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**Group 43**

**Weather Application**

**ECS522U/ECS744P - Graphical  
User Interfaces**

**Assignment 1: Stakeholder  
Research, Requirements  
Analysis and Design**

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## **PART 1: Overview of the stakeholder group**

### **Motivation**

The primary stakeholder group for the weather application is university students aged 18 and above who regularly exercise between 5 to 7 hours a week to maintain a healthy lifestyle. Amongst this group, it is estimated that Undergraduates study on average 14.4 hours a week. During these periods of study involving high concentration, the stakeholder group find themselves exposed to prolonged computer glare and often remain in sedentary positions (Shepherd, J., 2021). According to the NHS (2019), insufficient exercise can deteriorate mental and physical wellbeing as well as exacerbate existing health conditions. The review of the medical literature highlights a correlation between maintaining a healthy lifestyle through regular exercising (W. Grace, 2010). This has been shown to decrease the risk of developing conditions such as obesity, diabetes, cancers and in some cases, an early death (Lee et al., 2018). These conditions often demonstrate nascently in the stakeholder group. Moreover, physical activity induces the release of neurotrophins which benefits an individual's cognition, memory and learning (J. Heisz, 2017). As the stakeholders undertake strenuous higher education courses, physical activity can enhance their education and mental wellbeing, such as through boosting grades. Physical activity leads to reducing the risk of depression, managing stress and anxiety, more concentration and efficiency when studying (Mind, n.d.). With these considerations, physical activity would not only improve their physical health but also their mental health and provide confidence.

Despite the widespread benefits of exercising and the stakeholder's eagerness to be active, adverse weather often prematurely halts one's thought on the matter. From the gathered primary data, it is found that weather can bring about indecision, physical activity becomes postponed or even abandoned entirely. Ultimately, the health benefits discussed previously do not manifest. A study conducted on 502 individuals indicated that exercising was delayed altogether due to external weather conditions (L. Wagner, 2016). European statistics show that the age group of 18-24 is the most likely to exercise both indoors and outdoors (Cooke K., 2018 & Lange, 2020). Unsurprisingly, research highlights a key issue - How can students plan their exercise around the prevailing weather conditions?

### **Activities undertaken by stakeholder group**

University students predominantly prefer exercising during morning hours of 6AM-8AM, often citing "refreshed from the cold air" for this choice. Research shows that cold weather improves the brain activity and helps you think clearly, something that is vital for their busy schedule between 9AM-5PM (Wardleigh, C., 2020). The sport activity practiced throughout this schedule can range from low effort, such as walking, to high intensity workouts, such as sprinting.

### **Notification - Functionality**

If an outdoor activity is planned, students will check the weather before exercise. The weather application will optimise this process by sending notifications about the best time to perform outdoor activities. These user-defined notifications will suggest

suitability of outdoor exercising based on weather statistics at a specific user location. Some students skew towards exercising in hot conditions, while others in cold conditions. User adjusted notifications ensure that the application caters to the entire user base as much as possible.

Seasonal allergens as well as air quality measures have medical implications to the stakeholder. Primary users may suffer from medical conditions such as asthma and hay-fever stemming from allergens. In such cases, the application aims to alert users of changes to these environmental factors to prevent any aggravations.

Prior to the release of this product, university students would have used wearable smartwatches and separate mobile applications that focus solely on training. These services are used to measure the individual's performance for a physical activity showing the total number of steps, calories burned, duration of the exercise, distance travelled, average pace and speed. Unfortunately, failure to factor in weather changes can also influence the human body. For example, if you train outside when there is an average temperature of 35 degrees Celsius, you would train early in the morning when it is cool or very late at night, and not during the hottest hours of the day. This might result in a collapse that might arise from dehydration and sun strokes.

To summarise, the primary stakeholder group is looking to plan their exercise around the prevailing weather conditions particularly to enhance their wellbeing. The application aims to assist in the planning of outdoor activity. It will notify students where to exercise based on a number of weather statistics. It will consider users with medical problems and will cater to user environmental preferences.

## **PART 2: Identification and description of wider stakeholders**

### **Secondary stakeholders:**

#### *Gym facilities*

When conducting further research for the weather application, it was found that the secondary stakeholders involved are gym facilities of the students who regularly exercise. Their position in this scenario is that they will be directly affected by the system but do not engage with the system alone. The end users being the assets of these gyms, there is a high chance due to the weather forecast that a student will attend a gym or not. One of the main features of the application is to notify users whether to stay indoors or outdoors based on the current weather that day. Gyms relate to this interaction as the use of facilities may be hindered due to bad weather when it comes to travelling to gyms or if the users are told to stay indoors and prefer the gym atmosphere as opposed to outdoor activities.

#### *Competing software*

Other secondary stakeholder groups include competing weather applications such as BBC weather. Regularly exercising students that use the application may or may not recommend it to friends and families. With every application on the market, the competitors will be affected without the use of the application themselves. Advancements in the application will affect the end users of other weather applications. The justification behind competitors being secondary stakeholders is primarily because they do not engage with the system. Nonetheless, they are important for the success and survival of the app despite not directly impacting the primary stakeholders.

### **Tertiary stakeholders:**

#### *Universities*

The tertiary stakeholders are universities. While being a priority and a large influence for most students, universities do not fall into the primary or secondary stakeholder groups. They are, however, directly affected by the success or failure of the system. Their position in the system can be affected measurably when it comes to different weather conditions. The attendance of students is likely to be disturbed and leisure activities such as the gyms on campus or outdoor based societies will be affected. The weather can determine many things for students such as whether to study in provided outdoor seating or to simply stay inside in the library. While universities themselves do not engage with the system, they are affected by the outcome of the weather app as they play a role for the primary stakeholders.

#### *App store*

Provided that the application would be available on the app store/ Google play store, the pre-installed apps found on the primary stakeholders' devices, will be affected by the outcome of the weather application. The position of the app store and google play store is that undoubtedly, the success or failure of the system and how many people will end up using it in the long run will be of influence to them. They may not

utilise the system or be directly linked to the primary stakeholder such as the gym facilities or other competing applications. Though, they will be affected as they are the primary platform in which the app will be procured from.

### **Facilitating stakeholders:**

#### *Design team*

These stakeholders had the most interest in the problem and solutions of the weather app are the designers. Designers engage together to improve innovation and by creating an inclusive environment, they can create a weather app for the given primary stakeholders effectively. They are responsible to gather all ideas and result in a design that aligns with the primary stakeholders needs and desires. The design team plays a vital role from the beginning of the project till the end. They will not only design the application itself but design the different roles everyone within the project will have such as maintenance of the system, IT developer and developers of the system.

## **PART 3: Data gathering**

### **Chosen methods**

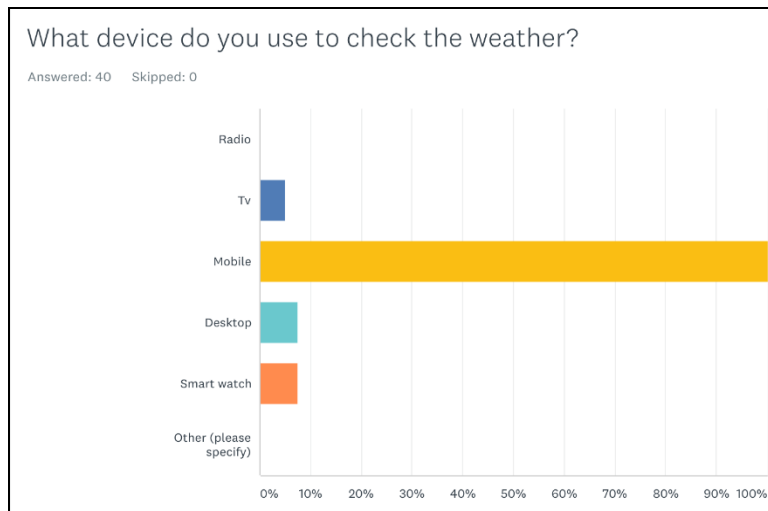
It was decided to use surveys and interviews to learn about the primary user. A survey was chosen because it is a format that most university students are already accustomed to and for its ease of data extraction. The 10 questions that were prepared were focused on system functionality. Additionally, the team interviewed several current students, and it was identified that the relationship between weather and exercising to be behavioural. Additionally, the method required exploratory qualitative research as surveys are restrictive in nature. It was expected interviews to provide more personal narrative regarding opinions held by the stakeholder group.

### **Results discussion**

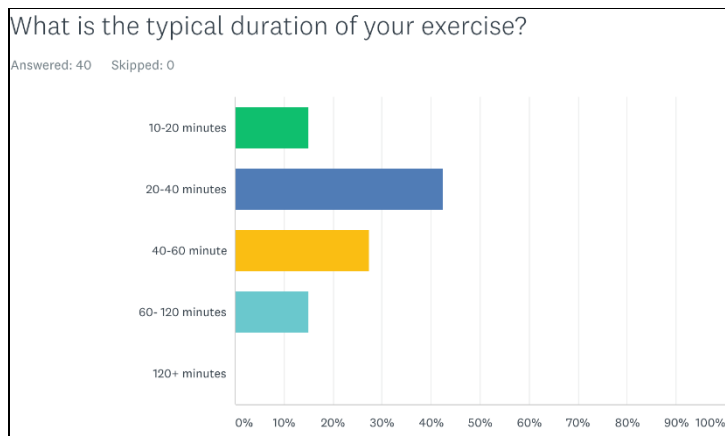
#### *Survey:*

The aim of the survey was to find out what shape the service should take. This was reassured that all the active university students questioned use mobile phones as their designated device for checking the weather [fig. 1]. When going for exercise, which usually ranges from 20 to 60 minutes [fig. 2], 80% of the respondents check the weather [fig. 3]. None of their current weather systems provide suggestions on exercise [fig. 4], although 77,5% would want such a thing [fig. 5], implying a missing functionality in the competing software. Most students feel affected by the weather when going for exercise [fig. 6] and 75% like to look at both the numbered temperature and symbols when deciding what to do [fig. 7]. Furthermore, the students deem temperature, symbols, weather forecast and precipitation as the core functionality of a weather app. These four were also what they wanted to see immediately upon entering the app [fig. 8]. 85% of questioned students are content with sharing their location while using the app [fig. 9].

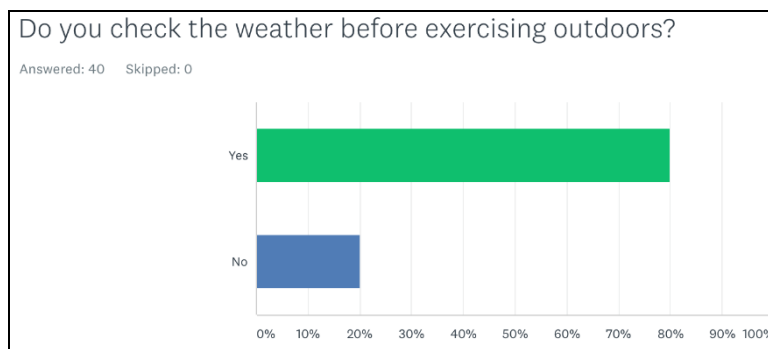
Going over the results it is clear that the system should run a mobile device. It can use location services to make personalised suggestions. The app should be simple in terms of features. The extra feature of exercise type suggestion was taken well and thus should definitely be included in the system.



**Figure 1**

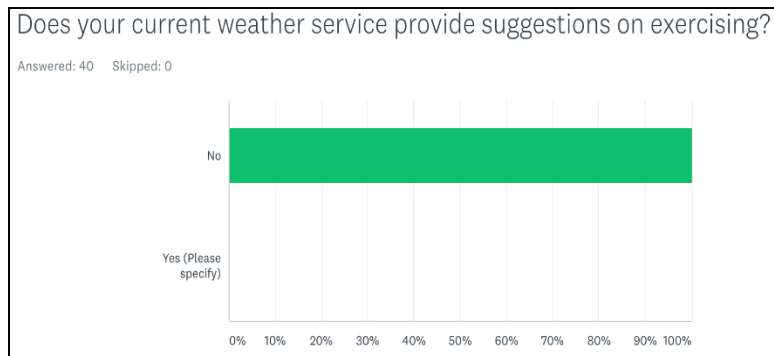


**Figure 2**

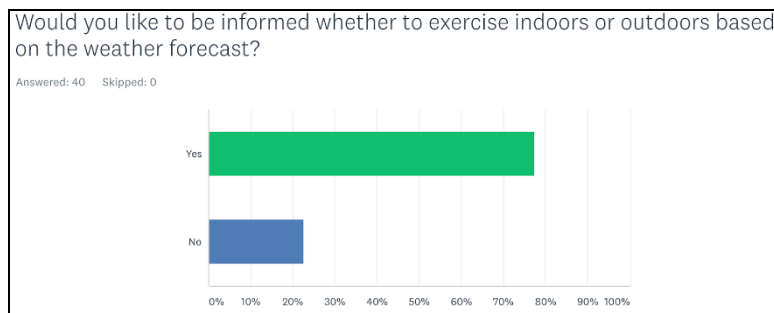


**Figure 3**

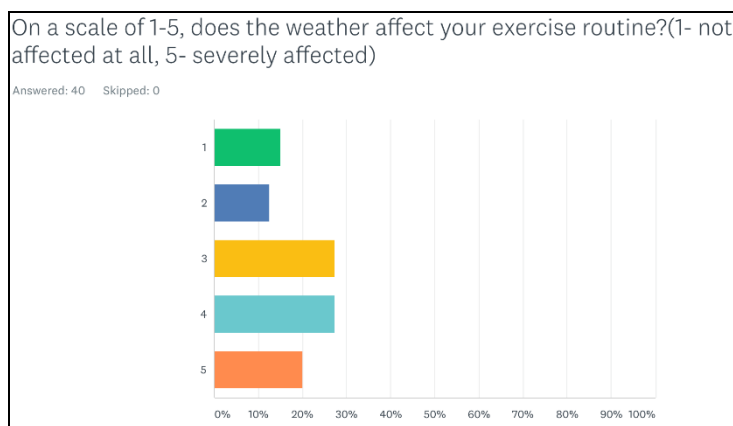




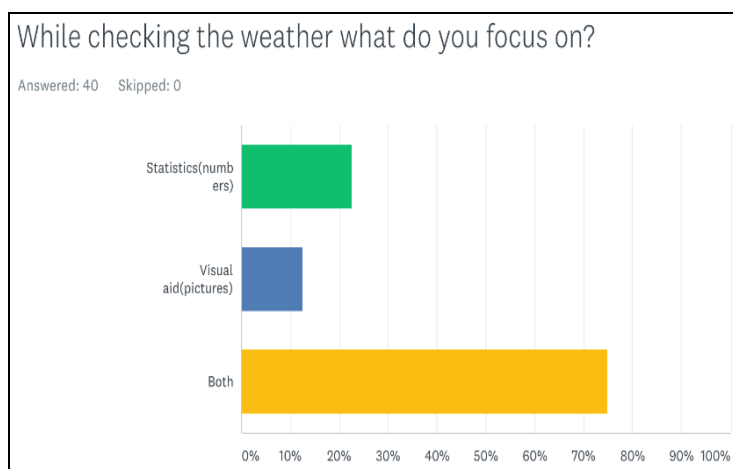
**Figure 4**



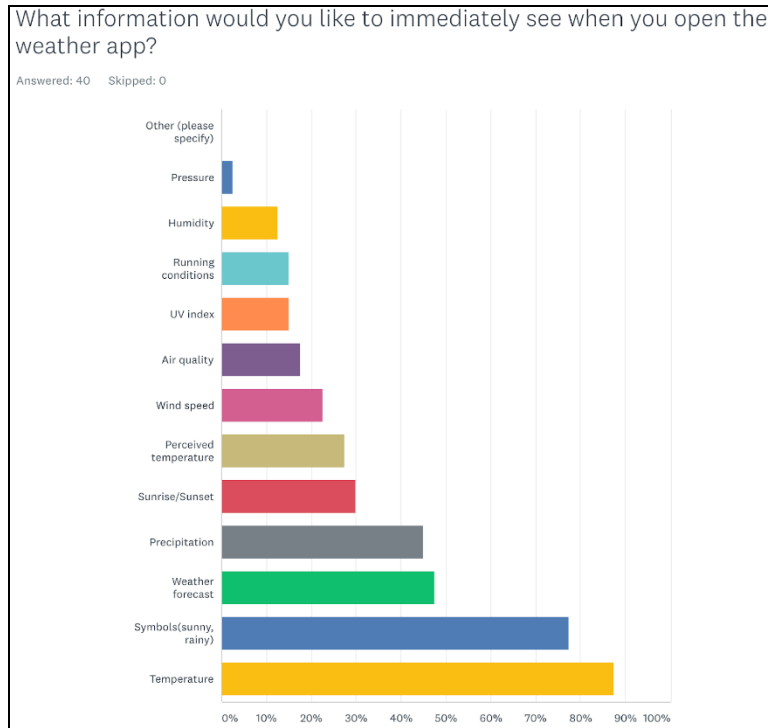
**Figure 5**



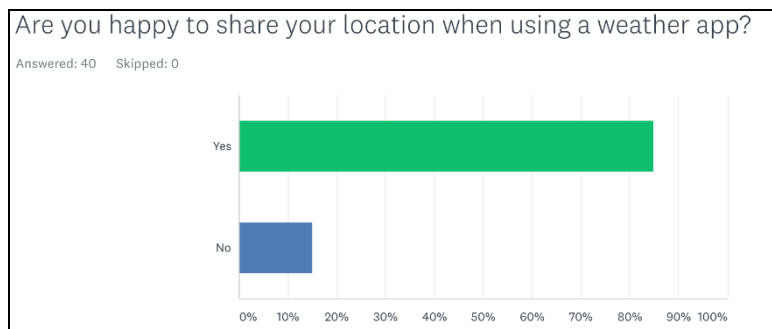
**Figure 6**



**Figure 7**



**Figure 8**



**Figure 9**

### *Interview:*

After conducting over 10 student interviews it was found that the data gathered highlighted the need for a weather application that facilitates outdoor exercising. From the interview sample, the majority of students corroborated that a correlation between ideal weather conditions and outdoor exercising exists. For example, most respondents replied stating that they possessed an optimum temperature range in the mild temperature spectrum, though some skewed towards harsher weather conditions such as colder climates as a motivation for strenuous training. This was noted as a key recurring theme that conceptualised the perception of outdoor exercising as a “fun activity”, but a strong emphasis on the prerequisite of favourable weather conditions was conveyed. Further, the facial expressions denoted optimism as well as enthusiasm when the weather was predominantly mild/sunny (but not hot) and dry. On another note, it was interesting to identify several responses coupling the ability to exercise successfully in their optimum weather conditions with particular focus on mental wellbeing. The respondents also

stated that they gained improved concentration levels following a bout of exercise. Moreover, a few respondents stated that they felt it helped their studies. When asked about why adverse weather conditions stop them from exercising outdoors, a few participants discussed safety and comfort as key factors that affect their decision to exercise outdoors. To conclude the interview, it was followed up by asking “How likely (as a percentage) are your fellow student friends to agree with your opinions on weather and exercising?”. The general consensus appears to be around 75% - 85% in that other fellow students felt the same way as themselves.

These methods allowed for a better understanding on both how the primary stakeholders usually go about exercising and checking the weather and also what is expected from the application. These inputs were key in constructing the design.

## **PART 4: Requirements development on the primary stakeholder**

### **From the data gathered:**

1. *Aims:*  
The primary stakeholder group would find notifications for when to exercise based on the weather useful. In the survey, the majority of users chose that they would like to be informed whether to exercise indoors or outdoors based on the weather forecast. None of their current weather applications do this, hence this would be a differentiating feature for one.
2. *Job satisfaction:*  
Majority of people that responded to the survey said they check the weather before exercising outdoors. This weather application can save a few seconds of their valuable time by notifying them when to exercise, thus making their routine more efficient. This would make them satisfied as they could just put some shoes on and go do their outdoor activities as soon as they receive the notification.
3. *Knowledge and skills:*  
In order for the weather application to be used effectively, one would need to know how to use a mobile phone to browse the internet, install applications and use those applications. Data gathered from the survey shows that they all use a mobile device to check the weather, while a few others use an additional device such as a desktop, smart watch or TV. This means that they already possess the necessary knowledge and skills to use this weather application.
4. *Work attitude:*  
The stakeholder's attitude to technology is positive. Students use technology such as this on a regular basis, as shown by the responses in the survey. This weather application would not change their regular actions, it would make some more efficient. A regular weather application like the ones they normally use to check the weather, but allowing them to receive notification for exercising outdoors without going into the application itself.
5. *Work group attributes:*  
Students spend 14.4 hours a week studying, most of the time sitting to watch lectures and computer screens. They spend quite a lot of their time sedentary. Exercise is needed in order to maintain productivity and a healthy lifestyle, so the weather application may become more acceptable to the user.
6. *Features of activity:*  
The stakeholders would have a few main features on the main page of the application, and a lot of extra useful statistics on an extra page in the application. They have chosen what they deem important in a weather application such as this. In addition, they would be able to select what type of weather they would prefer outdoor exercising in.

7. *Responsibilities:*

There is a responsibility towards the user for the weather application. Their location. Most responses in the survey showed that they are happy with sharing their location for use of weather-related queries, but that should be all their data is used for. If any data is sold about the user, they should be aware of it with all details disclosed.

8. *Work conditions:*

The majority of the stakeholder group would use this application before exercising outdoors, so most likely in a building, such as their home or work. Some may also check the weather forecast during their planned outdoor activities, in a park or walking down the street, to check for any sudden changes in the atmosphere that may affect said activities.

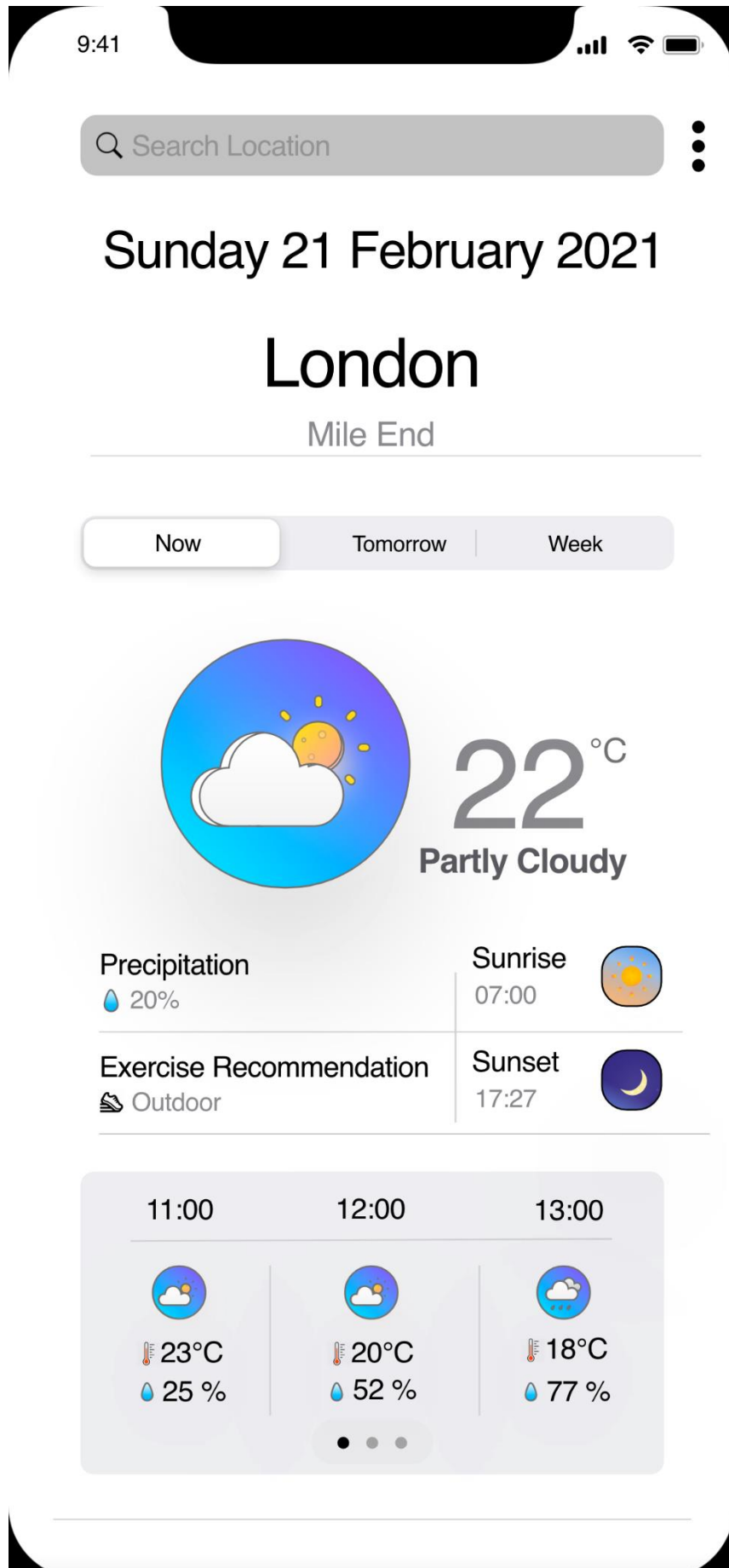
## **PART 5: Design**

### **Design rationale**

Most students who exercise regularly need a weather application that facilitates all their needs and is simple to use. Being busy with university, when it comes down to leisure time a student is looking for an app that is the most straightforward to follow and provides all the information they need. **After conducting research**, the end users preferred a few key features that they would like to see on the weather app and these included symbols, sunrise/sunset times, and precipitation levels. The design factored in all the important qualities a student looks for and placed them on the main page for the users benefit. **The rendering was created on Adobe XD** in which the design goes for a bright and intuitive look that would determine an individual getting ready to exercise. This promotes positive affirmations for the primary stakeholder, when looking at a clear blocked background. The software allowed to create a design that implements all features the primary stakeholder is looking for.

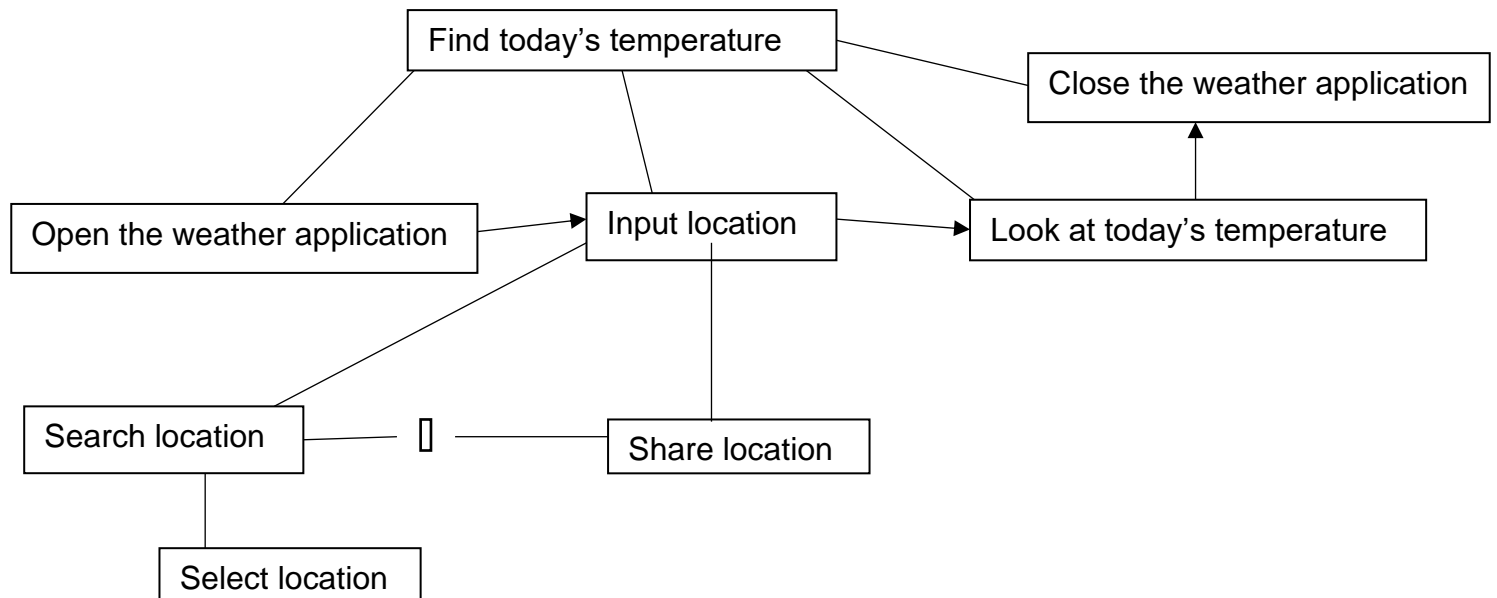
One of the features that the primary stakeholder will benefit from is notifying the user whether to exercise indoors or outdoors. This is a key element of the weather application as it is designed to tackle any hard decisions students may have to make when they decide to exercise. This will allow the user to make much more accurate decisions without the need of checking the forecast for the hours to come cutting down time.

## App's first screen



## Task – ‘Find today’s temperature’

Task model:



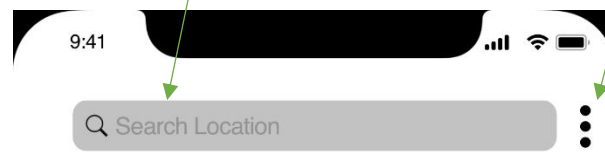
A user would find today's temperature by first starting the weather application. Upon opening it for the first time, the user is required to input a location. This can be done by searching for a specific location or by allowing user's location to be shared with the application. When the location has been keyed in, information about the weather for that location will be shown on the main screen of the application. Today's temperature is the main focus of that screen, with it being located around the center of the screen.

If a user opened the application any time after a location has already been selected, the temperature for the day would be located around the center of the first screen.



Extra locations can be searched for and added from here

Settings for the application can be managed from here



Sunday 21 February 2021

London

User's selected city name is shown here

A more specific location is showed here

Mile End

Now

Tomorrow

Week

User can select one of these tabs to see information about the weather for the present day, the next day or forecast of the whole week



22°C

Partly Cloudy

Today's temperature and conditions (such as cloud coverage or rain)

Precipitation  
20%

Sunrise  
07:00

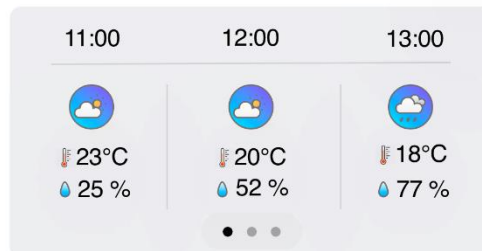


Exercise Recommendation  
Outdoor

Sunset  
17:27



Extra statistics that users can look at on the main screen are precipitation, exercise recommendation and sunrise and sunset times.

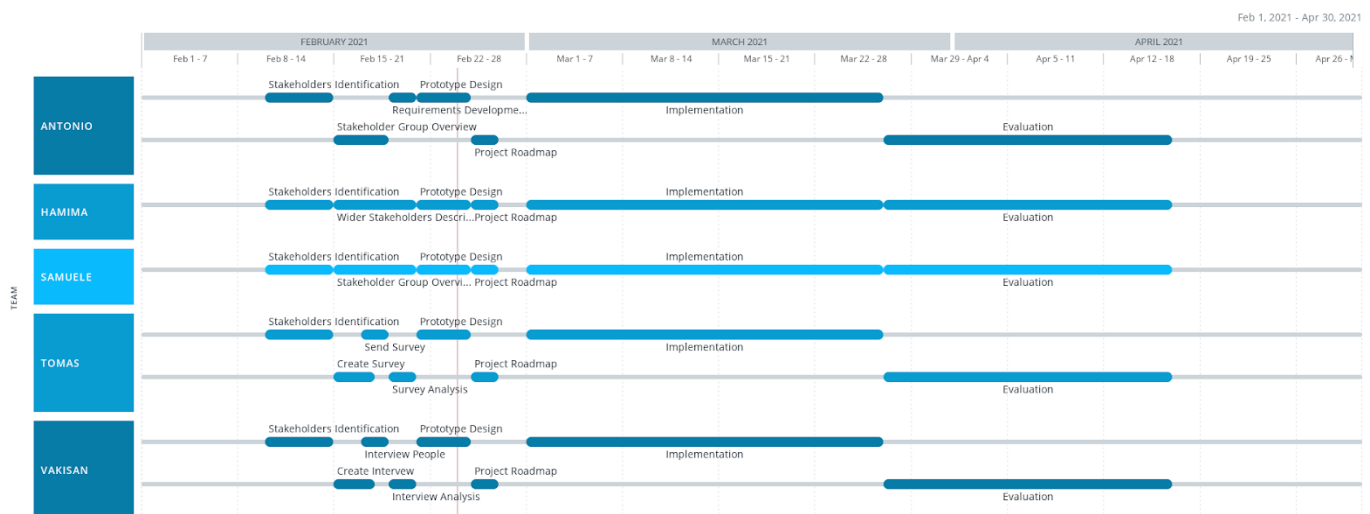
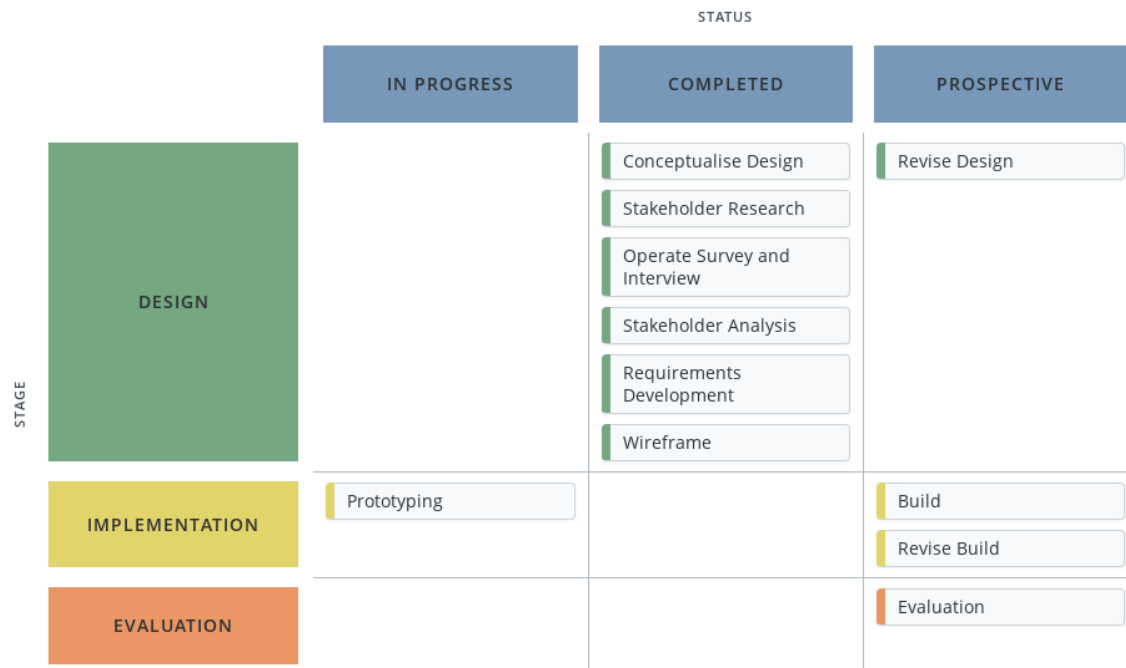


User can see daily forecast of weather here

### App summary

The app is centred around displaying current weather situations in users' location. The system displays temperature in °C along with an appropriate weather symbol and description. Additionally, users will also have instant access to present precipitation %, sunrise/sunset times and exercise recommendation. These features will allow the user to determine what exercise type is ideal for the present weather situation. The user will also have access to hourly forecasts to accommodate decision making for longer activities. To allow even greater flexibility in planning, the user can also search for weather in other locations and view forecasts for tomorrow or for the following week.

## PART 6: Project roadmap



### Problems we had to solve

When defining our primary stakeholder, we required a theoretical knowledge on how weather impacts students and their outdoor or indoor physical activity. We gained this from scientific and medical publications that are highly reputable. This included communicating new ideas and concepts to other members frequently.

Throughout the design process, our team encountered various problems. Firstly, we produced simple wireframes on paper which needed to be translated onto a highly complex prototyping software, namely Adobe XD. This was necessary to conceptualise and construct a high-fidelity visual model of the application.

### **Challenges we will have to overcome**

To design a prototype of our service we will have to learn a complicated tech stack including Preact, a JavaScript library, CSS and HTML which will be used to construct a working model. To obtain weather data, we will need to understand API's produced by the weather service provider. The Stack Overflow and W3Schools websites will be our main source of assistance.

Finally, the design will improve as we progress through the implementation stage as we will gain more information and understanding of our stakeholders and their needs. Some examples include changing temperature units and possible background changes. This will enable the application to be scalable in the future.

## **References:**

- Shepherd, J., 2021. *University students spend no more time with lecturers than six years ago*. [online] The Guardian. Available at: <https://www.theguardian.com/education/2012/may/17/students-time-lecturers#:~:text=The%20research%20shows%20that%20asking,years%20ago%2C%20the%20institute%20found> [Accessed 20 February 2021].
- NHS.uk. 2019. *Why we should sit less*. [online] Available at: <https://www.nhs.uk/live-well/exercise/why-sitting-too-much-is-bad-for-us/> [Accessed 20 February 2021].
- Mind.org.uk. n.d. *About physical activity*. [online] Available at: <https://www.mind.org.uk/information-support/tips-for-everyday-living/physical-activity-and-your-mental-health/about-physical-activity/> [Accessed 20 February 2021].
- StatCounter Global Stats. n.d. *Desktop vs Mobile vs Tablet Market Share Worldwide*. [online] Available at: <https://gs.statcounter.com/platform-market-share/desktop-mobile-tablet> [Accessed 20 February 2021].
- [5] Sleepstation.org.uk. 2020. *Why waking up to a sound-based alarm clock sets you up for a horrible day..* [online] Available at: <https://www.sleepstation.org.uk/articles/sleep-tips/best-alarm-clocks/> [Accessed 20 February 2021].
- Wardleigh, C., 2020. *5 Health Benefits of Cold Weather*. [online] Selecthealth.org. Available at: <https://selecthealth.org/blog/2020/02/5-health-benefits-of-cold-weather> [Accessed 22 February 2021].
- L. Wagner, A., Keusch, F., Yan, T. and J. Clarke, P., 2016. *The impact of weather on summer and winter exercise behaviors*. 1st ed. [ebook] Michigan: Elsevier B.V. on behalf of Shanghai University of Sport, pp.1-6. Available at: <https://www.sciencedirect.com/science/article/pii/S2095254616300576?via%3Dihub> [Accessed 18 February 2021].
- W. Grace, T., 2010. *Health Problems of College Students*. [online] Taylor & Francis. Available at: <https://www.tandfonline.com/doi/abs/10.1080/07448481.1997.9936894> [Accessed 20 February 2021].
- Lee, M., Ohde, S., Y. Urayama, K., Takahashi, O. and Fukui, T., 2018. *Weather and Health Symptoms*. [online] PubMed Central. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6122079/> [Accessed 20 February 2021].
- Lange, D., 2020. *EU: distribution of exercise and sport by age group and gender 2017 | Statista*. [online] Statista. Available at: <https://www.statista.com/statistics/592929/distribution-of-exercise-and-sport-frequencies-by-age-group-and-gender-eu/> [Accessed 22 February 2021].

Cooke, K., 2018. *37% of people in the UK never exercise or play sport*. [online] Kantar.com. Available at: <https://www.kantar.com/uki/inspiration/sport-leisure/37-per-cent-of-people-in-the-uk-never-exercise-or-play-sport/> [Accessed 26 February 2021].

J. Heisz, J., B. Clark, I., Bonin, K. and M. Paolucci, E., 2017. *The Effects of Physical Exercise and Cognitive Training on Memory and Neurotrophic Factors*. [online] MIT Press Journals. Available at: [https://www.mitpressjournals.org/doi/10.1162/jocn\\_a\\_01164?url\\_ver=Z39.88-2003&rfr\\_id=ori%3Arid%3Acrossref.org&rfr\\_dat=cr\\_pub++0pubmed&](https://www.mitpressjournals.org/doi/10.1162/jocn_a_01164?url_ver=Z39.88-2003&rfr_id=ori%3Arid%3Acrossref.org&rfr_dat=cr_pub++0pubmed&) [Accessed 22 February 2021].