INTERACTIVE MUSEUM AND GALLERY NAVIGATION APP

Soprano

Lauren Belisle

Introduction

Concept Overview

An interactive museum and gallery map application which allows the user to navigate their local area for museums and galleries. It will provide navigation to said locations as well as information on them.

Team Biography

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I am the Creative Lead here at **Soprano**, I pitched the idea of a museum and gallery navigation app to my group of experts that then set upon making my idea a tangible thing.
I provide our team with several creative ideas to enable them to initialise my creative vision. My Business Management degree allows me to effectively provide my team with direction and vision throughout the creation of the app, meaning they always have a strong lead and direction to their work.

Market Background

The apps target audience is one of the highest groups in ‘smartphone ownership’ in the United Kingdom, 16-24-year-olds. This also is, according to a government survey conducted in 2016, the group that is second lowest to have visited a museum or gallery in the last 12 months. Therefore, establishing a gap in the market open for innovation to up engagement and visitor numbers.

April is a peak tourist time in our capital. The warming weather and blossoming city provide an ideal time to visit museums or galleries. In April of 2017 there were a total of 4,666,685 visitors to Department for Digital, Culture, Media and Sport (DCMS) sponsored museums. Over the past two years that figure has seen a steady decline. With 2018 hitting 4,569,821 visitors and then 2019 hitting 4,490,888 visitors. The proposed app could help bridge the gap that has been formed in visitor numbers over the past 3 years, by advertising museums in a way that the target audience understand, an app.

According to a statistical survey performed by DCMS less unique visitors visited two of the top ten museums websites in 2018/2019 than they did in 2017/2018. The Science Museum and the British Museum both saw a fall in unique website visits in 2018/2019, with The British Museum seeing a fall of 10.5% from 2017/2018. Most of the visits, 74.3%, to their websites were ‘to find out about an exhibition or event’. None of the most common answers in the survey were about navigation to the museum itself. This highlights a downfall in their websites, they’re not attracting visitors for navigation but for the event information on their website. Thus, creating a need in the market for an easy and innovative way to access the event information needed while trying to navigate to the museum or gallery itself.

The biggest competitor our app would face is HERE WeGo Maps, they are a similar navigation app that provides directions to specified locations, such as museums. However, where our app differs from HERE WeGo is that ours, not only navigates to a specified museum or gallery, it also illuminates museums or galleries in your area and provides a short concise set of points about them. Meaning that you don't have to have a place in mind before you try to navigate to it. This allows you to go anywhere and still be able to find a museum or gallery of any size and stature. And thus, puts our proposed app ahead of our biggest competitor on the market.

Implementation

Technical challenges

A technical challenge the company would face during sales would be getting the museums on board with the app so that they can integrate it into their current business procedures. This is an issue because many museums already have an online presence, and this may impact how much a PR team are willing to put into more exposure. To overcome the distribution issue, we will produce a prototype to show the museums that will showcase the apps main features. The prototype will go alongside a well-organised pitch that shows how the app would benefit their business. The team plan to overcome the integration issue by a large social media-based campaign, so that it can gain interest and exposure in the app. This plan can be put in place for many online platforms, for example adverts on YouTube or similar streaming platforms.

Another technical challenge our app would face is OS update and bug support, failing to keep these up to date could cause usability of the app to plummet and thus lowering user app engagement. To mitigate this issue the same group of developers will be responsible for keeping the application up to date with OS updates and bug fixes. Keeping the same team members will lessen downtime of the app due to the developers already having a grasp on the applications code. The developer's knowledge will be supplemented with the support pages released with every update by Google and Apple.

The final main technical issue would be making the app accessible to those who are visually impaired. This will be a challenge for the development team as many have not needed to implement this tool before. This accessibility issue will be rectified by ensuring that the developers sufficiently implement each element with an Accessible Rich Internet Applications label property. This means that each element has an invisible label which can be read by a screen reader so that it is accessible to the visually impaired. Alongside this the design and development team will work together to ensure they can implement buttons and widgets that are a high enough contrast to be seen and understood by those that have limited vision.

Risk assessment

Below is the risk matrix that each risk is assessed against.

Severity

Likelihood	Risk Matrix	Low	Medium	High	Critical
	Not likely	1	2	3	4
	Possible	2	4	6	8
	Quite Likely	3	6	9	12
	Definite	4	8	12	16

Risk	Effect	On Hand Control Measures	Further Management	Risk Rating
Prerequisite dependency	Unable to be downloaded on a variety of devices if required resource is not previously available.	Development team are experienced in cross platform development. Developers ensure that only the main popular prerequisites are needed for the app.	Additional more experienced developers hired to get rid of any issues current staff cannot fix	2
Complex or cluttered UI	Makes the app confusing and hard to navigate, therefore unappealing. Cluttered screen will affect the ability for a screen reader to read each button or widget.	Design team works closely with developers to maintain usability while keeping it visually appealing.	Hire accessibility testing team	4
Data Loss	It will result in the delay of development and deployment of the app.	An off-site backup of data alongside off-site data storage.	If the loss of data is large, then a data recovery team will be hired.	6

GPS and internet unavailability	In app navigation could be limited while connection is low.	Testing of the app in slow and limited internet areas.	Experienced developers hired to implement a local download option to the map and navigation.	8
Market saturation	Interest may be low around another new navigation app.	PR team will work diligently on a social media campaign.	Purchase online advertisement on museum review websites.	6
Getting a range of devices for testing	If a range of devices cannot be procured the testing period for the app will be lengthy and difficult.	A cross platform development tool would be used to give additional support to the developers	Run beta testing in a hand-picked group of individuals with a multitude of devices on different operating systems.	4
Small museums with outdated or little to no online appearance	May be unwilling to endorse a connection with the app. Meaning the people who are looking for smaller museums will not find them on the app.	Public relations team will present a prototype to them alongside a presentation highlighting potential of the app to increase visitor count.	Re-pitching the app once into full release and in its most completed form.	2
Large well-established museums with lots of appearance	May draw away potential users if large and popular museums aren't available in the app.	Public relations team will present a prototype to them alongside a presentation that highlights the potential of the app supplementing their already large online appearance.	Re-pitching the app once into full release and in its most completed form. Purchase online advertisement, once in full release, to increase the apps desirability to museums.	1

SWOT analysis

Strengths	Weaknesses
Market has unused potential to grow, there are few existing apps like ours. The initial roll out cost of the app will be low due to pre-existing API. Free to use by all. This means that the potential audience is vast.	App dependent on Google Maps for majority of features, so if there's an issue with Google Maps then there's an issue with the app. Little to no income until app is made public. Lengthy development time.
Opportunities	**Threats**
Grow interest and visitor count in smaller museums. Potential for growth to allow in app ticket purchases and to earn a commission of ticket sales.	Another product like our app can be created, and this would reduce the potential in the market. The app takes off and the team cannot handle the rapid growth. Easy target for hackers due to the businesses small size.

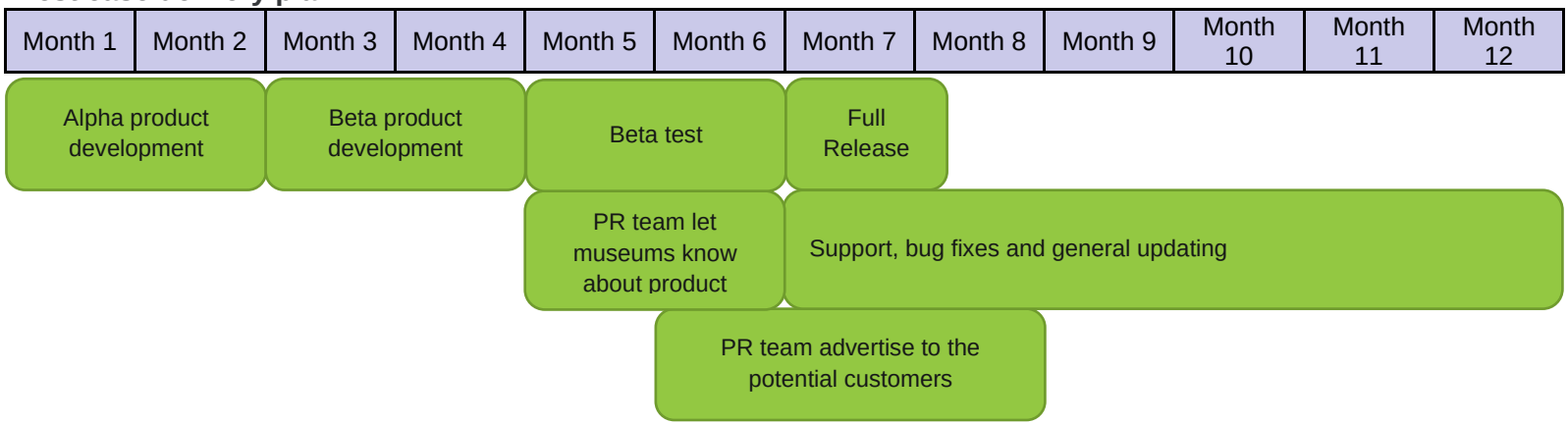
Delivery plan

Best case delivery plan

Months 1-2: Alpha development phase
Months 3-4: Beta development phase, visual finalisation
Months 5-7: PR presentation to museums
Month 5-7: Beta testing
Month 6-8: PR presentation to the museums
Month 7: Release
Month 7+: Continued support and bug fixing

The first 4 months will be the Alpha and Beta development phase. The 2-month Beta phase is focused on the UI and accessibility elements of the app. While this is underway the PR team will be pitching the app to museums, month 5 to 7. During month 5 and 6 the Beta testing will be carried out; accessibility will also be tested. After the Beta test is complete in month 7 the app will be rolled out to everyone. Alongside the release the final stage of development commences, support and bug fixing, 7 months and onwards, this will be a smaller team of coders as not many bugs are anticipated. All the while through months 6 to 9 the PR team will be advertising to potential customers.

Best case delivery plan

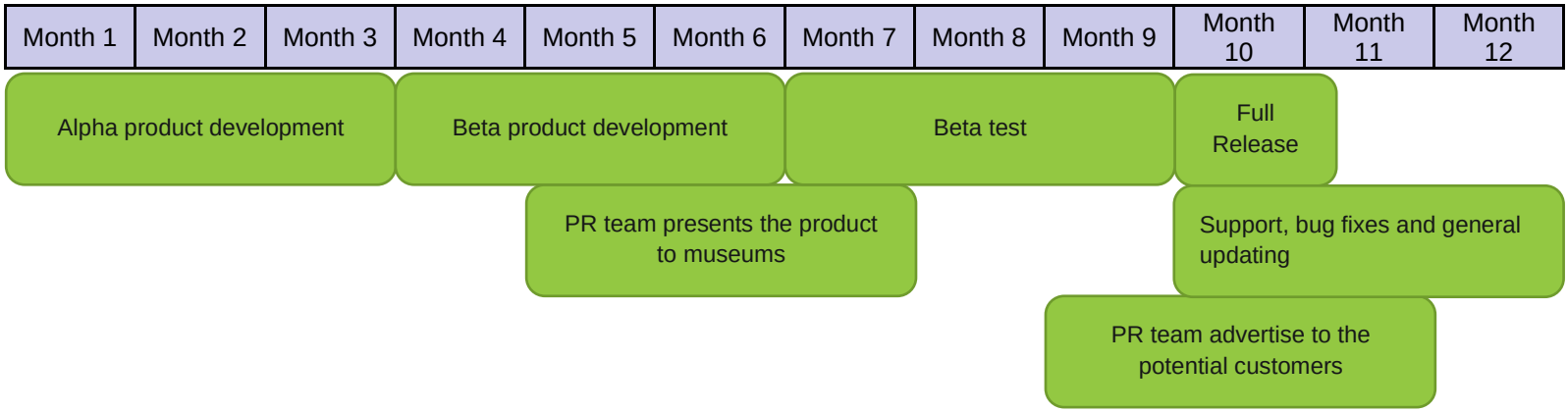


Worst case delivery plan

Month 1-4: Alpha product development
Month 4-7: Beta product development
Month 5-8: PR team let museums know about product
Month 7-10: Beta test & feedback
Month 9: Accessibility fixing
Month 9-11: PR team advertise to the potential customers
Month 10: Full Release
Month 10+: Support and general updating

In the first 6 months the app will be in Alpha and Beta development. During the 3-month Beta phase the developers will focus on the UI and accessibility elements of the app. Beginning at month 5 and continuing to the end of month 7, the PR team will present the apps beta to museums. In month 7 to 10 the app will undergo beta testing; accessibility will also be tested. Month 9 accessibility of application is fixed, possible hire of more team members. Month 9 to the end of 11 the PR team will advertise to potential customers. Month 10 the product will be fully released. Finally, month 10 onwards is support and bug fixing, this team will not shrink, the number of employed coders will remain the same.

Worst case delivery plan



Contingency plan based on risk assessment

As a consequence of the listed examples the project could require part-time staff to be hired during either the alpha development phase, the beta development phase, the beta testing phase or the post release support phase:

- Large amount of data loss, a recovery team would be hired
- A complex or cluttered UI, an accessibility focused testing team would be hired
- Prerequisite dependency, more experienced staff hired to mitigate issues staff cannot.
- GPS and internet unavailability, additional developers hired to implement local download of the map and the navigation.

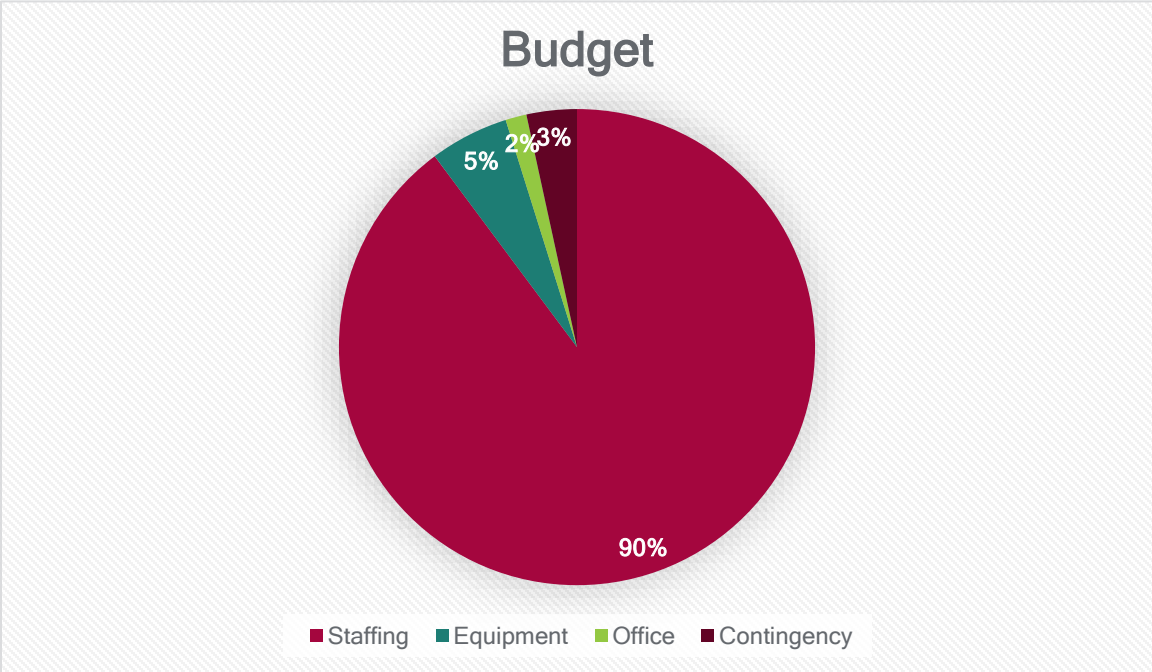
As a consequence of the listed examples the project could potentially require additional advertisement to be purchased during either the alpha development phase, the beta development phase, the beta testing phase or the post release support phase:

- Large well-established museums with lots of online presence, purchase advertisement on review websites to expand exposure, to make the app more appealing (show popularity).
- Market saturation, purchase advertisement on review websites and streaming websites to expand exposure.

If museums do not endorse the app at its beta phase it will require additional pitching by the PR team. The secondary pitch would be shown to the museums once the app is past its full release date. This will go alongside the prior mentioned online advertisement.

Costings

The costing is assessed against the best-case delivery plan and the contingency plan that has been proposed. **Soprano** are asking for a total grant of **£67,000.**



Staffing

We plan to employ four 18 to 20-year-old developers and for them to work 48-hour weeks in our office space. The UK national minimum wage for this age range is £6.45 an hour. This means that per week each of the four persons will be payed £309.60 and this will equate to a total between the four of £1,238.40 per week. Therefore, the total for all four staff for the initial 6-month development phase outlined in the delivery plan would come to £32,198.40 (rounded down to £32,198).

The second portion of our delivery plan requires less active development and more bug fixing / technical support. So, in this second 6-month period we will only have three active staff members out of our initial team of four. This means that the wage rate will remain at the same level, but the quantity of staff will reduce. The total staff wages for the secondary 6-month delivery period will be £24,148.80.

Therefore, for the entire 12-month delivery plan the total staff wages payable will be £56,347.20 (rounded down to £56,347).

Alongside the group of four developers we plan to hire a PR agent that is over the age of 21, therefore they would fall into the 21 to 24-year-old age bracket and require a different minimum wage. The UK national minimum wage for that age range is £8.20 an hour. We require the agent for the four-month advertising period outlined in the delivery plan, and in this advertising period they will work 28-hour weeks. The week hourly average is 28 hours as they are not required in the office space as much as the developers are, hence, the lower working hours. So, taking this into account we calculate that the total cost of hiring a PR agent for the four-month period will be £3,903.20 (rounded down to £3,903).

Taking the total costing for development staff being hired, £56,347, and the total for the PR agent being hired, £3,903, the rounded total of staffing will be £60,250.

Equipment rental
Figures for equipment rental are generated from hardsoftcomputers.co.uk.

In order to have the appropriate equipment to complete the project according to the best-case delivery plan we will rent computers, monitors, keyboards and mice. We plan to rent out a Dell XPS-8930, a LG 24″ 4K Display and a Logitech Wireless Mouse & Keyboard for each of the developers. For the entire 12-month delivery plan, as mentioned before, there will be four developers then three developers so the quantity of rentals will differ between the first half of delivery and the latter half of delivery. So, with this taken into account the total for renting all four pieces of equipment for the 12-month period will be £3,590.26, (rounded down to £3,590).

Office rental
Our business will begin proceedings with four staff members and grow to five staff members, and subsequently shrink back down to four. This means that at our maximum we require an office space large enough for five people and four desktop computers. So, with this taken into account we are choosing to hire out office space at Sparkhouse, Lincoln. This office space provides added specialist support for small business startups, thus meaning that this space is a well fitted match for our company. The rental of this office space will be £80 per calendar month meaning, a total of £960 will cover the entire 12-month rental proposed in our delivery plan.

All together **Soprano** requires £64,800 to begin proceedings with just the labour and equipment costs summed together. To allow for our contingency plan of hiring a specialist team member there will be an additional £450 added. This plans for the staff member to be working at minimum wage for 21 to 24-year old’s, at 25 hours a week and for two weeks, £410 total. Also, for the staff member to have another computer workstation hired for their use, totaling £39.60 (rounded up to £40). This will bring the total to £65,250. We will also add a leniency of £1,750 if the unlikely case that any unaccounted for issues were to occur.

Due Diligence

Legal

This section discusses relevant legislation related to our app and assesses how it can affect our company. It also evaluates how we are adhering to each law or act guidelines.

General Data Protection Regulation - GDPR

The first legal requirement that our business will need to comply with is the General Data Protection Regulation. This regulation controls the keeping of personal information which applies to individual persons and not public authorities. Our company is required to abide by this regulation because a pre-requisite to using the application is signing up and registering your account. This means that the user should be able to make an informed choice about how their personal data is being used. To allow a freely made and informed choice to be given the user will have to check separate boxes after reading each; Terms and Conditions and Privacy Policies.

The app will have third-party advertisements within it, this means that we need to give the user an option to opt-in or opt-out of their data being shared with third party advertisers. There will be a section to change their opt setting for marketing preferences, where at any time the user can opt out or in of third-party sharing. The user will also be allowed to request the data we have on them and to request we delete their data at any given time. This is so that we can comply with the Privacy rights section of the GDPR.

In order to ensure data security and GDPR compliance we will encrypt and pseudonymize the little server-side data that we hold. This will ensure that each users data set is as safe as we can make it from cyber-attacks. Alongside this we will create an internal security policy for our team to build awareness and knowledge about data protection. The policy will make it so that data protection is considered at all stages of development, it will include guidance on email security, two-factor authentication and password strength.

Computer Misuse Act 1990 - CMA

Majority of our data will be held client side, things like personal data (planned routes and saved locations) will be stored on the users end and little data will be held server side. This means that it is unlikely that we will breach the Computer Misuse Act, due to how much and how we are storing data. However, we still could breach sections of the CMA if we infringe on sections 1, 2 and 3.

Both section 1 and 2 refer to gaining unauthorised access to someone's computer. Section 1 - Unauthorised access to computer material states that *(Computer Misuse Act 1990, s.1(a))* 'intent to secure access to any program or data held in any computer' is in breach of the CMA. This means that during security testing we need to ensure that we do not breach the CMA when we are trying to bypass and test our protection levels. Section 2 - Unauthorised access with intent to commit or facilitate commission of further offences states that *(Computer Misuse Act 1990, s.2(b))* 'facilitate the commission of such an offence'. We could come in breach of the CMA in this section if we do not properly prepare and scrutinise any temporary staff hired. Within the risk assessment one of our mitigations were to hire temporary staff therefore, we need to have in place an intensive recruitment service which would include closely testing their trustworthiness.

Section 3 - Unauthorised acts with intent to impair, or with recklessness as to impairing, operation of computer, etc. states that *(Computer Misuse Act 1990, s.3(a))* 'any unauthorised act in relation to a computer' is in breach of the CMA. Breaching this section during testing or by any means could provide the consequence of losing access to all data stored. Therefore, it is important that another form of backup is stored so that we can maintain **Soprano's** integrity and workout misunderstandings.

Copyright, Designs and Patents Act 1988
Our application will be using a third-party map service, Google Maps™. Google Maps™ is an already existing navigation service that is copyrighted and trademarked. We therefore need to arrange an agreement with Google Maps™ to set out appropriate an amount of *(Copyright, designs and Patents Act 1988, s.142)* 'Royalty or other sum payable for lending of certain work'. In order to obtain appropriate permission so that we do not infringe upon the CDPA we will provide a full description of our product pitch alongside how their work will be distributed and used. Furthermore, we will also appropriately attribute the work to their business.

Ethical

This section is an ethical evaluation using normative theories that are in direct relation to our app. Normative ethics are an area of research that focusses on morality.

To conduct a full and in-depth ethical analysis of the proposed app and of the business, **Soprano**, we will be using three normative theories; Deontology, Utilitarianism and Consequentialism. Each normative framework gives a different viewpoint of morality.

Data Privacy
Soprano will be handling sensitive customer information, and this could present an ethical problem. It is important to disclose any issues regarding user data privacy, data leaking for example. The way the business finds solutions to the problem will be scrutinised if not properly ethically evaluated beforehand. We designed our app to hold majority of its data client side, this will minimise the risk of data leaks on **Soprano's** side but not on the clients' side. Storing our data mostly client side minimises the risk that there would be any accidental leaks from data being sent to an incorrect email. This however does not eliminate the risk of a user's data being accessed unknowingly, a user could be hacked. So, the hacker only has access to only one person's data and not an entire data base of people.

According to a Consequentialism viewpoint, **Soprano** protecting most people from a data leak by storing data client side would be moral. This ethical framework focusses the morality of an action on the results of said action rather than the action itself. Therefore, the action of storing our data client side to negate the possibility of a business side data leak would maximise good consequences.

From a Utilitarian perspective the business is morally sound if this issue were to occur. The business would be objectively deciding that the safety of majority of user data is more important than the safety of an individual's data. Utilitarianism applies an intrinsic value to happiness, meaning that our solution to store data client-side results in no data leaks, which then leads on to a happier majority, the bulk of users, because their data is safe.

Finally, the Deontology perspective would view the action of putting an individual at risk of being hacked as morally wrong. A Deontological viewpoint puts everyone at the same level, they believe ‘do unto others as you would have them do unto you’. The act of allowing an individual’s data to be unknowingly accessed would be disrespectful and not an act of equality, this goes against Deontological morality code.

All in all, the ethical issue of **Soprano** storing data client side would come in the bounds of being morally sound for two out of the three normative ethical frameworks. Therefore, the majority, or at least people with these ethical stances, would find the decision to store data client side to protect the many as morally sound.

Advertisement

The application is designed in such a way that advertisements are integrated into almost every part of the app. These adverts will provide **Soprano** with an additional way to maintain the apps price, free. The advertisements can be removed by the user via a onetime in-app purchase or an honest review on the app store, these both will help boost the app by providing exposure and extra funds to continue development. This presents an ethical issue around price, having a paywall will create ambiguity about the free status of the app. The app itself would remain free, but you can pay to remove the adverts, does this then change the free status of the app.

According to a Consequentialism viewpoint, **Soprano** integrating a pay wall and review scheme would be classified as moral. Many people would view having no nuisance adverts as a good thing, therefore the good consequence of the action of paying or writing a review makes the outcome and action moral. Allowing users to choose to remove adverts makes it so that they can maximise their own good consequences, which fits within the morality bounds of Consequentialism.

Utilitarianists could view this ethical issue as both moral and immoral. The paywall would create a way for users to remove the adverts, which could cause annoyances; therefore, by the removal of adverts it would boost their individual level of happiness. So, the boosting of human welfare, or happiness, makes the outcome moral. On the other hand, it could also present as immoral due to having to pay or write a time-consuming review to remove the advertisements. Although it provides the positive outcome of no adverts the method in which that state is achieved could lessen user happiness levels, thus making it immoral within Utilitarian bounds.

In a Deontological perspective the act of having a paywall feature would be immoral. The advertisements would hinder the users experience, which leads to them feeling forced into pay the pay-wall fee, just so that they could unlock a more enjoyable advert free app. Alongside the paywall being in place the secondary method of ad removal could be deemed as immoral. This is because **Soprano** could be unwittingly soliciting good reviews in order to provide an enjoyable experience to users. Therefore, this would be placing the value of our company over the value of everyone else, which Deontologist deem immoral.

Taking all three aforementioned ethical stances into account, the issue of advertisements and a paywall remains morally ambiguous. There is no clear moral stance between the three frameworks, an even split between “it is moral” and “it is not moral” is reached. Therefore, this means that

according to these ethical frameworks' users would be divided closely on whether this issue can be deemed as moral.

Third party navigation

The final ethical issue **Soprano** could encounter would be, taking credit for work done by others. At its core our app is a navigation app, but we are utilising third party software to perform majority of this action. Although our app is mainly navigation, we provide innovative features, such as in-house museum reviews and immediate business site navigation for ticket purchases. Even though the third-party navigation use is legal, is it moral.

Consequentialism theorises that the morality of an action comes from the amount of good consequences that an action causes. So, when applying this theory to **Soprano's** ethical issue it makes the third-party navigation use moral. The good consequence of having a useable and easily navigatable application out ways any moral doubt caused by third-party software use.

According to Utilitarianism using third party navigation would be morally sound. Utilitarianism focusses on the outcome of an action and on the welfare of the user rather than the action itself. Our application will use a third-party navigation to make our UI user friendly and easy to learn, this means that the outcome, happiness of users, out ways any moral ambiguity in the action taken to get there, third party software use.

Finally, in a Deontology perspective the use of copyrighted material within the bounds of the Copyright law would be deemed moral. Deontology seeks out proper copyright use as a matter of duty, this is because Deontology treats following legislation as if the individual being affected by a break in the law is the same as the person following it. So, a Deontologist would view this issue as if they were the ones having their Copyright infringed upon. Therefore, if **Soprano** gains appropriate permission to use and distribute copyrighted software this ethical issue is morally sound according to Deontology.

As a whole, the three normative frameworks came to the same morality conclusion on the issue of third-party software use, it is morally sound. Each of the three frameworks provided an outline of the potential majority stance users with these ethical views would take, this action is moral.

Summary

Our app will boost younger visitors and maximise the popularity of museums and galleries within this age group. Our innovative app will allow an accessible and useable way for everyone to discover museums and galleries small or large. The proposed delivery plan has been optimised to provide a feasible timeframe while maintaining the main priorities, quality and usability. Meaning that we are confident that our proposed product can be efficiently and effectively produced in a way that will make the Minerva Foundation honored to have contributed to its production.

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