

Development of Mobile Application Specifications for the Sir Arthur Sullivan Society



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Abstract

The Sir Arthur Sullivan Society works to promote the life and works of Sir Arthur Sullivan and is continually looking for ways to improve its outreach. This project continued work with the Society to develop a mobile application version of a walking tour of Sir Arthur Sullivan's London developed in 2013. To investigate the potential interest and determine which features would be the most desirable in a mobile application we conducted interviews with the Society and surveyed potential users. Analysis of this data demonstrated a want for a mobile application version of the walking tour. We developed a structured list of priorities and a visual mockup for the application. We concluded with recommendations of avenues to develop the application and directions for future research.

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Chapter 1 - Introduction

Sir Arthur Sullivan was one of the most influential musicians of the 19th century. As the composer for the music for his collaborations with W.S. Gilbert, Sullivan has always enjoyed popular recognition. However, it is his vast output of music for all mediums that has secured Sullivan his place as one of the greatest composers of all time. The mission of the Sir Arthur Sullivan Society (SASS) is to promote continued awareness of Sullivan's contributions to his art form through publications, lectures, recordings, and concerts.

To increase awareness of Sullivan's contributions a team of students from Worcester Polytechnic Institute (WPI) created a simple walking tour of sites relevant to Sullivan's life and career in London in a paper format (Rosenman et al., 2013). The goal of their project was to identify and select sites relevant to Sullivan's life while taking into consideration the distance and other characteristics of a walking tour that might be expected by users, based on the book (CITE). The team's final deliverable was a paper walking tour with eleven different sites related to Sullivan's life and career in London. The tour included a map of the site locations, a walking time estimate, directions from one site to the next, as well as a small write up about each of the locations on the tour with an accompanying picture. The 2013 project team concluded by suggesting ways to publicize the walking tour and recommending the creation of a mobile application of the tour.

This project continued the work of the 2013 London project group. The team created a set of specifications for a mobile application adaptation of the walking tour. In order to develop these specifications the team evaluated the current walking tour, designed and distributed a survey to evaluate important mobile application features, evaluated and assessed current mobile applications, conducted interviews with the Sir Arthur Sullivan Society members and board,

developed a paper mockup of the prototype, assessed possible mobile application developers, and finally developed a digital design prototype with specific recommendations.

Chapter 2 - Literature Review

In order to initiate our research, it was necessary to identify Sir Arthur Sullivan, examine the work done by the 2013 team to develop a walking tour, identify our potential user base, analyze previous mobile application prototypes, and investigate mobile application design guidelines.

2.1 Background on Sir Arthur Sullivan

Sir Arthur Sullivan is known as the composer who most personifies the era of Victorian Music. Born May 13th, 1842, Sullivan entered into a world of dramatic changes. He started his music career early, and by the end of his life had established himself as one of the great composers. Sullivan's body of work is vast, fourteen scores of W.S. Gilbert light operas, five other operas, twelve choral works, and two hundred thirty other compositions. His works influenced British and American theatre, and continue to be performed to this day.

Sullivan was exposed to music early in his life through his father, a bandleader for the Royal Military College. He was eager to pursue a career in music, despite his father's urging otherwise, and applied to become a member of the Chapel Royal. He was admitted at the age of 12, and quickly became recognized for his musical and vocal skills. In 1856, Sullivan was awarded the Mendelssohn scholarship, giving him an education in music at the Royal Academy of Music and eventually at the Leipzig Conservatory in Germany (Jacobs, 1984). It was at Leipzig at the age of 21 that Sullivan composed incidental music for *The Tempest* that rocketed him into fame.



Figure 1: Sir Arthur Sullivan 1886-87 (Jacobs, 1984)

Despite Sullivan's early launch into fame, he continued to work hard. Sullivan took work as a church organist and taught music lessons to make a living. It was not until 1875 that Sullivan began working with the now famous librettist W.S. Gilbert, now recognized as his partner in the famous Gilbert and Sullivan operettas. The pair despite their infamous quarrels wrote some of the most well known musicals of all time including: *H.M.S Pinafore*, *The Pirates of Penzance*, *Iolanthe*, and *The Mikado*.

Richard D'Oyly Carte for his part capitalized on the success of these works, building the Savoy Theatre specifically for their productions, and brought new innovations to theatrical spaces. The Savoy Theatre was the first theatre to be lit with only incandescent lighting and to eliminate a surcharge for programmes (Lawrence, Findon, & Bendall, 1980).

Sullivan as a composer worked and lived in London. He was born in London, died in London, and was even buried in St. Paul's Cathedral in London against his own wishes at the request of Queen Victoria (Lawrence, 1899). The Savoy Theatre was originally built exclusively to present his light operas. *Ivanhoe*, one of Sullivan's most successful grand operas was commissioned as the piece to open the Royal English Opera House, now the Palace Theatre. A memorial still stands to the great composer in the Victoria Embankment Gardens just off the Thames (Rosenman et al., 2013).

Shortly after his passing, Sir Arthur Sullivan's reputation took a sudden and sharp downward turn. Contemporary critics condemned his operettas as being attempts to find "fleeting popularity" (Lawrence, Findon, & Bendall, 1980, p. 402). These insults were compounded by attacks on Sullivan from major academic institutions of the time, the Royal Academy and Royal College of Music, Oxford, and Cambridge (Turnbull, 2010). Further the D'Oyly Carte Company held exclusive rights to Sullivan's works. The company led uninspired productions in their later years, hurting Sullivan's reputation even further. Only in the 1950s Sullivan's work began to see greater appreciation as the copyright expired and his works were suddenly available for public use. In the 1960s, copyright on Gilbert's work expired and suddenly the whole of the Gilbert and Sullivan body of works were free to be adapted to the stage. With new energized productions, Sullivan's work once again was on the rise.

2.2 Sir Arthur Sullivan Society

Founded in 1977, the Sir Arthur Sullivan Society (SASS) is a philanthropic organization that promotes and educates about his works, and has "grown to become a major force in the current revival interest in Sullivan and his music" (Society, 2010). They consider their most important focus to be the promotion of high quality recordings of Sullivan's works. One such high quality

recording is a recording of Sullivan's grand opera *Ivanhoe* conducted by this team's liaison to the SASS, Robin-Gordon Powell. This recording was so well received it was nominated for a Grammy award (Society, 2012). While the Society includes musicians, experts on Sullivan, and those actively involved in theatre, membership is open to anyone who supports their ideas. The Society publishes a magazine and a newsletter to keep its membership informed of events and other news concerning the works of the composer. It also maintains a library of materials related to Sullivan, and organizes an annual festival featuring performances of Sullivan's works. Last year the Society joined with WPI to develop a walking tour of Sir Arthur Sullivan's London in the hope of further increasing their outreach (Rosenman et al., 2013).

2.3 Development of the Sir Arthur Sullivan Walking Tour

In 2013, [the](#) WPI team worked closely with the SASS to develop a walking tour that pertained to Sir Arthur Sullivan's life and works. According to survey information taken by [this](#) group, participants from London were not [very](#) familiar with Sullivan's works with over fifty-five percent having little or no idea about his works (Rosenman et al., 2013). The tour aims to promote knowledge of Sullivan, his life, and his works. The brochure (shown below in figure 2) highlights eleven relevant sites, provides an image of each site, explains how to get to each site, and gives a brief explanation of how the site is relevant to Sir Arthur Sullivan or his works.



Figure 2: Final Brochure developed by (Rosenman et al., 2013).

The sites featured on the brochure include: the Shaftesbury Theatre, the Palace Theatre, the Garrick Club, the National Portrait Gallery, the Sullivan Memorial, the Savoy Hotel, the Savoy Theatre, the Lyceum Theatre, the Royal Opera House, the Royal Courts of Justice, and St. Paul's Cathedral. Many of the theaters are where Sullivan's works were showcased or where he conducted. Other sites relate more to Sullivan's personal life, such as the Courts of Justice where Gilbert and Sullivan were both litigants in Gilbert v. Carte, a lawsuit in which the pair argued that

they should not have to cover the costs of the front of house carpet in a D'Oyly Carte theatre. Some basic knowledge of Sullivan's works is needed to see the relevance of some of the sites, a factor that was considered when converting the format to an application.

In order to develop the walking tour the 2013 team conducted surveys to determine user demographics, preferences about the tour, and previous knowledge of Sullivan and his works. One source they polled was SavoyNet, "a listserv dedicated to discussion of W. S. Gilbert and Arthur Sullivan, the operas they wrote, British Culture and musical theatre of their time and related matters" (Shepherd, 2011). The team also polled a sample of the general public of London.

A majority of those surveyed, 97.6% on SavoyNet and 77.6% in live interviews, spoke English and had gone on fewer than 3 walking tours in the past year. The SavoyNet survey and live interviews represent different age demographics. The average age of the SavoyNet responder was 57.9 over twenty years older than the average of the live survey average of 35.1. This gap in age shows a large discrepancy, and sampling bias, in demographics of the polling (Rosenman et al., 2013). The age of the respondents may influence responses on topics such as distance, technological access, sites and stops. Respondents from SavoyNet were unsurprisingly more familiar with Sullivan's work than the respondents in live interviews.

Before arriving in London our team analyzed the 2013 London Project Team's paper, looking at what could be enhanced and compounded upon this year. The 2013 Project Team had two suggestions for possible next steps for the project the first was a calling tour version of the walking tour. The second was for a mobile application designed around the walking tour. The idea behind the calling tour was that at each location on the tour there would be plaque that you could call which would have a narration of what the paper walking tour had. This idea was

quickly discarded as it had a number of flaws. In order for the tour to work many of the locations would have to be contacted to ask to put up as small plaque. We discovered that many of the locations would not have a clear location to put up said plaque. There is also no clear way of expressing how to get from one location to the next without a map of some kind. If the tour also had to have a paper component it would not serve the purpose of being it's own tour.

Alternatively, if you put the numbers to call onto the paper walking tour it would use up more of the space that is already scarce on the paper tour. On top of no convenient way to have the numbers posted the tour requires cellular service and signal. Base on the inherent flaws with a calling tour out project team decided that a mobile application would be a better suited next step for the walking tour.

Upon arrival in London our team took the 2013 Sir Arthur Sullivan's London Walking Tour on which our project is based. This oriented the team both physically in London and also to the walking tour and its purpose. While there were no major problems with the tour, we observed aspects that could be enhanced and added by the use of a mobile application. The 2013 Sir Arthur Sullivan's London Walking Tour is primarily based on content from *Gilbert and Sullivan's London* by Andrew Goodman. This is a 191-page text full of information on the historical significance of many more sites than the eleven sites described in the 2013 tour. A vast amount of information had to be trimmed away for the tour to fit into a printed-paper walking tour, but a mobile walking tour application could conceivably contain all of this information and more. Further the paper walking tour cannot provide an interactive experience or helpful directions for lost visitors in London. These are major drawbacks that detract from a printed walking tour experience and suggest that using a mobile walking tour application is a logical next step.

2.4 Identifying Users and Patrons

The development of a recommendation of a mobile walking tour application about Sir Arthur Sullivan directly affects two groups. The first was the SASS. By assessing the feasibility of a mobile application, the Society can proceed with the development of the application. They have the potential to have an easily accessible format for people to access information about Sullivan's life. The Society then has the option to put it onto their website which would allow public access to the application. Public access to use of the application they can help further their mission of advancing "the education of the public in, and promote the performance of, the music of Sir Arthur Seymour Sullivan" (Society, 2012).

The next group that would be interested in the development of a mobile application of the walking tour is potential users of the application. SavoyNet is a good representative sample of potential users, as approximately sixty percent of online poll participants said that they would be relatively to very likely to take a tour of Sullivan life, while only 24.7 of survey participants in the live interviews showed interest (Rosenman et al., 2013). These statistics show interest in the enhancement of the walking tour that was presented last year.

2.5 Case Studies

In this section, we assess projects that were directly related to development of mobile applications in order to research effective techniques for evaluating and building mobile applications.

2.5.1 Mobile Application Prototype Developed By the Digital Palace Explorers Team

In 2012, another WPI student project team working in London with the Historic Royal Palaces built a mobile application prototype to narrate stories about the Tower of London to enhance the tour experience. The team began by creating an evaluation system for mobile applications that looked at ease of use, engagement level, and the application's ability to convey its historical information. They then used this system to evaluate other mobile applications that had historical purposes. The group proceeded to examine and evaluate historical trails around sites such as the Tower of London, Hampton Court, and Kensington Palace. From the development of this application, the team highlighted some aspects they felt were vital in the final product. These attributes included: offline access, a supplementary map, visual components such as pictures and video, and a menu navigation bar. The group also interviewed the head of information technology at the Historic Royal Palaces and discussed the difficulties of having a mobile application when a wireless connection is not available. He also provided insight about the ability of an application to work offline, international roaming charges, and the battery life of phones. The team then assessed different application building platforms (Whittier et al., 2012). The report concluded by the development of a prototype of the application that included a map and information about the different sites that the trail highlighted.

The team successfully built and tested the application with positive feedback from users (screenshot shown below). This project effectively highlights some of the more successful attributes of the application and how they might be utilized. Our team will be able to utilize these data when considering features to recommend to the Sir Arthur Sullivan on what to include in their application. We will also consider the previous group's application evaluation form when we are designing our own evaluation system for walking tour applications. In addition we will be able to utilize the research into the application platforms and what each platform allows for

development. While a good model for our project, the application designed by the previous group does not fully incorporate all of the recommended components. The application that was built does not have a menu page or any form of navigation, or any supplementary photos or videos. The group did not supply the individual site information in their report so we cannot assess the quality or format of the individual sites.

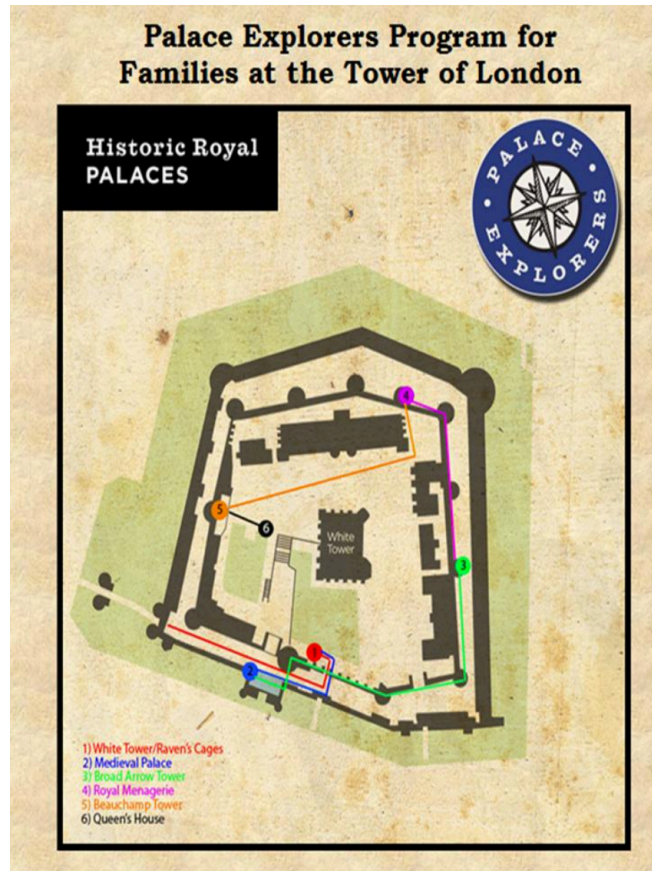


Figure 3: Tower Explorers Prototype (Whittier et al., 2012)

2.5.2 Application Development in the Venice Noise Project

In 2011, a WPI junior project team built a mobile application as part of a system to report noise problems in Venice, Italy (see figure 3). The goal of the smart phone application was to allow the citizens of Venice to record and upload noise samples to a website, which would analyze the

samples. The team began by breaking the application down into two parts. The graphical user interface (GUI) is what the application user interacts directly with and the model is the code, which allows the application to function properly. The group then brainstormed specific cases when their application could be used and optimized the application based on those scenarios (Ripley et al., 2012). They mentioned specifically that they wanted the interface to be simple and consistent throughout the application.



Figure 4: Final Application Developed for Venice Noise Project (Ripley et al., 2012)

Once the team had an idea of what they wanted from their application they moved on to analyzing what platform would be best for their application. Some of the factors they considered were cost, accessibility to users, and the application review process. The two options for platform development they researched were Android and iOS. Apple had more costs and procedures to get

applications approved for deployment onto the market than Android does (Ripley et al., 2012).

Thus this analysis illuminated the benefits of Android platform, such as the open source platform.

When it came to developing the prototype the group picked one main function of the application and then worked from there to the next important function. The team considered the most important aspect to be recording sounds. Once this feature had perfected the team needed to be able to upload the sound to the associated website. The team continued to work down the list from most important details to features that were not necessary but made the application easier to use or nicer to look at. Once the application was developed the team made the application public and put it onto the Android marketplace for distribution.

This project not only successfully built and tested their application, but the team took the project a step farther and published their application. The team's process of deciding what platform to build their application on is thorough and brings up the important point of how much the sponsor is willing to spend to build/ produce the application. The systematic approach to building the application also highlights the benefits of breaking the application down into a list of necessities and amenities. Creating a step-by-step list helps ensure that required parts of the application are completed before becoming preoccupied with trivial aspects that delay the project.

2.6 Mobile Application Design Guidelines

In 2007 a team developed a mobile application for a medical setting allowing researchers access to sorting information in randomized trials (Holzinger, 2007). The goal of the application was to increase the speed with which researchers could handle patient care and the induction of new subjects into randomized trials by preventing them from having to record information at the patient bedside and then transcribe it into a separate computer in a physically distant location.

The subject matter does not directly relate to our walking tour application but the team developed a general set of guidelines for the visual and functional design of mobile applications.

The study explores and explains a number of application prototyping techniques. There are two broad categories of prototypes working prototypes and paper mockups. A working prototype is demonstration with the actual hardware to be used of the application in an unfinished state to begin working out design issues and beginning catching bugs early on. A paper mockup is a non-functional visual mockup of the application, showing what elements should be displayed and how users can interact with them. A mockup requires significantly less development time and so allows multiple iterations of a design in a very short time span and with less lead time to the first prototype.

The study provides a set of recommendations that mostly cover visual and functional layout of mobile applications. The overall theme of these layout guidelines is consistency. "Be consistent in the use of font, font size, styles, etc.," "Use a consistent color scheme within the whole application," and "Locate common information in common screen locations" (Holzinger, 2007). These recommendations suggest that the visual and functional design of an application need to be coherent to provide a consistent interface to users. The study further recommends highlighting the most important information by making it available as quickly and easily as possible and to expect users to make errors and provide mechanisms to rectify them easily.

Analyzing this background research suggests a two-part design process for the development of recommendations. The first step is to identify all of the requirements of the application and rank them to help ensure that time is not spent on trivial features. The second step is to develop a paper mockup of the application to begin visually and functionally laying out the application. This second step will be repeated many times to help refine the flow of the application and to

help determine what features should be dropped because they detract rather than add to the application due to added complexity.

2.7 Walking Tour Application Guidelines

In 2007, a team of computer scientists developed two walking tour applications for use in a tourism center in Germany (Kramer, et al., 2007). The two applications are called the Planner and the Explorer. The Planner allows you to create a customized walking tour that is pre-planned before you begin your tour. The Explorer instead simply provides a map of interesting sites and gives you information on them that helps supplement the sites themselves. These two models are very different in how interaction takes place, so the researchers added capabilities to the application to provide a log of all interaction data and a recording of location information as the tour was used. This data allowed the researchers to see where and when users visited sites and how often they interacted with the application.

The researchers found there was no appreciable difference between the two application models. In both models the average duration of the tour was about 90 minutes and users visited the same number of sites. This agrees with research on walking tour duration done by Last year's project group (Rosenman et al., 2013). The application interaction was focused mostly in the initial planning, even for the Explorer application where there was no specific tour to plan. The researchers also collected demographic information on groups using the tour and found that only 10% of users were not in groups. This data suggests that customizable walking tours need to be able to handle the interests of a group of people rather than a single person (Kramer, et. al., 2007).

This research on walking tours can be synthesized into a rough outline of possibilities for a walking tour application. A walking tour application can take three forms: a fixed walking tour, a

customizable walking tour, or a free form exploratory map of sites. Walking tours in general should be designed to be around ninety minutes long regardless of the form they are delivered in. Applications for tourists should be able to handle the interests of groups of people in addition to a single person. The lack of mobile connectivity accessible by international tourists needs to be anticipated and design around and further limitations in battery life and system usability in chaotic environments need to be considered.

2.8 Summary

The background research conducted by this team provides a direction for the design of a mobile application adaptation of the 2013 *Sir Arthur Sullivan's London, A Walking Tour*. The mission statement of the primary stakeholder, the Sir Arthur Sullivan Society, directs the focus of an application towards providing information, education, and publicity of the life and works of Sir Arthur Sullivan. The life and work of Sullivan and its basis in London motivate a tour of the city to give a spatial context to the history of such an important composer. Existing guidelines for the development of mobile applications give a good understanding of what processes to use to prototype ideas and how to begin to visually design for small form factor devices, such as mobile phones. Research into existing walking tours and applications suggests that there are tour duration, length limitations, and further considerations that should be made regarding the behavior of tourists. This background research helped develop the structure and scope of our project and allowed us to make recommendations in the seven-week period.

Chapter 3 - Methodology

The goal of our project was to develop a set of specifications for an mobile walking tour application adaptation of the *Sir Arthur Sullivan's London Walking Tour* developed in 2013. In order to accomplish this goal we established four key objectives: to understand the needs of the Sir Arthur Sullivan Society, to evaluate mobile applications for tours and compile a list of best practices, to assess the needs of the intended audience for the application, and to develop a set of recommendations to present to the Society. In this section we expand upon these goals and objectives and describe out methodological strategies in depth.

3.1 Evaluate Needs of the Sir Arthur Sullivan Society

In order to achieve the goal of making specific application recommendations to the Sir Arthur Society interviews were conducted with board members of the Society. The interviews gave insight into the goals and desires of the Sir Arthur Sullivan Society and provided a major focus for our application recommendations. The interviews were semi-standardized and used snowball sampling. According to Berg & Lune (2012, p. 171), semi-standardized interviews allow “the interviewers to both ask a series of regularly scheduled questions, permitting comparisons across interviews, and to pursue areas spontaneously intimated by the interviewee.” Snowball sampling is a technique where subjects are asked to recommend other knowledgeable potential subjects. Snowball sampling is particularly effective for finding experts in a small field that would be difficult to find through random sampling of the public (Berg & Lune, 2012).

The nature of the Sir Arthur Sullivan Society necessitated that these interviews take place in many contexts and locations. Initial interviews were conducted in person during benefit events for the Society or during weekly meetings with our liaisons to the Society. Further interviews

whose subjects were suggested by previous interview responses were conducted initially over email and then on the phone. Several of these email initiated interviews never resulted in responses.

Following a brief introduction of the project team and goals the following questions were asked of every interviewed Sir Arthur Sullivan board member with many opportunities for diversions into topics of interest to the particular member being interviewed:

1. What is your position in or association with the Sir Arthur Sullivan Society?
2. What are your goals and desires for a mobile application walking tour of Sir Arthur Sullivan's London?
3. Would you consider such an application to be important as an educational or publicity tool?
4. Are there any other members of the Society that you would suggest we interview?

Interviews and presentations to sponsors would uncover new ideas and interests within the Society. These discussions would then uncover yet more ideas of what exactly the Society is looking for and what markets they are targeting with this application and so on. Interview responses provided a wealth of information not only to guide application development but on Arthur Sullivan and his works and how they relate to the contemporary world of art and how that might tie into publicity tools for the Society and so on.

3.2 Understand the State of the Art in Mobile Applications for Tours

Our first objective was to evaluate existing mobile applications for walking tours. Data from this evaluation illustrates what options exist in the field. These options provide a framework to begin developing recommendations for a mobile walking tour for SASS.

In order to assess existing mobile applications, we created an application rubric to help us organize our evaluations (see figure 4 or Appendix A for full survey). This rubric was modeled after the one developed by the Palace Explorers Team (Whittier et al., 2012, pp. 66–68). The team compiled a list of existing applications for walking tours and related applications, such as museum guide applications. These applications were selected based on subject (walking tours and similar guide applications), availability (price and platform), and quality (app store rating and reviews). Each application was evaluated using the application rubric.

From the results of our assessments, we analyzed statistics of guide applications, such as how many featured a single tour or multiple tours, how many had an offline mode, and how many included some sort of a map. Three of the top rated applications from the sample were selected to use as examples to guide recommendations for the design of the walking tour application.

Application Evaluation

* Required

Application name *

Date

Price

Platform Availability

☐ Ipad
☐ Iphone
☐ Android
☐ Windows
☐ Other:

Objective of Program
 Short purpose of the application

Overall Satisfaction
 1 2 3 4 5
 This is rubbish ☐ ☐ ☐ ☐ ☐ This is an ideal application

Aesthetic
 1 2 3 4 5
 The look was detrimental to the program ☐ ☐ ☐ ☐ ☐ The look aided the application

Figure 5: Application Evaluation Rubric.

3.3 Assess Needs of the Intended Audience

After our evaluation of walking tour applications we determined what features of applications are important to potential end users. The team surveyed a sample of potential end users, SavoyNet, to find out what they would like to see in a walking tour application. SavoyNet with its active membership of 700 provides a sample of convenience (Berg & Lune, 2012). While this sample is not a good representation of the general public, the Rosenman, et al. team surveyed SavoyNet in

researching how to create a walking tour and found that 38.1% of SavoyNet members would be very likely to take a Sir Arthur Sullivan walking tour.

This project's survey collected data on demographics and attributes, such as information on where our user base is from, what mobile phone platforms they use, and whether they would be willing to use an application if it requires the use of a mobile data plan. This survey was deployed using WPI's license to the Qualtrics platform, a well-regarded survey and data analysis platform. Deploying the survey with Qualtrics allowed the team to easily reach the intended audience by giving them access to the survey through a link to a webpage, greatly reducing time we would have to invest in fieldwork.

The questions asked in our survey were:

1. Please enter your age.
2. In which country do you reside?
3. What kind of mobile device do you have access to?
4. Would you be interested in a walking tour of Sir Arthur Sullivan, should you visit London?
5. Would you be interested in taking the walking tour if it were in the form of a mobile application?
6. Would you be more interested in:
 - (a) An application that was solely focused on the life of Sir Arthur Sullivan
 - (b) An application that was more focused on the life of Sir Arthur Sullivan, but included a walking tour
 - (c) A game about Sir Arthur Sullivan
 - (d) An application more focused on the works of Sir Arthur Sullivan

7. Would you have a data connection if you were to visit London?

At this point the survey would terminate if the respondent had indicated no interest in either the tour or its mobile adaptation. The next questions would then ask the respondent about relevant features in the application:

1. If the application featured additional locations related to Sir Arthur Sullivan not part of the main walking tour would this interest you?
2. Would you be interested in being able to take the tour virtually?
3. How important is each of the following?
 - (a) Location services
 - (b) Multimedia aspects
 - (c) Offline content
 - (d) Content in multiple languages
 - (e) Nearby interests
4. If there are any other features you would find important, please describe them.
5. How much would you be willing to pay for the application?

These two sets of questions provide data on both interest in the application as a whole and provide a framework for developing recommendations of features. The ___ demographics and interest data shows that interest does exist and identifies from whom. The feature-related questions show exactly what features are most important to potential users.

3.4 Develop Recommendations

Our penultimate objective was to synthesize all of our findings into a set of recommendations for the Sir Arthur Sullivan Society. The recommendations include a prioritized list from absolutely

necessary (e.g. having a map) to marginally desirable. We would further provide a list of current application development companies that could handle the creation of this walking tour application for the SASS.

3.5 Develop a Design Prototype

After completing the reviews of mobile applications and synthesizing its data we began developing the graphical prototype by doing hand sketches. All of the sketches were done using pencil and pen on paper with individual aspects of each model highlighted with a line and brief description of the aspect. These sketches (for complete series see appendix D) incorporated many of the features with favorable responses from the online survey and included different formats and layouts that were then shown to our advisor and sponsors. Based on the feedback we received from our sponsors and the survey choices, aspects of each sketch were chosen to go into our final paper prototype. Morgan Hopeman developed the final prototype designs using Adobe Photoshop based on the original sketches. Due to interest from our sponsor some aspects are represented in multiple different ways, for example the exact nature of the tour is shown in two different ways in the final prototype. The final prototype is shown in the conclusion section.

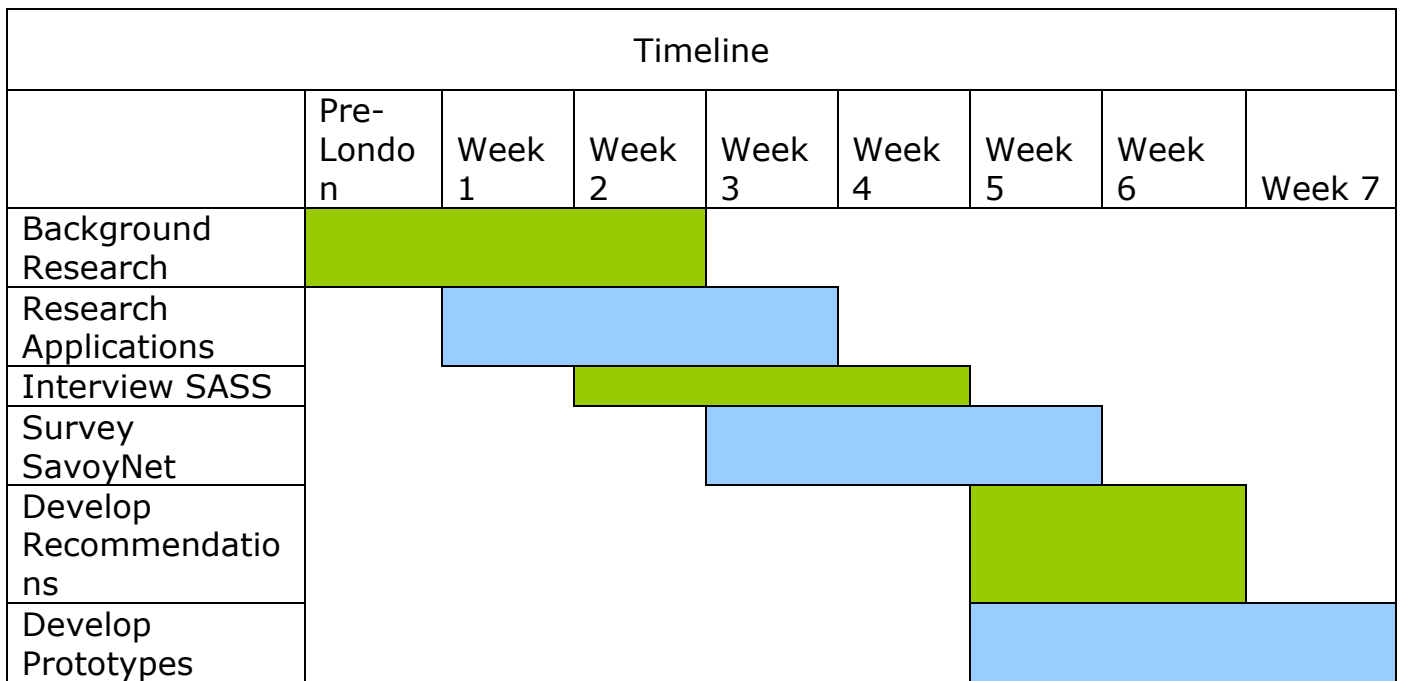
3.6 Cultural Exploration

One of the most challenging aspects of this project was Professor Delorey's want for the team to become "woven into the cultural fabric of the city." Although this seemed at first an easy task (incorporating theatre, museums and other cultural activities in such a limited time, given the demands of the project itself), the reality of scheduling so many events was rather daunting. In the appendices E, F, G, and H we have detailed not only the cultural events that we attended, but the five Discovery Papers that Professor Delorey assigned for specific museums and directed

topics.

3.7 Projected Timeline

Figure 6: A GANTT chart visualization of the flow of our project.



Chapter 4 - Findings and Analysis

4.1 Needs of the Sir Arthur Sullivan Society

The team conducted numerous interviews with the Sir Arthur Sullivan Society board and members to determine their needs and wants for the organization. These interviews often evolved into longer discussions, which often shed light on the overall organizational goals of the Society.

From these interviews developed a few common ideas in the Society and then a large body of widely varying ideas.

The common set of ideas found in interviews forms the basis of the organizational goals for an application of the Society. These ideas overall are that the application should be an educational and publicity tool design to engage new demographics with the Society. In interviews it became clear that a large untapped market for Sullivan's works is American academic theatre where Gilbert and Sullivan light operas get performed frequently. The Society would like to engage these groups who would be inclined to learn more about the context of the works to help better understand and enjoy them in a more complete way. Further this is a much younger demographic than currently comprises the members of the Society and other Sullivan enthusiasts and would help bring new members into the community.

The more diverse set of ideas represents differing ideas of how to accomplish the Society's overall goals through a walking tour application. There are three different broad approaches to a walking tour application that came up in interviews: a straight walking tour, a city explorer tour, and a game demonstrating the life and works of Sullivan. Further there were specific implementation ideas put forth in various interviews. In some interviews the idea of taking the tour virtually without visiting the city was expressed. Interviewees several times suggested the idea of using the application to market recordings of Sullivan's works and other available materials, especially those supported by the Society. Yet others suggested provided multimedia accompaniment to the tour, providing for no extra charge materials that the Society has exclusive access to.

A relatively small minority expressed interest in developing specifically a game, and most of the ideas expressed relate to a walking tour. With this in mind we focused on those two

implementation methods: a “Planner” and an “Explorer” tour. A tested model for these two applications exists in (Kramer 2007). No specific preference for either of these forms appears to exist so our focus changed to determining which of the auxiliary features should be included in an application recommendation.

In interviews with the Sir Arthur Sullivan Society board the team has determined the broad structure of the walking tour application and some of its desired features. We have determined that the Society would like some kind of tour application, either a guided “Planner” tour or a city “Explorer” application. Further the team has learnt the Society might reasonably like to see multimedia accompaniment to the tour, publicity for the Society and its products, and the ability to do the tour without being present in London.

4.2 State of the Art in Mobile Applications for Tours

The team conducted a survey of thirty-one mobile tour applications in order to understand what was the state of the art of mobile applications. The team rated on a scale from one to five various qualities of the application as judged by members of the project team: Overall Satisfaction, Aesthetic, Usability, Information, and Running Well (see figures 6- 10). The team further collected information on features the applications had: maps, location capabilities, and offline capabilities. The team then collected free form responses about the overall usefulness of each application and how it might serve as a model for our application. These responses gave us both a broad understanding of the state of applications and the effectiveness of individual applications.

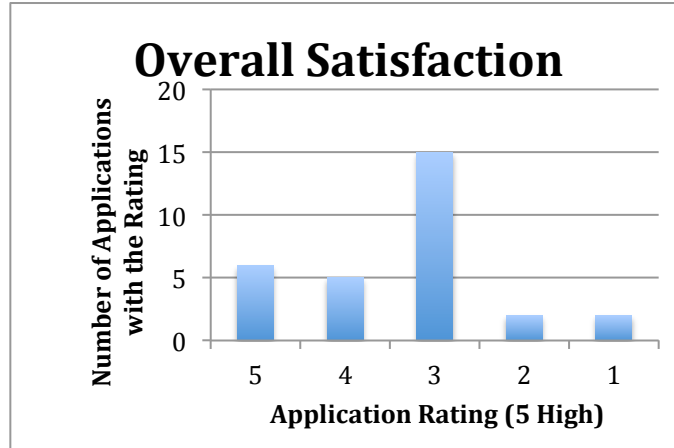


Figure 7: Overall Satisfaction

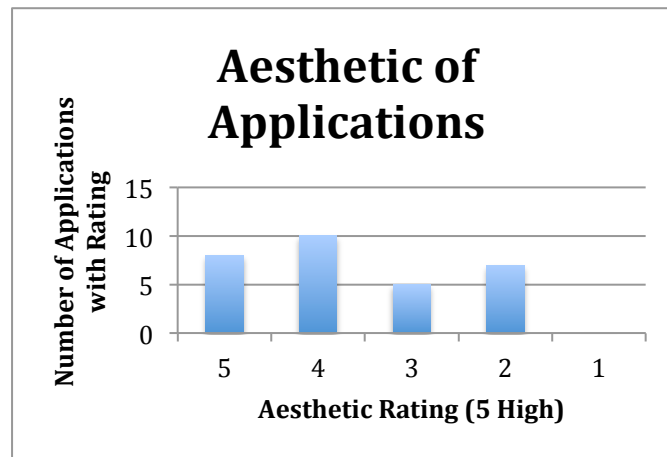


Figure 8: Aesthetic Quality

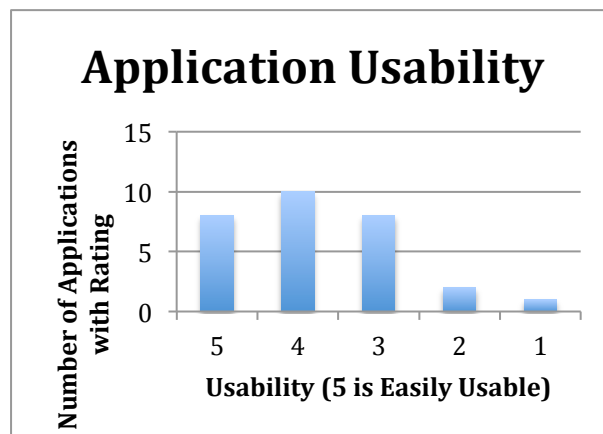


Figure 9: Usability

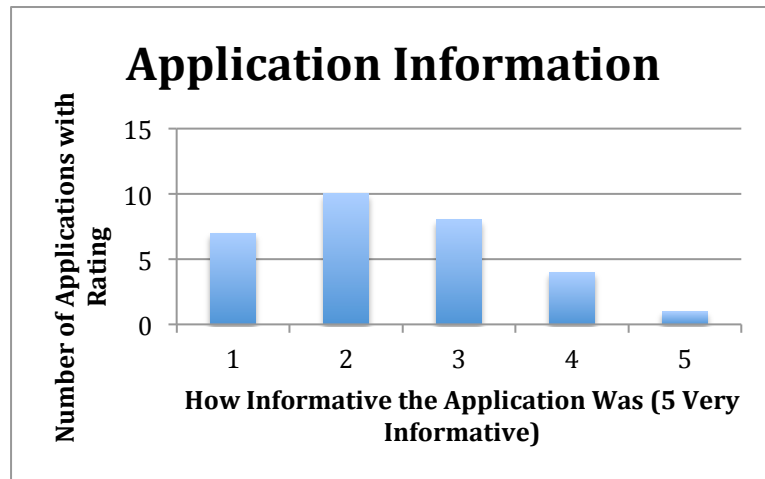


Figure 10: Information

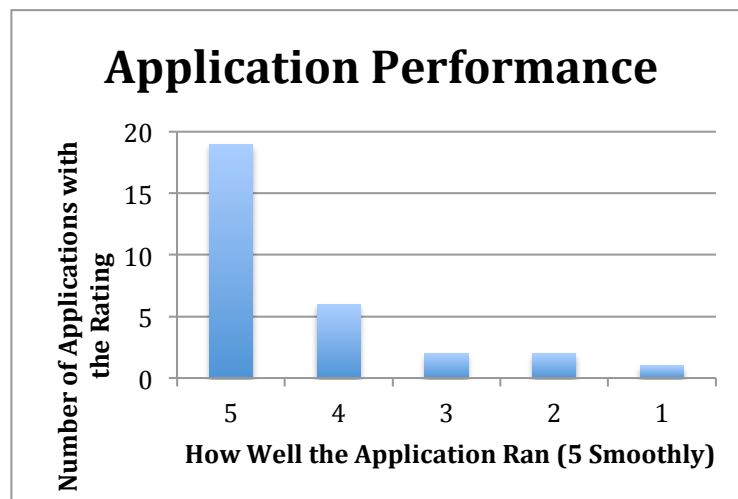


Figure 11: Performance

The numerical ratings gave us a picture of what the applications look like as a whole (see figures 6- 10 for the raw results). The overall satisfaction rating gives no clear preference for or against the current body of applications. The rating of aesthetic of applications was completely random which suggests that useful conclusions cannot be drawn from that data. Applications were in general usable and informative and overwhelming ran well. From this the team gathered that there is room for improvement in walking tour application design and that there is a need for applications to be well design and informative and well tested so they do not crash.

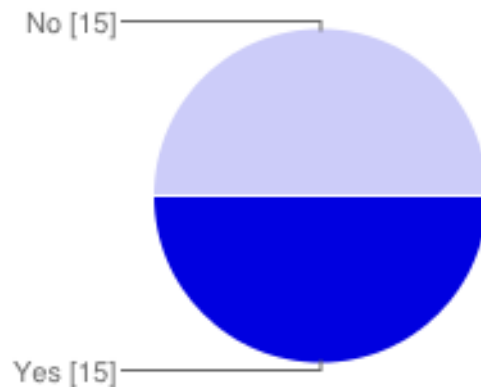


Figure 12: Does the application feature multiple tours?

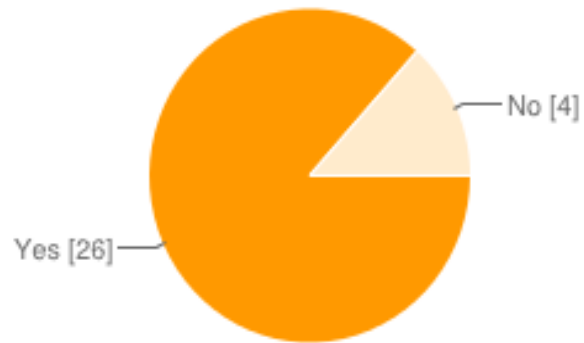


Figure 13: Does the application feature a map?

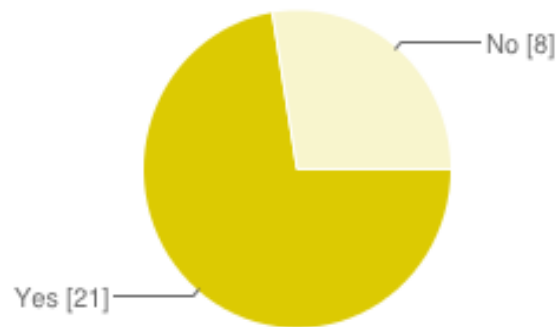


Figure 14: Does the application have geolocation capability?

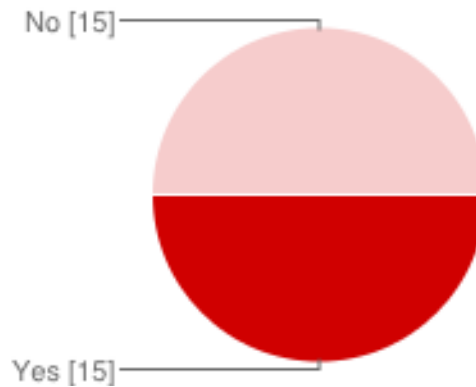


Figure 15: Does the application function offline?

The feature research helps us define what features should or should not be in a tour application (figures 11- 14 display the raw results from this portion of the evaluation). Unsurprisingly a majority of the tour applications had maps to help guide the application. Equal numbers had location abilities allowing you to see exactly where you were on a map. A small majority allowed the full application to be used without any data connection. Finally equal numbers of applications did or did not have multiple tours included in their applications. This data supports the fact that a walking tour application should probably have a map and offline capabilities.

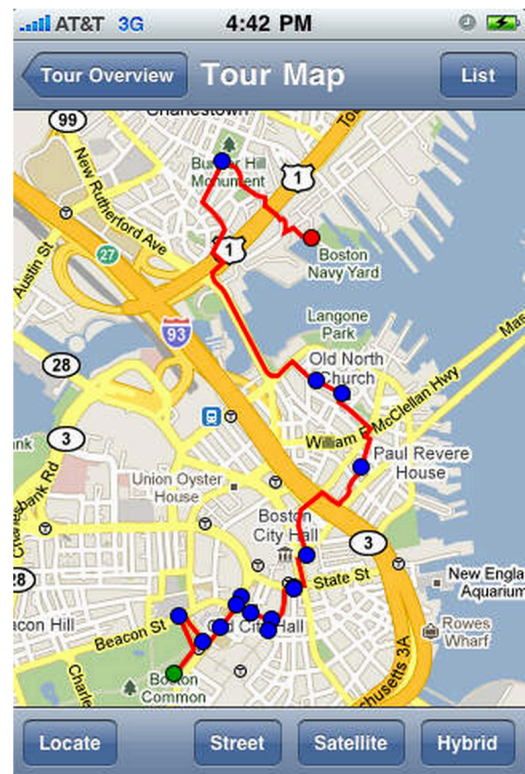


Figure 16: Top Application – Freedom Trail Walking Tour

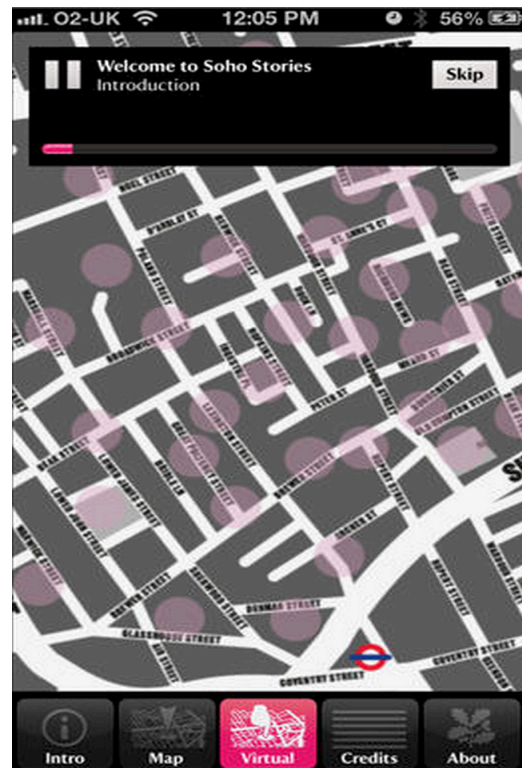
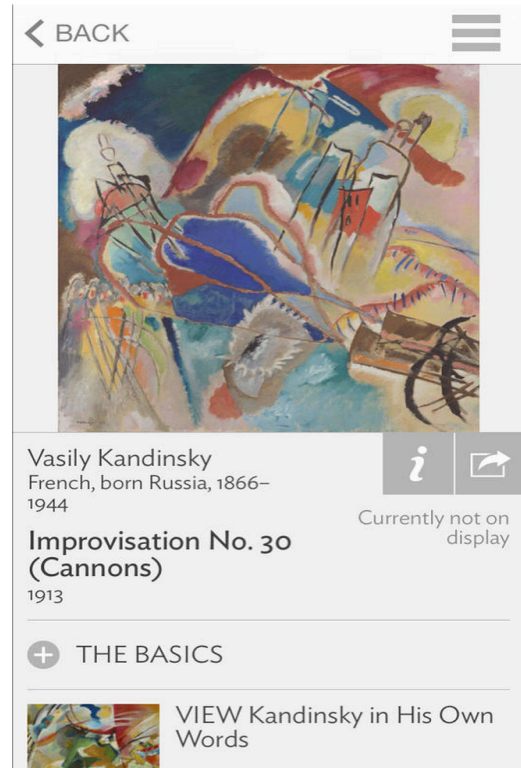
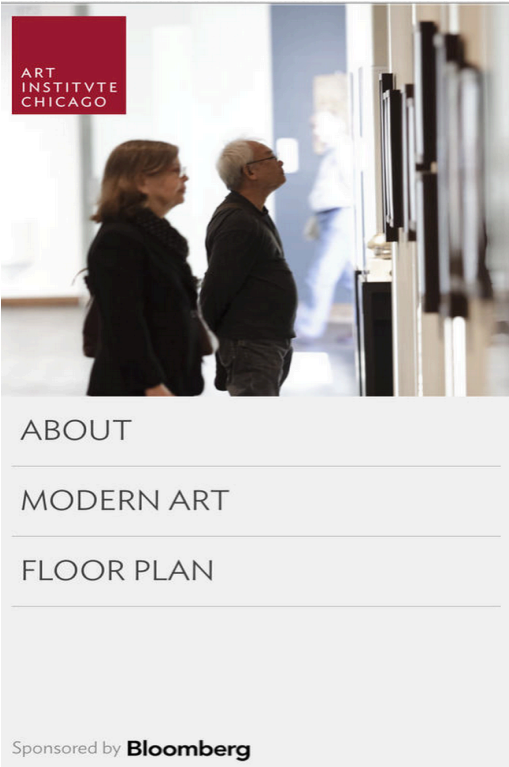


Figure 17 & 18: Top Applications – A Closer Look at the Art Institute of Chicago (Above)
Soho Stories (Below)

The free form responses as a whole are difficult to present an analysis of, but together with overall satisfaction ratings allowed the team to determine what applications would form a good model for a walking tour application. These applications are: Freedom Trail Walking Tour (Figure 16), A Closer Look at the Art Institute of Chicago (Figure 17), and Soho Stories (Figure 18).

The *Freedom Trail Walking Tour* is a good example of the “Planner” style tour application and represents the minimum set of requirements for such a walking tour application. The application provides a planned walking tour overlaid on a live map of Boston, Massachusetts. The live map displays the user’s current location, aiding in navigation. Each location on the tour has a short description of the site and its importance in the Freedom Trail. Finally a list of all of the applications can be accessed inside the application to see the full tour without having to dig through a map.

A Closer Look at the Art Institute of Chicago is a museum tour showcasing how to effectively present multimedia information supporting and accompanying sites. The application provides multimedia accompaniment to works of art on display at the Art Institute of Chicago that would be difficult to display in the physical museum. Accompanying multimedia range from related works of music to description of legal cases associated with pieces of modern art. The application provides a wealth of otherwise unavailable information and context in a way similar to a walking tour that cannot modify the physical sites it explores.

Soho Stories is not a specific walking tour but rather a good example of the “Explorer” style application. This style application does not provide a planned walking tour but instead a group of sites that can be visited. When a site is approached a notification is triggered to alert the user and a short audio narration begins, or an information screen comes up. Research by Kramer

et al. previously discussed showed that such an application allowed slightly more sites to be explored. This style application would allow sites that are far away from the main tour to still be explored by users.

These three applications are good examples of how to design tour applications. *Freedom Trail Walking Tour* provides the baseline a “Planner” tour application needs. *A Closer Look at the Art Institute of Chicago* shows how to provide multimedia accompaniment to sites. *Soho Stories* shows how to provide an “Explorer” tour in an entirely different interactive medium. These applications and their features provide an outline for recommendations made by the team, and can also be used by SASS as a tool to communicate their desires to future project teams.

Research into the state of the art of mobile walking tour applications provides a framework for recommendations and a tool for communicating ideas to future teams. The research provides an understanding state of the market and expectations of its users.

4.3 Needs of the Intended Audience

The team conducted a survey of SavoyNet and other groups interested in Sullivan to conduct information on interest in at mobile application and what features were relevant. (See figures 19 and 20 for this information) All responses to ranked questions in this survey are from five to one, with five being the most interested and one being the least. Respondents reported that they were interested in both the walking tour and its mobile application adaptation. Further in questions asking about important questions respondents indicated that they would be interested in features only realizable in a mobile application.

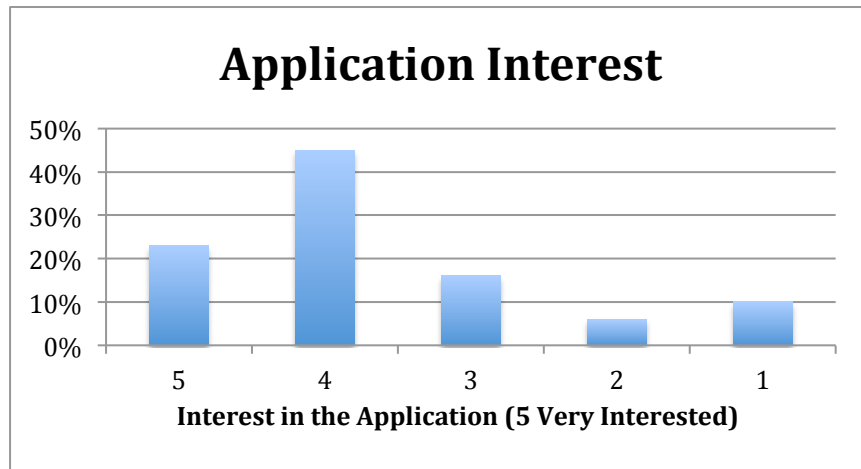


Figure 19: Interest in Taking the Tour in a Mobile Application Format

Virtual Tour	4.06
Location Services	4.55
Multi-Media	3.72
Offline Content	4.00
Multilingual Capabilities	2.27
Nearby Interests	3.57

Figure 20: Table of Mean Response on Desirability of Features (5 is Absolutely Necessary)

Data show that respondents have access to mobile devices. Forty-eight percent of survey respondents had iPhones, twenty-nine percent had iPads, and forty-five had some kind of Android device. This data indicates that potential tour users will have access mobile devices with which to take the tour. Further this data suggests that the two major mobile platforms iOS and Android should likely be supported.

Part of the goal of the survey was to determine what features were most important to the application. In a order from most to least important these features are: location services, virtual tours, offline content, multimedia content, nearby interests, and multilingual content. Figure 20 shows the mean value of a five to one ranked interest survey question for each feature. This list

of features further supports the need for a mobile application as location services, virtual tours, and multimedia content are all impossible to realize with a solely paper walking tour.

The information gleaned from this survey provides a good overview of the desires of the application user base. The team has gathered hard evidence that interest for this walking tour mobile application exists. A rough overview of the importance of various features has been arrived at. This data provides the backbone of functional recommendations for the mobile application.

Chapter 5 - Conclusion

5.1 Recommendations

All of our research culminated in a paper prototype of our recommended application. This prototype is a non-functional visual prototype of the application to demonstrate how the application might look and function without developing a full functioning application. In this section we present this prototype. The prototype demonstrates two walking tour models, the “Planner” tour and “Explorer” tour. There was interest in both application models, so both have been developed.

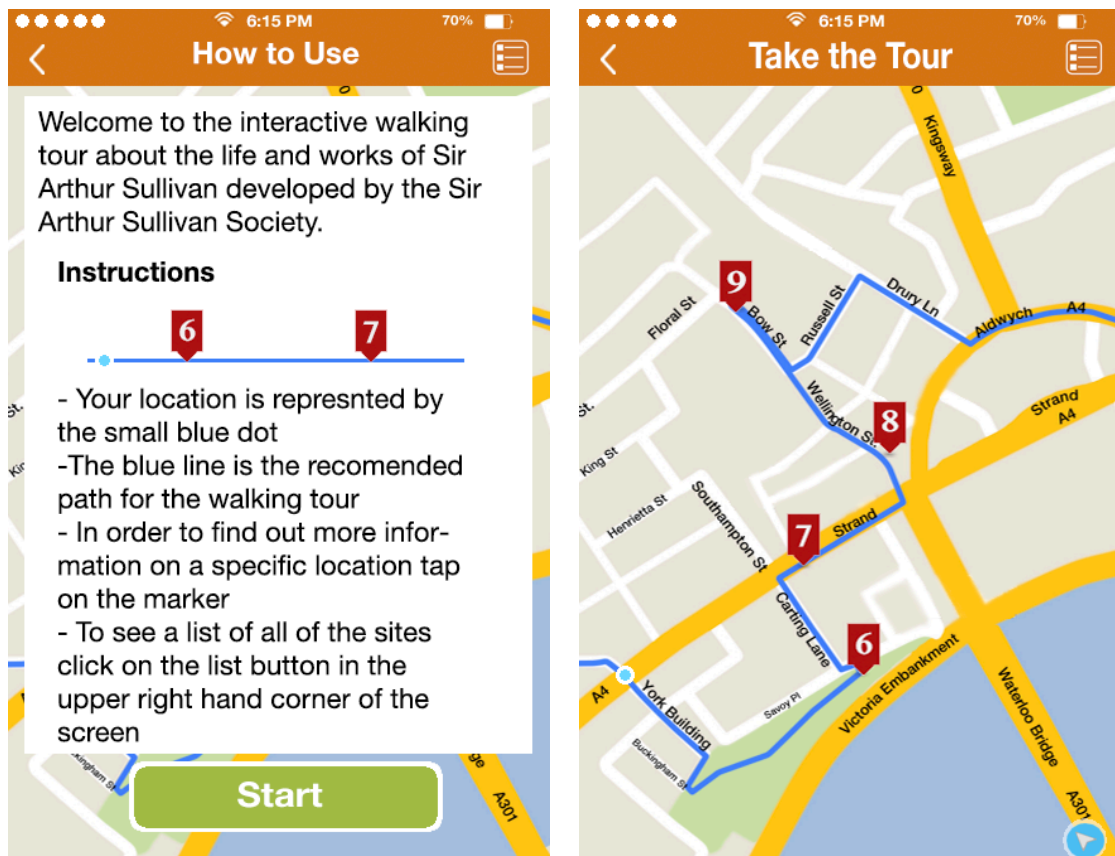


Figure 21: “Planner” tour

This paper prototype is based off of a prioritized list of features for the application. This list is, in order:

1. A map with tour overlaid
2. Specific information on location and how it relates to Sullivan
3. An introduction describing how to use the application

In addition the Qualtrics survey distributed to SavoyNet suggests that there is interest in other features such as:

1. Location services to provide directions during tour
2. An offline mode to take tour without data connection
3. Virtual tour to take tour without visiting London

There was also interest from the SASS for a mobile museum application with the tour built into it. For this kind of application the most important feature would be the works and pieces and the information about them. Our survey showed that there was more interest in a basic walking tour so we have not supplied a prioritized list for a museum version of the application.

The "Planner" tour presents a connected guided walking tour. When the application first opens it presents a quick information screen that explains how to use the application in as little text as possible to let people jump into the application very quickly. Then the application presents a simple marker, a dot representing your current location, and a line to follow for the walking tour. Tapping on a marker brings up a display with more information about the site, discussed in more detail later.

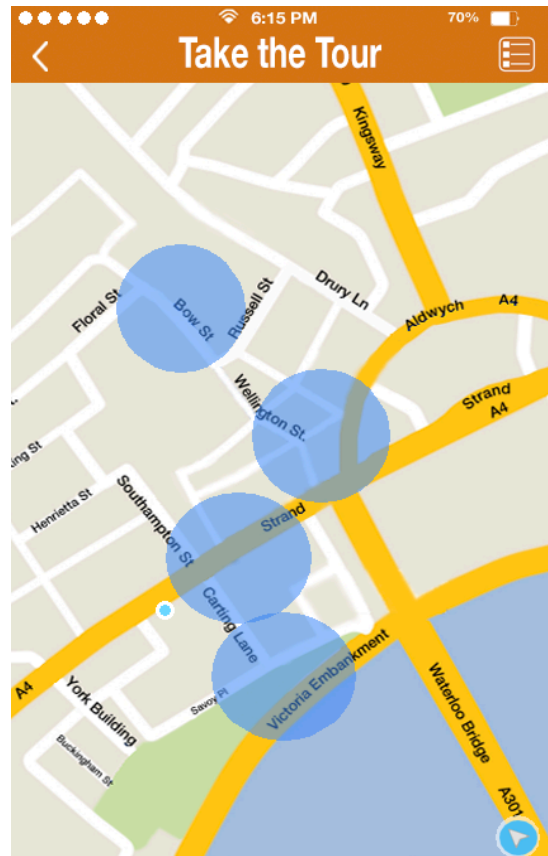


Figure 22: "Explorer" tour

The "Explorer" tour presents a more free form walking tour. The application presents interest circles which when entered trigger a notification and bring up the information screen for that site. This interactive tour gives a different perspective and form of interaction but similar content as the guided tour.

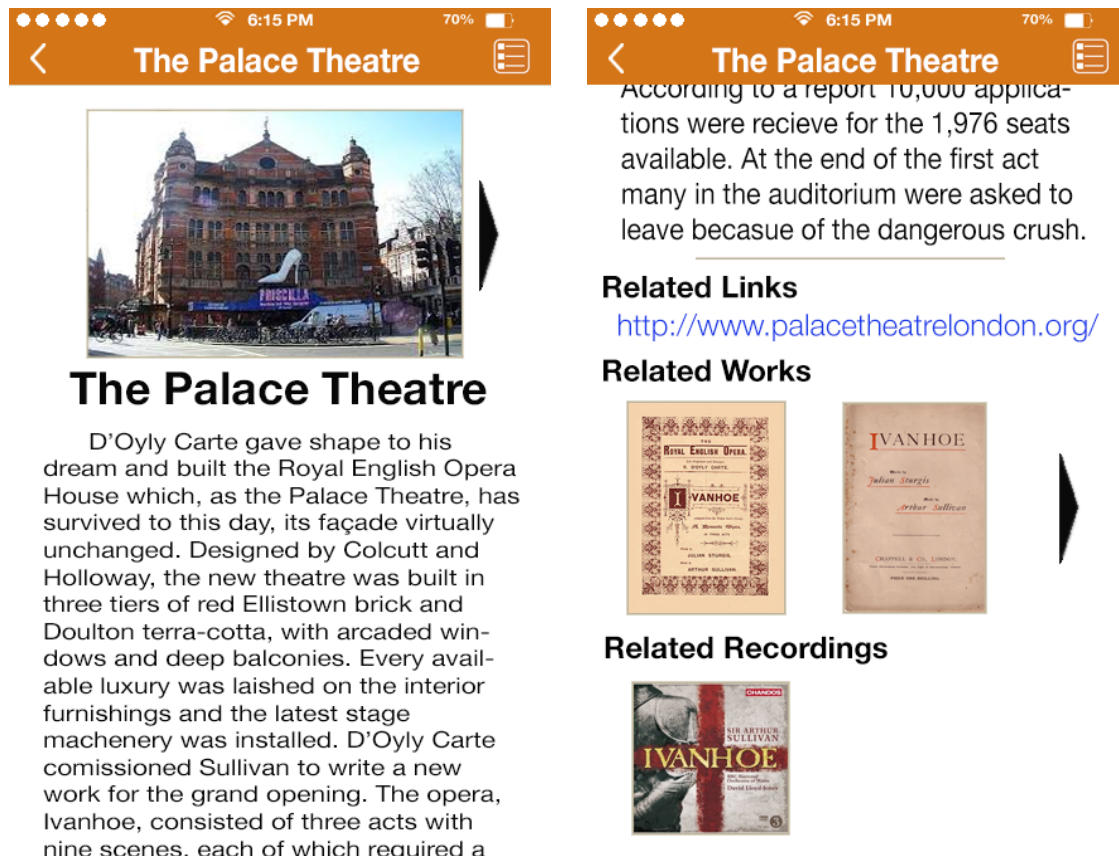


Figure 23: Information Screens

The information screens for sites on the tour are similar in both the “Planner” or “Explorer” models. The information screen contains photos of the site, exterior so you can find the location, and interior if possible to give more context to the space. A short description of the site and how it relates to Sullivan follows. The end of the information screen is a set of related materials, programmes, scripts, and publicity for ongoing works. A site that is a working theatre could have links to bookings for shows happening at the theatre, and locations like the Palace Theatre might include links to Sir Arthur Sullivan Society sponsored recordings of Sullivan’s works such as *Ivanhoe*.

5.2 Development

A developer is needed to develop these ideas into a full functioning application. There would be two reasonable paths to this, using a professional company or alternatively utilizing a Worcester Polytechnic Institute Major Qualifying Project (MQP) Team. Each approach has benefits and drawbacks.

A professional company will have a significant cost associated with designing and implementing an application. The nature of professional software consulting companies makes it difficult to provide exact cost estimates. Companies rarely provide cost estimates without directly contacting them for a consultation and quote. Determining the price of such development would have to be done by another WPI team or the Society.

Three potential companies with London offices for mobile application development are mubaloo, Red C, and The App Business. They represent the two facets of application development, enterprise and commercial. mubaloo is an enterprise developer, they develop applications internal to large corporations to help automate their business processes, as such they are undoubtedly an incredibly expensive option. Red C is a commercial developer, and they work with companies to develop applications to deploy to customers. Red C has worked with several charities in the past to develop publicity tools to help with outreach efforts. The App Business is another commercial developer that has worked to develop cutting edge applications. The App Business partnered with Mercedes Benz to develop an augmented reality application for their show rooms to enhance the shopping experience. It is again difficult to provide cost estimates for these last two companies, but their experience would let them explore ideas that this team had not even considered.

An MQP team would cost less than a professional company, but a team of qualified students would have to be assembled, organized, and approved by the University and Project Center staff. A qualified team of students would be primarily composed of Computer Science and Interactive Media and Game Design majors. Due to the nature of off campus projects the team would likely be available for the development of the application but not be present for its long-term maintenance. These issues would have to be considered by the Society before considering such an undertaking.

5.3 Conclusion


When the team arrived in London we developed a set of application specification recommendations based on interviews with the SASS, evaluations of current walking tour applications, and surveys of potential users. The team presented our findings and recommendations to the Sir Arthur Sullivan Society in the form of a list of required features, a list of additional accessory features that would enhance the application, and recommendations of options for the development of the application.

This project helped the Society in their efforts to promote works and history of Sir Arthur Sullivan. The project with along with the continuing work of the Society will help increase awareness of his works. Sullivan's works are important works of music and promoting their awareness helps enrich society and provide historical context for the Victorian era.

Appendix A – Application Survey

Below is the full application evaluation survey our team used to review the 30 applications as mentioned in methodology section 3.2.

Application Evaluation



* Required

Application name *

Date

Price

Platform Availability

☐ Ipad

☐ Iphone

☐ Android

☐ Windows

☐ Other:

Objective of Program

Short purpose of the application

Overall Satisfaction

1 2 3 4 5

This is rubbish ☐ ☐ ☐ ☐ ☐ This is an ideal application

Aesthetic

1 2 3 4 5

The look was detrimental to the program ☐ ☐ ☐ ☐ ☐ The look aided the application

Usability

1 2 3 4 5

I could not use the application ☐ ☐ ☐ ☐ ☐ The application was easy to use

Information

1 2 3 4 5

I learned nothing from this application ☐ ☐ ☐ ☐ ☐ The application was very informative

Runs well

1 2 3 4 5

The application crashed multiple times ☐ ☐ ☐ ☐ ☐ The application ran smoothly without crashing

Does the application have multiple tours?

☐ Yes

☐ No

If yes did this add or detract from the application?

Did the application have a map?

☐ Yes

☐ No

If yes did it have location abilities?

☐ Yes

☐ No

Does the application have an offline mode?

No data or internet needed

☐ Yes

☐ No

If yes, please briefly evaluate the offline mode:

Things I enjoyed about this application:

Things I disliked about this application:

Never submit passwords through Google Forms.

Appendix B – SavoyNet Survey

Below is the full survey that was distributed to SavoyNet our team used to determine desirable application aspects mentioned in methodology section 3.3.

Please enter your age:

In which country do you reside?

What kind of mobile device do you have access to?

- ☐ iPhone
- ☐ iPad
- ☐ Android phone
- ☐ Android tablet
- ☐ Other
- ☐ None of the above

Would you be interested in taking a walking tour of Sir Arthur Sullivan, should you visit London?

5. Very Interested 4 3 2 1. Not at all interested
- ☐ ☐ ☐ ☐ ☐

Would you be interested in taking the walking tour in the form of a mobile application?

5. Very interested 4 3 2 1. Not at all interested
- ☐ ☐ ☐ ☐ ☐

Would you be more interested in:

- ☐ An application that was solely focused on a walking tour of Sir Arthur Sullivan
- ☐ An application that was more focused on the life of Sir Arthur Sullivan, but included a walking tour
- ☐ A game about Sir Arthur Sullivan
- ☐ An application more focused on the works of Sir Arthur Sullivan

Would you have access to a data connection for your mobile phone while in London?

- ☐ Yes
- ☐ No

If the application featured additional locations related to Sir Arthur Sullivan which were not part of the main walking tour itself, would this interest you?

- ☐ Yes
☐ No

Would you be interested in being able to take the tour virtually?

5. Yes, I would be interested

4

3. I am indifferent

2

1. No, I would not be interested

How important is each aspect to the overall use of the application?

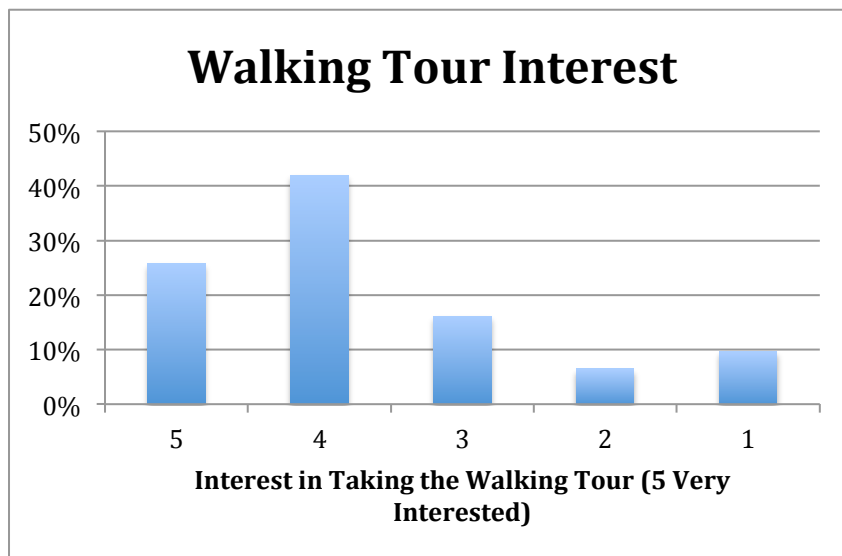
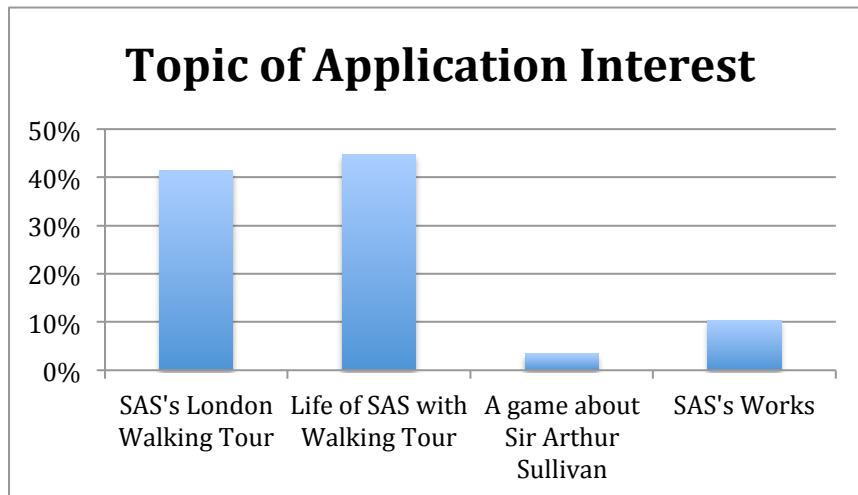
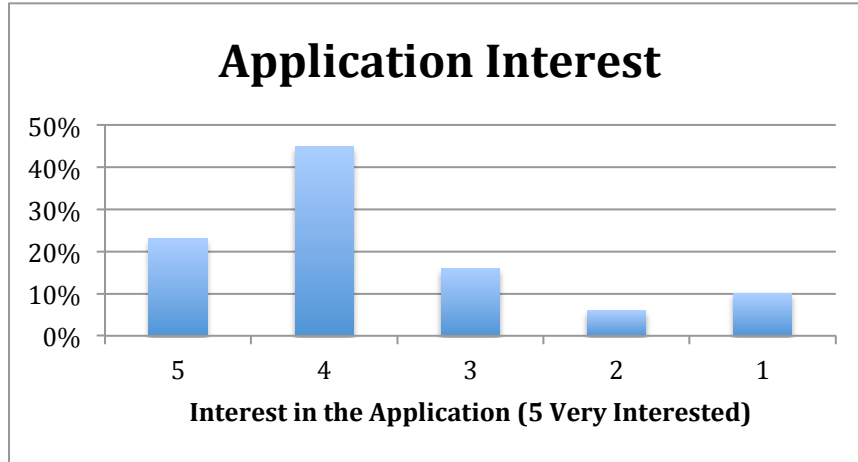
	5. This is a vital part of the application	4	3	2	1. This is unimportant to the application
Location services (show your location on the tour map)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Multimedia aspects (narration, video, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Offline content (the ability to use the application without an Internet connection)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Content in multiple languages	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nearby interests (dining, sightseeing, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If there are any other features you feel would be important in this application, please describe them.

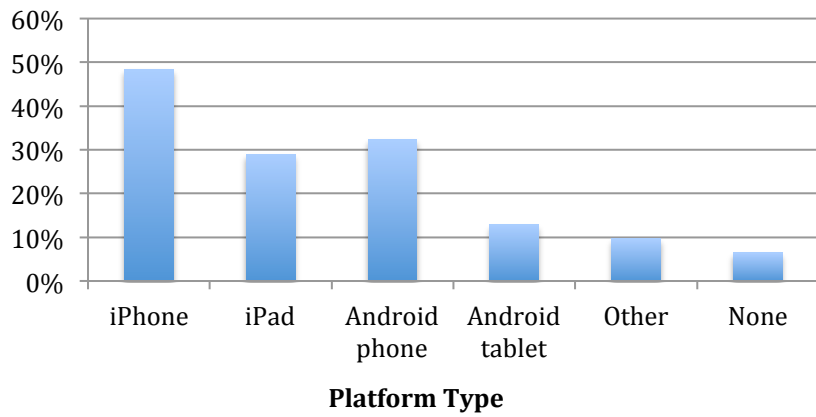
How much would you be willing to pay for the application? (If you would not pay for the application, please put 0)

>>

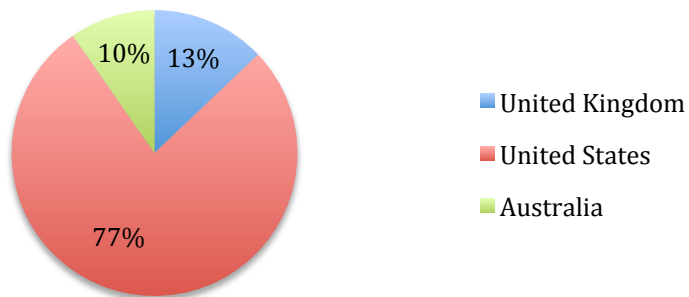
Appendix C – Qualtrics Survey Data



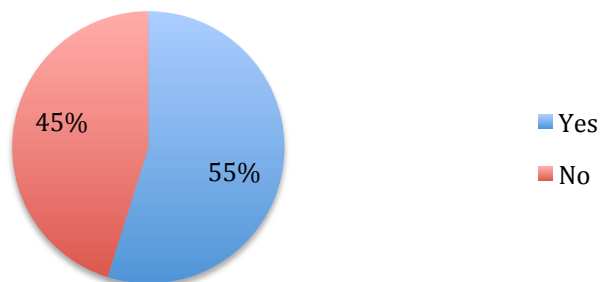
Platform Access

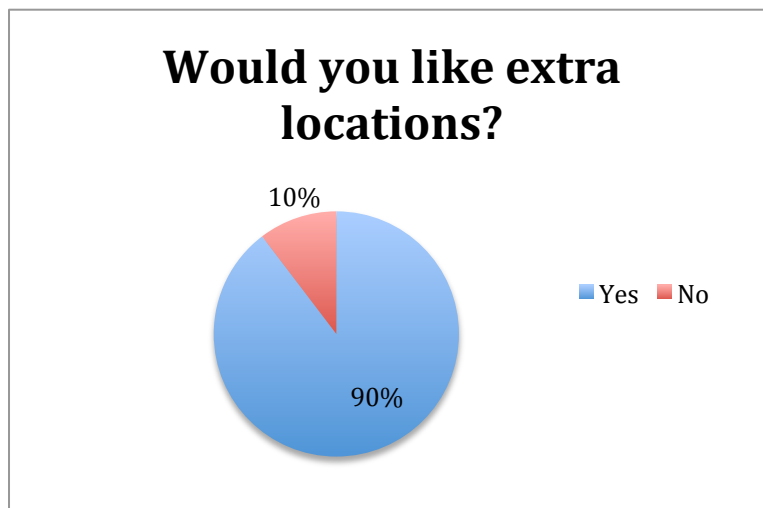
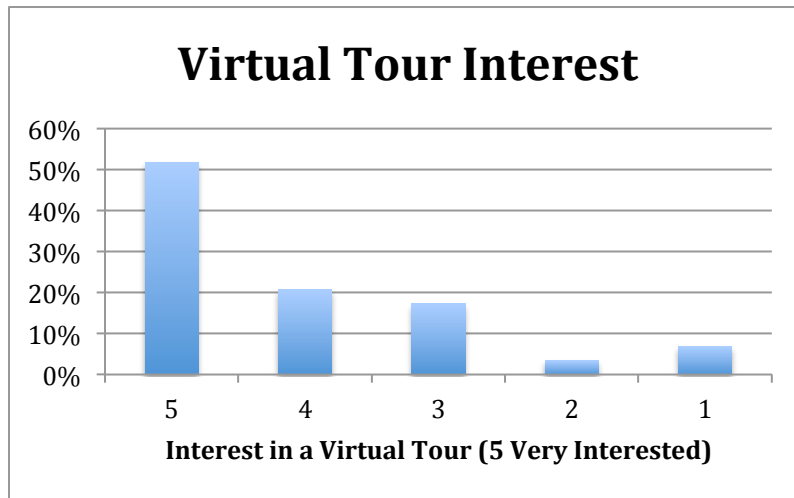


Country of Residence



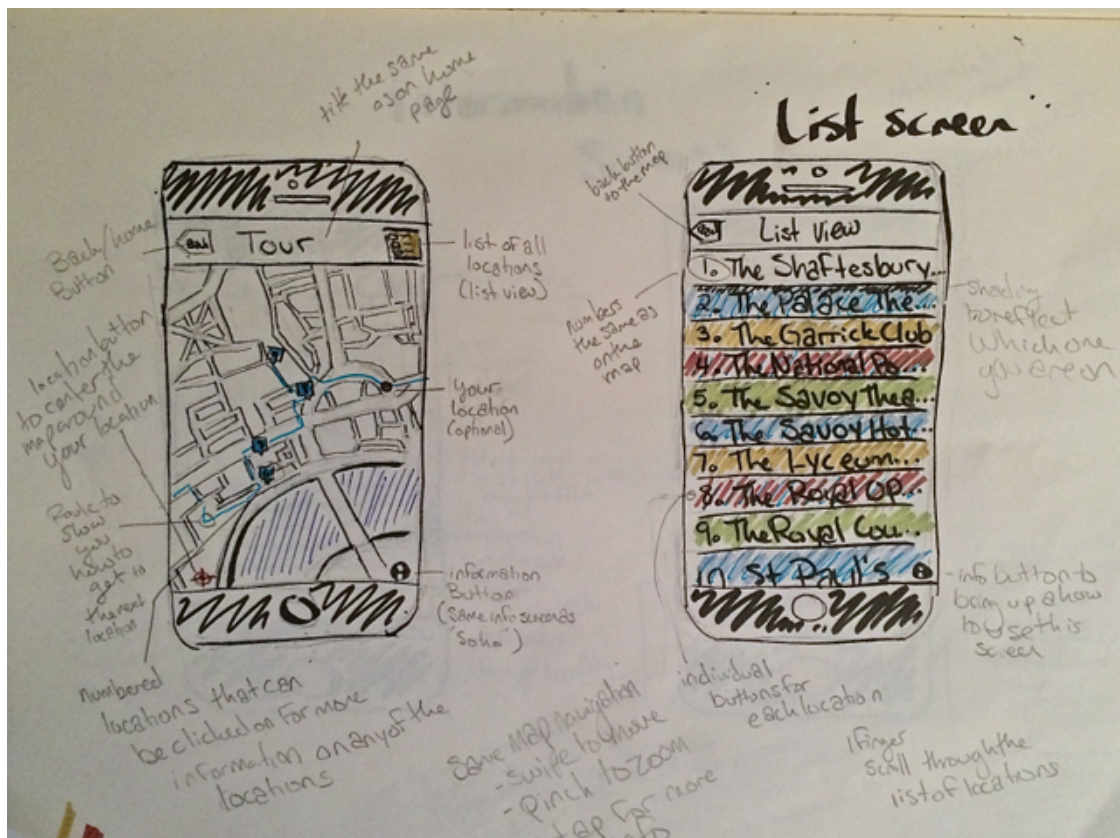
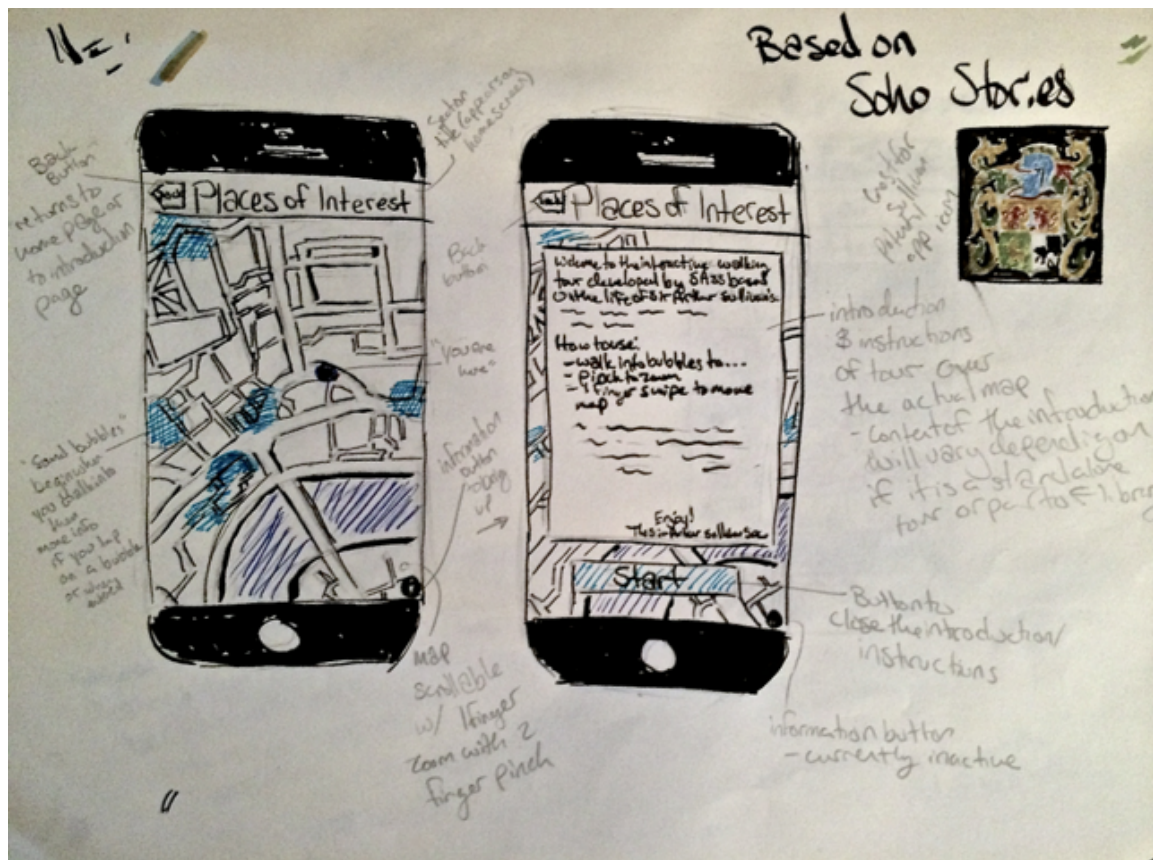
Access to a Data Connection



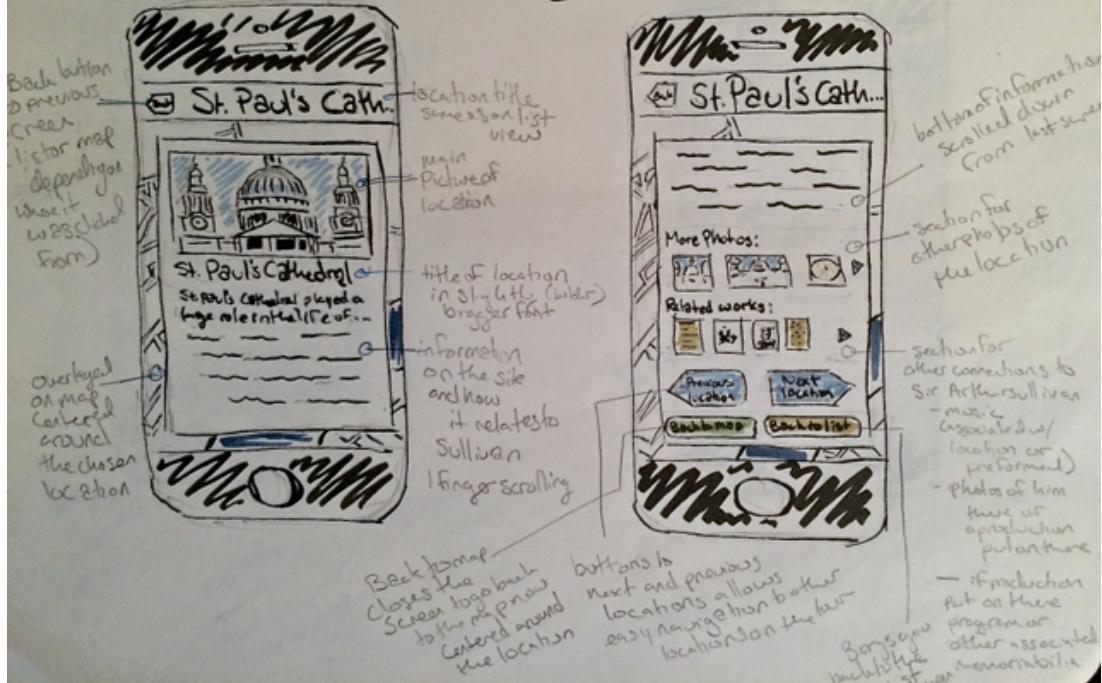


Appendix D – Paper Mockup

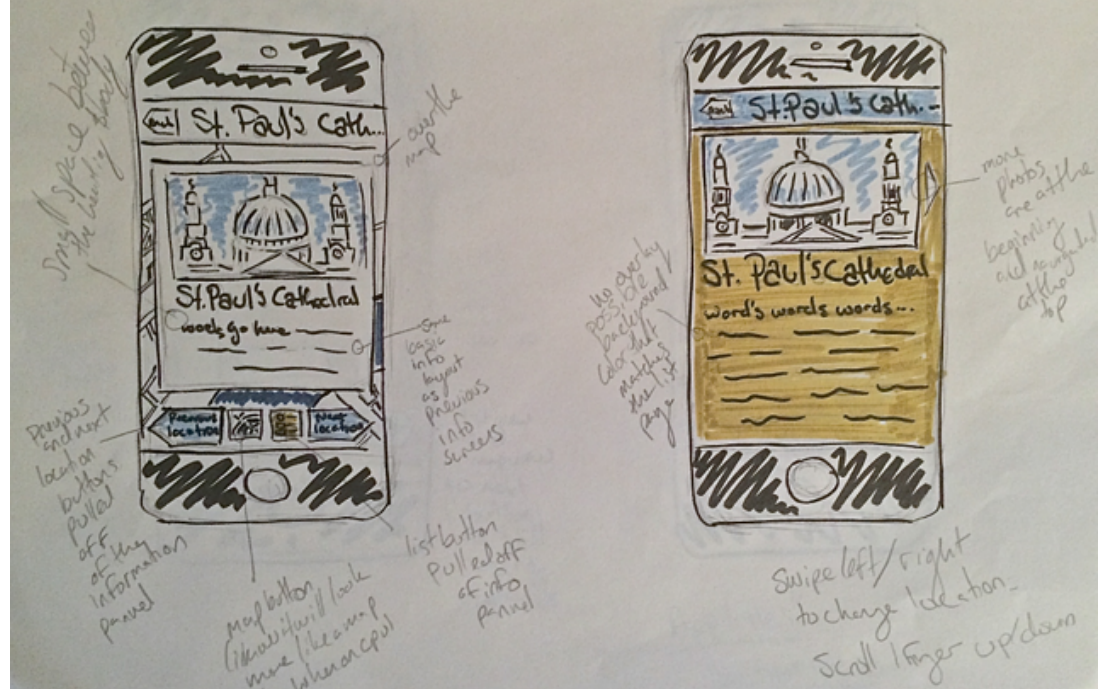
Below are the paper mockups for the prototype done in pen and pencil on paper and scanned.

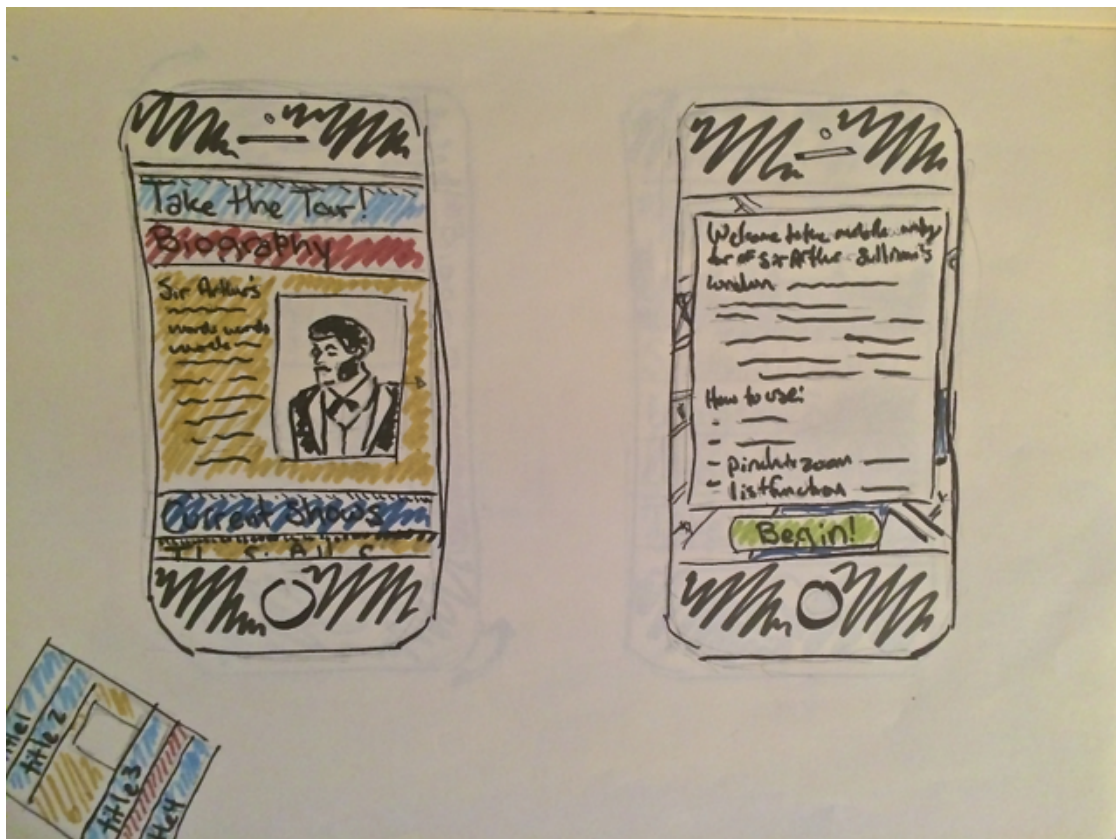
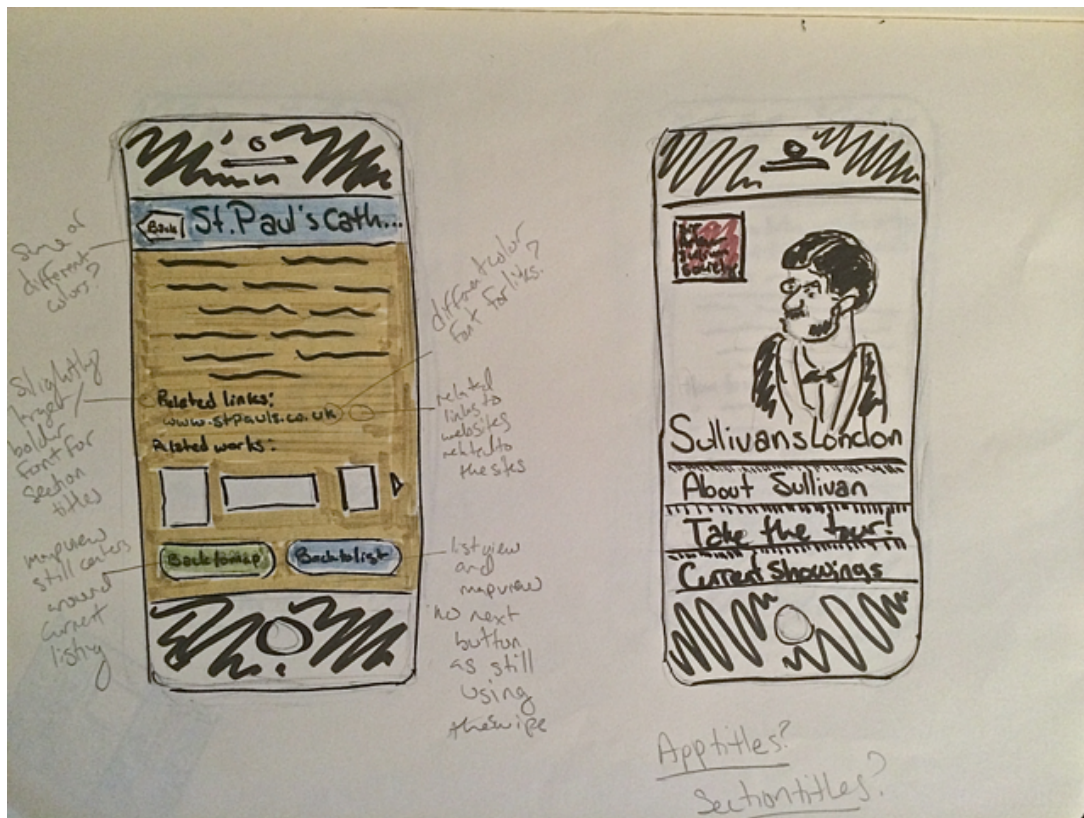


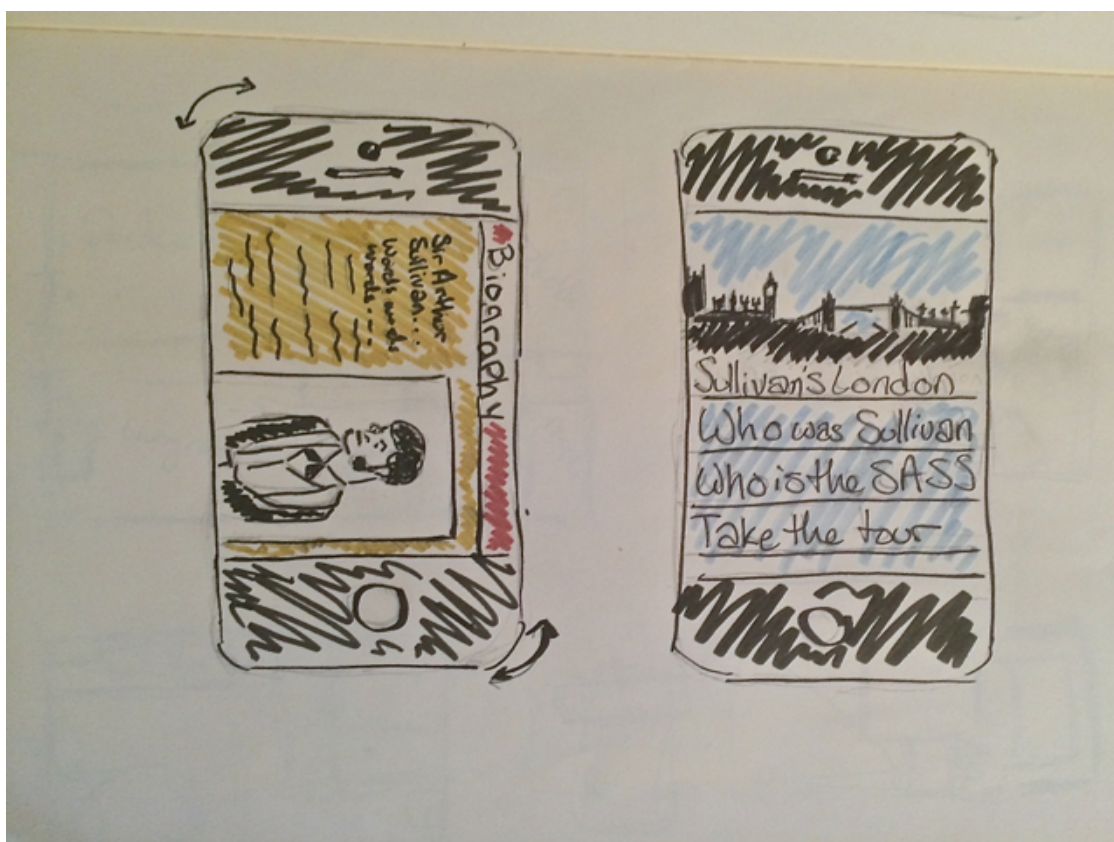
information Screens



Alternate info screens







Appendix E – Morgan Hopeman’s Discovery Papers

British Library - Michelangelo’s notebook

Among the treasures that reside in the treasure room lies a notebook of Michelangelo’s works. The notebook lies open to a letter written in Michelangelo’s hand detailing the finishing the end of the Sistine chapel and on the opposing page there is a sketch of a knee and a head behind it. The letter looks almost like calligraphy in character the handwriting itself being a work of art. The letter, signed by Michelangelo himself, sits just inside the notebook as if it were attached. The knee and head are done in a black chalk or charcoal and the head sits to the left hand side, drawn lightly enough that it may be missed if you were just casually scanning the page.

These works are incredibly important to save and preserve. While the note and picture

may not be one of Michelangelo's famous works, it is important to save any associated works that might give us insight to his major works. Sketches can provide insight into Michelangelo's technique, style, and methods. Letters can also provide insight into his inspiration and thoughts while he was painting such masterpieces as the Sistine Chapel. These works need to be protected and preserved to honor the works of art that Michelangelo created to allow others to enjoy and study his works. The preservation of this notebook will be a learning tool that can be utilized by other aspiring artists. Such artists can draw from his design, technique, and skill to enhance and inspire their own works.

British Museum - Kneeling Venus

It seems somehow fitting that one of the most popular sculptures in the Greek and Roman sculpture room is the statue of Aphrodite by Lely. The sculpture, created in marble and fixed in the center of the room, attracts bystanders and artists alike. Aphrodite the Greek goddess of love and beauty kneels poised in anticipation, staring at something that cannot be seen by visitors. Raised upon a pedestal of stone, instead of the pedestals of wood others are placed on the statue captures the attention of everyone who walks through the room.

The most interesting thing about watching the statue is to see the juxtaposition of the artists and visitors to the museum. Artists circle the statue attempting to capture the perfect curves and lines that Lely provided in stone. Everything is important, from the aging lines of the marble to the shadows cast from the lights above, no detail is too minute. In opposition to that are the passersby who stop to read the plaque and take a photo of the goddess. Visitors who are not artists simultaneously recognize her importance while not fully comprehending the time and mastery that the piece exhibits. Only the artists who stand, sit, and crouch around the sculpture seem to fully appreciate the effect that the sculpture captures.

Tate Britain - JMW Turner's "Going to the Ball"

"Going to the Ball", hung in the Tate Britain, exemplifies the mastery of Turner's work. The painting is an oil painting on canvas and depicts boats in a canal that is traveling toward the sunrise. Turner's mastery is most clearly exemplified in his use of color. The entire painting is in soft white colors, which are very difficult to paint with while retaining clear forms such as the building that line the horizon line of the painting. You can see each individual spire despite most of the buildings being the same color. The color also changes as you approach the sun centered in the picture. The buildings become slightly more prominent as if the light cast upon them has brought them into the reality of day while the buildings on the outside are still unreal having not been touched by the sun. There are three boats centered in the canal of the painting and a pier of people looking on. The people, while their faces are indistinguishable, are clearly denoted by their clothes and can be easily separated into different families. There is one more gondola that sits on the left hand side of the painting and is only partially pictured in the painting. To make the painting as detailed as it is Turner must have used a smaller strokes and a smaller gauge brush.

Tate Modern – Matisse Exhibit

Oceania, The Sky began when Matisse cut out a swallow and couldn't bear to throw away the cut out. Instead he used it to cover up a blemish on the wall. This idea snowballed as more cutouts of fish, coral, and birds were added to the walls of his apartment. The finished effect is a piece that through the emotion of each cut out. Each one is different and distinct and doesn't have the finished look some cutouts that were done in one sitting have. This difference really enhances the piece giving each of the fish and birds their own flair that is never alike. The final result makes the onlooker feel as if they have entered a sea in the clouds. The fact that birds and fish don't inhabit the same niche in an ecosystem the cutout makes it seem as if they could. All of the

cutouts are pinned to cloth and the colors are all muted, a white on tan background. The fact that there are only two colors in the entirety of the piece gives off the impression of shadows only either the water or the sky and has an entrancing effect on those looking at it.

National Gallery – Three Dancers in Violet Tutues

The Three Dancers in Violet Tutues is a pastel on paper by Degas. The Dancers stand pirouetting centered slightly to the right of center. The background seems to be mountains or hills, a contrast to many of Degas paintings where the dancers are often in studios. The Pastel gives Degas the freedom to blend colors without actually mixing the pastels. The dark blue is made up of hints of black and darker blues with purple intertwined. The girls appear to be looking at someone located off the painting on the left hand side. The girls are barefoot on the grass and the sun is high in the sky off the painting to the right hand side. The most remarkable aspect of the painting is the level of detail what Degas managed to achieve with pastels. All the fingers of the girls are clearly visible as well as many of their facial features. The tutues themselves seem to have a magical feature about them that captures a multitude of colors that are reflecting in the light while still remaining violet as a whole.

Appendix F – Julian Moore’s Discovery Papers

British Library - Folio of Geoffrey Chaucer’s Poems

The item was a folio of Geoffrey Chaucer’s poems owned by a Shakespeare contemporary poet Gabriel Harvey. The folio was opened to the end of one of Chaucer’s poems. An accompanying plaque explained that Harvey annotated books in his private library heavily,

and that on this particular page he makes the earliest reference to Shakespeare's "tragedie of Hamlet". It further explains that this is the first written references to one of Shakespeare plays. This item is in the British Library Treasure Room Collection for a number of reasons, educational and "national". The item serves an education role in providing context for the life behind Shakespeare's works. His works were not produced in a vacuum but rather in a community of contemporary poets. Secondly the item is included in the collection as a way of demonstrating the power and culture of Britain.

British Museum - Rosetta Stone

The observed object was a full-size replica of the Rosetta Stone. The replica was contained in a gallery on the opposite side of the museum from the actual stone. Inscribed on the pedestal holding the replica were the words "Please Touch". The replica surface was rough with indentations for the stone's writing. Touching the stone gave a tactile feel to this object, which can otherwise only be observed from behind a piece of plate glass.

This object garnered a number of interesting reactions. The stone was placed almost in an insignificant corner of the gallery and so seemed not to be of much importance. Those who did notice where without fail taken aback that an item of such importance would be kept without any kind of protective case. Then those same people would read the inscription on the pedestal and cautiously and feel the surface of the stone. From this point some people would quickly lose interest and others would spend several minutes feeling the different scripts on the stone and inspecting it visually.

Tate Britain - *The Soul of a Soulless City*

“The Soul of a Soulless City” is oil on canvas painted by Christopher Richardson Wynne Nevinson. The piece is a stylized depiction of train tracks running through the heart of New York City. An elevated train line runs through the center of the painting disappearing on the horizon. All around increasingly tall buildings rise up through clouds. There is not a single person to be seen despite it clearly being midday. The entire piece is painted in muted orange and grey tones. The piece and its title seem to be condemning the city and its lack of humanity and dependence on machines.

Tate Modern – *From Line*

“From Line” is oil paint and glue on canvas painted by Lee Ufan. Lee loaded a paintbrush with paint and dragged it from the top of the canvas to the bottom. An quotation from the artist on an accompanying plaque reads, “At the beginning it will appear dark and thick, then it will get gradually thinner and finally disappear ... A line must have a beginning and an end. Space appears within the passage of time, and when the process of creating space comes to an end, time also vanishes.” This captures the central idea and draw of the piece which is practically rather simple. It depicts the passage of time and how it inevitably affects everything that happens and ever will happen.

National Gallery – *The Four Times of Day*

The Four Times of Day is a set of four oil on canvas panels painted by Jean-Baptiste-Camille Corot. The panels depict four times of day: Morning, Noon, Evening, and Night, and are presented in the National Gallery in that order from left to right. Each time of day is portrayed as

a pastoral landscape, highlighting the color of the sky and the texture of light filtering through trees.

The pieces are fascinating because they depict the beauty of such simple natural scenes. A single day contains so many different variations on colors of sunlight. Further these panels were developed in the mind bogglingly short time of a single week. The pieces are not intended to be exquisitely detailed portraits, but nonetheless they are incredibly detailed and to have created them in only a week is a startling testament to Corot's improvisational painting skills.

Appendix G – John French's Discovery Papers

British Library – A book

The object is a book. Unlike the typical rectangular book, however, this one is octagonal. It is a perfect regular octagon, its sides all the same length. It is bound along a single edge, and the pages within are the same octagonal shape as the hard cover.

The cover appears to be made of some type of leather, and is a rich red color. It is covered in intricate patterns. These patterns are radially symmetrical about the center of the octagon. They are painted with some sort of gold paint or leaf. There is no title or text of any kind visible.

The book appears to exist not so much for any content on its pages, but for the artistic value of the book itself. It is an example of the art of bookbinding, free from any practical constraints (an octagonal book is not very practical) and without the actual content which books usually contain and which typically eclipses the art of the binding in the mind of a reader. It seems likely that this book is full of blank pages, even.

According to the plaque, the book was part of a bookbinding collection owned by a man who made a fortune manufacturing telephone wires, who donated it to the British Library. It

makes a very interesting exhibit at a library, which is quickly moving towards digital representations of information, which focus only on the information contained in books and eschew the physical elements of a book. This is the opposite extreme: a book devoid of any information, on display purely for the aesthetic qualities of its physical form.

British Museum – Two Tapestries

In the center of a room full of colorful exhibits behind glass cases is a massive table, about the length of a bus. Under the glass surface of the table lie two tapestries, side by side, one as long as the table, the other even longer, rolled up at one end to fit. These tapestries are not woven out of natural materials, however: they are made of a synthetic mesh, and their patterns are formed not by stitches but by thousands of tiny, colorful capsules.

On closer inspection, these turn out to be pills. Some bare tablets, some colorful gel-capsules, others still in their foil packaging. Arranged in pockets in the mesh-like fabric, they form patterns, which change at various points along the tapestry as new pills join the repeating sequence and old ones drop out.

Along the sides of the table, running in parallel with these strange medical tapestries, are two series of photographs and souvenirs. Every so often these are broken by a small group of vaccination needles. The photographs and souvenirs tell the story of two lives, from birth to death, with hints at what happened in between.

The two parallel collections of medicine, and their accompanying photographs, represent the lives of two people (a man and a woman). The photographs give some insight into their lives. The medicine is a collection of all the pills a modern person takes throughout their lifetime. The changes in the pattern correspond to events hinted at in the accompanying photographs: various sicknesses and injuries, pregnancy, cancer treatment.

Tate Britain

Near the end of the Tate Britain's series of chronologically-ordered galleries, in a room full of art from the late 20th century, there is a darkened alcove. A screen is mounted on the wall opposite the entrance, floating a small distance in front of the wall. Its corners are rounded rather than square.

In the center of the alcove is a pedestal. It is about as tall as a person, and about half as high as the screen. On top of this pedestal is a machine. Its chassis is dark tan in color, the paint chipped and scratched from years of use. It has a complex mechanism on top, most of which consists of a plexiglass disc. A thin strip of plastic emerges from the center of the disc. It runs around a spindle on an arm sticking out of the top of the machine, and then enters a complex series of sprockets and rollers in the front of the machine, the side facing the screen, before emerging on the back side of the machine and returning to the plexiglass disc.

In the midst of this complex mechanism the plastic strip passes between an aperture from which a bright light shines intermittently, flickering so fast that it appears to be continuous. and a lens. Images printed on the plastic strip are focused by the lens so that they fall perfectly on the screen, filling it to its curved corners and creating the illusion of a moving image.

The image is a strange one. On a white background (which may once have been solid but is now marred with a constant flickering array of dirt specs), a thick black line bounces around, seemingly trying to jump up out of the image but falling down again until eventually it catches hold of something above, swinging back and forth only to lose its grasp and fall back down again.

Tate Modern – Red Box

In the center of a room in the Tate Modern is a box. It is about one meter high and two meters square. The outside of the box is covered in a shiny copper-colored material, warped enough that it does not function as a mirror, but very metallic in appearance. The box has no top, so the inside of the walls can also be seen to be covered in the same material.

Surrounding the box is a square marked on the floor with the notice “Please Do Not Cross”. As an observer approaches the line, the box appears to emit an increasingly reddish glow, as if the red-hot coals of a fire are smoldering inside. However, without crossing the line, a person of average height can’t quite see the bottom of the box.

The red glow, reflecting off the metallic walls, tempts viewers to cross the line and peek inside, but none of the museum’s visitors do. The sign on the floor says not to. Unlike at the Science Museum (where a very similar exhibit asks visitors not to approach, but clearly expects them to), the Tate Modern feels too serious to put up a sign which visitors are expected to ignore, so everyone carefully stays outside the lines, trying to catch a glimpse of whatever is emitting the red glow from inside the box.

A visitor slightly above average height, standing on his toes, may discover the truth: the floor inside the box is simply painted red. The glow is an illusion created by the reflective surfaces. But is the exhibit really about the box itself—or the visitors’ curiosity?

National Gallery – Photographic Exhibition

In the National Gallery, amongst dozens of rooms of paintings, is a temporary exhibition of photography. The walls are covered in photographs, most of them around six by seven inches, in two or three rows. They are all black and white, and a close inspection reveals the texture and occasional defects (caused by dust in the enlarger lens or bubbles in the chemical solutions) of traditional chemical processes. This is somewhat surprising, as although all of the photographs

were taken between the 1960s and the 1980s, many of the prints were made less than a decade ago.

The photographs are often arranged in groups. For example, one set depicts the same building from approximately the same location in different seasons and as years go by. In some of the earlier pictures, children play on the street or sit on a wall nearby. In another, the street is covered in snow. In the last two, the house appears abandoned, and then is reduced to rubble. Another group shows a pair of friends sitting on a bench together, and then the same two friends five years later, on the same bench.

A television plays a documentary about the photographs, featuring interviews with the photographer. He discusses how his technique often involves spending long periods of time getting to know his subjects before photographing them, so that his photographs can more authentically present their subjects' lives. This perhaps explains the series of photographs, spaced many years apart, of the same subject.

Appendix H – List of Cultural Experiences

In this section the team lists the top fifty cultural events that they experienced collectively:

1. British Museum
2. Science Museum
3. National Gallery
4. Tate Britain
5. Dinner at the Cinnamon Club
6. *Les Miserables* at the Queen's Theatre
7. Arthur Miller's *The Crucible* at the Old Vic
8. Concerts at the Old Blue Last
9. Singing at Worcester Cathedral
10. Singing at St. Paul's Cathedral
11. Singing at St. Paul's Covent Garden Church
12. Singing at St. Martin in the Fields
13. Singing at Southwark Cathedral
14. Singing at the Royal Navy College Chapel
15. *The Producers* at Bridewell Theatre
16. *Patience* at the King's Head Theatre
17. *1984* at the Playhouse Theatre
18. *Ghost Stories* at the Arts Theatre
19. *Waiting for Godot* at the Arcola Theatre
20. *Between Us* at the Arcola Theatre
21. Taste of London festival
22. Evensong at Westminster Abbey
23. Climbing to the roof of St. Paul's Cathedral
24. Tour of the Tower Bridge
25. *The Room* at Prince Charles Cinema
26. Stonehenge
27. Bath
28. Windsor Castle
29. Trooping the Color
30. Beating Retreat
31. Tower of London tour with Yeomen of the Guard
32. Houses of Parliament tour
33. *Momentum* at the Barbican by United Visual Artists
34. *Manon Lescaut* at the Royal Opera House
35. *Matilda* at the Cambridge Theatre
36. *Titus Andronicus* at The Globe
37. *Julius Caesar* at the Globe
38. Working in British Library Reading Rooms
39. *In The Heights* at the Southwark Playhouse
40. *Hobson's Choice* at Regents Park Open Air Theatre

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