same:

1. Promote existing deals - Users are informed of whether an option is in their budget.
2. Interactive Map - Interface needs a way to search for options.
3. Editable and shareable list - User needs a way to review their options.

The fourth requirement will be split into two separate requirements as as the functionality and purpose were identified to be actually slightly different. The map view provides an overview of options that match the user's need, however while the menu also performs this action it is a narrower and more customised view of the particular restaurant. This not only requires the categorisation of the restaurant as a whole but also the individual factors of the menu; price, ingredients, etc.

4. Map filtered by preference - Users want an overview of what is relevant to their individual needs. *This is supported by previous research and the evaluations confirmed that this is expected behaviour of an interactive map.*
5. Filter restaurant menu by preference - Users want to make decisions without navigating to another graphic/page. *Users weren't aware in the low fidelity prototype that the menu was filtered and embedded but supported the idea as per the initial research that users almost always look at the menu beforehand and use apps to avoid navigating between different websites for information.*

The fifth requirement will also be split into two, as there are actually two separate requirements being compartmentalised into one; word of mouth recommendations and user tracking.

6. Recommend to a friend - Remove focus from reviews and encourage user interaction. *As per the initial research, users rarely leave reviews. From the evaluations most users commented that they would this word-of-mouth recommendation system as it is simple*

and it improves their experience.

7. Track user history - Remember preferences and customise experience. *Users expected that they had access to their history and that they would be able to save their preferences for later use, especially since the application would be used weekly.*

The original sixth requirement will also remain the same (though now it is eighth).

8. Restaurant Info - Information to make an informed decision.

1.2 Personas

To summarise and empathize with the users of the system, four personas have been developed. Each of these personas represent a different type of user to provide an overview of each group's expectations, use cases and highlight the most important functionality they need (Yale, 2020; usability.gov, 2020). There is a typical user as well as one at each end of the extremes (low and high use) and a user who requires the use of less required elements (dietary and planning). Each persona has a name, photo, life goal, blurb, quote relating to the system and an overview of their characters (employment, relationship status, income, interests, use of the system, restrictions). The full breakdown of each persona can be viewed in Appendix B.1.

./Med_Fidelity/Med_Report/images/personas_overview.PNG

Figure 4: Personas Overview

1.3 Interaction Scenarios

For each of the created persona's a storyboard of their typical interaction with the system was sketched. These scenarios communicate the subsets of user behaviour of the system to assist with ensuring all users needs are met and that the design of the system supports these expectations. Each scenario has 11 slides and uses the template supplied by NNGroup with rough sketches and simple explanations. There are four scenarios, all of which can be found in Appendix B.2.

1. David - Student Deals - Find the cheapest place with friends
2. Jessica - Hump Day - Choose from favourites with partner
3. Sophie - Busy Planner - Plan lunch ahead

4. Matt - Lunch at work - Choose first nearby, recommended place

1.4 UX Goals

When determining the 'success' of the user experience it is important to 'focus on the outcome not the feature' (NNGroup). Rather than focus on the service the application is offering, focus on the problem that this application is solving. The problem is that no existing solutions that give users what they actually want (the benefits); options to dine out with others based on personal preference (craving, dietary), nearby location and word-of-mouth recommendations.

These UX Goals were developed by identifying the main user needs, from previous evaluations and research, and then selecting content and functionality requirements to meet them. The goals use SMART principles and together cover all systems requirements. Each goal is a real-world end state that users want to reach (Yale, 2020). The full details of the UX goals can be found in Appendix B.3, including their source, measures and link to requirements.

1. I want to dine out at places that match my dietary requirement.
2. I want to eat what I am craving.
3. I want to choose where to eat based on my location.
4. I want to view the menu of the restaurant as it relates to me before going there.
5. I want to learn about the relevant deals of a restaurant.
6. I want access to the basic information of a restaurant.
7. I want to compare a variety of restaurants at once.
8. I want to share the experience of dining out with friends.
9. I want to dine out at restaurants that have been recommended by word-of-mouth.
10. I want to re-visit restaurants that I enjoyed.
11. I want to find new places to eat out.
12. I want to dine out in my budget.
13. I want to decide where to dine out in less than 20 minutes.
14. I want support restaurants without having to leave long reviews.

1.5 Prototype Development

Taking into consideration the revised requirements as outlined from the results of the low fidelity prototype evaluations a medium fidelity prototype was created. Figma was chosen due to its browser-based interface, easy-to-use design, prototype functionality and popularity in the UX world. Colour, icons and basic functionality has been implemented. Since this is the first digital version of the prototype, the same interaction as the low fidelity prototype was implemented (only one end option for each feature). Overall the updates ensure user's have clear understanding and awareness that:

- the shareable comparison list is a main feature with clear guidance to get there and understanding of its purpose.

- both the map and menu are filtered by their personal preferences with the ability to expand or minimise these options as needed.
- recommendations are by word of mouth, with the option to view all responses as well.
- they have access to basic information of a restaurant on every relevant page.

The below is the interface of the medium fidelity prototype, with any relevant updates outlined. Also note, the application now has a name; foodie. It is simple and fun. It will replace APPNAME in the top navigation bar.

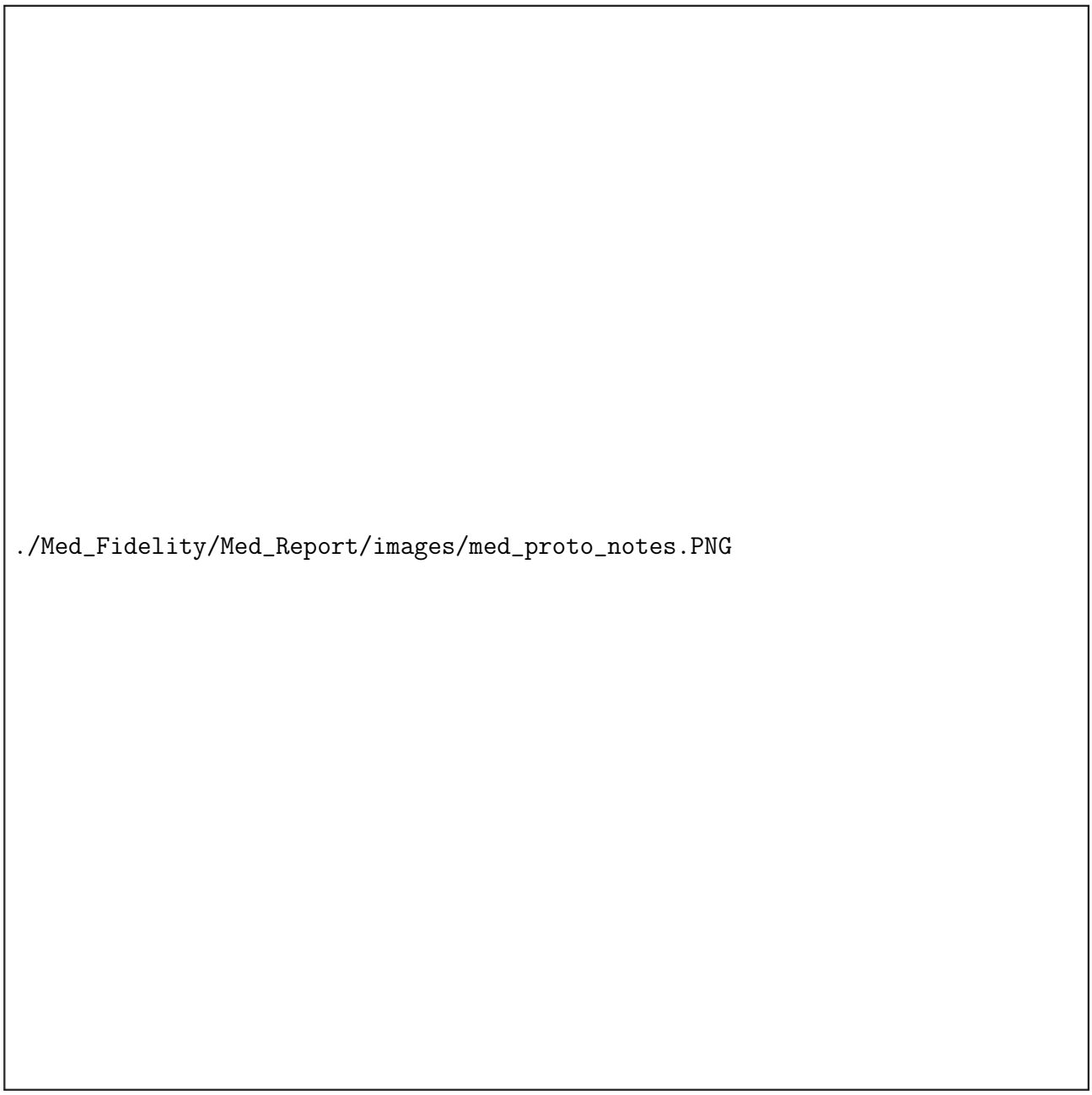

Figure 5: Medium Prototype

1.6 Evaluation Methods

Instead of evaluating whether the application assists users with solving a problem the purpose of the evaluations of the medium fidelity is to determine the usability of the application. Any gaps between mental models in the low fidelity prototype have been amended for the medium

fidelity prototype and it has been determined that this application is something users want, so now it is a matter of whether they can use it.

The think aloud evaluation method requires users to either complete a specific task or walk through all aspects of the application, whilst saying out loud everything they are thinking. This method was chosen as it provides substantial qualitative feedback on the user's experience as it is happening in regards to their expectations of the system. Since the end goal for this application is the same for every user, deciding where to dine out, the process of deciding is different for every user with a wide range of approaches that can be taken with the system.

The System Usability Scale (SUS) is a set of 10 questions, with both positive and negative responses, that provides a grade for the usability of the system. These questions are a popular staple of evaluation in the user experience industry as they are are cheap and quick process. Since the user is only required to respond with a numerical value, the full picture of why and how users feel about a system may be missing. This is used to supplement the think aloud evaluation as it provides an overall quantitative picture of the user experience after an overload of qualitative feedback.

1.7 Evaluation Protocol

The purpose of this protocol, structure and consistency, is the same as the low fidelity prototype. The protocol can be viewed in Appendix B.4. Also similarly, users are invited to a Google Form where all instructions, links and surveys are available to them. The form can be viewed in Appendix B.5. After providing consent the user will be directed to an interactive prototype. Each page of the prototype in presentation mode is outlined by a typical android smartphone frame. The slides can be viewed in Appendix B.6.

Users are asked to use the app as if they were a first time user interested in the app. They are given no specific task and to speak all thoughts out loud. This is inline with the Think Aloud evaluation method. In addition to taking note of their use and understanding of components of the prototype, the measures for the UX goals will also be taken simultaneously. After explaining each step of the system as they understand, users will be directed back to the Google Forms to complete the SUS questionnaire.

For this evaluation, there are six participants in total. Three of the users will be brand new to the system, whilst the other three took part in the evaluation of the low fidelity prototype. This provides a balance of fresh eyes with no preconceived ideas who can comment on the basic flow of the application, and also those who already have a basic understanding who were able to evaluate if the changes made were appropriate and look at the application in more detail. The raw notes are in Appendix B.7 and the results of the SUS questionnaire in Appendix B.8.

1.8 Evaluation Results

The following provides an overview of the results and feedback from the evaluations and is separated by each persona's ability to complete their scenario.

1. David - Student Deals
    - Today/now confusing, didn't understand the difference between the two.

- Wants to be able to filter by price before getting to the map view.
- Liked that there was a dedicated page for deals, though wanted to be able to view this tab first (before menu).

2. Jessica - Hump Day
    - Went to the saved restaurant but couldn't go to the restaurant information page without adding to the compare list first.
    - Tried to find an option to view all deals.
    - Wanted to be able to follow partner's saved places instead of just in the list.
3. Sophie - Busy Planner
    - Was able to filter by location, cuisine, dietary and tomorrow which she felt made the search very custom.
    - Wanted to be able to save her preferences for later but couldn't find how to without assistance.
    - After finding places , wasn't sure if compare list was going to be able to save for the next day and wanted to be able to save for future trips.
4. Matt - Lunchtime at work
    - Selected to filter by cuisine for the map, but wanted to be able tell which places were popular before having to click into each one
    - Once at the restaurant looked at the recommendations and could tell they were friends
    - Wanted to be able to go straight here without going to compare list, wanted a 'go here now' option
    - After going to the restaurant wanted to be able to recommend without having to open the app.

1.9 Evaluation Analysis

The overall interaction of the app was much improved from the low fidelity prototype as users could now progress from the restaurant page to the compare list, and move from compare list to their next desired page (back or forward) without issues.

In terms of usability, as per the SUS analysis the grading of the system overall was a low A with an above average score in the 82nd percentile. However, the scoring was as low as 62.5% (C - below average) to 95% (A - above average). The lowest scoring questions was 'I thought there was too much inconsistency in this system' with an average of 2.8. The highest scoring question was (reverse) I think that I would need the support of a technical person to be able to use this system' with 3.66, closely followed with 'I found the system unnecessarily complex' with 3.5. All other questions were either rated overall 3.16 or 3.33. This suggests that the system is easy to use in terms of technical complexity, however there is still too much thought process involved with moving through the system.

The think aloud evaluations identified that the main issue contributing to this inconsistency in this iteration was the availability of options for different actions. Firstly, users want to be able to filter by budget on the first page, and agreed the now option is redundant. Secondly, users want a broader view of the places on the map view with differentiation of restaurants based on popularity (different colour or icons with legends). Thirdly, users want the ability to be assisted with going to a restaurant straight from its page without proceeding to the compare

screen (more buttons). On the restaurant page no-one used the bottom tab and so instead this will be replaced by the popular action buttons.

Fourthly, users wanted to be able to set default preferences more easily, by changing the filters on the profile to settings. Finally, users wanted to be able to access more information on the places recorded in their profile without having to add them to the compare list first. Most users commented they usually wouldn't select more than one restaurant at a time, so instead of checkboxes the same overlay as the compare page will be used (more info, add to compare and delete as the options).

2 Notes for HIGH

1. UX Goals:
    - I want to re-visit restaurants that I enjoyed.
    - I want to dine out in my budget.
2. Design guidelines:
    - minimal effort
    - purposeful movement
    - consistency
3. Evalution method:
    - Heuristics