Interface Design

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Introduction (P6)

This document contains the details of my design process and the reasoning behind the decisions that resulted in how the final design would look and what device you would use to interact with the interface. Additionally, it contains quantitative data from the results of testing the prototype including survey responses from multiple participants regarding how easy to use or useful the prototype was, in order to provide some qualitative data and insight into how to improve upon my design.

Mobile App (P3)

Reference Image: https://www.linkedin.com/learning/creating-a-mobile-app-interface-in-after-effects

Description

My first example of an interface that could be suitable for the Olympic Park's needs is through the use of a mobile application that can provide all the information necessary to navigate the park and facilities. The vast majority of people nowadays have smartphones and understand the basics of completing simple actions with one such as sending an email. Interaction would be entirely through touch gestures such as buttons and, within ease of access settings, through a slider to adjust settings. Shouldn't require any form of on-screen keyboard entry due to simply not being required for the application to fully function.

Advantages

A mobile application would be easy to distribute to users by featuring it on the website so that when people check the website in advance can see that such a tool exists. The main purpose of this application would be to provide the user with information regarding services, conveniences and accommodation for example. It would also have easy integration with services such as Google Maps as the apps can interact with each other easily making the navigation aspect of the application seamless.

Disadvantages

However, one issue is that some people may not have access to smartphones or have difficulty using them due to a medical condition or not having much experience with them. This can make it a bit tedious and difficult for them to use and would be far better to be used as an optional alternative to a primary display due to these reasons.

Secondly, it is not guaranteed that everyone will check the website beforehand or even see that an application is available and will attend assuming they will be supplemented with some other way of obtaining information about the park. This could result in a lot of lost customers and general unsatisfactory service.

Integration

Overall, I wouldn't recommend this, at least not as a primary way of providing customers with the information about the park due to the many factors that can result in people either not knowing it or not being able to use it and should therefore only be used as an accomplice to a different interface to provide aid to the users who are aware of it whilst giving everyone else an easy option.

The mobile application would naturally take some time to develop, as alternatives would, but if you want to ensure compatibility you want to host it on at least both the Google Play Store and the IPhone App Store to ensure availability to the majority of potential users.

The only real work needed to be put into it, aside from the initial development cycle, is to make small fixes and updates to the facilities as needed, the only running costs would be hosting it on app stores and providing correct information on the server if providing information in real time.

Digital Kiosk (P3)

Reference Image: https://www.youtube.com/watch?v=0ZagDAyIrc0

Description

A second example of a virtual interface would be a digital kiosk. This would function as a sort of interactive powerpoint where the kiosk's only task is to play the powerpoint, making the kiosk fairly inexpensive to setup as it requires very small amounts of equipment to function. Multiple would likely be spread out across the park to ensure users will always be within a short walk of one. A kiosk would feature a large display that's touch sensitive. These can be interacted with through touch gestures for the most part but features such as speech recognition and a built-in narrator can be made use of for those with certain disabilities. No keyboard entry should be needed as it's simply providing information based on what the user has selected.

Advantages

One significant advantage of the kiosk is that its display is significantly larger than that of a smartphone. This is important due to Fitts law, where the time it takes for the human aspect part of the interaction to provide an input through the use of a pointer (in this case, their finger) is proportional to the distance the pointer must travel and the size of the button they're interacting with. Therefore, the larger the display the quicker it is for a human to interact with the interface theoretically.

A second, but similar, advantage is that a larger display means you can have more content on the screen at a time, whereas you would have to use very small fonts or interactables on a smartphone screen to fit the same amount of content. One example of this is that you can have a large icon for an ease of access button, ensuring that anyone can see and interact with it whereas on a smartphone app it may be more difficult to see and interact with.

Disadvantages

On the other hand, kiosks require much more maintenance than something such as a smartphone app. You have to create and maintain the software for the kiosks, like you would have to for the smartphone app, but you also have to deal with ensuring the kiosks themselves are functioning and to fix whatever issues occur. There's also the issue of having to connect the kiosks to the power supply and connect it to a network so that they can be updated easily.

Integration

In summary, using kiosks requires a lot more maintenance and takes a longer time to setup but would be very beneficial to every user due to it being very easy to use and being far more suitable for specialist needs simply due to a larger display, especially in comparison to a smartphone app.

There is also the issue of it having the running costs of powering it, which can be improved by implementing a sleep mode. As previously mentioned, Overall, the kiosk presents the most issues in integrating it into the park's facilities but once done, it provides the most features of the three listed interfaces.

However, once setup, the kiosk would be relatively easy to update without putting as much of a strain on the network as updating a large amount of mobile application users in real time as the amount of devices is cut significantly. This can help reduce costs in the long term in comparison to using a mobile application.

Audio Guide (P3)

Reference Image: https://www.britishmuseum.org/visit/audio-guide

Description

Another example would be audio guides, a device that has a pre-recorded narrator speak to you about the exhibit you want information about. They come with headphones to ensure you are able to hear it as clearly as possible to accomodate for those with poor hearing. They are used extensively in museums to explore the museum at their own pace and tailors the experienced based upon how much time you have, allowing you to make more informed decisions regarding timing.

The device itself is the shape of a smartphone and has an interface similar to one, likely to make it easier for users to adapt as it feels familiar to them. To compensate for the value of the device, repairs and providing the service they can charge a small fee to use one for a period of time to generate additional revenue. They also can come in many languages to accomodate for a large variety of audiences.

Advantages

As previously mentioned, the shape of the device itself is similar to a smartphone. This means that it can be far more comfortable to use than a device such as a stationary kiosk as most people are very accustomed to using smartphones, which in turn should theoretically speed up the interaction speed from the human aspect of human-computer interaction and enhancing the experience as a result.

Additionally, users aren't restricted as they would be by digital kiosks as they have freedom of movement whilst interacting with the system whereas with kiosks you can't bring the information around in a portable device.

Disadvantages

One main disadvantage is that the devices can be tricky to keep track of and that repair jobs could be frequent given the screens could easily break. Aside from the costs, this just adds to the workload for staff to handle among other tasks.

In addition to this, as a result of a smaller screen size, accessibility options may be harder to effectively implement and use for those who need it, as well as being limited by the capabilities of a device made with the sole purpose of listening to audio.

Integration

While they are far more portable than the digital kiosk, a mobile application can do everything it can and much more, especially given the fact that users would likely prefer using their own phone than a paid provided audio guide. It also doesn't pose the possibility of performing maintenance on equipment that may get damaged through repeated use.

On the other hand, they ensure that users have access to information regardless of whether they brought a phone or not, whether they have headphones or not and battery level as some examples, making sure that users have the option to access the content.

Additionally, the interface needs to provide far more information than simply giving auditory information about park facilities, it needs to provide some form of navigation, information about local services and conveniences and so on and the two listed alternatives are superior in that regard and definitely have the capability to do so, whereas an audio guide simply doesn't have as many features available.

User Tasks / Requirements (P3)

Navigation

One of the tools of the interface, regardless of which is used, is that it absolutely requires some form of navigation aid. The Olympic Park is five hundred and sixty acres so it is important that users can know their location at all times and where to go in order to reach different services. This will serve as the core purpose of the interface and is essential to providing a useful service.

The way this would work depends on the interface but it effectively remains the same across the three I mentioned previously. For the web page and the smartphone app, the map function will be embedded into the app, working similarly to how Google Maps works in terms of the birdseye view part but with significantly more detail on the park facilities, making use of simple icons with clear colour schemes to ensure its purpose is clear to any user. In regards to the kiosk interface, it would display a map of the entire facilities and allow for zooming into any section of the map through touch gestures, using icons in the same way as the other interfaces.

Accommodation & Travel

Another feature of the interface is that it needs to provide information about local services, such as off-site accomodation and travel. When the user reaches the accomodation and travel page, varying from each mentioned interface, it should present them with the name of the service (e.g. Holiday Inn, Travelodge, nearest train and bus stations) along with an appropriate tag next to it such as “Accommodation”, “Train”, “Bus” to clarify to users precisely what that service offers. Alongside the name and the tag, it should show the distance from the park to each listed service to give the users more information to decide what to do.

Conveniences

Similar to the previous requirement, each interface should display information regarding on-site conveniences such as toilets, drinks and snacks. While not necessarily as important as either of the other two mentioned requirements, it provides a service to visitors that’s rather essential if they plan to stay there for a while before leaving and will result in additional income for the park which is a clear benefit. The way users will be able to view this information would be similar to both “Navigation” and “Accommodation & Travel” in the sense that it takes the same icon and colour scheme as “Navigation” to use when referencing the same services in the list of conveniences to make it easy for users to correlate the two objects. They can select a specific object in the list, for instance

toilets, and it will show the map filtered to only show those corresponding icons to ensure they can be spotted easily and as a result, reduce the time taken to search for a specific service.

Specialist Needs (M1)

The Interface

For this section of the task, I will be referring to the digital kiosk interface I have previously discussed. This is because I believe it is the most suitable interface for adapting to specialist needs out of the types I listed largely due to it having a much larger and accessible display, giving more options for how to adapt it to be functional and comfortable for those with specialist needs.

Visual Impairment

One simple but effective way to assist everyone who uses the kiosk, but especially those with partial visual impairment, is to use enlarged buttons and text to reduce any difficulty they may have if smaller alternatives were used. In addition, through the ease of access menu (which would be a significantly larger button with text to ensure clarity) there will be multiple sliders that can change display settings such as brightness, contrast, hue and saturation.

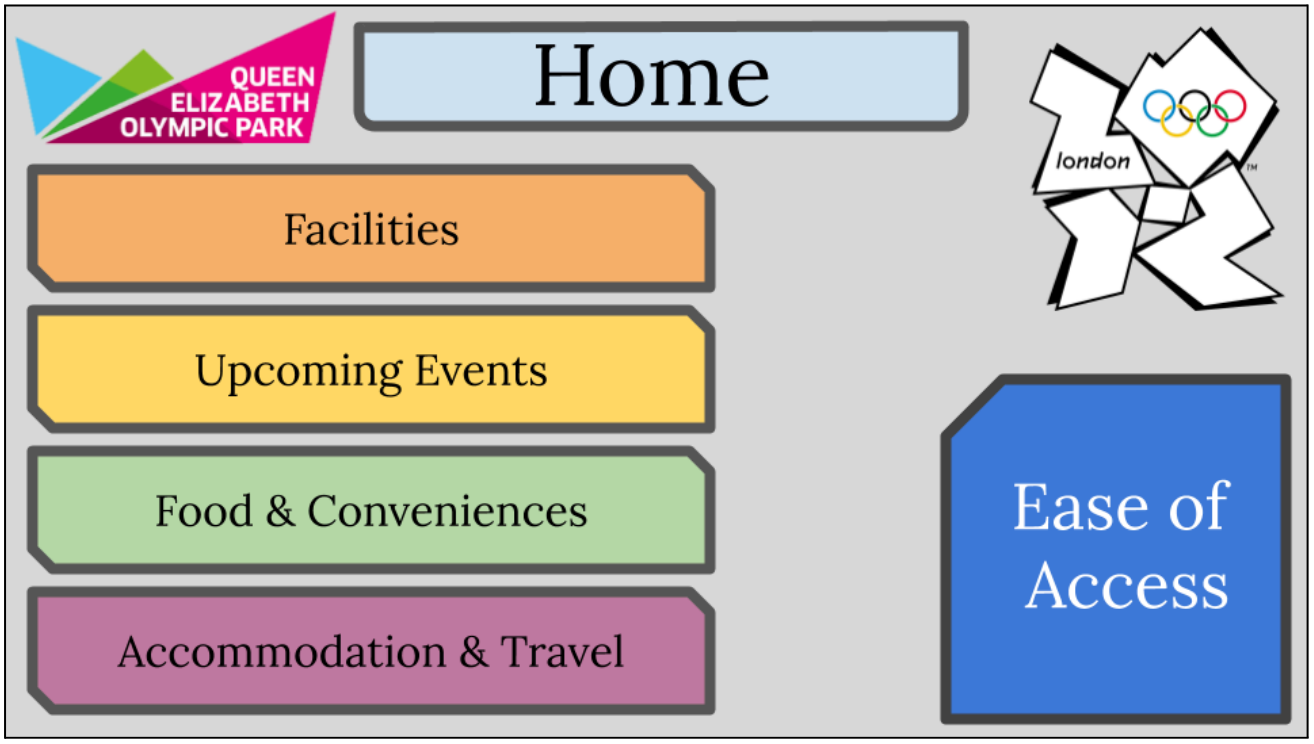
These sliders should accommodate a range of partial visual impairment such as color vision deficiency (difficulty in differentiating between different certain sets of colours or distortion of a wide range of colours) where in the worst case, the display will be set to absolute black and white, possibly grayscale if it suits the user better. These settings reset upon two minutes of inactivity so that if the user is finished, the settings should reset to the default settings soon enough in case the kiosk is completely unusable to a user due to the display settings (e.g. someone with red-green deficiency would have extreme difficulty using the interface if the previous user set the display to red-green colours primarily).

However, in the case of full visual impairment, there will be alternatives including a built-in narrator that narrates the available options as well as the information to the user and who can respond using the speech recognition to allow users to full access to the functions of the kiosk. The narrator will list available options in the format of “Home - 1”, “Facilities - 2” where the user is expected to respond with the corresponding number to select that option, as the narrator will explain at a set interval when on standby. The narrator will also repeat available options every thirty seconds or so to ensure the user has a chance to hear the options again.

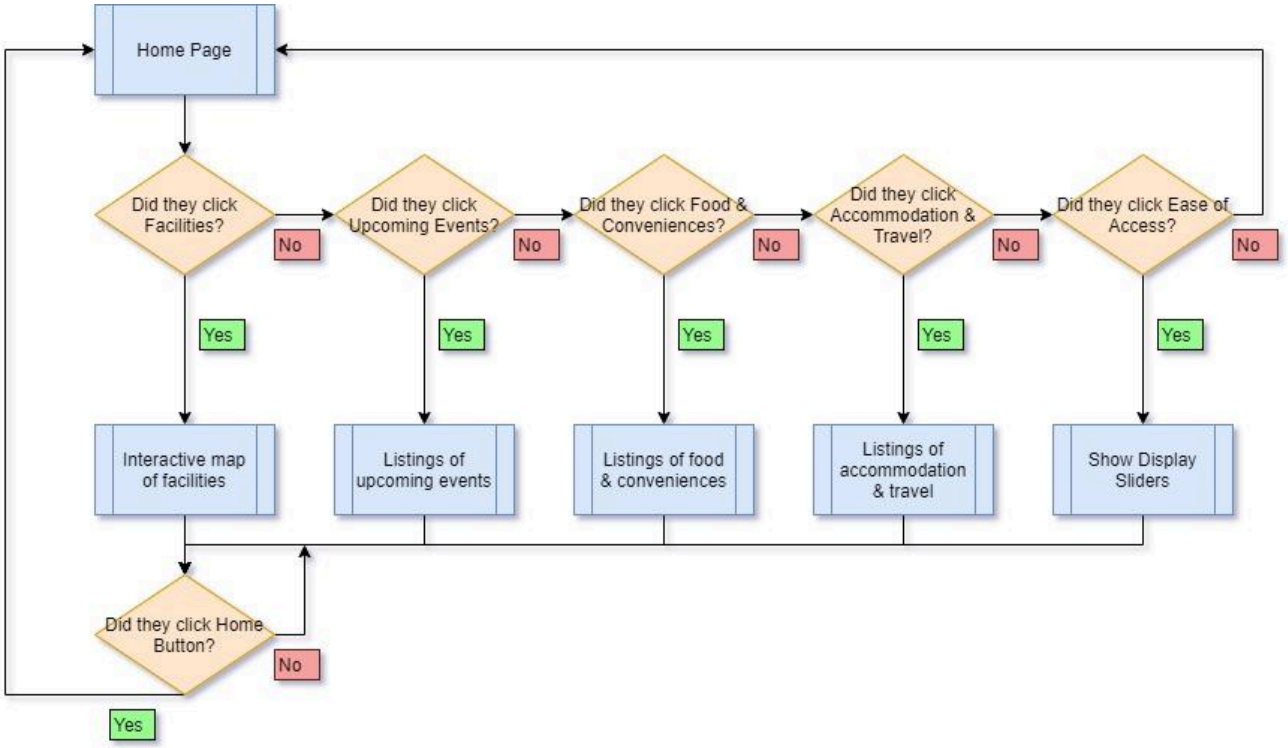
In addition to the previous utilities, each kiosk could have a system built in that when it is on standby, it plays some form of music on repeat to indicate where the system is for those with visual impairment, as well as helping the majority of the most users find one without needing to actually see it initially.

Kiosk Interface Prototype (P3)

First Screen

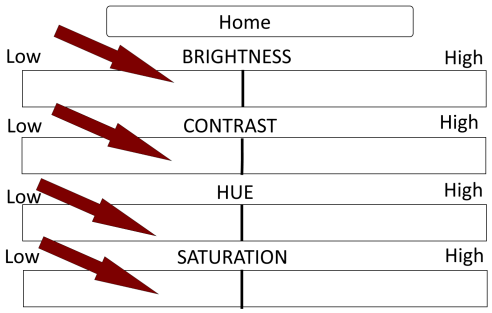


Flowchart of the interface



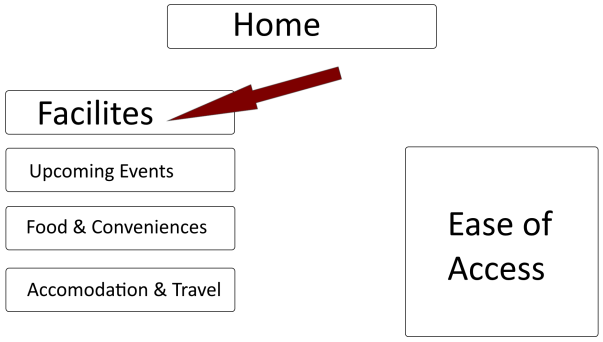
User's Journey (P4)

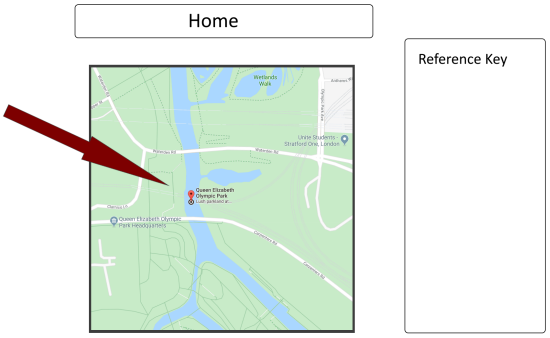
Goal - Adjust display settings and then check the map and see the upcoming events.



[1]From the Home Page, click "Ease of Access." The home button is used to refresh the page.

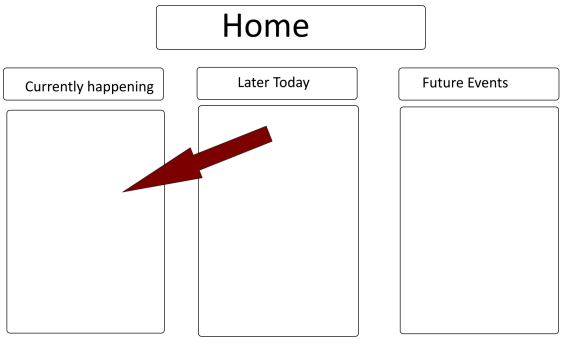
[2]From here, you can adjust the display settings as needed for the users needs. The user can then return home using the home button.





[3]The user then navigates to the "Facilities" button for facility information.

[4]This section would show the interactive map of the facilities with relevant icons. They can then press the home button to return to the home page.

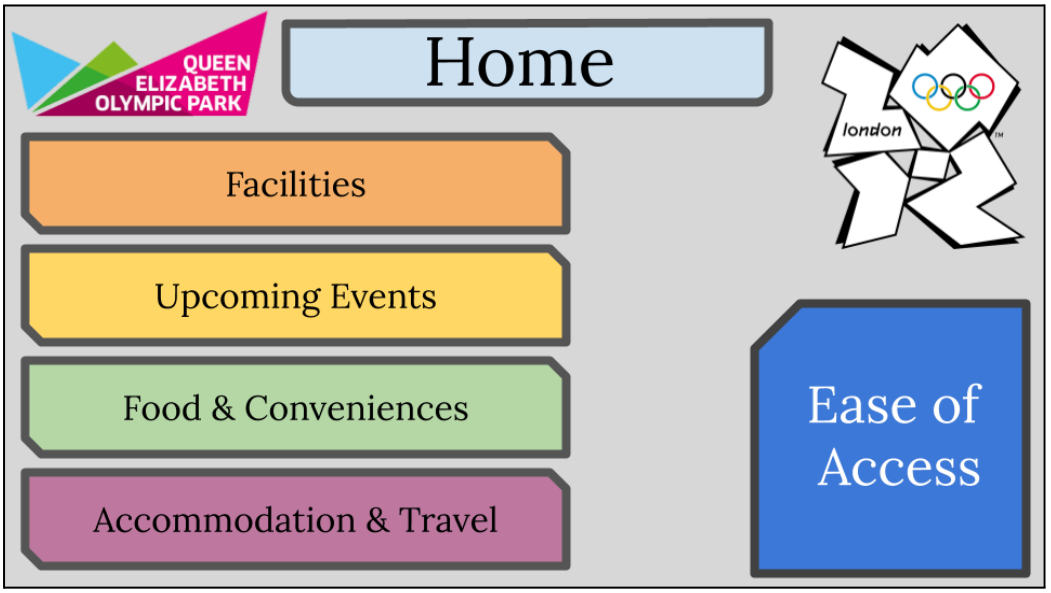


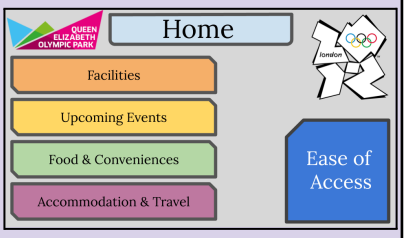
[5]A user can navigate to the upcoming events from the home menu as shown.

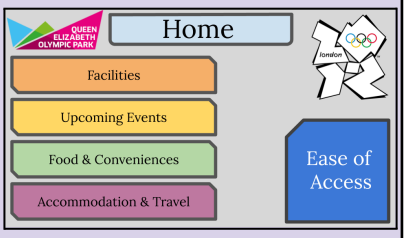
[6]The user is able to see the upcoming events split into three separate categories,

	labelled clearly for ease of use.

Fundamental principles of the design (M2)



<u>Colour</u> In the home screen I used a very pale gray for the background in addition to thick dark gray borders around the interactables in order to highlight them. I then used solid colours for the interactables backgrounds but I used very light variants of the colours to reduce the strain on the eyes for users as well as making it easy to differentiate between each interactable.	
<u>Fitts Law</u> The interactables are all very large in size to help reduce the amount of time it takes for a user to interact with them using a pointer of some form as well as aiding those using a non-dominant hand by reducing the margin of error for missing the intended target. This law follows the logic that the larger the interactable and the shorter the distance, the quicker it is for a user to interact with, making it far easier for users to work with.	

Similarity The main buttons are designed to be almost identical, with the only difference being in color and the actual text. This is to help group these together and to make the other interactables seem different. This results in a cleaner interface than if the elements of the interface were separate and unorganised. The shapes themselves are also dissimilar to other elements of the interface to aid this.	
Proximity The main buttons used for navigating are at equal distances apart from each other in a list, making them appear to be grouped together to make it easier for the user to understand these buttons perform similar functions, whereas the other two buttons have very different roles. I have also used this effect to generate the opposite effect to make the "Ease of Access" button stand out in comparison to the other elements.	
'Pop out' effect I used the principle of the 'Pop out' effect to make the "Ease of Access" button stand out. One way I have done this is by making the background of the button a solid dark blue, whereas the other buttons have been coloured using lighter colours. Additionally, I used white text for the button to show up better against the background as well as to contrast from the rest of the buttons, which only use black text. I have also made use of shapes to make certain elements stand out, mostly visible in the "Ease of Access" button by making it in a square shape with a corner cut off as opposed to the other buttons which are far more stretched out into a rectangular shape.	

Quantitative Testing (P5)

Input Speeds	Speed (Seconds)	Effective?
Keying	0.4	Yes
Response back from system	0.1	Yes
User speed of comprehension	1.7	Yes

COMPARATIVE COSTS	ESTIMATED VALUE (£)
• RUNNING COSTS	£400 annually
• MAINTENANCE COSTS	£50 Per Unit annually
• STAFFING COSTS	£21,727 annually (based on GlassDoor.co.uk)

COMPARISON WITH ORIGINAL NEEDS	
• HOW MANY FEATURES FULLY INCLUDED?	Two facilities included, Upcoming events listed Map with animated markers Accommodation & Travel information
• HOW MANY FEATURES PARTIALLY INCLUDED?	Ease of access designed Narrator Icon - no functionality
• DOES IT MEET CLIENT/USER NEEDS?	Yes, it provides the information for all the required categories in addition to providing a range of ease of access options.

Unit 23 Assignment 3

Peer Evaluation

COMPARISON	Peer 1	Peer 2	Peer 3
• LAYOUT	5	4	5
• BUTTONS	5	3	4
• COLOURS	4	4	4
• EFFECTIVENESS	5	4	4

5- Excellent

4- Good

3- Average

2- Bad

1-Very Bad

IDEAS FOR FUTURE IMPROVEMENT	
• IDEA 1	The Food & Conveniences page has very large dots for food sales locations.
• IDEA 2	The borders looked a misaligned on some of the later slides.
• IDEA 3	Adding Direction to the restaurants
• IDEA 4	Map being in Food & conveniences should be clearer
• IDEA 5	
• IDEA 6	
• IDEA 7	

USER SATISFACTION (Respondent 1)	
• KNOWLEDGE REQUIRED	Anyone can use it
• TIME TO USE INTERFACE	Very Fast
• EASY OF USE	I mean the links are pretty clear
• LIMITATIONS	Nothing really
• USEFULNESS OF SYSTEM	Very useful
• CLOSENESS TO ORIGINAL REQUIREMENTS	¯_(ツ)_/¯

USER SATISFACTION (Respondent 2)	
• KNOWLEDGE REQUIRED	Anyone can use it
• TIME TO USE INTERFACE	Average
• EASY OF USE	Not long
• LIMITATIONS	Working ease of access features
• USEFULNESS OF SYSTEM	Useful
• CLOSENESS TO ORIGINAL REQUIREMENTS	Could have one working ease of access feature

USER SATISFACTION (Respondent 3)	
• KNOWLEDGE REQUIRED	Anyone can use it
• TIME TO USE INTERFACE	Fast
• EASY OF USE	No Response
• LIMITATIONS	No Response
• USEFULNESS OF SYSTEM	Useful
• CLOSENESS TO ORIGINAL REQUIREMENTS	Close

EVALUATION	
• JUDGEMENT OF EFFECTIVENESS	Average rating of 4.3 from the respondents. It meets the listed requirements in the brief and each respondent has picked the "Anyone can use" option regarding the knowledge required to use it. Respondents have also picked either the "Useful" or "Very useful" options regarding how useful the system itself is.
• IMPROVEMENTS	Suggested improvements: 1. Reduce the size of the markers on the map 2. Fix the borders on later slides 3. Add directions to restaurants 4. Make the map clearer

Effectiveness of HCI (M3)

Quantitative

Quantitative data is numerical, typically used to measure the value of something such as time or distance. This type of data is very useful for statistical analysis used in topics such as measuring the effectiveness of something.

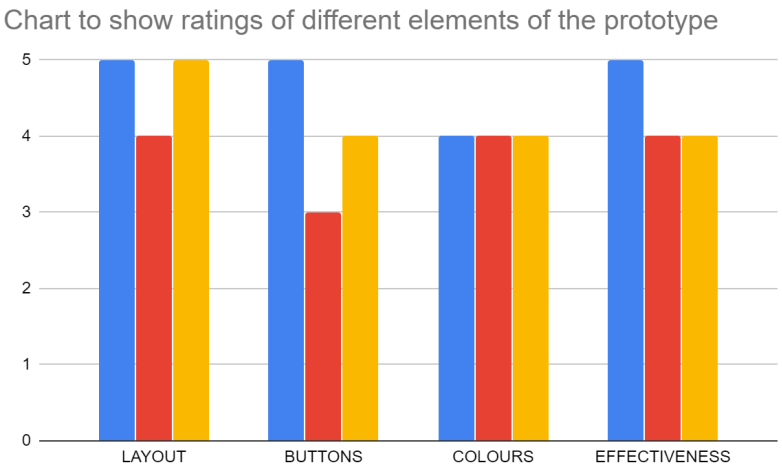
Testing

A simplistic example of how it can be useful in relation to the prototype is to measure the time it takes to complete a certain task in one prototype and then attempt the same in a different prototype, comparing the results in order to come to a conclusion on which performs better.

Many things can be tracked regarding the prototype: how long is spent on using a pointer to interact with the prototype, how many errors are made and how long it takes to complete a given task. These can easily be used to create graphs to help compare multiple prototypes and detect trends to understand what approach is best to develop a final product.

Some relevant examples of this include speed, errors and keystrokes. These three variables can be used to map out which elements of the human-computer interaction is holding it back from performing better. Speed would be measured in how long each segment of a user's journey takes and would likely be measured in seconds, whereas errors and keystrokes would simply be counted each time they occur.

As you can see below, I used qualitative data I obtained from a survey in which I asked 3 respondents to give feedback on how they found certain elements of the prototype. The four categories are layout, buttons, colours and effectiveness. The data I obtained from the feedback was a rating out of 5 stars to give data I can easily input to create graphs and charts as shown below.



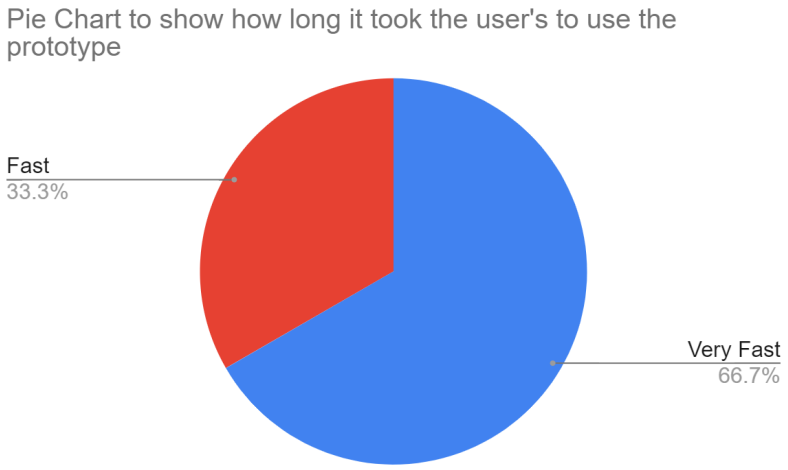
Qualitative

Qualitative data is non-numerical, such as someone stating what their favorite colour or season is. As a result of this, this data tends to be used very differently from quantitative data, an example being collecting data through surveys to create a column chart to compare how many people prefer packed lunch or cafeteria food at a school.

Testing

In the scenario of the prototype, it would be used to compare the opinions of users who have tested the prototype to gather more specific feedback on what they thought. In the pie chart below I supplied data about how long the user felt it took to use the prototype to find specific information. Given there were only three respondents, this data could be seen as unreliable due to not having enough feedback to get an accurate representation of how people on a large scale find the prototype so for some people it may in truth be extremely difficult to use but their opinion isn't represented in the below pie chart.

Other examples of qualitative data obtained from testing the prototype include measuring how useful users found the prototype as well as how easy it was for them to utilise the prototype, which can be represented through pie charts for instance, as shown below.



Report (D2)

Introduction

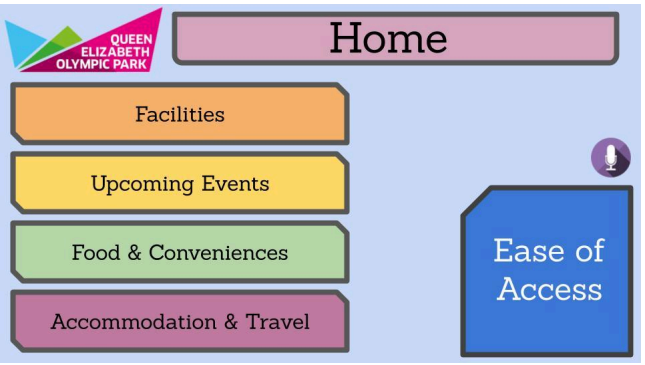
My prototype is designed to be displayed on a digital kiosk. It is designed to provide users with information regarding the Olympic Park's facilities and such whilst providing multiple options for ease of access, largely targeted towards those with visual and auditory impairments. The task I was given was to develop a prototype of a digital interface for the Olympic Park to use, in addition to determining what device it will be used on, requiring ease of access options and details about the facilities, travel and accommodation for example.

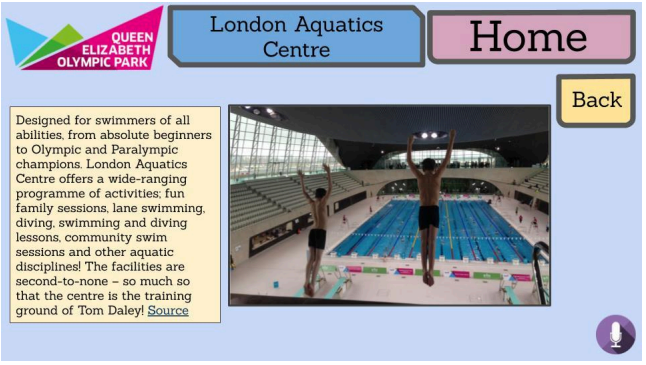
Evaluation

Requirements

Firstly, I believe that my prototype meets the design requirements asked of me. One reason I think this is that it has all the listed categories (Facilities, upcoming events, refreshments etc), grouped together for the sake of simplicity so that the interface contains less elements to improve organisation and reduce wasted space.

As you can see in the below screenshots, a home page is shown with all the categories I've used to organise all the information required in addition to an ease of access button. The second screenshot provides an example of a slide showing details about a specific facility, providing evidence of fulfilling the requirement.





Design

The design itself isn't particularly appealing to me, but I chose it because I wanted to ensure accessibility for as many people as reasonably possible, achieving this through using different pastel colours to reduce the strain on the eyes in addition to contrasting with darker hues such as the one used in the ease of access button, signifying importance.

Buttons

The large buttons are a result of Fitts' Law, which states that the bigger the button and the shorter the distance the pointer has to travel, the quicker a user can interact with the system. This is why i made the buttons far larger than normal and made sure they were

near the center of the display to ensure they were within a short distance of where the pointer would typically rest between use. Aside from the home page for clear reasons, every slide has a 'Home' and a 'Back' button in the exact same place for the purpose of ensuring familiarity.

Fonts

I used a font called 'Sanchez' for the entirety of the prototype, partially because it makes for a more comfortable user experience by using the same font across the whole prototype, but also because the font itself is very clear and readable, essential for any type of user interface.

Icons

The only icon I used was the narrator icon, designed to be pressed to instruct the display to read aloud the information on the display, aiding those with visual impairments. I did however include a logo that would consistently appear on every slide, the 'Queen Elizabeth Olympic Park' logo sourced from their website (https://www.queenelizabetholympicpark.co.uk).

Layout

Each element of the layout was placed bearing both Fitts Law and patterns in mind. An example of this is how on the main menu all the categories are on the left because they serve similar purposes and to help show this I used a distinct shape to contrast with the rest of the elements in addition to grouping similar elements. I also used varying colours for each category to give variation between the categories and make it easier for users to interact with if they already know which colour corresponds to what element, saving time reading the title.

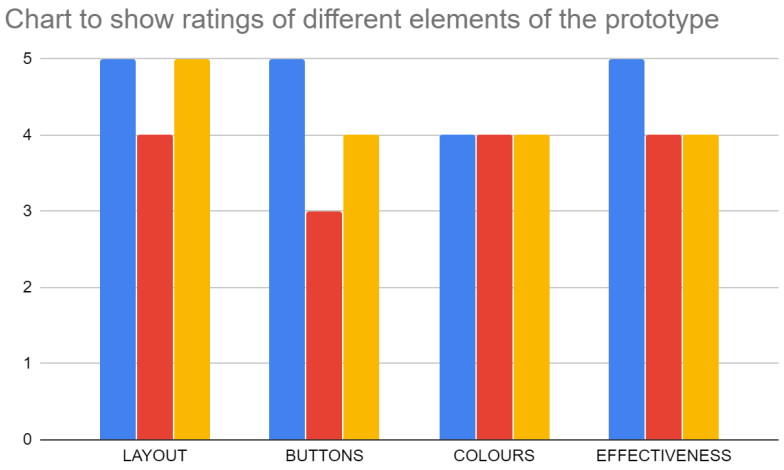
Software

I created the storyboard prototype designs using Paint.NET as it is a competent free image editor that I am comfortable with and has a wide range of free plugins available. For creating any flowcharts I used Draw.IO (https://www.draw.io) which is also a free tool with a clean, easy to use UI and plenty of options to make the diagrams themselves look neat. For creating the actual prototype, I used Google Slides which, yet again, is a free tool that I'm comfortable using and has many of the features of Microsoft Powerpoint, in addition to the plugins available and is easily accessible through an internet connection.

Feedback

Regarding the demo, the feedback from the survey was very positive indicating a successful implementation. The average user rating was a 4.3 out of 5, with results stating that they could use the prototype easily and quickly with 33.3% stating it was "Fast" and the other 66.7% stating "Very Fast". As you can see in the chart below, the best part was

the layout of the chart, which I consider one of the more important elements, and the weakest part was a tie between the buttons and colours, both parts I felt that could be improved for the average user but would come at a cost to users with visual impairments, possibly why the results were slightly lower than other areas. The overall effectiveness is fairly high which is a good measure of the prototype in general, showing the demo went successfully but still room for improvement in certain areas.



Conclusion

The main potential improvement I would like to implement is to improve the clarity of the map as suggested by multiple respondents from the survey. Some examples of the suggestions include reducing the size of the markers on the map and adding directions to get from point A to B, such as a restaurant.

The improvement regarding markers is easy to implement but I would have to ensure I don't make them too small, making them hard to see for those with visual impairments so I would have to issue a second survey giving a selection of marker sizes relative to the map and ask the respondent to choose which they think is the best fit and then calculate the mode value for the set of data and go with that option.

The implementation of directions would be more taxing however. The best option would likely be to make it so when you interact with a marker, it gives a popup giving details about that specific marker and then provide a button to give directions, possibly through embedding Google Maps.

The issue regarding incorrect borders has already been resolved as that was a minor fix due to how Google Slides presents powerpoints.