

Wal-c-r (walk-cycle-ride)

*The personal walking and cycling travel application for London*

By

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## ABSTRACT

What role does the technology we use every day influence the planning and execution of our daily active (walking & cycling) transportation habits, and are the current application offerings up to the task of promoting and encouraging these habits evenly across our society, or are they currently leaving many without an accessible platform? The study aims to identify whether a targeted software intervention can promote active journey choices across underrepresented and non-participating groups and challenge barriers to uptake within these groups.

## Declaration

I hereby certify that this report constitutes my own work, that where the language of others is used, quotation marks so indicate, and that appropriate credit is given where I have used the language, ideas, expressions, or writings of others.

I declare that this report describes the original work that has not been previously presented for the award of any other degree of any other institution.

James Simmonds

17/05/2023

Signed.

A handwritten signature in black ink, appearing to read "J. H. Simmonds".

### **Acknowledgements**

Special thanks to all the lecturers at the University who have supported my journey over the last two years to reach the point of completing this milestone, it would not have been possible without you.

A massive thank you to Graham Lane who as the project supervisor has supported me over the course of the project providing guidance and keeping me on track when it seemed overwhelming at times.

Lastly to my family and friends who supported me and tolerated me throughout the completion of this project.

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## **Introduction**

Wal-c-r (walk-cycle-ride) project aims to create a handy accessible to all personal travel application to promote active (walking & cycling) journey choices in London in under-represented, non-participating groups.

The scope of the project's research endeavours to examine the relationship between technology and participation in active transportation, offering an insight into current active transport trends in London, the current associated technology landscape, examination of local, national, and non-governmental future planning strategies, with the aim of identifying potential stakeholders and the barriers they face to participation and how best to target a software application solution that can drive uptake in active journey choices.

Through analysis of the background research, supported by primary research in the form of a survey and employing software development Agile methodology the project seeks to make informed design and features choices in the development of a Minimal viable product (MVP), that in turn can be evaluated through targeted usability testing, to determine the viability of the product, and develop a future development roadmap for the application.

## **Problem that will be addressed**

Identifying a best practice approach in the creation of a software application intervention to challenge barriers to participation, and drive uptake of active journey choices amongst underrepresented or non-participating groups.

## **Aims & Objectives**

### **Aims:**

- Create a handy web-based application for active journey planning in London
- Inspire people to walk and cycle more through technology
- Create an accessible platform that challenges the barriers to active journey participation.

### **Objectives:**

- Research local, national government and NGO strategies to encourage a wider uptake of both walking and cycling, with a view to identifying the barriers to uptake.
- Conduct primary research in the form of a survey to support the background research.
- Examine the ethics, security, legalities, and privacy concerns of Web API technology.
- Design and execute an MVP from user stories derived from the research data.
- Test and evaluate the product to define further iterations and future roadmap.

## **Legal, Social, Ethical and Professional Considerations**

### **Ethics**

Reimplementation and reusability of code has been paramount in the evolution of computer science as hardware progressed and code was required to be reimplemented for new systems.

The use of APIs raises ethical concerns around data privacy and vendor lock-in, where developers are unable to customize or innovate due to reliance on proprietary APIs. Open-source APIs and reusable code libraries offer a solution by allowing free modification and redistribution, facilitating flexibility, and innovation, as well as reducing duplication and speeding up development. Prioritizing these options can create a more ethical, customizable, and innovative software ecosystem.

### **Legalities**

#### Copyright Vs. Fair use – Oracle vs. Google [1]

The litigation undertaken by Oracle against Google relates to a dispute over whether Google's use of Java application programming interfaces (APIs) in its Android operating system constitutes fair use or copyright infringement.

Oracle, which owns the copyright for Java, sued Google in 2010, claiming that Google had copied more than 11,000 lines of Java code and the structure, sequence, and organization of the Java APIs in Android without permission. Google argued that its use of the APIs was a fair use, which allows limited copying of copyrighted material for certain purposes, such as commentary, criticism, or educational use.

The case went through several rounds of appeals during which the rulings switched in favour between the plaintiff and the defendant on several occasions, finally the United States Supreme Court ruled in favour of Google in 2021 stating that Google's use of the Java APIs was a fair use under copyright law. The court determined that the APIs were functional and therefore not protected by copyright law.

The outcome of the Oracle vs. Google case highlights the need for clarity and legal frameworks that strike a balance between protecting intellectual property rights and fostering open innovation through the free use of APIs. It underscores the importance of understanding the legal implications and potential limitations when utilizing web APIs, particularly in terms of copyright and licensing requirements.

Within the project multiple API's have been employed, their usage in all cases have been subject to limitation of usage T's & C's, whether that be a limit on daily calls within a "free use" pay wall, or in the case of the Google maps API a free 3-month trial period was given as a fair use for education or early development. These limited usage licences allow the freedom for innovation whilst still protecting intellectual property from being exploited for profit without adequate reparation.

### **Geolocation data**

The opinion of the European Union Article 29 Data Protection Working Party (WP29) on geolocation services and tracking technologies, published in 2011, provides guidance on the ethical and legal implications of geolocation in terms of personal privacy. [2]

The legal framework includes the EU Data Protection Directive and the e-Privacy Directive, which emphasize the importance of informed consent and data protection when collecting geolocation data.

Key points from the opinion include the need for informed consent, data protection measures, addressing risks associated with geolocation tracking, and implementing privacy-by-design principles.

To ensure compliance, the project required test users to sign a consent form, and physical testing was conducted using personal hardware instead of users' own devices. In a production version of the application, user consent would need to be incorporated to adhere to the necessary governance and comply with legislation.

## **Cyber Security**

The primary cause of the increased focus on API vulnerabilities among bad actors is the rapid rise in the usage and dependence on APIs in contemporary application architectures. Even though API usage dates back much further than the present, many of the most serious API security issues, in terms of potential records breaches and data involved, have happened in the past few years.

No Name Security cited in their “The 2022 API Security Trends Report” that two variants of the same problem, data breaches and accidental data exposure, were the API security pain points that are the most frequently reported security breaches.

Data breaches are typically viewed as the most severe negative consequence of a security vulnerability at a corporate level because of the brand harm and direct costs associated with them, such as having to pay for consumer credit monitoring or deal with legal issues. Whereas for the user it can lead potentially lead to identity theft and financial fraud. [3]

A malicious actor was able to request user account data, including age, gender, city, weight, and birthdate, in 2021 thanks to a leaky API managed by Peloton. An authorization vulnerability persisted even after the first attempt at a fix by Peloton because it only required authentication that the accessor was a Peloton user, not the user whose data was returned. [3]

There is an inherent risk when using 3<sup>rd</sup> party libraries and API's that needs to be managed, when considering the scalability of an application from MVP to a production model, security considerations should be built into the model from the outset to allow suitable governance to scale as the product grows. Governance should include regular scanning and testing to ensure external libraries and API's that have deprecated and updated with patched versions are in turn updated in the production model to minimise the potential security risks to the business and users.

## Background

### Active journey trends Pre & Post pandemic in London

Attitudes towards walking and cycling have both received a rejuvenation throughout the Pandemic, that has seen more and more people opting for “active” transport methods to undertake their journeys, this upward trend has carried forward into the post pandemic landscape despite an easing of restrictions and the social anxieties created by COVID-19.

TFL reported trends in cycling in the capital to be 140% of pre-pandemic levels overall, with hires from the popular Santander cycle hire scheme to be 111% of pre-pandemic levels as of October 2022. [4]

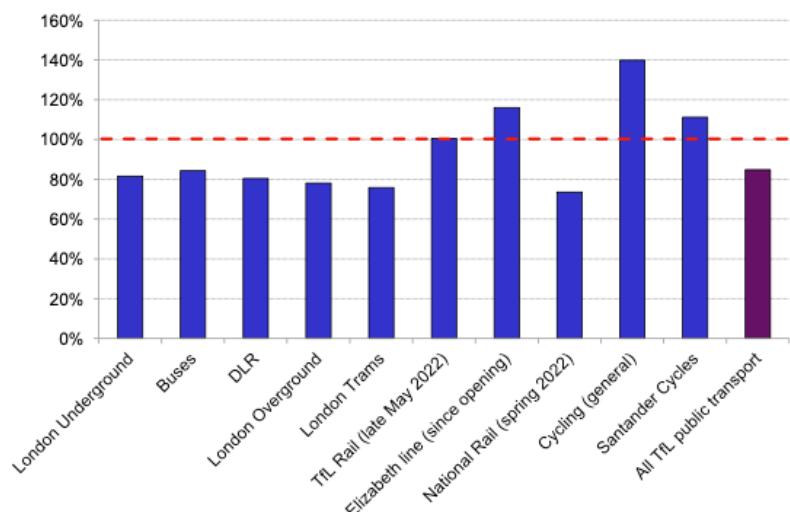


Figure 1. – Indicative average weekly demand on transport modes in London, autumn 2022 vs. representative pre-pandemic baselines –  
Travel in London report 15 Oct '22 [4]

Walking trips per person per day in the capital peaked at around 0.93 person at the height of the pandemic and had fallen to an average of 0.89 as of the autumn of 2022. This daily average of 0.89 represents a shift of 11% over the pre-pandemic level average.

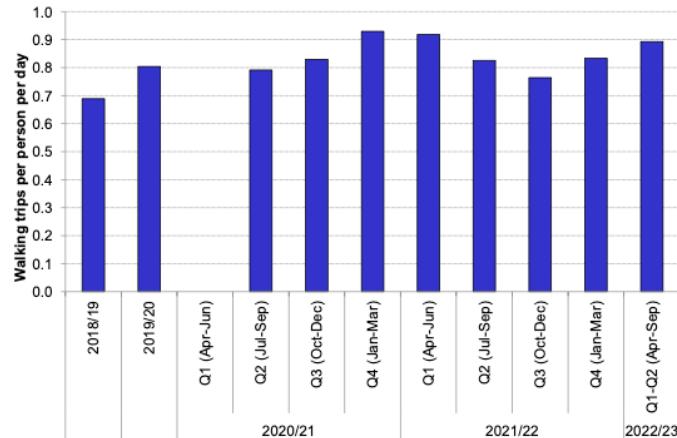


Figure 2. Walking trips by quarter, London residents ages 17+ 2018/19 – 2022/23 –

Travel in London report 15 Oct '22 [4]

The UK Government and Transport for London (TFL) both emphasise the importance of active transport's role in delivering their respective short- and long-term planning and forecasts.

### **The Cycling & Walking Investment (CWIS) strategy report to Parliament 2022**

Delivered to Parliament in July 2022, the document examines the impact that the inaugural report from 2016 has had and assesses its effectiveness in achieving its objectives then sets out aims and objectives to be achieved by 2025. [5]

The Government's long-term ambition as set out in the inaugural 2016 report [6] is to make walking and cycling the natural choice for shorter journeys or as a stage in a longer journey, citing the impact that promoting active journeys have on promoting wider governmental objectives including but not limited to the Clean Growth Strategy [7], Future of Mobility: Urban Strategy [8], Clean Air Strategy [9], Prevention is Better Than Cure – Public Health Strategy & The Childhood Obesity Plan [10].

The key aims as set out in the 2022 report are:

- **Double Cycling Activity:** Increase the number of cycling “stages” made each year from, 0.8 billion as of 2013, to 1.6 billion in 2025.
- **Increase Walking Activity:** To increase the total number of walking “stages” to 300 per person per year by 2025.
- **Increasing Walking to School:** Increasing participation in walking to school for children aged 5-10 to 55% by 2025, from the 2014 figure of 49%.
- **Gear Change:** Launched in 2020, the strategy aims to make England a walking and cycling nation, with half of journeys in towns and cities being active journeys by 2030.

The CWIS'22 report cites the Department for Transport NTS0308 data set [9] that more than half of trips made by car in towns and cities are less than 5 miles and offer the greatest potential to be converted to an active journey choice.

The term “stages” used within these aims refers to the UK government’s “Physical Activity for adults (19 – 64 years) guidelines published in September 2019. [11]

This term term is designed to promote inclusivity across the full age range, and for all levels of ability.

## **Mayor of London - 20 minutes per person per day**

The Mayor of London's active travel target is that by 2041 all Londoners will achieve at least 20 minutes of active travel (categorised as either walking or cycling) per day. [4]

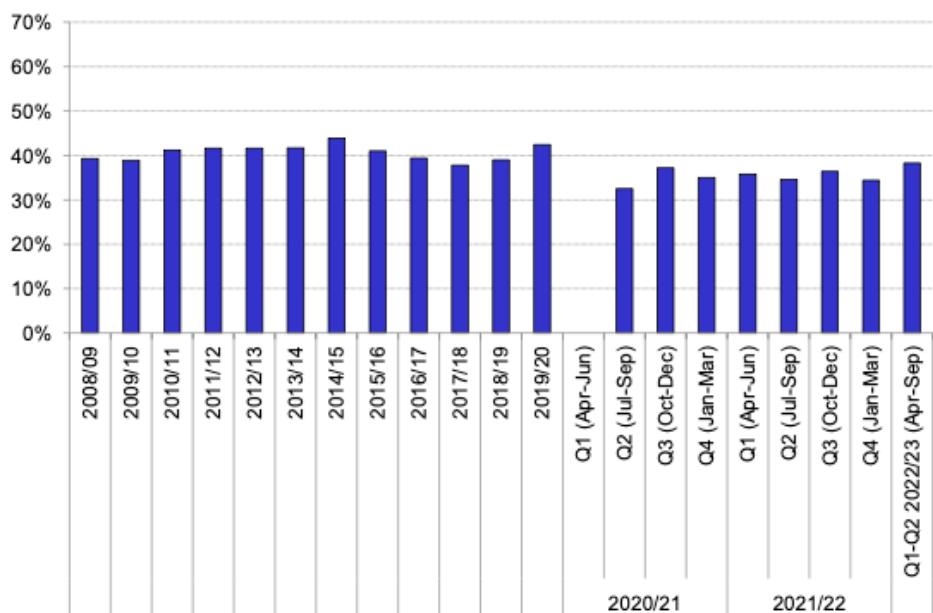


Figure 3. Proportion of London residents aged 20+ achieving a minimum of 20 minutes per day 2008/09 – 2022/23  
Travel in London report 15 Oct '22 [4]

Individual walking trips per person averages have increased post-pandemic and the mayor's target of 20 minutes per day, which as of October 2022 were 37%, are showing strong signs of returning to pre-pandemic levels. It is worth acknowledging at this point the impact that hybrid working arrangements that have persisted post-pandemic have had on this data due to their impact in changing trends overall in commuting habits.

## **London's cycle network**

TfL aims to increase the proportion of Londoners living within 400 metres of a high-quality cycle route to 33% by 2025. This proportion had risen to 21.9 percent by autumn 2022, from 19.4 percent in autumn 2021 and 11.5 percent in 2019 prior to the pandemic. [4]

It is worth noting that while much of the recent cycling infrastructure in London was delivered on a temporary basis as part of the Streetspace for London programme in response to the pandemic, TfL's emphasis is now on assessing the performance of experimental schemes to make informed decisions about their permanence.

## Barriers To Engagement – The Gender Divide

Cycling trips per person per year:

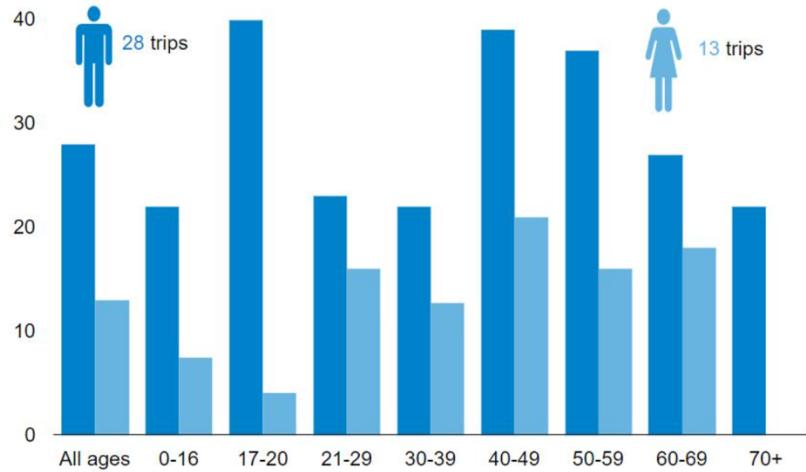


Figure 4. Cycling trips per person per year, by age and gender, England 2021 –  
Department for Transport statistical data set NTS0601 [12]

Cycling trips per person per year, by gender in the UK for 2021 saw men undertaking just over twice as many cycling trips as women, despite the 2:1 ratio favouring men these figures represent a significant shift from the 2019 data set where the ratio was a 3:1 average with 24 trips made by men and 8 by women. [13]

The shift in attitudes towards cycling have largely been attributed to the change in journey habits due to the pandemic creating social anxieties around use of public transport.

### Walking trips per person per year:

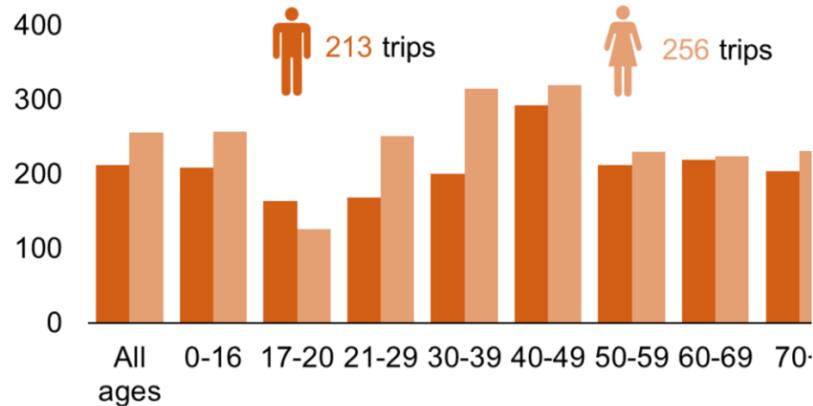


Figure 5. Walking trips per person per year, by age and gender, England 2021 –  
Department for Transport statistical data set NTS0601 [12]

Walking trips per person per year, by gender in the UK for 2021, indicated that women made 20% more walking trips than men, 256 trips vs. 213 trips.

Sustrans conducted a survey in 2018 as part their report Women: reducing the gender gap report, that sought to ascertain women's awareness of their local cycling infrastructure and views on road safety whilst cycling, the findings (shown below) highlight overall trends in awareness and potential barriers to uptake.

### Percentage of men and women that feel safety needs to be improved

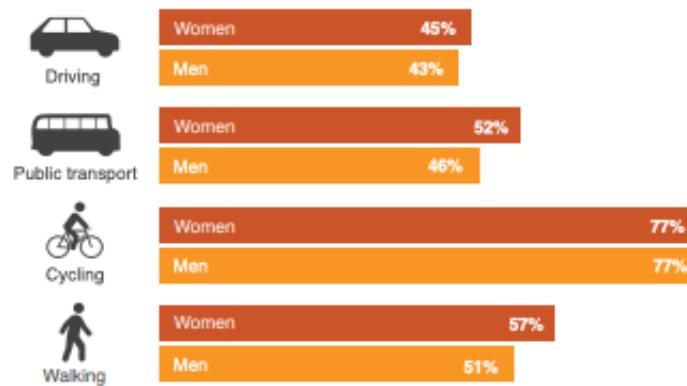


Figure 6. Percentage of men and women that feel safety needs to be improved  
Sustrans - 2018 report Women: reducing the gender gap [14]

### Views on current cycling infrastructure

Less than half of women (46%) think their city is a good place to cycle overall.

Less than half of women think cycling infrastructure is good in their city, including the amount, directness, condition and signposting.

% of women who think the following is good:



Figure 7. Views on current cycling infrastructure

Sustrans - 2018 report Women: reducing the gender gap [14]

### Awareness of current cycling infrastructure

Gaps in awareness may present a barrier to more women cycling.

Less than two fifths of women are aware of current cycling infrastructure, facilities and initiatives.

% of women who are aware of:



Figure 8. Awareness of current cycling infrastructure

Sustrans - 2018 report Women: reducing the gender gap [14]

76% of women who already cycle, or would like to start cycling, would find cycle routes alongside the road that are physically separated from traffic and pedestrians very useful to them to start cycling more.

In addition, 69% of women would find more traffic-free routes away from roads very useful. However, the scope for these routes due to space constraints in cities may be more limited.

#### What would be very useful to help you start cycling or cycle more?

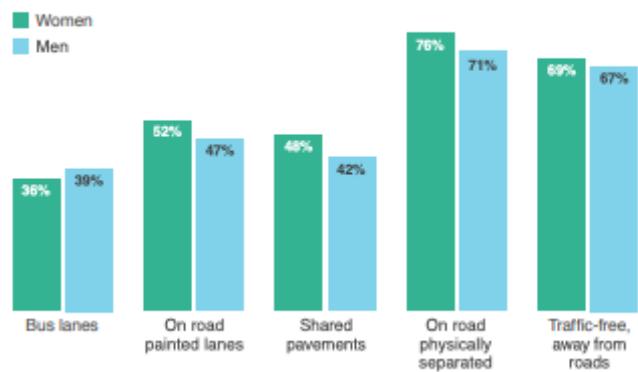


Figure 9. What would be useful to help you start cycling or cycle more?

Sustrans - 2018 report Women: reducing the gender gap [14]

It is important to acknowledge that while this report focuses on the 5 largest cities outside of London, and that awareness of cycling infrastructure and opinions of road safety whilst cycling are likely to vary given the focus on investment in active journey participation in the capital, however the report does go to highlight wider trends in attitudes and perceptions of cycle safety whilst highlighting the variances between gender.

## Barriers To Engagement - Road safety

### Pedestrians Killed or seriously injured (KSI)

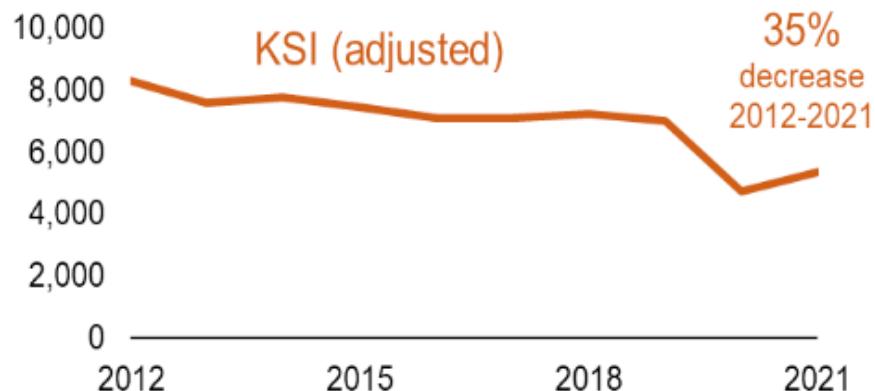


Figure 10. Pedestrians (KSI) killed or seriously injured 2012 - 2021 –  
Department for Transport statistical data set RAS9101 [12]

### Cyclists Killed or seriously injured (KSI)

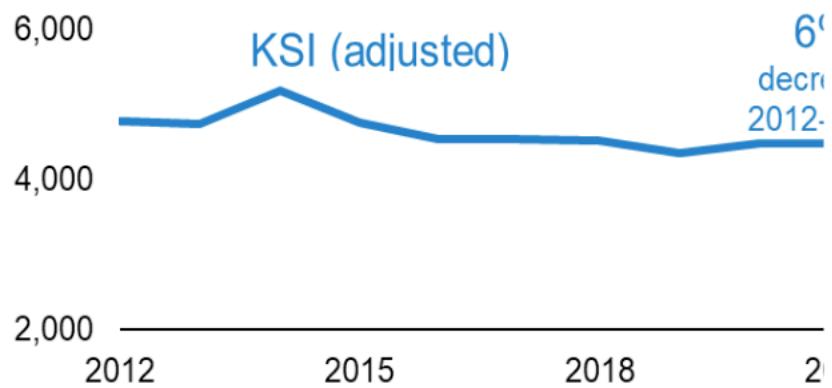


Figure 11. Pedal cyclists (KSI) killed or seriously injured 2012 - 2021 –  
Department for Transport statistical data set RAS9101 [12]

Walking KSI's show a clear correlation with the effect that COVID-19 restrictions had on the data and are now showing an uplift again now that restrictions have been removed, whereas cycling KSI's have remained consistent since 2015/16 through to the present day.

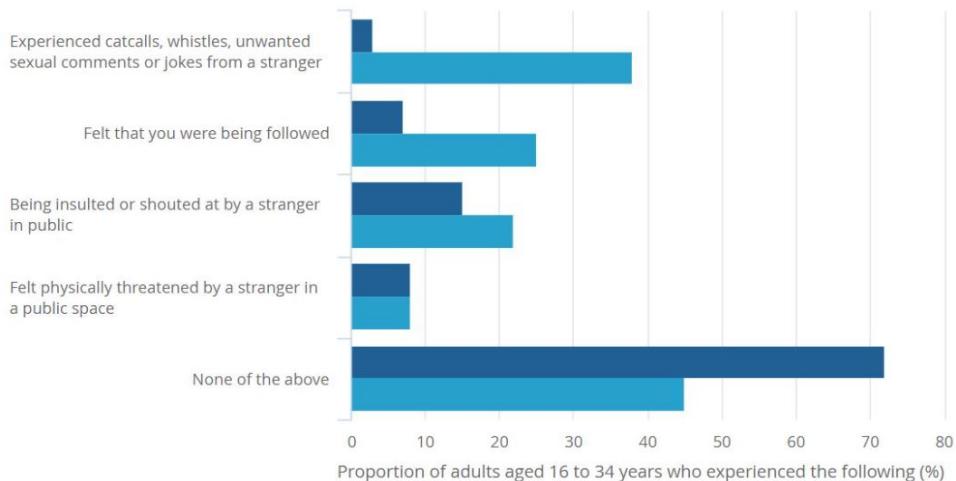
When comparing these two data sets what is interesting is that pedestrian KSI's have historically (pre-pandemic) been 40-50% higher per year than cycling KSI's, yet the perception of "road safety" when undertaking walking as an active journey method does not appear to deter uptake to the same extent that the perception of "road safety" when undertaking cycling as an active journey method, as seen in the Sustrans report previously.

## Barriers to Engagement - Personal safety

**Experiences of catcalls, unwanted sexual comments, and whistles were the most common form of harassment for women aged 16 to 34 years**

Proportion of adults aged 16 to 34 years who experienced types of harassment in the last 12 months, by sex, Great Britain, 16 February to 13 March 2022

● Male aged 16 to 34 years ● Female aged 16 to 34 years



**Source:** Perceptions of personal safety and experiences of harassment, Great Britain: 16 February to 13 March 2022

 Office for National Statistics

Figure 12. Perceptions of personal safety and experiences of harassment February – March 2022

Office of National statistics [15]

Personal safety and its influence on creating barriers in the development of active travel habits, especially within London feels particularly pertinent to explore when at the time of writing a string of high-profile exposés of serving Metropolitan Police Officers regarding violence and sexual violence have come to light. [16]

In the instance of the high-profile Sarah Everard case, serving officer Wayne Couzen's was able to abuse his power to coerce Sarah into his car whilst she undertook a short active journey from Clapham to Brixton, a journey not unlike the short local journeys being promoted by former prime minister Boris Johnson's Gear Change vision and the Mayor of London's 20 minutes per person per day target. [17]

It is not within the scope of this research to be examine the role of law enforcement in active transportation promotion, however the case of Sarah Everard does highlight the current challenges faced in London and the wider UK in tackling the relationship between promoting active journey habits and personal safety, especially when presented against the backdrop of a widening public mistrust of the powers in place to protect the public.

## Report Overview

The structure the report takes in its implantation is briefly defined below.

- **Literature and technology review:** examines the current technology landscape to determine the most suitable software approach to achieve the project's aims and objectives.
- **Methodology:** defines the overall Agile software development methodology employed in approaching the project.
- **Design:** implements a user survey to define a user persona and user story to characterise the features that will be included in the MVP, with these defined wire frames of the MVP have been created.
- **Implementation:** a production diary of the building of the MVP has been produced. With a working MVP in place usability testing has been employed.
- **Evaluation:** collated feedback from the usability testing is examined to draw conclusions as to the effectiveness of the MVP artefact.
- **Conclusion:** includes a future development road map created from the usability testing feedback. Reflection on the project provides insight into how the project could be approached differently and expanded upon based upon the lessons learnt from completion of the project. Finally, thoughts are given on the project's effectiveness on achieving the aim' and objectives.

## Literature & Technology review

### Literature Review

In 2019 the Department for Health & Human Services USA (HHS) published the paper “Comparing bicyclists who use smartphone apps to record rides with those who do not: implications for representativeness and selection bias”

The aim of the paper was to determine if cyclists who use smartphone apps to record their rides are representative of the larger cycling population, to better determine whether the use of app-generated data in studies evaluating bike-infrastructure interventions may result in biased effect estimates.

95 candidates were selected for the study in Atlanta, Georgia through means of a survey conducted between June 2016 & April 2017. The survey was conducted across 29 sites around the city where researchers expected to find a diverse cross section of utilitarian and recreational cyclists, these included large employers, bike related businesses, educational facilities, transit stations, public parks, restaurants, grocery stores and large retail outlets, and a large street festival, that was closed to motor vehicles.

The study was broken down into 3 user types, non app users, fitness app users and planning app users and their riding habits compared.

### Key findings

- Two-thirds (66%) of the respondents used smartphone apps to record their rides, with Strava being the most popular app used.
- Cyclists who used smartphone apps to record their rides were more likely to be male (75%) than female (25%), and younger, with 74% being under the age of 45.
- App users were also more likely to be experienced cyclists, with 60% reporting that they had been cycling for more than 5 years.

- Bicyclists who used smartphone apps to record their rides were more likely to be competitive and goal-oriented in their cycling behaviour, with 71% reporting that they tried to improve their performance on each ride.
- Non-users of smartphone apps were more likely to report that they cycled for transportation purposes (e.g., commuting, running errands), while app users were more likely to cycle for recreational and fitness purposes.

The use of smartphone apps to collect data in research studies of this type have the potential to distort estimates of cycling behaviour, attitudes, and outcomes as these studies could overrepresent certain segments of the cycling population and underrepresent others.

This could limit the validity of findings and have wider implications for the representativeness and selection bias of such studies. The study does serve to highlight the need for researchers to consider the potential biases and limitations of smartphone app data and to use multiple sources of data to ensure a more representative and diverse sample of cyclists.

The overriding themes surrounding age and gender in cycling participation within the findings of this study do not come as a surprise and correlates with the previous data seen in “Cycling trips per person per year” (figure 4) despite the geographical and social variation between the UK and US, this does lead to further questioning as to the potential for additional comparable results if this study were replicated in London.

Non-users of smartphone apps reporting that they were more likely to use cycling as a means for utilitarian purposes e.g., Commuting, or running errands, does open the question on how would it be possible elicit engagement with an app, how would that app cater features to this demographic, and what benefits if any would it bring?

This study does very clearly demonstrate demographic engagement by app types (performance, route planning) and highlights perception of such apps such as Strava, MapmyRide, and their potential to be non-inclusive.

### **Technology Overview:**

In exploring the potential that technology can have in promoting active travel habits it is important to understand the current technological landscape and to categorise some popular existing products to better comprehend their individual characteristics and define a suitable software implementation for the project.

### **Fitness App (Strava/Mapmy...) Characteristics for Encouraging Active Transport Uptake:**

- Activity Tracking: Track and record active transport activities.
- Gamification and Challenges: Offer challenges and rewards for engaging in active transport.
- Goal Setting and Progress Tracking: Set goals and monitor progress related to active transport.
- Social Features and Community: Connect with others, share activities, and participate in group events.
- Route Exploration: Discover new routes for cycling, walking, or running.
- Health and Fitness Tracking: Monitor calories burned, distance covered, and fitness metrics.
- Integration with Smart Devices and Wearables: Sync with devices for real-time feedback and motivation.

### **Mobility as a Service (MaaS) App Characteristics (Citymapper) for Encouraging Active Transport Uptake:**

- Multi-Modal Options: Provide information on cycling, walking, and other active transport modes.
- Route Planning with Active Transport: Include walking and cycling options in route planning.
- Real-Time Updates: Keep users informed about bike-sharing availability and path conditions.
- Integration with Bike-Sharing Services: Simplify access to bicycles for active transport.
- Incentives and Discounts: Partner with local businesses to offer benefits for active transport.
- Navigation and Safety Features: Provide turn-by-turn directions and safety information.
- Environmental Impact Awareness: Highlight the environmental benefits of active transport.

## **MaaS for active journeys**

When considering an overall concept, design and features for the Wal-c-r project, that in its aims and objectives is to elicit engagement from non-participating or underrepresented groups it would be pertinent to avoid elements that could be deemed to promote elitist or competitive elements, and that opting for a MaaS model for the application is far more likely to target the stakeholders defined in the aims and objectives, through its inclusiveness.

Mobility as a Service (MaaS) refers to the combination of numerous modes of travel and transportation-related services into a single, comprehensive, and on-demand mobility service. Active mobility options such as bicycle and walking are an important part of the services provided in delivering the desired improvements in social goals. [18]

Active mobility can enhance multi-modal journeys that comprise public and private mobility services and fit well with MaaS platforms. Active mobility frequently delivers economic benefits that can be prioritised by MaaS apps. Furthermore, can integrate gamification components to visualise externalities, specifically the value added to society by using active mobility modes. MaaS apps can display safer routes for riders, better cycling experiences, fewer hills along the way, and so on. It might also evolve the point of mapping the pavement to provide important information to those with disabilities. [18]

## Software Review

In exploring possible software implementations for the Wal-c-r project we shall examine two existing MaaS products Citymapper & Go Jauntly. Both applications share similarities in their ability to plan routes and live track whilst undertaking a route, however they provide these in contrasting ways with very different USP's

### Citymapper

Citymapper features a high level of integration with external API's including but not limited to the TFL, Limebike, and Uber APIs to provide a comprehensive travel and route planning guide to the capital.

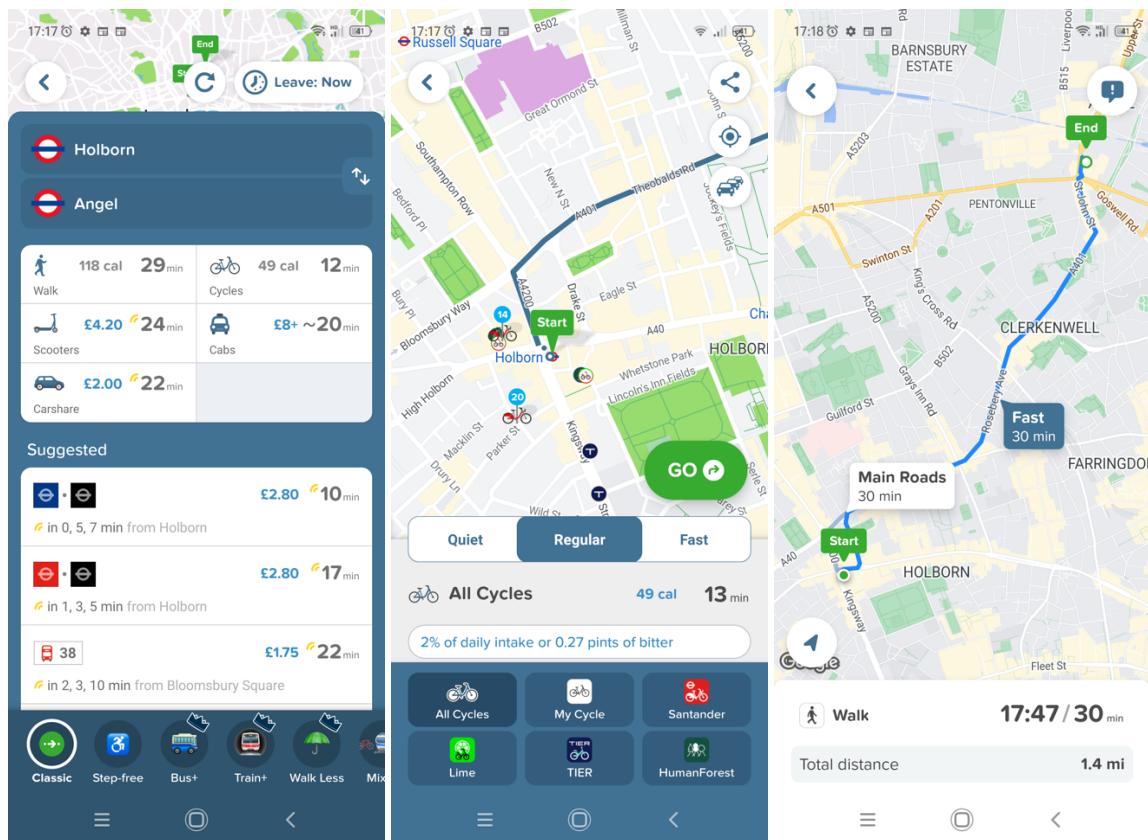


Figure 13. Multiple screenshots of Citymapper application

When researching MaaS mobile applications that support active travel choices Citymapper not only came up in numerous online searches but has also been a personal choice for some time for journey planning in London.

The integration with multiple cycle-hire providers APIs alongside a cycling centric journey planning option that gives multiple route options for safety, competence and confidence and makes it a strong platform for promoting safe and accessible cycle journeys.

Citymapper offers the same for walking, with route options for quiet off main road routes, and the fastest direct routing options.

A nice addition that can be seen in the centre picture of the examples above is the gentle almost playful way it promotes the health benefits of taking an active journey method in an encouraging but non-competitive manner.

## Go Jauntly

Go Jauntly provides a walking centric mobile application with a focus on community and social, allowing users to create and share routes with the addition of allowing sharing of photographs of created routes.

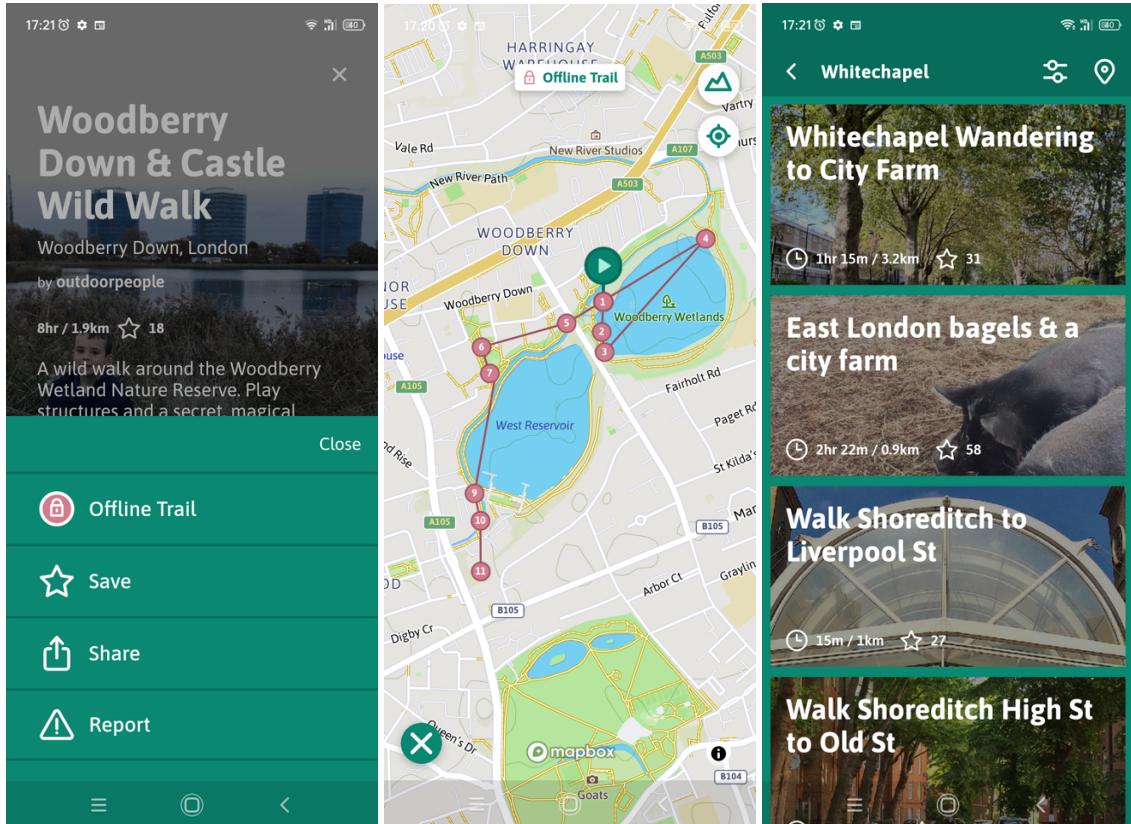


Figure 14. Multiple screenshots of the Go Jauntly application

Go Jauntly demonstrates a MaaS platform application creating engagement through community and social in a similar manner to that seen when examining the characteristics of fitness applications, in contrast to these applications it achieves this through an inclusive non-competitive implementation. The ability in app to view other users saved routes to help facilitate the expansion of personal knowledge of routes within a user's local area is a key factor in promoting walking uptake.

In the documentation found in researching Go Jauntly, it did state that the application does have integration with the TFL API for the purpose of bike point location with the view to creating staged walking and cycling journeys. In the A-B route planning within the application, however this was not found in practice when using the application.

Go Jauntly offers a more immersive community and social experience than that which Citymapper has to offer, where as City mapper has a far more extensive and consolidated implementation of 3<sup>rd</sup> party travel centric APIs.

To promote active travel habits in a MaaS application a hybrid of features from both these applications would be an optimal model.

## Methodology

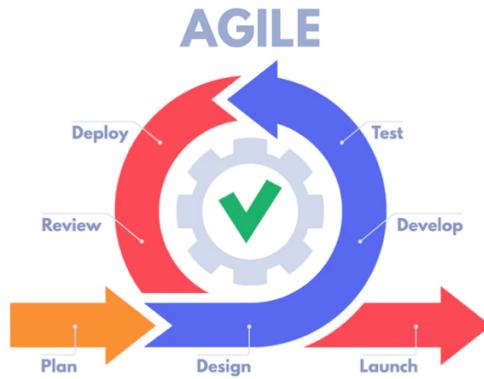


Figure 15. Agile development Lifecycle diagram [19]

The overarching approach to the project has been to implement Agile software development methodology in defining the project's structure and workflow.

### Planning:

Planning has taken the form of extensive background research into local and national governmental policy, and barriers to uptake affecting active journey participation with the view to identifying potential areas that could be influenced with a targeted technology solution. The project has been managed through a sprint-based system using Jira, that has been periodically reviewed, and a clear backlog of work being undertaken can be evidenced.

Areas of skill gaps have been identified as they have arisen and means taken to address these gaps with external educational resources.

### Design:

A survey was created to support the background research and to consolidate both sets of findings to develop a short list of areas suitable for the scope of an MVP, that would also give the greatest opportunity to test the project's aims which could also be implemented with API solutions. The shortlist was developed into a single user persona, and from this a user story to define the UX and UI objectives of the MVP, and wire framing of the proposed application completed.

### **Implementation (Development):**

The technical artefact was built as a Web application using JavaScript, HTML and CSS. Defined in the Design phase of the project Openweathermap.org API, and the TFL bike points API were used to generate JSON data, the latter being overlayed on a map rendered with the Google maps API to create a user-friendly MAAS application. The primary outcome was to create a first iteration of the MVP suitable to allow conducting usability testing upon within the timeframe of the project.

### **Testing:**

Testing commenced with a consent form, this form acknowledged its responsibilities regarding GDPR concerns, anonymity, limitations of data usage and recording of the sessions.

A pre-testing survey structured as a short form of the survey conducted earlier in the project was used to ascertain the subject's suitability and gain some background knowledge of the subject's active travel and application usage habits.

The usability testing was conducted face-to-face using Microsoft Teams to record the sessions, although the video recordings were not the aim of this, the transcription facility to generate a log that could remain anonymous was. A face-to-face setting was a decision made by the limitations of a suitable environment to conduct the testing remotely and give control to my personal laptop securely.

Testing was structured as two tasks 1.) Find the current weather, and then plan a walking route to a destination of your choice. 2.) Find a local Santander bike point to your location and then plan a cycling route to destination of your choice.

A post testing survey was conducted, this consisted of two sections 1.) A Likert scale set of 12 questions. 2.) A set of predetermined open-ended questions. The first to allow the measuring of quantifiable variables over multiple testing rounds to identify trends in perception to the application and the latter to determine areas for future development, and most importantly to evaluate the project's research question in their own words.

The methodology is expanded upon further in the Usability Testing section of this document.

**Deploy:**

Deployment in the context of the project will be viewed as successful deployment of a usability testing environment, and the preparation of the artefact for submission via Github.

**Evaluation:**

Analysis of the usability testing is being used to determine the suitability and effectiveness of the MVP in achieving the project's aim of encouraging participation in uptake of active journey choices in underrepresented and nonparticipating groups. In addition to this analysis is the creation of a future development roadmap derived from the post testing questionnaire.

Personal reflection of the project is also provided, with observations about the project, personal development, and areas for future development.

## **Design: Potential User Survey**

To further support the project's exploration of the topic of active journey habits, it felt applicable to conduct primary research to corroborate findings, and to identify any further barriers to participation that may have been overlooked throughout the research, that may add more depth to the personas and stories once moving on to the design phase of the project.

The survey created in Google Forms consisted of 19 questions, made up of a mix of multiple-choice questions and short paragraph responses where participants could describe in their own words the barriers that stop them from making active journey choices.

Questions were designed to mirror the project's secondary research with questions around gender, age, socioeconomic status, walking & cycling habits, and app usage whilst planning and conducting journeys.

(Full survey available in the supporting documents section of the report).

Prior to undertaking primary research discussion was had with the project supervisor about the methodology and its' effectiveness, the main take away of this conversation was the around survey return volume and the social media survey approach initially considered, and that approaching the task from the perspective of a small pool of interviews may be a better methodology to elicit a better quality of data and responses.

The decision was made to run a hybrid methodology, generating an easy-to-use online survey format, that would provide the necessary evidence for the academic outcomes of the project, but rather than conducting an untargeted approach via social media, engaging subjects directly prior to initiate a discussion around the topic of active journey habits prior participating in the survey.

6 participants were engaged in a preliminary conversation and expressed interest in proceeding with participation, 4 female candidates and 2 male candidates. At the time of collating the data a 50 percent response rate was achieved.

Potential participants were selected by gender and London residential status.

2/3rds of potential participants were female and 1/3<sup>rd</sup> male, this decision in the ratio of male to female was taken when selecting participants to test the previous findings around cycling participation and barriers to uptake.

Participant's identity was kept anonymous, participation was engaged via direct conversation prior, and a unique link to the survey provided, the initiation conversations have been omitted in line with protecting participant anonymity.

To ensure that the data generated was compliant with GDPR a disclaimer was provided in the introduction explaining the limitations of the usage of the data provided, and that the storage of the data would also be compliant. See Below.

*"Any engagement is entirely anonymous, with any data collected only being used for this project and not supplied to any third parties or marketers in line with GDPR considerations, data will be stored in an appropriate encrypted manner for this same consideration."*

For analysis, the key findings from the survey will be examined, however the full survey including responses is available in the supporting documents section of the report

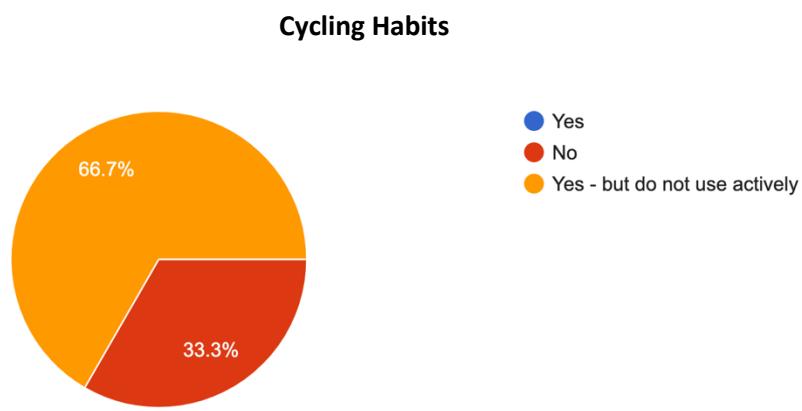


Figure 16. Cycling habits: Do you own a bicycle?

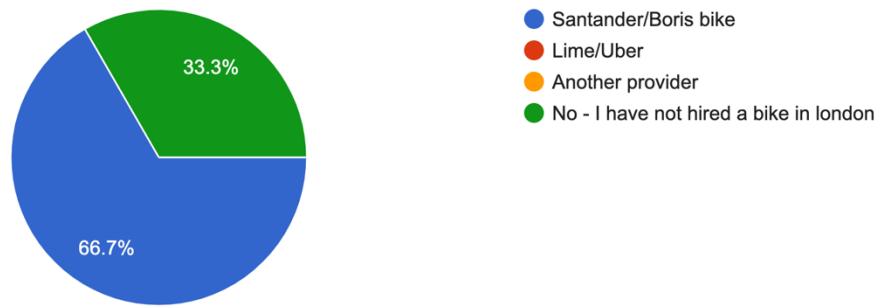


Figure 17. Cycling habits: Have you ever hired a bicycle in London?

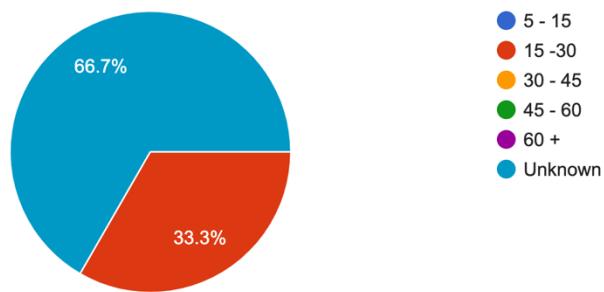


Figure 18. Cycling habits: What is the maximum time you are prepared to cycle to commute in London?

Of the participants interviewed 2/3<sup>rd</sup>s had engaged in cycling in London, and of this demographic there was an even split to male and female, the subject who had not engaged in cycling at all identified as female. 2/3rds of subjects did not have any experience of the time to complete a journey by bicycle in London.

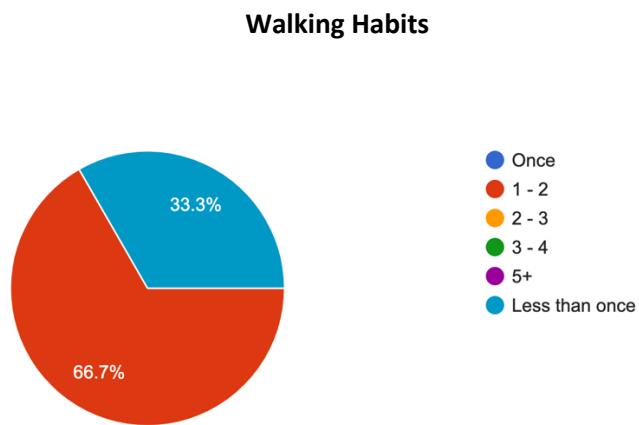


Figure 19. Walking habits: how many times a day do you walk to complete a journey?

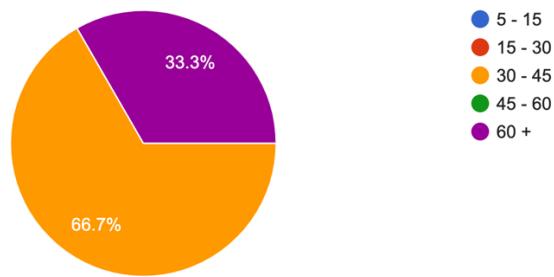


Figure 20. What is the maximum time you are prepared to walk to complete a journey?

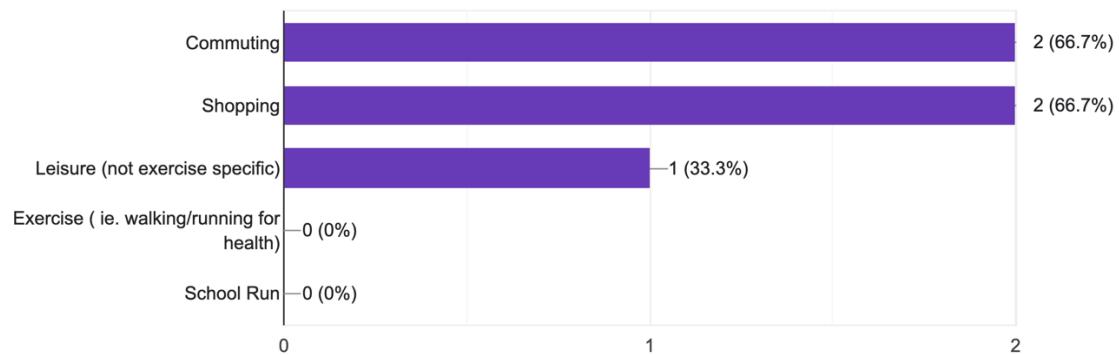


Figure 20. Walking habits: What are your main walking activities?

2/3<sup>rd</sup>s of participants walked at least once a day, the other 1/3rd less than once due to a shift in working pattern since the pandemic to that of a hybrid work from home model.

Unlike in the responses seen in the cycling questions all participants all had a good understanding of the length of time it would take to complete a journey in London.

None of the participants who engaged in the survey were parents, so no data around walking to children to school was able to be obtained.

### Application usage in planning and executing journeys

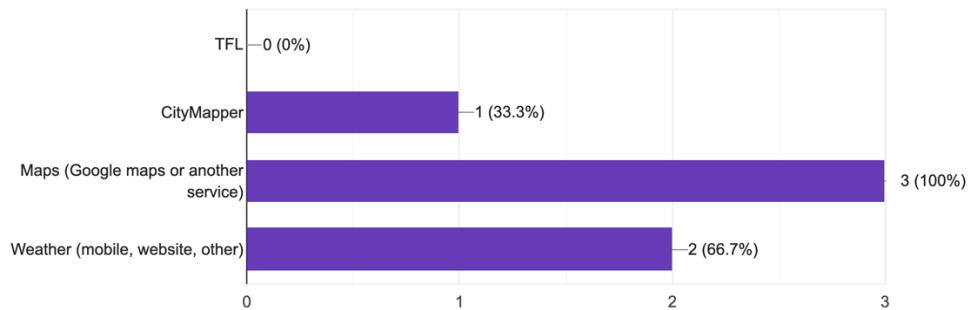


Figure 21. App usage: What app's do you use to plan your journey?

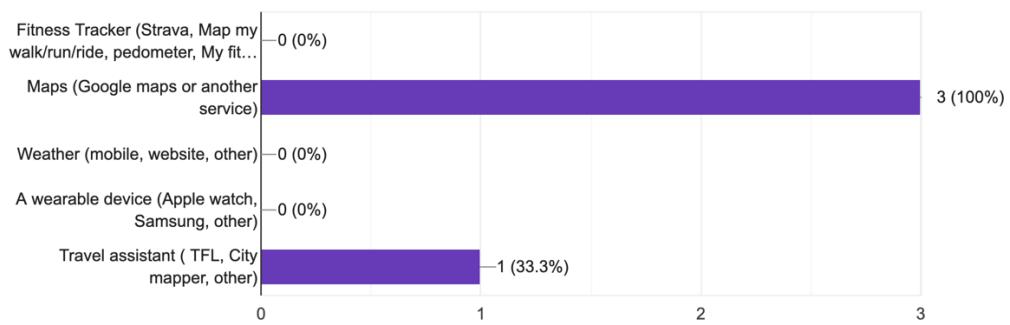


Figure 22. App usage: Which type of app's do you use as you're making your journey?

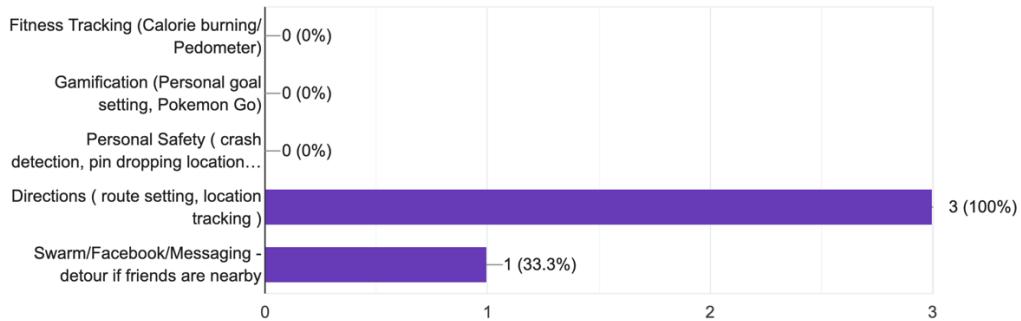


Figure 23. App usage: Do any of these application feature encourage you to make active transport decisions?

The results of the questions surrounding app usage and planning & executing journeys was conclusive.

2/3rds of participants used a weather app when planning a journey, all participants used google maps whilst planning and executing a journey. All participants expressed that inclusion of directions in an application encouraged them to make an active journey.

### **Barriers to active journey choices**

#### Barriers

In your own words...

Which barriers stop you from wanting to walk to complete a journey?

(Meteorological/Safety Concerns/Geographical/other)

3 responses

Only when I'm being lazy like today I got the bus rather than walked a journey I would usually walk because I have exercised a lot recently and needed a rest day

if it's cold, wet, or I'm late

weather conditions mostly

Figure 24. Barriers: Which barriers stop you from wanting to walk to complete a journey?

Unsurprisingly the great British weather featured highly in reasons participants would not choose walking to complete a journey. None of the participants expressed concerns over personal safety in their decision making.

Barriers

In your own words...

Which barriers stop you from wanting to cycle to complete a journey?

(Meteorological/Safety Concerns/Geographical/Financial/Storage/ Repairing)

3 responses

Safety concerns, I have been known to be a liability on a bike. Also my sense of direction I don't want to be staring at maps so maybe I would need headphones with directions but then I won't hear traffic....

Secure bicycle storage

Safety concerns: I can't cycle and I don't want to learn, because I am too scared to share the road with cars.

Figure 25. Barriers: Which barriers stop you from wanting to cycle to complete a journey?

2/3rds of participants expressed concerns over road safety as being their primary barrier to engaging in cycling as an active journey choice. This finding directly correlates with the previous research regarding cycling uptake and the gender divide in uptake.

The additional finding not seen in the secondary research was the safety concern surrounding cycle storage safety, this is a pertinent point that if expanding the research beyond the defined scope of the project would direct examination to crime rates, cycle storage, and socioeconomic and housing factors affecting storage and in turn cycling engagement within London.

Despite being a limited pool of subjects, the survey findings have none the less been illuminating, and as hypothesized validated key areas found in the secondary research conducted. To make a more effective and generate deeper insights the pool of participants would need to be suitably upscaled.

## **Design: Opportunities identified through research**

Several areas emerged from the research that all have potential to address barriers to uptake and elicit engagement in active habits within different currently underrepresented groups or engaging nonparticipating stakeholder groups.

In some cases, the areas identified directly relate to local and national government planning strategies, others are based on the sociological findings observed in the research.

Below are the areas identified, that could be focused upon provide a software solution in the form of a feature within a targeted application.

- **MaaS** – mobility as a service modelled app, as opposed to a fitness focused app.
- **Weather** – Determines travel choices.
- **Route Planning** – safe cycling and walking infrastructure routes.
- **Bike points** - Santander, lime bike
- **Female cycling uptake** – Gender Bias in cycling uptake.
- **Male walking uptake** – Gender Bias in walking uptake.
- **School run** – increasing walking to school in children - CWIS '22 strategy
- **20-minute daily walks and cycles** – Mayor of London strategy
- **Replace car journeys under 5 miles** – Gear Change: CWIS strategy
- **Accessibility** – Computer literacy, Cycle ownership
- **Safety** – Personal, road safety, cycle storage
- **Community: Social element** - Sharing routes, photos of routes – creating engagement.

The shortlisted areas chosen to focus on for an MVP and their related 3<sup>rd</sup> party API solution are as follows:

**Weather:** The user survey alluded to the weather being the first area checked when planning a journey. **API:** Openweather.org/API

**Route Planning:** Route planning being the primary feature in a MaaS solution. **API:** Google maps API

**Cycling uptake:** In the spirit of inclusivity providing Santander cycle hire locations to promote cycling uptake in the application. **API:** TLF bike/point API

## Design: User Persona

### Persona 1 – Anna Johnson



#### Anna Johnson Data Scientist

- 🎂 28 years old
- 📍 London
- ❤️ Single
- 👶 No kids
- 🎓 Data Science

I would like to cycle to work in London, but I have no idea how long the journey would take me, and the safest way of doing so. I do not own a bike as storing it my house share is not possible, so need to know where my nearest cycle hire options are.

#### Biography

Anna is a data scientist who works for a leading national food retailer at their HQ in Holborn.

She struggles to find the time to exercise around her busy work schedule and would like to incorporate cycling into her daily commute. Anna lives in Zone 2 in North London, and gets frustrated with using the tube.

Anna does not own a bike due to not being able to store one and would like to know where her closest hire option would be.

She likes her job a lot but what her passion is traveling and meeting up with friends.

Whenever she can, she hangs out with her friends after work, loves going out for dinner with friends in the city, and walking her dog.

#### Personality

Organized      Nervous      Extroverted      Adventurous

#### Motivations

- Finishing work promptly to have free time.
- Traveling and meeting new people.
- Spending time socialising.

#### Frustrations

- Struggling to find time to exercise in her day.
- Spending too much money each month on transport.
- Tube and bus strikes are affecting work and social life.

#### Influences

Friends

Dog

Music

Travelling

#### Scenario

Anna currently buys a monthly Oyster season ticket, but due to the recent industrial action she has struggled to get into work easily on a number of occasions and is frustrated, it is also affecting her ability to meet friends after work.

Anna struggles to fit in consistent exercise around her work and social commitments, she believes that cycling may be a solution, but she has not ridden for many years and not in London.

Not owning a bike Anna needs to know where her closest bike hire options are in Islington

Figure 26. Design: User Persona – Anna Johnson.

User Story: Anna Johnson – Find a cycle route to work and a bike hire close to me.

The image shows a green smartphone with rounded corners and a white screen. On the screen, there is a portrait of a smiling woman with dark curly hair and glasses, identified as Anna Johnson. Below the portrait, the name "Anna Johnson" is displayed in a large, bold, black font. Underneath her name, the word "Wal-C-R" is written in a large, bold, black font. To the left of "Wal-C-R" is a small icon of two feet walking. To the right of "Wal-C-R" are two more icons: a person riding a bicycle and a bus. Below these elements, a box contains the user story text. The text is organized into four distinct sections, each starting with the word "So".

**Story: Find a cycle route to work and a bike hire close to me.**

As a commuter in London I would an application to help me start cycling from my home in Zone 2/3 to my job in Zone 1 .

So I can locate a cycle hire close to me.

So I can find out how long it will take me to complete the journey.

So I can find the safest route to complete my journey.

Figure 27. Design: User Story – Anna Johnson – find a cycle route to work and a bike hire close to me

**Wal-C-R**

Walking icon

Cycling icon

Public Transport icon

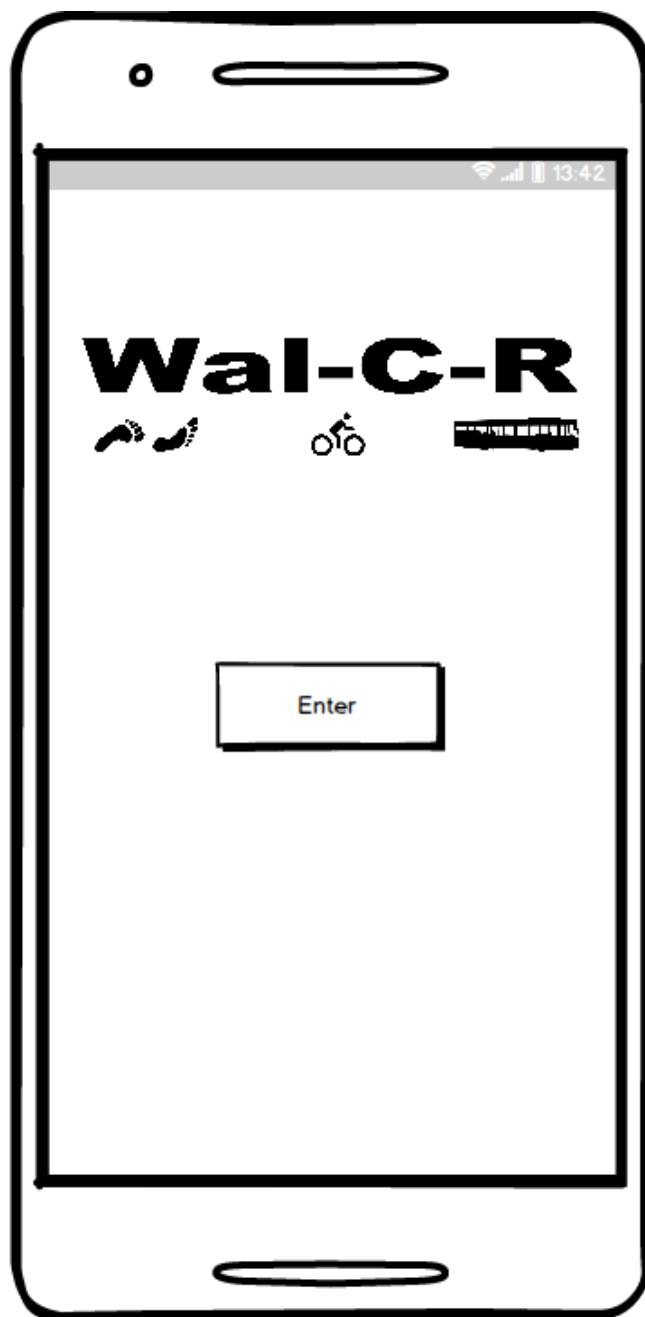
## Conditions of Satisfaction

### Find a cycle route to work

- Can they easily find out how long it will take?
- Can they find a cycle hire close to their Location?
- Does the search return a suitable route for cycling?
- Is the interface intuitive?
- Is the interface easy to use ?
- Are the search parameters adequate?
- Is the design suited to its intended use environment ie. mobile first?
- Is the search too restrictive?
- Is there scope to develop the search further?
- How can it developed more in later sprints?

Figure 27. Design: User Story – Anna Johnson – Conditions of Satisfaction

**Design: Wire frames**



**Figure 28. Landing Page**

A simple landing page, within the scope of the P.O.C/ MVP the project does not store user data and as such does not require a log in or register screen.

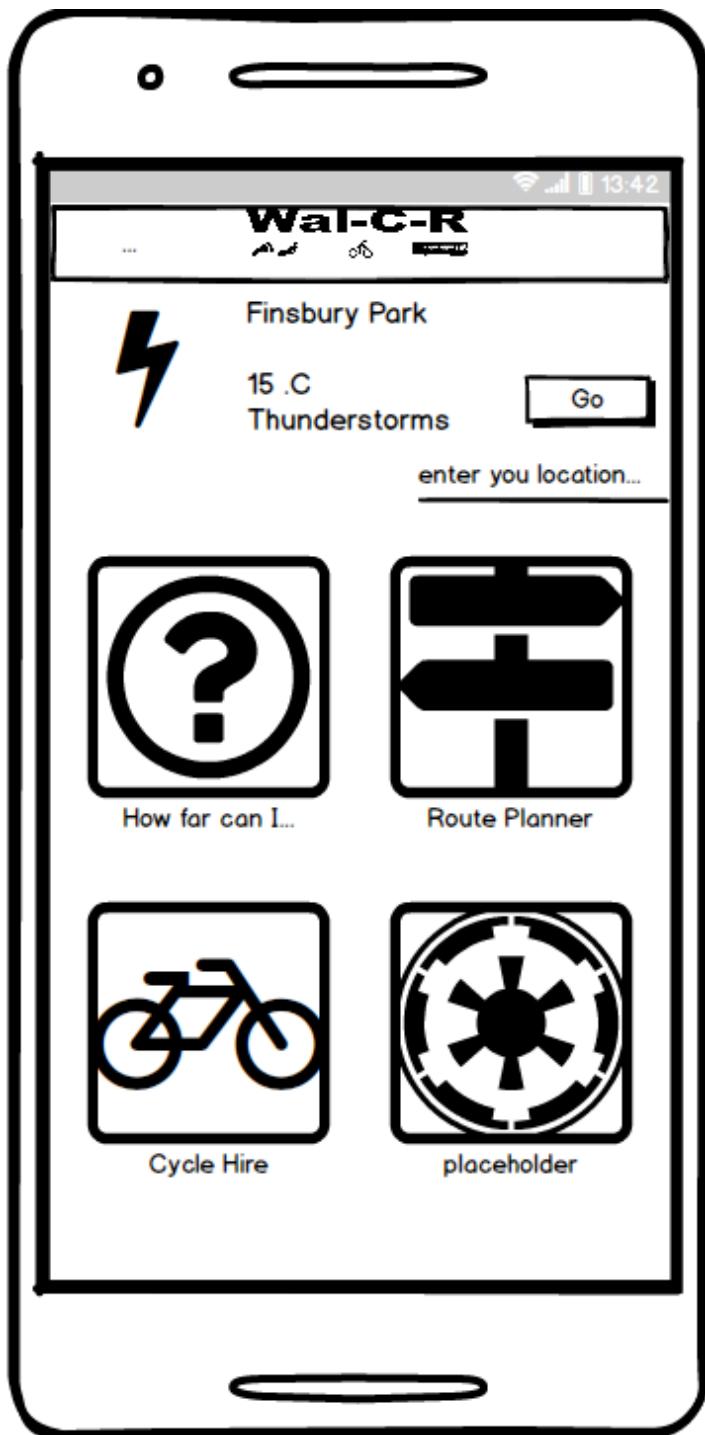


Figure 29. Home screen/ Index.html

Home page displaying live weather information from the Openweather.com API defined by the user's input of their location. Simple large icons to make it easy to see and use outside.

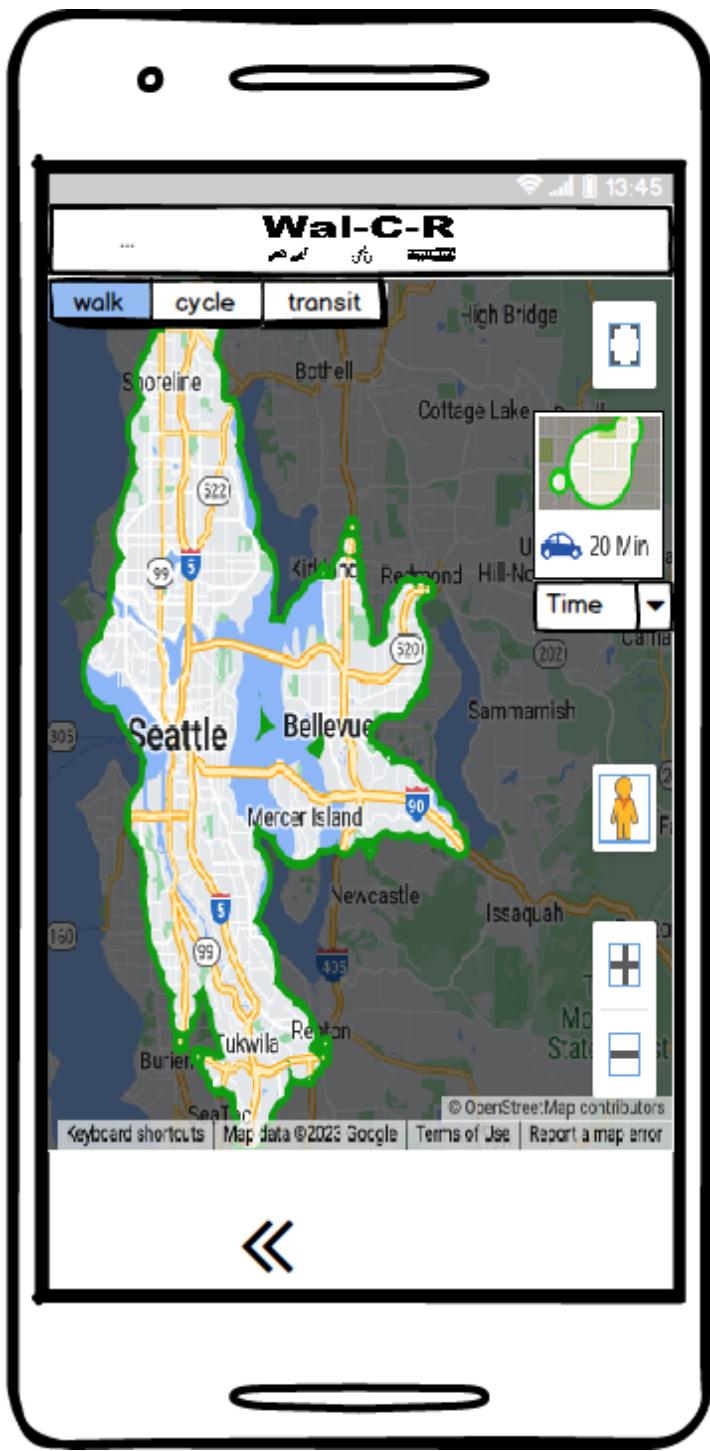


Figure 30. How far can I... (Planned, but not implemented)

How can I ? is a simple tool that uses a widget from the walkscore.com API overlaid on the Google maps API. A simple tool that allows the user to define their travel method from a button selector, and then select time options of 20, 40 & 60 minutes, generating an overlay of their location showing a range of how far they can travel in that time by their preferred method. Targeted at inexperienced active transport users as an easy-to-use quick guide.

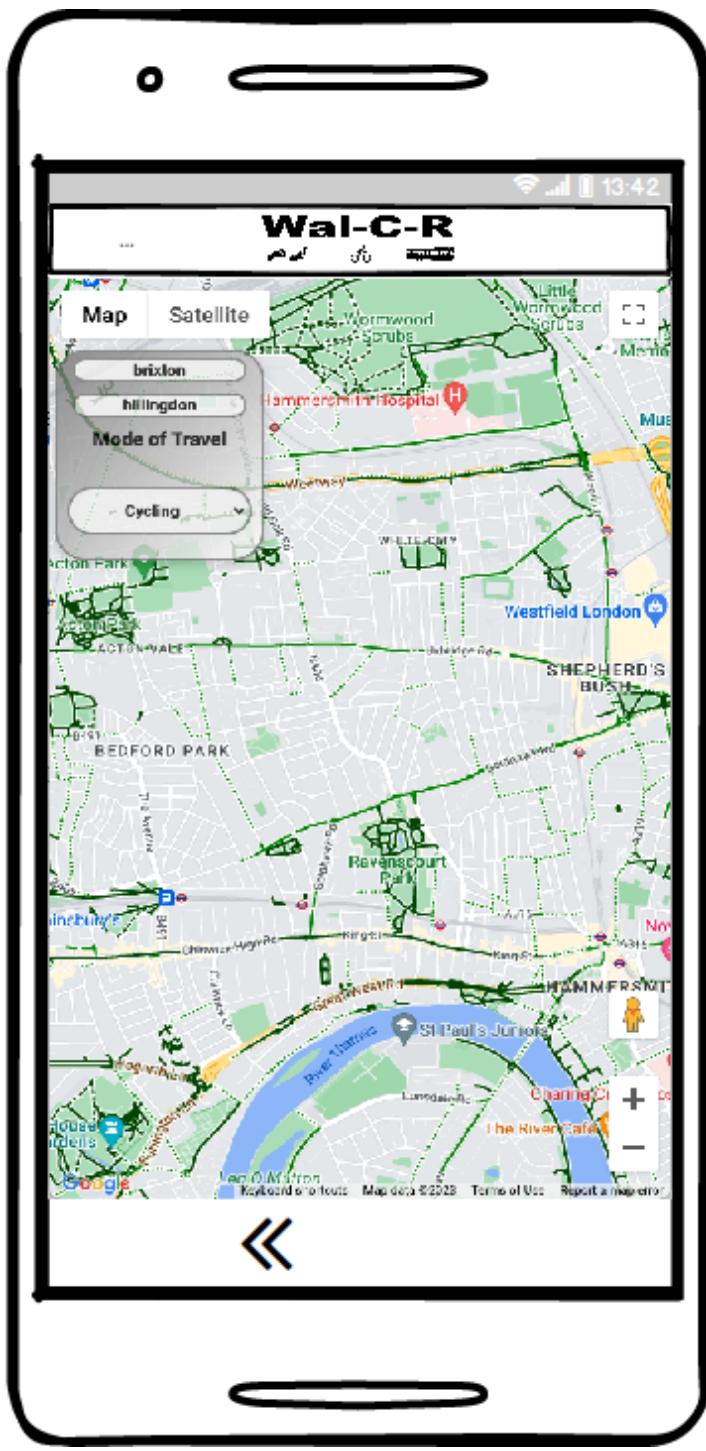


Figure 31. Route Planner

Route Planner utilises the Google maps API, deploying a very simple on-screen interface allowing a user to select start point and end destination, and select their preferred transportation method from a drop-down selector. The map then displays the route on screen.

Distance and time would also be included additionally to this result although not depicted in this wire frame that has been created from the work achieved at the time of writing.

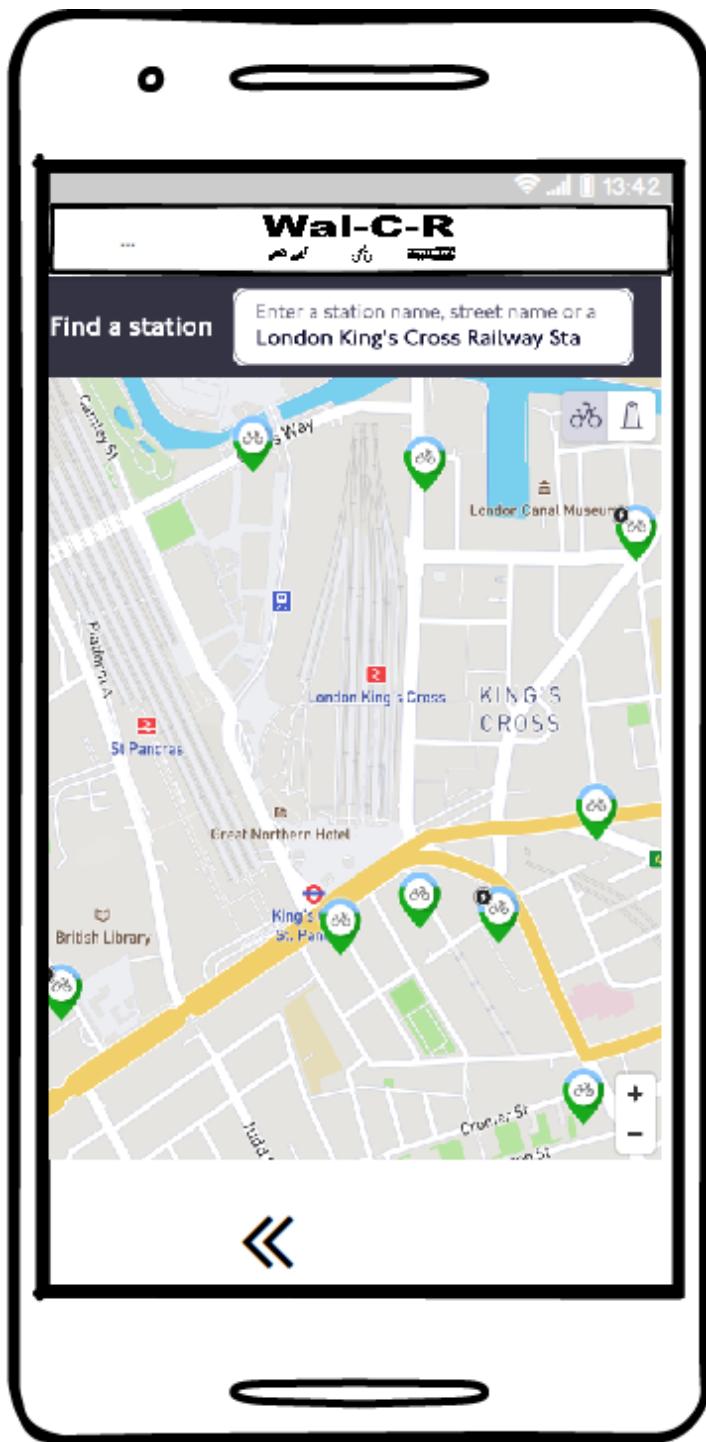


Figure 32. Cycle Hire

Integrating the TFL Santander bicycle hire station locator API and the Google maps API to create quick in application access to this information without the need for using the TFL application. User's geolocation will centre the map to their position, showing the docking stations closest to them.

## Implementation: Production diary – Weather service

The screenshot shows the Postman interface for testing an API endpoint. The URL is <https://api.openweathermap.org/data/2.5/weather?q=London&appid=a75f6e4468a4602bb9e06eb...>. The method is GET. The query parameters are: q=London, appid=a75f6e4468a4602bb9e06eb52d2c6b55, and units=metric. The response status is 200 OK, 141 ms, 802 B. The JSON response body is displayed:

```

1 {
2   "coord": {
3     "lon": -0.1257,
4     "lat": 51.5085
5   },
6   "weather": [
7     {
8       "id": 804,
9       "main": "Clouds",
10      "description": "overcast clouds",
11      "icon": "04d"
12    }
13  ]
14}

```

Figure 33. API URL route testing in Postman

Using Postman to test an API URL request to [openweathermap.org](https://openweathermap.org) to test that the request is working and to view the json response data.

The request is using the parameters of London and units of measurement in metric.

```

21 // Calls the main function once the page is loaded, and inserts the cityID into the API URL //
22 window.onload = function() {
23   | weatherForecastApiCall( 2643743 );
24 }

```

Figure 34. Window on load function app.js

Calls the `weatherForecastApiCall` when the window is loaded in the html, inserts the CityId in the function.

```

7 // Call the weather data from open weather API
8 function weatherForecastApiCall( cityID ) {
9     var key = 'a75f6e4468a4602bb9e06eb52d2c6b55';
10    fetch('https://api.openweathermap.org/data/2.5/weather?id=' + cityID + '&appid=' + key)
11    .then(function(resp) { return resp.json() }) // Convert data to json
12    .then(function(data) {
13        console.log(data)
14        insertWeatherData(data);
15    })
16    .catch(function() {
17        // catch errors to be updated to actually catch some errors
18    });
19 }

```

Figure 35. API URL call app.js

Creating a fetch request to the Open weather API, using the API key generated in Open weather in this instance the City Id is being hardcoded. The data is being converted to JSON data, then an insert weather data function is being called, with the JSON data being called.

```

26 // html render function - inserts the data in to the corresponding tags on the index.html page//
27 function insertWeatherData( d ) {
28     var celcius = Math.round(parseFloat(d.main.temp)-273.15);
29     //var fahrenheit = Math.round(((parseFloat(d.main.temp)-273.15)*1.8)+32); //
30

```

Figure 36. Degrees centigrade conversion

Firstly, once the insertWeatherData has been called it takes care of converting the temperature data from the JSON data into celcius using the Math.round library native to JavaScript and saves it to a new “celcius” variable.

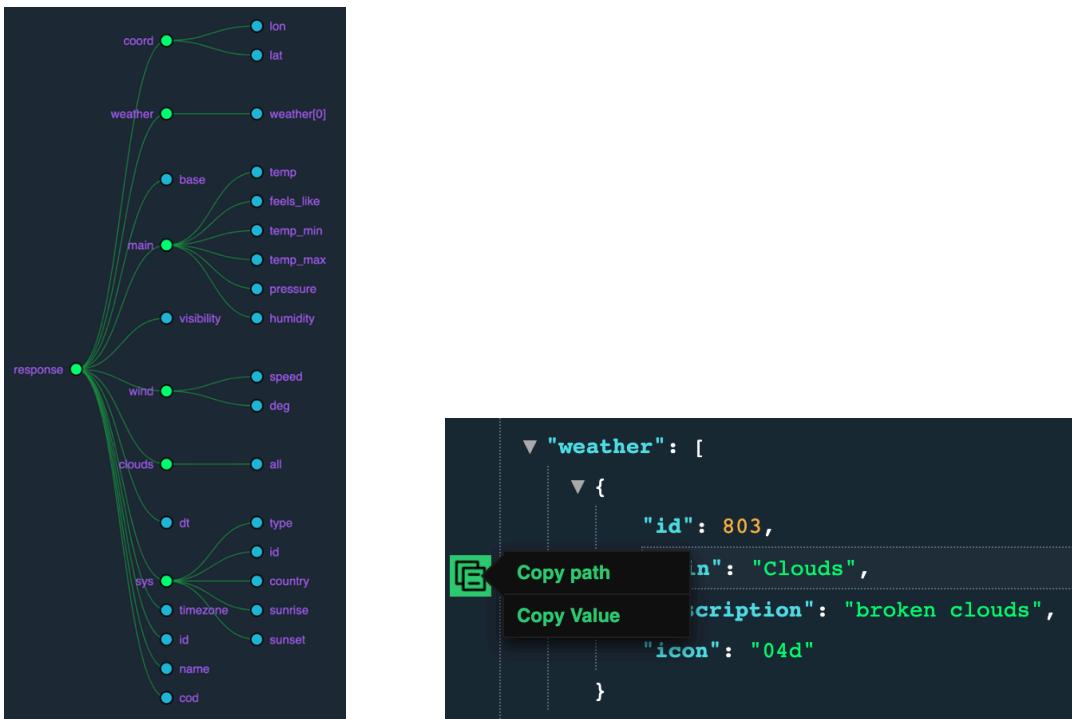


Figure 33. API URL route testing in Postman

Using JSON Viewer Awesome plug in for Chrome browser it is possible to view the JSON data structure in a far more user-friendly format, and to select specific paths to copy and paste into the Vscode project

```

// html render function - inserts the data in to the corresponding tags on the
function insertWeatherData( d ) {
var celcius = Math.round(parseFloat(d.main.temp)-273.15);
//var fahrenheit = Math.round(((parseFloat(d.main.temp)-273.15)*1.8)+32); //

document.getElementById('description').innerHTML = d.weather[0].description;
document.getElementById('temp').innerHTML = celcius + '&deg;' + "c";
document.getElementById('location').innerHTML = d.name;
document.getElementById('wind').innerHTML = "wind: " + d.wind.speed + " mph";

}
  
```

Figure 38. Routing from app.js to index.html

```

<div id="weatherbody">
    <div id="weathercontainer">
        <div id="description"></div>
        <!-- <div id="weathericon"></div> -->
        <h1 id="temp"></h1>
        <div id="location"></div>
        <div id="wind"></div>
    </div>
</div>

```

Figure 39. index html implementation

Having identified the paths required in the JSON data (wind speed, location, temperature and weather description) it was necessary to pass the data to the client-side. This was completed using document.getElementById( ‘ ’).innerHTML using the corresponding <div> from the html page and its corresponding pathway from the JSON data.

```

***** Weather v.1 CSS *****
#weatherbody {
    font-family: 'Montserrat', sans-serif;
    font-weight: 400;
    font-size: 1.3em;
    color: #fff;
    text-shadow: .1em .1em 0 rgba(0,0,0,.3);
    height: 0vh;
    padding-top: 50px;
    padding-bottom: 50px;
    display: flex;
    align-items: center;
    justify-content: center;
}
#weathercontainer {
    background-color: #aqua;
    border-radius: 8px;
    padding-left: 10px;
    padding-right: 10px;
    padding-bottom: 10px;
}
h1 {
    margin: 0 auto;
    font-size: 2.2em;
    text-align: center;
    color: #fff;
    font-size: 5em;
}

```



Figure 40. CSS implementation & resulting output

Adding some simple CSS styling produced a simple eye-catching weather information panel.

## Implementation: Production diary – TFL API Santander Bike point

```
2 // users geolocation function//
3
4 if (navigator.geolocation) {
5     // Gets the users current position and then calls the "mapCreator" function if successful//
6     // if unsuccessful calls an error handling function//
7     navigator.geolocation.getCurrentPosition(mapCreator, showError);
8 } else {
9     // handle UI if navigator.geolocation is not available
10 }
11
12 //Error logs with definitions as per w3 schools //
13 function showError(error) {
14     switch(error.code) {
15         case error.PERMISSION_DENIED:
16             x.innerHTML = "Geolocation request was denied by the user."
17             break;
18         case error.POSITION_UNAVAILABLE:
19             x.innerHTML = "geolocation data is unavailable."
20             break;
21         case error.TIMEOUT:
22             x.innerHTML = "The users geolocation request has timed out."
23             break;
24         case error.UNKNOWN_ERROR:
25             x.innerHTML = " Unknown error occurred."
26             break;
27     }
28 }
```

Figure 41. Geolocation implementation

Setting up the geolocation function using the geolocation API called with `navigator.geolocation`. This then either calls the `mapCreator` function, or the `showError` function.  
Error handling is provided in an else if statement, the specifics of the error handling have been derived from [W3schools.com documentation](https://www.w3schools.com/jsref/jsref_error_code.asp).

```
// Google maps renderer function//

// renders google maps on the users current geolocation//
// sets the google maps centering default on the users geolocation position//
// by creating a const of the users coordinates//
// then calls the getBikePointdata function//

let map;
let marker;

function mapCreator(position) {
    const { latitude, longitude } = position.coords;
    map = new google.maps.Map(document.getElementById("map"), {
        center: { lat: latitude, lng: longitude },
        zoom: 16,
    });
    getBikePointData();
}
```

Figure 42. Generating a Google maps render

First variables for map and marker are created.

The mapCreator function takes in the position data generated in the geolocation function, then creates a const variable of the latitude and longitude from these position coordinates. A google map instance is called from the Googlemaps API and stored in the map variable created, then rendered to the client side html using document.getElementById. The map is centred on the user's geolocation using the stored latitude and longitude position data, and the starting level of zoom into the map is set. After the getBikePointData function is called.

```
51 // TFL bike point API call function//  
52  
53 // fetch request to the TFL bike point API//  
54 // parses the response as JSON data//  
55 // then call the addBikePointPins function  
56  
57 function getBikePointData() {  
58   fetch("https://api.tfl.gov.uk/bikepoint")  
59   //fetch("https://api.tfl.gov.uk/BikePoint/Search?query=angel")//  
60   .then((response) => response.json())  
61   .then(addBikePointPins);  
62 }  
63
```

Figure 43. Calling the TFL bike point URL

The TFL API is called to return the bike point data as a JSON data, then the addBikePointPins function is called. It is worth noting the commented out additional API call, this will allow a user to narrow the search to a specific place name and is left in for inclusion for later development options.

```
64 // Bike point marker added on google maps function//  
65  
66 // function iterates through the bike point JSON data  
67 // from this data it saves the latitude and longitude information inside a new variable  
68 // google map then renders a marker position for each set of coordinates  
69 // the icon is a customised image icon//  
70  
71 function addBikePointPins(bikepoints) {  
72   bikepoints.forEach((bikepoint) => {  
73     const dockingStationLocation = { lat: bikepoint.lat, lng: bikepoint.lon };  
74     marker = new google.maps.Marker({  
75       position: dockingStationLocation,  
76       map: map,  
77       icon: bikeIcon,  
78     });  
79   });  
80 }  
81  
82 }
```

Figure 44. Plotting bike point markers on the map

The function adds markers/pins to the rendered google map of the geolocation of the bike points. Using a For loop the function iterates through the bike point JSON data and creates a new variable of

each bike point by their latitude and longitude. The marker variable created earlier is used to store the google maps marker function from their API and maps them to the geolocation data of each bike point.

```
// bike docking station marker icon//  
  
// calls a custom image  
// scales it using the google maps documentation for scaling//  
  
const bikeIcon = {  
  url: "./images/bike_icon.png",  
  scaledSize: new google.maps.Size(40, 45),  
  
};
```

Figure 45. Custom marker icon

The custom icon for each bike point marker is set, and the scaling is defined by the documentation google map API documentation.

```
<!DOCTYPE html>  
<html>  
  
<head>  
  <meta charset="utf-8">  
  <meta id="viewport" content="width=device-width, initial-scale=1.0">  
  <title>TfL Santander Cycles mapper</title>  
  <link rel="stylesheet" href="style.css">  
  
  <script defer src="https://maps.googleapis.com/maps/api/js?key=AIzaSyCjoKzgA4HnMJ0ZIdJCe14K4U0k1M2s2mk">  
  </script>  
  
  <script src="cyclehire.js" charset="utf-8" defer></script>  
</head>  
  
<body>  
  <div id="map"></div>  
</body>  
  
</html>
```

Figure 45. html client side implementation

The client side html is very simple to implement the google maps, the render takes place in a simple

```
<div id="map">
```

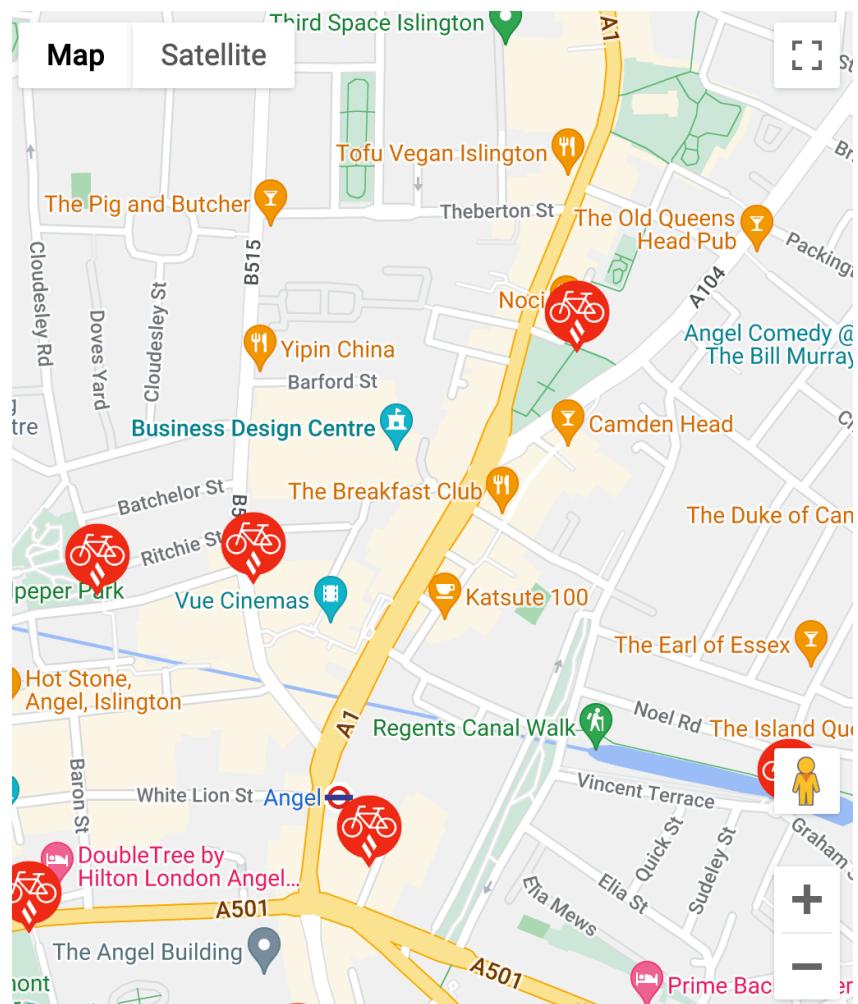


Figure 46. Example of the bike point implementation working

## Implementation: Production diary - Google maps Route Planner

```
2 // Google maps initialisation function//  
3 // creating const variables from Google maps directions services//  
4 function initMap() {  
5     const directionsRenderer = new google.maps.DirectionsRenderer();  
6     const directionsService = new google.maps.DirectionsService();  
7  
8     // creating a const variable of the map display, the div in the html it is selecting//  
9     // to render the map inside, and defining the latitude and longitude of london to defult to//  
10    // and the level of default zoom when loading//  
11    const map = new google.maps.Map(document.getElementById("map"), {  
12        zoom: 12,  
13        center: {lat:51.5072, lng: 0.1276},  
14    });  
15  
16    directionsRenderer.setMap(map);  
17    calculateAndDisplayRoute(directionsService, directionsRenderer);  
18    document.getElementById("mode").addEventListener("change", ()=> {  
19        calculateAndDisplayRoute(directionsService, directionsRenderer);  
20    });  
21}  
22
```

Figure 47. setting up google maps direction services and map render

```
25 function calculateAndDisplayRoute(directionsService, directionsRenderer) {  
26     const selectedMode = document.getElementById("mode").value;  
27  
28     directionsService.route({  
29         origin: document.getElementById("from").value + ",London",  
30         destination: document.getElementById("to").value + ",London",  
31  
32         travelMode: google.maps.TravelMode[selectedMode],  
33     })  
34  
35     .then((response) => {  
36         directionsRenderer.setDirections(response);  
37     })  
38  
39     // catch not working, research how to do this as "status" is depracated//  
40     .catch((e)=> window.alert("This direction request has failed due to" + status));  
41 }
```

Figure 48. Routing the google maps direction service to the client side html

```

1  <!DOCTYPE html>
2  <html lang="en">
3  <head>
4      <meta charset="UTF-8">
5      <meta http-equiv="X-UA-Compatible" content="IE=edge">
6      <meta name="viewport" content="width=device-width, initial-scale=1.0">
7      <title>Travel modes & directions</title>
8      <link rel="stylesheet" type="text/css" href="/style.css" />
9      <script src="/routeplanner.js"></script>
10 </head>
11 <body>
12     <!-- Container for the Panel for user input -->
13     <div id="floating-panel">
14         <!-- User journey start and end point input-->
15         <div>
16             <div>
17                 <input type="text" id="from" placeholder="Start point">
18             </div>
19         </div>
20         <div>
21             <div>
22                 <input type="text" id="to" placeholder="End point">
23             </div>
24         </div>
25         <!-- Mode of travel selector-->
26         <b>Mode of Travel</b>
27         <br><br>
28         <select id="mode">
29             <option value="WALKING">Walking</option>
30             <option value="BICYCLING">Cycling</option>
31             <option value="TRANSIT">Public Transport</option>
32         </select>
33     </div> <!--end of panel container-->
34
35     <!-- div for the map to render within-->
36     <div id="map"></div>
37
38     <!-- google maps api key-->
39     <script src="https://maps.googleapis.com/maps/api/js?key=AIzaSyCJoKzgA4HnMJ0ZIdJCe14K4U0k1M2s2mk&callback=initMap"
40           async></script>
41 </body>
42 </html>

```

Figure 49. html client-side implementation of the google maps directions service

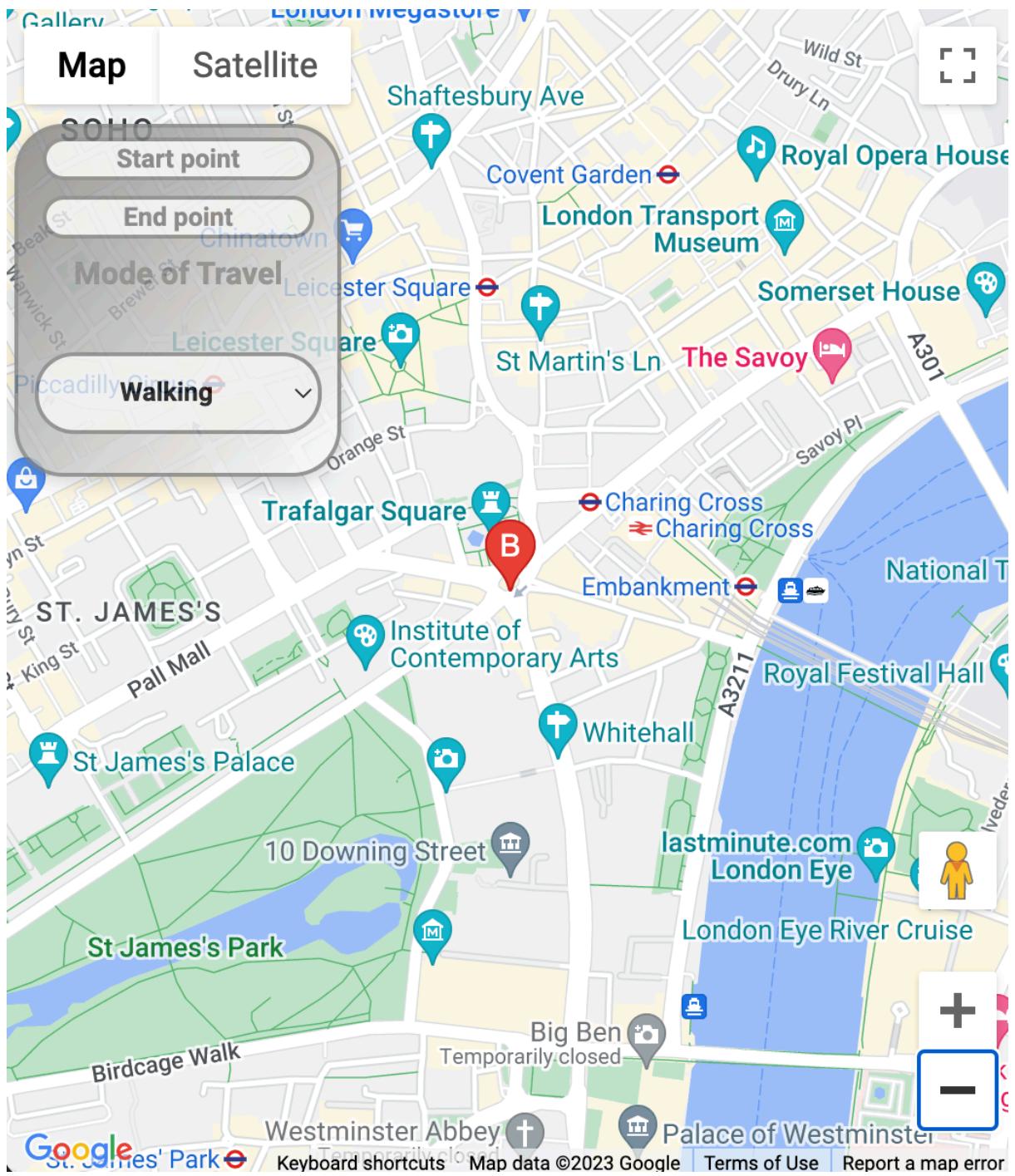


Figure 50. Example of the google maps direction service implementation working, with CSS styling.

## **Implementation - Usability Testing**

In continuing with the Agile methodology being implemented throughout the project, conducting testing of the first iteration of the MVP was the next step.

Testing supported the evaluative academic outcomes of the project and additionally define the future development backlog for the application.

### **Methodology**

The chosen methodology for conducting testing is an in person 1-2-1 setting, utilising “think aloud testing”. The in-person nature of this testing has been driven by the limitations on the ability for a subject to be able to be able to take control of my personal hardware, and at this stage the project is not in a technically advanced stage to support a cloud-based server approach.

### **Test subject selection**

Test subject selection was based upon the pool of prospective candidates that the primary research survey yielded, although only three candidates responded in time for inclusion in the primary research survey a fourth did submit the survey later, and their participation in the testing phase was offered when approached.

As per conversations with the project’s supervisor it was suggested that 6 - 10 candidates would be required for suitable sized test subject base, ultimately 4 were secured.

### **Candidate Criteria**

The main criteria for test subject selection were based upon the user story that defined the MVP/POC, in essence that the candidate was either not an active cyclist in London or that they were perhaps not an experienced cyclist in London.

Unlike the gender centric nature of the user story used for the MVP/POC the pool of candidates was not exclusively female, in discussion with the project Supervisor around the subject of creating a balanced data set from testing it was opted upon to create a balanced test pool of this of male and female candidates.

Testing was structured as follows:

- **Initial consent form:** This took into consideration the legalities and privacies of personal information, data handling & storage and the recording of the sessions, whilst outlining the nature of the testing and the format.
- **Pre-test survey:** A condensed version of the survey used in the primary research survey was used to ascertain information surrounding gender, socioeconomic status, walking and cycling competence & frequency, in addition some basic information around current application usage.
- **Think aloud test:** Conducted using Microsoft teams to allow for session recording and live transcription. The candidates were set 2 tasks, one directly relating to the cycling focused user story created for the MVP/POC and another based on walking journeys to give some balance, as the overall project aims focused were around active journeys inclusive of walking and cycling.

Testing was logged throughout and then consolidated with the transcription from the session.

- **Post Test Questionnaire:** The post-test questionnaire consisted of 2 sections. The first of these consisted of Likert scale set of 12 questions, that would allow for some quantifiable data generation that could then be compared across all test subjects to better identify trends. The second section allowed for candidates to describe in their own words their experience through answering predetermined open-ended questions. The aim of this was to determine specifics about what they felt worked in the application, what was missing, what additional features could be added in the future development road map and the effectiveness the application solution would have on them making active journey decisions as per the projects aims of promoting active journey decisions in underrepresented groups.

### **Analysis - Likert Scale data set**

The individual test subjects' responses were compiled into one data set to allow for analyse of the overall trends across the test subjects and to create a quantifiable score that has the potential to be measured across multiple tests over time to monitor changes in attitudes to the product.

### **Analysis - Post-test questionnaire – (Usability & Suitability)**

The results of the testing logs including facilitator observations and the open-end questions in the post test survey were compiled with the intent to provide an answer to the project's overarching aim of whether the project's software solution would work in promoting active journey decisions in underrepresented groups.

### **Analysis - Future development road map**

Structured as a quick win, medium and long-term development backlog, the road map consisted of the compiled points from the think aloud testing and post test survey, along with development objectives determined by myself from my experience in conducting the project.

Completed usability tests are provided in the project's supporting documentation.

### Results: Likert Scale Accumulated

| Question  |       | Subject 1 | Subject 2 | Subject 3 | Subject 4 |
|---|-------|-----------|-----------|-----------|-----------|
| I would like to use this app  |       | 4         | 5         | 4         | 3         |
| The app is unnecessarily complex                                    |       | 1         | 3         | 2         | 2         |
| The app was easy to use   |       | 5         | 4         | 4         | 3         |
| I think I would need assistance to use this app                     |       | 3         | 3         | 2         | 1         |
| I found the various function in this app to be well integrated      |       | 4         | 3         | 3         | 4         |
| I thought there was too much inconsistency on the app               |       | 5         | 1         | 3         | 2         |
| I imagine that most people would learn to use this app very quickly |       | 5         | 5         | 5         | 5         |
| I found this app very cumbersome/awkward to use                     |       | 1         | 2         | 2         | 3         |
| I felt very confident using this app                                |       | 5         | 3         | 4         | 4         |
| I needed to learn a lot before using this app                       |       | 1         | 2         | 1         | 1         |
| I found it easy to complete the tasks asked of me.                  |       | 5         | 3         | 5         | 5         |
| The app would encourage me to make active journey choices           |       | 1         | 4         | 4         | 4         |
|   | Total | 40        | 38        | 39        | 37        |

| Strongly Disagree | Disagree | Nuetral | Agree | Strongly Agree |
|-------------------|----------|---------|-------|----------------|
| 1                 | 2        | 3       | 4     | 5              |

## **Results: Post testing questionnaire results accumulated**

### **What did you like about the app?**

#### **Subject One**

I liked that it was very intuitive and easy to determine how to find out what I needed to know. It was not cluttered at all and had a very clean design.

#### **Subject Two**

Big buttons with obvious pictures made it easy to understand what each section was for

#### **Subject Three**

Large clearly labelled icons made it easy to navigate between the sections.

It was pretty quick (responsiveness)

#### **Subject Four**

I liked the fact that it incorporates elements from a few different places, weather, TFL info and google maps

### **What do you feel is missing from the app?**

#### **Subject One**

It would be good to see the weather over the map when route planning or looking for bike hire locations. It would be good to plan a route between bike docking points. It would be good to see mileage and time for routes.

#### **Subject Two**

I would have liked it all to have been on one page, it would have been a lot easier to plan a route from the bike point.

It was bit difficult to understand at first in the route planning the drop-down box isn't obvious, but after the first time it was easy though.

### **Subject Three**

The ability to move between the bike point and the route planner directly.

### **Subject Four**

I think the bike point selection and the route planner need to be better linked, I should be able to hover or click on the bike point marker and it should be able to give me the option to plan the route from there, also it would be good to have a drop down about the number of bikes or empty space at the bike point. Distance of my route and time to complete were missing as well.

### **What additional features would you like to see?**

#### **Subject One**

Live route tracking, and fitness information (pedometer etc) when on a route.

#### **Subject Two**

It's hard to say, I do struggle with my own bike in the flat as there isn't much space, so maybe having safe bike storage location might be nice

### **Subject Three**

Better routes for quieter off main road cycling

### **Subject Four**

It would be nice to see the other cycle hire schemes in London included

Maybe better cycle route planning, it wasn't bad, but it did take me through a known accident black spot in Holborn

### **Would this app encourage you to take a cycling journey in London? and why?**

#### **Subject One**

No, because I don't enjoy cycling in London due to safety concerns and laziness.

### **Subject Two**

I haven't really seen many apps for bikes, so having something like this would be good to help me as I've not really ridden in London. It was great that it gave me what looks like a safer route that used the canal, and not the main road.

### **Subject Three**

Having a few different services in one place is good, I don't wish to be rude, but Citymapper is doing it better, the weather included is a nice touch. As it is now, not so much, but I can see what you are trying to do with it and that I do like.

### **Subject Four**

I think it might do; it is nice to see an app with a cycling focus

## **Would this app encourage you to walk in London? and why?**

### **Subject One**

Yes, because I enjoy walking the dog to new locations and this app would be great for measuring distances and exploring new parks etc. It's very useful for seeing the weather immediately also.

### **Subject Two**

I walk quite a lot, that's why I got the cheap bike and I use Google maps a lot when I am walking, so having something that was easy to use for both would be good.

### **Subject Three**

Purely based on the route it gave me for the walk I planned, no. I think having an app with a walking focus is great, but once again Citymapper is doing a better job and I use that. If you can get it comparable or offer something unique then yes, I think it would then.

### **Subject Four**

I walk quite a lot in London anyway, and use a google maps for route planning, so seeing things I know from that, but in a more simplified interface was nice, it might do when it is a bit more finished, I'm interested in seeing where it goes.

**What features in an app do you feel would encourage you to walk or cycle?**

**Subject One**

I think integrating the weather over the route planner would encourage me to walk as it would be great so get both of this information at glance.

**Subject Two**

Not knowing any safe routes to cycle, especially in central London, having some routes to see so I can use them to plan my own would be good.

**Subject Three**

I'd like to be able to see previous routes that other people have made, would let me find new places I haven't been.

**Subject Four**

Maybe some kind of calorie tracker or pedometer, just so I have a better gauge of what I'm achieving, in the same way maybe being able to save my completed routes as an option.

## Evaluation

The overall reception of the application has been largely positive within the user testing sessions, and despite the pool of subjects being somewhat limited at 4 there are some clear trends in additions and revisions users would like to see made to make it more appealing to make active journey decisions (complied in the project's future development road map).

Unification of weather information and Santander Bike point information into one route planning application was widely well received, with the addition of the weather information being regarded as a unique USP that would encourage application usage. In the cases of both implementations' users were keen to see these expanded upon and further integrated into the application.

In two of the usability tests the routes plotted by the application raised concerns over the suitability of the suggested routes, and in turn does raise questions about the reliance on the Google maps API for solely providing routing suggestions.

With the one user who came across as verging on hostile in their testing feedback, they were able to acknowledge the aims of the project despite not necessarily grasping the nature of an MVP when comparing to a production build level application. This feedback does however lead to questioning their suitability for the study, although they did meet the infrequent walking and cycling criteria, they may well represent the bias explored in the literature review of the Atlanta, Georgia study relating to bias in planning from existing application users.

Although the project has not been part of a design course, it is worth acknowledging the positive feedback to the UX/UI considerations in the MVP implementation, clean well labelled, and large understandable icon choices were made to facilitate HCI aimed at all levels of IT literacy, as would be required in developing an application that targets groups unfamiliar with MaaS applications.

In conclusion the overarching concept of the project through the research and usability testing has had its validity proven, and there are encouraging signs from the usability testing that the MVP could promote active journey participation with under-represented/nonengaging groups, however the scope of the project's research and the MVP would have to be expanded upon, additionally the user testing pool needs to be better defined whilst also being expanded upon, this however was not deliverable in the confines of the scope of this work, ideally the projects findings would be folded

into a larger study where this project's findings are used as the basis by which to better define a larger study's aims and objectives from the lessons learnt.

## **Related Work**

### **Alan Turing Institute partnership (ATIP) with Active Travel England**

On 31<sup>st</sup> March 2023 a partnership between The Alan Turing Institute (ATIP) and Active Travel England was announced. [20] The partnership endeavours to use data and software engineering techniques to support evidence-based planning in active transportation interventions. ATIP have created an interactive web-based application for local authorities to plot routes where active transport interventions would benefit the local community. This software implementation has been built to aid local authorities' applications for the Active Travel Fund 4 (ATF4) that will define the allocation of public funding for active travel infrastructure between 2025-2030.

The key policies that define ATF4 directly correlate with those outlined within the background section of this project (CWIS, increased walking stages, Gear Change & increased walking to school). The overlap between this partnership and its use of a technological implementation to support ATF4 and the work undertaken within this project spurred me to reach out to the lead developer at the ATIP and we are now engaged in dialogue about our projects via email, and they are keen to view my work once moderation and marking of the project has been completed.

## **Conclusion: Future Development Road map**

### **Short term/Quick wins**

- Weather - added to the map e.g., in a map marker pop up box for bike points, or in the route planner start and end points.
- Route Planner – Distance added to the route displayed
- Route Planner – Time the route is going to take to complete
- Bike points – Clickable markers, additional information e.g., empty docks, number of bikes etc.
- Route Planner – method of journey drop-down not intuitive, maybe create a submit button or similar. Maybe an additional list item in the drop down as the primary “select your method”.

### **Mid length**

- Route Planning – Be able to plan a route between Santander docking stations, to easily have a start and end point to pick up and drop off at.
- Bike points – Should be able to click on a bike point marker to begin the route planning from there.
- Route Options – More Cycle routing options – quiet, direct, on road with cycle lanes
- Route Options – More walking route options – quiet off main roads, off road, direct.
- Server build of the site – running on a node.js server not front-end client-side build. Porting code to back-end framework.
- How Far Can I...? As outlined in the wire framing it had been the aim to include this feature in the MVP/POC. As the project developed and the user story focused on cycle journeys this work was not completed.

### **Long Term**

- Fitness – pedometer or similar element from fitness app added for personal goal tracking.
- Live route tracking - whilst undertaking the route have a live tracker
- Route Sharing – social element, users can share routes with each other.

- Research – Identifying community groups, schools, health professionals to facilitate a better targeting of subjects to survey and to run user testing upon.

## **Conclusion: Reflection**

### **API keys – local development environment.**

While developing with the openweathermap.org API, I encountered challenges incorporating a user input function for retrieving local weather information. Initially, I called the API on page load, causing frequent updates and exceeding the free tier's 1000 daily call limit. After discussions with tech support, I had to wait 24 hours to resolve this. To avoid excessive API requests, capturing JSON data in the API's format and creating a local JSON file for offline use could be considered in future projects with usage limitations.

### **Remote Testing**

When planning remote discount usability testing sessions, the question of granting candidates remote control over the project environment arose. While tools like Microsoft Teams offer useful features for documenting meetings, finding a suitable solution for remote access and control was not achieved in this project. Future projects should consider this aspect early on, exploring options such as cloud-based environments or dedicated hardware solutions.

### **Usability Testing in underrepresented groups – Inclusion & Accessibility**

Considerations in usability testing for "underrepresented groups" involve acknowledging factors such as IT literacy, disabilities, and overall literacy. In one instance, a potential testing subject who participated in the project's primary research survey had valuable insights but faced speech difficulties due to an underlying health condition. While testing was completed with a patient and reassuring approach, it raised questions about the suitability and limitations of think aloud testing in being inclusive and accessible to the demographics the project aimed to reach within underrepresented groups.

## **Front end Vs. backend JavaScript**

The project's approach involved working on individual API components with the aim of eventually integrating them into a node.js and Express environment. However, my limited skills and experience in backend development posed a challenge. To implement this, an additional 2-3 weeks would have been ideal to familiarize myself with templating tools like PUG or EJS, which I intended to use. Ultimately, the decision was made with my project supervisor to prioritize delivering a working prototype for user testing, aligning with the project's academic goals and Agile methodology. The testing environment was constructed using front-end JavaScript, HTML, and CSS, utilizing the live server plugin in the Vscode IDE. The project's supporting documentation includes examples of the progress made during the porting process to the backend.

## **Identifying and engaging suitable stakeholders**

It is hard to determine the success of achieving the project aims with such a limited prototype, additionally the testing pool for further iterations would need to be expanded upon greatly, furthermore additional research into how to target this pool towards the demographic it aims to engage, who are by the very nature of their non-engagement elusive.

As the literature review of the Atlanta, Georgia study regarding performance and route planning application usage alluded, ultimately anyone already using these apps were not necessarily the target stakeholders for this project.

I could envision targeting health professionals to create targeted focus groups of their patients with low mobility to find potential candidates to survey and use for testing an area I have had experience of running similar sessions in the past when engaging local health professionals in the B&NES authority around Hepatitis C support groups.

Targeted community group engagement, as an example was discussed with the project supervisor when approaching the testing phase of the project about a community group for families where their children don't need to buy bicycles but come and replace and exchange the bicycle as the child outgrows it, another potential area to target in surveying and later iteration testing for an expansion of the project.

## **Personal Development**

It is fair to say that this work represents possibly the largest piece of self-defined work that I have undertaken in either my academic or professional life and is the first self-defined coding project I have ever undertaken.

The project has pushed my boundaries in respect of the technical and intellectual achievements, although I feel I fell short of my technical aspirations for the project in the time frame I had to work within.

This work has enabled me to cement my current technical skillset, but more importantly it has enabled me to identify where my skill gaps are and allow me now to target the research for learning support, I need to achieve my goal of moving into a software development career and to continue developing this project outside of outcomes.

## **Aims & Objectives reviewed**

The effectiveness of the project to achieve the aims as set out in the project proposal is subjective, the MVP has delivered through UX & UI considerations an accessible web-based application as demonstrated in the usability testing feedback. The MVP does attempt to implement a “handy” active journey planning application through its unification of the selected API’s based upon the evidence gathering of the background research and the user survey conducted to define features.

The effectiveness of the MVP built to challenge the barriers to active journey participation is inconclusive with such a limited MVP, however the feedback from the usability testing is invaluable in better defining the stakeholders for the project in the future and has provided a comprehensive development roadmap does have the potential to address these barriers to uptake.

All the objectives that were set out in the project proposal have been accomplished and were well incorporated into the project’s use of Agile methodology to ensure they were achieved so long as adequate time management of the project was employed, the decision to use Jira to execute this gave the best possible chance of success (evidence supplied in the supporting documentation).

## References

- [1] Anonymous "Google v Oracle: Supreme Court declares Google's code copying fair," *BBC News*, 2021. Available: <https://www.bbc.com/news/technology-56639088>.
- [2] Anonymous "Opinion 13/2011 on Geolocation services on smart mobile devices," (*Article 29 Data Protection Working Party*), 2011. Available: [https://ec.europa.eu/justice/article-29/documentation/opinion-recommendation/files/2011/wp185\\_en.pdf](https://ec.europa.eu/justice/article-29/documentation/opinion-recommendation/files/2011/wp185_en.pdf).
- [3] D. Kennedy, "The 2022 API security trends report industry challenges and approaches to API security black & white," No Name Security, /04. 2022.
- [4] Anonymous "Overview Travel in London report 15," .
- [5] Anonymous "Cycling and Walking Investment Strategy Report to Parliament 2022," *UK Parliament Command Paper*, 2022. Available: <https://www.publicinformationonline.com/uk-parliament/command-papers/2022-2023/9781528635639/237373>.
- [6] Anonymous "cycling-walking-investment-strategy," .
- [7] Anonymous "The clean growth strategy leading the way to a low carbon future," UK Government, United Kingdom, October. 2017.
- [8] Anonymous "Future of mobility: Urban strategy moving britain ahead," UK Government, United Kingdom, -03. 2019.
- [9] Anonymous "Clean air strategy 2019," UK Government, United Kingdom, 2019.
- [10] Anonymous "Prevention is better than cure our vision to help you live well for longer," UK Government, United Kingdom, 08/11/. 2018.
- [11] S. C Davies *et al*, "UK chief medical officers physical activity guidelines," UK Govenrment, 2019Available:  
[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/832868/uk-chief-medical-officers-physical-activity-guidelines.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/832868/uk-chief-medical-officers-physical-activity-guidelines.pdf).
- [12] (.). *Department of Transport - Statistical Data set's : Mode of Travel*. Available:  
<https://www.gov.uk/government/statistical-data-sets/nts03-modal-comparisons>.
- [13] Anonymous "Statistical Release," *The Journal of Thoracic and Cardiovascular Surgery*, vol. 149, (1), pp. A33-A34, 2019. Available: <https://www.clinicalkey.es/playcontent/1-s2.0-S0022522314018479>. DOI: 10.1016/S0022-5223(14)01847-9.
- [14] Anonymous "Women: reducing the gender gap All cities publication," 2018.
- [15] ONS, " Perceptions of personal safety and experiences of harassment, great britain: 16 february to 13 march 2022," Office of National Statistics, UK, March. 2022.
- [16] L. Dearden, "Two to three Met Police officers including alleged sex offenders to appear in court every week," *The Independent*, 2023. Available:

<https://www.independent.co.uk/news/uk/crime/met-police-officers-court-rape-rowley-b2268832.html>.

[17] V. Dodd and Walker Peter, "Sarah Everard: Wayne Couzens to be sentenced for kidnap, rape and murder," *The Guardian*, 30/09/21. Available: <https://www.theguardian.com/uk-news/2021/sep/30/sarah-everard-wayne-couzens-to-be-sentenced-for-kidnap-and>.

[18] Anonymous "02-MaaS-Alliance\_Active-mobility-1," Mass-alliance, Belgium, .

[19] N. Mahipal. (May,). *6 Stages of the Agile Development Lifecycle*. Available: <https://www.decipherzone.com/blog-detail/agile-development-lifecycle>.

[20] K. Mccaskill-baxter. (31st April). *Alan Turing Institute partnership brings data expertise to nationwide walking and cycling schemes*. Available: <https://www.gov.uk/government/news/alan-turing-institute-partnership-brings-data-expertise-to-nationwide-walking-and-cycling-schemes>.

## Appendices

Revision: 02\_11/12/2021 12:22:32

# CMP060L050 MSc Project Proposal Form

|                          |  |
|--------------------------|--|
| <b>Student Name</b>      | James Simmonds   |
| <b>Student ID</b>        | SIM20499428  |
| <b>Project Title</b>     | Wal-c-r (walk-cycle-ride)<br><i>The personal walking and cycling travel application for London</i> |
| <b>Programme</b>         | MSc Computing  |
| <b>First Supervisor</b>  | Graham Lane  |
| <b>Second Supervisor</b> |  |

### Project Description

#### Wal-c-r (walk-cycle-ride)

*The personal walking and cycling travel application for London*

A Walking and cycling application for London, with a focus on accessibility and design choices that favour mobile.

The scope of the project's research endeavours to examine the relationship between technology and participation in active (walking & cycling) transportation, offering an insight into current active transport trends in London, the current associated technology landscape, examination of local, national, and non-governmental future planning strategies, the identification of the barriers to participation and how a targeted application solution can drive uptake in active journeys.

The asset will comprise of a P.O.C/MVP designed based upon user stories derived from the data assessed from the research, the project will be structured using agile methodology and project managed using Jira.

Project will be a web-based application utilising existing Web API's as a modular building block to create a unique travel application, the tech stack will consist of node js, html and css.

### Project Aims

Please list up to three aims of your project. An aim is an expected outcome of your project.

|   |   |
|---|---|
| 1 | Create a handy web-based application for active journey planning in London                  |
| 2 | Inspire people to walk and cycle more through technology                                    |
| 3 | Create an accessible platform that challenges the barriers to active journey participation. |

## Project Objectives

Please list up to five objectives of your project. An objective is a tangible task you will complete.

|   |  |
|---|--|
| 1 | Research local, national government and NGO strategies to encourage a wider uptake of both walking and cycling, with a view to identifying the barriers to uptake. |
| 2 | Conduct primary research in the form of a survey to support the research.  |
| 3 | Examine the ethics, security, legalities, and privacy concerns of Web API technology.  |
| 4 | Design and execute an MVP from user stories derived from the research data.  |
| 5 | Test and evaluate the product to define further iterations and future roadmap  |

## Background Information

Please list sources of background information you will be using to inform your project.

- Department of Transport - Analysis of travel habits.
- TFL – Transport habits and policy in London.
- CWIS – National government walking and cycling strategy.
- Sustrans – Sustrans data surrounding barriers to cycling uptake.
- Application usage and its influence on active transport uptake.

## Risks, Ethical Issues, and Other Considerations

Please describe any risks or other issues your project may have to consider.

- GDPR – Location data
- API – Legalities
- API – Ethics, open sourcing, and reimplementation
- API Legalities – Google vs. Oracle (reimplementation case study example)
- Cyber security – Web API concerns, privacy & data
- GDPR – Primary research (Survey), limitation of data and storage considerations

## Signoff

|                        |                |
|------------------------|----------------|
| <b>Student Name</b>    | James Simmonds |
| <b>Signature</b>       |                |
| <b>Supervisor Name</b> |                |
| <b>Signature</b>       |                |

# James Simmonds – Mid-point review meeting

---

**Location:** via Teams

**Date:** 30/03/2023

**Time:** 11:00 – 11:30

---

## **Attendance:**

James Simmonds (student)

Graham Lane (supervisor)

Lisa Haskell (2<sup>nd</sup> supervisor)

## **Agenda Items:**

Midpoint review

## **Key Points:**

Aims & Objectives:

- Update the main document with the revised project submission data.

Contextual review:

- Discussion around inclusion of software reviews and journals in research. I explained I had researched this, but had yet to write this part up, additionally I discussed the software review featuring city mapper as it is the closest, I have found to the functionality I am proposing for my user story being focused on.

Combining Features:

- The user story implementation it has been suggested would need to build in back end ~~Javascript~~ to allow combining data from multiple API sources.

Frameworks:

- PUG and EJS templating engines suggested.
- Use the SD2 framework as a starting point.

Future work:

- Be sure to include the outcomes of the usability testing in the future development section.

**Action Items:**

- Write up the software focused research.
- Research EJS as a templating engine.
- Research backend development frameworks and implementations of the work already completed in front end JavaScript.

**Other Notes**

- Lisa as 2<sup>nd</sup> supervisor and module convener, happy with my progress so far, very happy with my plans for testing, and evaluation.
- Made it clear that the work I had down technically was enough and academically was a very good position to be in at this juncture, and made a distinct point of making sure that I did not set my technical expectations on something finished, but to document my work and my journey.

## Project Management: Jira Sprint Documentation

▼ Sprint 2 - initiation 9 Feb – 20 Feb (5 issues)

Project Proposal - Around 300 words expanding on your topic, including key references and a description of what you will make. Useful links: project timetable slide <https://moodle.roehampton.ac.uk>

0 0 0 Complete sprint ...

|   |               |
|---|---------------|
| <input checked="" type="checkbox"/> JSMMMP2-7 Create a Microsoft forms survey - travel habits & app assistant usage             | DONE ✓        |
| <input checked="" type="checkbox"/> JSMMMP2-8 Create a draft pro forma document for 1-2-1's with Supervisor                     | DONE ✓        |
| <input checked="" type="checkbox"/> JSMMMP2-9 Research walking & cycling policy - Local(London) & National (Central Government) | DONE ✓        |
| <input checked="" type="checkbox"/> JSMMMP2-11 Finalise & submit project initialisation document - Friday 10th Feb              | DONE ✓        |
| <input checked="" type="checkbox"/> JSMMMP2-12 Software Tutorials - AJAX requests/JSON data/ web api projects                   | - DONE ✓  ... |

+ Create issue

▼ Sprint 3 - Proposal Monday 6/3 21 Feb – 6 Mar (3 issues)

Finalise project proposal

0 0 0 Start sprint ...

|  |               |
|--|---------------|
| <input checked="" type="checkbox"/> JSMMMP2-10 Software review research - what products are available - cross reference against survey | TO DO ✓       |
| <input checked="" type="checkbox"/> JSMMMP2-13 Google maps API - youtube, and Udemy tutorials - set up of account for API key          | IN PROGRESS ✓ |
| <input checked="" type="checkbox"/> JSMMMP2-15 Finishing writing Ethics & legalities   | IN PROGRESS ✓ |

+ Create issue

▼ Sprint 4 - Persona/Story/Env 8 Mar – 16 Mar (4 issues)

Persona, user story & Environment set up

0 0 0 Start sprint ...

|   |               |
|---|---------------|
| <input checked="" type="checkbox"/> JSMMMP2-18 User persona   | IN PROGRESS ✓ |
| <input checked="" type="checkbox"/> JSMMMP2-19 User Story   | IN PROGRESS ✓ |
| <input checked="" type="checkbox"/> JSMMMP2-20 Project Environment setup  | IN PROGRESS ✓ |
| <input checked="" type="checkbox"/> JSMMMP2-21 Weather API - test environment by setting up a weather data ajax request | IN PROGRESS ✓ |

+ Create issue

▼ Sprint 5 - Build part 1 17 Mar – 27 Mar (6 issues)

Google maps integration. Set up and ajax request to the google maps api to set up route planning feature

0 0 0 Start sprint ...

|  |               |
|--|---------------|
| <input checked="" type="checkbox"/> JSMMMP2-22 Wire framing - Design of the application                | IN PROGRESS ✓ |
| <input checked="" type="checkbox"/> JSMMMP2-23 HTML Build - Create a site from the wire framing        | IN PROGRESS ✓ |
| <input checked="" type="checkbox"/> JSMMMP2-24 Open Weather API - Create a dynamic user input          | IN PROGRESS ✓ |
| <input checked="" type="checkbox"/> JSMMMP2-25 Consolidate the existing work into the main environment | TO DO ✓       |
| <input checked="" type="checkbox"/> JSMMMP2-26 Integrate the project to Git Hub                        | TO DO ✓       |
| <input checked="" type="checkbox"/> JSMMMP2-27 Amend the project document ready for the 1/2 way review | TO DO ✓       |
| <input checked="" type="checkbox"/> What needs to be done?   |               |

✓ Sprint 6 - Build part 2 28 Mar – 5 Apr (1 issue)  
Interface design and build

JSMMP2-36 The week's sprint lost rescheduled due to sickness

+ Create issue

0 0 0 Start sprint ...

✓ Sprint 8 - Writing gaps 6 Apr – 23 Apr (5 issues)  
evaluate the written work - fill the gaps in the writing, complete unfinished sections

JSMMP2-33 Literature review - Atlanta Georgia app usage study

JSMMP2-37 Design and construct usability testing methodology and testing documentation

JSMMP2-34 Usability test - subject one

JSMMP2-38 Software review - Go Jaunty & Citymapper

JSMMP2-39 Software review - fitness tracker vs. MAAS applications

+ Create issue

0 0 0 Start sprint ...

✓ Sprint 9 - report restructure 24 Apr – 11 May (6 issues)  
Report restructuring following Supervisor read through and feed back

JSMMP2-28 Usability test - Subject 2

JSMMP2-29 Usability test - Subject 3

JSMMP2-30 Usability test - Subject 4

JSMMP2-31 Usability test - write up results

JSMMP2-32 Project written work restructure - as per the notes provided in last supervisor meeting

JSMMP2-35 update Appendix with all evidence and supporting documents

+ Create issue

0 0 0 Start sprint ...

## Production diary – Node.js Environment set up

```
● (base) jamessimmonds@Jamess-MacBook-Pro walcr - MSc Project % npm init --save-dev
This utility will walk you through creating a package.json file.
It only covers the most common items, and tries to guess sensible defaults.

See `npm help init` for definitive documentation on these fields
and exactly what they do.

Use `npm install <pkg>` afterwards to install a package and
save it as a dependency in the package.json file.

Press ^C at any time to quit.
package name: (walcr—msc-project)
version: (1.0.0)
description:
entry point: (app.js)
test command:
git repository:
keywords:
author:
license: (ISC)
About to write to /Users/jamessimmonds/Documents/walcr - MSc Project/package.json:

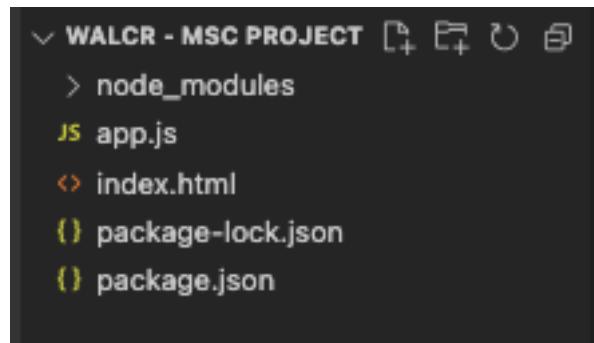
{
  "name": "walcr—msc-project",
  "version": "1.0.0",
  "description": "",
  "main": "app.js",
  "scripts": {
    "test": "echo \"Error: no test specified\" && exit 1"
  },
  "author": "",
  "license": "ISC"
}

Is this OK? (yes)
```

```
● (base) jamessimmonds@Jamess-MacBook-Pro walcr - MSc Project % npm i express --save-dev
added 57 packages, and audited 58 packages in 2s

7 packages are looking for funding
  run `npm fund` for details

found 0 vulnerabilities
```



Installing necessary dependencies after creating a new project file. Dependencies are installed locally to the project using –save-dev, this is to aid portability of the project so that users do not need to install dependencies to use the project when sharing.

```
const express = require("express");

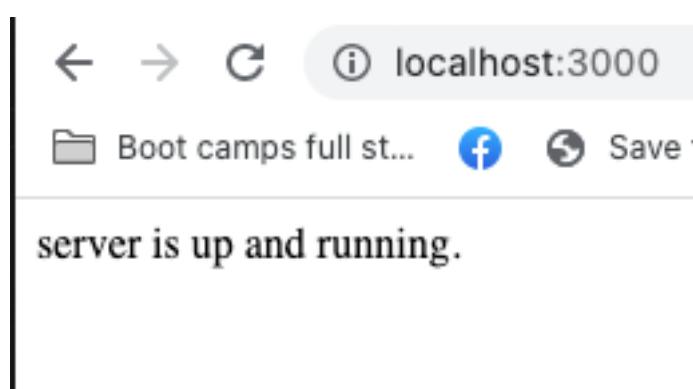
const app = express();

app.get("/", function(req, res){
    res.send("server is up and running.")
})

app.listen(3000, function(){
    console.log("Server is running on port 3000.");
})
```

Setting up a basic node app to log in the console that the server is running on port 3000, and to return a “server is up and running message” when viewed at localhost:3000 in the browser.

```
○ (base) jamessimmonds@Jamess-MacBook-Pro walcr - MSc Project % nodemon app.js
[nodemon] 2.0.15
[nodemon] to restart at any time, enter `rs`
[nodemon] watching path(s): ***!
[nodemon] watching extensions: js,mjs,json
[nodemon] starting `node app.js`
Server is running on port 3000.
```



## Weather service - Node.JS & Express implementation

The screenshot shows a code editor interface with a dark theme. At the top, there is a navigation bar with tabs labeled 'PROBLEMS', 'DEBUG CONSOLE', and 'TERMINAL'. The 'TERMINAL' tab is currently active, indicated by a blue underline. Below the tabs, the terminal window displays the following text:

```
[nodemon] starting `node app.js`
Server is running on port 3000.
200
200
```

The code editor area contains the following Node.js code:

```
7
8 app.get("/", function(req, res){
9
10   const url = "https://api.openweathermap.org/data
11
12   https.get(url, function(response){
13     console.log(response.statusCode);
14   })
15 }
```

Creating an https request which is native to node without additional libraries to create a get request to the openweather.org API URL request from postman. In the `console.log(response.statusCode)` the status code is shown as 200, meaning the request has been successful.

```
8  app.get("/", function(req, res){  
9  
10     const url = "https://api.openweathermap.org/data/2.5/weather?q=London,uk";  
11  
12     https.get(url, function(response){  
13         console.log(response.statusCode);  
14  
15         response.on("data", function(data){  
16             const wthrdata = JSON.parse(data)  
17             console.log(wthrdata);  
18         })  
19     })  
20 }
```

PROBLEMS DEBUG CONSOLE TERMINAL

```
[nodemon] starting `node app.js`  
Server is running on port 3000.  
200  
{  
  coord: { lon: -0.1257, lat: 51.5085 },  
  weather: [  
    {  
      id: 803,  
      main: 'Clouds',  
      description: 'broken clouds',  
      icon: '04d'  
    },  
    ...  
  ]}
```

Adding a function to return data from the API and then to parse it into JSON formatted data, console.log(wthrdata) demonstrates in the console that the data is in fact parsing as JSON.

```
https.get(url, function(response){  
  console.log(response.statusCode);  
  
  response.on("data", function(data){  
    const wthrData = JSON.parse(data)  
    const temp = wthrData.main.temp  
    const weatherdescription = wthrData.weather[0].description
```

## James Simmonds – Major Project Minutes Week 2

**Location:** David Bell 082: Workshop – Marking Criteria

**Date:** 08/02/2023

**Time:** 14:00 – 16:00

### Attendance:

- Class based
- Facilitated: Lisa Haskel & Oge Okonor
- Myself

### Agenda Items:

1. Marking Criteria workshop

### Key Points:

#### **Evaluation:**

- Consider the evaluation process, how to define success, construct a meaningful future road map.
- Usability testing built into the project lifecycle – review software dev 2 & comp in society work.
- 

#### **Literature & software review:**

- Review previous submission examples
- 

#### **Primary Research:**

- Design a Survey – define app usage for travel in London.
- 

#### **Agile methodology:**

- Define the project structure
- Iterative process
- Personas
- Stories
- Features – workflow

\$

**Action Items:**

**Immediate:**

- Proforma meeting minutes
- Design a survey using Microsoft forms

**Mid – range:**

- Document the agile process to be used
- Better understand the literature/software review expectations

**Long term:**

- Usability Testing
- Future Road map
- Evaluation – create a plan for this

**Other Notes**

## James Simmonds – Week 3 Workshop Minutes

---

**Location:** Workshop: David Bell 082

**Date:** 15/02/2023

**Time:** 14:00 – 16:30

---

### **Attendance:**

Class Based Workshop: Lisa ~~Haskel~~ & Oge Okana supervising.

Myself.

### **Agenda Items:**

Aims & Objectives workshop.

Feedback: Project initiation submission.

### **Key Points:**

#### **Aims & Objectives Workshop**

- Communicate motivation and key activities.
- Help to plan research define & define the resources required.
- Focus & define the scope.

#### **Aim:**

- What I am looking to achieve overall, why I think it is important and the intended benefit of my outcomes.
- 3 aims
- Create a narrative for the reader to follow.

#### **Objectives:**

- How this will be achieved.
- Practical.

**Feedback: Project initiation submission:**

- Manage the scope – be mindful of the boundaries creeping.
- What problem is the project helping? What are the barriers to walking and cycling uptake.
- Small amount of interviews instead of wider survey, better response, manage the response time, more controlled.

**Action Items:**

- Add research of what barriers hold people back from walking and cycling to the short term backlog.
- Draft survey over the weekend, potentially ask for feedback, a short turnaround on this and the response/interviews is required due to its need to inclusion in early development ideas.

**Other Notes**

# James Simmonds – Supervisor Meeting minutes

---

**Location:** Online – First Supervisor Meeting

**Date:** 27/02/2023

**Time:** 17:00 - 17:40

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## **Attendance:**

James Simmonds – Student

Graham lane - Supervisor

## **Agenda Items:**

Introductions

Project Overview

Scope

Current Technical skill set

MVP

Document – Current status

## **Key Points:**

### **Design:**

- Importance of personas, user stories, and journey mapping
- Integrating the survey conducted in creating user stories

### **Current Skill/Tech Stack:**

- Agreed that Node, "vanilla" JS, CSS & HTML are good fit.
- Not overextending to frameworks such as Vue, REACT or Django.
- Ajax requests through client side feasibly within my current skill set.

### **MVP:**

- Focus on delivering one working function for the 1<sup>st</sup> iteration.
- A working environment capable of pulling through ajax requests to the client side.
- The importance of good design to tie in with the project proposal of inclusivity.

**Written work:**

- Current sprint is focused upon consolidating my research so I can focus fully on the design and MVP and production diary for most of the March to meet ½ review goals 27<sup>th</sup>.

**Action Items:**

**Design:**

- Focus of personas, and user stories in the design phase.

**Written work:**

- Consolidate current work in sprint 3 for review Tuesday 7<sup>th</sup> March.

**Create Teams meeting:**

- 10am Tuesday 7<sup>th</sup> March.

**Other Notes:**

Agreed an email Monday 6<sup>th</sup> to confirm where my writing deadlines are.

Next Meeting 10am 7<sup>th</sup>

**Backlog ideas:**

- Santander bike point locators.
- Cycle storage locators – Bike theft in London
- Simplification of an app, non-elitist, accessibility – opposite to Strava and Garmin.
- Location integration – GDPR
- TFL journey – walking and cycling planner

## James Simmonds – Supervisor meeting Minutes

---

**Location:** Online via Teams

**Date:** 07/03/2023

**Time:** 10:00 – 10:40

---

### **Attendance:**

- James Simmonds (Student)
- Graham Lane (Supervisor)

### **Agenda Items:**

Written work review & feedback points

Project Proposal review and sign off

Personas and Stories

Jira & Next Sprint's

### **Key Points:**

- Update - "Underrepresented groups" – better highlighting in the document.
- Update - Add more focus to APIs in introduction.
- Include – start thinking about the testing and evaluation planning.
- Include – Analysis – start thinking about strategy and time management planning
- Sprints – shorter sprints – split the next proposed one into 2 – deadline 27<sup>th</sup> March
- Update – Redefine Mobile focused as "mobile design focus"
- GIS – research
- TFL API key research
- Low Traffic Networks
- User stories – tie back into the research well
- Feedback narrative works well overall

**Action Items:**

- Next meeting – Thursday 16<sup>th</sup> – 10 am
- Create teams calendar date for next meeting

**Other Notes**

# James Simmonds – Major Project Supervisor meeting |

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|                  |               |
|------------------|---------------|
| <b>Location:</b> | Via Teams     |
| <b>Date:</b>     | 16/03/2023    |
| <b>Time:</b>     | 10:00 – 10:45 |

---

## Attendance:

James Simmonds (student)

Graham Lane - Supervisor

## Agenda Items:

Persona & Story review

Code review: environment, maps API, weather API

Sprint schedule up until May 8<sup>th</sup>

Mid-Point Review

Testing & Evaluation

## Key Points:

Mid-point review:

- Moodle – check 2<sup>nd</sup> supervisor status
- Chair – Graham chairing meeting – invite to be sent to me.
- Format: Demo of artefact, draft document show and tell.
- 2<sup>nd</sup> supervisor sign off
- (better) Define research methodology

Additional use cases:

- Accuweather API.
- Air quality in London.

**Test & Evaluation:**

- Consent forms for participants
- Teams: transcribe and video
- Pro Forma: discount usability testing
- Format: in person/ remote
- Remote access infrastructure

**Evaluation:**

- Personal: skills, what I have learnt and developed
- Improvements on skill set
- Learnt skills

**Project evaluation:**

- Bring back to the aims of the project – Underrepresented groups.
- Future development roadmap

**Action Items:**

**Next meeting:**

- 23/03/23 Thursday 10am
- Resubmit proposal – amend aim's points and send to Graham for sign off.

**Other Notes**

James Simmonds – Week 8 Supervisor meeting

**Location:** via teams meeting

Date: 23/03/2023

**Time:** 10:00 – 11:00

**Attendance:**

James Simmonds (student)

Graham Lane - Supervisor

## **Agenda Items:**

Code Show & tell

$\frac{1}{2}$  way point meeting

## Evaluation Section Planning

### **Key Points:**

## Code Show & tell:

- Discussion around whether the current implementation would tick all the academic boxes in terms of complexity, suggested that I would need to explore manipulating/combing data from multiple API's to create something “new”.
  - Discussion around front and back-end frameworks to achieve this, the realization that all my JavaScript work so far is “frontend” JavaScript.
  - Lisa Haskell workshop – API workshop pm Friday 24<sup>th</sup> March, will possibly give some clarity as to how to proceed regarding structure and “back-end” dev approach.

### **½ way point meeting planning:**

- Evaluation Criteria – breaking this down into subsections and have a plan to discuss.
  - Valid Research – discussion around some of my research is not London centric and should be reviewed – female cycle uptake barriers **Sustrans** research.
  - Consolidating Project – moving all the separate modules that have been built into one environment.

- ~~Github~~ – Setting up a repository for the overall project.

Evaluation/discount usability testing:

- Usability testing pool – discussion about how the demographic make-up should be structured, and selection of candidates. Balanced gender group, with candidates from the targeted “under-represented” groups”.
- Physicality of conducting the testing – remote options, limitations of the framework, face to face testing using teams to document the sessions to use the recording and transcribing opportunities. The latter is likely the easiest to implement.
- Documenting – Discussion around the need for consent forms, and a pro forma for recording the sessions to ensure consistency. Reusing the documentation from the Computing in society module for this.
- GDPR: - Discussion around data handling, storage, limitations of use and anonymity. I have good experience of this in my working life where I handle a lot of data and have experience implementing GDPR governance to a team. Time limitation is an area I overlooked. Will generate GDPR statement to accompany the work.
- Pre-questionnaire discussed – not 100% about implementing this.

### **Action Items:**

- Create next supervisor meeting teams calendar date Thursday 30<sup>th</sup> March
- Implement the points raised in the ½ way point meeting discussion.
- RSVP the API tutorial with Lisa Haskell on Friday 24<sup>th</sup> march.
- Create a Teams meeting with Graham to discuss the points from Lisa's workshop, post meeting 13:30 30<sup>th</sup> March

### **Other Notes**

# James Simmonds – API workshop & supervisor discussion meeting

---

**Location:** via Teams

**Date:** 24<sup>th</sup> March 2023

**Time:** 11:00 & 13:30 -14:00

---

## Attendance:

Workshop – Class based via teams – Hosted by Lisa Haskell

Follow up Meeting: James Simmonds (student) & Graham Lane (supervisor)

## Agenda Items:

Workshop:

- Postman/handling API requests
- Json data – understanding Json structure
- Backend environment setup – using ~~Axios~~ library

Follow up meeting:

- Front vs. backend JavaScript
- Revising the user story to incorporate multiple API's and create new data.

## Key Points:

Front vs. backend JavaScript:

- Researching the ~~Axios~~ framework demonstrated by Lisa.
- Backend will be the best way to approach combining data from multiple API's

Artefact learning outcomes:

- Previous discussion about doing more than just pulling Json data into the project, agreed to work towards including bike hire points into this, so a user's location triggers a local hire option.

**Action Items:**

- RSVP the ½ way review meeting organized by Graham on this occasion.

**Other Notes**

# James Simmonds – Major Project meeting Minutes

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**Location:** Via Teams  
**Date:** 07<sup>th</sup> April 2023  
**Time:** 09:00 – 09:

---

## **Attendance:**

James Simmonds (Student)  
Graham Lane (Supervisor)

## **Agenda Items:**

### **Key Points:**

Focus on delivering user testing ready POC:

- At this point focusing on a product good enough to run testing on.

Node server version unlikely to be implemented:

- Control the narrative in the written work, priorities and own technical limitations have swayed the decision-making processes.

## **Action Items:**

- Create a meeting for 14<sup>th</sup> April 9am

## **Other Notes**

# James Simmonds – Major Project Supervisor Minutes

---

**Location:** Via Teams  
**Date:** 14<sup>th</sup> April 2023  
**Time:** 09:00 – 09:45

---

## **Attendance:**

James Simmonds (Student)

Graham Lane (Supervisor)

## **Agenda Items:**

Adding Value to the Code:

Body parser issues not returning full JSON in the node-based server

Focus on a platform ready enough for testing

## **Key Points:**

Adding Value to the Code:

- Geolocation to bike points
- Add weather to a click on pop up on the bike points (mixing 2 API's)
- Add further info to the bike points
- Distance between current location and bike point
- 

Focus on a platform ready enough for testing

- Agreed this was the primary focus at this stage, and the focus on delivering a testing ready product was the right choice at this juncture.

## **Action Items:**

- Next meeting 20<sup>th</sup> April

## **Other Notes**

- Controlling the narrative about the decisions made in opting to focus on a live server running app, to deliver the testing objectives

# James Simmonds – Major Project Minutes

---

**Location:** via Teams  
**Date:** 20<sup>th</sup> April 2023  
**Time:** 10:00 – 10:45

---

## **Attendance:**

James Simmonds (Student)  
Graham Lane (Supervisor)

## **Agenda Items:**

Testing  
Post submission meeting

## **Key Points:**

Testing:

- Recording and participation consent forms – agreed and have some templates
- Test group – should be inexperienced users, could reach out to ~~uni~~ peer group
- Structure – prequestionnaire, post questionnaire – post questionnaire, mix of open questions and closed for creating quantifiable result
- Does the test ask the question relating to the main project objective?

## **Action Items:**

- Finalize testing documents
- Next meeting Thursday 27<sup>th</sup>
- Send Graham a copy of document Friday 29th

## **Other Notes**

- Reflection: If I were approaching this again, I would have considered the role of community a lot more, as opposed to be so solely focused on the technological elements
- ~~Comoot~~: look at this app for community implementation



## Survey

03/03/2023, 13:04

Survey - Active transport engagement, barriers and application usage.

# Survey - Active transport engagement, barriers and application usage.

For the major project element of my MSc the area I have focused upon is a walking and cycling centric personal travel application, I am looking to build a simple modular design with a mobile first approach.

The working title for the project is wal-c-r (walk - cycle - ride). No self respecting app for London isn't misspelt ending in an R.

This survey is primary research looking to identify trends in "active" transport habits (walking and cycling), barriers to engagement and whether application usage can further engagement.

As part of both the Department for Transport and TfL's strategies for their net carbon zero goals walking and cycling engagement feature heavily, with 40% and 60% uplifts respectively to achieve their projections.

In the research undertaken thus far there are clear socio-economic and gender divides within engagement that provide clear opportunities to target in a personal travel app.

The data from this survey will lead to the creation of user stories, targeted design considerations, stake holder engagement and identify a potential test bed of subjects for the iterative design and testing phases of the project.

Any engagement is entirely anonymous, with any data collected only being used for this project and not supplied to any third parties or marketers in line with GDPR considerations, data will be stored in an appropriate encrypted manner for this same consideration.

### 1. Age

*Mark only one oval.*

- 18 - 25
- 26 - 34
- 35 - 40
- 41 - 49
- 50 +

## 2. Gender

*Mark only one oval.*

- Male
- Female
- Non Binary
- Prefer not to say
- Other: \_\_\_\_\_

## 3. Income per annum

*Mark only one oval.*

- Below £12,000
- £12,000 - £19,999
- £20,000 - £29,999
- £30,000 - £39,999
- £40,000 - £49,999
- £50,000 +

## 4. Home Ownership Status

*Mark only one oval.*

- Home Owner
- Tenant (Private Landlord)
- Tenant (Social Housing)
- Living with Family
- Other: \_\_\_\_\_

## 5. Living Area

*Mark only one oval.*

- Zone 1
- Zone 2
- Zone 3
- Zone 4
- Zone 5 or greater

## 6. Working Area

*Mark only one oval.*

- Zone 1
- Zone 2
- Zone 3
- Zone 4
- Zone 5 or greater
- Mainly work from home
- Other: \_\_\_\_\_

## 7. Walking

How many times a day do you walk to complete a journey on average?

*Mark only one oval.*

- Once
- 1 - 2
- 2 - 3
- 3 - 4
- 5+
- Less than once

**8. Walking**

What is the maximum time you are prepared to walk to complete a journey?

*Mark only one oval.*

- 5 - 15
- 15 - 30
- 30 - 45
- 45 - 60
- 60 +

**9. Walking**

What are your main walking activities?

*Tick all that apply.*

- Commuting
- Shopping
- Leisure (not exercise specific)
- Exercise ( ie. walking/running for health)
- School Run

**10. Cycling**

Do you own a bicycle?

*Mark only one oval.*

- Yes
- No
- Yes - but do not use actively

**11. Cycling**

Have you ever hired a bicycle in London?

*Mark only one oval.*

- Santander/Boris bike
- Lime/Uber
- Another provider
- No - I have not hired a bike in london

**12. Cycling**

What is the maximum time you are prepared to cycle to complete a journey in London?

*Mark only one oval.*

- 5 - 15
- 15 -30
- 30 - 45
- 45 - 60
- 60 +
- Unknown

**13. Cycling**

What are your main cycling activities?

*Tick all that apply.*

- Commuting
- Shopping
- Leisure (not exercise specific)
- Exercise (ie. planned)
- School Run
- None of the above
- I do not cycle
- Other: \_\_\_\_\_

**14. App Usage**

What app's do you use to plan your journey?

*Tick all that apply.*

- TFL
- CityMapper
- Maps (Google maps or another service)
- Weather (mobile, website, other)
- Other: \_\_\_\_\_

**15. App Usage**

Which type of app's do you use as you're making your journey?

*Tick all that apply.*

- Fitness Tracker (Strava, Map my walk/run/ride, pedometer, My fitness Pal)
- Maps (Google maps or another service)
- Weather (mobile, website, other)
- A wearable device (Apple watch, Samsung, other)
- Travel assistant (TFL, City mapper, other)

**16. App Usage**

Do any of these application features encourage you to make active transport decisions? (Walk or Cycle)

*Tick all that apply.*

- Fitness Tracking (Calorie burning/Pedometer)
- Gamification (Personal goal setting, Pokemon Go)
- Personal Safety (crash detection, pin dropping location, live location sharing)
- Directions (route setting, location tracking)
- Other: \_\_\_\_\_

**17. App usage**

Do you feel you are missing any application features to help your daily journey's?

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**18. Barriers**

In your own words...

Which barriers stop you from wanting to walk to complete a journey?

(Meteorological/Safety Concerns/Geographical/other)

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**19. Barriers**

In your own words...

Which barriers stop you from wanting to cycle to complete a journey?

(Meteorological/Safety Concerns/Geographical/Financial/Storage/ Repairing)

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This content is neither created nor endorsed by Google.

Google Forms

## User Testing Informed Consent Form

Study administrator is: James Simmonds

Participant is: Jamie Lawson

Participant number: 01

This is a study about developing an application to encourage active travel habits (walking/cycling) intended for people who are inexperienced users that are underrepresented in the current technology landscape. The goal is to make a web application that appealing, intuitive and user friendly. Your participation will help us achieve this goal.

In this session you will be working with a working prototype. We'll ask you to perform tasks a typical user might do, such as check the current weather, find a local Santander bike point & plan a route. A facilitator will sit in the same room, quietly observing and taking notes, the facilitator will help you if you are stuck or have questions.

All information collected in the session belongs to the university and will be used for internal purposes. We will record and transcribe the session via Microsoft Teams. We may publish our results from this and other sessions in our report, but all such reports will be confidential and will not include your name.

This is a test of the software. We are not testing you. We want to find out what aspects are confusing, so we can make it better. You may take breaks as needed and stop your participation in the study at any time.

### Statement of Informed Consent

I have read the description of the study and of my rights as a participant. I voluntarily agree to participate in the study.

Print Name: Jamie Lawson

Signature: Z

Date: 22/04/23

## Pre-Testing Survey

### Age

- 18 - 25
- 26 - 34
- 35 - 40
- 41 - 49
- 50 +

### Gender

- Male
- Female
- Non Binary
- Prefer not to say
- Other:

### Income per annum

- Below £12,000
- £12,000 - £19,999
- £20,000 - £29,999
- £30,000 - £39,999
- £40,000 - £49,999
- £50,000 +

### Walking

How many times a day do you walk to complete a journey on average?

- Once
- 1 - 2
- 2 - 3
- 3 - 4
- 5+
- Less than once

### Walking

What are your main walking activities?

- Commuting
- Shopping
- Leisure (not exercise specific)
- Exercise ( ie. walking/running for health)
- School Run
- OTHER Dog walking

### Cycling

Do you own a bicycle?

- Yes
- No
- Yes - but do not use actively

### Cycling

Have you ever hired a bicycle in London?

- Santander/Boris bike
- Lime/Uber
- Another provider
- No - I have not hired a bike in london

### App Usage

What app's do you use to plan your journey?

- TFL
- CityMapper
- Maps (Google maps or another service)
- Weather (mobile, website, other)
- Other: *Or Google nest (For the weather)*

### App Usage

Which type of app's do you use as you're making your journey?

- Fitness Tracker (Strava, Map my walk/run/ride, pedometer, My fitness Pal)
- Maps (Google maps or another service)
- Weather (mobile, website, other)
- A wearable device (Apple watch, Samsung, other)
- Travel assistant (TFL, City mapper, other)

### Think aloud testing Log Sheet

| Question type    | Question asked          | Summary of answer |
|------------------|-------------------------|-------------------|
| Consent question | Are you happy to begin? | Yes               |

|  |  |  |
|--|--|--|
|  | (Consent form and prequestionnaire completed)  |  |
| Warm up question   | So today we are testing a product and not testing you, no wrong answers                    | No worries   |
| General question about the interface (eg. What do you think you are looking at? What do you think you can do with this website/app/device) |  |  |
| Task 1   | <p>Check the weather, then plan walking route to a place of your choice that you know.</p> | <p>00:00:20.031 → 00:00:24.987<br/>It's I believe. Yeah. What?<br/>Yeah, I think just the page</p> <p>00:00:24.987 → 00:00:28.621<br/>size. Well, don't even think it's that now.</p> <p>00:00:29.771 → 00:00:32.745<br/>Yeah, I'm hovering on it. What am I doing it wrong? Ohh yeah.</p> <p>00:00:32.745 → 00:00:34.711<br/>Well, it's a bit intermittent, isn't it?</p> <p>00:00:37.241 → 00:00:39.151<br/>That's interesting. That's interesting.</p> <p>00:00:40.021 → 00:00:42.071<br/>Try it like that. Bit bigger, sure.</p> <p>00:00:42.901 → 00:00:45.251<br/>Cool. So I guess that's the point of testing.</p> <p>00:00:46.911 → 00:00:49.571<br/>Yeah, very cool.</p> <p>00:00:50.691 → 00:00:53.711<br/>She was centered it a little bit close for my taste.</p> <p>00:00:54.911 → 00:00:55.381</p> |

Cool.

00:00:56.261 -> 00:01:00.312  
And so I guess if we wanted to  
plan a route, if I could just

00:01:00.312 -> 00:01:04.562  
see a bit more than that, that  
very useful cool extend that out

00:01:04.562 -> 00:01:04.761  
as.

00:01:05.901 -> 00:01:08.201  
That is great, gives me a better  
view.

00:01:10.621 -> 00:01:14.620  
And I can say I can enter my  
start point here, and I'd be

00:01:14.620 -> 00:01:18.620  
inclined to use my postcode.

00:01:32.901 -> 00:01:36.696  
Uh, let me getting the  
Rout to, we walk to Hyde

00:01:36.696 -> 00:01:38.421  
Park. That's not too far.

00:01:39.161 -> 00:01:44.271  
I'm calling because spelling is  
not my strong point.

00:01:45.111 -> 00:01:47.141  
And I can't tell him.

00:01:49.881 -> 00:01:51.021  
When you going to, yeah.

00:01:53.851 -> 00:01:58.301  
Umm, thank you. Didn't message  
first then come back to it.

|  |  |   |
|--|--|---|
|  |  | <p>00:01:59.741 -&gt; 00:02:01.771<br/>No, no. And in the in the drop down.</p> <p>bec74f8b-34f4-487b-bc89-84507e0b01fc/928-0<br/>00:02:06.751 -&gt; 00:02:10.491<br/>Ohh, cool. That's so interesting to know. Yeah.</p> <p>00:02:11.651 -&gt; 00:02:14.877<br/>And so this I mean I can't see the map yet, but yeah, that's</p> <p>00:02:14.877 -&gt; 00:02:18.050<br/>correct. Just rendering? Yeah. Yeah, yeah, that has worked.</p> <p>00:02:18.050 -&gt; 00:02:21.487<br/>Treat I've combined. I mean it's very impressed that I can start</p> <p>00:02:21.487 -&gt; 00:02:24.765<br/>with a post code and then just type something in like that. I</p> <p>00:02:24.765 -&gt; 00:02:28.044<br/>like that they're flexibility. It's interesting that remember</p> <p>00:02:28.044 -&gt; 00:02:28.731<br/>when talking.</p> <p>00:02:30.491 -&gt; 00:02:33.294<br/>It's</p> <p>00:02:33.294 -&gt; 00:02:36.188<br/>given an accurate route in terms of your experience. That's the</p> <p>00:02:36.188 -&gt; 00:02:39.081<br/>route I actually take down to a tee. If I walked up, if we walk</p> <p>00:02:39.081 -&gt; 00:02:41.658<br/>to Hyde Park, we did that a couple weeks back, we walked</p> |
|--|--|---|

|        |  |  |
|--------|--|--|
|        |  | <p>00:02:41.658 --&gt; 00:02:44.371<br/>back, we didn't walk there, but<br/>that was that was the exact</p> <p>00:02:44.371 --&gt; 00:02:45.501<br/>route we came back along.</p> <p>00:02:47.731 --&gt; 00:02:51.663<br/>Yeah, that's inch perfect. Exact<br/>route we took. So that's yeah,</p> <p>00:02:51.663 --&gt; 00:02:55.164<br/>that's something I would<br/>definitely do and use it for as</p> <p>00:02:55.164 --&gt; 00:02:55.471<br/>well. So yeah, that's perfect.</p> <p>00:02:56.801 --&gt; 00:03:01.380<br/>Cool.<br/>So that's that's the end of the</p> <p>00:03:01.380 --&gt; 00:03:06.031<br/>first task. Sure if you wanna go<br/>back to the main screen for me.</p> |
| Task 2 | Find a Santander bike point , then plan a cycling route. How suitable was the route for cycling? | <p>WEBVTT</p> <p>00:03:14.141 --&gt; 00:03:16.171<br/>So task 2.</p> <p>00:03:16.671 --&gt; 00:03:20.964<br/>I'm gonna start again. You know,<br/>we start with checking the</p> <p>00:03:20.964 --&gt; 00:03:25.543<br/>weather. Then I want you to find<br/>a local bike. Point to you a a</p> <p>00:03:25.543 --&gt; 00:03:30.121<br/>local Santander bike. Point to<br/>you. And then I want you to plan</p>   |

00:03:30.121 -> 00:03:34.557  
a route that you might cycle.  
OK. Should you choose to choose

00:03:34.557 -> 00:03:39.064  
to, you can very welcome to use  
the last one again if you want

00:03:39.064 -> 00:03:43.714  
to use that same route. Sure. OK.  
So I can see this down here says

00:03:43.714 -> 00:03:44.501  
cycle hire.

00:03:44.881 -> 00:03:45.751  
And.

00:03:46.881 -> 00:03:47.511  
There we go.

00:03:50.571 -> 00:03:54.141  
The picture of the bike gave it  
away before I read the text.

00:03:55.181 -> 00:03:57.511  
Uh, and uh? Well, look at that.  
That's.

00:03:58.741 -> 00:04:02.108  
That's very good. So you got  
something close to you? Yeah.

00:04:02.108 -> 00:04:03.021  
Perfect. So you.

00:04:05.041 -> 00:04:08.774  
That would be the not at the  
moment. OK, cool. But yeah, but

00:04:08.774 -> 00:04:12.324  
you can find something that's  
close to your location. But

00:04:12.324 -> 00:04:16.301  
then, yeah, that's very close. I  
mean, that's just run a corner.

00:04:16.301 → 00:04:20.157  
And did it find it straight away  
for you? Yeah, I don't. Yeah,

00:04:20.157 → 00:04:24.134  
it's nice to input anything for  
it. No, no, no. Just immediately

00:04:24.134 → 00:04:27.806  
came up. And yeah, it looks it.  
I know there's one there as

00:04:27.806 → 00:04:31.539  
well. So that, that's yeah.  
Perfectly accurate. Perfect. And

00:04:31.539 → 00:04:33.191  
yeah, I would use that. So.

00:04:34.061 → 00:04:35.981  
I am not used to MacBook.

00:04:37.541 → 00:04:40.604  
So if I wanted to create a  
route, I'd go back to the route

00:04:40.604 → 00:04:41.331  
planner, yeah.

00:04:44.831 → 00:04:46.841  
Easy game and then I would.

00:04:46.921 → 00:04:47.731  
A.

00:04:49.481 → 00:04:51.951  
I know that's on the road called  
Farm Lane.

00:04:57.521 → 00:05:01.821  
It's good, cool, but I like. I'm  
guessing I cannot know. It's

00:05:01.821 → 00:05:05.011  
good. It's all good. I'm  
guessing I can also.

00:05:07.281 -> 00:05:08.121  
To find it.

00:05:08.981 -> 00:05:10.431  
By just dragging across the map.

00:05:14.611 -> 00:05:15.801  
Because I know where it is as  
well.

00:05:28.531 -> 00:05:30.561  
So I know that's there. Perfect.

00:05:32.611 -> 00:05:34.101  
And you want to plan a cycling  
Rd.

00:05:36.131 -> 00:05:36.941  
So.

00:05:37.351 -> 00:05:39.871  
And I might go to work if.

00:05:40.641 -> 00:05:44.441  
Let's cycle to work. That's a  
very cyclable route. Great. West

00:05:44.441 -> 00:05:47.999  
house. That's where my work is.

00:05:49.401 -> 00:05:53.097  
And that's where I work perfect.  
Look at that. OK, if you have a

00:05:53.097 -> 00:05:56.394  
look at the room, I know.  
Appreciate. You said to me that

00:05:56.394 -> 00:05:59.634  
you don't cycle. Yeah, but just  
the would that really be

00:05:59.634 -> 00:06:03.102  
something that you think in your  
knowledge of the local area

|  |  |   |
|--|--|---|
|  |  | <p>00:06:03.102 → 00:06:06.570<br/>would it think it be something<br/>that is taking you a a better</p> <p>00:06:06.570 → 00:06:06.911<br/>route?</p> <p>00:06:07.611 → 00:06:10.943<br/>Yeah. So the route I drive to<br/>work, so the route I would drive</p> <p>00:06:10.943 → 00:06:14.328<br/>would be horrendous for cycling<br/>and it's very busy and probably</p> <p>00:06:14.328 → 00:06:17.554<br/>a bit dangerous. This goes along<br/>the river. It's avoids, you</p> <p>00:06:17.554 → 00:06:20.516<br/>know, busy roads for the for the<br/>for this part, I would</p> <p>00:06:20.516 → 00:06:23.530<br/>definitely cycle this. It's<br/>giving you a like a suitable</p> <p>00:06:23.530 → 00:06:26.545<br/>cycle route for it. Yeah,<br/>absolutely. And I mean, yeah. I</p> <p>00:06:26.545 → 00:06:29.877<br/>mean, there's Chitiki Rd. but<br/>that's not as busy as Great West</p> <p>00:06:29.877 → 00:06:33.209<br/>Road, for example. That's good.<br/>Yeah. That looks like a really</p> <p>00:06:33.209 → 00:06:35.641<br/>solid route. And it goes to<br/>where I work. So.</p> <p>00:06:36.451 → 00:06:41.691<br/>And yeah, perfect again, super</p> |
|--|--|---|

|  |  |  |
|--|--|--|
|  |  | <p>accurate super accurate route.</p> <p>00:06:43.581 --&gt; 00:06:46.201<br/>Perfect. Yeah. And it's very clear, the roots, very clear. I</p> <p>00:06:46.201 --&gt; 00:06:47.231<br/>can see it very clearly.</p> <p>00:06:48.591 --&gt; 00:06:49.301<br/>Appreciate that.</p> <p>00:06:50.241 --&gt; 00:06:50.781<br/>And.</p> <p>00:06:52.221 --&gt; 00:06:55.492<br/>So that's uh, you got any other comments you wanna make about</p> <p>00:06:55.492 --&gt; 00:06:55.861<br/>though?</p> <p>00:06:57.661 --&gt; 00:06:58.411<br/>Overall.</p> <p>00:07:00.961 --&gt; 00:07:05.211<br/>Yeah, it's visually very easy to use and I.</p> <p>00:07:06.641 --&gt; 00:07:09.925<br/>It was quite intuitive where I needed to click or. I need to</p> <p>00:07:09.925 --&gt; 00:07:11.971<br/>look to solve that kind of thing and.</p> <p>00:07:14.491 --&gt; 00:07:15.581<br/>Yeah, I mean.</p> <p>00:07:16.971 --&gt; 00:07:18.521<br/>The last to say really it was.</p> <p>00:07:22.341 --&gt; 00:07:25.492<br/>I like how quick it is like it was very quick. That was</p> |
|--|--|--|

00:07:25.492 -> 00:07:26.111  
impressive.

00:07:27.891 -> 00:07:30.908  
Some app, some sometimes are a  
bit slow to get routes and

00:07:30.908 -> 00:07:33.781  
things like that, so it seemed  
to straight away just pop up

00:07:33.781 -> 00:07:34.451  
with the route.

00:07:35.421 -> 00:07:35.971  
And.

00:07:37.471 -> 00:07:42.220  
Yeah, pretty good. Yeah. Love  
it. Love it. Ohh, call it. Call

00:07:42.220 -> 00:07:43.981  
it the end there. Cool.

**Post testing questionnaire**

| Question  | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|-------------------|----------|---------|-------|----------------|
|   | 1                 | 2        | 3       | 4     | 5              |
| I would like to use this app  |                   |          |         | 4     |                |
| The app is unnecessarily complex                                    | 1                 |          |         |       |                |
| The app was easy to use   |                   |          |         |       | 5              |
| I think I would need assistance to use this app                     |                   |          | 3       |       |                |
| I found the various function in this app to be well integrated      |                   |          |         | 4     |                |
| I thought there was too much inconsistency on the app               |                   |          |         |       | 5              |
| I imagine that most people would learn to use this app very quickly |                   |          |         |       | 5              |
| I found this app very cumbersome/awkward to use                     | 1                 |          |         |       |                |
| I felt very confident using this app                                |                   |          |         |       | 5              |
| I needed to learn a lot before using this app                       | 1                 |          |         |       |                |
| I found it easy to complete the tasks asked of me.                  |                   |          |         |       | 5              |
| The app would encourage me to make active journey choices           | 1                 |          |         |       |                |
| Totals  |                   |          |         |       |                |
| Overall Score   |                   |          |         | 40    |                |

In your own words....

**What did you like about the app?**

I liked that it was very intuitive and easy to determine how to find out what I needed to know. It was not cluttered at all and had a very clean design.

**What do you feel is missing from the app?**

It would be good to see the weather over the map when route planning or looking for bike hire locations. It would be good to plan a route between bike docking points. It would be good to see mileage and time for routes.

**What additional features would you like to see?**

Route tracking, and fitness information (pedometer etc) when on a route.

**Would this app encourage you to take a cycling journey in London? and why?**

No, because I don't enjoy cycling in London due to safety concerns and laziness.

**Would this app encourage you to walk in London? and why?**

Yes, because I enjoy walking the dog to new locations and this app would be great for measuring distances and exploring new parks etc. It's very useful for seeing the weather at a glance also.

**What features in an app do feel would encourage you to walk or cycle?**

I think integrating the weather over the route planner would encourage me to walk as it would be great so get both of this information at glance.

## User Testing Informed Consent Form

Study administrator is: James Simmonds

Participant is: Scarlet Lindley

Participant number: 02

This is a study about developing an application to encourage active travel habits (walking/cycling) intended for people who are inexperienced users that are underrepresented in the current technology landscape. The goal is to make a web application that appealing, intuitive and user friendly. Your participation will help us achieve this goal.

In this session you will be working with a working prototype. We'll ask you to perform tasks a typical user might do, such as check the current weather, find a local Santander bike point & plan a route. A facilitator will sit in the same room, quietly observing and taking notes, the facilitator will help you if you are stuck or have questions.

All information collected in the session belongs to the university and will be used for internal purposes. We will record and transcribe the session via Microsoft Teams. We may publish our results from this and other sessions in our report, but all such reports will be confidential and will not include your name.

This is a test of the software. We are not testing you. We want to find out what aspects are confusing, so we can make it better. You may take breaks as needed and stop your participation in the study at any time.

### Statement of Informed Consent

I have read the description of the study and of my rights as a participant. I voluntarily agree to participate in the study.

Print Name: Scarlet Lindley

Signature: Scarlet

Date: 02/05/2023

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## Pre-Testing Survey

### Age

- 18 - 25
- 26 - 34
- 35 - 40
- 41 - 49
- 50 +

### Gender

- Male
- Female
- Non Binary
- Prefer not to say
- Other:

### Income per annum

- Below £12,000
  - £12,000 - £19,999
  - £20,000 - £29,999
  - £30,000 - £39,999
  - £40,000 - £49,999
  - £50,000 +
-

### Walking

How many times a day do you walk to complete a journey on average?

- Once
- 1 - 2
- 2 - 3
- 3 - 4
- 5+
- Less than once

### Walking

What are your main walking activities?

- Commuting
- Shopping
- Leisure (not exercise specific)
- Exercise ( ie. walking/running for health)
- School Run

### Cycling

Do you own a bicycle?

- Yes
- No
- Yes - but do not use actively

### Cycling

Have you ever hired a bicycle in London?

- Santander/Boris bike
- Lime/Uber
- Another provider
- No - I have not hired a bike in london

### App Usage

What app's do you use to plan your journey?

- TFL
- CityMapper
- Maps (Google maps or another service)
- Weather (mobile, website, other)
- Other:

### App Usage

Which type of app's do you use as you're making your journey?

- Fitness Tracker (Strava, Map my walk/run/ride, pedometer, My fitness Pal)
- Maps (Google maps or another service)
- Weather (mobile, website, other)
- A wearable device (Apple watch, Samsung, other)
- Travel assistant (TFL, City mapper, other)

| Question type  | Question asked   | Summary of answer   |
|--|--|---|
| Consent question   | So if you're happy to go ahead at this point, we'll get started.   | Yes that's Fine   |
| Warm up question   | <p>Have you ever done anything like this before?</p> <p>It's very it's quite a simple thing. It's not a simple process and it's the product we're testing its not you. We're testing. So there's not any right or wrong answers that, I just wanna get your feedback about what you think about this prototype and this is the first version of it. And so it's good to get early feedback.</p> <p>So let me tell you a bit about the process. It's gonna involve to think about loud test. So you just literally as you're going through it, just telling to talk as you're going through it about what you're doing, everything that you click on, what you think about the things you're going through it and it's nice and gentle. And if you get stuck in anything, you could just ask and I'll point you in the right direction with it. But other than that, I'm gonna sort of try and take a step back and just predominantly watch.</p> | No, no, it's the first time. The little bit nervous.  |
| General question about the interface (eg. What do you think you are looking at? What do you think you can do with this website/app/device) | <p>I will ask you to find a bicycle hire Santander one and then after that planning cycling route. Maybe something you've done before, are you? You're quite new to cycling, aren't you?</p> <p>I just want to ask you, what do you think you can see, what do you think it looks like?</p>  | <p>Yes, I've just recently got my own bike and I have used the Santander a couple of times so I'm quite. I'm quite new to it and I've never really, well I used to in Suffolk but I'm not really in London.</p> <p>And I think it looks like a just like a web page. Really. I can see all nice and quiet large icons for stuff. They look like I can hover over them.</p>  |
| Task 1   | Check the weather and then plan a walking route to a place of your choosing.   | <p>0:3:4.590 --&gt; 0:3:10.600<br/>So first I can see the weather straight away, it's straight in front of me on the top of the on this front page.</p> <p>0:3:12.240 --&gt; 0:3:14.750<br/>And I can see it's give me pretty accurate.</p> <p>0:3:14.830 --&gt; 0:3:21.370<br/>There, like there what the weather is like here in London.</p> <p>0:3:23.890 --&gt; 0:3:30.680<br/>I guess and then I think it's pretty</p> |

obvious where I'm going next is big route Planner Icon helps.

0:3:32.500 --> 0:3:34.270

I have tried to keep him bold.

0:3:38.210 --> 0:3:40.140

So I've loaded that up.

0:3:41.390 --> 0:3:43.940

It's what's going on here.

0:3:47.760 --> 0:3:49.750

OK, let's see now.

0:3:51.440 --> 0:3:53.830

Ok that that looks better. That makes a bit more sense.

0:3:55.550 --> 0:3:56.330

Okay.

0:3:58.340 --> 0:4:2.470

Just, you know, make a route that you do or something that you know.

0:4:4.590 --> 0:4:7.40

OK, so let's have a look. Let me.

0:4:8.540 --> 0:4:9.850

Let me do.

0:4:11.50 --> 0:4:12.130

They do from.

0:4:17.330 --> 0:4:22.840

Ok let me make one from King's Cross, near my flat

0:4:25.640 --> 0:4:25.920

And.

0:4:26.950 --> 0:4:28.380

kings cross Station.

0:4:29.390 --> 0:4:32.220

To that's Waterloo.

0:4:33.590 --> 0:4:35.400

I did that for a meeting sometimes.

0:4:39.360 --> 0:4:40.870

Do I click on them now or?

0:4:42.200 --> 0:4:43.230

If I hit return.

0:4:47.70 --> 0:4:48.400  
A bit stuck.

0:4:50.670 --> 0:5:0.180  
If you're stuck, just have a look just by. You see an arrow and it's gonna gives you a drop down menu. Just if you click there.

0:5:3.160 --> 0:5:6.60  
Hey, that's giving me the cycling one. Let me click on this one.

0:5:6.870 --> 0:5:9.340  
Ohh yeah, it's given me it's give me a walking route.

0:5:10.690 --> 0:5:11.310  
And.

0:5:14.280 --> 0:5:17.890  
Ohh, that's good. Yeah, it's taking me through round by Russell Square and then.

0:5:19.140 --> 0:5:20.890  
Down through Holborn.

0:5:22.570 --> 0:5:25.760  
And then across Waterloo Bridge.

0:5:27.40 --> 0:5:29.170  
Ohh, I see you. You know it quite well then that route.

0:5:30.830 --> 0:5:34.60  
I might go a different route myself if I chose to. I might.

0:5:35.900 --> 0:5:39.450  
Around through a bit more through Soho and then go across the.

0:5:40.660 --> 0:5:43.270  
The Walking Bridge and South Bank.

0:5:44.460 --> 0:5:48.540  
The crosses over with that's taking me across Waterloo Bridge, which?

0:5:49.260 --> 0:5:54.230  
It's quite it's. Yeah, there are big pavements there. It's it's still quite a busy.

|        |  |  |
|--------|--|--|
|        |  | <p>0:5:55.490 → 0:5:56.300<br/>Busy Rd.</p> <p>0:5:59.720 → 0:6:4.570<br/>But yeah, it's getting me there and it's got me from A to B and I was looking to go.</p> <p>0:6:6.670 → 0:6:8.430<br/><b>I there anything else that you wanna.</b></p> <p>0:6:9.620 → 0:6:11.520<br/><b>Mention at this stage.</b></p> <p>0:6:13.560 → 0:6:16.750<br/>No, no, I think it seems to have done it all quite well.</p> <p>0:6:18.410 → 0:6:23.230<br/><b>Perfect. If you happy ? we will go on to the second task?</b></p> <p>0:6:25.720 → 0:6:31.10<br/><b>So if you wanna go to get back, you just have to click on the arrows at the top left, then in the browser.</b></p>   |
| Task 2 | Find A bike point close to you, then plan a cycle route of your choice | <p>0:6:34.710 → 0:6:50.420<br/>So as I mentioned for the second task, I'd like you to find a cycle hire point local to you. You may find it a little more difficult just because where we're doing the testing it's not going to drop it on your location sadly, cause there aren't any Santander points where we are.</p> <p>0:6:59.110 → 0:7:4.860<br/>OK. Yeah. I will try and find something near the hostel near King's Cross.</p> <p>0:7:6.170 → 0:7:7.450<br/>Well, I'm at the moment.</p> <p>0:7:8.620 → 0:7:12.880<br/>So let me click on the click on the bike. I'm guessing is the cycle hire.</p> <p>0:7:15.800 → 0:7:18.310<br/>Is it working? Ohh no, it's just slow.</p> <p>0:7:21.810 → 0:7:22.380<br/>OK.</p> |

0:7:23.220 --> 0:7:25.770  
Yep, I can see it's probably on your location.

0:7:27.290 --> 0:7:35.970  
**Yeah, it was a little bit of an oversight when doing this testing about where I did it and for something that was gonna be a Geo location, please, it should find it easy enough to scroll down.**

0:7:37.790 --> 0:7:42.880  
Yeah, I can get down there and it well it's showing all the bike points in London.

0:7:45.360 --> 0:7:46.730  
Okay that's quite busy.

0:7:49.300 --> 0:7:52.850  
Okay. Yeah, I kind of know this one here.

0:7:57.50 --> 0:7:58.740  
That's kind of near the boot pub.

0:7:59.500 --> 0:8:0.490  
**I think it is.**

0:8:5.750 --> 0:8:7.420  
Tavistock place.

0:8:12.100 --> 0:8:12.630  
Brilliant.

0:8:14.430 --> 0:8:14.920

0:8:15.960 --> 0:8:19.590  
Ohh I want what do I do from here? Like I can't really see.

0:8:20.380 --> 0:8:22.50  
Um, what I do from this point?

0:8:24.670 --> 0:8:29.140  
You're gonna have to take a step back if you get back up onto the arrows at the top.

0:8:30.470 --> 0:8:32.170  
And I just think I plan a route.

0:8:34.60 --> 0:8:36.410  
**Do you remember what the where? The bike point was?**

0:8:38.500 --> 0:8:40.90  
Yes, Tavistock

0:8:41.590 --> 0:8:42.20  
Brilliant.

0:8:44.80 --> 0:8:45.630  
Okay. So let me.

0:8:51.20 --> 0:8:56.40  
And I I don't know where I'd cycle, I  
haven't really cycled that much in  
London.

0:9:0.670 --> 0:9:3.700  
**It can be anyway you like. It could  
be a short journey or a longer  
journey.**

0:9:7.30 --> 0:9:9.460  
I'm gonna try. I'm gonna try to  
Hyde Park.

0:9:10.110 --> 0:9:12.880  
Ohh no, let me try. Let me try  
Notting Hill cause I gotta go there  
soon.

0:9:18.970 --> 0:9:21.680  
And then just like last time use the  
drop down.

0:9:31.610 --> 0:9:33.560  
Yep, I say seems so give me  
something.

0:9:35.380 --> 0:9:37.0  
And that's taking me from.

0:9:37.990 --> 0:9:39.240  
Yep, let's given me a route

0:9:40.590 --> 0:9:45.760  
Where it was Tavistock and that's  
taken me through to Portobello.

0:9:48.750 --> 0:9:50.740  
**And you, you haven't cycled very  
much in London.**

0:9:52.380 --> 0:9:54.390  
No, not not very much.

0:9:55.160 --> 0:10:0.530  
**What? What would you think?  
Anything of the route, if anything,  
any thoughts about it?**

0:10:2.450 --> 0:10:6.60  
I can. I can have a look at the map  
and I can see.

0:10:6.790 --> 0:10:9.900  
That it isn't taking anyone any main  
big major roads.

0:10:11.50 --> 0:10:13.860  
It looks like it's taking me around a  
lot of the backstreets.

0:10:14.580 --> 0:10:16.570  
around Marylebone.  
0:10:18.190 --> 0:10:22.20  
Ohh and then it looks like it's gonna  
take me along the canal.

0:10:23.120 --> 0:10:26.980  
Hmm, not round, sort of  
Paddington towards maida vale

0:10:27.850 --> 0:10:34.610  
And around that way, so I don't, I  
don't know those routes, but it  
looks like it's taken me a quiet way.

0:10:35.310 --> 0:10:40.840  
Ohh well, I guess quite a cycle  
friendly route rather than by any  
horrific main roads.

0:10:42.870 --> 0:10:50.80  
So yeah, I mean, I don't know these  
places, but it's it looks like it's a, it's  
taking me a bit more of a quiet  
route.

0:10:53.680 --> 0:10:57.250  
**So anything else you have? You  
wanna mention about it or.**

0:10:58.750 --> 0:11:3.830  
No, it it seems to have given me  
what I needed to complete the  
task.

0:11:6.250 --> 0:11:9.180  
**Perfect if you if you're happy, we  
can leave it there. Thank you.**

## Post testing Questionnaire

|   | 1 | 2 | 3  | 4 | 5  |
|---|---|---|----|---|----|
| I would like to use this app  |   |   |    |   | 5  |
| The app is unnecessarily complex                                    |   |   | 3  |   |    |
| The app was easy to use   |   |   |    | 4 |    |
| I think I would need assistance to use this app                     |   |   | 3  |   |    |
| I found the various function in this app to be well integrated      |   |   | 3  |   |    |
| I thought there was too much inconsistency on the app               | 1 |   |    |   |    |
| I imagine that most people would learn to use this app very quickly |   |   |    |   | 5  |
| I found this app very cumbersome/awkward to use                     |   | 2 |    |   |    |
| I felt very confident using this app                                |   |   | 3  |   |    |
| I needed to learn a lot before using this app                       |   | 2 |    |   |    |
| I found it easy to complete the tasks asked of me.                  |   |   | 3  |   |    |
| The app would encourage me to make active journey choices           |   |   |    | 4 |    |
| Totals  | 1 | 4 | 15 | 8 | 10 |
| Overall Score   |   |   | 38 |   |    |

In your own words....

**What did you like about the app?**

Big buttons with obvious pictures made it easy to understand what each section was for

**What do you feel is missing from the app?**

I would have liked it all to have been on one page, it would have been a lot easier to plan a route from the bike point.

It was bit difficult to understand at first in the route planning the drop down box isn't obvious, but after the first time it was easy though.

**What additional features would you like to see?**

It's hard to say, I do struggle with my own bike in the flat as there isn't much space, so maybe having safe bike storage location might be nice

**Would this app encourage you to take a cycling journey in London? and why?**

I haven't really seen many apps for bikes, so having something like this would be really good to help me as I've not really ridden in London. It was great that it gave me what looks like a safer route that used the canal, and not the main road.

**Would this app encourage you to walk in London? and why?**

I walk quite a lot, that's why I got the cheap bike and I use Google maps a lot when I am walking, so having something that was easy to use for both would be good.

**What features in an app do feel would encourage you to walk or cycle?**

Not knowing any safe routes to cycle, especially in central London, having some routes to see so I can use them to plan my own would be good.

## User Testing Informed Consent Form

Study administrator is: James Simmonds

Participant is: Thomas Hooper

Participant number: 03

This is a study about developing an application to encourage active travel habits (walking/cycling) intended for people who are inexperienced users that are underrepresented in the current technology landscape. The goal is to make a web application that appealing, intuitive and user friendly. Your participation will help us achieve this goal.

In this session you will be working with a working prototype. We'll ask you to perform tasks a typical user might do, such as check the current weather, find a local Santander bike point & plan a route. A facilitator will sit in the same room, quietly observing and taking notes, the facilitator will help you if you are stuck or have questions.

All information collected in the session belongs to the university and will be used for internal purposes. We will record and transcribe the session via Microsoft Teams. We may publish our results from this and other sessions in our report, but all such reports will be confidential and will not include your name.

This is a test of the software. We are not testing you. We want to find out what aspects are confusing, so we can make it better. You may take breaks as needed and stop your participation in the study at any time.

### Statement of Informed Consent

I have read the description of the study and of my rights as a participant. I voluntarily agree to participate in the study.

Print Name: T. Hooper

Signature: T. Hooper

Date: 02/05/23

## Pre-Testing Survey

### Age

- 18 - 25
- 26 - 34
- 35 - 40
- 41 - 49
- 50 +

### Gender

- Male
- Female
- Non Binary
- Prefer not to say
- Other:

### Income per annum

- Below £12,000
- £12,000 - £19,999
- £20,000 - £29,999
- £30,000 - £39,999
- £40,000 - £49,999
- £50,000 +

### Walking

How many times a day do you walk to complete a journey on average?

- Once
- 1 - 2
- 2 - 3
- 3 - 4
- 5+
- Less than once

### Walking

What are your main walking activities?

- Commuting
- Shopping
- Leisure (not exercise specific)
- Exercise ( ie. walking/running for health)
- School Run

### Cycling

Do you own a bicycle?

- Yes
- No
- Yes - but do not use actively

### Cycling

Have you ever hired a bicycle in London?

- Santander/Boris bike
- Lime/Uber
- Another provider
- No - I have not hired a bike in london

### App Usage

What app's do you use to plan your journey?

- TFL
- CityMapper
- Maps (Google maps or another service)
- Weather (mobile, website, other)
- Other:

### App Usage

Which type of app's do you use as you're making your journey?

- Fitness Tracker (Strava, Map my walk/run/ride, pedometer, My fitness Pal)
- Maps (Google maps or another service)
- Weather (mobile, website, other)
- A wearable device (Apple watch, Samsung, other)
- Travel assistant (TFL, City mapper, other)

| Question type  | Question asked  | Summary of answer   |
|--|---|---|
| Consent question   | Are you happy to proceed?   | Yes   |
| Warm up question   | <p>I don't know if you've done one of these before. So the format for it is it's a usability test and the purpose that is been testing the product. We're not testing you, so there's no need to feel uncomfortable. There's no right or wrong answers with that.</p> <p>And what I will do is I will be asking you to complete two separate tasks.</p> |   |
| General question about the interface (eg. What do you think you are looking at? What do you think you can do with this website/app/device) | So what do you think that you're looking at this point?   | It looks like a web application or some sort of website. Some quite large icons on there. So first impressions are it's looks fairly easy to navigate around.   |
| Task 1   | <p>Will be to check the weather for me and to then plan a walking route. And I suggest you do something. I've maybe you know or. Yeah, maybe you do regularly. Something like that to make it, you know, a bit more.</p>  | <p>0:1:45.560 --&gt; 0:1:49.70<br/> <b>Brilliant. I'm so. If you're ready to continue.</b></p> <p>0:1:50.900 --&gt; 0:1:53.470<br/>     Yes we can get on.</p> <p>0:1:54.260 --&gt; 0:2:3.280<br/> <b>I'll ask you to take that first task for me and that will be to check the weather to and then to plan a walking route of your choice.</b></p> <p>0:2:4.960 --&gt; 0:2:14.510</p> <p>OK, so I can see the the weather. It's straight on the on the front page here, so there's no no difficulty in in finding that.</p> <p>0:2:17.670 --&gt; 0:2:19.440<br/>     This is this is clickable</p> <p>0:2:21.680 --&gt; 0:2:23.550<br/>     No, it doesn't. It doesn't appear to be.</p> <p>0:2:24.580 --&gt; 0:2:33.450<br/>     So it's in quite large icons here I'm I'm guessing. So we can hover over them. I'm guessing that it's gonna be the way I find my route planning.</p> <p>0:2:37.210 --&gt; 0:2:38.440<br/>     Ohh lovely</p> |

0:2:59.500 --> 0:3:4.250  
I'm not doing as much walking as I was since I'm working from home these days, but let's try and think of something that I would do regularly.

Does it matter if it's postcode or place names?

0:3:6.800 --> 0:3:11.110  
**I think it should work either way, but you tell me that works for you.**

0:3:13.60 --> 0:3:14.310  
Let's try.

0:3:17.330 --> 0:3:23.30

They are gonna be closing my local station soon for some work. So let's try from there. I'm gonna have to do some more walking.

0:3:25.860 --> 0:3:26.980  
Let's do.

0:3:30.890 --> 0:3:33.220  
Kentish Town station.

0:3:35.250 --> 0:3:36.720  
To.

0:3:38.320 --> 0:3:39.390  
Let's think.

0:3:41.580 --> 0:3:46.730  
Maybe I'll try up on Hampstead Heath, Highgate.

0:3:58.130 --> 0:4:1.460  
If it will take the name of that.

0:4:3.620 --> 0:4:4.30  
And.

0:4:6.60 --> 0:4:8.640  
Okay, I'm not certain what I'm doing here.

0:4:12.20 --> 0:4:19.460  
**There's a drop down, you know, it's maybe a little small, but if you see it, there's a little arrow.**

0:4:20.170 --> 0:4:24.750  
And so let's try something

0:4:29.410 --> 0:4:34.220  
I mean it, it's it's come up fairly, it's pretty quick.

0:4:35.840 --> 0:4:37.940  
And it's getting it's giving me a route.

0:4:41.50 --> 0:4:42.720  
**So what do you think of that route?**

0:4:45.360 --> 0:4:52.770  
it is a very direct route, it does look like it's going up the main road up Highgate Hill.

0:4:53.470 --> 0:4:56.580  
Ohh no, not Highgate Hill Archway Rd.

0:4:57.490 --> 0:5:10.260  
And yeah, I it's, I would say it's the quickest, but there are a lot of parks around here like Dartmouth Park Water, Waterlow Park that you could walk through.

0:5:10.760 --> 0:5:24.380  
A lot more of a walking friendly route I would say, or more scenic routes, plus Highgate Cemetery. So it has given me something and it it's given me the right directions.

0:5:27.590 --> 0:5:35.980  
I was able to put in a station name and the name of a pub and where it was in Highgate and it's given me that.

0:5:39.630 --> 0:5:42.580  
**Is there any other commentary you wanna make about it at this point?**

0:5:44.720 --> 0:5:49.510  
Not no, not not. Not so much. Is there a distance on here?

0:5:51.680 --> 0:5:57.660  
**No, not not at the moment. Its the first first version of this. It's not not included in there yet.**

|        |  |  |
|--------|--|--|
|        |  | <p>0:6:0.300 --&gt; 0:6:4.690<br/> <b>No worries. If you're happy to leave it there, we can call it. You can call it on that first one.</b></p> <p>0:6:6.480 --&gt; 0:6:12.510<br/> <b>If you want to go back to the front end, front page. The index for me.</b></p> <p>0:6:13.150 --&gt; 0:6:17.620<br/> <b>At the moment you're gonna have to use the arrows on the browser.</b></p>  |
| Task 2 | <p>And then the second one will look like a I'll ask you to find a cycle hire location close to you and then I'll ask you to then plan a cycling route once again, probably stick to something you know or something you've done</p> | <p>0:6:19.80 --&gt; 0:6:20.800<br/>     Okay. I'm coming back there.</p> <p>0:6:22.330 --&gt; 0:6:37.550<br/> <b>If you're happy to continue with the second task, I'm gonna get you to plan, is find a cycle route a cycle bike point. So here Santander bike point and then afterwards to plan a route to a place that you choose and.</b></p> <p>0:6:40.230 --&gt; 0:6:43.90<br/>     OK. No, wait. Here we go.</p> <p>0:6:44.60 --&gt; 0:6:50.0<br/>     OK, so it's quite a prominent icon in the bottom here, so click on that.</p> <p>0:6:52.90 --&gt; 0:6:55.940<br/>     That's all it took a second to load there, but it's come up now.</p> <p>0:6:57.100 --&gt; 0:7:19.230<br/> <b>Well, I'm just gonna add to you is I am aware that we are doing this testing in my house and actually, yeah, it's an oversight on my part in this testing is that I'm outside the Santander bike points. So if you maybe wanna find an area that you're familiar with in where you can see that they are all in front of you.</b></p> <p>0:7:20.170 --&gt; 0:7:21.300<br/> <b>And plan the route from there.</b></p> <p>0:7:23.0 --&gt; 0:7:23.420<br/>     OK.</p> <p>0:7:24.620 --&gt; 0:7:25.680<br/>     I can do that.</p> |

0:7:27.430 --> 0:7:29.650  
So let me do one from the City of London.

0:7:33.520 --> 0:7:45.10  
Let me try. I sometimes work in the office down near Aldgate and let me let me find one there. Ohh perfect. Yep. So I'm gonna go from.

0:7:50.480 --> 0:7:51.210  
Let's have a look.

0:7:53.340 --> 0:7:56.10  
Yeah, that's that looks good, Mansell St.

0:7:57.630 --> 0:8:1.400  
I'm. I'm sorry, I'm guessing I just click on this now?

0:8:4.70 --> 0:8:10.100  
**Not not at the moment. It's it is. It's early stages, which is what we're going testing for today, so no it's not clickable at the moment.**

0:8:14.900 --> 0:8:18.600  
Okay so I guess I'm gonna have to.

0:8:20.590 --> 0:8:22.950  
Go back to.

0:8:23.650 --> 0:8:28.500  
The previous page in that case, and then go back to the route planner.

0:8:30.790 --> 0:8:35.80

And now I cannot not remember what was the, what was the name of the street?

0:8:36.10 --> 0:8:40.640  
Ohh let me think if I remember, it was.

0:8:43.510 --> 0:8:52.160  
Then let me I'll do it back to my house at back to home to Kentish Town.

0:8:53.490 --> 0:8:54.980  
Station for the place.

0:8:55.880 --> 0:8:57.200  
And.

0:8:58.310 --> 0:8:59.680  
I can drop that down.

0:9:5.80 --> 0:9:7.350  
That's Yep, it's giving me. It's giving  
me a route.

0:9:8.390 --> 0:9:9.360  
And.

0:9:13.900 --> 0:9:18.800  
And yes, it is definitely from where  
I initially asked.

0:9:21.250 --> 0:9:23.280

**What? What do you think about  
the route its giving you?**

0:9:26.870 --> 0:9:33.780  
It looks like it's predominantly on  
some pretty big main roads.

0:9:38.330 --> 0:9:41.70  
I mean, it's definitely a route I  
would know.

0:9:42.470 --> 0:9:44.900  
Take me up to King's Cross and  
then.

0:9:47.960 --> 0:9:50.280  
Round the back of there, up  
through.

0:9:51.500 --> 0:9:59.450  
Camden actually the bits around  
Camden I do know and they are a  
very, very much segregated  
cycleways now.

0:10:0.960 --> 0:10:3.790  
And maybe a bit sort round King's  
Cross, but I think.

0:10:5.210 --> 0:10:9.920  
Definitely getting out of the City of  
London up to Old Street and that  
way.

0:10:11.0 --> 0:10:14.540  
It's taking me through Shoreditch  
and those are.

0:10:18.150 --> 0:10:27.550  
fairly congested roads. So yeah, I  
mean it's it is quite direct and I  
think it's probably better towards  
the end of that route than it is.

0:10:27.860 --> 0:10:29.910  
than at that beginning of it

0:10:34.570 --> 0:10:37.190  
Have you got any anything else you  
want to say about it?

0:10:39.0 --> 0:10:48.910  
Ohh, not so much just the same  
things I saw before. It would be  
good to see how long it was gonna  
take me as well.

0:10:52.610 --> 0:10:57.910  
But yeah, it would have been quite  
good too. We had a kind of click  
straight into it while I'm having to  
remember where I was.

0:11:0.860 --> 0:11:7.90  
If you if you haven't got anything  
else, then I'm happy to call at the  
end of the test and thank you.

## Post testing Questionnaire

| Question  | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|-------------------|----------|---------|-------|----------------|
|   | 1                 | 2        | 3       | 4     | 5              |
| I would like to use this app  |                   |          |         | 4     |                |
| The app is unnecessarily complex                                    |                   | 2        |         |       |                |
| The app was easy to use   |                   |          |         | 4     |                |
| I think I would need assistance to use this app                     |                   | 2        |         |       |                |
| I found the various function in this app to be well integrated      |                   |          | 3       |       |                |
| I thought there was too much inconsistency on the app               |                   |          | 3       |       |                |
| I imagine that most people would learn to use this app very quickly |                   |          |         |       | 5              |
| I found this app very cumbersome/awkward to use                     |                   | 2        |         |       |                |
| I felt very confident using this app                                |                   |          |         | 4     |                |
| I needed to learn a lot before using this app                       | 1                 |          |         |       |                |
| I found it easy to complete the tasks asked of me.                  |                   |          |         |       | 5              |
| The app would encourage me to make active journey choices           |                   |          |         | 4     |                |
| Totals  | 1                 | 6        | 6       | 16    | 10             |
| Overall Score   | 39                |          |         |       |                |

In your own words....

**What did you like about the app?**

Large clearly labelled icons made it easy to navigate between the sections.  
It was pretty quick (responsiveness)

**What do you feel is missing from the app?**

The ability to move between the bike point and the route planner directly.

**What additional features would you like to see?**

Better routes for quieter off main road cycling

**Would this app encourage you to take a cycling journey in London? and why?**

Having a few different services in one place is good, I don't wish to be rude, but Citymapper is doing it better, the weather included is a nice touch. As it is now, not so much, but I can see what you are trying to do with it and that I do like.

**Would this app encourage you to walk in London? and why?**

Purely based on the route it gave me for the walk I planned, no. I think having an app with a walking focus is great, but once again Citymapper is doing a better job and I use that. If you can get it comparable or offer something unique then yes I think it would then.

**What features in an app do feel would encourage you to walk or cycle?**

I'd like to be able to see previous routes that other people have made, would let me find new places I haven't been.

## User Testing Informed Consent Form

Study administrator is: James Simmonds

Participant is: Liisa Vaarje

Participant number: 04

This is a study about developing an application to encourage active travel habits (walking/cycling) intended for people who are inexperienced users that are underrepresented in the current technology landscape. The goal is to make a web application that appealing, intuitive and user friendly. Your participation will help us achieve this goal.

In this session you will be working with a working prototype. We'll ask you to perform tasks a typical user might do, such as check the current weather, find a local Santander bike point & plan a route. A facilitator will sit in the same room, quietly observing and taking notes, the facilitator will help you if you are stuck or have questions.

All information collected in the session belongs to the university and will be used for internal purposes. We will record and transcribe the session via Microsoft Teams. We may publish our results from this and other sessions in our report, but all such reports will be confidential and will not include your name.

This is a test of the software. We are not testing you. We want to find out what aspects are confusing, so we can make it better. You may take breaks as needed and stop your participation in the study at any time.

### Statement of Informed Consent

I have read the description of the study and of my rights as a participant. I voluntarily agree to participate in the study.

Print Name: Liisa Vaarje

Signature: ✓

Date: 03/05/23

## Pre-Testing Survey

### Age

- 18 - 25
- 26 - 34
- 35 - 40
- 41 - 49
- 50 +

### Gender

- Male
- Female
- Non Binary
- Prefer not to say
- Other:

### Income per annum

- Below £12,000
- £12,000 - £19,999
- £20,000 - £29,999
- £30,000 - £39,999
- £40,000 - £49,999
- £50,000 +

### Walking

How many times a day do you walk to complete a journey on average?

- Once
- 1 - 2
- 2 - 3
- 3 - 4
- 5+
- Less than once

### Walking

What are your main walking activities?

- Commuting
- Shopping
- Leisure (not exercise specific)
- Exercise ( ie. walking/running for health)
- School Run

### Cycling

Do you own a bicycle?

- Yes
- No
- Yes - but do not use actively

### Cycling

Have you ever hired a bicycle in London?

- Santander/Boris bike
- Lime/Uber
- Another provider
- No - I have not hired a bike in london

### App Usage

What app's do you use to plan your journey?

- TFL
- CityMapper
- Maps (Google maps or another service)
- Weather (mobile, website, other)
- Other:

### App Usage

Which type of app's do you use as you're making your journey?

- Fitness Tracker (Strava, Map my walk/run/ride, pedometer, My fitness Pal)
- Maps (Google maps or another service)
- Weather (mobile, website, other)
- A wearable device (Apple watch, Samsung, other)
- Travel assistant (TFL, City mapper, other)

| <b>Question type</b>   | <b>Question asked</b>   | <b>Summary of answer</b>  |
|--|---|---|
| Consent question   | <p>Thank you for agreeing to do this with me today. So what the purpose of it is, if you've not done one before, is it so usability test that we conduct in today and so the purpose of this is to test the product.</p> <p>We're not testing you in anyway.</p>  | Yeah, yeah, no problem  |
| Warm up question   | Is this the first time you have done one of these tests?  | Yes   |
| General question about the interface (eg. What do you think you are looking at? What do you think you can do with this website/app/device) | <p>What is it you think you are looking at?</p> <p>Perfect. So it's got the structure of two questions. Two tasks rather for you to complete. So did the first one and then we'll go on to the second one. And what we do is just talk out loud as we going through it.</p> <p>As I said, there's no right or wrong answers. It's just kind of get a flavour for what do you think about the product?</p> | It appears to be some type of website   |
| Task 1   | <p>So the first Test I want you to do first, task rather that I want you to do is I want you to find out what the weather is and then I want you to plan a walk in route to a destination of your own choice in. So please when you're ready.</p> <p>So yeah, please if you click over there you should be ready to go</p>  | <p>00:01:15.400 --&gt; 00:01:16.230<br/>So.</p> <p>00:01:17.810 --&gt; 00:01:22.410<br/>I guess. Ohh well, that's it's nice. Nice and clear up at the top.</p> <p>00:01:24.290 --&gt; 00:01:28.680<br/>I'm off. We got in here. I can see I've got a weather description</p> <p>00:01:29.650 --&gt; 00:01:34.630<br/>We got the temperature and it's definitely London. That's where we are.</p> <p>00:01:35.710 --&gt; 00:01:39.660<br/>And we got the wind is 3 1/2. That's not too bad</p> |

00:01:40.620 --> 00:01:47.310  
OK, so looking at this, I'm probably gonna guess it's this route planning bus and then the great big one

00:01:49.250 --> 00:01:51.520

**Try it.**

00:01:58.500 --> 00:02:00.980

Okay, what's going on there?  
Yeah.

00:02:02.890 --> 00:02:04.150

Appears to be very

00:02:04.860 --> 00:02:09.330

Very zoomed in, very pull out a bit here

00:02:10.930 --> 00:02:14.820

Ohh OK yeah, that's centered me on central London

00:02:17.890 --> 00:02:20.580

And you said to plan a anywhere of my choice

00:02:21.600 --> 00:02:25.710

**that's right, Wherever you feel comfortable, something that you would do maybe regularly.**

00:02:26.830 --> 00:02:29.080

OK, OK. Maybe I'll do from my work.

00:02:38.270 --> 00:02:40.940

Ohh cool. Im guessing from the drop down in there

00:02:43.640 --> 00:02:46.980

And will it work with a A  
postcode as well?

00:02:49.040 --> 00:02:51.270

**Give it a try. See what happens**

00:02:52.560 --> 00:02:54.960

OK. Yeah, I'll, I'll, let's try that.

00:03:01.290 --> 00:03:04.260

What do I do here? There's no  
submit button

00:03:07.390 --> 00:03:10.510

Ohh I see there is a drop down  
here though. Let's try that.

00:03:13.610 --> 00:03:14.920

Uh ha

00:03:18.830 --> 00:03:19.550

Ohh.

00:03:20.820 --> 00:03:22.540

Ohh yeah, there, there. It  
goes.

00:03:26.150 --> 00:03:33.040

I am not convinced I would walk  
all of that way necessarily, but  
it's definitely give me what I  
want from bounds green

00:03:34.970 --> 00:03:37.280

And it looks to be

00:03:38.490 --> 00:03:39.070

Quite

00:03:39.840 --> 00:03:40.840

Usable

00:03:42.070 --> 00:03:43.490

**Is it? Is it a route that you know?**

00:03:44.340 --> 00:03:52.370

Yeah, I mean, some of it, the bits, the bits around bounds green and Wood Green, yeah. And then and then maybe a little bits in more central would know well.

00:03:53.680 --> 00:03:56.390

But yeah, it it looks to have done the job

00:03:57.910 --> 00:03:59.700

Ohh I see then you.

00:04:03.610 --> 00:04:05.440

Yeah, that that looks that looks good

00:04:07.660 --> 00:04:08.410

**Perfect.**

00:04:10.430 --> 00:04:12.670

**Is there anything else that you want to do with that at the moment?**

00:04:13.980 --> 00:04:16.490

No, no, it it looks like I've got there

00:04:19.830 --> 00:04:21.060

that looks good.

|        |  |   |
|--------|--|---|
|        |  | <p>00:04:23.170 --&gt; 00:04:33.940</p> <p>So if you're happy that you've completed that task, then what? We're gonna what I'd like you to do for the second task. If you go back to the index page, the the first page that you're on. OK</p> <p>00:04:35.250 --&gt; 00:04:46.500</p> <p><b>Ohh my getting there. Yeah, at this stage it's I haven't got one built into it. So you you just need to use the the browser controls at the top of the page.</b></p> <p>OK, OK. Yeah. I'll just hit back up there</p> <p>.</p> |
| Task 2 | <p>So now what I want you to do for the second task is I want you to, Find a cycle, find a bike hire point local to you And then I want you to plan a cycling journey To a destination of your choice. Once again, something that you might have done, or something that you know or a place that you know, and then give some commentary back afterwards about the route.</p> | <p>00:05:28.370 --&gt; 00:05:37.620</p> <p>Great. So what we're doing here? Well, I think the the clue here may be the great big picture of a bicycle. So let's start there</p> <p>00:05:39.000 --&gt; 00:05:46.360</p> <p>Ohh nice. It's got like a nice little hover effect on it so it does light up, so that is definitely looks like the right one. Let's give that a go</p> <p>00:05:51.630 --&gt; 00:05:53.400</p> <p>Ohh, it took a minute to load there</p> <p>00:05:56.590 --&gt; 00:05:57.130</p> <p>Ohh</p>     |

00:05:59.210 --> 00:06:00.320  
Ohh click around  
00:06:03.170 --> 00:06:04.420  
Ohh perfect  
00:06:07.040 --> 00:06:22.060  
**Well, I can see that the issue here is that we may be conducting this testing with it outside of her where the bike points might be, but if you could pick somewhere that is, I don't know something somewhere, you know maybe**  
00:06:22.970 --> 00:06:24.480  
Yeah. No, no, no problems.  
00:06:25.980 --> 00:06:30.910  
Once again, let me have a look a near my work but near Russell Square  
00:06:32.520 --> 00:06:35.070  
That's fine on there. For that I would know.  
00:06:36.510 --> 00:06:40.850  
Ohh well they they're all there, aren't they? Everything's everything's up on there.  
00:06:43.000 --> 00:06:43.480  
I think  
00:06:44.180 --> 00:06:53.560  
I know this one quite well near the British Museum. It's one I've used a few times.  
00:06:54.780 --> 00:06:56.690  
a few times  
00:06:58.590 --> 00:07:04.240

Brilliant. Yeah, I know. The one here quite well. On the corner of Montague St, buy the British Museum

00:07:05.070 --> 00:07:07.370  
**So it's it looks accurate to you.**

00:07:08.780 --> 00:07:15.470  
Yeah, that's a pretty familiar that one. It looks to be in the right place. So what do I do now?

00:07:16.310 --> 00:07:17.390  
Is this clickable?

00:07:21.030 --> 00:07:27.100  
**No, no, no. It's at the moment it's it's quite an early prototype and there's not clickable at this moment.**

00:07:27.870 --> 00:07:34.200  
So what? You want me to do next was to do a plan. A journey

00:07:35.800 --> 00:07:36.550  
Ohh

00:07:37.230 --> 00:07:37.700  
So

00:07:37.780 --> 00:07:43.030  
Ohh I will probably have to go back to the main page with them.

00:07:44.170 --> 00:07:50.980  
Ohh and then I did see a cycling thing on that drop down in the route planner, so let's

00:07:51.810 --> 00:07:53.410  
let's go back there.

00:07:56.120 --> 00:07:56.960  
All good

00:07:58.000 --> 00:08:02.570  
as I recall

00:08:03.710 --> 00:08:07.640

As I said, I think the one I was talking about, I think it's Montague St

00:08:10.490 --> 00:08:16.500  
So let's try that. Let's try it and see if I can just type in Montague speed. Ohh here

00:08:17.800 --> 00:08:28.700  
And let's set the end part. Ohh let's do it. If I was gonna go to the club. If it's gonna go up to Angel, let's try that.

00:08:32.500 --> 00:08:35.830  
Let's see what this will do for me.

00:08:39.190 --> 00:08:44.150  
Ohh yes yeah, it's it's done that I was able to put in a street name and a place name.

00:08:45.070 --> 00:08:48.300  
Ohh and it managed to handle that quite well.

00:08:50.640 --> 00:08:51.530  
That which is good.

00:08:53.310 --> 00:08:53.670  
What's?

00:08:54.400 --> 00:08:55.220  
Um.

00:08:56.710 --> 00:08:58.570  
I have done this route before

00:09:00.390 --> 00:09:17.270  
<v James Simmonds  
(Student)>It does look like it's taking me in. All fairness, not really a particularly nice route around this part here, but yeah, it's there.

**you've used that route before  
are you quite happy with that.**

00:09:21.540 --> 00:09:24.850

Yeah, yeah, I know it really quite well

00:09:26.870 --> 00:09:28.670  
And it's taking me up there.

00:09:29.810 --> 00:09:42.330  
I don't think it's any fault of this.  
I think that probably is one of  
the better cycling routes to get  
there, but it's just that part  
through Holborn pretty, pretty  
dangerous. It's obviously quite a  
lot of cycle deaths that have  
happened around there

00:09:45.300 --> 00:09:49.510  
**I know that junction well too. Is  
it taking you straight across  
there?**

00:09:50.670 --> 00:09:51.240  
Yeah.

00:09:52.330 --> 00:09:59.880  
I think it is probably quite direct  
and the majority of its cycle  
friendly. If even if that part isn't.

00:10:02.570 --> 00:10:06.910  
**Is there anything else that you  
want to kind of say or do you  
quite happy with it at the  
moment?**

00:10:09.040 --> 00:10:11.260  
No, no, I I think it's done it. I can  
see

00:10:12.140 --> 00:10:14.600  
the bikre point I was looking at  
previously

00:10:16.080 --> 00:10:19.130  
it's got me to where I asked it to

00:10:21.270 --> 00:10:25.390  
  
That's fine if you if you're happy  
with that, then we'll leave that  
there.  
Thank you

## Post testing Questionnaire

| Question  | Strongly Disagree<br>1 | Disagree<br>2 | Neutral<br>3 | Agree<br>4 | Strongly Agree<br>5 |
|---|------------------------|---------------|--------------|------------|---------------------|
| I would like to use this app  |                        |               | 3            |            |                     |
| The app is unnecessarily complex                                    |                        | 1             |              |            |                     |
| The app was easy to use   |                        |               | 3            |            |                     |
| I think I would need assistance to use this app                     | 1                      |               |              |            |                     |
| I found the various function in this app to be well integrated      |                        |               |              | 4          |                     |
| I thought there was too much inconsistency on the app               |                        | 2             |              |            |                     |
| I imagine that most people would learn to use this app very quickly |                        |               |              |            | 5                   |
| I found this app very cumbersome/awkward to use                     |                        |               | 3            |            |                     |
| I felt very confident using this app                                |                        |               |              | 4          |                     |
| I needed to learn a lot before using this app                       | 1                      |               |              |            |                     |
| I found it easy to complete the tasks asked of me.                  |                        |               |              |            | 5                   |
| The app would encourage me to make active journey choices           |                        |               |              | 4          |                     |
| Totals  | 3                      | 3             | 12           | 16         | 15                  |
| Overall Score   | 51                     |               |              |            |                     |

In your own words....

**What did you like about the app?**

I liked the fact that it incorporates elements from a few different places, weather, TFL info and google maps

**What do you feel is missing from the app?**

I think the bike point selection and the route planner need to be better linked, I should be able to hover or click on the bike point marker and it should be able to give me the option to plan the route from there, also it would be good to have a drop down about the number of bikes or empty space at the bike point.

Distance of my route and time to complete were missing as well.

**What additional features would you like to see?**

It would be nice to see the other cycle hire schemes in London included  
Maybe better cycle route planning, it wasn't bad, but it did take me through a known accident black spot in Holborn

**Would this app encourage you to take a cycling journey in London? and why?**

I think it might do, it is nice to see an app with a cycling first approach

**Would this app encourage you to walk in London? and why?**

I walk quite a lot in London anyway, and use a google maps for route planning anyway, so seeing things I know from that, but in a more simplified interface was nice, it might do when it is a bit more finished, I'm interested in seeing where it goes.

**What features in an app do feel would encourage you to walk or cycle?**

Maybe some kind of calorie tracker or pedometer, just so I have a better gauge of what I'm achieving, in the same vein maybe being able to save my completed routes as an option.

## **Github Repository**

<https://github.com/JaimiiGrindhouse/Wal-C-R-project>