TEAM FOUR GUIS
RIDE-SHARING APP
CARAOKE APP

PREPARED FOR

ICTE3002 (Human Computer Interface) - Assignment 2

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TUTE DAY & TIME – Tuesday at 10:30am

Table of Contents

Executive Summary 5

1 Introduction 5

2 Team Members 7

3 Usability Testing 7

3.1 Usability Testing Plan 8

3.1.1 Define the Research Goal 9

3.1.2 Experimental Set-Up 15

3.1.3 Facilitator 17

3.1.4 Task Scenario and Tasks 21

3.1.5 A/B Testing 24

3.1.6 Task Sheet 30

3.1.7 Participants 31

3.2 Piloting 35

3.3 Experimental Data Collection 37

3.4 Analysis of Usability Testing Report 43

4 Final High-Fidelity Prototype Design 44

5 Handoff Report 50

6 Posters 50

6.1 Conference Poster 50

6.2 Advertising Poster 50

7 Project Management 51

7.1 Meetings 52

7.2 Risk Management 53

7.3 Milestones 54

7.4 Problems Encountered 55

8 Conclusion 56
9 Acknowledgements 57
10 References 58
11 Glossary 59
12 Contribution Matrix 60
13 Appendix 61
Appendix A: User Survey Responses 61
Appendix B: ChatGPT 66
Appendix C: Meeting Minutes 67
Appendix D: Record Keeping 68
Appendix E: Other teamwork evidence 69
Appendix F: Figma Files 70

List of Figures

Figure 1: Usability Testing Dashboard 8
Figure 2: Research goal process flowchart 9
Figure 3: User & system tasks 10
Figure 4: Grouped up tasks. 11
Figure 5: Priority table 12
Figure 6: Experimental setup 15
Figure 7: Facilitator 18
Figure 8: Facilitator's script 20
Figure 9: Task scenarios and tasks 21
Figure 10: Sign-in interface V1 and V2 25
Figure 11: Driver sign-up interface V1 and V2 25
Figure 12: Rider map search bar interface V1 and V2 26
Figure 13: Community icon interface V1 and V2 27
Figure 14: User analytics interface V1 and V2 28

Figure 15: Confirm booking interface V1 and V2 29
Figure 16: Language preference interface V1 and V2 30
Figure 17: Participants 32
Figure 18: Overall personality of participants 33
Figure 19: Industry expert review participant 34
Figure 20: Conducting pilot study. 35
Figure 21: Experimental data collection 38
Figure 22: Refined - Community icon 44
Figure 23: Figure 23: Refined - Wallet + icon changed to add button. 45
Figure 24: Refined - SOS changed to 911. 45
Figure 25: Refined - No button colour changed to red. 46
Figure 26: Refined - Button colours and text maintained. 47
Figure 27: Refined - add a got it button 47
Figure 28: Refined - Text colour contrast changed. 48
Figure 29: Refined – Skip button added in rating system. 48
Figure 30: Refined - emoji-based and star-based rating system 49
Figure 31: Survey questions and responses 61
Figure 32: weekly scrum (05/05/23) 67
Figure 33: Kanban board 68
Figure 34: Toggle time 68
Figure 35: Usability testing - round 1 with group 10 69

Executive Summary

By promoting shared transportation and advocating a reduction in the use of privately-owned vehicles, the Caraoke App aims to supply a solution to traffic congestion and carbon emissions all around the world. While Assignment 1 conveyed the process of setting up high-fidelity prototypes acknowledging the necessary design principles and usability heuristics, Assignment 2 focuses on testing of users engaged in typical tasks during testing, their interactions with the application using specific mechanisms. The data collected was then evaluated to find pain points, sources of confusion, and other issues. To address these issues, high-fidelity prototypes were developed to test potential solutions. These prototypes were refined based on feedback from test participants and industry experts, and new iterations were tested until a final design was reached. There are two posters used to highlight the design process and high-fidelity features and novelty features. Overall, the usability testing and analysis of the results helped to find and refine the high-fidelity prototypes to create more user-friendly interfaces.

1 Introduction

The emergence of the ride-sharing economy has transformed commuting and disrupted traditional transportation industries. But since there are so many ride-sharing applications, the rivalry has grown fierce. It's essential for ride-sharing applications to be user-friendly, and intuitive, and meet their customers' demands to stand out from the competition. Therefore, Caraoke App should perfectly align with the end-user's goals and what they prefer for the high-fidelity prototypes so the prototypes must be changed appropriately with respect to the user's feedback.

The purpose of this report is to address concerns related to user-friendliness and improve the overall experience of the app by performing usability testing. This testing is aimed at evaluating the app's ease of use and finding areas that require improvement about any feedback received by the user (could be verbal comments or any behavioral and attitudinal expressions. Subsequently, the results obtained from testing are analysed, and high-fidelity prototypes are iteratively refined to create a better user experience. The data are analysed against the results collected from the answers received to the in-testing and post-test questions during the usability testing sessions conducted with end users. A few of the key findings that were gathered from the test are shown below:

- The participants that performed the test remotely belonged to the age group of 18-24 and the participants that performed the test physically belonged to the age group of 25-60, which allowed the team to achieve our target audience.
- Most participants understood the general premise of the Caraoke App.
- 3 out of 8 participants had some difficulty in performing the payment and transaction task.
- 2 out of 8 participants had issues with time to finish booking a ride within the given time.
- The booking of a carpool ride received consistently positive feedback from the participants.
- 98% of the participants enjoyed the easy and user-friendly interfaces as they were more familiar with the outlook of the app.

Users generally regarded the app to be simple to use, but some aspects/tasks were refined to enhance the overall experience according to the end-users' and stakeholders' liking.

This usability report will focus on a ride-sharing app that underwent usability testing with relevant task scenarios, research goals and task sheet questions, analysis of the testing results, and refinement of high-fidelity prototypes. The report will further discuss the testing process, the analysis of the results obtained, and the changes made to the application to create a more user-friendly experience. The final high-fidelity prototypes and their specifics will be laid out in a handoff report to the development team, encompassing information about the font styles, icons, and other guidelines used in developing the prototypes. Finally, there are two posters, the conference poster which is used to exhibit the final design process that went through to create the prototypes, and the advertising poster which showcases the novelty features of the high-fidelity prototypes and how to get customers interested in downloading the app through the poster. This report aims to equip its readers with the usability testing of the Caraoke application, changes driven by analytics and user feedback and the positive impact it had on improving the UI/UX experience of the application.

2 Team Members

The below table shows the team members and their corresponding roles and responsibilities.

Student	Name	Curtin ID	SLIIT ID	Roles
1	Pramoda Gunarathne	20531218	it21115820	Project Manager Data Logger Document Controller
2	Harshi Kasundi Bandaranayake	20583387	it21151606	Data Analyst Psychologist Facilitator
3	Sahas Gunasekara	20462075	it21100666	Interaction Designer Tech Support
4	Sanugi Perera	20542524	it21138836	Testing Moderator Facilitator

3 Usability Testing

Product under test

Caraoke is a ridesharing/car-pooling native mobile application built with hopes of enforcing United Nation's Sustainable Development Goals (11 & 12).

Why conduct Usability Testing?

- Finding any specific problems or pain points seen in the high-fidelity prototypes developed during Assignment 1 and creating an application that can attract a loyal user base.
- Uncovering any usability issues that were not discovered during expert reviews.
- Confirm or disprove any incorrect assumptions made about the usability of the prototype designed in Assignment 1.

The FourGUIs team designed a one-page, simple-to-read Usability Testing Dashboard to prevent any hiccups prior to or during the actual testing session. Elements found in acclaimed usability testing templates (Travis 2017), (Pérez 2015) were incorporated into our own.

Link to the FourGUIs Usability Testing Dashboard – Usability Testing Plan. A screenshot will be added in below section 3.1. Usability Testing Plan.

The specifics of our research method, the findings we discovered, and a list of suggested changes and changes made to the High-Fidelity prototypes developed in Assignment 1 are all included in the following document.

3.1 Usability Testing Plan

The evaluation of user interfaces was done by using usability testing, which is a combination of methods in a controlled setting such as experiments, observations, and questionnaires. We conduct this test remotely as well as physically. The same task scenarios and the same questions will be used for both rounds simplifying the process for the facilitators. To execute the useability testing perfectly we have the usability test plan dashboard as follows which summarises the plan for the usability test such as the business case, equipment, responsibilities and test goals, and test tasks as shown below.

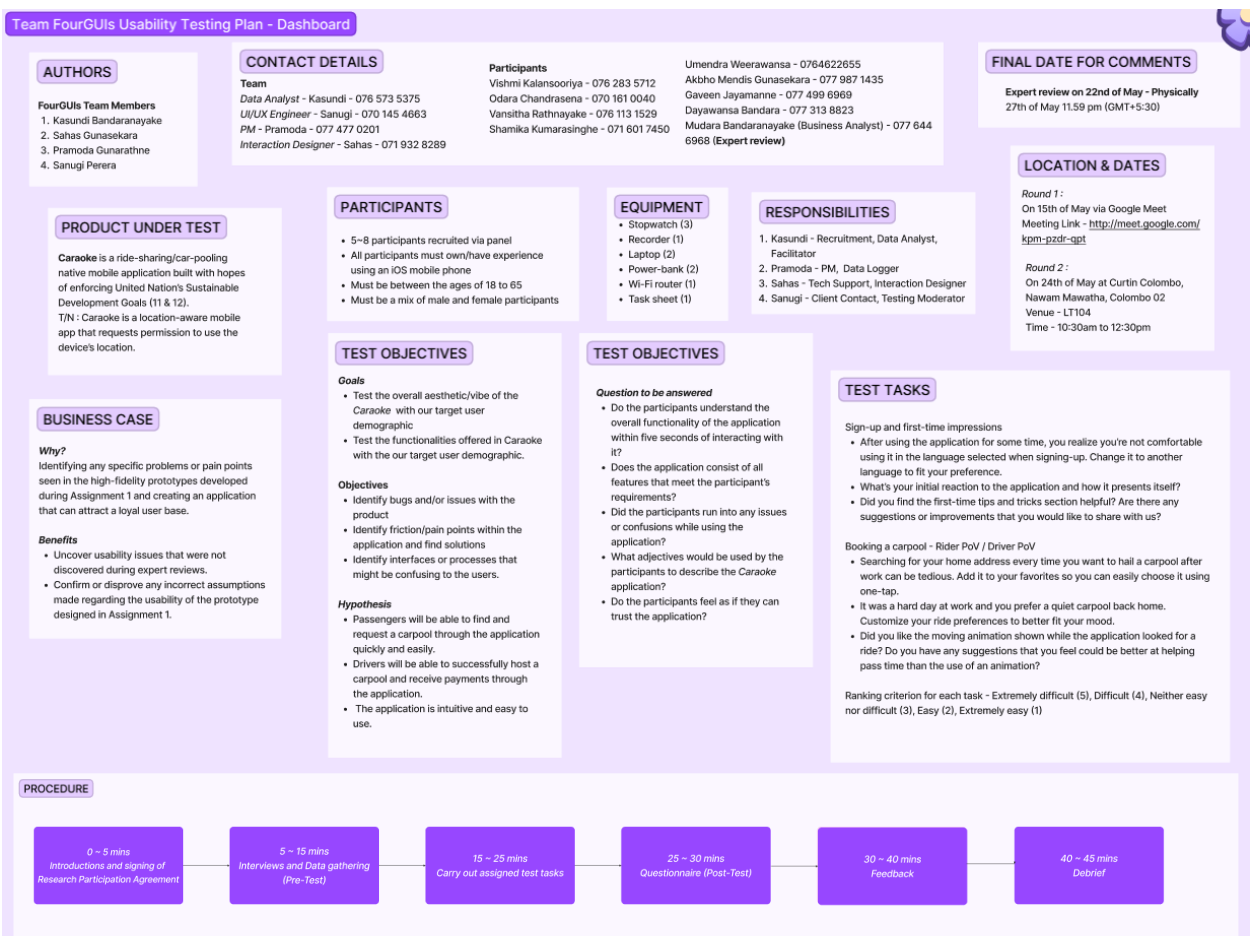


Figure 1: Usability Testing Dashboard

3.1.1 Define the Research Goal

The group chose the precise and exploratory goals that must be carried out by the end of Assignment 2 before moving on to creating a usability testing plan.

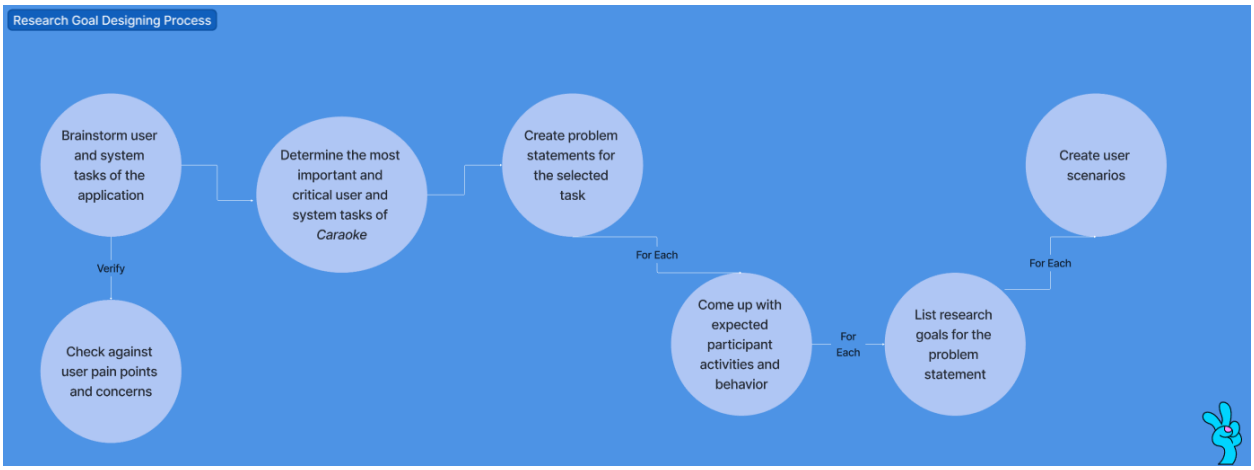


Figure 2: Research goal process flowchart

Step #1: Figure out the Most Important User Tasks

The team sat down together and jotted down their ideas to compile a list of tasks that needs to be tested, it swiftly became apparent that many tasks need to be tested and consulted on (both from a user's perspective and a developer's perspective). Throughout this process, the team found the user feedback received in Assignment 1 to be immensely valuable in deciding the crucial user aspects of the *Caraoke* application.

Step #2: Discover Which System Aspects Are of Most Concern

The team took the liberty of stepping into the role of a potential stakeholder to identify the system aspects of the *Caraoke* application from a stakeholder's perspective. As such, a list of system aspects that helps to find frustrations and pain points, features that cost the stakeholders, and tasks that are too long and tedious were found.

The below figure shows how both the user tasks and system tasks were achieved:

Tasks - Brainstorm

User Tasks

1. Sign-up to create an account.
2. Customize/Edit account information
3. Host a carpool
4. Request a carpool
5. Share trip details
6. Rate a carpooling experience
7. Customizable ride preferences and settings
8. Tip the driver
9. Pay for a carpool
10. Lodge a complaint
11. Add a card payment
12. Check user analytics
13. Add a saved place
14. Ask for support
15. View past trips and transactions
16. Contact past carpool drivers/ riders
17. Join the Caraoke community
18. Post questions and view FAQs

System Tasks

1. Accessibility
2. Findability of options offered in the application
3. Testing novel features (female-only ride etc.)
4. Ease of learning and understanding features
5. User satisfaction in customer service and support
6. Understand what users enjoy/ dislike about the application
7. User Experience and Design - user friendly interfaces
8. Ability to complete a task successfully without running into any confusion and how long it takes
9. Intuitive user interfaces
10. Is content presented in a way that is easy to find and understand?
11. Learning and training costs.

Figure 3: User & system tasks

Step #3: Group Items from 1 & 2, then Sort Issues by Importance to Users and Organization

The brainstormed user and system aspects were further dissected into comprehensive tasks, stakeholder concerns, and questions, grouping based on their similarity of concern. The group chose the precise and exploratory goals that must be carried out by the end of Assignment 2 before moving on to creating the rest of the usability testing plan.

Figure 4: Grouped up tasks.

Listing down all concerns related to the users' aspect and system's aspect, the team then came up with a priority table to help identify the most important research goals that must be tested during Assignment 2. These concerns have been prioritized based on their significance and impact on the overall usability of the application.

1. Registration, Authentication, Log-in, and Profile Creation
2. Analytics and Reports
3. Payments and Tips
4. Ride Hosting
5. Ride Request
6. Past Trips and Transaction History

Link to the Team FourGUIs Priority Table - [Priority Table - Caraoke]

Issues	Importance		
Name	Users	Organization	Total Score
Registration, Authentication, Log-in and Profile Creation	5	5	10
Ride Request	5	4	9
Ride Hosting	5	4	9
Update Profiles	4	2	6
Rate and Review	4	4	8
Ride Cancellation	3	2	5
Past Trips and Transaction History	5	4	9
Settings and Preferences	4	1	5
Customer Support	4	4	8
Payments and Tips	5	4	9
Analytics and Reports	5	5	10
Social Networking	1	1	2
Integration with Third-Party Applications	2	2	4
Learning and Training Costs	1	4	5
Testing Novel Features	1	5	6
User Experience and Design	5	4	9
Safety and Security	4	3	7

Figure 5: Priority table

Step #4: For Each Top Issue, Condense the Information into a Problem Statement

Registration, Authentication, Log-in, and Profile Creation

Problem statement #1: Lack of proper or rigorous verification of users registering in the Caraoke application (National identity card, driver's license, vehicle registration documents etc.) may attract people with malicious intent who may use the application for fraudulent, illegal, and unsafe activities. Such incidents will cause users to lose faith in the application and later lead to potential financial losses for the stakeholders.

Analytics and Reports

Problem statement #2: The inability to provide users and stakeholders with meaningful, detailed, and insightful analytics about the number of carbon emissions saved, and the amount of money earned/saved through using the Caraoke application hinders the main objective - promoting UN SDG goal 11 (sustainable cities and communities) and goal 12 (responsible consumption and production), on top of which the application was built upon and publicized. Overlooking the core premise of the application may lead to disappointment of enthusiastic users and the application will lack one of its main incentives to attract a user base.

Payments and Tips

Problem statement #3: Not supplying safe and secure transactions will cause angered users to contact customer service frequently to sort out transaction issues or will abandon the application and discourage their family, friends, and close acquaintances from using the application. Customer support can be a costly aspect for the stakeholders (costs for staff, infrastructure, and training) and tarnished reputation will hurt the longevity of the Caraoke application.

Ride Hosting and Request

Problem statement #4: Users being forced to go through over-complicated steps to complete one of the main functionalities expected of any carpooling application can lead to a frustrated user and a loss of user engagement. Furthermore, difficulties experienced while trying to host/request carpool results in a poor usability experience and a decrease in user satisfaction with the Caraoke application.

Past Trips and Transaction History

Problem statement #5: Not providing users with smooth, intuitive user flows to retrieve and access past trip details and transaction history disrupts the first objective on top of which the Caraoke application was born. Additionally, not supplying information regarding past user activity takes away accessibility from the application as users will opt to contact customer support to retrieve past trip details in the event of a financial dispute or reimbursement purposes. This can be time-consuming, expensive, frustrating to the user, and heavily resource-exhaustive to the stakeholders.

Step #5: For Each Problem Statement, List the Research Goals

Problem statement #1:

- Evaluation of usability and user-friendliness of the registration, login, and profile management interfaces.
- Decide how to validate and verify user details.
- Find out alternatives to ease the verification process and reduce the number of user interfaces involved.

- Ensure that the verification and registration processes follow privacy regulations, data privacy laws, and various standards.

Problem statement #2:

- Evaluation of usability and user-friendliness of the user analytics interfaces
- Learn types of information that the users and stakeholders expect to analyse through the application.
- Find out effective and impactful methods to depict user analytics gathered by the application.
- Find the latest data representation methods that can encompass more information effectively.

Problem statement #3:

- Evaluation of usability and user-friendliness of payment, payment options and transaction history interfaces
- Support multiple payment options in a way that does not overwhelm the users.
- Ensure that the application is transparent in how it deals with finances, payments, and cost-calculations.

Problem statement #4:

- Evaluation of usability and user-friendliness of the ride-requesting/hosting interfaces
- Find redundant user interfaces that complicate the process and bores the user.
- Ensure that information provided to the user helps build a sense of trust in the ride-matching process.

Problem statement #5:

- Evaluation of usability and user-friendliness of the past trips and transaction history interfaces
- Ensure that the information presented in the interfaces is conveyed and grasped by the user accurately.

Following the above-mentioned 5-step method to create and define research goals [1], the team managed to filter out the most important aspects of the application and develop a comprehensive list of task scenarios, related tasks, and subtasks that must be tested.

3.1.2 Experimental Set-Up

The usability testing for *Caraoke* mobile application will take place in two rounds, both held within a week apart from each other. *Round 1 of 2* will be a remote usability testing session, taking place over Google Meets. The remote session was carried out with the demographic age group of 18-25 where the participants were group 10 in the HCI unit. *Round 2 of 2* will be a physically held testing session which was carried out for Vishmi Kalansooriya, Odara Chandrasena, and Dayawansa Bandara in the usability testing lab. The industry expert review was conducted physically with Mudara Bandaranayake in the same week as the round 2 (in-person) sessions. Considering the benefits and drawbacks of each method, the team chose to conduct both online and in-person usability testing sessions to gain more insight into our high-fidelity prototypes.

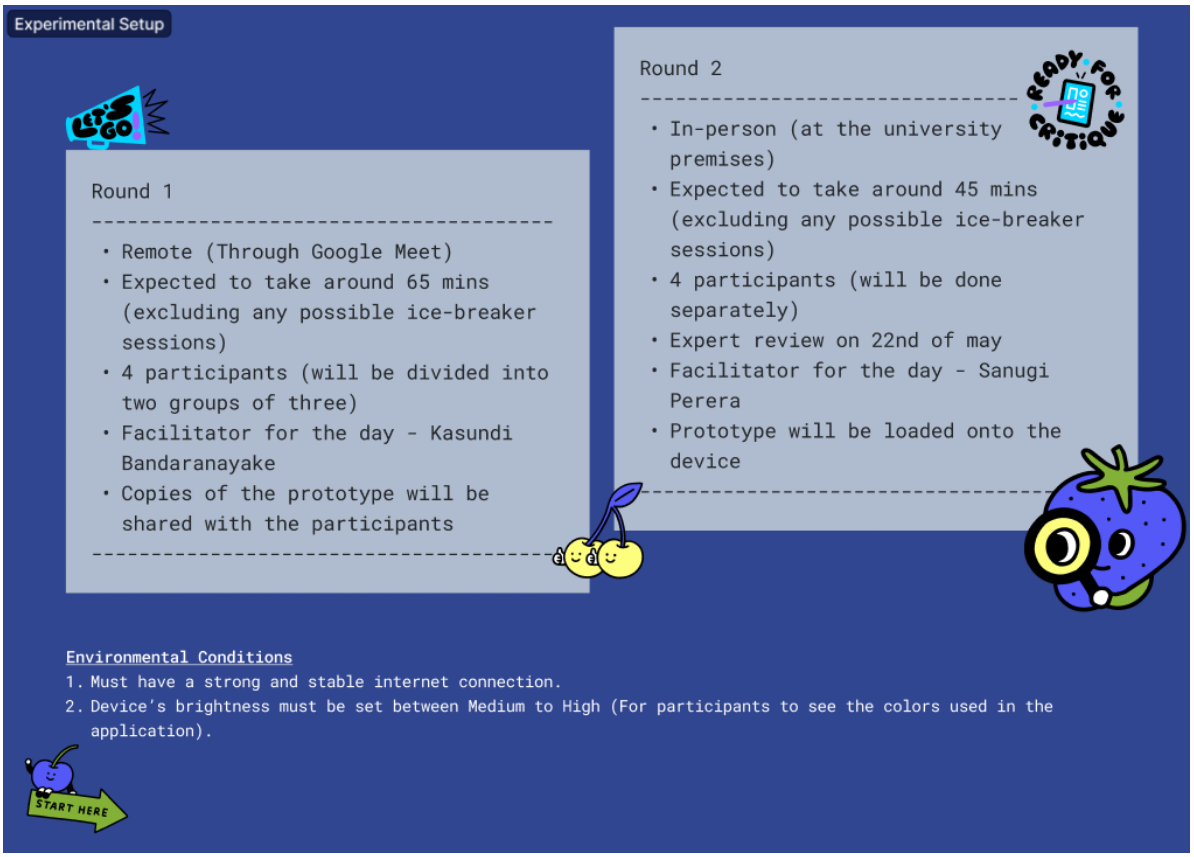


Figure 6: Experimental setup

The participants will receive an overview of the usability test procedure, equipment, and software during each round. In the moderation section, they will be broadly explained accordingly to the round that was held during each session. The same task script will be followed for both sessions for easiness for the facilitators and the team members. The first round was the remote session which was held via google meet on the 15th of May. The round 2 physical sessions for the 4 participants were held separately according to the order of (Dayawansa Bandara, Vishmi Kalansooriya, Odara Chandrasena, and Umendra Weerawansa) in the usability testing lab on the same day which was the 24th of May. The industry expert review was conducted on the 22nd of May for Mudara Bandaranayake at a user-friendly place.

For in-person sessions:

Usability testing sessions for the ride-sharing app will be held at LT104 in Nawam Mawatha, Colombo 02. Participants will use a laptop with the Figma prototype and necessary software in a typical office environment. The facilitator and team members will watch participant interactions, while note-takers and data loggers will be present in the room. Sessions will be recorded and uploaded. Facilitators will ensure a strong Wi-Fi connection, a charged laptop, and have their own equipment for notetaking.

Participants will sign a participation agreement, acknowledging their voluntary involvement, the choice to stop at any time, and privacy protection during recording. The facilitator will supply an overview of the prototypes and clarify the evaluation's purpose. Participants can ask questions before beginning.

Tasks will be performed according to a script. Participants will complete a pretest questionnaire and then continue with the tasks. The facilitator will read each task aloud, and participants will start. Time-on-task will be measured, and participants will be encouraged to think aloud. After each task, participants will fill out a questionnaire and discuss their experience with the facilitator. In the end, a post-test satisfaction questionnaire will be completed. Only some sessions were recorded, excluding cases of disagreement or technical issues. A/B testing was performed for the physical sessions asking users which work with they prefer more.

An expert review followed a similar procedure, taking place at Raffles Cafe in Nawam Mawatha, Colombo 2, and was recorded.

For remote testing:

Participants will join the usability test remotely using screen-sharing technology from their workstations. Communication will be done through Google Meet. The facilitator will supply a similar briefing as in the physical session, sharing all necessary information before starting the testing process. To ensure clarity, the facilitator will directly share the task script with the participant.

During the remote session, the facilitator will ask the participant to read the task description aloud and encourage them to share their thoughts ("think aloud") during the task. User comments will be noted down by the data logger. After each task, the participant will complete a post-task questionnaire and supply more details about their experience. Once all tasks are completed, the participant will fill out a post-test satisfaction questionnaire. Unlike the physical session, the online session will not be recorded due to the extended duration of the session.

3.1.3 Facilitator

The role of the facilitator is to experiment smoothly with the relevant information needed for the experiment. We will give less information as possible to the participants so that they can find the application on their own to find errors.

The facilitator's responsibilities during *Caraoke* mobile app's usability testing are as follows:

- Encourage the participants to fully take part in the *Caraoke* testing process.
- Lead participants throughout the testing process.
- Provides tasks with clear instructions, answers questions, and prompt follow-up questions from the participants about the *Caraoke* application and/or the testing process.
- Unbiased, objective moderating throughout the testing process.
- Collect signed copies of the Research Participation Agreements from the participants.
- Draw out the right information from the participants that will help the UI/UX design team in their design iterative process.
- Make use of the limited time on-hand to focus on elements of *Caraoke* that are most important to develop and improve the application.

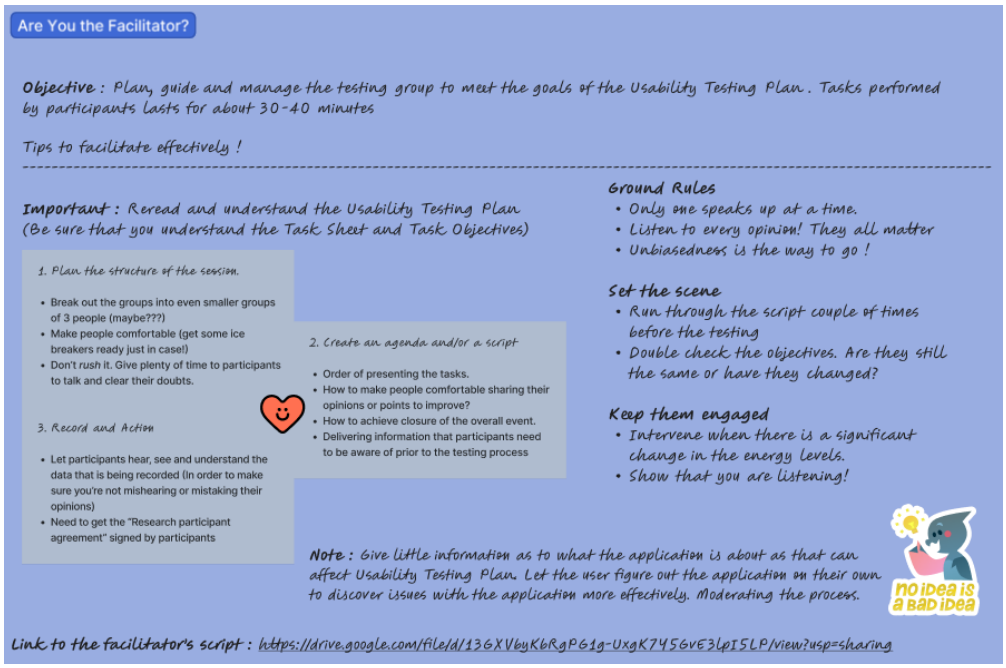


Figure 7: Facilitator

The roles involved in a usability test are as follows. An individual may play multiple roles and tests may not require all roles.

Facilitator (Kasundi and Sanugi)

- Supply training overview before usability testing.
- Supplies an overview of the study to participants.
- Defines usability and purpose of usability testing to participants.
- Aids in the conduct of participant and observer debriefing sessions.
- Responds to participant's requests for help.

Data Logger (Pramoda and Sahas)

- Records participant's actions and comments

Test Observers (Pramoda)

- Helps the data logger in identifying problems, concerns, coding bugs, and procedural errors.
- Serve as note-takers.

Testing Moderator (Sanugi)

- Moderates the tests and helps the facilitators if they require any assistance during the process.
- Make sure the environment is exact to conduct the testing.

Tech support (Sahas)

- Make sure the necessary equipment for each session is available and kept properly.

Data Analyst and psychologist (Kasundi)

- The answers from the participants will be analysed and behavioral & attitude changes will be noted.

Facilitator's Script

To ensure a smooth usability testing session, the team designed a script to be followed by the facilitator at the testing session. The script lists important contact details, aims to be completed, and the procedure that must be followed by the facilitator to make maximum use of time.

Facilitator's Script

Venue : LT104, Curtin Colombo, Colombo 02
Time : 10.30 AM to 12.30 PM

Contact Details
Tech Support (Mr. Sahas Gunasekara) : +94 71 932 8289
Project Manager (Ms. Pramoda Gunarathne): +94 77 477 0201

Objective

- **Gather recommendations to improve the UI/UX of Caraoke application**
- **Identify further pain points and issues with the high-fidelity prototypes**

Good day everyone! Welcome to usability testing session of the Caraoke mobile application. We are so glad to have all of you with us today, hoping to take in your valuable opinions to help improve our application.

Action Points

1) Introduce the FourGUIs team - Kasundi, Pramoda, Sanugi and Sahas
2) Make participants aware that their responses are being taken note of (if being recorded let them know this as well) and allow participants to withdraw if not consented to above conditions.
3) Send out the Research Participation Agreement form and collect the signed copies.
4) Give time for the participants to introduce themselves to eachother present during the testing session.
5) Guide the participants to prepare for the testing procedure
   - Check if their device is connected to internet and can access internet.
   - Set device brightness to at least 50% in order to see the color scheme of the application.
5) Share the Google form link to fill in ideas to improve, further recommendations, Pros and Cons of the prototypes.
6) Lead participants through each user task and provide ample time for them to fill in the recommendation form and/or to ask questions.
7) Make sure to summarize what has been done after each user task and keep the participants on track with progress.
8) Hold a brief 5 minute Q&A session and allow the users to add and/or to finalize their recommendation forms.
9) Check if every recommendation form has been successfully received and express team's sincere gratitude towards the participants for their co-operation.

Figure 8: Facilitator's script

3.1.4 Task Scenario and Tasks

Having compiled the research goals and found what user/system tasks are the most important and the problem statements related to each identified aspect, team FourGUIs brainstormed specific task scenarios that align with the intended usage of the *Caraoke* application.

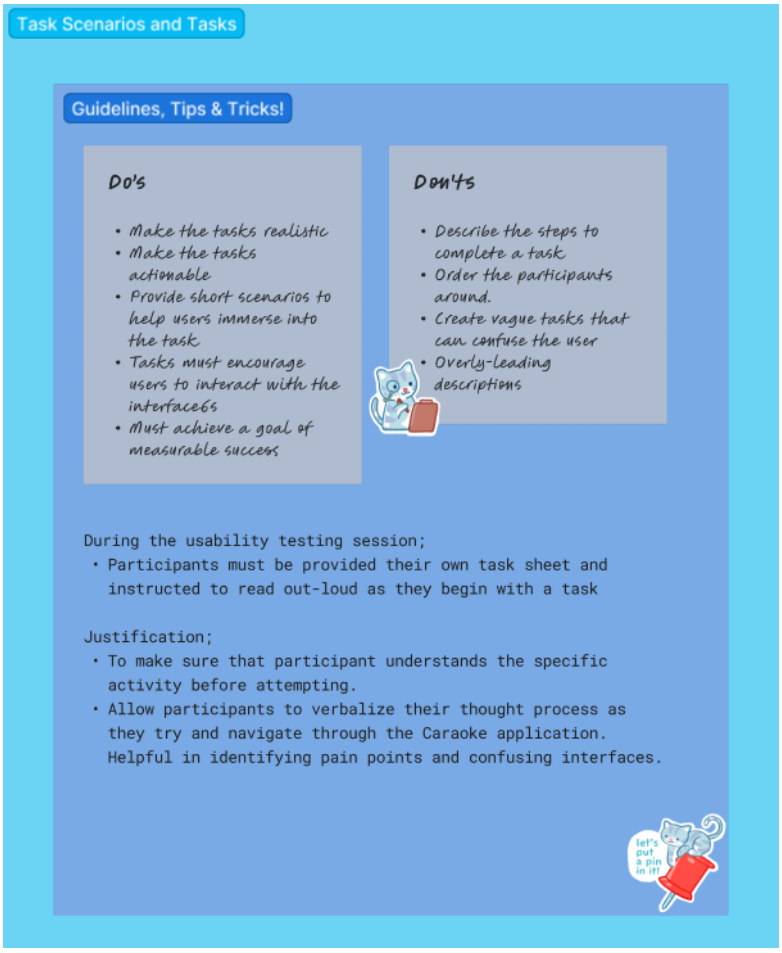


Figure 9: Task scenarios and tasks

The team took extra effort to make sure that the developed task scenarios were realistic and situations that the participants could relate to and understand. Additionally, the tasks detailed under each scenario supplied little to no "instructions" or detailed descriptions on how to perform the specific task, rather the tasks were designed to describe an outcome that the users were encouraged to achieve.

Some of the task scenarios and tasks are given to the usability testing participants are given below.

<u>Scenario #1:</u> *'You just heard of a brand-new application that helps you earn money by sharing a ride on your way to a destination. You would like to join the Caraoke Application as a driver. Please use the mobile app to sign in and create a user account.'*

Task: *'Join the application and discover its basic functionalities and feel'*

Subtasks:

1. After using the application for some time, you realize you're not comfortable using it in the language selected when signing up. Change it to another language to fit your preference.
2. You realized quite belatedly that you wished to sign-up as a rider but signed up as a driver instead. Delete your account and create a new account as a rider.

<u>Scenario #2:</u> *'You're on your way home and would like to save some money by hailing a carpool that's heading your way.*

Task: *'Book a carpool as a passenger'*

Subtasks:

1. Search for your home address to book a carpool.
2. Searching for your home address every time you want to hail a carpool after work can be tedious. Add it to your favourites so you can easily choose it to use one tap.
3. It was an exhausting day at work, and you prefer a quiet carpool back home. Customize your ride preferences to better fit your mood.

<u>Scenario #3:</u> *'You're on your way to a party and would like to make some cash by offering a carpool while heading your way.'*

Task: *'Offer a carpool as a driver'*

Subtasks:

1. You prefer if the detours aren't too long and prefer to keep them under 3km from your original route. Customize your ride preferences to suit your conditions.
2. You're carrying a gift for your friend at the party and there are only two seats to offer in the car on your way. Set your preferences so that the carpool is only offered for 2 people.

<u>Scenario #4:</u> 'As a loyal user of Caraoke, you're interested to know your user activity within the application'.

Task: *'Discover the wide variety of user analytics provided by the Caraoke application'*

Subtasks:

1. Oops! Seems like you lost your wallet yesterday and you're pretty sure you had it on before you got into your *Caraoke* carpool to go back home. Find out a way to contact your carpool driver through the application to inquire about the lost wallet.
2. Credit card charges are at an all-time high! To keep yourself and your budget in check, you would like to view all credit-card transactions done through the application.

<u>Scenario #5:</u> 'As a responsible user, keeping track of your payments and transactions done through the application is important to you'.

Task: *'Discover payment options and customizations provided by the Caraoke application'*

Subtasks:

1. You wish to add another card as a choice to pay for the carpools. Add a card to your account.
2. The non-primary card was recently updated and is no longer in use. As it is no longer valid, take it off your list of credit cards.
3. Find out all the destinations you've travelled to and paid to by your primary card through the application.

<u>Scenario #6:</u> 'As a responsible user, keeping track of your payments and transactions done through the application is important to you from the driver's POV.'

Task: '*Discover payment options and customizations provided by the Caraoke application*'

Subtasks:

1. Find out the total amount of money earned by offering carpools using the application,

- Today.
- This week.
- This month.

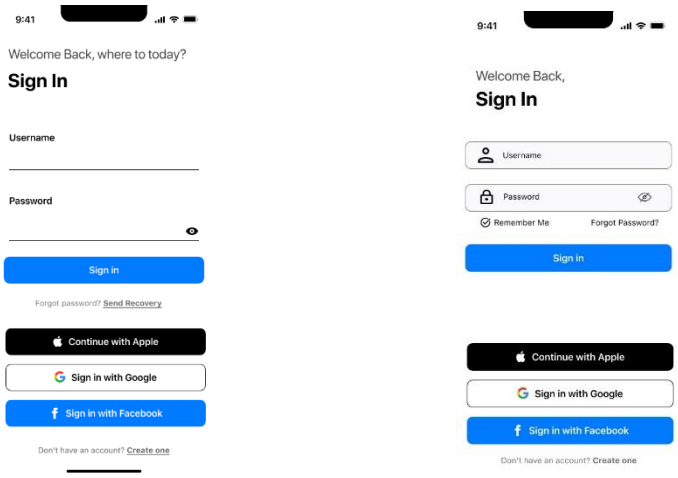
It is important to note that the team has also compiled a set of post-task questions to gain feedback from users after completing each task scenario, as these are valuable insights that can help FourGUIs to build an application that supplies the best usability experience to its users.

As *Caraoke* application focus on two types of users primarily (passenger, hailing a carpool and driver, hosting a carpool), task scenarios and tasks have been made to focus on testing usability in both perspectives.

3.1.5 A/B Testing

A/B testing was carried out as below where the high-fidelity in the initial version is compared to a specific version 2 of the same interface. This version 2 was tweaked to check if users would prefer the changed version 2 interface over the first version's interface. These questions were tested during round 2 of the in-person sessions that were conducted on the 24th of May. The 4 participants were asked to try both alternative workflows for each version and the results were recorded (metrics) from their process. The below shows the corresponding interface first interface (version 1) and alternative interface (version 2):

1. Screen 01 - Sign-in

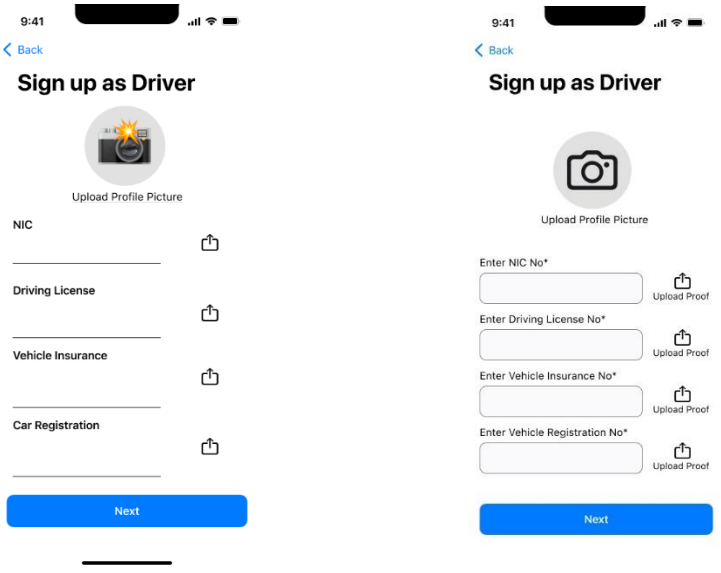


Before(V1) After (V2)

Figure 10: Sign-in interface V1 and V2

The input boxes are squared, and an icon is also used with the input fields in addition to labelling them. Additionally, a "remember me" option is also given to the users for convenience and to reduce the number of times they must sign in to use the app.

2. Screen 02 – Driver sign-up



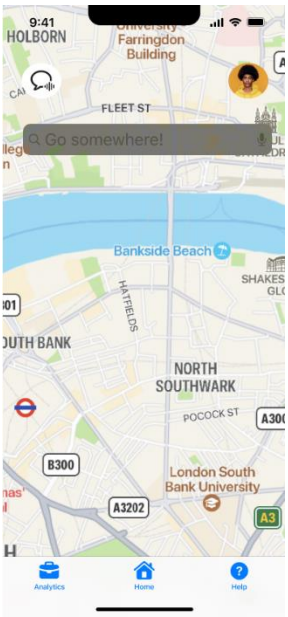
Before(V1) After(V2)

Figure 11: Driver sign-up interface V1 and V2

A simpler wired-vector icon is used to stand for the requested action - "Upload Profile Picture". Input text boxes are used instead of input fields and upload proof buttons represented by the iOS "Upload" icon are labelled for more clarity.

3. Screen 03 – Rider map search bar

A different map is used, and the "search destination" text input box is made lighter and the map in the screen is made grey to focus more on the search bar for users who have eye constraints.

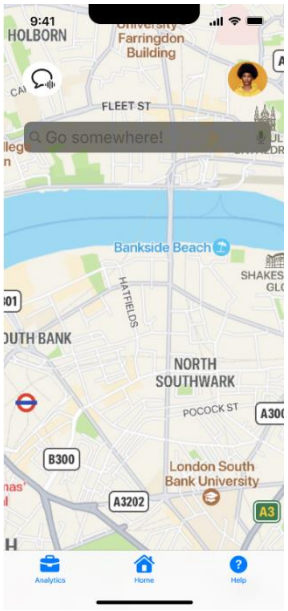


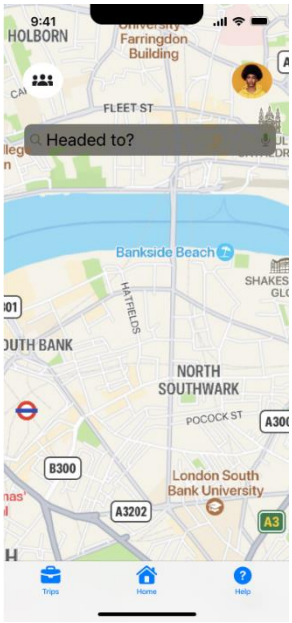
Before (V1)

After (V2)

Figure 12: Rider map search bar interface V1 and V2

4. Screen 04 - Driver map (community button) and ‘go somewhere’ changed to ‘headed to’ in the search bar.





Before (V1) After (V2)

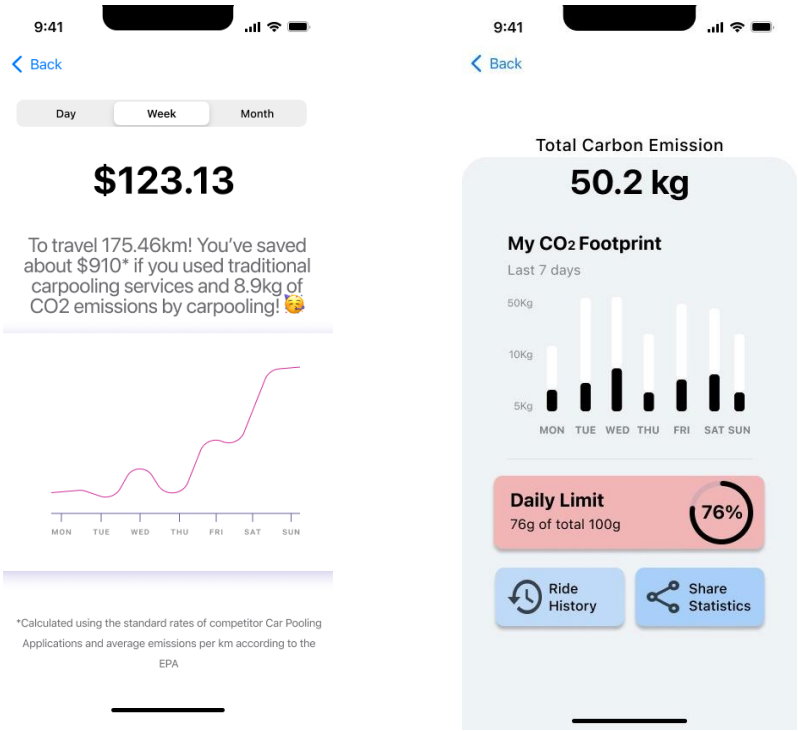
Figure 13: Community icon interface V1 and V2

The community button on top of the screen is confused with a chat box icon. So, in version 2, it's changed to a more appropriate icon that shows that it’s a community button.

The search bar’s text is changed from Go somewhere (which can be confusing) to Headed to? So, users can distinguish that it's used for entering the destination of their trip.

5. Screen 05 - Analytics

Only the total carbon emission per week is shown to the user. The line graph only reflects the user's daily limit and how much they have contributed to emissions over one week. We can conclude a bar chart to include the levels of emission against what must be kept each week to achieve lower carbon emission levels by using the application.

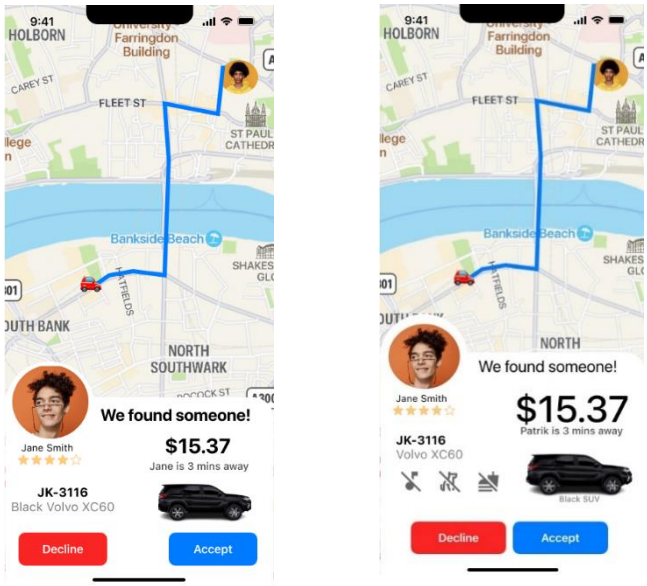


Before(V1) After (V2)

Figure 14: User analytics interface V1 and V2

6. Screen 06 – Confirm booking.

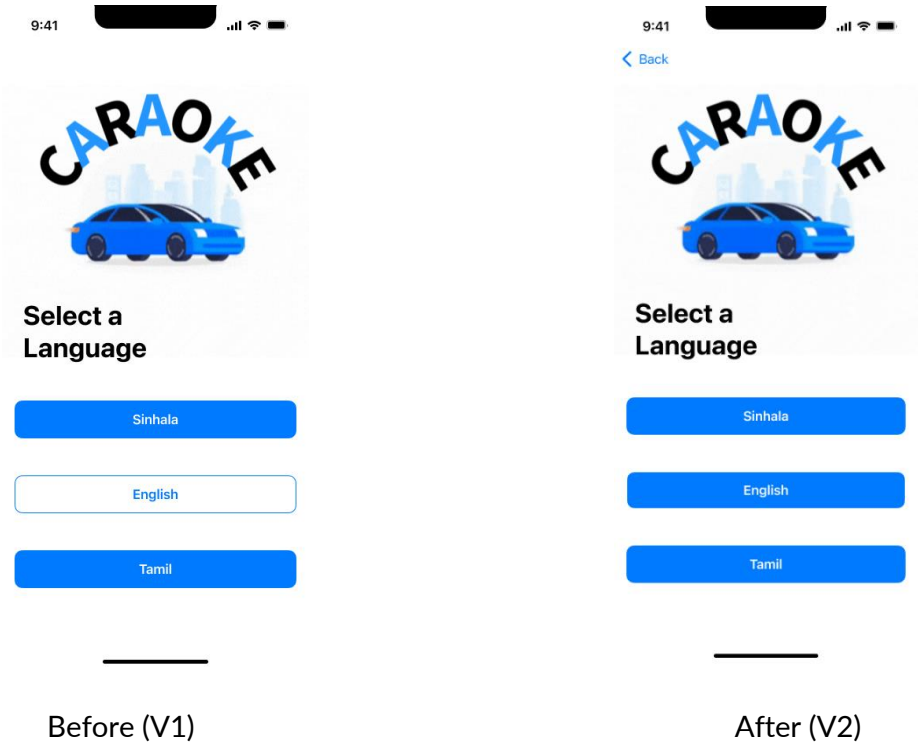
Added more icons to stand for the user's selected ride preferences before confirming a ride. Altered alignment of vehicle information and buttons to optimize card space. In version 2, we can see that the users are also given the option to see what drivers prefer as well.



Before(V1) After(V2)

Figure 15: Confirm booking interface V1 and V2

7. Screen 07 – Language choice and overall colour palette.



Before (V1) After (V2)

Figure 16: Language preference interface V1 and V2

The colour palette was kept where the blue button with white text is available. The before version illustrates two distinct colour palettes for the buttons.

3.1.6 Task Sheet

The FourGUIs team conducted extensive research on writing effective task scenarios for usability testing scenarios prior to creating a task sheet (McCloskey 2014). The team then compiled this information into a list of Dos and Don'ts to be referred to while creating task scenarios and tasks.

After compiling and piloting the task sheet, the team then brainstormed on how to administer these tasks to the participants during the testing session. As the *thinking-out-aloud* approach is highly acclaimed and recognized as an effective usability tool, it was decided that the task sheet will be provided to the participants themselves, and will be instructed to read each task out loud

before attempting as it serves as an insight to participant's thought process, letting the team discover what users truly think of the Caraoke application (Nielsen 2012).

T/N: The example document included in the Assignment 2 brief is heavily cited in the task sheet.

View the complete copy of the Usability Testing Script: Usability Testing Script

3.1.7 Participants

Outreach and Screening

The participants were matched for the user personas that were presented for the app. They were screened by the questions from a survey that was achieved in assignment 1. The survey questions were based on gathering demographic information and the first thought about the concept of the Caraoke app such as how comfortable the users are with hitch-hacking a ride with strangers, how familiar they are with carpooling mobile applications, etc. These survey questions and the results are available in Appendix A. This survey that was conducted in assignment 1 was passed around by the team via WhatsApp and email.

The participants that fulfilled this survey were analysed and the team gathered a variety of users that fulfilled the following criteria for the recruitment of participants that match the user personas:

1. All participants must be between the ages of 18 to 65 years.
2. Males and females must be represented fairly in the participant sample.
3. All participants must own/have experience using an Apple mobile phone.
4. Extensively uses ride-hailing applications such as Uber etc.

Following these specifications, the team decided on a group of 9 participants. The team made sure to invite a few peers (Group 10) from the ICTE3002 module as well since they fit the profile of *Caraoke*'s target users and might be more adept at spotting any overlooked usability heuristics or design considerations. 5 participants were selected by the survey analysis and met the above criteria.

The above-mentioned factors used to select test participants were discussed and agreed upon by all team members of FourGUIs. Furthermore, a consent form that explains the procedures and deals with ethical issues is known to the participants. This signed and informed consent is the

participation agreement that explains What the participant would be asked to do, the participant's right to withdraw from the study at any time, that their identity would not be disclosed, and that they have agreed to the session being recorded.

Link to the Research Participation Agreements - [Research Participation Agreement]

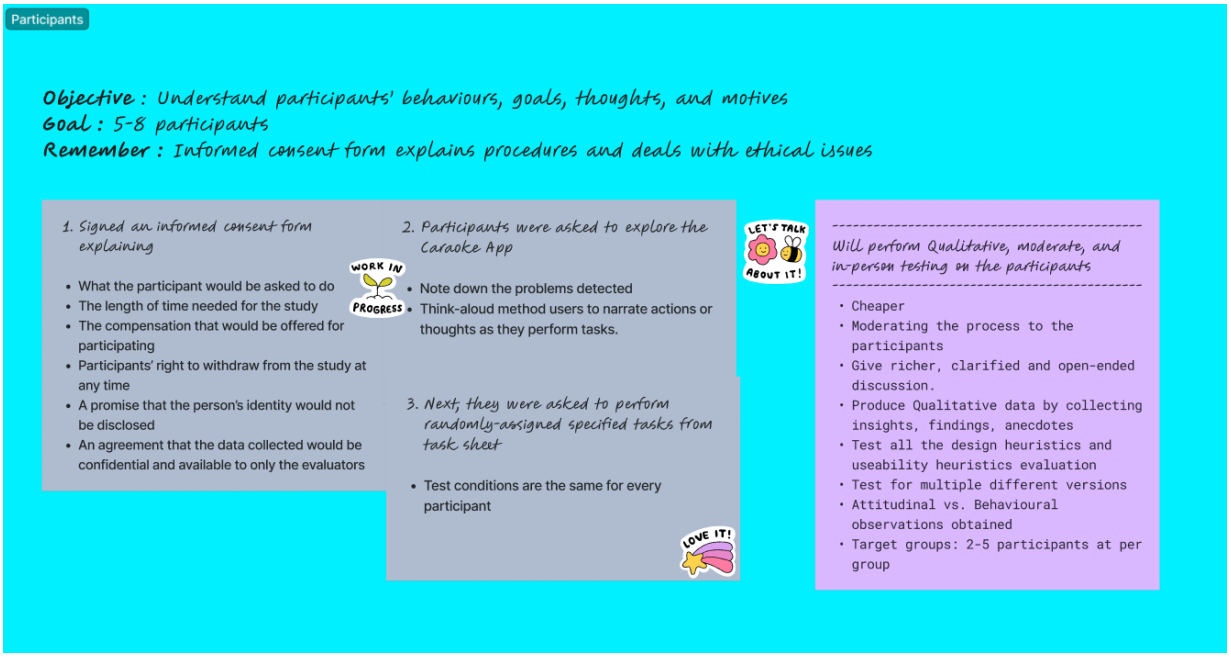


Figure 17: Participants

Participant Profiles

Participant	Age	Gender	Employee Status
Ms. Odara Chandrasena	21 years	Female	Unemployed (Undergraduate)
Mr. Dayawansa Bandara	61 years	Male	Unemployed (Retired)
Ms. Mudara Bandaranayake	29 years	Female	Employed
Mr. Vansitha Rathnayake	22 years	Male	Employed (Intern)
Mr. Akbho Mendis Gunasekara	22 years	Male	Employed (Intern)
Mr. Gaveen Jayamanne	22 years	Male	Unemployed (Undergraduate)
Mr. Shamika Kumarasinghe	22 years	Male	Unemployed (Undergraduate)
Mrs. Umendra Weerawansa	56 years	Female	Employed
Ms. Vishmi Kalansooriya	23 years	Female	Employed (Intern)

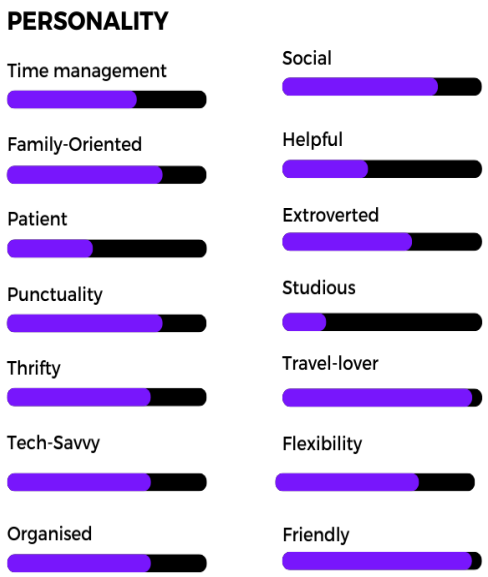


Figure 18: Overall personality of participants

This table also shows the employee status of each participant, where 5 participants are employed, and the rest 4 participants are unemployed. There is a mix of participants involved in the testing process, 4 females and 5 males, this is crucial to achieving an in-depth analysis in testing as we have an option for females-only trips.

The overall personality of the participants can be characterized as shown on the left. This helps the team to acquire answers to the task scenarios and the questions based on their personality, which helps the users to achieve the analysis accordingly. This personality analysis shows that overall participants love to travel and are friendly and extroverted, helping the course of the usability testing to be successful.

Reaching out to subject matter experts and advisors

The team also made an effort to get in touch with Ms. Mudara Bandaranayake, a business analyst with extensive experience in fields related to the application domain of Caraoke.

Figure 19: Industry expert review participant

List of key takeaway points presented by our esteemed industry expert during the reviewing session for the high-fidelity prototypes designed in Assignment 1:

1. Pointers on how to reduce redundant information presented in the interfaces to help minimize the number of clicks that the users must perform to complete a task.

2. Pointers on how to convey better information and give meaningful feedback on actions to the users.

3. Pointers on the standardized way of how applications in similar domain work and the usefulness of following these standardized methods to help increase the usability of the application.

4. Pointers on important functionalities to help elevate the usability of an application that has been overlooked by the team during Assignment 1.

Additionally, the FourGUIs team made it their utmost priority to consult the instructors regarding the interfaces designed and made sure to take note of their valuable feedback and make necessary improvements. The analysis is explained in depth under 3.4. Analysis of usability testing report.

Link to meeting minutes of the Industry Expert review - [Industry Expert Review - Google Drive]

Link to the voice recording of the Industry Expert review - [Industry Expert Review - Feedback for Caraoke.m4a]

3.2 Piloting

Conducting pilot testing, which involves a preliminary testing session before the actual experiment, can improve the reliability of usability studies. This process allows the team to validate the wording of the tasks, determine the appropriate session length, and potentially collect additional data (Schade, 2015).

The brainstorming for conducting the pilot study was done as shown below:

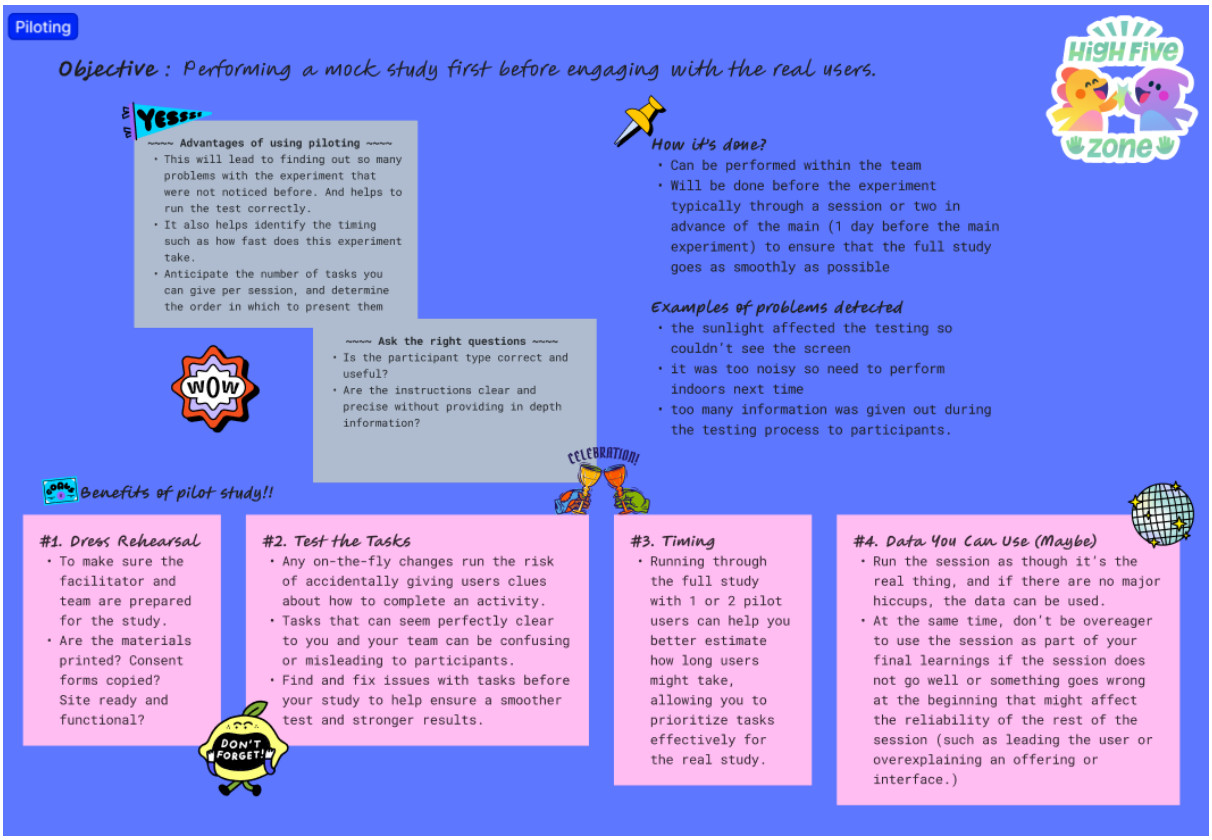


Figure 20: Conducting pilot study.

The pilot study was conducted with the team *before each usability testing session* to ensure that the main experiment goes as smoothly as possible. With qualitative usability studies, small groups of users can provide valuable insights into the strengths and flaws of designs and

usability. Hence, piloting before the main study can help in testing the study itself to prevent users from giving incorrect results (Schade, 2015).

<u>During the Pilot session</u>

The team initially test-run the session as a real experiment and found out that there were noticeable changes that needs to be done before the actual test.

- The estimated time of the session run-through was one hour approximately including the time to perform the research user tasks. The tasks which took an average time than expected were to request/host a carpool and add a card payment method. Therefore, it is crucial to prioritize tasks such as requesting/hosting a carpool depending on the user as this takes a long time and initiates the next flow of the application.
- The online session will take extra time than the expected time as we noticed that the expected time to complete the tasks physically itself takes approximately more than 1 hour.

The round 1 session will be conducted online and round 2 will be carried out in person, therefore the requirements that will be needed will vary. For the online session, the types of equipment needed are a facilitator's laptop, a platform that allows one to record the session (such as Zoom, teams), a Figma link to the prototypes, a task sheet, a participant's laptop, and a good internet connection. For the in-person session, the equipment required will be the same as online along with a Wi-Fi-router, stopwatch, and recorder to record the session. *Performing in-person usability testing is helpful as we can get the participants to perform the think-aloud method and we can judge their attitudinal and body language for each task.*

- Check to see if the task sheet covers all the necessary system aspects and user aspects of the application. And it was evident that it provides clear data about what we have to improve on the application (Schade, 2015). A few tweaks were done during the pilot session to make the task script more advanced. The team made sure to include questions to get feedback on the overall design (layouts) of the interfaces.
- The task scenarios described to the participants were precise and simple which helped them to complete the task on their own without assistance. Hence, tasks were not misleading which in turn reduced the time spend on reading out the tasks to the

participants and this clarified that the main study would go smoothly producing strong results.

- Finally, the recruitment of the correct set of users that **match your target profile/personas** for pilot studies helps to get meaningful feedback about the study or the prototype being tested. But solely carrying out the pilot study with the team is also enough to notice any problems, which was what was done.

Successful pilot testing helps fine-tune the study methodology and can lead to more accurate results in the final experiment. Therefore, this stage in usability testing helped the team in identifying errors and correcting them before conducting the usability testing procedure.

3.3 Experimental Data Collection

Simulated experimental data collection is an advanced method of gathering data from user research studies. To create a top-notch user experience, it's crucial to have a deep understanding of your users, their needs, and their motivations (Veal 2022). User research is an effective way to explore how your target audience interacts with your system. However, it's essential to ask the right questions to get the most out of your research (Veal 2022). Poorly designed questions can compromise the usefulness of your usability testing sessions and steer your system development in the wrong direction (Veal 2022). The right user experience testing questions can provide valuable insights and lead to developing a more desirable high-fidelity prototype.

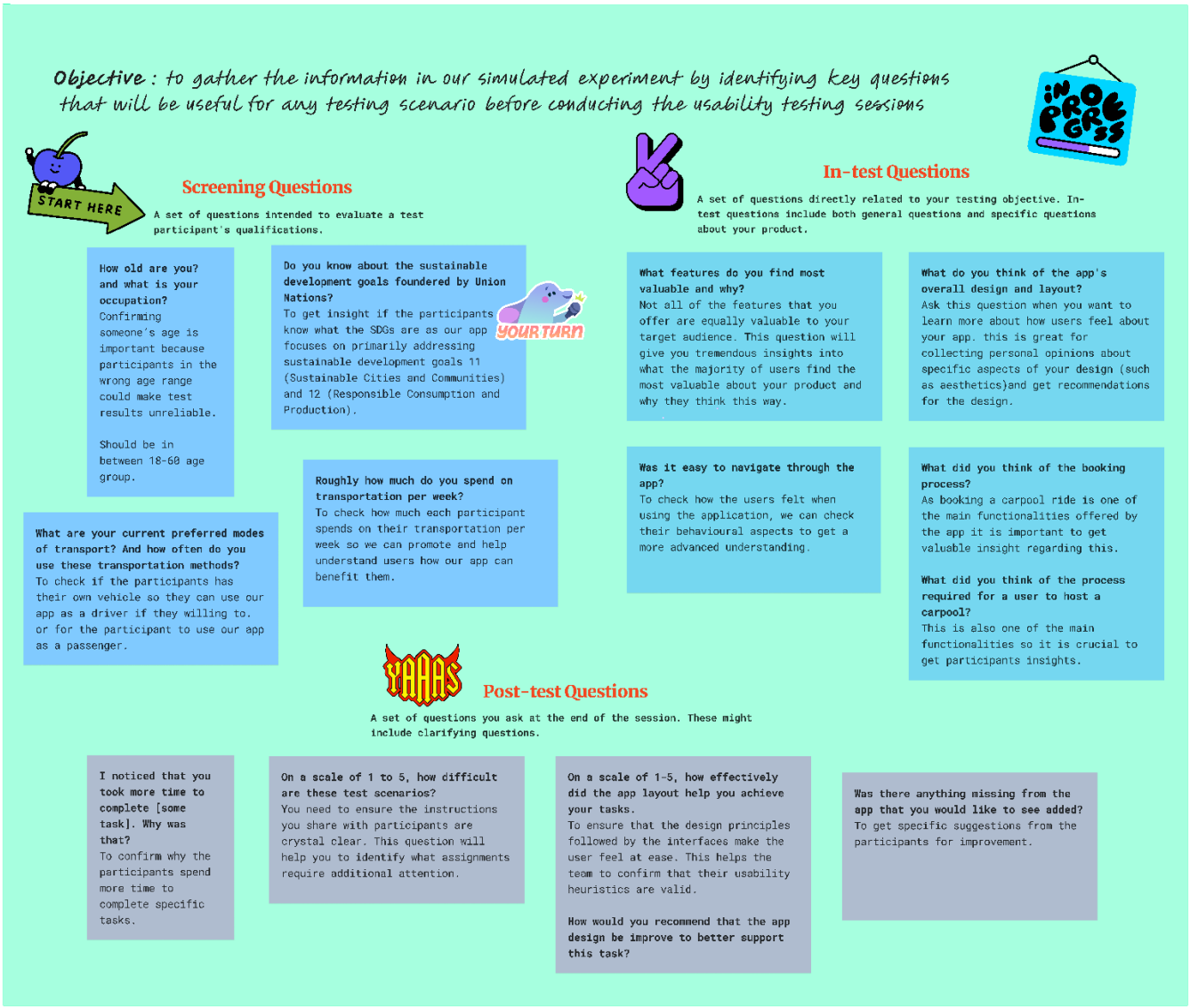


Figure 21: Experimental data collection

We aim to gather the information in our simulated experiment as brainstormed below by identifying key questions that will be useful for any testing scenario before conducting the usability testing sessions (Veal 2022). These questions are divided into three main categories for user testing which are **Screening questions**, **in-test questions**, and **post-test questions** allowing us to better understand our users' behaviours and preferences (Babich 2021).

The users were asked to perform a think-aloud mechanism where they verbalized their thoughts and emotions and some of the sessions were recorded with the participant's consent.

1. Screening questions

The first step in user testing is to find people who represent your target audience, which could be your current or potential users. We set a standard for the ideal participant and evaluated all the candidates based on that. During the screening process, we asked questions to understand the demographics and experience of the candidates.

- How old are you?

It is crucial to confirm the age of the participants because having individuals outside the desired age range may compromise the reliability of the test results. Our demographic should be between the range of 18-60.

- What's your current state of employment?

To check if the participants have their own vehicle so they can use our app as a driver if they are willing to. or for the participant to use our app as a passenger. With an idea of their daily commute, we can gain insight into their daily transportation lifestyle.

- How often during the week do you use public transport?

To check how much each participant spends on their transportation per week so we can promote and help users understand how our app can benefit them by having an idea about how much it cost them weekly for transportation.

- Roughly how much do you spend on transportation per week?

To check how much each participant spends on their transportation per week so we can promote and help users understand how our app can benefit them by having an idea about how much it cost them weekly for transportation.

- How familiar are you with downloading applications from Play Store, App Store etc?

The answer will determine which devices (desktop, tablet, mobile) users are most comfortable using. Our participants should be familiar with downloading apps from the App Store.

- Do you use any ride-hailing, or car-pooling applications on your smartphone? If you have, how do you rate your experience?

To get an idea about how familiar participants are with the product. If they have used the app's competitors before and check what emotions, they faced during the experience.

- How comfortable would you feel using a car-pool with strangers?

To check how enthusiastic participants are regarding the new concept of hitch-hiking a ride with strangers.

- How up to date are you with the United Nations' sustainable development goals?

To get insight if the participants know what the SDGs are as our app focuses on primarily addressing sustainable development goals 11 (Sustainable Cities and Communities) and 12 (Responsible Consumption and Production).

2. In-test questions

By using these user testing questions, we gain significant insights into how users behave when interacting with our product. During this phase, participants are allowed to engage with the product while their interactions are observed, and relevant questions are asked. The goal is to collect data that helps explain user behaviours.

- What features do you find most valuable and why?

This inquiry will provide the team with a wealth of information on what most of the people value most about your product and the reasons behind their perceptions.

- What do you think of the app's overall design and layout?

When you want to find out more about how consumers feel about your app, pose this question. This is excellent for gathering individual viewpoints about elements of your design (such as aesthetics) and receiving design recommendations.

- Was it easy to navigate through the app?

To check how the users felt when using the application, we can check their behavioural aspects to get a more advanced understanding.

- What did you think of the booking process?

As booking a carpool ride is one of the main functionalities offered by the app it is important to get valuable insight regarding this.

- What did you think of the process required for a user to host a carpool?

This is also one of the main functionalities, so it is crucial to get participants' insights.

- Were there any features or functionalities that you found confusing or difficult to use?

To get reasons why the users faced these issues and what functionalities they found confusing and how can we improve this.

- Were you able to quickly find the information you were looking for?

To get insights into what users found easy to find within the app.

- What did you think of our community interfaces and their functionalities?

To get insight into the community forums and other functionalities it offers this question can help broadly.

- Did you think there were enough options to customize your ride preferences? If not, can you suggest a few?

We have share trip details, options that riders can choose from before the ride to customize their experience with the driver, and a dark theme offered. We want to know if users liked these options and if they were enough, so they can recommend more if they like.

- I noticed you [did something]. Why?

This question comes from observation during the test. It's an ideal question for the situation when a Testing moderator notices some interesting user behaviours and wants to know the rationale behind it. The answer will help you reveal the motivations behind user actions.

- Overall, this task was…”

- Extremely difficult (5)

- Difficult (4)

- Neither easy nor difficult (3)

- Easy (2)

- Extremely easy (1)

The in-test questions differ according to the 6 tasks that were accomplished during usability testing.

3. Post-test questions

To get more unique viewpoints we ask the participants about their overview regarding the Caraoke app.

- How would you rate the tasks that were presented to you in today’s session? (1 = extremely easy, 5 = exceedingly difficult)

It's important to make sure that the instructions given to participants are clear and easy to understand. This question is designed to identify any tasks that may need further clarification or attention to ensure that participants can complete them accurately.

- On a scale of 1-5, how effectively did the app layout help you achieve your tasks?

To ensure that the design principles followed by the interfaces make the user feel at ease. This helps the team to confirm that their usability heuristics are valid.

- How does your experience with using Caraoke compare to other ride-hailing/sharing applications you’re currently using?

- Overall, I would rate the user-friendliness of Caraoke as:
    - Worst imaginable
    - Awful
    - Poor
    - OK
    - Good

- Excellent
- Best imaginable

To get specific suggestions from the participants for user-friendliness.

- What adjectives would you use to describe the Caraoke application to someone?
- Would you recommend this product to a friend or colleague? If not, why?
- What was your favourite aspect of the product?
- What was the most confusing part of the test?
- If you could change one thing about Caraoke, what would it be and why?
- Would you be interested in using this product after its release?
- Anything else you'd like to add before we wrap this session up?

The above questions help the team learn about how users feel about our Caraoke App. Open-ended questions are great for collecting individual opinions concerning specific aspects of our design, while close-ended questions are equally important to gather specific information. With these experimental questions, we can conclude what kind of approach is needed to execute our tweaking process for the high-fidelity prototypes increasing our user experience.

3.4 Analysis of Usability Testing Report

The analysis of the usability testing report involves examining the findings and observations from the testing sessions to gain insights into the usability of the ride-sharing app. Examine the job completion rates to ascertain how well the app assists users in achieving their intended objectives. Analyse the number and kinds of mistakes that participants made during the testing sessions. Analyse the participant comments and qualitative feedback from the testing sessions. Review the audio recordings of the "think-aloud" sessions where users discussed their ideas and impressions while using the app. Examine the responses to the post-task questions that the participants answered. Analyses specific suggestions for enhancing the usability of the app based on the findings. The team may learn about the advantages and disadvantages of the usability of the ride-sharing app by carefully analysing the usability testing report.

The link to the usability testing report is available below where this report is written analysing all the relevant sections. This analysis is written in a different report because a few sections of the analysis report template consist of some repeating sections with the main report and attaching the usability testing report as a separate report expands the readability and easiness.

The link to the Analysis of the usability testing report.

The link to the pdf document of the usability analysis report.

4 Final High-Fidelity Prototype Design

After analysing the results from the test, the team got together and made a copy of the high-fidelity prototypes, and the team performed design improvements according to the information gathered.

Link to the initial high-fidelity prototypes.

Link to the refined final high-fidelity prototypes.

A few of the high-fidelity prototype tweaking are shown below, the rest can be viewed by the link provided above.

1. The community button on top of the rider-driver map screens was confusing. So, this was changed to a more appropriate icon, and the users agreed that this icon was much better during A/B testing.

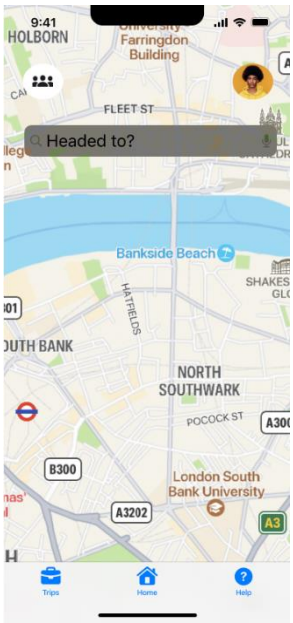


Figure 22: Refined - Community icon

2. The add card option on the wallet has complained to be confusing as users thought it was to add a new user account because the plus button was directly in front of the username. So, we added the button next to the cards.

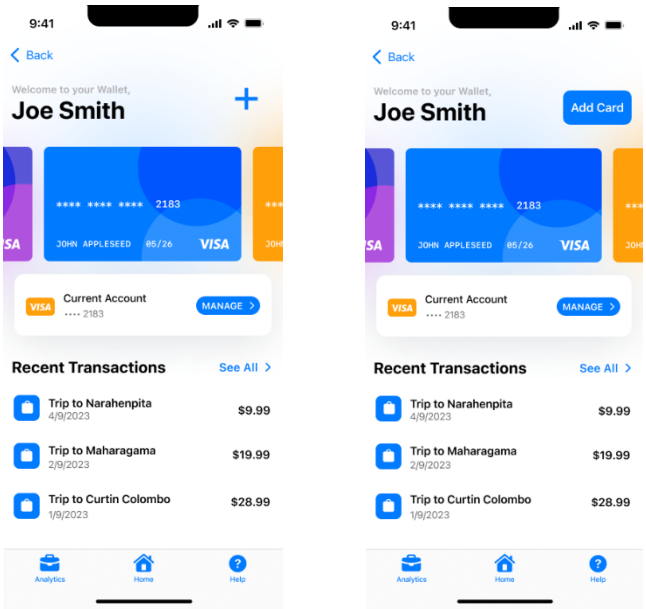


Figure 23: Figure 23: Refined - Wallet + icon changed to add button.

An alternative instead of using SOS as text to show the SOS button (as we analysed that people have a challenging time figuring it out). The SOS button was changed to 911 which is the hotline used for an emergency contact. This is common sense and users will not have a challenging time figuring this out.

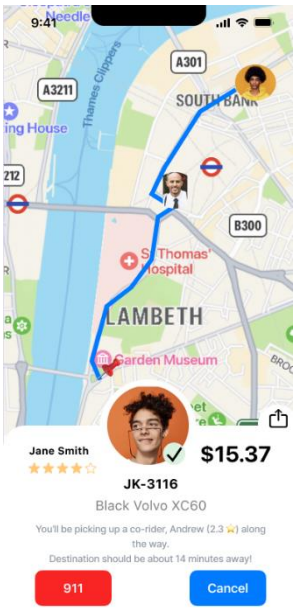


Figure 24: Refined - SOS changed to 911.

3. When users go from Rider-Map- Ride in Progress screen to Ride Cancellation page the button's colours changes where the No button was represented by blue and the Yes with red. One of our participants explained that older people and any users build a sort of muscle memory of the colours and what they represent. They might end up accidentally cancelling the trip because the buttons switched sides suddenly. Hence, this is bad for business and frustrates the users.

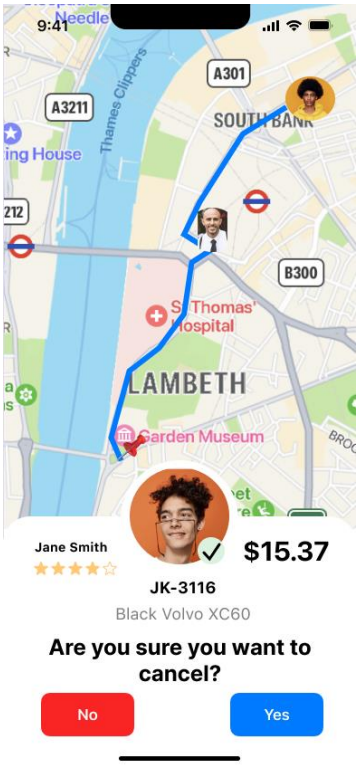


Figure 25: Refined - No button colour changed to red.

For the language preference screen users said to stick to one button colour. The preferred was blue with white text. This was done to make the high-fidelity more user-friendly and easier for the eyes.

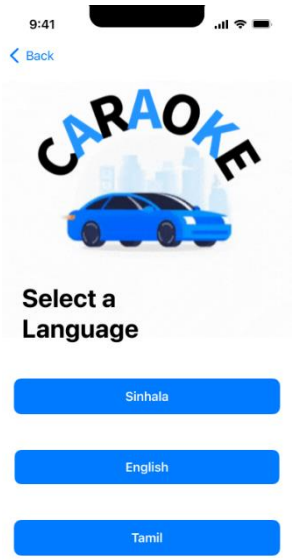


Figure 26: Refined - Button colours and text maintained.

4. The confirm payment button provided at the end of the ride on the driver's side confused users a bit - because for a moment they thought it was for payment instead of confirming the payment. This helps to improve readability and understandability for the users of the Caraoke app.

Figure 27: Refined - add a got it button

5. The users Could not find the search bar on the Driver-Map Page. They analysed that the text box was too dark, and the text is not visible enough.

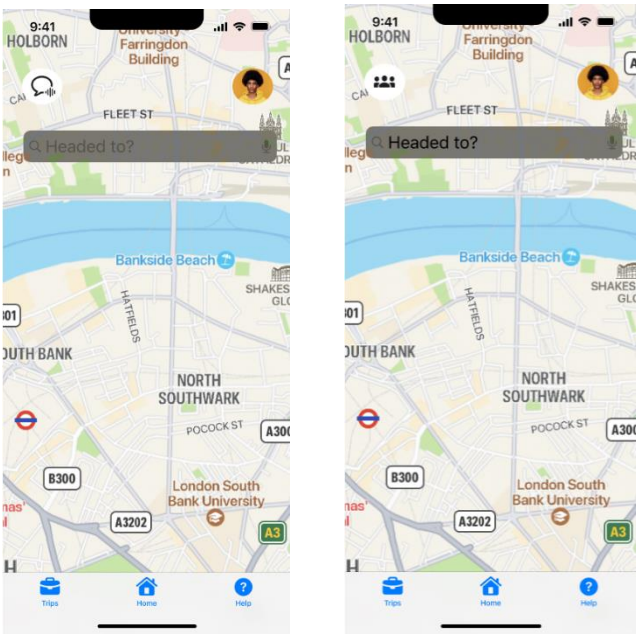
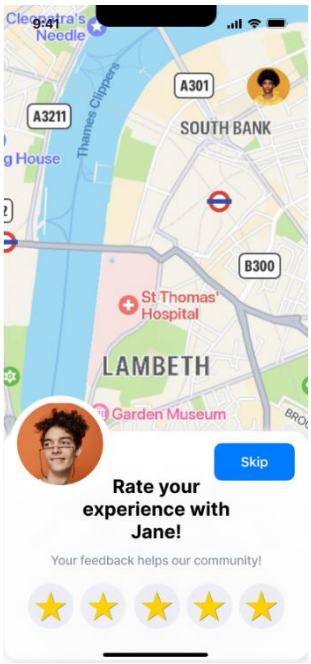


Figure 28: Refined - Text colour contrast changed.

The text is too light, as shown on the left side. This is extremely hard for older people and colour-blind people to figure out. Hence, the text was concluded to have a much darker contrast.

6. The users predicted that they must consider adding a "skip" or "remind me later" option to the rating screen after a ride because this can be inconvenient and frustrating to users. Therefore, having a button to skip is more flexible for the users.



The users find this more standard and flexible because office workers who are in a hurry during rush hours can be annoyed by having to rate the driver to do other functionalities.

Figure 29: Refined – Skip button added in rating system.

7. The rating for the experience of the ride provided starts and what each of these starts presented by emotion is also provided, so users can more easily tell us how they feel. The participants wanted us to keep both the emoji-based rating and the star-based rating system.

   Providing an emoji-based rating system is crucial to get significant feedback regarding the app from users.

   However, users suggested including both the rating system and emoji-based rating to increase user experience.

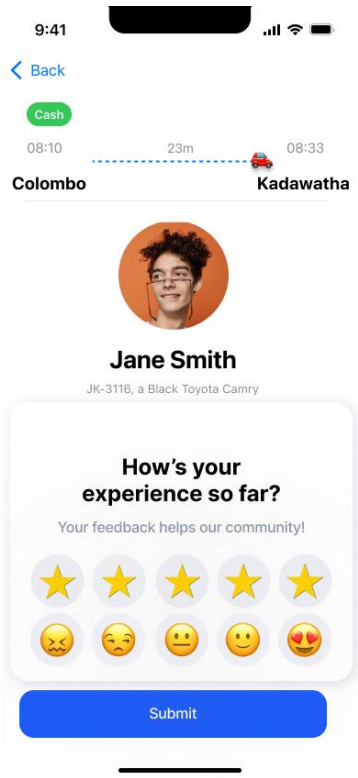


Figure 30: Refined - emoji-based and star-based rating system

8. A few of the prototyping issues were refined accordingly to the user's preference for easiness such as the back button of the sign-up page should redirect back to the login page because the user could accidentally press signup on the login page. Hence, they need this option to get back to the correct page. Another example: use Automatic Transitioning between "Headed North for 100m" Screen and the "We found someone" screen.

In this section only the most noticeable changes are mentioned, therefore, to assess the other changes please check our refined final high-fidelity prototype link. However, from the A/B testing results we only ensured that the community icon, language selection button and the driver search bar to be changed as 88% of the participants agreed that their corresponding new interfaces was more impactful than V1. Furthermore, 98% of the participants loved the idea of hitch-hiking rides with strangers particularly because this application lets users obtain user analytics regarding the amount of carbon emission reduced every week, month, and day by using the app. The participants also mentioned that they feel a sense of fulfilment when the number goes up, encouraging them to continue using the application. The same participants also

concluded that they loved the fact that users are rewarded based on their carbon emissions saved.

5 Handoff Report

The handoff report has presented the general design principles and guidelines, layout, high fidelity interaction with the initial and final, components that have been covered through use case diagrams and full system diagrams, user case stories, typeface guidelines, and other things. It also includes the icons and graphics colour palettes of the prototypes. The handoff report also consists of the gif/animation, interactions, and gestures. Furthermore, it includes the link to the new high-fidelity prototypes which can be accessed on a mobile device or laptop. The handoff report is written in a different Word document to increase readability.

The link to the hand-off report.

The link to the pdf document of the hand-off report.

6 Posters

6.1 Conference Poster

The conference poster created showcases the design thinking process we went through to develop our final prototype. It includes critical components, such as user research (including surveys and persona development), ideation on pain points and potential solutions, as well as key functional and non-functional requirements. Our poster highlights the evolution of our prototype from low to high fidelity, including decisions made and ideas accepted or rejected. It also emphasizes our adherence to design principles and heuristics to ensure our final product meets the highest standards of usability and user experience.

AO-Conference poster link.

6.2 Advertising Poster

The advertisement poster created for the Caraoke App is a highly effective, versatile, and affordable way to reach and engage with the desired target audience and achieve a variety of campaign objectives that align with the goals of the business and development goals (Kumar 2022). People's purchasing decisions are heavily influenced by emotion hence the poster shown

below radiates this aspect to the target audience. The 4k pdf format of the poster can be acquired from the below link.

4k-Advertising poster link.

7 Project Management

Pramoda Gunarathne was our project manager, and she made sure that the assignment 2 tasks were divided and accomplished perfectly without any issues. Primarily, the planning for usability testing was completed by the team during the last week of May. The usability testing dashboard, facilitator's script, task scenarios, task script, defining the research goals, experimental data collection, identifying participants, and experimental setup were all brainstormed and finished by 13th of the May. The piloting section was accomplished on the 13th of May after conducting the session online with the team, where the team evaluated the tasks and tweaked the script as needed. The Google survey was conducted during the Pain points week submission from the 17th to the 21st of April from assignment 1. The data analysis which was done during the 2nd week of May before the 13th of May helped the team analyse the target audience and acquire participants for the demographic user group meeting the relevant criteria.

The usability testing round 1 (remote session) was carried out on the 15th of May with the group_SLIIT_10 via google meet. The next week was usability testing round 2 where the first physical session was carried out on the 22nd of May with the industry expert, Mudara Bandaranayake. On the 24th of May, each of the 4 participants was interviewed physically in Nawan Mawatha Colombo 2, where the first 2 participants were interviewed with all four team members but as time was running out, the team members decided to conduct the last two tests simultaneously. Hence, Pramoda and Kasundi interviewed Odara Chandrasena with Kasundi being the facilitator while correspondingly Sahas and Sanugi were interviewing Umendra Weerawansa with Sanugi being the facilitator. Pramoda and Sahas was acquiring the roles of data logger, testing moderator, and tech support during the last session of the evening.

The interview that was conducted online was done on a timeline of the week 03rd in May therefore, this was our first initial interview conducted to get the necessary observation. During the final high-fidelity prototype refinement, each team member made sure the interfaces covered the desired aspect of the functionality followed the test participant's answer analysis. More usability testing was conducted respectively as mentioned above was carried out on the 3rd

week of May for the tweaking of high-fidelity prototypes which helped immersivity for the team to finalize the design principles and move forward with the final iteration. Our main purpose was to make sure that the design solutions were in accordance with the participant's objectives and requirements.

7.1 Meetings

Before the meeting sessions began, we established precise agendas to avoid moving away from the purpose of the meeting. We had our meetings on the Google Meet platform and collaborated on google docs at times to distribute our contribution to the task script, and analysis of the usability report (The links to these google docs will be linked under Appendix D). The meetings that were conducted were associated with every team member being present. Our weekly process was discussed in online team meetings, where we would discuss our agenda for the next week which will help us to complete assignments 2 and 3. These kinds of productive meeting management improved goal setting and project-management skills. Furthermore, weekly meetings and keeping the team up to date on a loop increased the synergy of the group and helped us in the long run.

In terms of frequency, we held weekly meetings for 4 weeks during the assignment 2 time period. Before conducting usability testing, the team conducted a team meeting to finalize the content of the task script and took part in a piloting session to make sure that task scenarios and the rest of the environment were valid before the actual testing session. These meetings are crucial to avoid any confusion between the users. Subsequently, any issues and frustrations within the team can be prevented in these weekly meetings.

The usability testing period was achieved smoothly without any issues for 2 weeks and this was conducted online for the 1st week and physically for the 2nd week, to acquire a more in-depth analysis of the interfaces. We used a project management tool known as Jira, which incorporates confluence, where most of our knowledge-sharing and collaborations took place (The links will be available in Appendix D).

7.2 Risk Management

As this project requires two functionality-based interfaces that is Passenger and Driver POV, it is hard to complete both POVs for usability testing. This application was solely developed to address sustainable development goals 11 and 12 but it would be quite hard to successfully maximize the goals in the real world concerning the prevention of carbon emissions as increasing the user base for the Caraoke App can be unyielding.

The following risks can be considered with ways to avoid this risk:

Identifying pressing needs to identify the target audience – It is essential to have proper engagement with the associated use base otherwise approaching them again for usability testing can be hard as they can ignore or forget which can negatively affect the user experience of the app. Selecting the perfect target audience is important and this should be achieved by analysing the survey results obtained from assignment 1 accurately with the team. These were discussed in the first team meeting on the 5th of May. The responses were analysed and the potential end-to-end users (5 out of the 16 responses) were approached formally where they were asked to be involved in the usability testing of the Caraoke app. However, selecting only a limited number of participants is not accurate enough because we must make sure every aspect of the prototypes was tested with a wide variety of user personas that match our system.

The testing method didn't achieve the best results that are useful for usability testing – Both qualitative and quantitative usability testing have their own benefits. Selecting the best one depends on the research goals. Qualitative testing emphasizes gathering subjective feedback and insights from users. It aims to understand their experiences, attitudes, and perceptions, while Quantitative testing emphasizes collecting measurable data and statistical analysis to evaluate the performance and efficiency of a system. It focuses on objective metrics and numerical results. In practice, a blend of qualitative and quantitative techniques can offer a thorough comprehension of the usefulness of ride-sharing apps. Quantitative testing can be used to collect more statistical data for validation and performance evaluation after qualitative testing to identify user insights and pain areas.

Risk of not testing driver POV in usability testing – The risk is high because almost all the participants wanted to test the prototypes in the rider's POV. This can lead to the incompetent gathering of analysis from the driver's POV. This can be utilized by making sure a few of the

participants perform specific tasks from the driver's POV to achieve enough data to analyse the usability of the driver's POV interfaces.

Risk of having more competitors in the industry – As carpooling is not a new concept it is hard to be 100% unique regarding our end achievement. With successful competitors in the industry such as Uber (which has a user base of more than a 500Million+) there is a higher risk of losing marketing space in the industry to attract customers they will be biased with the current competitors available (SLIIT_12_Assignment01 2023). This can be avoided by attracting users not with only a carpooling experience but using the main aspect of reducing carbon emissions to the environment by having a smaller number of vehicles. However, by using the correct perspective aspects we can build a livelier application that meets the purpose of addressing sustainable development goals such as 11 and 12 (SLIIT_12_Assignment01 2023).

7.3 Milestones

The milestones for assignment 2 from the 26th of April to the 28th of May were covered as shown below:

Date	**Milestone**
April 26th – 30th	Brainstorming for usability testing plan
May 1st – 5th	Worksheets 07 and 08
May 5th	Team meeting (analysing the survey results to obtain participants, dividing work & brainstormed)
May 5th – 8th	Usability testing plan, defining research goals, experimental setup, participants, facilitators. Upload worksheet 09.
May 9th – 13th	Task Scenario and Tasks, task script, piloting, and experimental data collection. Starting conference poster.
May 13th	Team meeting - Performing piloting Session and making the necessary tweaking in the task script. Discuss the completed work and refine them together. Prepare for the online session of usability testing session.
May 14th	Completed the task sheet to be shared with the participants
May 15th	Round 1 – remote usability testing with group 10.
May 15th – 16th	Analysing the usability testing report and refining the necessary

	usability testing plan section.
May 17th to 19th	The initial start of High-fidelity prototypes, finishing off the conference poster, and starting on the advertising poster.
May 20th	Team meeting - arranging everything for the industry expert review interview, starting with fidelity prototyping and divide tweaking.
May 21st	Uploading conference poster
May 22nd	Round 2 in-person - Industry expert review interview
May 23rd	Analysing the results and preparing for round 2 of the physical session with the 4 participants that will be on the 24th.
May 24th	Conducting the final round 2 of usability testing with the 4 participants.
May 22nd – 26th	Advertising poster and high-fidelity refinement
May 24th – 28th	Analysis of the usability testing report and starting handoff report
May 26th	Team meeting - finalizing the high-fidelity prototyping and handoff report.
May 27th	Project management and finalizing the final usability report
May 28th	Submission of the adverting poster, usability testing report which concludes the usability testing plan, handoff report, and analysis of the usability data.

7.4 Problems Encountered

There were no significant issues that affected the project deeply. However, during the interviews and usability sessions, the participants were hesitant to be recorded in the online session and few physical sessions, therefore we only had the right to write meeting minutes. Round 2 of the in-person session that was carried out on the 24th was divided into 4 sessions. The first 2 sessions were carried out with all four members involved but due to time constraints, the last two sessions were simultaneously completed to save time. This can result in the consistent gathering of information as only one team member will be monitoring the participant's behaviours changes and log data, while the facilitator interacts with the participants.

8 Conclusion

In conclusion, the FourGUIs team aimed to thoroughly investigate the usability testing of the high-fidelity prototypes by getting the target audience, research goals, team member roles, an accurate task sheet, and a pilot session before the actual interview. The analysis of the usability results was completed to understand the in-depth actions to the participant's answers. This helped to achieve the final refinement of the final high-fidelity prototypes.

Hands-on surveys which were completed on assignment 01 were used to analyse the target participant's demography and select the target audience. The participants are aimed at a diverse group between the age group of 18-60 and above. A maximum of 9 participants were acquired to complete usability testing, providing a range of inputs from different age groups. Evaluating the effectiveness and efficiency of key features and functionalities with the target audience increases the chances of finding bugs/issues effectively. During each interview, facilitators will interact with the participant by using the task script, which consists of all the actions needed to complete the usability testing accurately. During the tests, the team collected both qualitative and quantitative data. The team ensured to remember to adapt the usability testing plan and analysis to the specific requirements and context of the Caraoke app while considering the resources and constraints available for conducting the testing and implementing the recommendations.

As Team FourGUIs, we are confident that during the past few weeks leading up to handing over Assignment 2, all members have gained a great deal of knowledge regarding Human-Computer Interaction (HCI), its significance, and utilization of good practices relating to HCI to help develop a UI/UX that is focused on enhancing capabilities of its users (abled or differently- abled) rather than hindering them and provide the amplified user-friendly version of the high-fidelity prototypes after analysing the usability testing results.

Finally, by promoting the use of Caraoke and encouraging individuals to share rides, we aim to address the environmental challenges we face today. Through our application, we aspire to create a community of environmentally conscious users who actively take part in reducing their carbon footprint and embracing sustainable transportation alternatives. In summary, Team FourGUIs is committed to using the Caraoke application to raise awareness and drive positive change in line with the United Nations' vision for sustainable development.

9 Acknowledgements

We would like to acknowledge everyone who helped us accomplish Assignments 2 and 3. We would like to extend thankful hands to Mudara Bandaranayake for contributing and sitting with us for an industry expert review on our application, and we are also thankful to Dayawansa Bandara, Vishmi Kalansooriya, Umendra Weerawansa and Odara Chandrasena who gave us valuable and insightful answers to the questions in usability testing process regarding our high-fidelity prototypes which helped us bring forward a more user-friendly version. A special thank you to the lecturer in charge, Mr. Jagath, and the instructors, Miss Divya Manatunga and Sir Praveen for giving us valuable insights throughout assignment two. Finally, a warm thank you is extended to people who contributed to our survey with their responses and group 10 for conducting an expert review of our high-fidelity prototypes which was used to analyse and refine our prototypes.

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11 Glossary

Sustainable Development Goals - The Sustainable Development Goals (SDGs) are a set of 17 global goals adopted by the United Nations in 2015 as part of the 2030 Agenda for Sustainable Development. These goals supply a comprehensive framework to address social, economic, and environmental challenges facing the world.

Think-aloud - is a method used to gather data in usability testing in product design and development, in psychology, and a range of social sciences.

Facilitator's script - In usability testing, a facilitator script refers to a document or guide used by the facilitator to conduct the testing sessions in a consistent and structured manner. The facilitator script outlines the instructions, prompts, and questions that the facilitator follows during the testing process.

Task script - A usability testing script is a list of all the steps you must do to conduct a successful test. You can prepare the usability tasks and questions in advance and evaluate them with your colleagues by using a script.

Piloting - Prior to doing the complete research, a pilot session offers the chance to test the discussion guide (and tasks if usability testing).

12 Contribution Matrix

The contribution matrix is as follows shown using the contribution table:

Section / Students	Pramoda Gunarathne	Harshi Kasundi Bandaranayake	Sahas Gunasekara	Sanugi Perera
Executive Summary				
Introduction				
Usability Testing Plan				
Define the Research Goal				
Experimental Setup				
Facilitator				
Task Scenario and Tasks				
A/B Testing				
Task Sheet				
Participants				
Piloting				
Experimental Data Collection				
Analysis of Usability Testing Report				
Final High-Fidelity Prototype				
Handoff Report				
Conference Poster				
Advertising Poster				
Project Management				
References & Glossary				
Conclusion				

Acknowledgments				
Contribution Matrix				
Appendix				
Fig-Jam				
Maintaining the Google Drive				
Meeting Minutes				
Jira Integration				

This colour stands for the work that is completed by each member.

13 Appendix

Appendix A: User Survey Responses

A Google / User survey was performed to get information regarding the user demographic and system requirements of the system. In the below section the survey questions with their responses are shown:

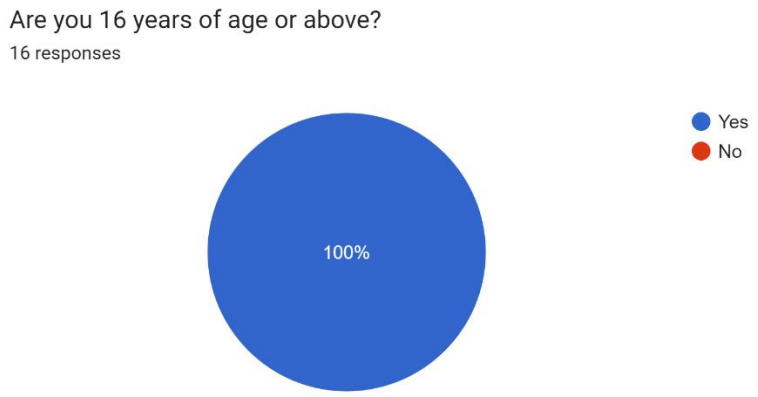
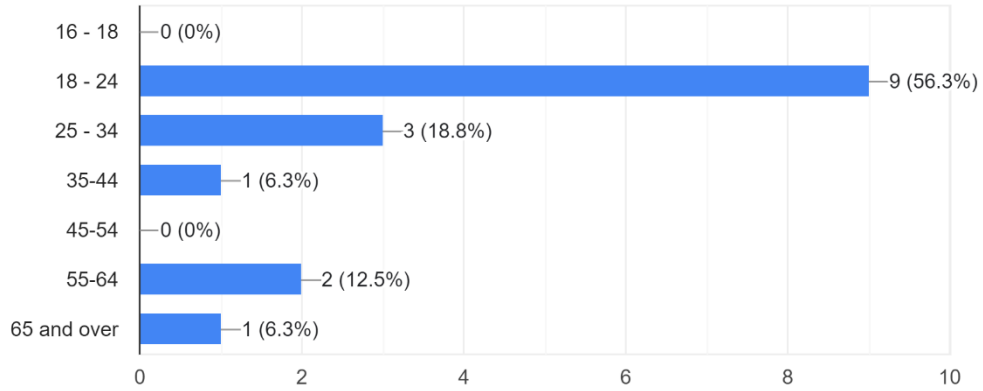


Figure 31: Survey questions and responses

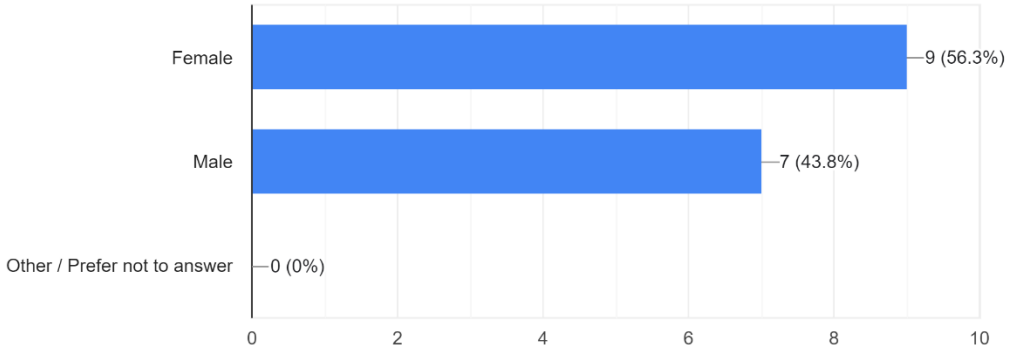
How old are you?

16 responses



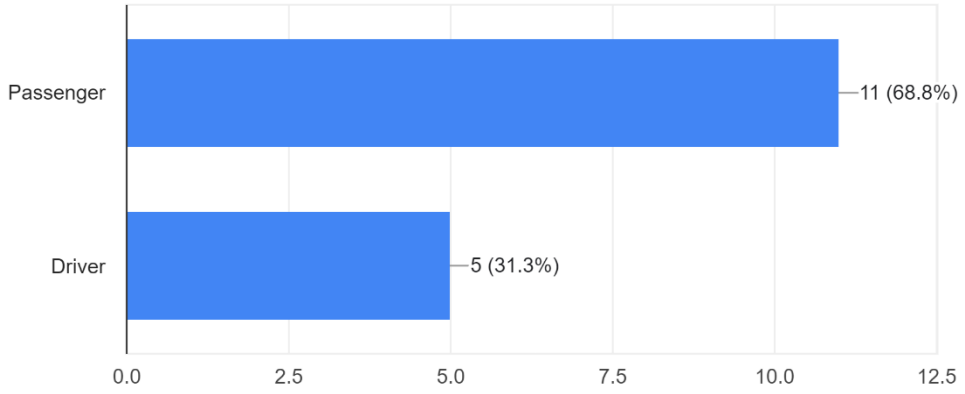
Gender

16 responses



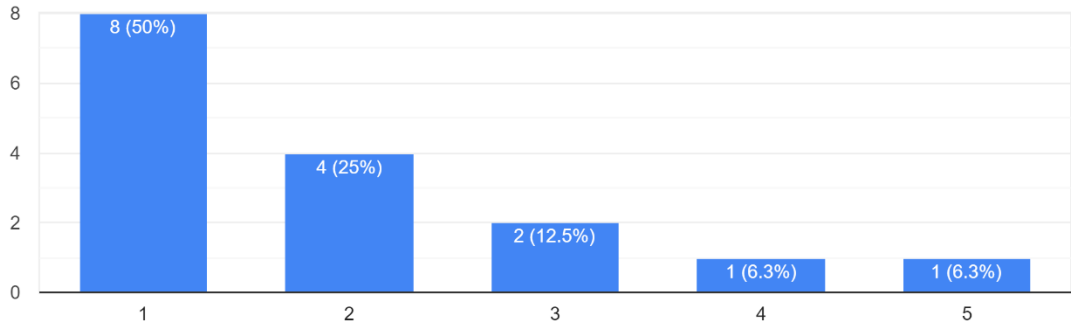
Will you be using a carpooling application primarily as a passenger (requests a carpool) or a driver (offers a carpool)?

16 responses



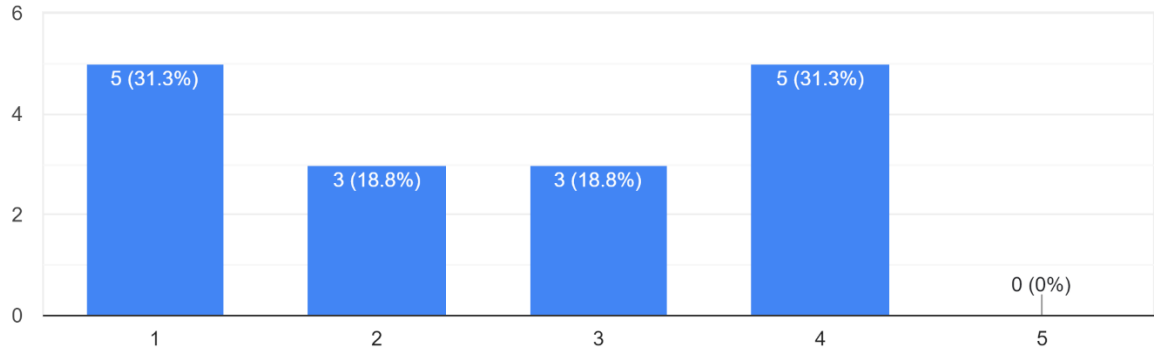
On a scale of 1 to 5, How familiar are you with ridesharing/carpooling mobile applications

16 responses



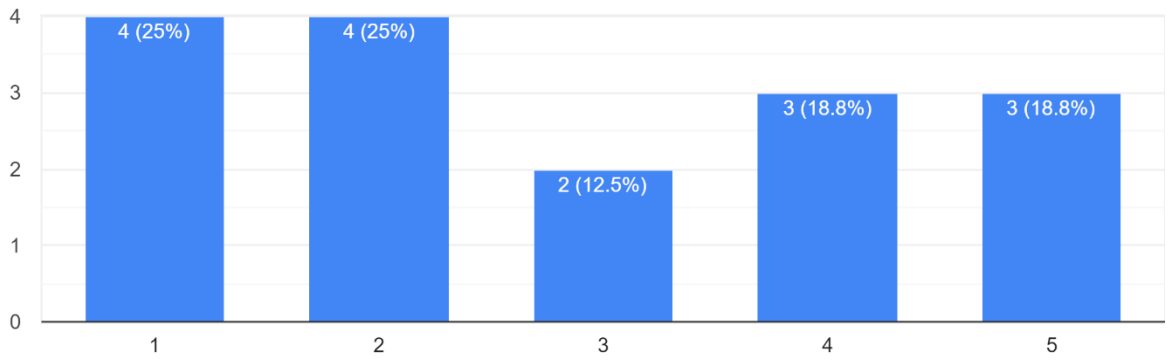
On a scale of 1 to 5, How comfortable would you be receiving a lift from /providing a lift to a stranger?

16 responses



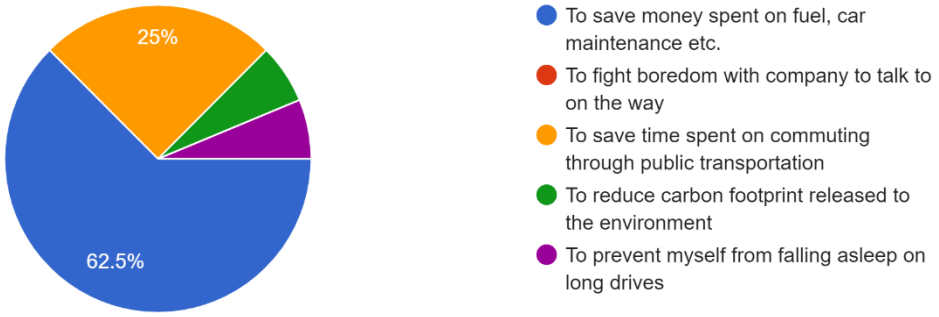
On a scale of 1 to 5, How likely would you be willing to try out a carpooling service?

16 responses



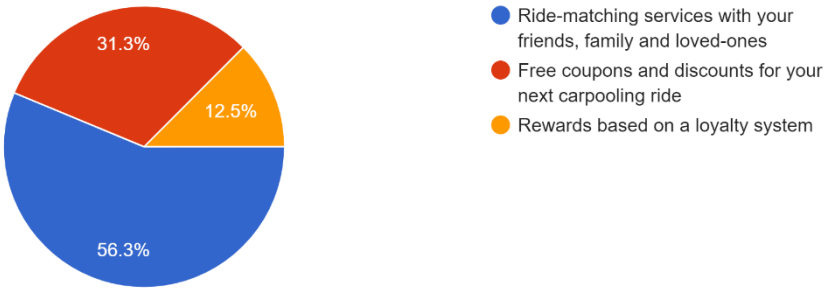
What would be your primary motivation for trying out a carpooling application?

16 responses



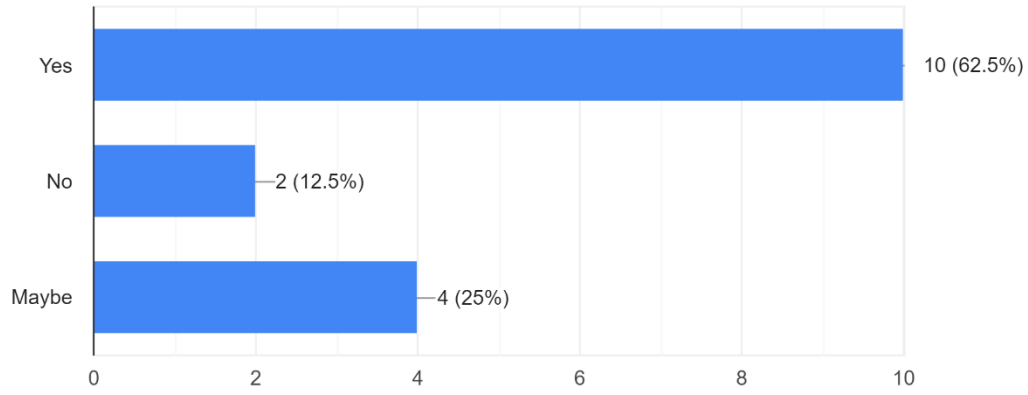
What could mostly influence your decision to carpool more frequently through a mobile application?

16 responses



Would reduced carbon footprint encourage you to use carpool?

16 responses



Have you ever had any notable negative experiences using a carpooling service? If yes, please elaborate.

11 responses

No

No

Personaly not a fan of ride sharing unless its someone I know

Have never used a carpooling service before

no

nope

Have not used previously

Taking necessary safety measures is important in a carpool to ensure a comfortable ride for everyone.

What security features are you looking for in a carpool application?

13 responses

ride sharing

A review feature for every driver and rider
A service which informs police whenever a user rings a danger alarm

The rides sharing app having full closure about the driver and all user data considered safe from the drivers end.

Emergency contact
Details of the ride and it's participants

Copy of ID of the passenger before enjoying the facility

Don't know

Driver details are correctly provided for the user to refer

Driver vehicle options available with their route details

Appendix B: ChatGPT

Nothing was referred from ChatGPT.

Appendix C: Meeting Minutes

The meeting minutes were recorded as follows on confluence:

[SP09] - 05/05/2023 (Weekly Scrum)

Meeting Objective	Weekly scrum
Date	05/05/2023
Time	6pm
Platform	☐ Physical Meeting ☑ Google Meet
Attendees Present	☑ @Pramoda Gunarathne ☑ @Kasundi Bandaranayake ☑ @Sanugi Upenya Perera ☑ @Sahas Renuja Gunasekara
Notes	The team made sure to analyse the survey responses obtained to get the target audience for our caraoke app. (age between 18 - 60 and above). @Pramoda Gunarathne divided the sections of the usability testing plan part to all the members equally which needed to be completed before the 13th of May. As the topics were finalized, brainstorming was done to get familiar with what each of us thought about how to conduct a usability testing plan. These were recorded in figjam in Usability Testing Plan . Every member participant in the brainstorming part of the usability testing plan. 8:45pm - meeting dismissed.

Figure 32: weekly scrum (05/05/23)

All the *meeting minutes* are saved in the Google folder:

FourGUI's Meeting Space - Meeting Minutes

Link: **Meeting Minutes Folder**

Appendix D: Record Keeping

The Kanban board during the last week of assignment 2:

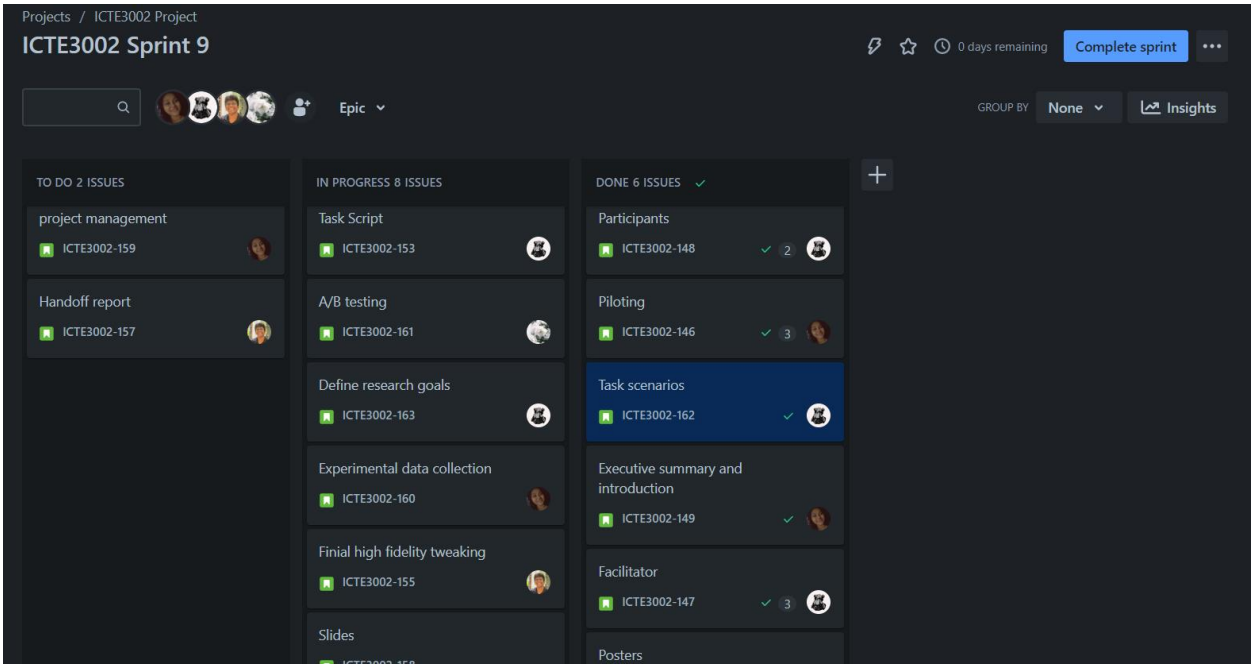


Figure 33: Kanban board

The following shows the *toggle time track* from April 26th to May 28th:

Figure 34: Toggle time

Round 1 of usability testing conducted online with group_10 on 15th of May from 3 pm to 5pm via google meet:

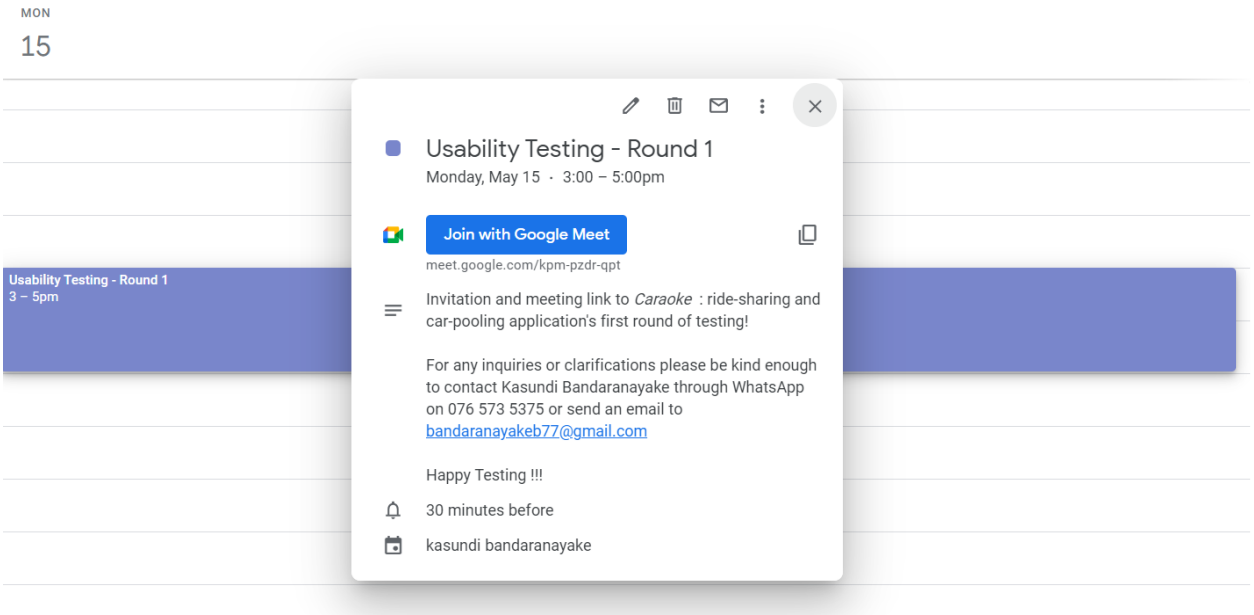


Figure 35: Usability testing - round 1 with group 10

- The following link can give access to the *google docs* which were used for assignment 2 such as the handoff report, analysis usability testing report, and task script:

FourGUI's Google Documents - Collaboration Work

Link: **Google Docs - Collaboration Work**

- The following link can be used to gain access to the collaboration workspace (Confluence) where every member completed their work for assignment 2 collaboratively:

FourGUI's Confluence Workspace - Collaboration Work

Link: **Confluence Workspace - Collaboration Work**

Appendix E: Other teamwork evidence

- Link to the Google Form (Access is provided to view responses to the survey): Survey Link
- Results of the survey (Screenshots attached) - Survey Results - Google Drive
- Link to the recordings of the interviews conducted for usability testing – Usability testing recordings

- Link to the pdf formats of the usability report, hand-off report, facilitator's script, task script, and more – pdf format of the reports
- Link to the research participation agreements signed by the interviewers – research participation agreement
- Link to the individual toggle reports of each member (for assignment 2&3 timeline i.e. 26th of April to 28th of May) – Individual toggle reports

Appendix F: Figma Files

- Link to the Weekly Figjam board – Caraoke FigJam
- Link to the Design Thinking Figjam board – Design Thinking FigJam
- Link to the Usability Testing Plan Figjam board – Usability Testing Plan Figjam
- Figma link to the first iteration of high-fidelity prototypes – initial prototypes
- Figma link to the final iteration of the high-fidelity prototypes – final prototypes