



CST3180

User Experience (UX) Design

Coursework 1

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1. Problem Definition

1.1. Background

The public transport system in Mauritius is essential for daily travel, with many relying on buses, metro and taxis to get around. However, the lack of accurate, real-time transport information creates significant challenges for people, leading to long wait times, missed buses or metro and dissatisfaction. While some transport apps such as Mobiss, exist, they often fail due to technical issues, no updates, limited functionality and inaccurate data.

In Mauritius, no app provides a comprehensive solution like Citymapper, which offers real-time updates, multi-model journey planning, and route optimization. The current situation highlights the need for a user-friendly application tailored to people's specific challenges while using public transport.

1.2. Existing Solutions and Identified Gaps

While some transport apps exist, they fail to address critical user needs:

Reasons	Explanation
1. Inaccurate and Missing Information	Apps like Mobiss often provide inaccurate bus timings and route data, leading users to experience delays and missed buses.
2. Unreliable Performance	Mobiss and similar apps are frequently reported to have bugs and crashes creating a poor experience and reducing trust in the app's reliability
3. Limited Features	Unlike Citymapper and Google Maps, local apps do not offer key features such as real-time tracking, and integration of multiple transport options which are essential for planning trips.
4. Lack of Multi-Model Integration	Many users need to switch between buses, metro and taxis, but existing apps do not offer seamless journey planning across different transport modes.
5. Poor User Interface and Experience	The interfaces of existing apps are outdated and unintuitive, making it hard for users to plan trips effectively.

Table 1 - Existing Solution and identified gaps

1.3. Problem Solving

There is a clear need for comprehensive and reliable transport app in Mauritius to address these issues. MauTransport aims to offer accurate, real-time updates for buses, metro and taxis, ensuring that users have information they need at their fingertips. The app will integrate multiple transport modes allowing people to plan their trips efficiently. Additionally, it will focus on user experience, providing a simple and intuitive interface that cater to both novice users and experienced users. MauTransport has the potential to transform how people navigate public transportation in Mauritius, improving both efficiency and user satisfaction.

2. Expert Evaluation of an Existing Similar System

Citymapper, launched in 2011, is an urban navigation app available on IOS and Android, designed to simplify public transit by providing real-time updates across multiple travel modes, including buses, train, trams, and bicycles (Citymapper, 2023). Operating in major cities worldwide, Citymapper sets a high standard with its streamlined, multi-model support for efficient urban travel. For Mauritius, where public transport is widely used yet lacks comprehensive digital support, Citymapper's model is ideal. The Mauritian market would benefit from an integrated app to address local gaps in travel information, reduce missed connections, and manage unpredictable schedules. Current apps like mobiss have faced issues such as technical instability and inaccurate data, underscoring the need for a reliable, localized solution.

In this coursework, Citymapper will serve as our secondary research example, and this heuristic evaluation will apply Nielsen Norman's 10 usability heuristics to assess Citymapper's features, identifying strengths and potential adaptations to create a locally optimised app for Mauritius.

1. **Visibility of System Status;** Ideally, systems should constantly keep users informed about what is going on by providing suitable feedback in a timely manner (Harley, 2018)

Loading Page: When the user touches the login button, the system clearly displays a loading indicator to let them know their action is being processed. This effectively applies the visibility of system status (Fig. 1).

Settings Page: The settings page is well-organised, with clear visibility of distinct functions, allowing users to immediately know what actions they can perform (Fig. 8).

Violation: On the bus and train selection displays; when users receive real-time updates, the system might better describe the route they should follow to minimise misunderstanding. This is a partial violation of the heuristic, as more comprehensive instruction is required to increase usability (Fig. 16,17).

2. **Match Between System and the Real World;** The system should be designed to be user-friendly, using familiar terms and phrases, and following real-world conventions to ensure a natural and logical order of information (Kaley, 2018).

Login Page: There is a partial violation here since the login page lacks icons often associated with logging in, such as user or key symbols. Including them would make the system more accessible to users (Fig. 2).

Settings Page: The system employs recognisable symbols that correspond to real-world

expectations (e.g., gear icons for settings), making it simple for users to comprehend the function of each feature (Fig. 8, 9, 10). There were no violations identified here.

Bus, Train, Tram, and Map Display: These features employ worldwide transport symbol norms, such as bus and train iconography, to make them more user-friendly. However, better comments or explanations would enhance the user experience while perusing travel alternatives. Furthermore, the maps have recognised symbols such as rail lines and station names, allowing users to compare the digital map to its real-world counterpart. While the match is generally effective, adding interactive map elements might improve this battle (Fig. 14, 15, 17, 19, 20, 21).

3. **User Control and Freedom;** Users frequently mistakenly select system functions, necessitating a clear "emergency exit" to exit unwanted states without lengthy dialogue. Supports undo and redo (Rosala, 2020).

Loading, Login, Logout, Sign Up, Setting, Bus, Train, Tram and Main Page: Users may easily depart all the pages, giving them control over navigation without feeling trapped (Figs. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17).

Settings Page: The settings page allows users to simply quit, but it lacks the ability to cancel critical changes, such as logging out. This is a partial violation since confirmation dialogues can improve user control by preventing unintended actions (Fig. 8).

Bus, Train, Tram, and Map Display: Users have complete flexibility and freedom when switching between routes and modes of transportation. However, with static maps, users cannot zoom or toggle, restricting their capacity to investigate routes in depth, which partly contradicts this heuristic (Fig. 14, 15, 17, 19, 20, 21).

4. **Consistency and Standards;** Users should adhere to platform and industry conventions to avoid confusion about the meaning of different words, situations, or actions (Krause, 2021).

Loading, Login, Sign Up and Sign Out Page: The program employs similar colours and iconography, such as green buttons, throughout its many parts, making it familiar to users (Figs. 1, 2, 5, 6).

Settings Page: The settings page has the same structure and iconography as the rest of the app, so users understand what to expect and how to interact with it. There are no infractions observed here (Fig. 8).

Bus, Train, Tram, and Main Screen: The app consistently applies its icons and colour schemes across all transport modes and pages. This consistency makes it easy for users to

transition between different sections and platforms without confusion (Fig. 14, 15, 16, 17, 18).

5. **Error Prevention** To prevent unconscious errors, users should offer suggestions, use constraints, and be flexible to help them stay focused on the task at hand (Laubheimer, 2015).

Login and Settings Pages: One major flaw in these areas is the lack of confirmation prompts after logging out. Users may unintentionally log out without a prompt, leading to irritation. Including confirmation dialogues would prevent such mistakes (Figs. 5, 6, 7).

Bus, Train, and Tram: The software guarantees that once users are on the navigation screen, they cannot quickly modify their position, hence reducing route planning mistakes. However, there is no tool to prevent users from picking the incorrect path while using map navigation, and interactive map features might assist advise users and prevent mistakes (Fig. 14, 15, 16, 17, 18).

6. **Recognition Rather Than Recall;** Recalling items from scratch is more challenging than recognizing correct options in a list of choices due to the additional context that aids in retrieving information from memory (Budiu, 2024).

Login and Settings Pages: One major flaw in these areas is the lack of confirmation prompts after logging out. Users may unintentionally log out without a prompt, leading to irritation. Including confirmation dialogues would prevent such mistakes (, Figs. 5, 6, 7).

Bus, Train, and Tram: The software guarantees that once users are on the navigation screen, they cannot quickly modify their position, hence reducing route planning mistakes. However, there is no tool to prevent users from picking the incorrect path while using map navigation, and interactive map features might provide guidance to users and prevent mistakes (Fig. 14, 15, 16, 17,18).

7. **Flexibility and Efficiency of Use;** The system utilizes shortcuts, which are not visible to novice users, to enhance interaction for expert users, ensuring compatibility with both inexperienced and experienced users (Laubheimer, 2024).

Sign Up Page: Multiple login options (e.g., email, social media) give users the flexibility to choose their preferred method (Fig. 6).

Bus, Train, Tram, and Maps Display: Users can easily change routes and transport modes, allowing for efficient planning. However, the static nature of the maps limits flexibility, as

users cannot interact with the map to customize their views or explore alternate routes (Fig. 14, 15, 17, 19, 20, 21).

8. **Aesthetic and Minimalist Design;** A brand's memorable experiences can be achieved through visually appealing designs, but interfaces should focus on essential elements with high informational value. Clarity prevails over visual flourish (Fessenden, 2021).

Login and Settings Pages: Both pages adhere to minimalist design principles, displaying just the most important options and buttons to reduce clutter (Figs. 1, 2, 4, 5). However, redundant buttons on the settings page (for example, two "Remove Ads" buttons) might be deleted to further simplify the design.

Bus, Train, Tram, and Main Screen: The app provides a lot of information without overwhelming the user; therefore the design is clean and focused. However, certain places appear crowded, and combining some options might make the UI even more simplified. Allowing customisation for colour-blind users or those with visual difficulties would further boost the aesthetic appeal (Fig. 14, 15, 16, 17).

9. **Help Users Recognize, Diagnose, and Recover From Errors;** Design effective error messages by ensuring they are highly visible, providing constructive communication, and respecting user effort (Neusesser et al., 2023).

Error Page: If login fails, the program displays a brief error message but offers no alternatives for resolving the issue (refer to appendix, Fig. 7). Including actions or ideas would help people recover faster.

Bus, Train, Tram, and Map Display: Users can recover from mistakes, such as picking the incorrect route, by returning and selecting an alternative choice. However, there are no proactive error prevention tools or assistance, especially on maps, where interactive feedback might help users avoid making mistakes in the first place (Fig. 14, 15, 17, 19, 20, 21).

10. **Help and Documentation;** Interface help is provided in two forms: proactive, aimed at familiarizing users with an interface, and reactive, designed for troubleshooting and system proficiency (Joyce, 2020).

Login Page: There is no help or documentation link available on the login page. Including a link to troubleshooting or FAQs would assist people who experience login problems (Fig. 1).

Settings Page: The settings page lacks an incorporated help option, although this feature

might be readily implemented to assist users who may struggle with specific capabilities (Fig. 8,9).

Bus, Train, Tram, and Map Display: The app might contain more extensive advice or a quick introduction to utilising these functionalities. Although there is some documentation, it is insufficient, particularly for novice users navigating a complex transportation system (Fig. 14, 15, 17, 19, 20, 21).

Login Page

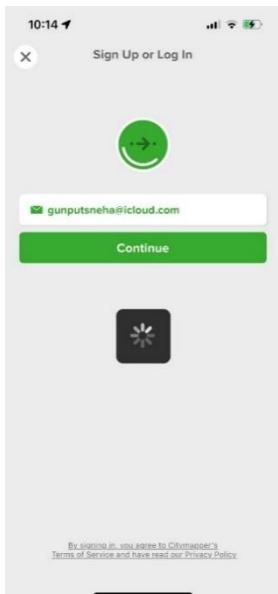


Figure 1 - Loading page

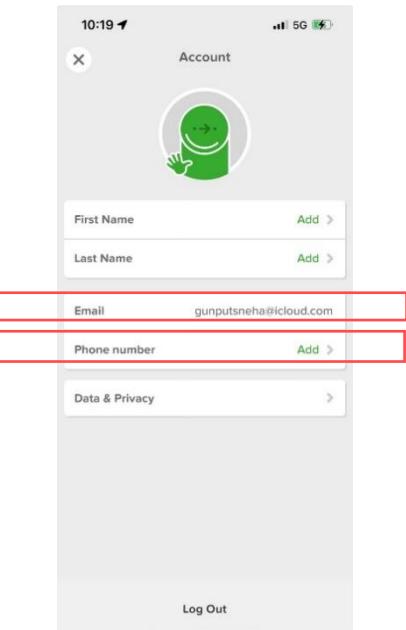


Figure 2 - No icons



Figure 3 - Icons Examples

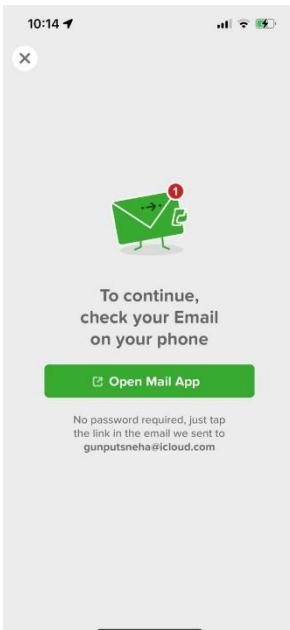


Figure 4 - Open mail button



Figure 5 - Log out

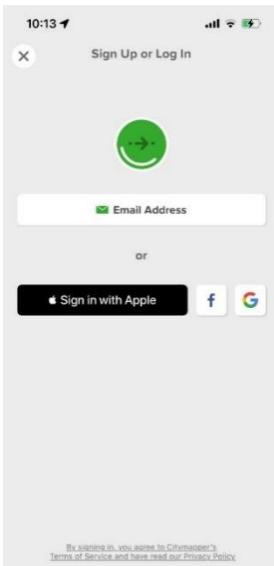


Figure 6 - Different methods to sign up



Figure 7 - Error message is displayed

Setting Page



Figure 8 - setting page

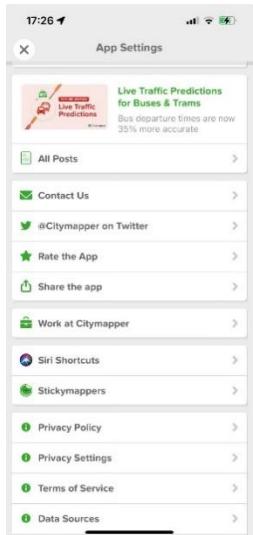


Figure 9- The icons

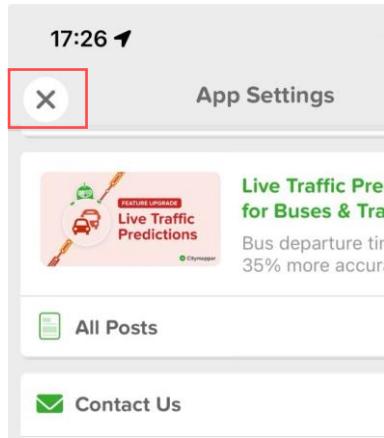


Figure 10 - The exit button



Figure 11 - log out action

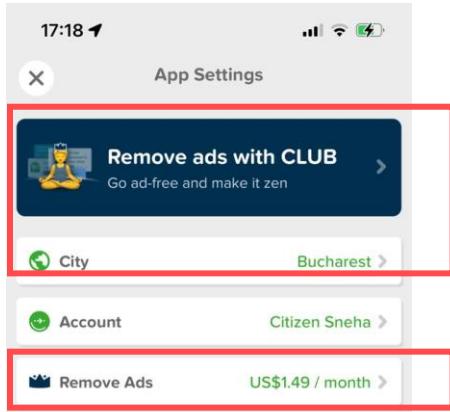


Figure 12 - Remove ads button

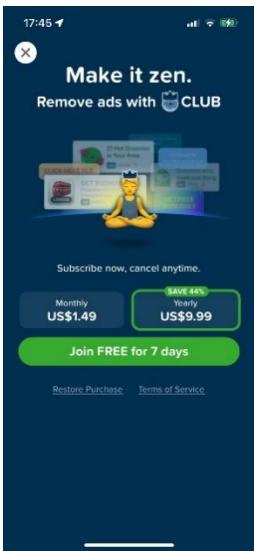


Figure 13 - Remove ads page

Main screen page



Figure 14 - main screen page

Bus page

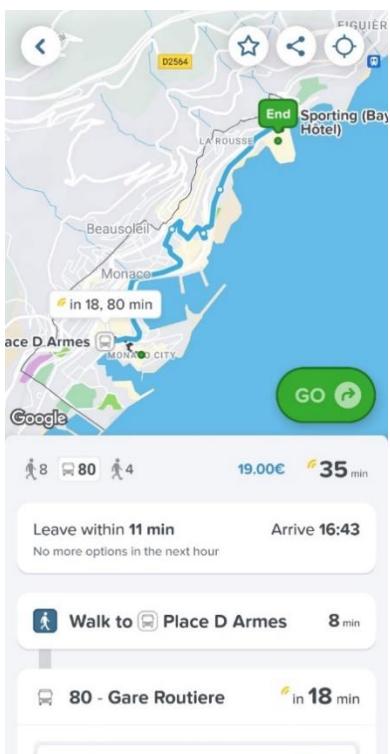


Figure 15 - Bus page

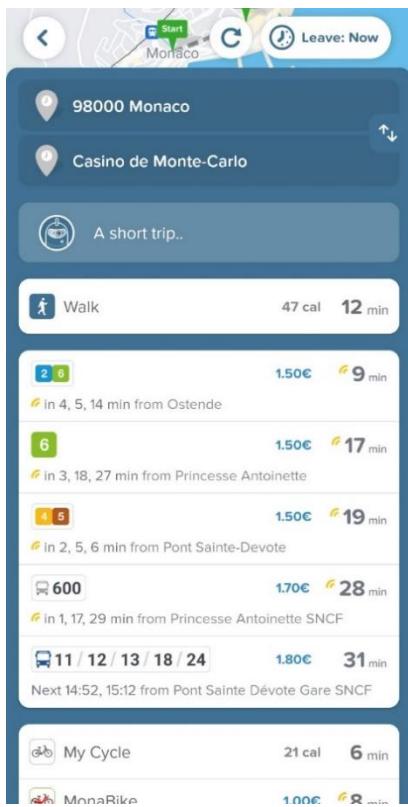


Figure 16 - Bus selection

Train selection Page

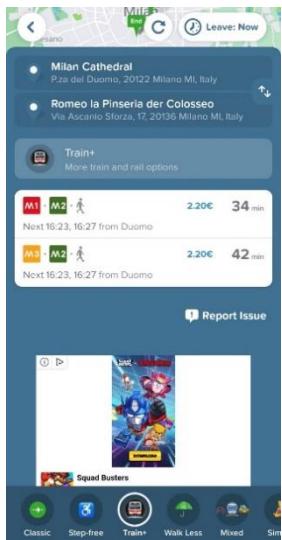


Figure 17 - Train Selection Page

Tram selection Page

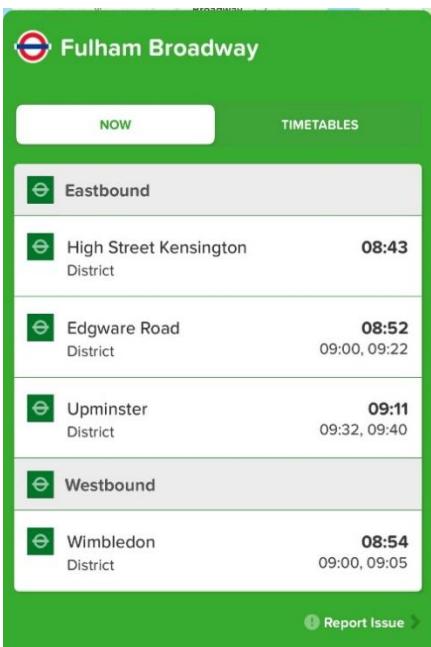


Figure 18 - tram selection

Map page



Figure 19 - Tube map



Figure 20 - Tub/Rail map



Figure 21 - Night Tube

3. Data Gathering Methods

Data gathering methods, are techniques for obtaining research information, from surveys to experiments, including interviews, observations, focus groups and secondary data analysis. The collected data can then be analysed to support or refute hypotheses and draw conclusions on subject matters (QuestionsPro, 2019). In this coursework, surveys and focus groups were used for data gathering.

3.1. Triangulation

Triangulation is a research strategy that uses multiple datasets, methods and investigators to address a research question, enhancing validity and credibility, and mitigating biases in qualitative and quantitative research. The key point of triangulation is the combination of different techniques that leads up to balancing each other (Bhandari, 2023).

For this research based on user experience and likings, two different data gathering methods were used. First and foremost is the survey, whereby survey forms were sent to a group of participants. This method has proven useful in gathering both qualitative and quantitative data from a large group rapidly.

In addition to that, to provide proof and support data collected from the survey, a focus group meeting was conducted and gathered data were analysed and compared. As a result, this increased the accuracy and comprehensiveness of the conducted assessment.

By applying the triangulation method, this study gained a clearer understanding of the needs and preferences of users of transportation and navigation apps. Comparing and contrasting different data-gathering methods helped identify and better cater to the specific and detailed requirements of these users.

3.2. Method 1: Survey

A survey is a structured research method used to gather information, opinions or feedback from a group of people through a series of questions. It is commonly conducted online or in person and can collect both qualitative and quantitative data, helping researchers gather diverse perspectives on user needs (GCU, 2023).

Our survey was conducted to gather data specifically from students doing bachelor's in computer science, IT and Cybersecurity at our university and participation was open only to students aged 18 and above. Before participating, each student completed a consent form allowing us to use their data ethically. Then invitations to complete the survey were sent via a WhatsApp link, simplifying access while targeting the intended audience efficiently.

We chose an online survey over paper forms to ensure completeness and data quality, as paper surveys often result in blank or incomplete responses. By using an online format, we

ensured that all questions were mandatory, reducing the risk of missing information and discarding the questionnaire. Additionally, an online survey was more sustainable, minimizing paper waste and allowed participants to complete the survey in a comfortable environment, helping to reduce bias response. The convenience and non-intrusive nature of online survey made this approach the most effective for gathering authentic feedback from university students (Mirzaei et al., 2022).

The survey included both qualitative and quantitative questions to gain well-rounded insights. Qualitative questions invited students to share detailed feedback on their transport needs and preferences, while quantitative questions gathered demographic data and usage patterns. This combination provided a robust dataset, allowing us to create user personas that accurately reflect student needs and behaviors. (Girardin, 2024).

3.3. Method 2: Focus group

Focus groups are qualitative methods where a small group discusses a topic with guidance from a moderator, allowing participants to share insights, opinions and experiences openly (JHU, 2024).

For our project, we conducted two focus groups with students, one held in library's room H103 with eight participants, and another in room BG03 with ten participants. Each participant read and signed a consent form before beginning. The sessions started with introductory questions to help participants ease into discussion, followed by in-depth questions to address the main topic and ended with exit questions to ensure no important points were missed throughout the talk. To capture the full discussion, we used a voice recorder, assigned three team members engaged with the audience asking questions, one team member was the timekeeper, and the other three team members were assigned to take notes.

Focus group complemented our survey by allowing deeper exploration of students' needs through direct interaction. This setup enables participants to build on each other's responses, generating richer insights that would be missed in a survey alone. Non-verbal cues added context to responses and the open-ended nature allowed us to pursue unexpected but relevant points, capturing spontaneous feedback essential for detailed understanding of user expectations (Ligre, 2024).

Qualitative research focuses on understanding real-world problems by analysing participants' experiences, perceptions, and behaviour. It generates hypotheses to understand quantitative data and can be standalone or part of mixed-methods research (Lenny, 2022). We opted for qualitative data for the focus group, as verbal communication is used within the group, receiving quantitative data would be a waste of the verbal communication we have available. As this data collection method is carried out in group, it would allow participants to vent out their point of view about questions therefore making data gathering much more open ended.

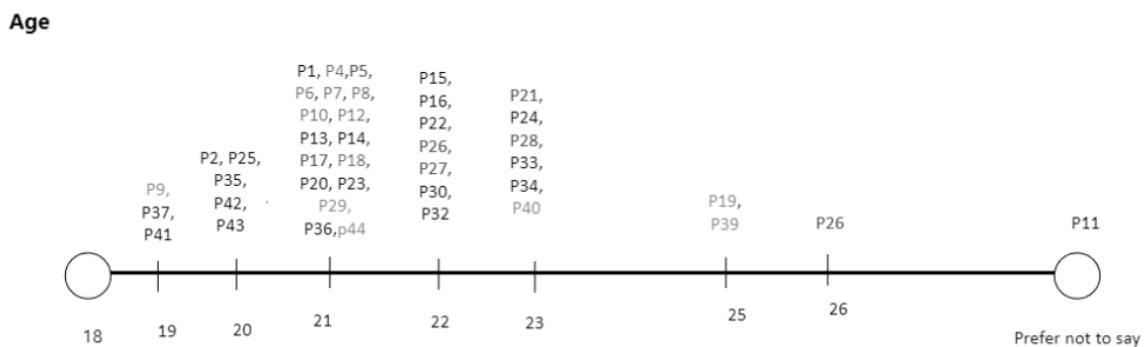
4. Analysis of Gathered Data

In developing our transport app, MauTransport, we conducted both secondary and primary research. Our secondary research analysed Citymapper, identifying key features like multi-model transport options, real-time updates, and user-friendly navigation, which informed our app's design. We did primary research through survey and focus group to understand user preferences, expectations and pain points in transportation applications.

4.1. Survey Analysis

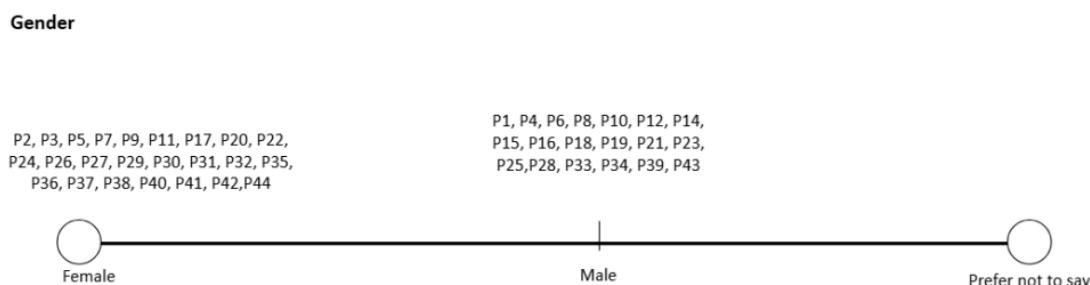
A total of 44 participants took part in our survey. The questions covered a range of topics including demographic information, app usage habits, preferences for transportation apps, and desired features. Below is a summary of responses for each survey questions:

1. What is your age?



Since respondents are young adults aged between 19 to 25, the app can include advanced features without overwhelming them, enhancing engagement and usability. Young users generally appreciate modern aesthetics, quick navigation and customizable features.

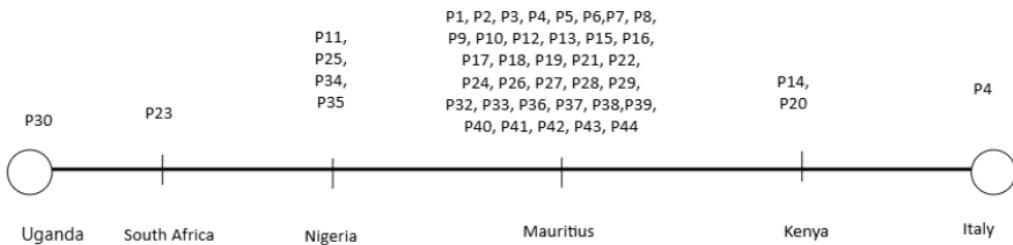
2. What is your gender?



The gender diversity among participants provided a range of perspectives on transport app features, ensuring inclusive design.

3. Which country are you from?

Nationality



Participants are from diverse backgrounds, including Mauritius, Nigeria, Italy, South Africa, and Uganda. Nationality may influence user needs, such as familiarity with public transport options and specific preferences based on local infrastructure or lifestyle.

4. In which city are you currently living in?

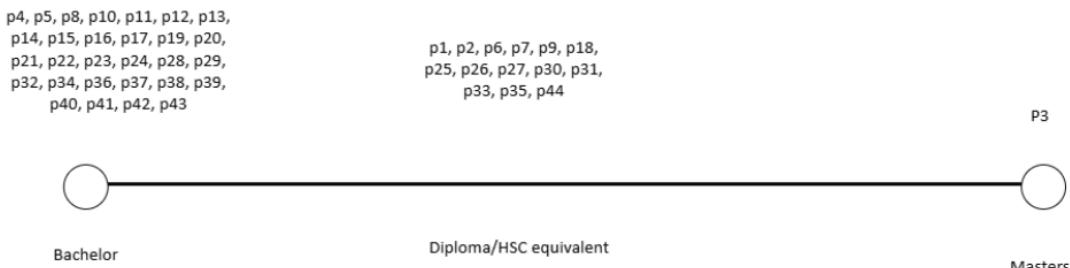
7 respondents (15%) answered Flic for this question.



The variety of locations within Mauritius can impact the responses due to differing access to public transport systems. Urban areas may have different needs compared to rural ones, such as higher reliance on punctuality and real-time tracking.

5. What is your highest level of education?

Education



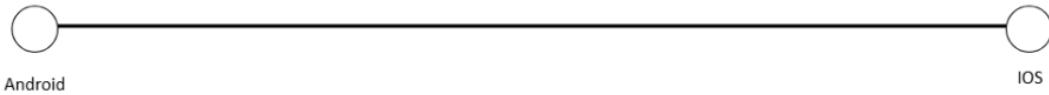
The education levels vary from high school diplomas to bachelor's and master's degrees. Higher education may correlate with user-friendly designs and familiarity with app features.

6. What type of smartphone do you use?

OS

P2, P3, P4, P6, P7, P8, P9,
P10, P11, P12, P13, P14,
P15, P16, P18, P19, P20, P22,
P23, P24, P25, P32, P35, P37,
P39, P40, P41, P42, P44

P1, P5, P17, P21, P26, P27, P28, P28, P30,
P31, P33, P34, P36, P38, P43



Responses indicate both Android and iOS users. Compatibility across both platforms is crucial, and understanding any platform-specific preferences could guide feature optimization, especially for interface designs.

7. How often do you use your smartphone each day?

Screentime

P9, P19, P29,
P39, P40, P44

P1, P3, P4, P7, P8, P11, P12, P13, P14, P15,
P16, P17, P18, P20, P21, P22, P23, P24, P26,
P27, P28, P32, P35, P37, P43

P2, P5, P6, P10, P25, P30, P31, P33, P34,
P36, P38, P41, P42



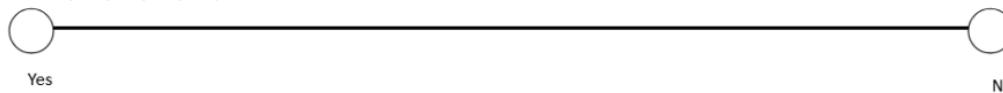
Responses showed varied mobile usage patterns, suggesting that some users may need simple features because with less than 3 hours of screen time; they tend to engage in fewer actions. As screen time increases, the range of actions performed expands, with the 4-to-7-hour group showing that others may appreciate more advanced functionalities.

8. Have you ever done internet banking transactions or in app-purchases within an application?

Online Transaction

P1, P2, P3, P4, P5, P6, P8, P9, P10, P11, P12, P14, P15,
P16, P17, P18, P19, P20, P21, P22, P23, P24, P25, P26,
P27, P28, P29, P30, P31, P32, P33, P34, P35, P36, P37,
P39, P40, P41, P42, P43, P44

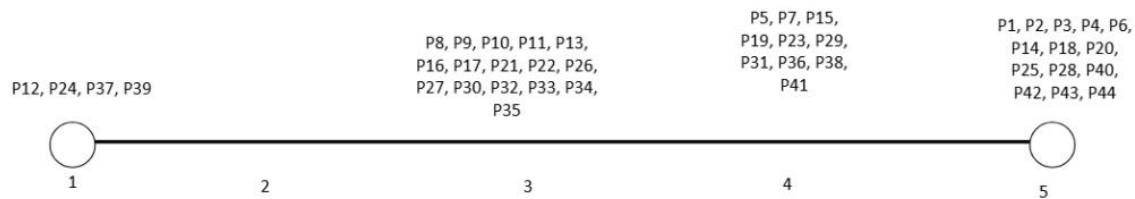
P7, P13, P38



Most respondents have experience with Internet banking or in-app purchases, indicating a high level of comfort with online transactions. This suggests that integrating payment options within the app for ticket purchases or loyalty rewards would likely be well-received by users.

9. On a scale of 1 (lowest) to 5 (highest), how would discounted fares impact your likelihood of using public transport more frequently?

discounted fares impact your likelihood of using public transport more frequently?



Responses show a strong inclination toward discounted fares encouraging more frequent public transport use. With a majority scoring 3 or above, and many selecting 4 or 5, this indicates that fare reductions could be a significant motivator for users, making it a valuable feature to consider in the app's offerings.

10. What is your favorite brand?

5 respondents (11%) answered brand for this question.



Responses show wide range of favorite brands across various categories such as automobile brands, tech and electronics, and fashion and accessories. The brands mentioned helped us understand design and usability standards that participants appreciate, providing a reference for app aesthetics.

11. List 3 of your favorite applications/websites:

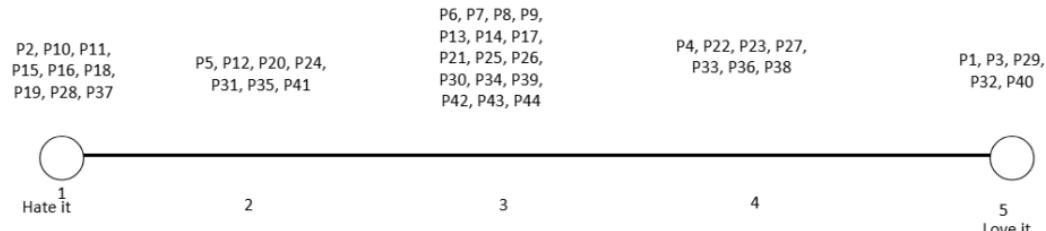
9 respondents (20%) answered instagram for this question.



Favorite apps include social media (Instagram, YouTube), productivity apps (Google Maps), and entertainment (Netflix, Spotify). This indicates that users are accustomed to apps with robust UX/UI and instant access to information, setting high expectations for the transportation app interface and functionality.

12. How do you feel about an application that offers background music while browsing a transportation application?

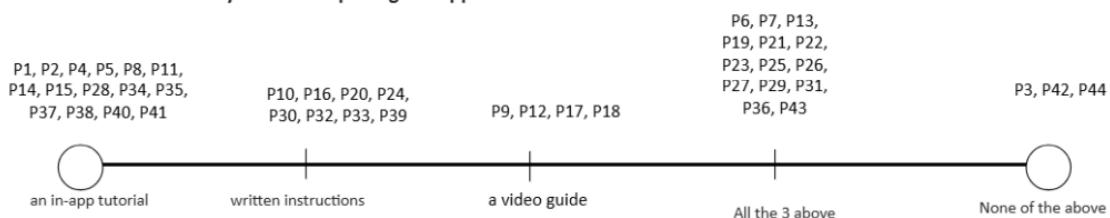
How do you feel about an application that offers background music while browsing a transportation application?



Responses to background music in a transportation app are mixed. While some users appreciate it for enhanced browsing, most feel neutral, and a few view it as distracting. To accommodate all preferences, background music could be an optional, easily toggled feature.

13. Would you like to be greeted by any of the following instruction manual when you're first opening the application:

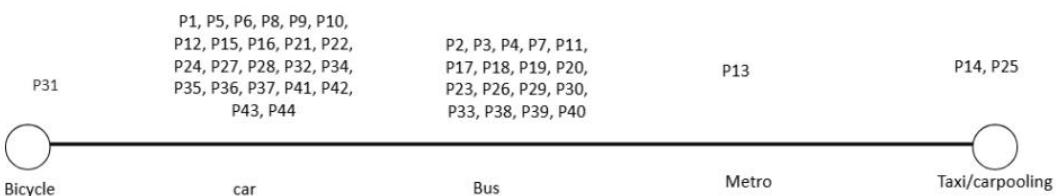
Would you like to be greeted by any of the following instruction manual when you're first opening the application:



The responses indicate a strong preference for an in-app tutorial, with multiple mentions suggesting that users value interactive guidance when first using an application. Additionally, there is significant interest in combining this tutorial with video guides and written instructions, emphasizing the importance of providing varied support methods to enhance user experience.

14. What mode of transportation do you use most often?

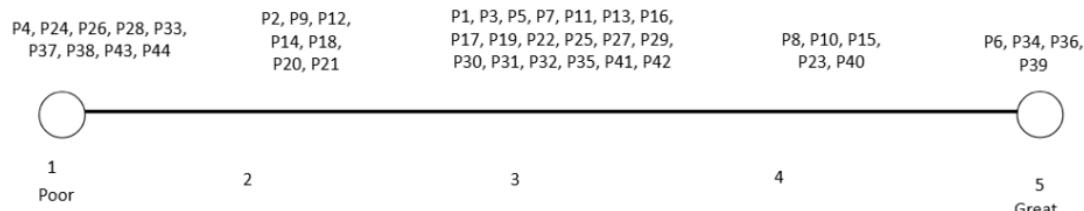
What mode of transportation do you use most often?



The responses indicate that while personal cars are the preferred mode of transportation, buses are a significant secondary choice. This suggests that incorporating features related to bus services such as real-time schedules, route planning, and delay notifications would enhance the app's utility.

15. How do you feel about the current state of public transport in your area?

How do you feel about the current state of
public transport in your area?



The responses reflect a mixed sentiment about the current state of public transport in the area, with ratings around 2 to 4. The variation in scores suggests inconsistencies in public transport quality, efficiency, or accessibility, highlighting the need for improvements.

16. List 3 issues faced when using transportation apps

8 respondents (17%) answered time for this question.

app is often faulty proper hygiene transports in particular arrival time
tracking of transportation user friendly time is not transport Apps
delay in the app Public transport transportation apps
badly design often inaccurate drivers App glitches
response in app GPS tracking Lack of space Buses

Frequent issues include app glitches, inaccurate information, lag, and lack of updates. Addressing these frustrations (e.g., improving real-time tracking, app reliability) is crucial for enhancing user satisfaction.

17. List 3 services which you think are beneficial when using a transportation application

10 respondents (22%) answered transport for this question.

time management tracking of bus time information means of transportation time/place
optionsReal time time tracking bus transport Real time travel time
bus location fares arrival time transportation Better time
time and price time ETA List of time time trackingMultiple

Frequent requests include live GPS tracking, fare estimation, online payments, scheduling, and seat availability. By prioritizing those requests, we will meet significant user demands.

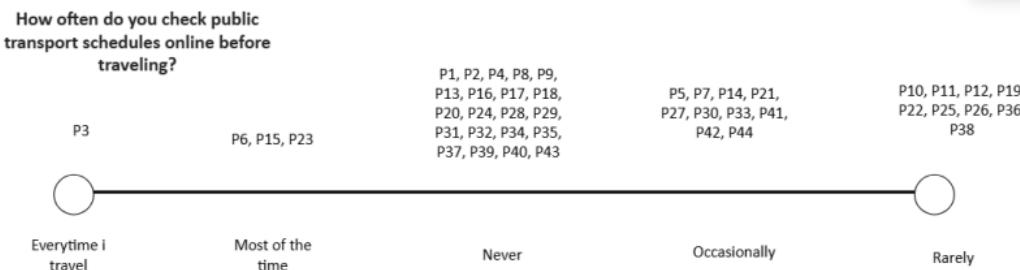
18. List 3 reasons that encourage you to use public transport rather than driving:

11 respondents (24%) answered Cost for this question.



Users are motivated to choose public transport over driving for several reasons, primarily cost savings and environmental benefits, as it is generally cheaper and reduces pollution. Additionally, public transport allows users to avoid traffic jams and parking hassles while providing opportunities to relax or multitask during their travels. These insights suggest that highlighting the economic and ecological advantages of public transport could encourage more people to use these services.

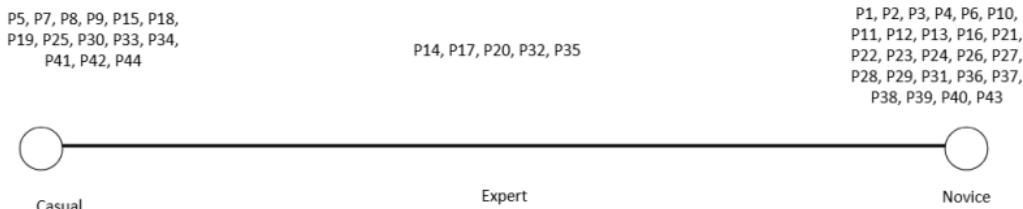
19. How often do you check public transport schedules online before traveling?



Many users rarely or occasionally use transport apps, with only a few frequent users. Increasing regular usage may require incentives like loyalty programs, discounts, or unique in-app features.

20. How would you describe your experience level with using transportation apps?

How would you describe your experience level with using transportation apps?



Most respondents consider themselves novices, while a few classify as experts. The app should cater to beginners, with simple navigation and clear instructions, while offering advanced features for advanced users.

4.2. Focus group Analysis

A total of 18 participants took part in our focus groups, which further deepened our understanding of user expectations for the transport app. Below is a summary of responses for each focus group question (The raw data is also provided in the appendix):

1. List 3 apps or websites you enjoy using regularly.

Most participants enjoy using YouTube, Instagram, TikTok, and other popular platforms for their ease of use, multi-functional content, and entertainment value. YouTube, in particular, is valued for its versatility, offering educational, research, and entertainment content, making it the most frequently mentioned app.

2. How would you describe the design of your chosen favorite apps or websites in terms of its aesthetic features, responsiveness and services it offers?

Simplicity and ease of navigation were highlighted as key qualities. Participants favor minimalist designs that are visually pleasing, fast, and allow users to find what they need without clutter. A straightforward design aids in quick, efficient navigation from point A to B.

3. On a scale of 1 (lowest) to 5 (highest), how do the visual aspects and fluidity of the navigation system influence your satisfaction with the service?

Participants rated visual design and navigation fluidity as highly influential, with most giving scores of 4 or 5. They prefer minimalist, straightforward layouts that reduce distractions, especially while driving, making it easier to reach their destinations without confusion.

4. Would you prefer if a transportation app offers multiple modes of transport?(e.g.: metro, bus, bicycle, etc)

All participants agreed that a transportation app should offer multiple modes of transport, such as metro, bus, and bicycle options. Having an all-in-one platform would be convenient, saving device storage and streamlining travel planning by providing comprehensive options in a single app.

5. If an app offers you loyalty incentives, list 3 benefits you would like to have.

Participants suggested a points-based loyalty system and discounted fares as preferred incentives. Additional suggestions included cashback, priority in traffic, and vouchers for other shops. The consensus is that discounts or points that translate into tangible benefits would increase user engagement.

6. When you're planning your navigation for a trip, which device do you usually use? (e.g.: tablet, phone or PC)

The majority of participants prefer smartphones for trip planning due to their portability and ease of access while on the go. Laptops were also mentioned for their larger screens

and the ability to plan routes using multiple tabs, although they are less practical for quick access when traveling.

7. List 5 kinds of customization would you prefer having on a navigation app.

Participants desired customization options that allow them to adjust the organization of icons, hide unused features, offline mode and toggle between different navigation modes. Customizing the view based on personal preferences was a common theme, with several suggesting that having voice assistance while driving was important and being able to rename streets or change the interface layout would enhance the user experience.

8. Additional Notes: Participants expressed a preference for advance booking options for tickets with refund options, as well as mixed opinions on carpooling features. Safety was a major concern, with certified drivers being a prerequisite for those open to carpooling. Security features, such as two-factor authentication and biometric login, were also considered important for user trust.

4.3. Requirements

Based on the survey and focus group analysis, here are the requirements for the MauTransport app:

4.3.1. Functional Requirements

Requirement	Description
User Authentication	The system must allow users to create accounts, log in, and reset passwords securely.
Multi-Mode Transport Support	Users should be able to view and compare multiple transport modes (e.g., bus, metro, taxi, bicycle) in a single interface.
Trip Planning and Routes	Enable users to plan routes, offering alternative options in case of congestion, with real-time updates.
Real-Time Scheduling & Updates	Provide live updates on transport schedules, including delays and route changes.
GPS Accuracy	Ensure accurate GPS tracking for navigation, showing real-time location and estimated arrival times (ETA).
Booking & Ticket Purchase	Users should be able to book tickets in advance and link payment cards for in-app purchases.
Notifications	Send push notifications for updates on trip progress, delays, and personalized offers.
Customizable Navigation	Users should be able to customize the interface (themes, layout, transport preferences).
Promotion Loyalty Program	Implement a points-based system where users can earn rewards and discounts for regular use.

Table 2 - Functional Requirements

4.3.2. Non-functional Requirements

Requirement	Description
Performance	The app should load route options and real-time transport information within 2 seconds to ensure a smooth experience.
Scalability	The app should handle increasing users and data loads efficiently, accommodating peak usage times and user growth.
Security	Ensure secure handling of user data, especially for payments and account information, using encryption and secure payment gateways.
Reliability	Ensure a high availability rate for essential services, especially for real-time route information, to maintain user trust
Compatibility	The app must be available on both Android and iOS platforms, with consistent performance on both.
Data Privacy Compliance	Adhere to data protection regulations like GDPR by ensuring user consent and data anonymization.

Table 3 - Non-Functional Requirements

4.3.3. User Requirements

Requirement	Description
User Profile Management	Users want to create and manage profiles, set preferences, and save frequent routes.
Easy Trip Planning	Users need a straightforward way to plan trips with options for different transport modes.
Cost Optimization	Users prefer to view cost comparisons for different transport options and save on travel expenses.
Background Music Option	Provide an optional background music feature while browsing, with an easy toggle to switch it on or off.
Driving Aids(Driving Assistance Systems)	Provide driving assistance features, such as voice commands and a distraction-free layout, to enhance users' safety and convenience while driving.
Integrated Payment Methods	Support multiple payment methods, including credit cards, mobile wallets, and other digital payments, for user convenience.

Table 4 - User Requirements

4.3.4. Usability Requirements

Requirement	Description
Minimalistic Design	The interface should be simple, clutter-free, and easy to navigate, especially for first-time users.
Accessibility	The app should include features like screen reader compatibility, color-blind mode, high contrast mode, and adjustable font sizes.
Responsive Design	The app should adapt seamlessly to different screen sizes and orientations (smartphones or Laptops)
Personalization	Allow users to customize navigation elements, such as color themes, frequently used routes, organize icons and hide unused features for a tailored experience.
Error Prevention	Provide clear prompts, confirmations, and error messages to reduce user mistakes (e.g., booking confirmation).

Table 5 - Usability Requirements

4.3.5. Environmental Requirements

Requirement	Description
Hardware Compatibility	The app must function on various hardware configurations.
Offline Mode	Users should be able to download routes and schedules for offline access, especially in areas with poor connectivity.
Energy Efficiency	The app should be optimized for low battery consumption, minimizing resource usage during prolonged navigation.
Eco-Friendly Options	Promote sustainable transport options by suggesting eco-friendly routes and carpooling features.
Compliance with Local Regulations	Ensure the app complies with regional transport and data privacy laws (e.g., GDPR, local transport authorities).
Network Resilience	The app should function efficiently with any internet connection like 3G, 4G or 5G

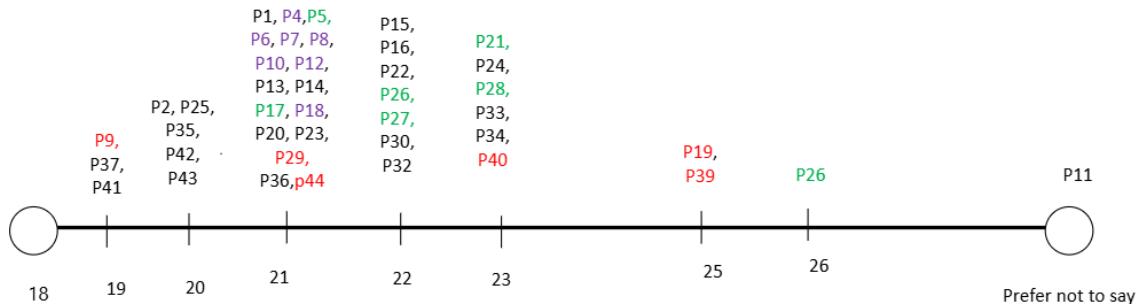
Table 6 - Environmental Requirements

5. UX Deliverables

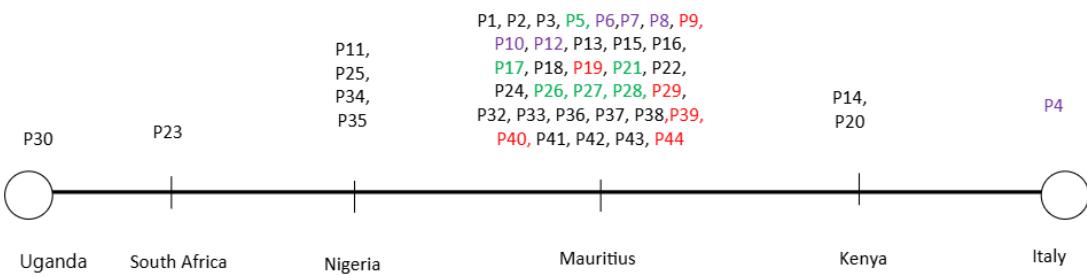
5.1. Behavioural variables mapping

In the behavioral variables mapping found below, we placed participants on a timeline to represent their distribution and identify patterns and trends visually. By clustering them into color-coded groups, we highlighted shared characteristics and behavioral similarities, which helped in forming distinct personas. This approach of grouping participants based on similar responses or behaviors allows us to better understand their unique needs, preferences, and motivations.

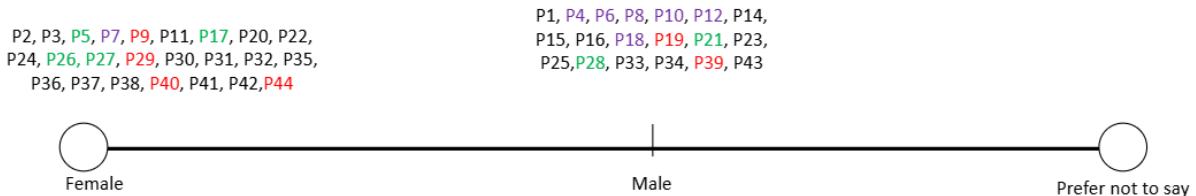
Age



Nationality



Gender



os

P2, P3, **P4, P6, P7, P8, P9,**
P10, P11, P12, P13, P14,
P15,P16, **P18, P19, P20, P22,**
P23, P24, P25, P32, P35 P37,
P39, P40, P41, P42, P44

P1, P5, P17, P21, P26, P27, P28, P29, P30,
P31, P33, P34, P36, P38, P43



Screentime

P9, P19, P29,
P39, P40, P44

P1, P3, **P4, P7, P8, P11, P12, P13, P14, P15,**
P16,**P17, P18, P20, P21, P22, P23, P24, P26,**
P27, P28, P29, P30, P31, P32, P33, P34, P35, P36, P37,
P39, P40, P41, P42, P43, P44

P2, P5, **P6, P10, P25, P30, P31, P33, P34,**
P36, P38, P41, P42



Online Transaction

P1, P2, P3, **P4, P5, P6, P8, P9, P10, P11, P12, P14, P15,**
P16, **P17, P18, P19, P20, P21, P22, P23, P24, P25, P26,**
P27, P28, P29, P30, P31, P32, P33, P34, P35, P36, P37,
P39, P40, P41, P42, P43, P44

P7, P13, P38



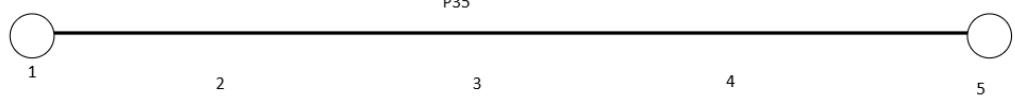
discounted fares impact your likelihood of using public transport more frequently?

P12, P24, P37, P39

P8, P9, P10, P11, P13,
P16, **P17, P21, P22, P26,**
P27, P30, P32, P33, P34,
P35

P5, P7, P15,
P19, P23, P29,
P31, P36, P38,
P41

P1, P2, P3, **P4, P6,**
P14, P18, P20,
P25, P28, P40,
P42, P43, P44

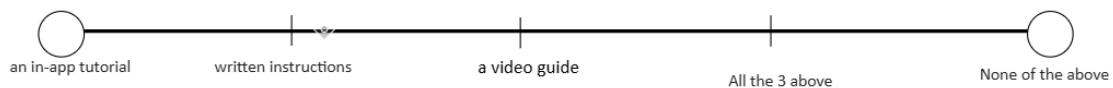


Would you like to be greeted by any of the following instruction manual when you're first opening the application:

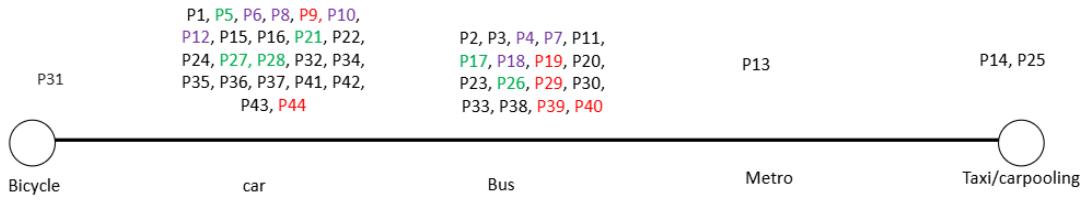
P1, P2, **P4, P5, P8, P11,**
P14, P15, **P28, P34, P35,**
P37, P38, **P40, P41**

P10, P16, P20, P24,
P30, P32, P33, **P39**

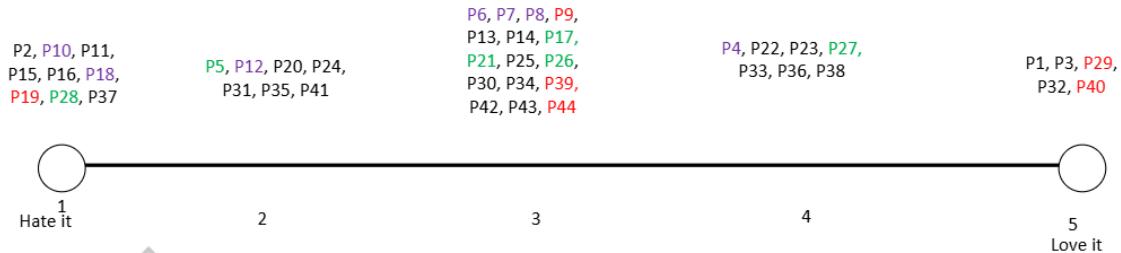
P6, P7, P13,
P19, P21, P22,
P23, P25, **P26,**
P27, P29, P31,
P36, P43
P3, P42, P44



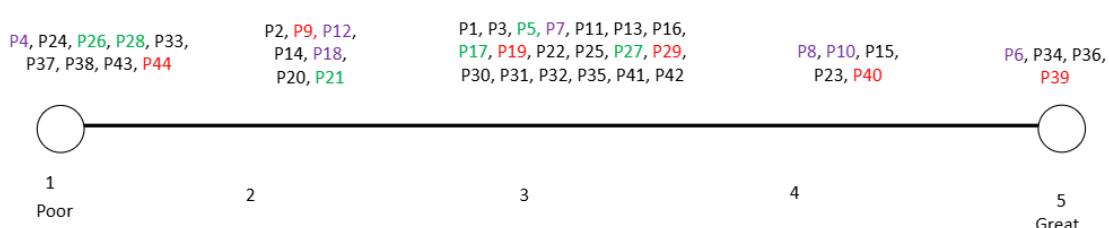
What mode of transportation do you use most often?



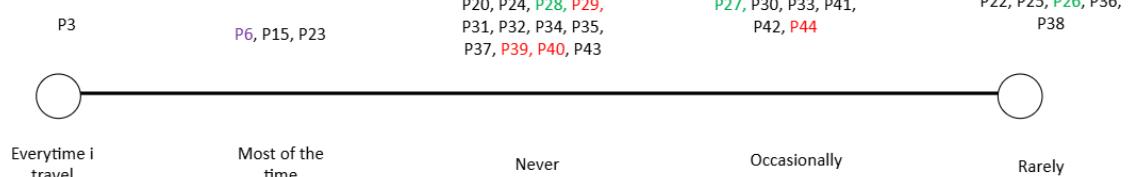
How do you feel about an application that offers background music while browsing a transportation application?



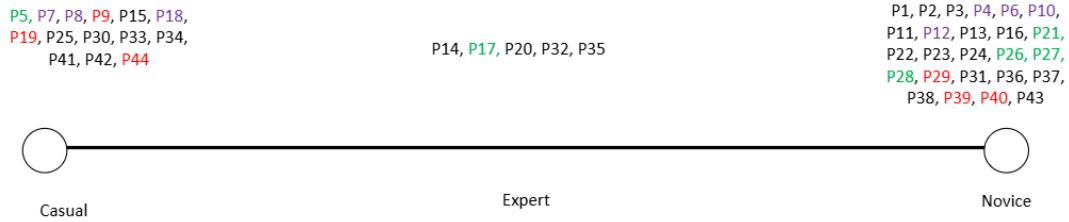
How do you feel about the current state of public transport in your area?



How often do you check public transport schedules online before traveling?



How would you describe your experience level with using transportation apps?



Education

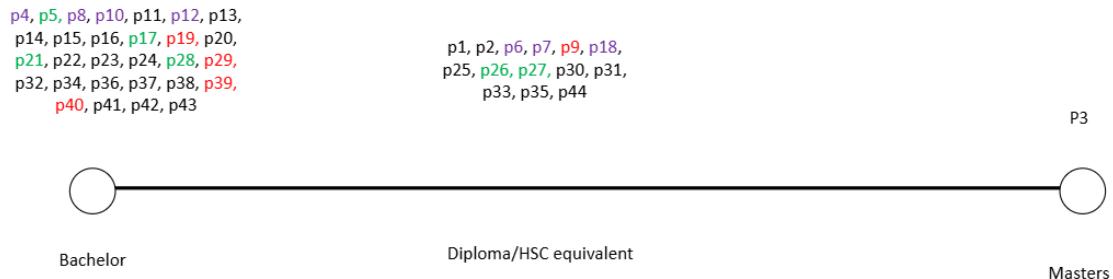


Figure 22 - Behavioural variables mapping

5.2. Persona

Persona 1

Arusha Ramessur, a 23-year-old computer science student from Mauritius, needs a minimalistic transport app with real-time updates and intuitive navigation for efficient, stress-free planning.

Arusha Ramessur



AGE 23
EDUCATION Diploma
OCCUPATION Student
NATIONALITY Mauritian
ADDRESS Rose Belle
TECH LITERATE Novice

“ Clear directions and an easy way to get there without losing time.

Motivation
A quick reliable way to navigate the day without complications.
Use of straight forward approach.

Brands
  

Bio
Arusha Ramessur, a 23 years old computer science student from Mauritius, who values eco-friendly, efficient planning with simple, distraction free app interfaces.

Core needs

- A minimalist app with intuitive navigation and clear icons for quick, stress free planning.
- A single app integrating metro, bus and routes.
- Up to date schedules and real time tracking to prevent delays or missed connections.

Frustrations

- Apps that feel clustered or require too many steps to find basic info.
- Unreliable schedules and GPS tracking that leads to delays or missed connections.
- Apps that don't allow customization or organise frequently used features will make navigation inefficient.

Favorite Applications
  

Operating System
 Android

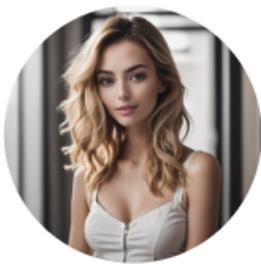
Platform
 Smartphone

Figure 23 - Persona 1: Arusha Ramessur

Persona 2

Cameron Williamson, a 21-year-old Mauritian student, seeks a unified, distraction-free transport app that's accessible, cost-effective, and environmentally conscious.

Cameron Williamson



AGE 21
EDUCATION Bachelors
OCCUPATION Student
NATIONALITY Mauritian
LOCATION Flic-en-Flac
TECH LEVEL Casual

Bio
She currently lives in Mauritius. She is studying a bachelor's degree in Computer Science System Engineering. As a busy student who often switches between different modes of transportation, She wants an application to view all available transport options in a single app, including buses, metro, and carpooling. So that she can choose the most efficient combination of modes without having to switch between multiple apps. She is currently single and like to go out with friends on long holidays.

Core needs

- Allowing users to toggle between different layouts, set preferred transport modes, or activate accessibility features like larger text or high-contrast colors.
- View all her transport options in a single application
- The price of the service is very important

Frustrations

- Reduces pollution and conserves resources; values live GPS tracking and fare estimation
- Unnecessary Notifications or Intrusive Ads
- Slow or unresponsive application

Motivation
Lower costs compared to owning a car; environmental benefits and reduced traffic

Favorite Applications



Brands



Operating system
Digital Payment

Platform
Smartphone

Figure 24 - Persona 2: Cameron Williamson

Persona 3

Wade Warren, a 25-year-old Mauritian student and tech expert, wants a reliable, feature-rich transport app that is accessible, accurate, and supports offline use.

Wade Warren



AGE 25
EDUCATION Masters
OCCUPATION Student
NATIONALITY Black River
LOCATION Mauritius
TECH LEVEL Expert

Core needs

- Access to key features, like saved routes or maps, even when offline or in areas with poor network connectivity.
- Support for users with disabilities, including options like voice commands, larger fonts, screen readers, and high-contrast mode.
- Loyalty Programs and Incentives

Frustrations

- Occasionally uses personal car; values tracking and fare estimation features in transport apps
- GPS inaccuracies and outdated data that cause him to feel frustrated and distrustful of the app's reliability
- Unpredictable bus schedules, leading to missed or delayed journeys

Motivation

Saves money on transportation while avoiding the stress of self-driving

Favorite Applications

facebook  linkedin  whatsapp 

Brands

Operating System

 iOS

Platform

 Laptop  Smartphone

Figure 25 - Persona 3: Wade Warren

Persona 4

Liam Patel, a 21-year-old Mauritian student, seeks a clear, real-time transport app with online payments, minimal distractions, and background music.

Liam Patel



AGE 21
EDUCATION Bachelor
OCCUPATION Student
NATIONALITY Mauritian
ADDRESS Quatre Bornes
TECH LITERATE Casual

“ A smooth journey starts with a clear map and good music.

Motivation
Finding the best way possible in a short span of time, having all features in one place.

Brands
  

Bio
Liam Patel a 21 year old student who is a novice public transport user would love clear and concise application whereby he can find a way out easily. He likes listening to music while traveling.

Core needs

- Being a novice user to transporation app, it should be simple and clear to use.
- Familiar with online payment, the app should offer the ability to do transaction online.
- Spending a moderate time on phone, the app should be visually straight forward and efficient.

Frustrations

- Inability to read routes and their travel times.
- The app cannot provide real time update of transport or delayed arrival.
- If the app cannot communicate available discount and promotions effectively.

Favorite Applications
 Facebook  Whatsapp  Reddit

Operating System
 Android

Platform
 Smartphone

Figure 26 - Persona 4: Liam Patel

5.3. User Stories

User story 1

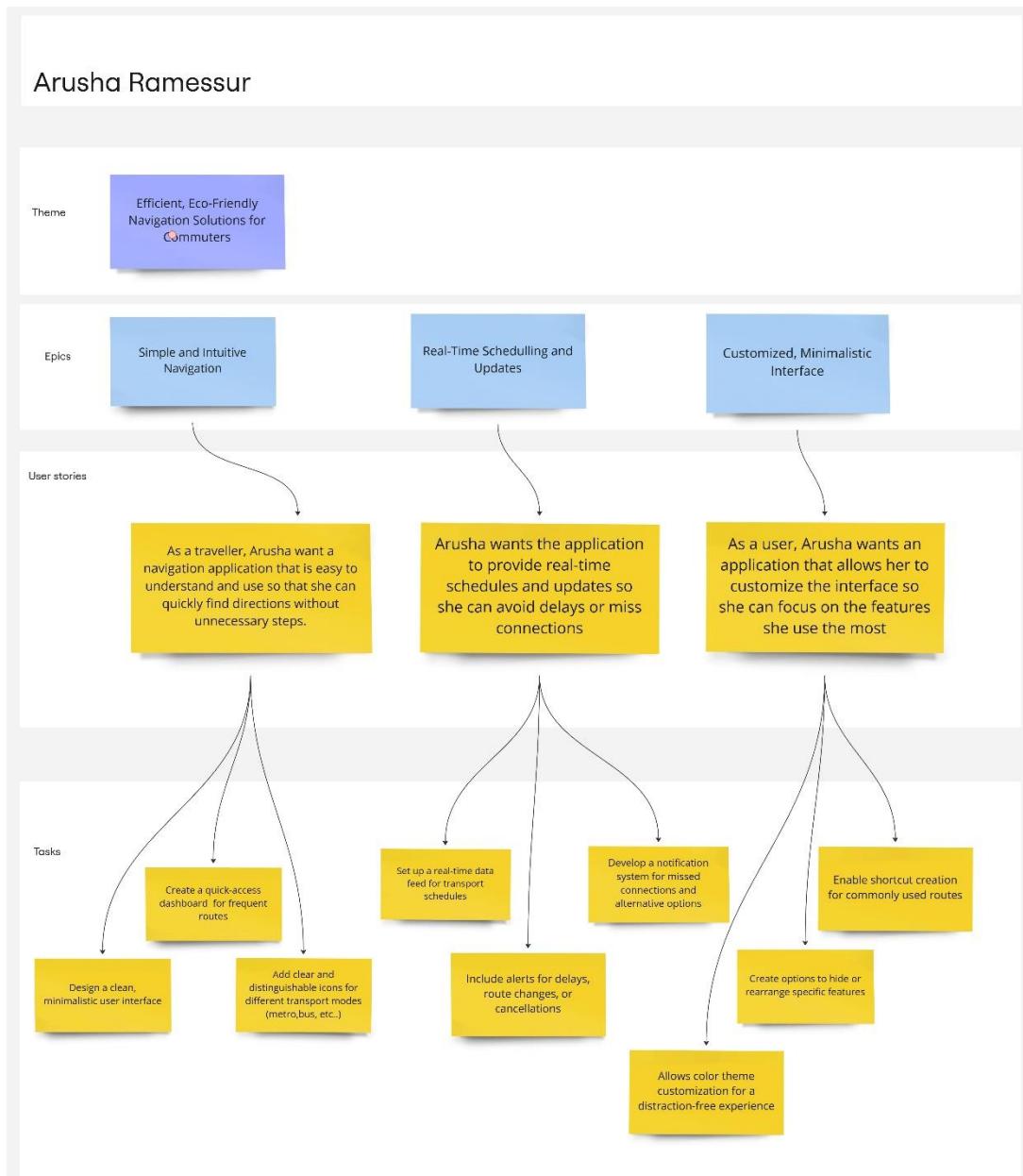


Figure 27 - User Story 1: Arusha Ramessur

Here is the link to the image:

https://drive.google.com/file/d/11XORGlcLWWnSn_jK6Ym9qMG2PpAjh7L/view?usp=sharing

User story 2

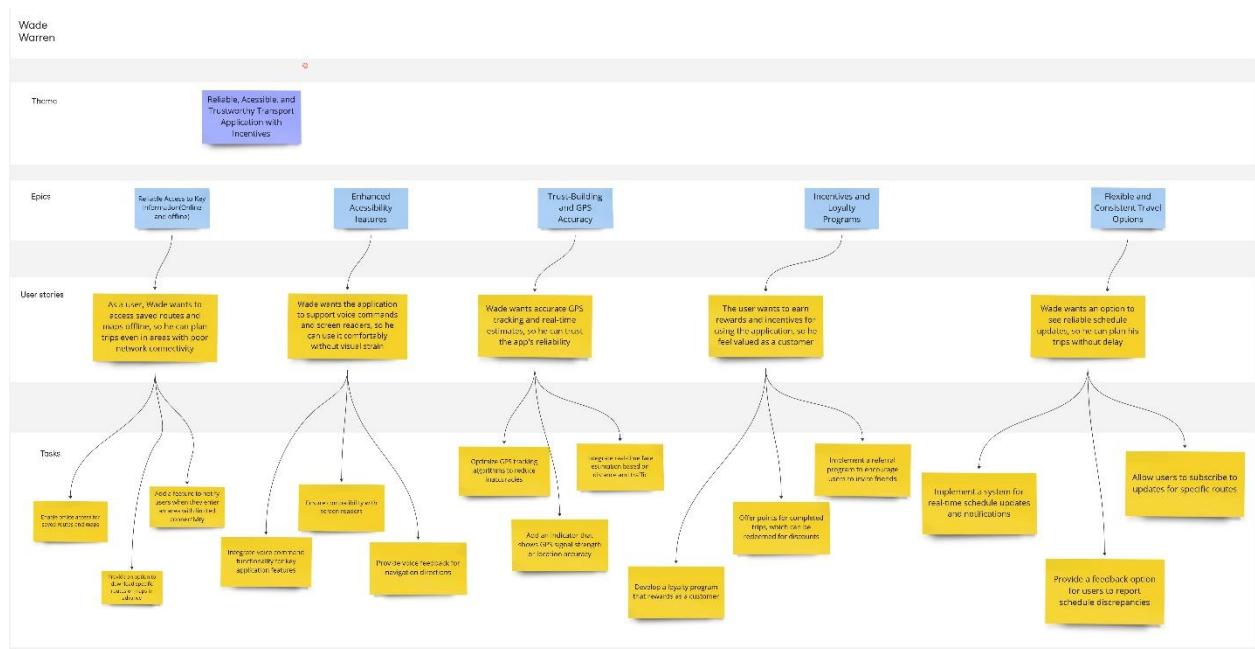


Figure 28 - User Story 2: Wade Warren

Here is the link to the image:

<https://drive.google.com/file/d/1L9EkJwf0GZOhpI2y0gbCdtkgZPaJBk-/view?usp=sharing>

User Story 3

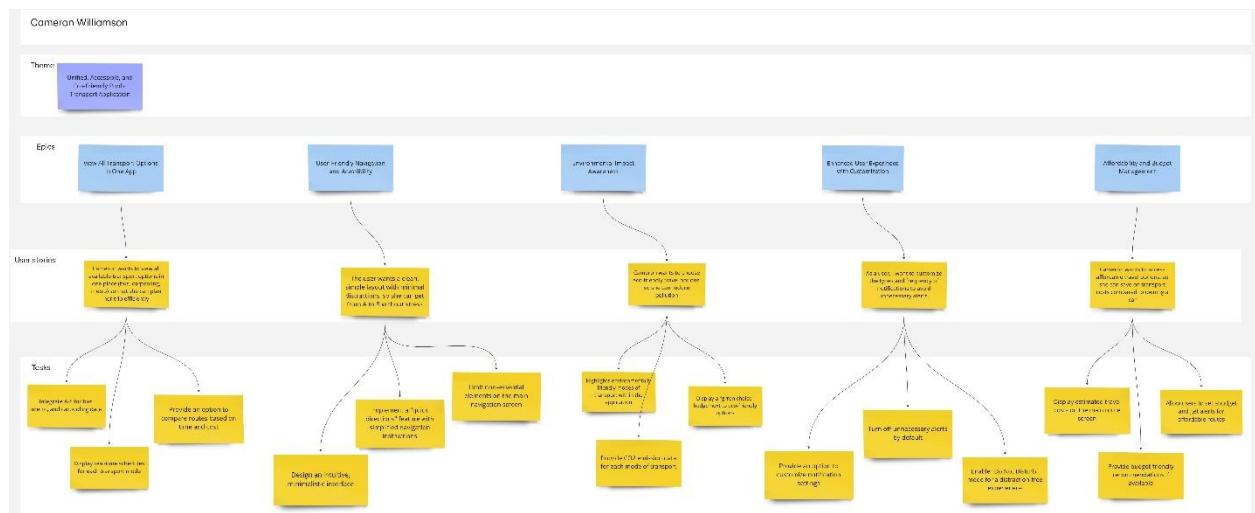


Figure 29 - User Story 3: Cameron Williamson

Here is the link to the image:

https://drive.google.com/file/d/10gKXOYyBTKlnD_4SHeVP_DNT76tlD92m/view?usp=sharing

User Story 4

Liam Patel

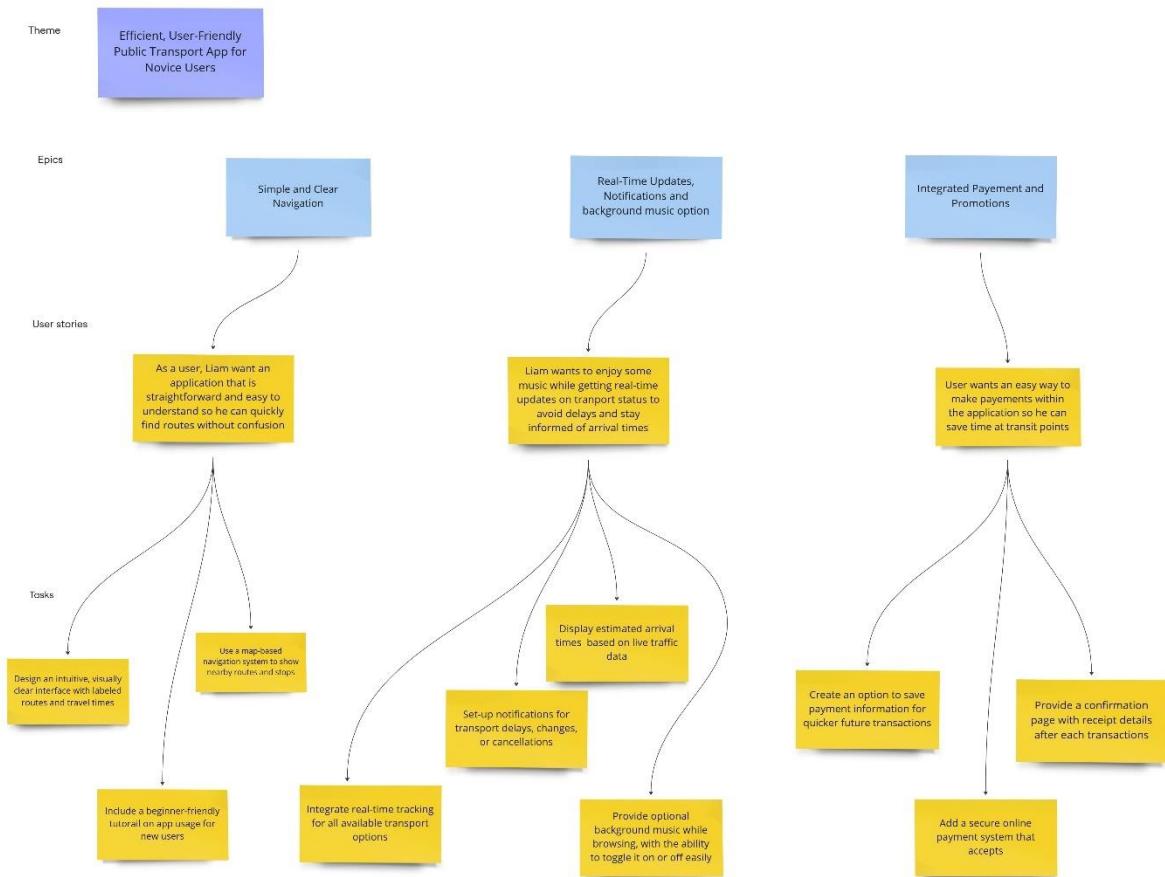


Figure 30 - User Story 4: Liam Patel

Here is the link to the image:

<https://drive.google.com/file/d/1SuiRxfOLdZIPnwtUHJrtKMg2TrtyJQ9b/view?usp=sharing>

5.4. User journey



Figure 31 - User journey: Cameron Williamson

The diagram illustrates Cameron's journey of using a transportation app to reach Middlesex University quickly and affordably. It starts with her discovering the need for transportation, followed by her reflection on her options. She then procures tickets through the app, initiates her journey, and finally refers to the app to others based on her experience. The diagram highlights potential problems and solutions at each stage, emphasizing the importance of accurate location, reliable filters, real-time updates, robust error handling, and easy sharing options for a seamless user experience.

5.5. UXI Matrix

UXI Matrix	Target Personas				Estimates & Priority			UXI Metrics		UX Staffing			
	Anusha Rameshur	Cameron Williamson	Liam Patel	Wade Warren	UX Complexity	PO Business Impact	Dev Est./Story Points	Story Verified	Design Complete	Task Completion Rate	xD Assigned	UR Assigned	VD Assigned
Core Functionality													
(Focus group: Q8) User profile and Authentication	Y	Y	Y	Y	1	M		Y					
(Focus Group: Q4) Multi - Mode Transport support	Y	Y			3	H		Y					
(Survey: Q17) Real time scheduling & updates	Y		Y	Y	2	H		Y					
(Survey: Q17) GPS Accuracy tracking	Y	Y			1	H		Y					
(Secondary Research) Trip planning and route	Y	Y	Y	Y	4	H		Y					
(Focus group: Q8) Booking & Ticket Purchase	Y	Y	Y	Y	2	H		Y					
User Experience													
(Focus group: Q7 & Q3) Customized, Minimalistic Interface	Y	Y	Y	Y	4	H		Y					
(Secondary Research) Notification	Y		Y	Y	2	M		Y					
(Survey: Q12) Background music option			Y		1	L		Y					
User Convenience													
(Survey: Q19) Integrated different payment methods			Y		2	H		Y					
(Focus group: Q7) Online and offline mode option				Y	3	M		Y					
(Focus group: Q7) Driving aids (Driving Assistance Systems)				Y	5	H		Y					
(Survey: Q18) Cost Optimisation		Y		Y	1	H		Y					
(Survey: Q9) Promotion and Loyalty Program			Y	Y	1	H		Y					
Overall Persona Weight	8	7	9	11									
Persona Verified	Y	Y	Y	Y									
#Participated in Testing													
Task Completion Rates													
Persona SUS Score													
Persona Net Promoter													

Figure 32 - UXI Matrix

Legend:

Y = Yes

UX Complexity:

- **1:** Simple feature with minimal design effort
- **2:** Requires clear information hierarchy and visual design
- **3:** Involves complex information architecture, user flows, and potential personalization
- **4:** Involves map integration, user interaction design and user preferences
- **5:** Complex interaction design and potential safety considerations

PO Business Impact:

- **High:** Significant impact on user satisfaction, retention, and revenue
- **Medium:** Moderate impact on user satisfaction, retention, and revenue
- **Low:** Minimal impact on user satisfaction, retention, and revenue

5.6. Initial sketches

Register account

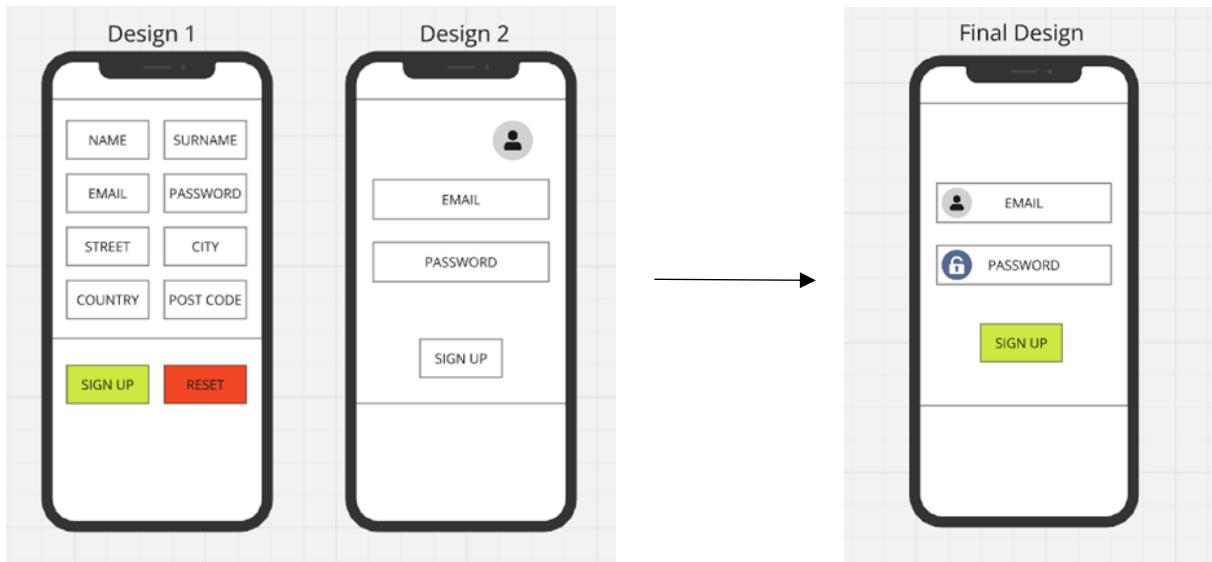


Figure 33 - Registration pages of initial design

This image shows a progression of design sketches for a registration page in the transport app. It begins with "Design 1," which has multiple input fields (Name, Surname, Email, Password, Street, City, Country, Post Code) and two buttons: "Sign Up" and "Reset." In Design 1, the overall layout feels cluttered with excessive information, which could overwhelm users, potentially leading to disengagement. This aligns with reducing memory load, as the design could benefit from minimizing the number of fields that users need to process. The placement of the "RESET" button also poses a risk of accidental clicks, which would force users to re-enter their information and contribute to frustration. This addresses error prevention, as accidental resets can interrupt the user experience.

"Design 2" simplifies the layout by reducing the fields to just Email, Password, and a "Sign Up" button, integrating all necessary details later in the signup flow. This aligns with flexibility and efficiency of use, allowing users to fill out only critical fields initially. It also follows Newman's heuristic of error prevention, as removing the "RESET" button reduces the chance of users accidentally erasing their input.

The "Final Design" is even more minimal, retaining only Email, Password fields, and a "Sign Up" button with the addition of universally recognized icons. The use of icons follows the 'speak the user's language' heuristic, making it easy for users to understand the purpose of each field, regardless of language barriers. As these are early low-fidelity designs, there were still ideas for improvement, such as adding "Enter Details" prompts or allowing users to switch between signup and login. This would support flexibility and efficiency of use, giving users options based on their needs and improving the user experience overall.

Selection of Mode of Transport



Figure 34 - Selection of Mode of Transport design pages

Design 1 adopts a visual approach, utilizing icons for various transport options, which enhances visual appeal and facilitates quick selection. The icons help users recognize options without needing to read through text, supporting fast decision-making on mobile devices and aligning with user's language. However, relying solely on icons introduces potential ambiguity, as some symbols may not be universally understood. Adding brief labels or tooltips would address this by supporting recognition rather than recall, helping users confidently identify each option without risk of misinterpretation. The layout also prioritizes accessibility with a prominent map and navigation bar, aligning with flexibility and efficiency of use by making core elements easily accessible.

In contrast, Design 2 uses a text-based list within a dropdown-style selector, which provides clarity by eliminating the risk of icon misinterpretation and aligns with what the user sees in the real world. The dropdown reduces on-screen clutter, offering a cleaner interface, which supports minimizing the gulf of execution and evaluation. However, the absence of visual elements makes this design less engaging, potentially affecting the experience of users who rely on visual cues. Incorporating small icons alongside each transport method could enhance visual appeal while maintaining clarity, aligning with aesthetic and minimalist design.

The final design synthesizes the strengths of both approaches. By combining icons with text labels, it ensures clear understanding for all users, addressing both error prevention and recognition rather than recall. The dropdown format reduces clutter by allowing users to

expand or collapse options, supporting flexibility and efficiency of use and a minimalist design. Additionally, the inclusion of a search bar enables users to quickly select their preferred transport method, enhancing efficiency of use and further reducing clutter. This balanced approach creates an interface that is intuitive, visually engaging, and efficient, providing a more user-friendly experience overall.

Map (direction)

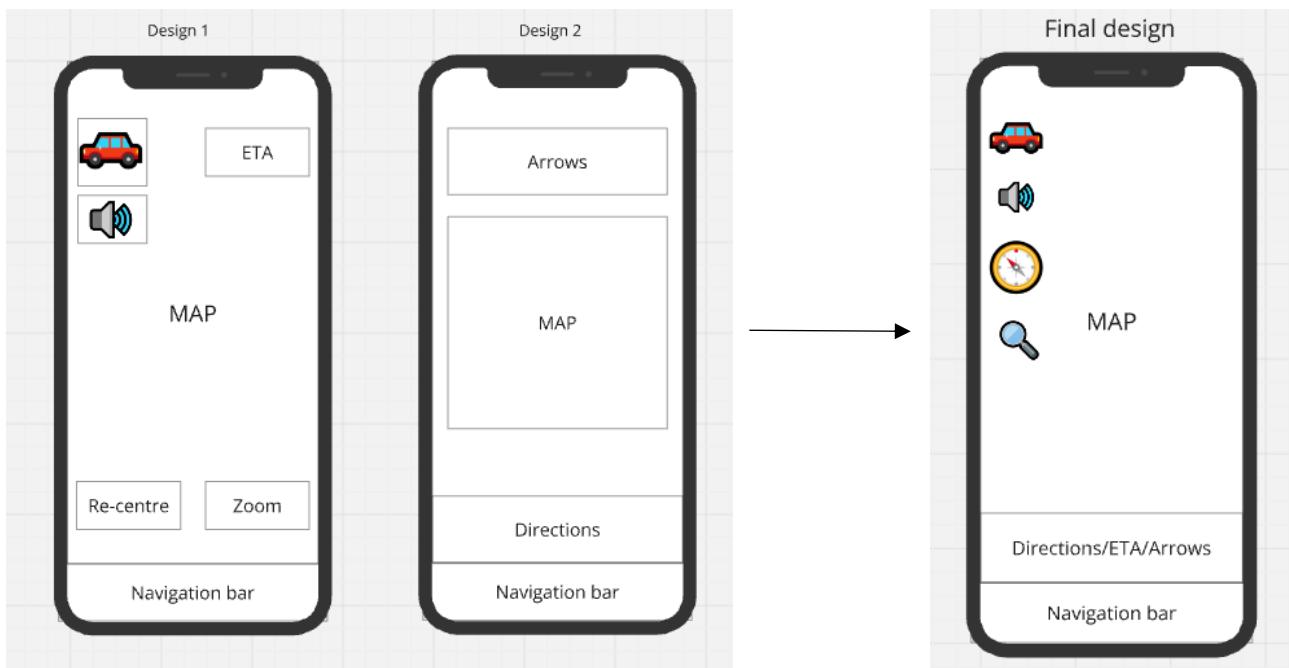


Figure 35 - Initial map designs

Design 1 is a full-screen map with floating information panels, providing an immersive and visually appealing experience. This design supports aesthetic and minimalist design by focusing on the map and key information only. The chosen method of transport, estimated time of arrival (ETA), and two important buttons for re-centering and zooming enhance usability, aligning with flexibility and efficiency of use. Icons or arrows mark directions and appear contextually as the user approaches their next turn, reducing reliance on text and supporting recognition rather than recall, as users can understand their next steps without additional cognitive load.

Design 2 features a split-screen layout, where the map is positioned in the middle with text-based directions at the bottom and directional arrow icons above. While this layout provides both visual and textual information, it may cause users to shift their focus between sections, which can be distracting and may not fully align with minimize the gulf of execution and evaluation.

After analysing both designs, we created a final design focused on helping users navigate from point A to point B without distractions. Recognizing that unnecessary information could divert attention, we aimed to simplify the direction page by limiting content, following aesthetic and minimalist design and error prevention. To enhance user immersion, we introduced an audio direction feature, allowing users to keep their eyes on the road and interact less with the screen, aligning with flexibility and efficiency of use.

We adopted the full-screen map approach, as the split-screen layout could be harder to interpret quickly. To make the directions more visible, we combined directional arrows with ETA into a single area, reducing the need for users to shift their gaze, thereby supporting minimize the gulf of execution and evaluation. The re-center and zoom buttons were scaled down to smaller icons to reduce clutter, and their opacity was slightly lowered to prevent interference with the map view, aligning with aesthetic and minimalist design. This approach balances necessary functionality with simplicity, creating an intuitive and user-focused navigation experience.

Payment Page

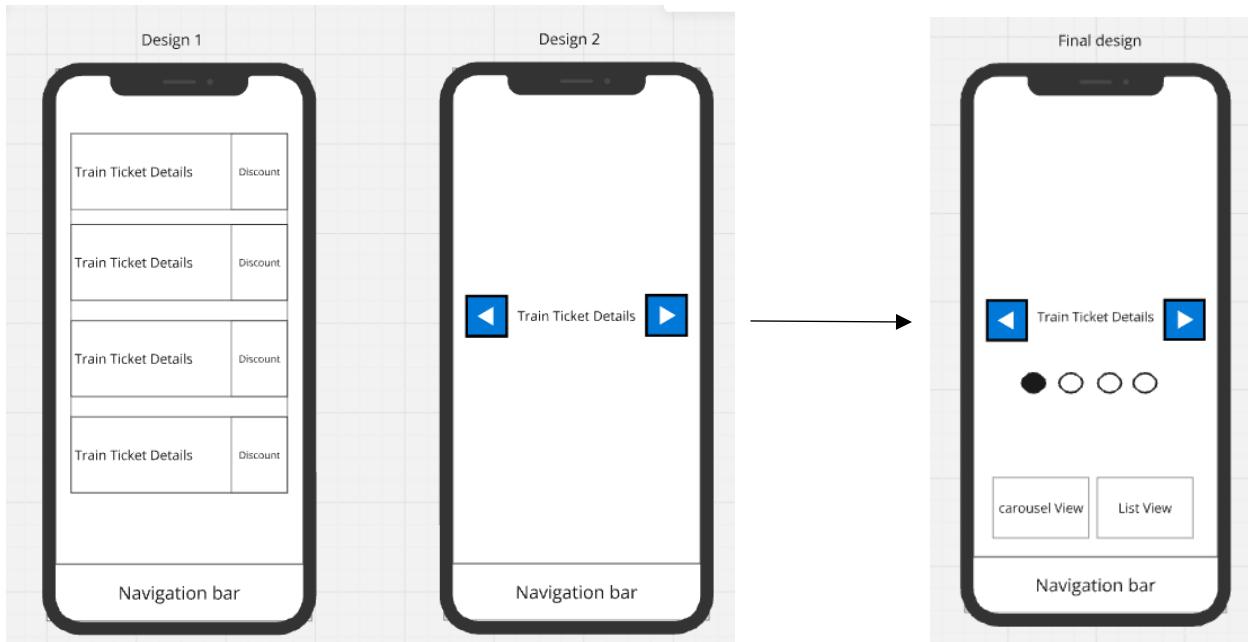


Figure 36 - Design of payment pages

Design 1 adopts a list-based layout, presenting multiple ticket options vertically with a "Discount" label next to each ticket. This format aligns with recognition rather than recall, as users can quickly scan and compare options, which is especially useful when there are multiple ticket types or discount levels. However, on mobile screens, this list could feel

cluttered and overwhelming if there are numerous options to scroll through, potentially violating the aesthetic and minimalist design principle. Adding visual separators or subtle backgrounds for each item would help distinguish individual tickets and reduce visual clutter, enhancing readability and perceptibility of information. Additionally, adding a clear call-to-action button, such as "Select" or "More Details," would make the layout more actionable, supporting flexibility and efficiency of use by enabling users to take immediate action on each option.

Design 2, in contrast, takes a single-item carousel approach, displaying one ticket at a time with navigation arrows. This focused layout minimizes clutter, providing a more prominent and immersive presentation of each ticket, aligning with the aesthetic and minimalist design principle. This design is ideal for users who prefer a more detailed exploration, but the requirement to navigate through each option individually may slow down the experience, especially if there are many options. Adding a visual indicator, such as dots or numbers to show the user's position in the carousel, would align with the minimize the gulf of execution and evaluation principle, providing a clearer sense of orientation and helping users understand how many options remain.

The final design combines the strengths of both layouts, allowing users to toggle between a list view for quick comparison and a carousel view for focused browsing. This flexibility supports user control and freedom, as users can choose the most convenient browsing method based on their preferences. The addition of a progress indicator in the carousel view shows users their position in the sequence of tickets, reinforcing feedback and visibility of system status, which gives users a better sense of control and enhances the browsing experience. This hybrid approach aims to create a balanced, user-friendly interface that is both efficient and visually engaging, catering to diverse user preferences.

6. Reference

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7. Appendices

Contribution Table

Contribution Table	
Team Members	Contibution
Arusha	Problem Definition, Functional, Non functional, user usability, Environmental Requirements, Persona, user story, UXI Matrix.
Manasi	Heuristics, Data gathering methods for Survey and Focus group, Analyse survey, Persona, User stories, Initial sketches
Sneha	Heuristics, Behavioural variable mapping, UXI Matrix.
Jason	Heuristics, Triangulation, Persona, User journey, UXI Matrix.
Nageswararao	Heuristics, Triangulation,User stories, UXI Matrix.
Kuba	Heuristics, Triangulation, Analysis of focus groups 1 and 2, Persona, Initial design sketches.

Table 7 - Contribution Table

Focus Group Roles and Responsibilities

Focus Group Participation		
	Action	Members involved
Focus Group 1	Conduct discussion	Arusha & Kuba
	Time keeper	Manasi
	Note takers	Sneha, Jason, Nageswararao
Focus Group 2	Conduct discussion	Arusha & Manasi
	Time keeper	Kuba
	Note takers	Sneha, Jason, Nageswararao

Table 8 - Focus Group Roles and Responsibilities

Ethical Approval Request Form



MIDDLESEX UNIVERSITY

PARTICIPANT SHEET (PIS)

Participant ID Code:.....

1. Study title

User research, design and evaluation of a transport system prototype (MauTransport)

2. Invitation paragraph

You are being invited to take part in a user research study by year 3 students pursuing BSc in Computer Science, and IT. We are Arusha Ramessur, Kuba Sobczak, Manasi Chundunsing, Sneha Gunput, Jason Bheekarry, and Yashvin Balloo. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Thank you for reading this.

3. What is the purpose of the study?

The purpose of the work is to carry out user research towards the design of a mobile app for transport facilities in Mauritius called MauTransport.

4. Why have I been chosen?

It is important that we assess as many participants as possible, and you have indicated that you are interested in taking part in this study. To ensure eligibility, please confirm that you meet the following criteria:

- Be at least 18 years old.

- Be enrolled in a Bachelor of Science program at Middlesex University Mauritius in one of the following: Computer Science, Cybersecurity, or Information Technology.

You have been chosen as eligible because your design needs are closely matched with the potential end users of the system which plan to design. Your experiences with similar systems will give us a useful indication of whether our intended design that will meet with all design needs.

5. Do I have to take part?

It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time and without giving a reason. If you do decide to withdraw from the study then please inform the researcher as soon as possible, and they will facilitate your withdrawal. If, for any reason, you wish to withdraw your data please contact the researcher within a month of your participation. After this date it may not be possible to withdraw your individual data as the results may have already been published. However, as all data are anonymised, your individual data will not be identifiable in any way.

6. What will I have to do?

- The session will take no more than 30 minutes.
- You will only need to participate in one of the following:
 - Focus group
 - Survey

8. What are the possible disadvantages and risks of taking part?

It is unlikely that you will feel any discomfort during the session, but if you do you can stop immediately. Appropriate risk assessments for all procedures have been conducted and will be followed throughout the duration of the study.

9. What are the possible benefits of taking part?

The information we get from this study may help us to improve the design of existing artefacts/designs. There is no intended benefit to the participant.

9. Will my taking part in this study be kept confidential?

The research team has put a number of procedures in place to protect the confidentiality of participants. You will be allocated a participant code that will always be used to identify any data you provide. Your name or other personal details will not be associated with your data, for example, the consent form that you sign will be kept separate from your data. All paper

records will be stored in a locked filing cabinet, accessible only to the research team, and all electronic data will be stored on a password protected computer. All information you provide will be treated in accordance with the UK Data Protection Act.

10. What will happen to the results of the research study?

The results of the research study will be used as part of the UX Design Module. The results may also be presented at conferences or in journal articles. However, the data will only be used by members of the research team and at no point will your personal information or data be revealed.

11. Who has reviewed the study?

The study has received full ethical clearance from the Research ethics committee who reviewed the study. The committee is the Middlesex Psychology Department Research Ethics Committee

12. Contact for further information

If you require further information, have any questions or would like to withdraw your data then please contact:

Dr Priscilla Ramsamy, School of Computer Science, Middlesex University Mauritius Branch Campus, Flic en Flac, p.ramsamy@mdx.ac.mu

Thank you for taking part in this study. You should keep this participant information sheet as it contains your participant code, important information and the research teams contact details

Middlesex University Guide to Research Privacy Notices

Privacy notices need to be presented whenever data is collected and should be understandable and accessible. Privacy notices must explain the type and source of data that will be processed. They will also set out the processing purpose, data retention schedules and data sharing. Privacy notices must include details of the subject's rights and who the subject can complain to.

The following example may be used and completed for your research purposes.

Middlesex University Privacy Notice for Research Participants

The General Data Protection Regulation (GDPR) protects the rights of individuals by setting out certain rules as to what organisation can and cannot do with information about people. A key element to this is the principle to process individuals' data lawfully and fairly. This means we need to provide information on how we process personal data.

The University takes its obligation under the GDPR very seriously and will always ensure personal data is collected, handled, stored and shared in a secure manner. [The University's Data Protection Policy can be accessed here](#): https://www.mdx.ac.uk/_data/assets/pdf_file/0023/471326/Data-Protection-Policy-GPS4-v2.4.pdf.

The following statements will outline what personal data we collect, how we use it and who we share it with. It will also provide guidance on your individual rights and how to make a complaint to the Information Commissioner's Officer (ICO), the regulator for data protection in the UK.

Why are we collecting your personal data?

As a university we undertake research as part of our function and in our capacity as a teaching and research institution to advance education and learning. The specific purpose for data collection on this occasion is to ...evaluate a software prototype.

The legal basis for processing your personal data under GDPR on this occasion is Article 6(1a) consent of the data subject.

Transferring data outside Europe

In the majority of instances your data will be processed by Middlesex University researchers only or in collaboration with researchers at other UK or European institutions so will stay inside the EU and be protected by the requirements of the GDPR.

In any instances in which your data might be used as part of a collaboration with researchers based outside the EU all the necessary safeguards that are required under the GDPR for transferring data outside of the EU will be put in place. You will be informed if this is relevant for the specific study you are a participant of.

Your rights under data protection

Under the GDPR and the DPA you have the following rights:

- to obtain access to, and copies of, the personal data that we hold about you;
- to require that we cease processing your personal data if the processing is causing you damage or distress;
- to require us to correct the personal data we hold about you if it is incorrect;
- to require us to erase your personal data;
- to require us to restrict our data processing activities;
- to receive from us the personal data we hold about you which you have provided to us, in a reasonable format specified by you, including for the purpose of you transmitting that personal data to another data controller;

- to object, on grounds relating to your particular situation, to any of our particular processing activities where you feel this has a disproportionate impact on your rights.

Where Personal Information is processed as part of a research project, the extent to which these rights apply varies under the GDPR and the DPA. In particular, your rights to access, change, or move your information may be limited, as we need to manage your information in specific ways in order for the research to be reliable and accurate. If you withdraw from the study, we may not be able to remove the information that we have already obtained. To safeguard your rights, we will use the minimum personally-identifiable information possible. The Participant Information Sheet will detail up to what point in the study data can be withdrawn.

If you submit a data protection rights request to the University, you will be informed of the decision within one month. If it is considered necessary to refuse to comply with any of your data protection rights, you also have the right to complain about our decision to the UK supervisory authority for data protection, the Information Commissioner's Office.

None of the above precludes your right to withdraw consent from participating in the research study at any time.

Collecting and using personal data

We will record your utterances and input actions as you use the prototype. We will also record your answers to questions after you have used the prototype.

Data sharing

Your information will usually be shared within the research team conducting the project you are participating in, mainly so that they can identify you as a participant and contact you about the research project.

Responsible members of the University may also be given access to personal data used in a research project for monitoring purposes and/or to carry out an audit of the study to ensure that the research is complying with applicable regulations. Individuals from regulatory authorities (people who check that we are carrying out the study correctly) may require access to your records. All of these people have a duty to keep your information, as a research participant, strictly confidential.

If we are working with other organisations and information is shared about you, we will inform you in the Participant Information Sheet. Information shared will be on a 'need to know' basis relative to achieving the research project's objectives, and with all appropriate safeguards in place to ensure the security of your information.

Storage and security

The University takes a robust approach to protecting the information it holds with dedicated storage areas for research data with controlled access.

Alongside these technical measures there are comprehensive and effective policies and processes in place to ensure that users and administrators of University information are aware of their obligations and responsibilities for the data they have access to. By default, people are only granted access to the information they require to perform their duties. Training is provided to new staff joining the University and existing staff have training and expert advice available if needed.

Retention

Under the GDPR and DPA personal data collected for research purposes can be kept indefinitely, providing there is no impact to you outside the parameters of the study you have consented to take part in.

Having stated the above, the length of time for which we keep your data will depend on a number of factors including the importance of the data, the funding requirements, the nature of the study, and the requirements of the publisher. Details will be given in the information sheet for each project.

Contact us

The Principal Investigator leading this research Dr Priscilla Ramsamy
Dr Priscilla Ramsamy, Middlesex University Mauritius Branch Campus, Flic en Flac
p.ramsamy@mdx.ac.mu



The University's official contact details are:

Data Protection Officer
Middlesex University
Flic en Flac
Mauritius

Email: p.ramsamy@mdx.ac.mu

Signed Consent Forms



Study title

User research, design and evaluation of a transport system prototype (MauTransport)

Invitation paragraph

You are being invited to take part in a user research study by year 3 students pursuing BSc in Computer Science, and IT. We are Arusha Ramessur, Kuba Sobczak, Manasi Chundunsing, Sneha Gunput, Jason Bheekarry, and Yashvin Balloo. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Thank you for reading this.

What is the purpose of the study?

The purpose of the work is to carry out user research towards the design of a mobile app for transport facilities in Mauritius called MauTransport.

Confidentiality and Anonymity:

To maintain your privacy, you will be assigned a Participant ID Code. Your responses will remain anonymous, and your name will not be associated with any of the data collected. All information you provide will be strictly confidential.

Consent

By signing below, you confirm that you:

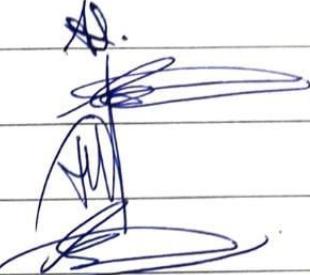
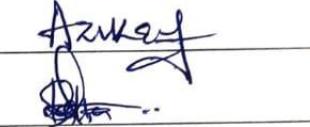
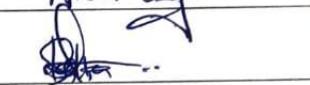
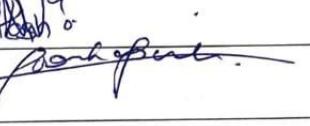
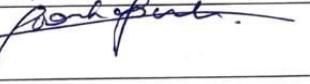
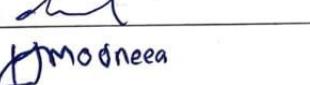
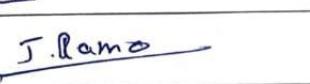
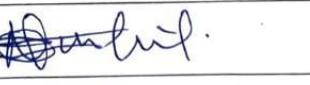
- Have read and understood the information above.
- Are at least 18 years old.
- Agree to participate in this study voluntarily.

Survey:

P1	
P2	
P3	



P4	
P5	
P6	
P7	
P8	
P9	
P10	
P11	
P12	
P13	
P14	
P15	
P16	
P17	
P18	
P19	
P20	

P21	
P22	
P23	
P24	
P25	
P26	
P27	
P28	
P29	
P30	
P31	
P32	
P33	
P34	
P35	



P36	
P37	
P38	 Cquay
P39	 Donor.
P40	
P41	
P42	
P43	
P44	
P45	
P46	
P47	
P48	
P49	
P50	



Focus group:

P1	
P2	
P3	
P4	
P5	
P6	
P7	
P8	
P9	
P10	
P11	
P12	
P13	
P14	
P15	
P16	



P17	
P18	
P19	
P20	
P21	
P22	
P23	
P24	
P25	

Questionnaire for Survey

CST3180-Data-Gathering: MauTransport User Experience Survey

Thank you for participating in our survey! We are gathering insights to help design MauTransport, a user-friendly transportation app specifically tailored for Mauritius. Your responses will guide us in creating an intuitive and efficient user experience that meets the needs of our community. By understanding your preferences, habits, and challenges with public transport, we can develop features that will make traveling easier and more convenient for everyone. Your input is valuable, and we appreciate your time and feedback as we work to improve transportation services in Mauritius.

1. What is your age? *

Enter your answer

2. What is your gender? *

Woman

Man

Non-binary

Prefer not to say

3. Which country are you from? *

Enter your answer

4. In which city are you currently living in? *

Enter your answer

5. What is your highest level of education? *

- PhD
- Master
- Bachelor
- Diploma or High school equivalent

6. What type of smartphone do you use? *

- Android
- iOS
- HarmonyOS

7. How often do you use your smartphone each day? *

- less than 3 hours
- 4 to 7 hours
- More than 8 hours

8. Have you ever done internet banking transactions or in app-purchases within an application? *

- Yes
- No
- Neither

9. On a scale of 1 (lowest) to 5 (highest), how would discounted fares impact your likelihood of using public transport more frequently? *

1	2	3	4	5
---	---	---	---	---

10. What is your favourite brand? *

Enter your answer

11. List 3 of your favourite applications/website: *

Enter your answer

12. How do you feel about an application that offers background music while browsing a transportation application? *

HATE IT 😞 😞 😞 😞 😞 LOVE IT

13. Would you like to be greeted by any of the following instruction manual when you're first opening the application: *

- an in-app tutorial
- a video guide
- written instructions
- All the 3 above
- None of the above

14. What mode of transportation do you use most often? *

- Bus
- Metro
- Car (personal use)
- Taxi services/carpool
- Bicycle

15. How do you feel about the current state of public transport in your area? *

Poor      Great

16. List 3 issues faced when using transportation apps *

Enter your answer

17. List 3 services which you think is beneficial when using a transportation application *

Enter your answer

18. List 3 reasons that encourages you to use public transport rather than driving: *

Enter your answer

19. How often do you check public transport schedules online before traveling? *

Every time I travel

Most of the time

Occasionally

Rarely

Never

20. How would you describe your experience level with using transportation apps? *

Novice (I'm new to using them)

Casual (I use them occasionally)

Expert (I use them regularly and am very familiar with them)

Focus group Raw data

Focus group 1:

Q1 = list 3 app/website you enjoy using regularly

Speaker 1 = YouTube, TikTok, cracked website

WHY?

- Free
- Ease of use / navigation / search

Speaker 2 = Instagram, temu, games

Speaker 3 = mobile version of express, YouTube, twitter

WHY?

- To receive latest information

Speaker 4 = Instagram, twitter, TikTok

Speaker 5 = reddit, steam, Instagram

WHY?

- Plays games frequently

Speaker 6 = Pinterest, YouTube, Instagram

Speaker 7 = Pinterest, YouTube, TikTok

Speaker 8 = YouTube, discord

Most popular = YouTube

Why?

- Very multi-functional, can watch all types of different content, eg. Entertainment, educational, research. Multipurpose. Convenient.

Q2 = What device would you use to plan your trip

Speaker 1 = laptop, **smartphone**

WHY?

- Both are user friendly for the purpose

Speaker 2 = **smartphone**

Speaker 3 = **no** device

WHY?

- Good knowledge of the island

Speaker 4 = laptop

WHY?

- Can plan multiple routes on different tabs easily

Speaker 5 = **smartphone**

WHY?

- Easy access to phone

Speaker 6 = **smartphone**, laptop

Speaker 7 = **smartphone**

WHY?

- Ease of use

Most popular = smartphone

WHY?

- Very conventional, as when traveling phone is easy to pull out and use rather than a laptop. Ease of use.

Q3 = If an app offers you loyalty incentives, list 3 benefits you would like to have.

Speaker 1 =

- alternative direction if there is congestion
- **Point system / discount**
- Don't want car share

Speaker 3 =

- Optional to car share

Speaker 4 =

- Free rides / **point system**
- Money back
- Voucher for other shops

Speaker 5 =

- **Discount**
- Priority transport

Speaker 6 =

- Optional to car share / **point system**

Speaker 8 =

- Priority transport

Most popular = Point system / discount

WHY?

- To save money

Q4 = Would you prefer if a transportation app offers multiple modes of transport?(e.g.: metro, bus, bicycle, etc)

All speakers answered = **yes**

WHY?

You can check what the route and distance is for each method of transport allowing you to choose the most convenient option.

Q5 = On a scale of 1 (lowest) to 5 (highest), how do the visual aspects and fluidity of the navigation system influence your satisfaction with the service?

Speaker 1 = 4/5

WHY?

- There are many apps where you can get lost, it would be good to navigate everywhere with one or two clicks

Speaker 2 = 4/5

Speaker 3 = 5

Speaker 4 = 5

WHY?

- On a navigation app the visual design is most important, the easier it is to see the better the app

Speaker 6 = 5

WHY?

- If it's a big app with multiple transport options, if the design is not done correctly it will lead to confusion

Speaker 5 = 5

Most popular = 5 (high)

WHY?

- If the navigation system is not good, you'll just use it once and wouldn't want to come back

Q6 = How would you describe the design of your chosen favorite apps or websites in terms of its aesthetic features, responsiveness and services it offers?

Speaker 1 =

- **The simplicity of the UI**
- Searching for things is easy

Speaker 5 =

- **simple layout**
- Know where everything is
- Neat
- Dynamic and smooth

Speaker 3 =

- Precise and convince
- No elements on top of each other

Speaker 7 =

- **Simple**
- Well designed
- However still provides you with the functionality

Speaker 8 =

- Quick, smooth, simple
- Very responsive and fast
- **Simplicity**

Most popular = Simplicity

WHY?

The whole point of a navigation system is to get the user from point A to B as fast as possible, with no confusion. A simple layout promotes this as a design with multiple colors and a lot going on could distract and slow down the user.

Q7 = List 5 kind of customization would you prefer having on a navigation app.

Speaker 4 =

- Filters
- Sorting different modes of transport
- Traffic lines are red

Speaker 5 =

- Colour-blind mode

Notes (spoke about after questions):

Privacy, logging into the app, 2FA, security features, bio-metrics

Focus group 2:

1: List 3 apps or websites do you enjoy using regularly?

+ **why** do you like these apps?

Speaker 1: YouTube, TikTok, **Instagram**

- Likes YouTube because it knows your video preferences, recommendations

Speaker 2: Pinterest, Spotify, YouTube

- minimalistic interface especially for Pinterest, Spotify, allows to make her own playlist. YouTube get recommendations

Speaker 3: Netflix **Instagram**, TikTok

- Netflix get reminders of new movies

Speaker 4: My health app

- get constant reminders, notification usability

Speaker 5: **Instagram**, Snapchat, WhatsApp

- WhatsApp because it is easy to use for communication, Instagram and snapchat because get to chat with close friends and explore contents

Speaker 6: Netflix, **Instagram**, google maps.

- Google map, because the participant moves around a lot. Save location that he visits frequently, to get directions.

Speaker 7: TikTok

- Entertainment

Speaker 8: WhatsApp, discord, YouTube

- Good for communication and for entertainment

Speaker 9: Discord

- to keep up with his community, chat share files

Speaker 10: Telegram

Most popular = Instagram

Q2: What device would you use to plan your trip

+ **why**?

Speaker 1: **Smartphone**

Speaker 2: Computer larger layout

Speaker 3: Laptop

Speaker 4: **Smartphone**

- because it's portable easily accessible, we always have our phone handy

Speaker 5: usually **Smartphone**, but laptop for more research

- laptop has a bigger screen, easier to grasp information

Speaker 6: **Smartphone**

Speaker 7: **Smartphone**

Speaker 8: **Smartphone**

Speaker 9: Laptop

Speaker 10: **Smartphone**

Most popular = Smartphone

Q3 = If an app offers you loyalty incentives, list 3 benefits you would like to have.

1. Cashback loyalty
2. Point basis loyalty
3. Priority in case of traffic

Q4 = Would you prefer if a transportation app offers multiple modes of transport? (e.g.: metro, bus, bicycle, etc)

Majority answer = Multiple mode, because sometimes you need to take the metro, then the bus. So, **all in one** is beneficial. So that not to download a lots of app, save storage in phone.

Q5 = On a scale of 1 (lowest) to 5 (highest), how do the visual aspects and fluidity of the navigation system influence your satisfaction with the service?

+Why?

Speaker 1: Minimalistic

- so that not to be distracted while driving, so that not to take attention

Speaker 2: Minimalistic

- driving on, off. If driving = minimalistic and if not driving = enable other options

Speaker 3: Detailed + no distractions

- Detailed when looking for transport, No music in the background

Speaker 4: Both

Speaker 5: Both

Speaker 6: Minimalistic

Speaker 7: Minimalistic

Speaker 8: Both

Speaker 9: Minimalistic

Most popular = Minimalistic

WHY?

When using a navigation app, the purpose is to reach A to B as fast as possible. Not having a minimalist design can cause danger when driving and delays due to unclear display for roads, 2 modes. One for when browsing and one for when on journey (Simplistic/Detailed).

Q6 = How would you describe the design of your chosen favorite apps or websites in terms of its aesthetic features, responsiveness and services it offers?

Speaker 1: Easy to use, minimalist, easy to see and find way around. Do not like complicated app.

Speaker 2: Different purpose it offers

Speaker 3: **Minimalistic**, aesthetic pleasing

Most popular = Ease of use / minimalism

Q7 = List 5 kind of customization would you prefer having on a navigation app.

Speaker 1: Icons organization based on user preference. Hide option they do not use.
different modes of navigation,

Speaker 2: Organization of modes of transportation

Speaker 3: Google map type easy to use

Speaker 4: Customize the view of the apps.

Speaker 5: User customize name of street.

Most popular= **User customization**

Why?

Be able to change certain things based on their preference

Note: (spoke about after questions):

Would you buy your ticket in advance or on spot?

Yes book in advance. But should have refund option.

Both option. That is ticket option and naviagation also.

User login is important. Link payment card to account.

Would you be interested in carpooling option in the app?

Yes want carpooling option

No, not safe. Even if the cost is being shared, they won't car pool. Huge factor: safety.

If there are certified driver, then user finds it credible.