Description of the app

We are launching an app to improve users' diets and make users more mindful of their environmental impact. As this app is for a new business, we decided to carry out user research to see what user's needs in these two areas were. We came up with questions for our interviews that would give us an insight into the user's current lives and where our app could help improve their diets and help them make more sustainable choices. In addition to the interviews, we did contextual studies to see users in a real-life setting and see what pain points we could gather from there.

After user research, we found that users wanted to improve their diets but found it hard to find recipes that considered their needs whether that meant they had health problems such as diabetes, lactose intolerance or dietary requirements such as being a vegetarian. They wanted to eat healthier but usually just stuck to meals they knew how to cook as it was hard to find new recipes to suit their needs.

Another insight we found from our user research was that individuals wanted to be sustainable but did not know much about it or didn't know ways that they could be more sustainable. A lot of users stated if there was an easy way for them to be educated, they would be more likely to implement those tips into their life and be more sustainable.

From these two insights, we came up with the main two features of the app: our Cook tab and our Learn tab. The Cook tab allows users to filter through thousands of recipes and it recommends the recipes to their dietary needs so they can have a quick and healthy meal without being overwhelmed. This tab also recommends recipes based on ingredients in your pantry that are expiring soon. The recipe shows macronutrients so that the user is aware of their intake. Also, it allows users to adjust the portion by setting how many people they are cooking for which helps to reduce food waste by getting the right portion. The Learn tab gives users lots of sustainability tips to help them be mindful of their environmental impact.The app also has sustainability tips pop-ups during the cooking process so that the user can implement them at the right time.

From our research, we also realised that users shop and get ingredients differently, but a lot of them seem to have a large problem with food wastage due to multiple reasons such as forgetting they bought a certain ingredient, buying too many ingredients or not remembering about leftovers. We found that people wanted a place where they had an overview of all their ingredients and their expiration date as well as a place to add their shopping list.

We came up with our Pantry tab that kept all of the user's foods in one place. Users could scan items if they bought them from the store, whilst their online basket would be added automatically. Also, they could add shopping items through voice commands or through companion apps. This means that users know what ingredients they have and when ingredients are going to expire, allowing them to have less food waste and not overbuy which helps them be more sustainable.

When the user first signs up during the onboarding stage, the app asks questions such as their dietary needs, what level of cooking they are, and what their favourite cuisines are so that when they finish answering the questions, they are able to see personalised recipes on the homepage. To make the app even more personalised, on the sidebar we allow users to customise widgets based on their needs - such as calorie intake, rewards for sustainability-related actions and their shopping list. No matter where they are in the app, users can easily check their favourite information at a glance. In addition to this, the homepage shows users their new recommended meals, sustainability tips and expiring ingredients so they are always up to date.

Lastly, there was a large amount of user data that demonstrated that users wanted to save time during the cooking process and would really like a way to switch between native languages. So that our app was not just functional and usable we decided to include these as subsidiary features to make the app more

pleasurable and meaningful to our users giving them a better user experience. All the features of the app can be seen as a table on page 13 of the appendices.

Hardware

The decision on what screen size to use for the project was made based on the Echo Show 10.1” with a resolution of 1280 x 800. This screen size was chosen because it allows for more flexibility in terms of design and layout, and it is similar to the size of an iPad screen, making it easy for users to adapt to the app. The Echo Show now can have apps, so we propose an application rather than widgets.

Integrations

Integration involves a companion app on the phone that allowed users to scan ingredients and add them to ‘Pantry’ in the Echo Show, that way the user could see what they had at home and what needed to later be added to their shopping list.

We also allowed for the app to have access to supermarket shopping apps such as Waitrose, Sainsbury’s, and Tesco so that ingredients could easily be bought online and added to the Pantry automatically if ordered in that way.

One of the pain points mentioned by interviews was that they had too many different starting points to find out about healthy ways of living, so integration with wearable tech was an important feature to keep in mind. Smartwatch integrations added to the app allowed users to quickly identify their micronutrient needs. The idea is that if the user burns up many calories, the app would then make them aware of how many calories they can intake.

Voice Interaction

Voice interaction within the app would use Alexa to guide the user on how to be more sustainable, what to add to shopping lists as well as the user being able to prompt Alexa to help with substitutes, more tips on sustainability, and so on. In addition to providing tips and guidance on sustainability, the app could also use Alexa to help users make more informed decisions about their food choices. For example, when the user is cooking a recipe and needs to make a substitution, Alexa could provide suggestions based on the user's preferences and dietary restrictions. This would make the app more useful and would help the user make healthier and more sustainable choices. Alexa can also be used to add ingredients to the Pantry and add items to a shopping list. Alexa can also be especially useful while cooking with a video recoup to pause and play the video ensuring the user does not fall behind with the video.

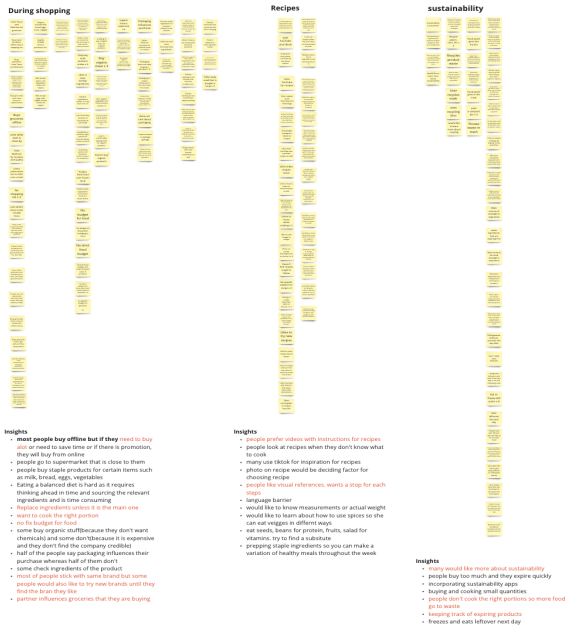
User research

Contextual inquiry and interviews

To create a design relevant to the users, we started with the design process with user research to empathize with the users (Mortensen, 2022) which is part of the User-Centred Design process and one of the stages of Design Thinking. To better understand the user behaviours and needs, we chose contextual inquiry and semi-structured interviews as techniques for collecting qualitative data as these are very useful, especially in the early design stage (Salazar , 2020). We discussed questions that we wanted to ask the interviewees and came up with questions and divided them into 4 different categories which are cooking habits, shopping habits, dietary preferences, and sustainability. We used mostly open questions as they are useful in the initial design stage compared to closed questions which are more effective in the evaluation stage. Also, we were aware that the questions should stay neutral. Before the contextual inquiry and interviews, we obtained the informed consent form from the interviewees.

All of us conducted both contextual inquiry and interviews with our interviewees. For the contextual inquiry, we conducted field research in mostly the interviewee's kitchen and the supermarket to observe them in real-world settings while they were cooking and doing groceries. We were conscious that we do not manipulate the settings. We asked them if they could think aloud about their actions and asked them questions related to their behaviours to collect in-depth information about them. The contextual inquiry helped us generate insights that were not found in the interviews. Some of the questions and answers can be seen on page 1-3 on the appendices.

Data Analysis



After conducting a week of user research, we were able to gather valuable insights from 15 interviewees from interviews and contextual inquiries. To identify the opportunity and problems, we started analysing the data with affinity diagramming (Thornton, 2020) by using miro. We wrote down all the findings that we thought were insightful from our research onto individual sticky notes. After we have written down all our findings on sticky notes, we grouped those that are similar together into categories. Finally, we named each of the categories and summarised key insights from it, and highlighted insights that are repeated multiple times in red (page 4 appendices).

From the key insights from affinity diagramming, we were able to come up with 3 main personas that represent each major user group. In each persona, we made sure to include their frustrations, needs, and goals. And we did not include irrelevant information that would not help to design a better product and created a story of their background to make them realistic (Shestopalov, 2019). These personas helped us focus on designing user-centred solutions as we were able to remind ourselves of key users' needs during the design stage (page 5-6 appendices).

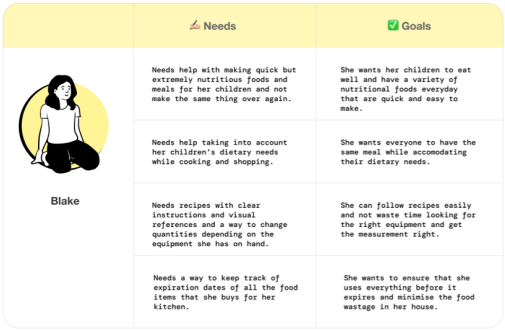
We created a user journey (Joyce, 2021) for each persona based on the user research, to find users' frustrations and opportunities. We used sticky notes to describe actions, touchpoints, thoughts, and feelings while they progressed to each step. From the users' frustrations in the user journey, we were able to clarify design opportunities that helped us to proceed to the ideation stage (page 6 appendices).

Conceptual design

To design a cooking app that can be a valuable resource for home cooks of all skill levels, we used our user research to gain insights into the needs and challenges of home cooks. We aimed to create a digital tool that can support and enhance the cooking experience for people of all skill levels. Our conceptual design process included several stages, including - point-of-view statements, ideation, and storyboarding from scenarios. These stages allowed us to explore and refine our design concept, and eventually create a prototype that can be tested and validated with real users.

Point of View Statements

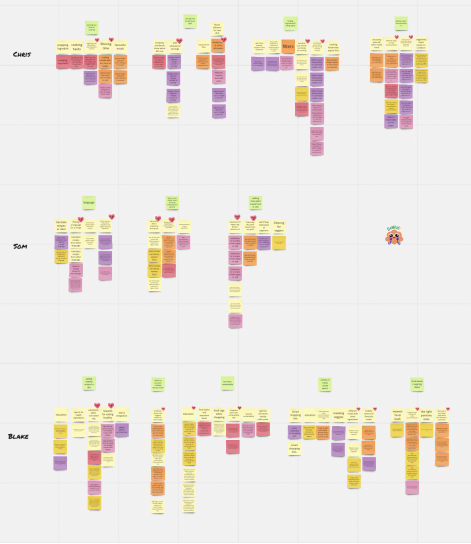
The process began by identifying the needs and goals of each persona and creating a statement from their perspective to better understand their needs (Siang, 2019). This helped us to tailor the app to the specific requirements and desires of the target audience (page 7 appendices).



	Needs	Goals
Blake	Needs help with making quick but extremely nutritious foods and meals for her children and not make the same thing over again.	She wants her children to eat well and have a variety of nutritional foods everyday that are quick and easy to make.
	Needs help taking into account her children's dietary needs while cooking and shopping.	She wants everyone to have the same meal while accomodating their dietary needs.
	Needs recipes with clear instructions and visual references and a way to change quantities depending on the equipment she has on hand.	She can follow recipes easily and not waste time looking for the right equipment and get the measurement right.
	Needs a way to keep track of expiration dates of all the food items that she buys for her kitchen.	She wants to ensure that she uses everything before it expires and minimise the food wastage in her house.

Ideation

Once we had a clear understanding of the needs and goals of our different user personas, we held a brainstorming session to generate ideas for the app (Stevens, 2022). We carefully considered and evaluated each idea, eventually curating a selection of the most useful and promising concepts to develop further. This process allowed us to identify the best potential solutions to address the needs of our users (page 8-9 appendices).



Storyboarding

To further understand how the app addresses the needs of each user group, we created storyboards (Krause, 2018) using scenarios for each persona. This allowed us to visualise the functionality and benefits of the app for each major user group and helped us to refine our ideas and make informed decisions about the design of the app. By using this method, we were able to gain a better understanding of how the app could assist each user group and tailor its features and capabilities to their specific needs (page 10 -13 appendices).

Detailed design

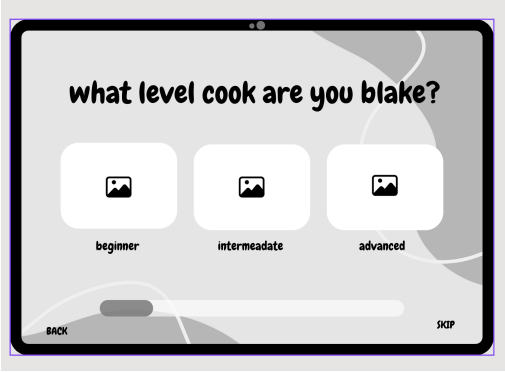
As part of the User Centred Design process, Detailed Design can start once specific goals have been set up during conceptual design when more defined sequences of interaction and user requirements are clear. This must be built in a way that allows iteration to take place.

With a well-defined conceptual design, we divided the team to explore different parts of the app and understand how the overall design would affect usability and cater to alleviate identified user pain points and ensure consistency and clarity.

Wireframes and low fidelity

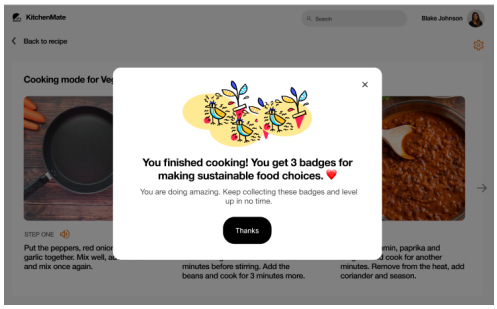
We started by creating rough sketches on an iPad as a group (page 11 appendices), sitting at a table and roughly drawing them (Gordon, 2021). We shared them on our Slack group and had them work on them individually. At this stage interface appearance was proposed, such as how content and navigation would interact. Each team member created rough wireframes in Canva/Figma to illustrate how the user would interact with unique features in the app and how they would get from one screen to another (page 14 appendices).

Example of onboarding page as low fidelity wireframe:



After the first pass on onboarding, cooking, shopping, education, and recipe pages, we went back and iterated each frame based on the team's feedback. Some iterations included: ensuring we had a skip button during onboarding if the user did not wish to answer questions when they first sign up, and including photos at each stage of the recipe (mentioned by users during the interview stage as a defining feature to decide on what to cook), locating the search button at every page in the same place so it becomes second nature to find it and so on (page 15 appendices).

Design principles and high fidelity



Once the rough wireframes were revised we moved into Figma to start making high fidelity wireframes (page 16 appendices) and prototyping. We tested on colour palettes, use of symbols (weights and scales, design variants for icons and photo usage, etc), typography, etc. Following a range of design principles such as Schneiderman's golden rules in interaction design (Wong, 2020), and Norman's high-level design principles (Komninos, 2020).

We then revisited as a group each page and revised many parts of our design such as the colour palette to ensure accessibility and the use of images/icons to make interactions clearer. We kept in mind visual/physical design, content, and interactivity (page 17 appendices).

For example the use of clearly defined buttons and the use of highlighted colours to make visibility, affordance, and consistency across the design.

Prototyping

Creating scenarios that would mirror users' interactions in the real world, we put together further pages that would reflect the navigation experience. We also revisited the nomenclature of each part of the app settling into Home, Cook, Pantry, and Learn and how the user can move in between them. We also wanted to ensure the main features of the app such as sustainability education and tips, dietary needs, macronutrients information, ingredients expiration date, shopping, and substitutes to mention a few where easy to find.

Prototype Evaluation

To validate our design decisions and to test if the user can use the product, we conducted user testing in person with 6 users with the prototype that we have created in Figma. We chose an in-person method because it is easier to see how they interact with the design elements and able to capture if they went to the wrong path. Also, we can hear their thoughts behind their decision at the same time. Although we wanted to recruit participants who are close to our persona and ideally use our product, due to time constraints, we tested who we are close with and documented the results with a note(Brooke,2018). To start with, we gave the participants several tasks with a scenario and explained to them the purpose of the testing. The tasks are mainly related to our key features of sustainable living and a healthy diet. We asked them to think aloud to better understand their behaviours. We mainly used summative evaluations and used usability metrics to measure the quantitative results as it is difficult to measure qualitative data on user experience.

The table below shows the findings from the user testing results and suggestions for future improvements for an actionable item. Overall, users find it helpful and easy to use the product. However, we realised that some of the tasks that we gave them were unclear which gave them confusion when implementing their tasks. Before conducting a test, having clear tasks and questions should be carefully considered as it would influence our test results from the users.

Task	Results / Problem	Future Improvement for the Problem
You are not sure what you want to cook for dinner tonight. Where would you go and find inspiration?	All 6 users find it easy to go to the cooking tab or find inspiration on the home page in a short amount of time.	No iteration is required.
You are lactose intolerant. How would you find a recipe that meets your dietary requirement?	5 out of 6 users find it easy to find the filter in the cooking tab to find lactose-intolerant recipes. One of the users prefers to find the recipe by using a search bar to find it instead of using a filter. And one mentioned although it is easy to find the filter, the filter should be more noticeable. This can be a problem for users in their search experience if they are not able to find the filter in the cooking tab.	**Findability experience** We can design faceted navigation in the search result where they can filter lactose intolerant recipes. **The filter is not noticeable** Although this is a UI issue, this should be improved as it will demand more user attention to implement the task which goes against usability metrics. The filter should be more noticeable with a clearer colour choice and

		where it should be placed.
You are making vegan burritos for four people. Find the recipe and change the serving size accordingly.	Although all the users were able to change the serving size, 4 out of 6 users found it difficult to find the vegan burrito recipe which was surprising as we thought it was quite straightforward. We found out that the confusion came because of the prototype issue as the screen showed vegan burrito only in the shuffle but not on the search results where people would expect to find it. Also, the labelling was an issue as there was a lack of clarity on what “shuffle” means which is a problem for users as they have difficulty understanding how to use it.	This part is related to the user confusion because we only included vegan burrito recipes on the shuffle but if we have shown vegan burritos as a search result, that would be easier for the people to find the vegan burrito. **Labelling issue** To improve clarity in wording, shuffle can be replaced with “customised meal” or “random meal” with a description that it is recommended for their dietary needs which will help to increase the efficiency and effectiveness of the user’s search experience.
To learn more about sustainability, where would you go and find out more information? And can you find a guide on how to keep ingredients fresh?	5 out of 6 users find it easy to go to the Learn tab to find out more about sustainability although one user mentioned he is not sure what “learn” means and it is hard to imagine that it is related to sustainability. This will be a problem as the user might take a long time to figure out where to click. And all the users find our task confusing to understand, that is finding a guide to preserve the ingredients and this is not directly related to the usability issue but the question itself.	**Labelling issue** Although most users were able to find it, to improve the clarity and to help reduce the mistakes of users going to the wrong path, the learn tab could be renamed to a term that includes sustainability and tips.

User-centred design

User-centred design is a design process in which the needs, wants and limitations of the end user of any product or service are the main focus (Abdeljaoued, 2020). The aim of User centred design is to create a product for the user that is useful, usable and desirable. The way to achieve this is by considering the user's perspective at every step of the design process when researching, testing and making iterations to the product (Browne, 2021).

One of the fundamental parts of user-centred design is that the user should be involved in the design process from the beginning (Browne, 2021). . Researching the user's needs, wants and limitations allow designers to design a better product for the user. This data is also used to inform the design of the product or service (Browne, 2021)..

We did this by carrying out interviews and doing contextual inquiries on users to gain insights into what their major needs, wants and limitations were when it comes to improving their diets and sustainability. We found that a lot of people wanted to eat healthily but found it hard to come up with new recipes that considered their needs and so they usually stuck to what they know. Also, users stated they would like to be sustainable but weren't educated on steps they could take to be more sustainable. So, to take into account the users' needs during our design process, especially during the ideation stage we made sure to come up with ideas that could help solve these two major problems for users. This included creating a cook tab, so individuals had an endless number of new recipes that considered their needs and a learn tab to help educate users on how to be more sustainable.

In addition to this so our product was not just useful and usable but also desirable we tried to include features that would help users with other needs they had that may not have helped with sustainability and improving their diet but made the app more enjoyable to them. Such as trying to save time while cooking by recommending meals with ingredients they already had and allowing the app to change languages to their native language so recipes and ingredients were easier to get and read.

Another fundamental part of the user design process is testing your product with users to ensure that their needs are met and that the product is easy to use (Browne, 2021). We did this by testing our prototype on users to see what was easy to use on the app and what parts may need some iteration as the user found them hard to use. Testing the prototype did give us some good feedback however it may have been better for us to do paper prototype testing before we did our actual testing as this may of yield better feedback and more opinions from our users. This is because users are more likely to tell you their honest feedback when looking at paper prototypes. After all, they think that a lot of time was not spent on it than users testing a high-fidelity prototype where you can see the effort that was put into it (Morales, 2021).

The last fundamental part of the user-centred design process is making iterations based on the feedback and data gathered during the testing phase to meet the user's needs and expectations. This can be done multiple times until all the user's needs and wants are met (Browne, 2021). We, unfortunately, didn't get a chance to do this during this project however it would be one of the key parts we would do if we had more time. This is because by incorporating the feedback we get from users the product we design would better meet the user's needs.

The strength of using user-centred design during our design process is that we considered the user's perspective throughout our whole product to help come up with a design that was user-friendly and met the user's needs. Overall, we believe that our product can help users improve their diet and become more sustainable. However, the weakness of using this approach was that it was time-consuming. This meant that we didn't get to do everything we wanted to, such as make the iterations to our app from the feedback we got from users. Although this would be a key aspect, we would make more time for it in future projects as it is fundamental to making the product better for the user.

Evaluation

User Research

We started by doing a pilot interview to ensure the questions we were asking would yield good responses. We also wanted to check the length of the interview to ensure it was not too long and interviews would not get boring. By carrying out this pilot study we added a few questions and took some out which gave us a better interview overall. Choosing to do a semi-structured interview helped us gather a rich amount of data as when an individual gave us answers we weren't expecting, we could ask them to elaborate on it. We chose to do interviews as it allowed us to get a large amount of data in a short period, which was ideal for this quick turnaround project.

Although a weakness of this is that we could only rely on the information that was given to us and sometimes answers may lack detail, or they could be telling us an idealised version of what they do instead of being honest. Furthermore, the interviewees may answer questions in ways that they think the interviewer wants them answered, which does not give us a true representation of what they do. To counterbalance this, we also carried out contextual inquiries to see what users do in real-life settings. Observing the user in their real-world setting allowed us to see actual pain points they might not have thought of when asked questions. Contextual inquiries allowed us to gain insight into how users use certain gadgets when they cook and what frustrates them when they're cooking. These insights were some of the key aspects we used when building our app.

We combined all our notes and answers from both the interviews and contextual inquiries to do our affinity mapping. This was one of the best things we did as a group as it allowed us to generate key insights from all our data. Although the process took a lot of time it helped us understand what users wanted and what their pain points were. By doing this process the user was at the forefront of our design as everything we came up with after this point was only made if it met the needs of the users.

Personas helped represent our three main user groups. It allowed us to humanise our data and helped with the ideation stage as we felt we knew whom we were designing for and what features would help tackle that person's pain point. It also helped keep us on track as when coming up with ideas or implanting features we had to justify how they would apply to them. We also created the personas' user journeys to see at what point they may get frustrated and where the app could help.

Conceptual design

Point of view statements allowed us to identify the needs and goals for each of our personas helping us to tailor the app to their specific requirements. Their needs came from the initial insights we got from our data analysis. Initially, as a group, we did find this hard because we didn't quite get what we had to do and struggled to write down the needs and goals of each persona but by reading Stage 2 in the Design Thinking Process: Define the Problem and Interpret the Results by Siang, 2019 we figured it out. The point of view statement helped the ideation stage as it gave us a direction to try and find solutions so they could achieve their goals.

Our brainstorming session was something we had a lot of fun with. Giving everyone 5 minutes to come up with any suggestions to solve each frustration/goal generated a huge selection of ideas.
At the end of the session, each group member took a few ideas for each problem they believed would solve the problem and the ones that came up consistently we put a heart on and chose to use in our app. Everyone enjoyed this, and it helped us get very creative. A weakness of this technique was that it was taxing on the group and did drain everyone's energy so by the end we were slowly running out of ideas. Next time maybe using a variety of techniques such as the worst possible idea or constraint removal to come up with ideas may be better.

Writing scenarios helped us see if we could put the ideas in a setting that our persona would use. We then based our storyboards of our scenarios making sure it showed us visual representation of how our app can help users improve their diets and become more sustainable

Detailed design

We all sat down and sketched on the iPad making rough designs of what we thought would look good. From this, we made our wireframes. During this process, we had lots of iteration as everyone in the group had a go and we then picked what we thought looked good. We made sure to listen to everyone's reasoning and debated suggestions. This gave us a very good idea of how we wanted our high-fidelity wireframes to look and what interaction we wanted for each section. A good example of this is that we wanted to show tailored features for each user, but we didn't want the user to keep going to their home page or profile to find this. So we came up with a sidebar that could pull out and have all the users' favourite features tailored to themselves. The bar got changed to a tab on the prototype as it did not look as good as a bar. This feature allowed users to see the tailored features at glance and made it more personal to them which we loved.

For our detailed design, we all agreed on the colour scheme and design system to keep things consistent, and we all had a go at designing certain features in Figma. From this, we again debated on what we thought we should keep and what we could get rid of then our strongest designer went through and made everything more consistent. Having a chance to design certain areas of apps allowed everyone a chance to learn a skill and use programs (Miro, Canva, iPad, Figma) that some of us have never used before.

Future

Overall, all our design processes aligned well with user-centred design and used many UX design techniques we have learnt throughout the course. If we had more time, there would be things that we would have loved to look into more, such as a community tab to further motivate users to eat healthily and be more sustainable. We would have liked to add more personas, such as students, so we could design features for them, but we just didn't have enough time. We feel like these features may have helped elevate our app. We would also like to implement the feedback we got from testing our prototype to make a better experience for our users.

Links

Mirro board link *- https://miro.com/app/board/uXjVPGBLQ5g=/?share_link_id=912927405880*

Prototype link-
https://www.figma.com/proto/4GwucFOroYOts79GuY2a2d/Coursework-Kitchen-Mate?page-id=0%3A1&node-id=510%3A2599&viewport=719%2C-88%2C0.02&scaling=contain&starting-point-node-id=510%3A2599&show-proto-sidebar=1

Vision Video link

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