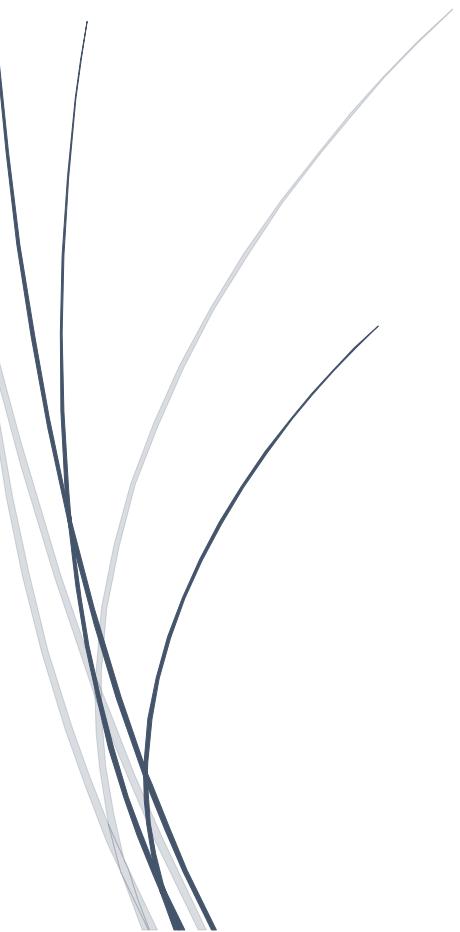


Cross Platform Development

CMP3035M Assignment 1

Word Count: 4229

Excluding: Contents, 950 peer reviews, Reference list and appendices.



Luke Thompson

THO13378493

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DESIGN

CONCEPT

The concept of the application is an application for Lincoln Cathedral to assist visiting tourists in their time at Lincoln Cathedral.

EXPLANATION

The Cathedral currently provides several different options for guides to the Cathedral. Unfortunately, in terms of content and detail they are sparse. The most information and colour can be found on the English fold out welcome guide shown in the appendix. The cathedral has a modern website and a large visitor base every year.

MOOD BOARDS

Mood boards were chosen to quickly demonstrate ideas around the theme to then come up with concepts. They are used to “communicate ideas for new products or the look and feel of the final product, embodying the aesthetic knowledge and judgment of the designer” (Endrissat et al, 2016) Overall mood boards provide inspiration. (*ibid*)

“Mood boards are often arranged around one central image which encapsulates the essence of that mood, with others that indicate the scope for interpretations. Some images are included purely for their visual properties, others for their cultural properties.” (Eckert and Stacey, 2000)

Tourism is popular in Lincoln the author knows this from their experience of working in the industry for 3 years. There are several popular attractions that draw tourists into the area. The location of the University, Cathedral and castle all contribute to visitors arriving in the city.

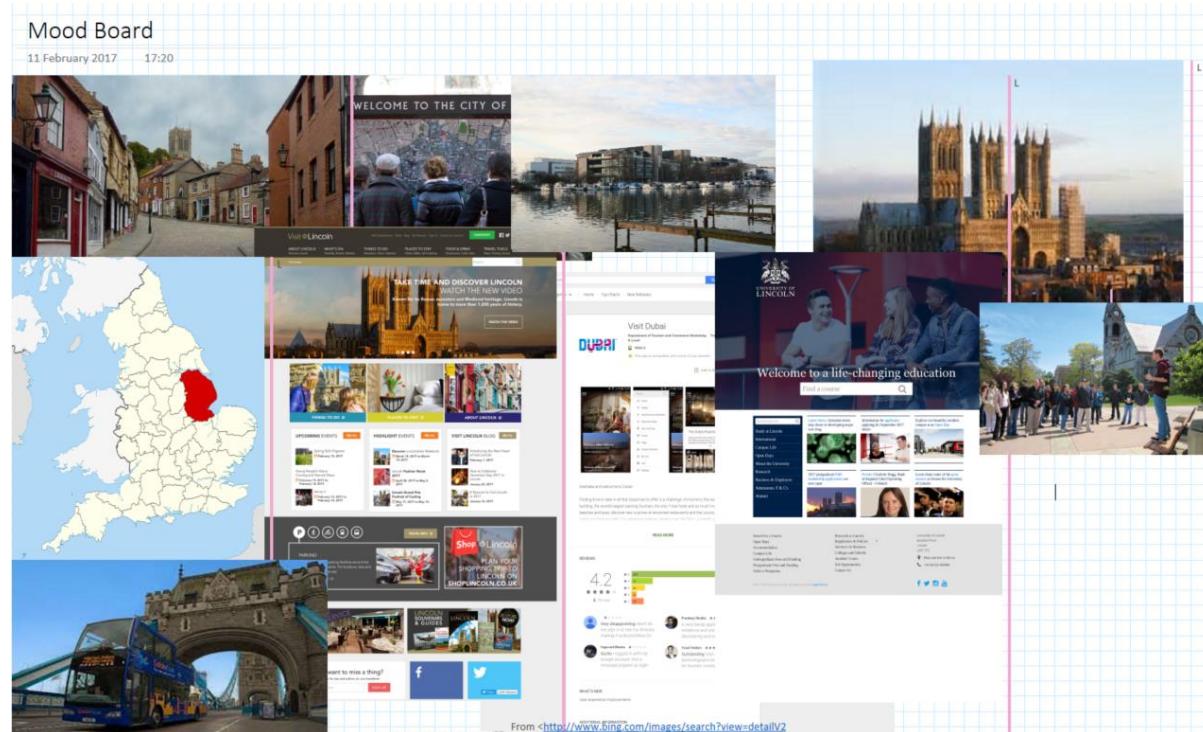


Figure 1 Theme mood board

CHOSEN IDEA

The first mood board was based specifically on the theme Lincoln / Lincolnshire. After reducing that down to a more specific subject a more in depth board was produced.

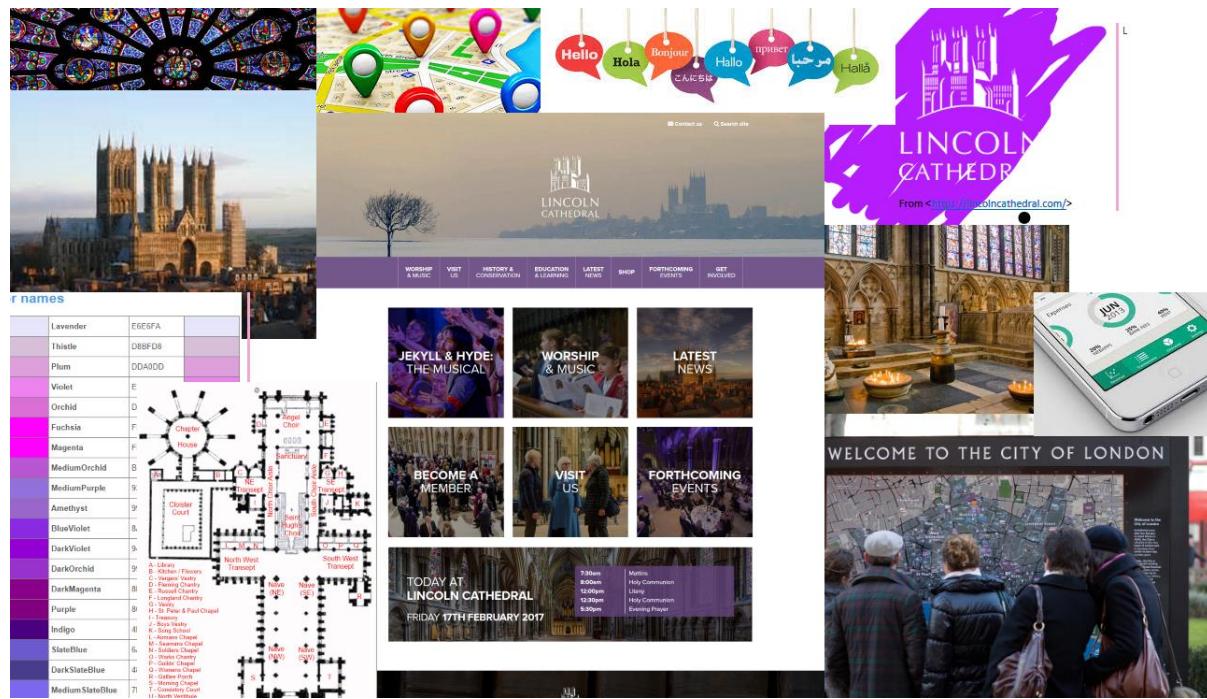


Figure 2 Detailed focussed mood board

USERS

PERSONAS

VISITOR TO CATHEDRAL

Visitors to the cathedral is a wide persona. However, the author imagines a visitor to be anyone visiting the city who may or may not be from a religious background.

In the case that older visitors are expected they are likely to benefit from clearer and simpler user interfaces with descriptive call to actions as they may be less familiar with icons that are recognised by younger generations.

It is likely that everyone visiting the attraction will have individual areas of interest, so providing documentation for these needs could be problematic. When visiting the Cathedral, the author saw this when walking past some artefacts whilst their family stopped and looked for more information or a guide to help them understand their surroundings.

USER STORIES

STORY ONE

Recently retired user, who is interested in technology, is visiting Lincolnshire. They arrive at the cathedral and install the application to their smartphone. Whilst walking around they are interested in a artefact and want to know more than is next to it. They use their smartphone to find out more.

STORY TWO

Whilst visiting the cathedral a family give their children one of their smartphones. They find interesting artefacts and scan them. Whilst walking around with their children the parents are notified that they are near the café, they stop by for something to drink.

INTERFACE DESIGN

To break down the concept the author has chosen to utilise a set of concepts that take a bottom – up approach. The following five planes of interaction design by Garret deal with a different level of detail in each one to help the author build the design. (Garrett, 2002)

STRATEGY PLANE

Cathedral Directors

- Increase visiting numbers
- Attract donations to upkeep the cathedral and exhibits (increasing conversions to donations)
- Increase sales from shop and cafe
- Engage a younger audience

Cathedral staff

- Spend more time with visitors enhancing the experience
- Encourage digital engagement
- Less printing and cleaning tasks from leaflets
- Provide up to date information

Visitors to Cathedral

- Get up to date information
- Get in depth information
- Find more information than is printed
- Interactive experience

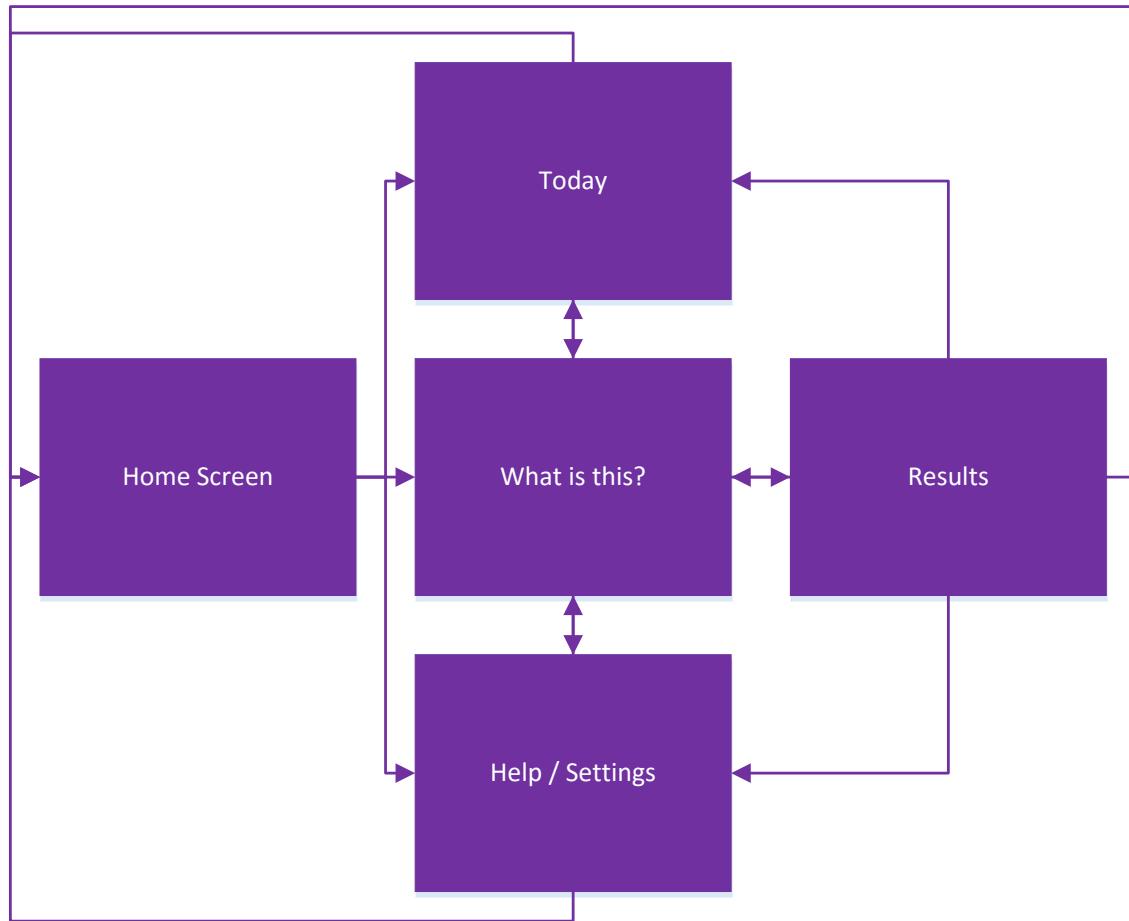
SCOPE PLANE

- Identify artefacts
 - Get Information
 - Pictures
- Follow Tours
 - Map of the cathedral and locations
- Get Information
 - Find service times
 - Know about special events or closed areas
- Get help with the app
- Remind users of amenities when nearby (café + shop)

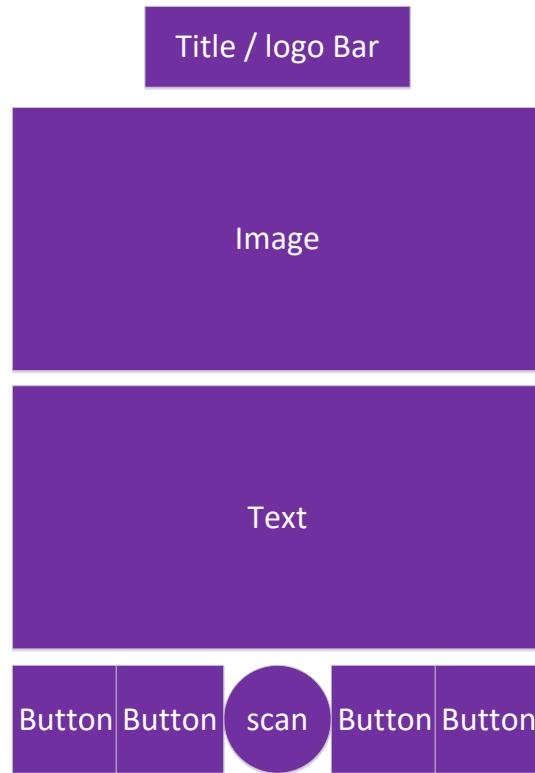
Stretch

- Donate to charity
- Discover artefacts
- In user's language
- Locate on a map

STRUCTURE PLANE



SKELETON PLANE



SURFACE



STATE OF THE ART ANALYSIS

WINCHESTER CATHEDRAL



Figure 3 Winchester Cathedral app (The Centre for the Study of Christianity and Culture, 2014)

The first application selected for the state of the art analysis is Winchester Cathedral. Published by a research group from the university of York the application looks to assist its visitors with pre-set routes around the cathedral and extra information.

In terms of user interface the first screen offers information about different trails that are possible and then takes the user to that specific trail by way of a clickable map that has information presented to the user at each click of each image. In terms of user experience, the app relies on the user orienting the space correctly to ensure they are in the right place. This supports the need for a different user experience.

AIX CATHEDRAL CONNECT

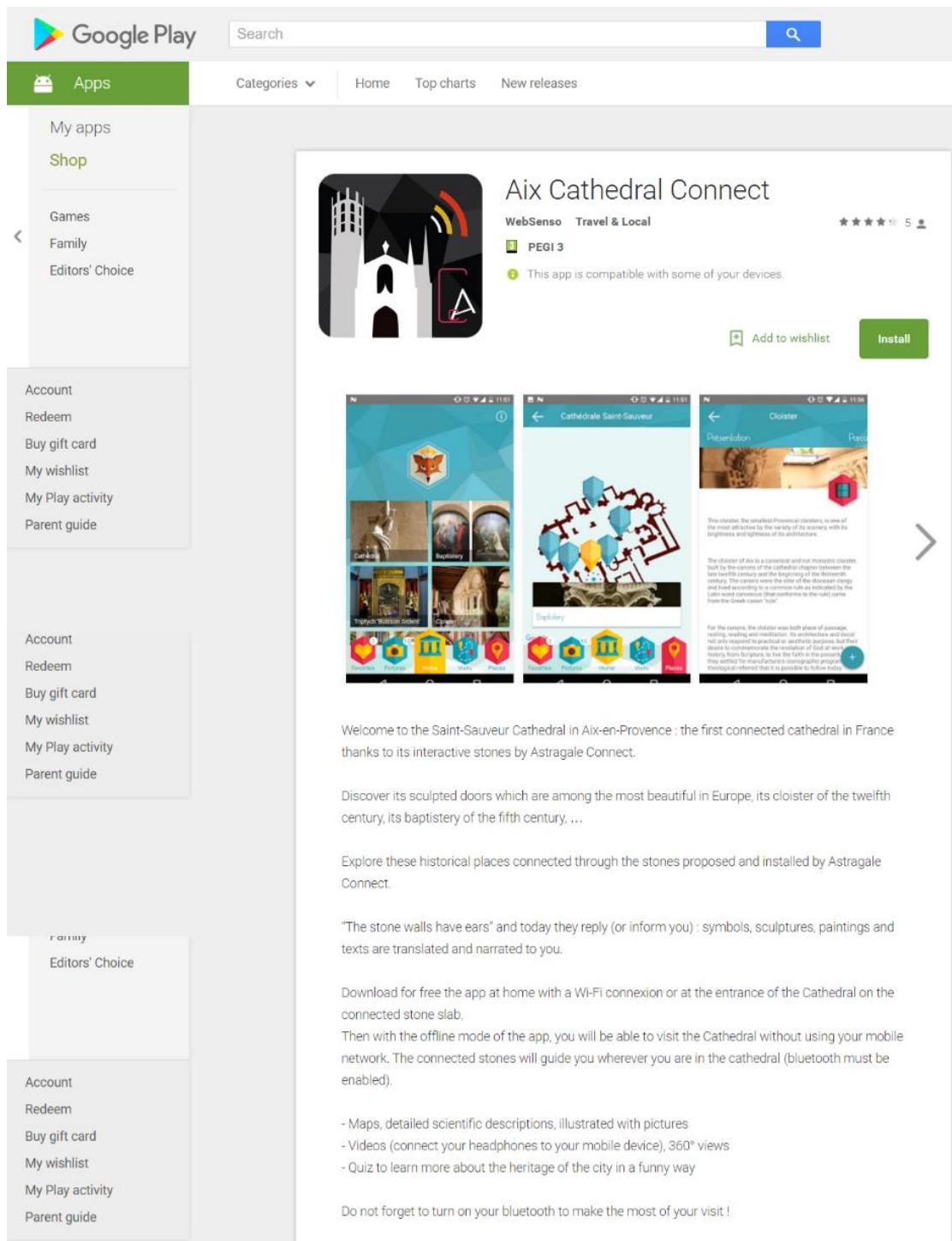


Figure 4 AIX Cathedral Connect app (WebSenso, 2017)

AIX Cathedral connect discusses the usage of smart blocks for navigating a French cathedral. It has a very colourful user interface and may be targeted at a different user group to the Winchester app. The design is very colourful potentially leading towards child friendly, or gamification. It is not obvious at first glance which cathedral this is for either.

Technology wise the description leads the author into believing that Bluetooth LE beacons are being used to provide proximity and location information.

COVENTRY CATHEDRAL

Coventry Cathedral

Your invitation to a wonderful place – with a story that moves and inspires

The screenshot shows the Coventry Cathedral website. At the top, there's a navigation bar with links like Home, News & media, About us, What we do, Visit us, Schools, Hold an event, Join us, Support us, Shop, Downloads, Donate, and Contact us. Below the navigation is a search bar with a magnifying glass icon. A secondary navigation bar below it includes Online shop and Online tickets. On the left, there's a link to 'Smartphone app'. The main content area features a grid-based graphic for the app, followed by text about its launch and quotes from its creators.



Coventry Cathedral was the first cathedral in the UK to launch a smartphone app guide with interactive panoramas, trails and an acoustic reconstruction of medieval worship – showing that one of Britain's most striking ecclesiastical buildings is still at the cutting edge.

Created by the University of York's Centre for the Study of Christianity and Culture, the mobile phone app is designed to encourage visitors of all ages to explore this magnificent building in new and exciting ways.

His Royal Highness The Duke of Gloucester launched the new app guide during a visit to the Cathedral in October 2012 as part of its 50th anniversary celebrations.

The Revd Canon Tim Pullen, then Sub Dean and Canon Pastor of Coventry Cathedral, said: *"We're absolutely delighted to have worked in partnership to develop the app which brings the story of this iconic place to life in a new and exciting way, and are greatly looking forward to seeing it used by visitors to the Cathedral. As the Cathedral is one of the major tourist attractions of the city of Coventry, we hope that it will also encourage more visitors and subsequently help to boost the local economy."*

Dr Dee Dyas, Director of the University's Centre for the Study of Christianity and Culture, said: *"Coventry Cathedral embraced new technology and contemporary art as it rose out of the ashes of wartime destruction; now it is embracing cutting-edge technology once more, this time to tell its story afresh for today's generation. Cathedrals hold so much of the nation's history and spiritual and artistic heritage. It is vital that we find new ways to help people of all ages and backgrounds explore and enjoy these glorious buildings and their stories, past and present."*

The Coventry Cathedral app offers three trails designed to help visitors enjoy the Cathedral's unique, spectacular art and architecture, trace the story of the three cathedrals which have stood on the site, and experience being a 'pilgrim', exploring the many evocative spaces, stories and symbols.

The launch of the Coventry Cathedral app follows the successful introduction of an app for Shakespeare's church, Holy Trinity Church, in Stratford-upon-Avon, created by the University of York earlier in 2012. York's Centre for the Study of Christianity and Culture is also working with Norwich, Ripon, Winchester and Worcester Cathedrals, as well as a dozen churches in York to develop similar apps.

The Coventry Cathedral app is available for both Apple iOS (iPhone and iPad) devices ([click here](#)) and Android devices ([click here](#)). Alternatively, search for 'Coventry Cathedral' in Google Play or the Apple Appstore. Why not download it before you come and use it to experience the Cathedral in a fresh and new way?



Coventry Cathedral
1 Hill Top
Coventry CV1 5AB

Switchboard: +44 (0) 24 7652 1200
Visitors Team: +44 (0) 24 7652 1234
[gmw id="3"]

[Privacy & Cookies PC](#)

[Privacy & Cookies PC](#)

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[Privacy & Cookies PC](#)

Figure 5 Coventry Cathedral App (The Centre for the Study of Christianity and Culture, 2017)

The Coventry cathedral has a very original layout which is more artistic than traditional app design seen in social media apps like Instagram and Facebook. It has very similar aims as the Warwick cathedral app as it is designed by the same group of researchers. This app has less in the way of features in comparison to AIX cathedral connect. As with Winchester cathedral the app is available for both IOS and Android platforms, It was also the first app for a UK cathedral to hit the market. (The Centre for the Study of Christianity and Culture, 2017)

PROTOTYPING

LO – FI PAPER PROTOTYPING

This is also an opportunity to take the designs from the surface and skeleton planes above and turn them into usable and demonstrable prototypes to gain peer feedback and improvements.

The general layout of the design is based loosely on popular applications like Instagram and Facebook. The idea behind this is that there is a clear call to action button in the centre and the navigation buttons are close to the users reach. The thinking behind this is that there is not sufficient functionality or items in this application to warrant the full use of a hamburger side menu.

The prototype itself was created using a hollowed-out device as a window and sliding screens on paper from behind so users could see how the app would interact with their touches.

HOME PAGE

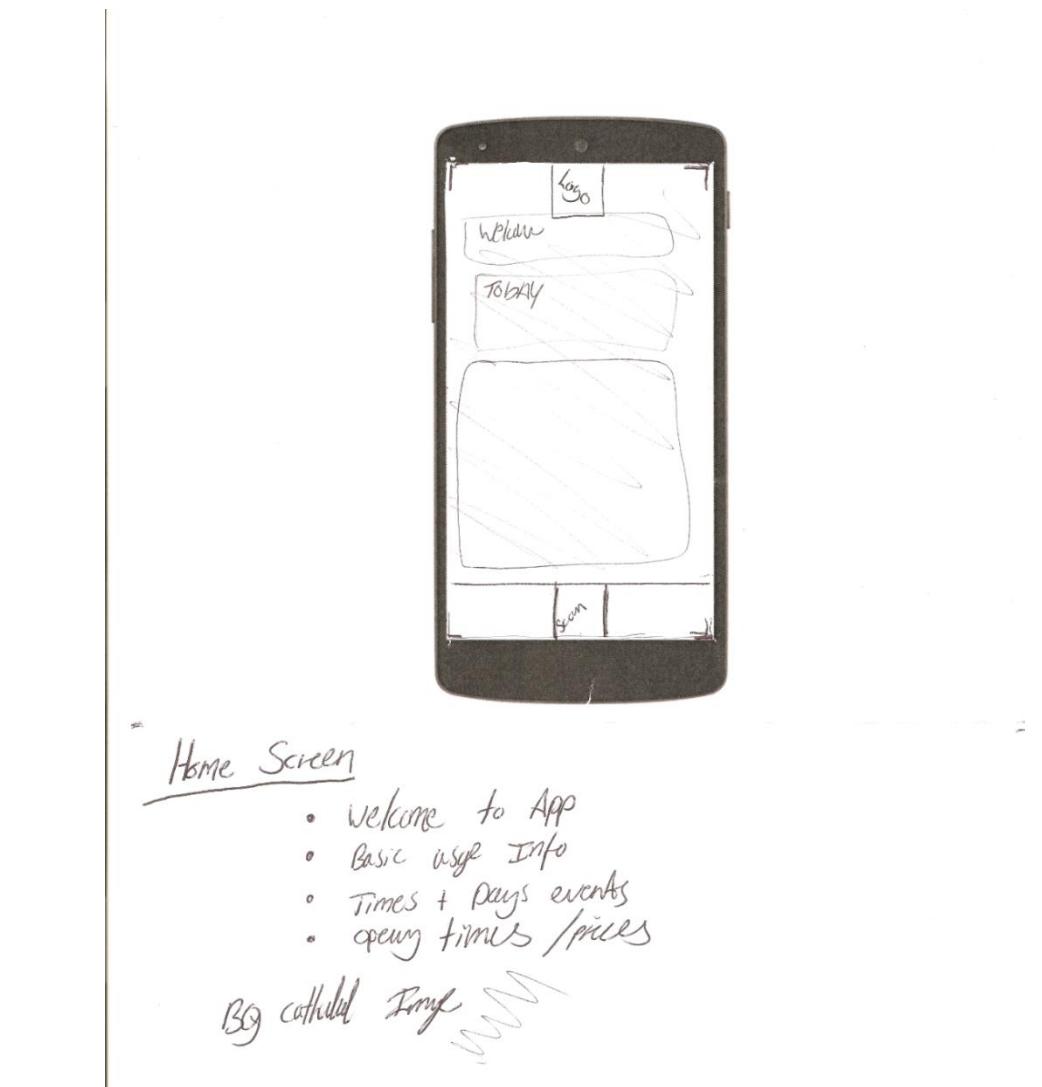


Figure 6 Paper Prototype: Home page

RESULTS PAGE & MAP PAGE

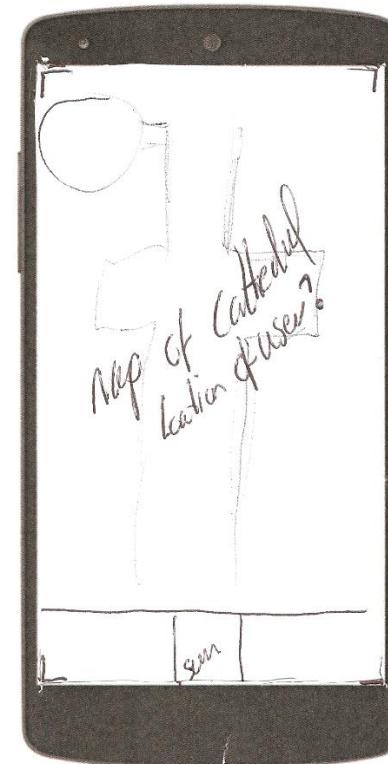


Results Screen

- Image of Artifab
- Information about Artifab

By cathedral bridge

Figure 7 Paper Prototype: Results of scan screen



Map ?

Figure 8 Paper Prototype: Map screen

HELP / FAQ PAGE

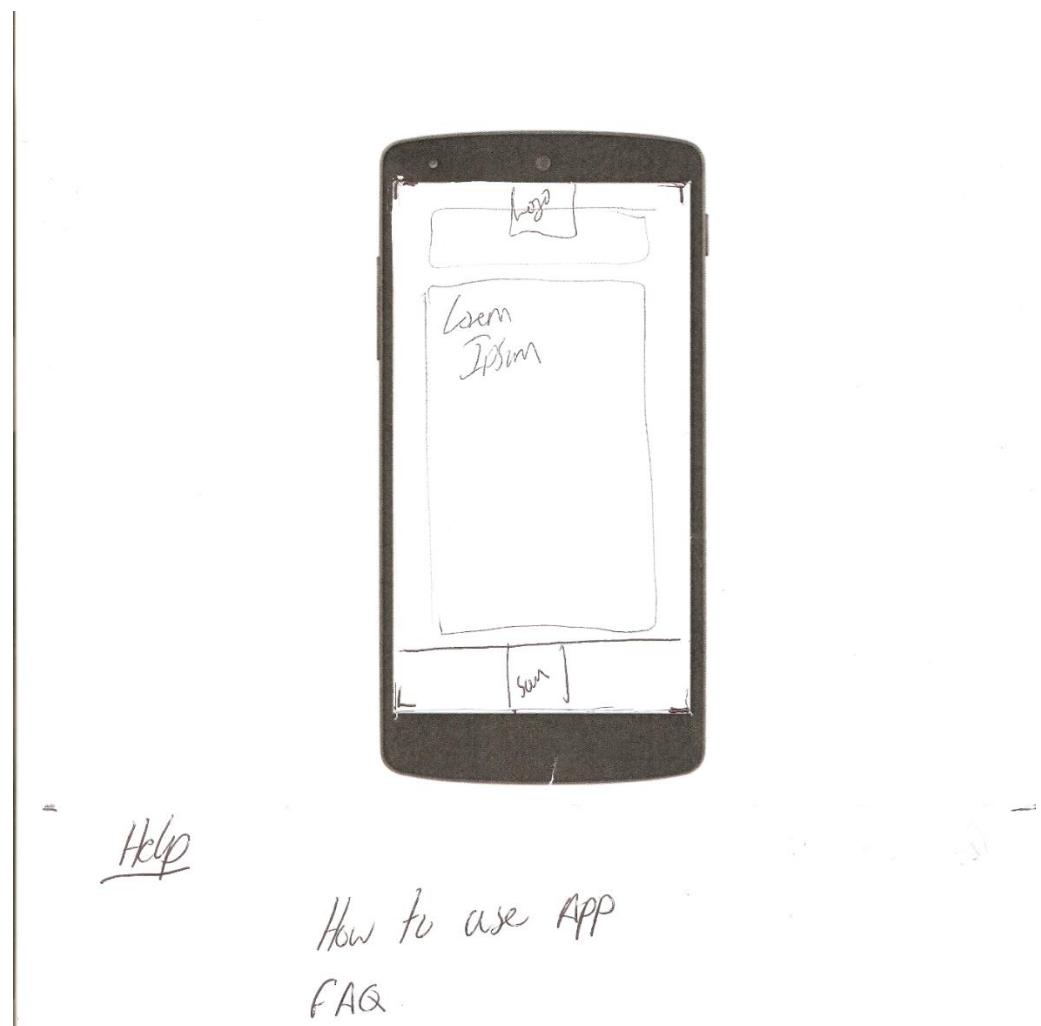


Figure 9 Paper Prototype: Help screen

HI – FI PROTOTYPING

Although tools are available to conduct the prototyping of user interfaces such as Just In Mind and Adobe XD due to time restraints the author will prototype in the mark-up languages of the final product HTML5 and CSS3. In the early iterations feedback came from those involved in the design of similar applications. Later on this moved towards the target group of less technical close to retirement adults.

FIRST ITERATION

Theme Roller has been leveraged to modify the basic themes that are used by jQuery. This visual method has allowed the author to gain an extensive css implementation that can then be modified rather than starting completely from scratch. (jQuery Foundation, 2017) This does carry the negative in terms of there being additional code that may never be used, however it is preferential to ensure a consistent house style which is guaranteed by doing this for colouring.

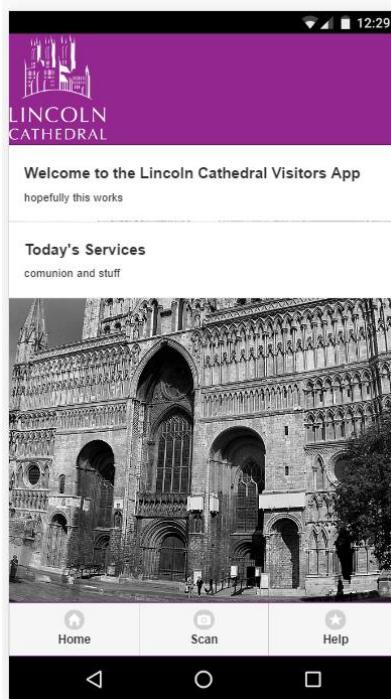


Figure 10 First Iteration

SECOND ITERATION

Figure 11 adds More styling to the header and the content of the app. Peers reviewing the layout revealed that the background would become hidden if more were to be placed on screen. It was also realised that the user was unable to tell which part of the app they were in, adding this active state functionality assisted.



Figure 11 Second Iteration

THIRD ITERATION

A conscious effort has been made to distinguish titles, with the headers being in purple. A user liked that it was attempting to mimic the corporate style but colour was incorrect and modified to the correct shade.



Figure 12 Third Iteration

FOURTH ITERATION

The users felt that the app could be an interactive replacement to the map, therefore this changed the structure plane of the app. Changes were made to bring the UI away from the sides of the device. Some further work on the services functions allowed a reduction in notices and only showing upcoming services that day. Obtaining this information from a different page in the website allowed the addition of location information to produce notifications, unseen here but part of the iterations. As extra time allowed experimentation with iBeacons began to work out if it was possible to utilise them in anyway. The reflective log shows how this was initially problematic but in later revisions worked.

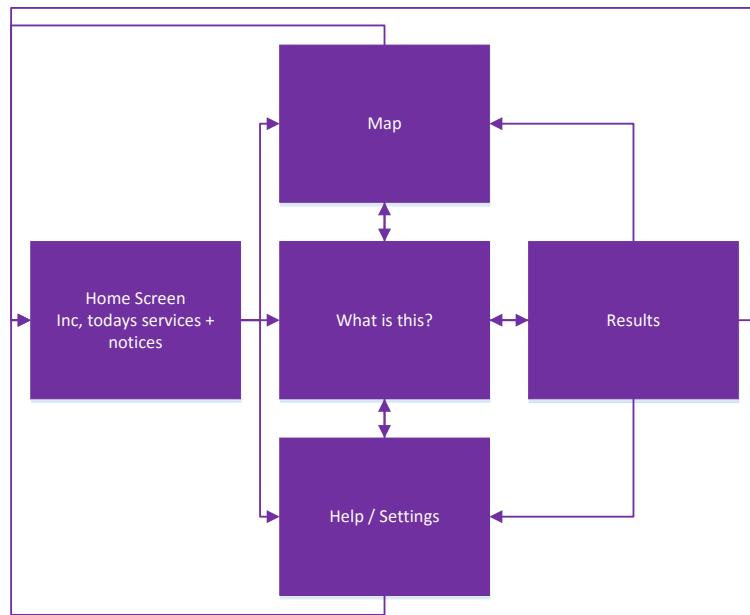


Figure 13 Updated Structure plane



Figure 14 Fourth iteration

FIFTH ITERATION

Rounding of the navbar has been achieved, along with collapsing the notices and services to allow the user to show what they wanted, ongoing testing of the app with users pointed out the issue of too much being on screen.

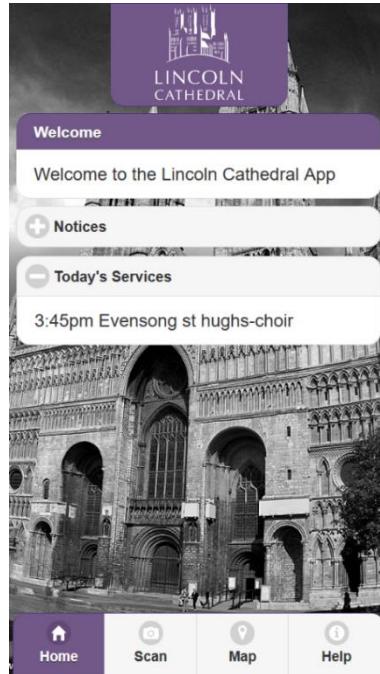


Figure 15 Fifth Iteration

SIXTH ITERATION

This iteration brings styling of the navigation bar, as well as increasing the size of the map. It was hoped that the map could become an interface but this was not achieved. Instead tap zooming and making it scrollable was chosen. The header was also made smaller to further improve on the screen space.

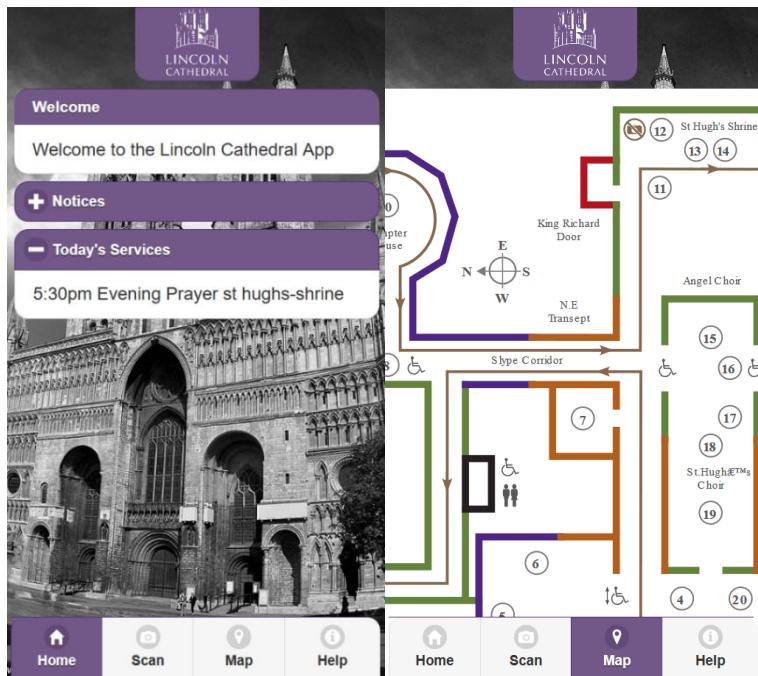


Figure 16 Sixth Iteration

IMPLEMENTATION

HTTP GET

As there is not currently an API for the cathedral, AJAX http get calls have been utilised to retrieve live information from the Cathedral's website. Once retrieved It is then presented on the home page of the app. Using the page's structure only one month of notices are selected using the H6 title tag and the break tag that each month has on the website visit-us page. (Lincoln Cathedral, 2017) Expired notices remove themselves from the website, so on app reload these will not appear. However, in the case of services these stay for the whole day, so when making the call the app checks if the service time has passed, and only shows upcoming services. Enabling users to make good decisions of what time to visit if they are visiting other attractions in the day.

NOTIFICATIONS

Extending from the previous section notifications have been implemented to remind users of events that are happening that day. Therefore, the output of the AJAX service request is turned into a notification object and then scheduled using the Cordova Local notifications plugin. This means that the user is notified of a service if the app is open or not. The local notification plugin has been implemented to do this. (Katzer, 2015) As this plugin produces native notifications, they were also found to work with a smartwatch, enhancing the experience even if the phone is not in the hand.

QR CODES

Barcodes been used to assist users in the cathedral who may want more information. This way the user can interact with the exhibits they wish by simply lining up the barcode seen on the wall. The logic in the app ensures it's a valid barcode by checking for "Lincoln" at the beginning of the text and then uses the number at the end to retrieve relevant image, text and title content from a locally stored folder. The barcode reader plugin gets the result which is then acted upon by the custom code. (PhoneGap, 2017)

Barcodes were created using an online service to demonstrate the app as well as show an idea of their potential look when placed in the cathedral. (Unitag, 2017)



Figure 17 QR Codes: Lincoln1, Lincoln2 and Lincoln 3. (Unitag, 2017)

IBEACONS

In the state of the art analysis, the author demonstrated the AIX cathedral connect app, knowing this works by using iBeacons this could be a solution to make the experience more passive. A passive experience to the user would result in them not acting and being notified that they are near something of interest.

For this prototype, it is intended to use iBeacons for increasing sales by letting users know when they are nearby points of sale like the café and shop. It could be expanded further in the future to replace barcodes.

There are different methods that can be used with beacons, monitoring and ranging. Monitoring seen in figure 18 detects if a beacon is in range or not, a more binary approach in comparison to ranging as seen in figure 19 which if in range calculates the distance. (Borowicz, 2016)

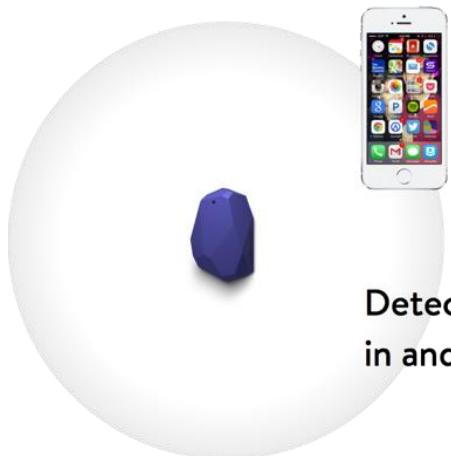


Figure 18 iBeacon Ranging Method (Borowicz, 2016)

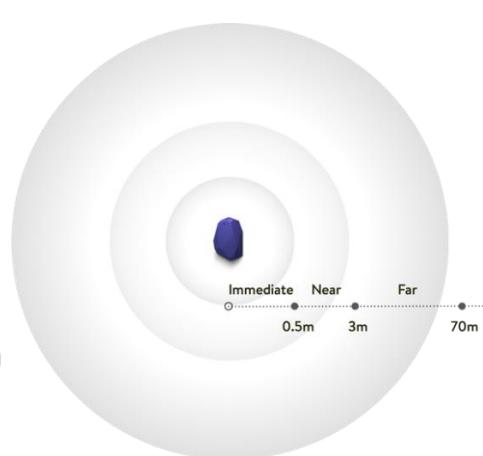


Figure 19 Ranging method (Borowicz, 2016)

In the context of this application monitoring has been used. However, it is seen that expansions to the functionality of the app could include ranging, especially for gamification such as finding the Lincoln imp. Even more functionality could be developed in future like that seen in the case of AIX cathedral connect, including audio and visual elements. (WebSenso, 2017)

Using Metz's iBeacon plugin and customised code the application can detect when it is in the region of a specific Estimote iBeacon and trigger a notification to the user when they are near the coffee shop using the framework for notifications discussed earlier. (Metz, 2017)

ERROR HANDLING

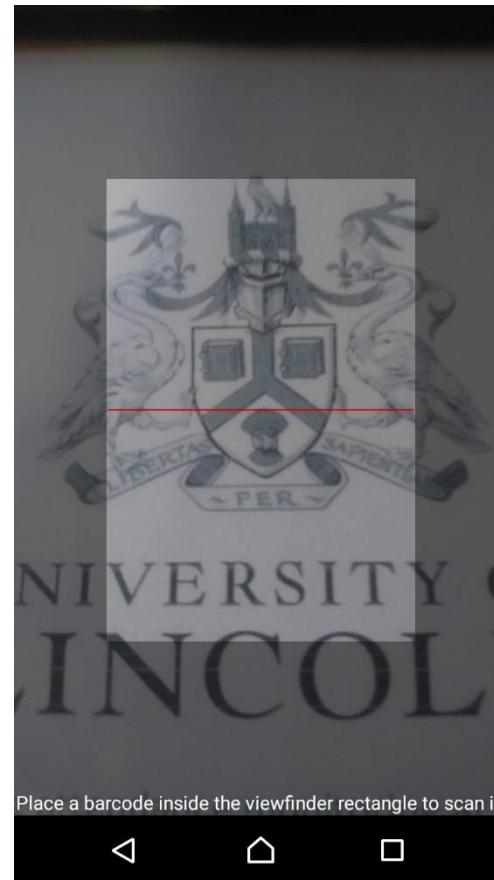
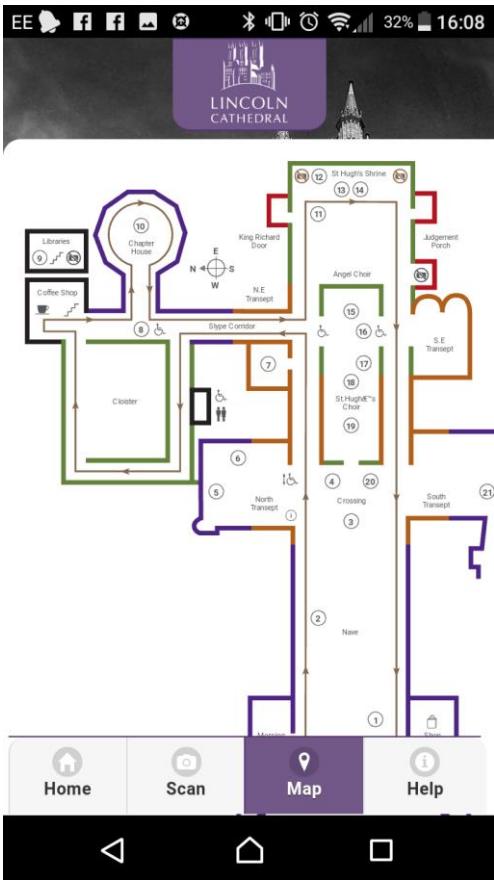
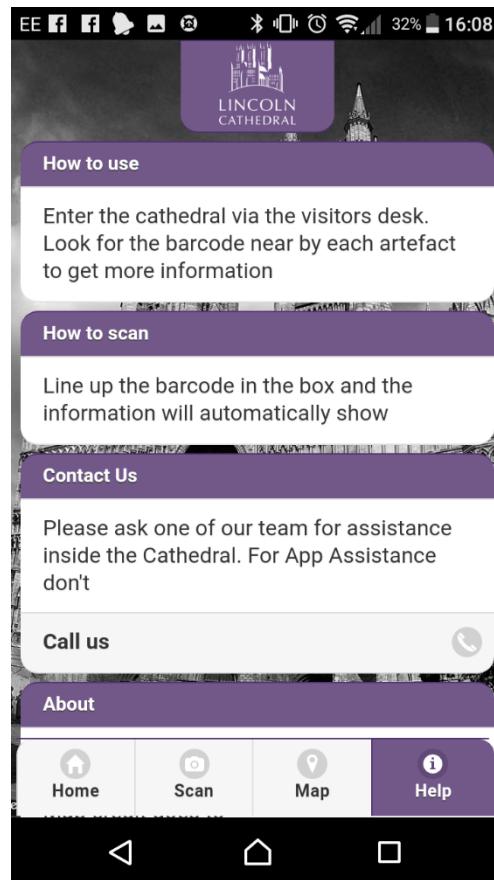
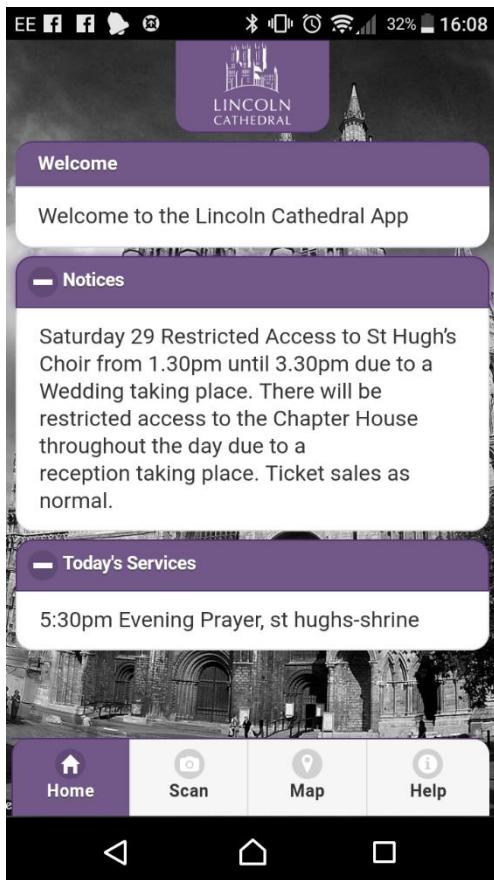
In the following screenshots, you will see some error handling of the barcode scanner. The same was intended for if the user were not to have an internet connection. For this prototype, it has been omitted due to time restrictions and it adding little in terms of experience or features, but network connectivity could and would be added in a production version before executing any code that requires a connection, which can be seen by the comments in the code submission separate to this document.

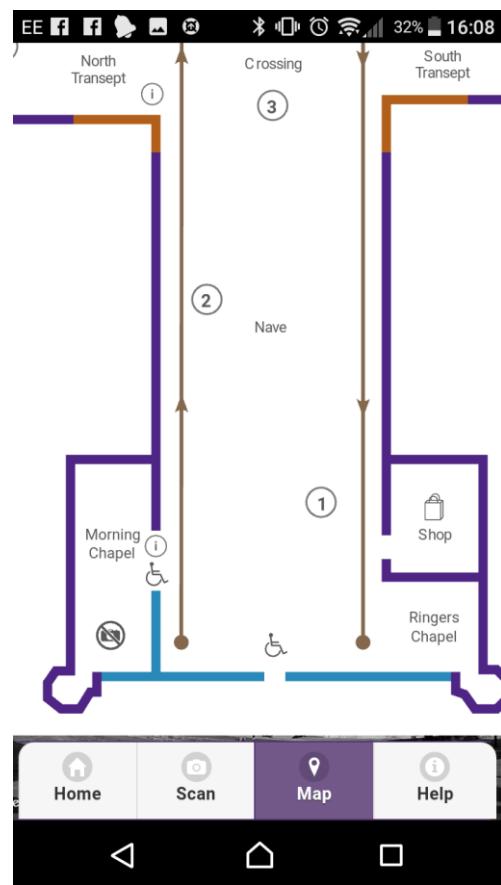
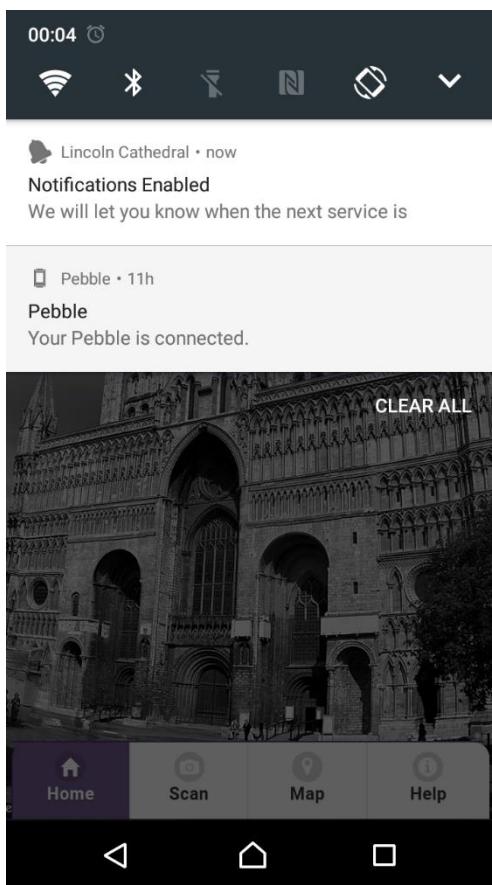
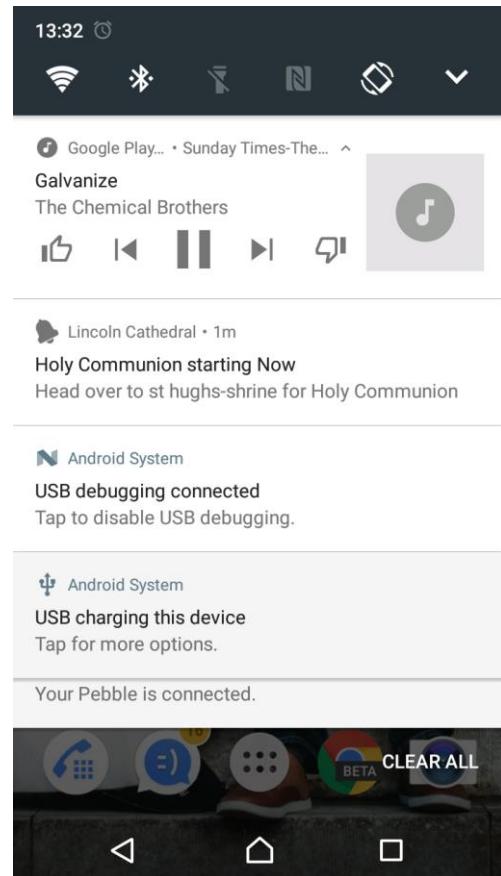
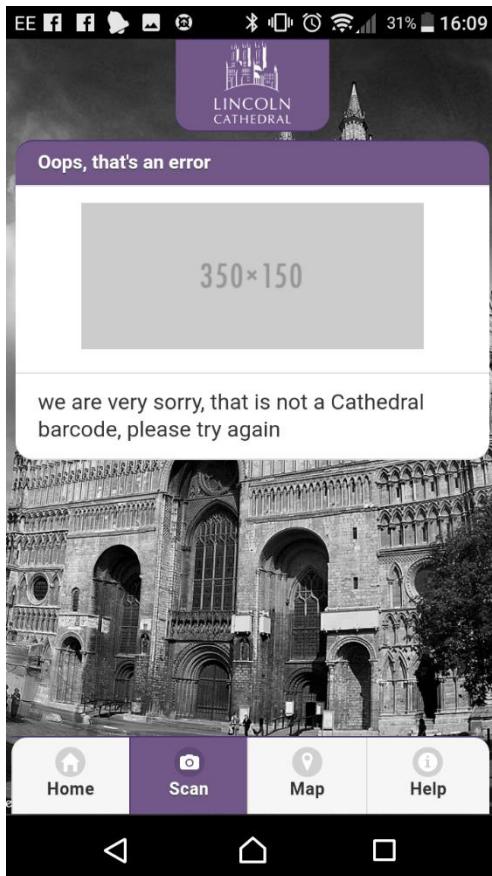
SPLASH SCREEN / ICONS

To help identify the app a logo from the cathedral website was added to a coloured background to make an icon. This icon however was only one size, which is difficult as android and IOS both have specifications to handle differing resolution devices. To combat this the abiro tool was used to create splash screens and icons for all devices. (Borg, 2017) This required adding the platform specific configuration file code to signify which platform and resolution it is for.

In order to keep app size low the images not needed for the platform were omitted using the '.pgbomit' file in the directory structure, which instructs PhoneGap to ignore the IOS files when building for android and visa versa. (PhoneGap, 2015)

SCREENSHOTS





DEVICE TESTING

CROSS PLATFORM TESTING

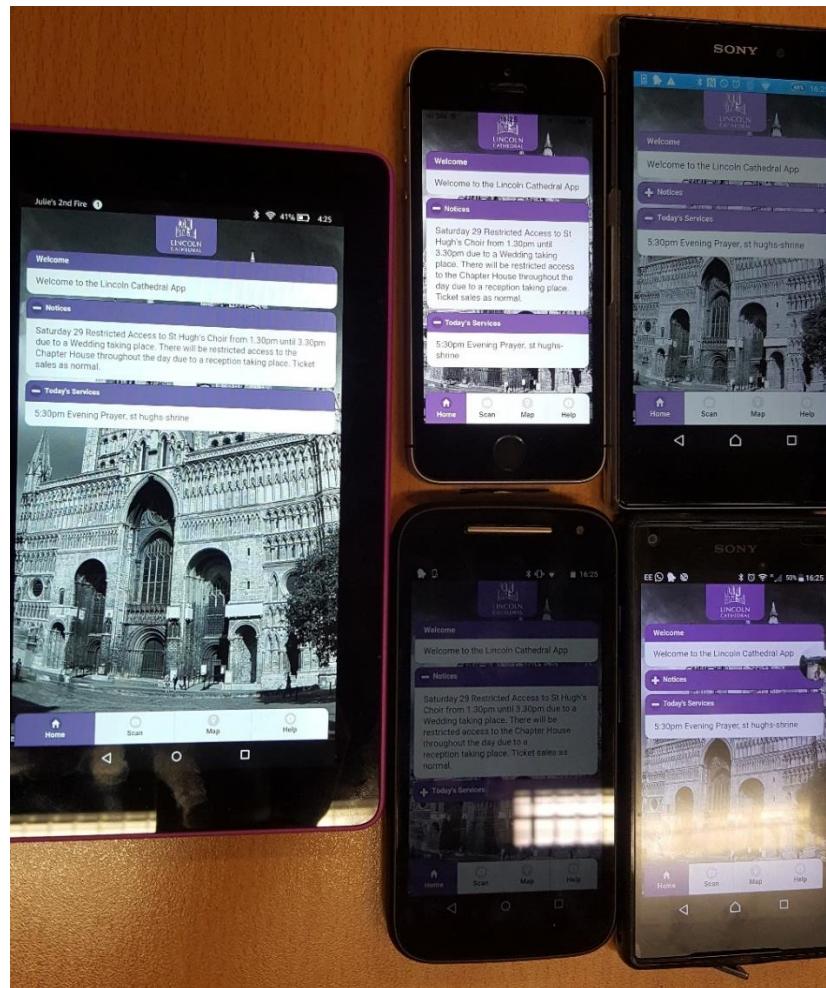
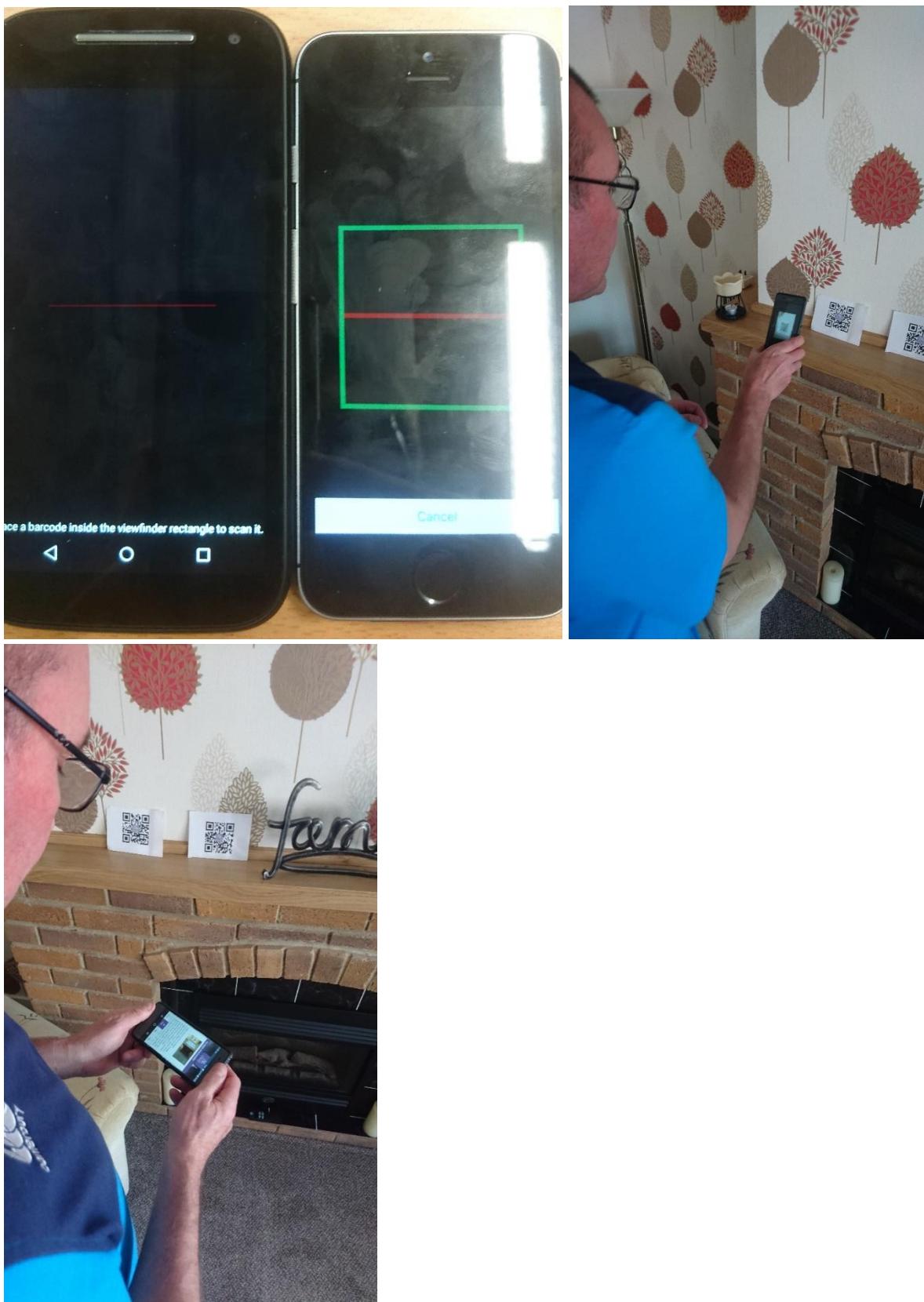


Figure 20 Multiple Devices running the application

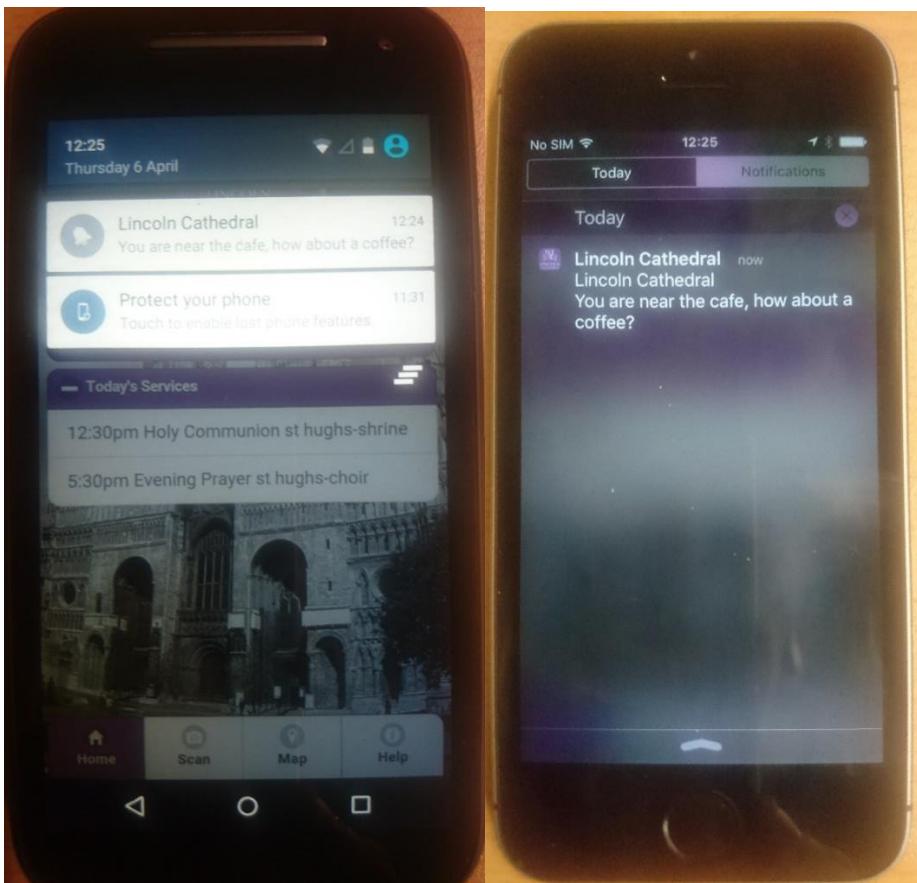
The application as shown in figure 20 was tested on 6 devices, only 5 are shown as one device was taking the photograph. Devices used can be seen below.

Device	Features	Operating System	Notes
Motorola G4	Low end, older device, low res screen	Android 5.0 Lollipop	Barcode success call-back error, fully functional otherwise
Sony Xperia Z1	Older device,	Android 5.1.1 Lollipop	Fully functioning
Samsung Galaxy S6 Edge	High end, high res screen	Android 6.0 Marshmallow	Fully functioning (manual permissions granted)
Sony Xperia Z5 Compact	High end,	Android 7.0 Nougat	Fully functioning (manual permissions granted)
Sony Xperia XA (Thompson, 2017)	Low end, high res screen	Android 7.0 Nougat	Fully functioning (manual permissions granted)
iPhone SE	iOS, New device, high res small screen	iOS 9.3.2	Fully functioning + Splash screen
Kindle fire tablet 7"	Low res, Large screen	Fire OS	Fully functioning

USER SCANNING WITH DEVICES



USER IN RANGE OF BEACON



PEER REVIEW OF OTHER APPS

SITESCAPE – ALEX K CURTIS 12270921

TARGET GROUPS AND REQUIREMENTS

It is believed that the application would attract tourists who are visiting different cities. The app is still targeted quite wide as little in this version of the prototype has been done with styling. The app has the potential to be gamified with the sight book, this again would help narrow the target market down

FUNCTIONALITY

The app locates the user and then directs them with a compass to that location. Enabling them to take a photograph of that sight to keep for the future. The features are well thought out and have a different twist on mapping for those who may not know the area well, but would be able to quickly absorb the sights of a new place like Lincoln without prior knowledge. Geo location, compass and camera are all technically challenging features. However some polish is needed to ensure they all work as expected. At this stage in the prototype this is understandable

USER EXPERIENCE AND USABILITY

Each screen has a clear call to action, however navigation forwards and backwards can be unclear at times. The call to action on the compass screen is very clear. However other screens at first is a little vague. Usage of android material design floating call to action buttons after selecting a sight could be a solution to this. (Google, 2014) Another issue noted is that there is no help page, which forms part of Nielsen's heuristic of help documentation. (Nielsen, 1995)

SUMMARY

Strengths	Weaknesses
<ul style="list-style-type: none"> Clever concept Working functions 	<ul style="list-style-type: none"> Wide target market Compass graphic rotation looks strange Lack of application help
Opportunities	Threats
<ul style="list-style-type: none"> Not able to save photographs external to the app. Expansion to other cities as a platform is a great idea 	<ul style="list-style-type: none"> Compass compatibility across platforms.

RECOMMENDATIONS

Styling – look at styling the app and building the brand image, this will make it clearer who the target audience is as well as tidy up the user interface potentially increasing usability of elements that are already present but would benefit from differentiating from the white background.

Device rotation – Catering to people using different device orientations for taking pictures will help remove unnecessary device orienting by the user making a more pleasurable user experience as the device stays one handed.

Compass and distance functionality although demonstrated prototype needs to work to make the app purposeful without that key function working to a suitable level of detail users will not trust it and as result not use it.

SCREENSHOTS SITESCAPE

<p>Back</p> <p>Minerva Building Heading: 288° NW</p>  <p>Stop Compass</p> <p>Success: False Distance: 73</p> <p>Camera</p> <p>View Sightbook</p>	<p>Sights To See</p> <p>Back</p> <p>Popularity A-Z</p> <p>Lincoln Cathedral</p>  <p>Sight Info</p> <p>Lincoln Castle</p> 
 <p>Taken when</p> <p>Lincoln Minerva</p>  <p>Taken when</p> <p>The Swan</p> 	<p>YourSights</p> <p>Where would you like to see?</p> <p> Lincoln Current Location</p> <p>Sights</p>

IMP COMPANION – ASHLEY CROMACK 12450621

TARGET GROUPS AND REQUIREMENTS

The target group is perceived to be football fans of all ages wanting to keep up with the specific football team – Lincoln City. The finished app would probably attract more fans who are carrying smartphones to games, demographically this is difficult as I do not know much about football fans. It could appeal to a wider group by having more image content and icons, expanding on those present in the navigation bar. Text sizing is good for users with weaker vision so could work for an older demographic too.

FUNCTIONALITY

The app shows fixtures and table position information to users in separate pages. As well as a quick view of the previous and next match information. The club's twitter also appears on the page which is useful for users who may not have or use twitter but still want to keep up with their club news. The app has a memories section which allows users to take photos of each other at the match and save them in app. Which is great for those wanting to capture their happiness or a specific moment on the pitch.

USER EXPERIENCE AND USABILITY

The user experience is pleasurable. The icon looks good and fits with the image of the club. The navigation is both clear and reasonable, however does have some drawbacks such as lack of clarity on which page of the app the user is on. Each screen does have a clear purpose and matching icon on the nav bar which is useful and pleasing, demonstrating Nielsen's heuristic of recognition rather than recall. (Nielsen, 1995) Another of Nielsen's heuristics is help documentation, this prototype does not have any. (Nielsen, 1995)

SUMMARY

Strengths	Weaknesses
<ul style="list-style-type: none"> • Clean layout • Icons have clear purpose • Portrait mode is forced which prevents accidental rotation 	<ul style="list-style-type: none"> • User does not know what page they are on • Content is placeholder (okay at this stage) • Lack of user help
Opportunities	Threats
<ul style="list-style-type: none"> • Fixtures table could be sized better to make viewing easier • Tweets appears twice in the app, Could this be improved? 	<ul style="list-style-type: none"> • Data may be difficult to get hold of • Offline what features will still work? • External links take you out of the app, would a container be better?

RECOMMENDATIONS

Navigation – show the user which page they are currently on to aid in navigation. Due to some pages sharing information it may be confusing where they are.

Images- It is not obvious that it is a Lincoln City app until you look at the content, maybe consider adding the logo or having a more picture heavy home screen. Including more team based images would improve this.

Web content- replacing the placeholder content would make the app more visible and help with the design. Connecting the app to live information for next game and previous game would make the prototype viable.

Repeated content – tweets and fixtures take up a lot of the home screen space. Potentially showing just Lincoln's table position and points. Could the latest tweet be shown and then direct the user to the others? That way the homepage becomes less cluttered and more purposeful, which the user can drill down into.

SCREENSHOTS IMP COMPANION

Club Twitter				
<p>Tweets by @LincolnCity_FC</p> <div style="display: flex; align-items: flex-start;"> <div style="flex: 1;">  <p>Lincoln City FC  @LincolnCity_FC</p> <p>OFFER Buy a Stacey West Stand ticket for the Bromley match and get a Daggers one for half price! - redimps.co.uk/news/article/2...</p>  <p style="font-size: small; margin-top: 10px;">27m</p> </div> </div>				
<div style="display: flex; justify-content: space-between;"> <div style="flex: 1;">  <p>Lincoln City FC  @LincolnCity_FC</p> <p>We are looking for a Man of the Match Sponsor for this Saturday's game v Bromley. Please contact commercial@lincolncityfc.co.uk for info.</p> <p style="font-size: small; margin-top: 10px;">2h</p> </div> </div>				
 Home	 Fixtures	 Table	 Tweets	 Commem...

Fixtures				
DATE	TEAM CREST	TEAM	LEAGUE/CUP	SCORER
25/03/2017	CREST	Forest Green	National League	3-0
21/03/2017	CREST	Boreham	National League	2-1
18/03/2017	CREST	York	FA Trophy	1-0
14/03/2017	CREST	York	FA Trophy	2-0
11/03/2017	CREST	Arsenal	Emirates FA Cup	5-0
07/03/2017	CREST	Braintree Town	National League	0-0
04/03/2017	CREST	Aldershot	National League	0-0
28/02/2017	CREST	York	National League	1-0
25/02/2017	CREST	Boreham	FA Trophy	0-0
21/02/2017	CREST	North Ferriby Utd	National League	0-0
18/02/2017	CREST	Burnley	Emirates FA Cup	0-0
11/02/2017	CREST	Woking	National League	3-0

Home																																																				
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>#</th> <th>Team</th> <th>GP</th> <th>Wins</th> <th>Draws</th> <th>Losses</th> <th>GD</th> <th>Points</th> </tr> </thead> <tbody> <tr> <td>1</td> <td><u>Lincoln City</u></td> <td>34</td> <td>22</td> <td>6</td> <td>6</td> <td>35</td> <td>72</td> </tr> <tr> <td>2</td> <td>Dag & Red</td> <td>36</td> <td>21</td> <td>4</td> <td>11</td> <td>20</td> <td>67</td> </tr> <tr> <td>3</td> <td>Forest Green</td> <td>35</td> <td>19</td> <td>9</td> <td>7</td> <td>28</td> <td>66</td> </tr> <tr> <td>4</td> <td>Tranmere Rovers</td> <td>34</td> <td>20</td> <td>6</td> <td>8</td> <td>20</td> <td>66</td> </tr> <tr> <td>5</td> <td>Gateshead</td> <td>36</td> <td>17</td> <td>10</td> <td>9</td> <td>25</td> <td>61</td> </tr> </tbody> </table>					#	Team	GP	Wins	Draws	Losses	GD	Points	1	<u>Lincoln City</u>	34	22	6	6	35	72	2	Dag & Red	36	21	4	11	20	67	3	Forest Green	35	19	9	7	28	66	4	Tranmere Rovers	34	20	6	8	20	66	5	Gateshead	36	17	10	9	25	61
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Commemorate				
<div style="border: 1px solid #ccc; padding: 10px; width: 100%;"> <p>Capture Photo</p> </div>				
<div style="border: 1px solid #ccc; padding: 10px; width: 100%;"> <p>Save Photo</p> </div>				
				

REFLECTION

JUSTIFICATION

The cathedral is in the position that it is a charity focussed on the maintenance of a place of worship. Going mobile takes advantage of a rise in mobile usage that suggesting most visitors will have device; meaning no need for the cathedral to invest in hardware. This is a reasonable assumption due to research in device ownership. "A mere nine years after the launch of the first full touchscreen smartphone, adoption is nearing a plateau, at 81 per cent of UK adults, and 91 per cent of 18–44 year olds." (Deloitte, 2016, 1)

With the Cathedrals position reaching as many devices as possible is important especially if the app is being used for the conversion of visitors to donations and sales, this does result in the need for a development team for each platform. "software developers that want to reach a large audience of users would be required to develop their apps for each platform separately." (Heitkötter et al, 2012) Companies in a position such as the Cathedral may have to make the decision of which platform to prioritise, normally this is based on their target market, those looking at a developing market choose android, whilst more high end lean towards IOS. (Ranger, 2015). A hybrid approach however provides, a single code base that can be installed and executed on many devices without the need for native development, resulting in them being able to access sensors and API's specific to the platform in question. (Heitkötter et al, 2012)

The Cathedral does have a mobile capable website, however this relies on users looking around the interface to find information, as well as link their online experience to physical. Mobile moments like notifications, iBeacons and the QR interactivity allow for a much better user experience, that can be used offline which is a key point in a building of the Cathedrals location and construction.

EVALUATION

USER TESTING

The talking out loud protocol was used, whilst making observations of what the users did whilst using the app. Nielsen states that talking out loud is a cheap and reliable tool in usability. (Nielsen, 2012) As can be seen throughout the iterations design and functionality changes have been made to accommodate user needs, based on their behaviour as well as what they said. Participants chosen initially were involved in similar application development and provided a different view on design theory and their opinions ad students who may use the app. Other participants fitted the target user much more closely being near retirement and having visited the cathedral.

As can be seen in the appendices user 1 and 2 were both happy navigationally with the app, however picked up on the inability to zoom on the map as well as some design issues that were subsequently addressed in the iterations.

User 3 was the first in the target audience to try out the app, as well as being the first to test it at this stage with iBeacon and map zoom functionality in place. A beacon and QR codes were placed in a mock test area to enable the user to test the functionality, this is shown on page 23 and 24. The user was not afraid to press the navigation buttons and could scan multiple barcodes without intervention from the observer. It is also useful to note that on their device text size was suitable for them to use at arm's length, without reading glasses that they normally require. "As someone who is not very good with technology, I thought the app was very easy to use" (Thompson, 2017) An issue was found with images being rotated on the device as shown in figure 13, this was later solved by editing the image data and compressing it in Adobe Photoshop, resulting in a faster and smaller app. The size reduction being great to assist with user uptake as it would be a smaller download.

Although contact was made with the Cathedral very early on, with the Deans verger stating “I think there might be some mileage in your thoughts” (Campbell, 2017), This communication did not continue through the iterations of the product, potentially explained due to the time of year being around Easter celebrations. Should the author have had access to the space and staff a focus group would have been set up with different devices to facilitate testing in the space that is intended for use, with the people that know their visitors best. This feedback could then have been added into the iterations, to further improve the design, accessibility and functionality.

IMPLEMENTATION

Developing for Phone Gap provided both benefits and challenges in that it was possible to develop and see the results quickly using a text editor and choice of browser. As the app got more complex and the inclusion of plugins this slowly became more difficult as the plug ins could not be tested away from a device. Furthermore, issues with cross origin requests in the browser meant that web data functionality did not work in the browser unless this security feature was disabled with a browser add in. Although not preferable it the issue did not hinder the application working on the mobile device thanks to additions to the configuration file.

Whilst every effort was made to produce a technically sound application, some bugs did still exist. The first being a plugin error that was only found on certain android devices. Fragmentation of the android platform and supporting all the different versions can be a challenge. This issue was only on one device and therefore if commercially released would be investigated further. The same can be said for android permissions. Changes in the android operating system at android 6.0 mean that some permissions are not granted at install or run time. This means that on all test devices location permission was manually granted. In future iterations, the user would be prompted for this. This small example does highlight one drawback of cross-platform development that it is reliant on the 3rd party tools, in this case Phone Gap, updating when a new update is released to the platforms. This reduces the developers control over their target devices as experienced by the author in this context.

Concerns in the evaluations with technical experts were raised on the usage of HTTP get rather than an established API. These concerns were realised when the functionality stopped working thanks to the website of the Cathedral being changed mid project thus changing the location and format of the data requested. Resulting in a late modification to the process. If the cathedral were a client, changes like this would be discussed beforehand or more preferably implement an API to hold the data ensuring that it does not change location.

The iterative approach taken by the author was assisted with the reflective log that can be seen in the appendices of this document. Small informal discussions with potential users, experts and peers influenced the design and implementation process in a less formal but still important way to achieve the result. The notes and results from these tests can be seen in the appendices also.

USER EVALUATION

From observing the application in use by users and getting them to use the talking aloud protocol, it was clear that all of those tested found the navigation around the application easy as they had no questions or ambiguity. All who participated attempted to resize the map, or asked if they could. In the iteration tested this was not possible, later versions had it, but interestingly when retested the users instinctively pinched rather than tap as implemented. In the future, this user interface would benefit from being as the users expect, pinch or double tap rather than single tap- assisting with incorporating Nielsen’s recognition rather than recall seen in the usage of icons in the menu bar. (Nielsen, 1995)

TESTING

Unfortunately, physical devices were difficult for the author to obtain. More android devices were available at the time of testing which showed good testing across the different versions of the platform. Only one IOS device was tested which is a slight flaw, however the platform is less fragmented as it is a single manufacturer. If this project were to be conducted again investigations into the windows phone platform would be a high priority, as well as larger tablets such as the Apple iPad and equivalently sized android variants.

FUTURE ENHANCEMENTS

If the author were to continue work on this application there are several expansions that could assist. The first would be a redesign to make the app a platform that multiple destinations could use. Meaning the user would download once, but upon visiting different venues can access different content by downloading on arrival OR having a live connection to restful API. Another option more closely related to the concept would be to replace the current translation devices used by the cathedral with the mobile app. Utilising online translation services would mean that the experience would be consistent regardless of your language with text and speech in visitor's native tongue rather than carrying around a cathedral owned audio device and entering numbered points to hear pre-recorded messages.

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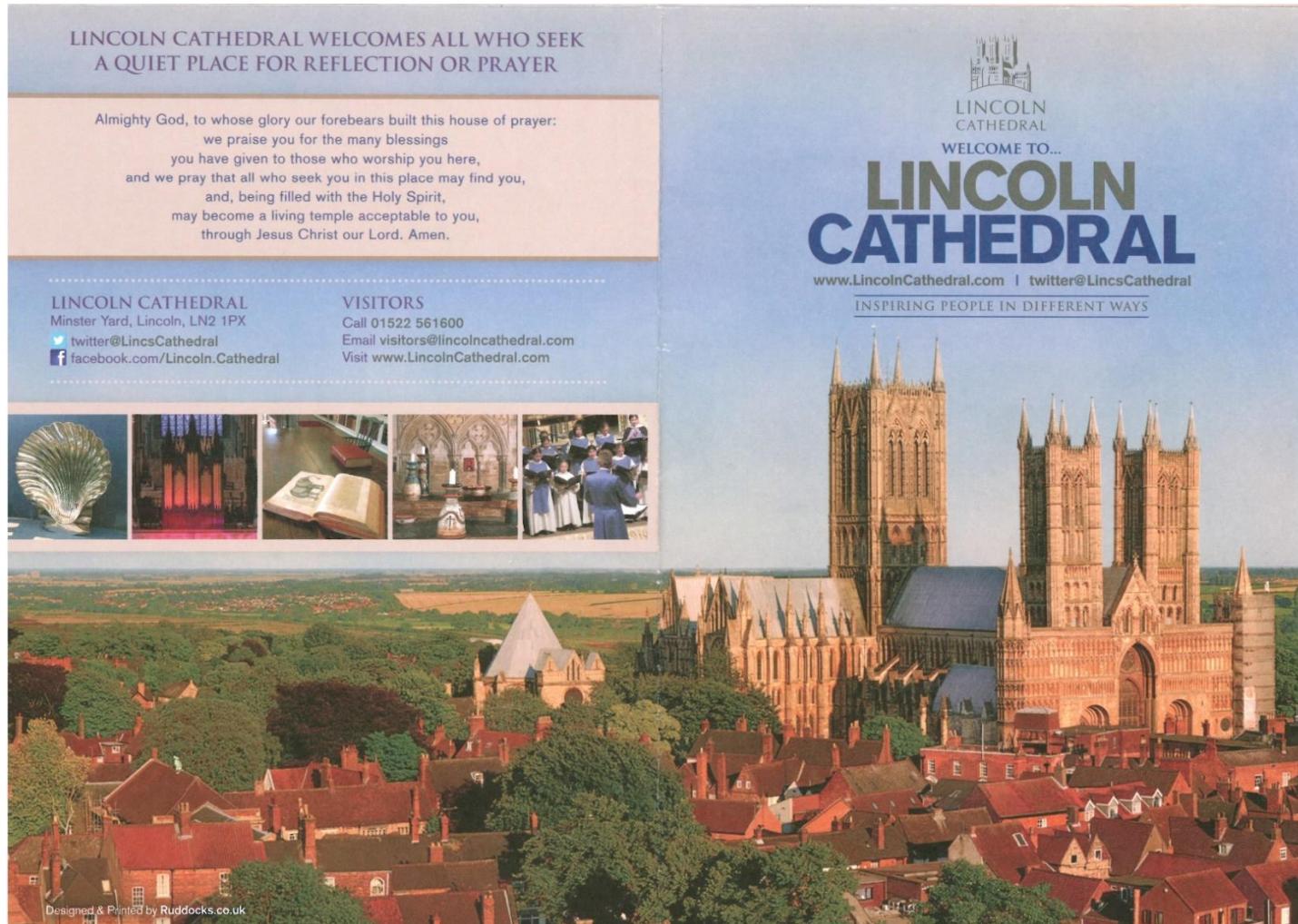
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APPENDIX

CATHEDRAL WELCOME BOOKLET (A4 BOOKLET, FOLD OUT A3, SCANNED 18/03/2017)



MAKE THE MOST OF YOUR VISIT

SERVICES

All visitors are welcome to join Cathedral services. If you would like any further information please ask at the entry desk.

WEEKDAYS & SATURDAYS*

07:30	Morning Prayer
08:00	Holy Communion
10:30	Holy Communion (Tuesdays & Thursdays only)
12:30	Holy Communion
17:30	Evensong

SUNDAYS*

08:00	Holy Communion
09:30	Sung Eucharist
11:15	Mattins
12:30	Holy Communion
15:45	Evensong

*Times can be subject to change



CHAPTER HOUSE, LIBRARIES & TREASURY

Visit the Treasury, displaying historic silver from churches across the diocese, and the Chapter House, still used to this day for meetings, events and exhibitions.

LIBRARY - OPENING TIMES

April to June and September to October	
Monday - Friday	13:00 - 15:00
Saturday	11:00 - 15:00
July and August	
Monday - Saturday	11:00 - 15:00

GIFT SHOP & COFFEE SHOP

Enjoy a light bite or coffee and cake in the Coffee Shop located in the Cloister. For a memento of your day the Gift Shop is located at the West End of the Cathedral, opposite the entry desk.

GIFT SHOP - OPENING TIMES*

Monday - Saturday	09:30 - 16:45
Sunday	10:30 - 16:00

COFFEE SHOP - OPENING TIMES*

Monday - Saturday	10:00 - 16:30
Sunday	12:00 - 16:00

*Times can be subject to change



TOURS

Floor tours are included when you pay admission to Lincoln Cathedral.

FLOOR TOURS** Monday to Saturday

Mar - Oct	11:00, 13:00 & 15:00
Nov - Feb	11:00 & 14:00

ROOF TOURS** Monday to Saturday

Mar - Oct	11:00 & 14:00
Nov - Feb	13:30 (Extra Tour on Saturdays at 11:00)

TOWER TOURS**

Saturdays & Bank Holidays	
Mar - Nov	11:30, 13:00 & 14:30

** Tours are subject to change and restrictions may apply.

A MESSAGE FROM THE DEAN

We warmly welcome you to Lincoln Cathedral.

As you step across the threshold you enter an ancient house of prayer and daily worship that has stood for close to a thousand years.

Like the stream of pilgrims and visitors who have gone before you over the centuries, may you discover its history, encounter the extraordinary and be inspired by the



Dean Christine
The Very Reverend Christine Wilson
Dean of Lincoln

message it proclaims of God's faithfulness and love for us all.

We hope your visit will be a source of enlightenment, blessing and peace.

A BRIEF HISTORY

After his conquest of England, William the Conqueror embarked upon a programme of cathedral building throughout the country. In 1072 William instructed Bishop Remigius to move the seat of this diocese from Dorchester on Thames to Lincoln. The diocese stretched from the Humber in the north, to the Thames in the south.

Building a cathedral required a huge workforce of skilled craftsmen and labourers who worked from sunrise to sunset. It is estimated that £2,000 a year was spent on building the Cathedral; nearly £5,000,000 in today's money.

famously, the Swineherd of Stow who gave his meagre life savings towards the great work. His statue sits on the northwest turret opposite that of Saint Hugh on the southwest.

Much of the design and construction of the Cathedral was experimental and in 1237 the central tower collapsed. It was replaced by 1311 with a tower topped with a spire making the Cathedral approximately 525 feet high (160m) and reputedly the tallest building in the world for nearly 238 years. In 1548 the central spire fell down in a storm and had to be removed. It was never replaced. To this day the Cathedral still opens its doors to welcome pilgrims and visitors alike. We hope that you enjoy your visit.



LINCOLN CATHEDRAL A PILGRIMAGE IS A SPECIAL KIND OF JOURNEY

10. CHAPTER HOUSE
Built in the early 13th Century the Chapter House is where the College of Canons still meets today. It may have hosted Parliament three times.

11. LINCOLN IMP
Situated in the 'Angel Choir' at the top of the pillar closest to the head shrine of St. Hugh you will find the Imp. Legend has it that he caused so much havoc that one of the angels turned him into stone. He is a reminder that even in a holy place evil may not be far away.

12. GILBERT POTS
Named after the Lincolnshire monk, Gilbert of Sempringham. This is one place to light candles for prayer.

13. ST. HUGH'S SHRINE
Since the early 14th Century pilgrims from far and wide have made pilgrimage to pray at the tomb of St. Hugh.

14. ELEANOR OF CASTILE'S TOMB

15. THE HIGH ALTAR
On the altar bread and wine are placed at the Eucharist which as Jesus promised become His body and His blood; spiritual food to strengthen Christians to live lives dedicated to Him.

16. KATHERINE SWYNFORD'S TOMB

17. CATHEDRA
The Bishop's throne is the seat of the Bishop of Lincoln. A church into which a Bishop's official cathedra is installed is called a Cathedral.

18. ST. HUGH'S CHOIR
A church within a church, one of the oldest parts of the building St. Hugh himself probably prayed here.

19. THE LECTERN
The Bible rests on the wings of a great brass eagle which stands on a globe symbolising the word of God being carried throughout the world.

20. THE WILLIS ORGAN
The organ was originally built by Henry Willis in 1898. It has approximately 4,000 pipes many of which are hidden from view in the gallery above. It is considered to be one of the finest organs in the country.

21. THE BISHOP'S EYE
This great rose window watches over the city as the Bishop does. It contains fragments of medieval glass.

CONSTRUCTION PERIODS

NORMAN	1072
EARLY ENGLISH	1192
LATE EARLY ENGLISH	1235
DÉCORATED	1256
PERPENDICULAR	1432
MODERN	1914

KEY

- WHEELCHAIR ACCESS
- TOILETS
- GIFT SHOP
- COFFEE SHOP
- INFORMATION
- STAIRS TO LIBRARIES

MEASUREMENTS

LENGTH INSIDE	147 M	482 FT
WIDTH INSIDE	24 M	78 FT
NAVE HEIGHT	24 M	78 FT
AREA (APPROX)	5,000 M ²	53,820 FT ²

CHAPEL FOR PRAYER
Some areas of the Cathedral are reserved for private prayer and we respectfully ask that no photographs be taken there.

Timeline of Events:

- 1066 The Battle of Hastings
- 1092 Lincoln Cathedral consecrated
- 1141 Lincoln Cathedral ravaged by fire
- 1192 Lincoln Cathedral re-built after earthquake
- 1215 King John seals the Magna Carta
- 1292 Cathedral Cloisters built
- 1348 The Black Death reaches England
- 1509 Henry VIII becomes king
- 1534 English Reformation of the Catholic Church begins
- 1548 Central tower spire is blown down
- 1644 Cromwell's forces damage Cathedral
- 1666 The Great Fire of London
- 1676 The Wren Library is added
- 1807 Spires removed from western towers
- 1898 The Willis organ is installed
- WW1 1914 to 1918
- WW2 1939 to 1945

1ST REVIEWER OF THE CATHEDRAL APP

TALKING ALOUD PROTOCOL

User asked no questions with regards to how to use the application.

OBSERVATIONS

User found the scan function and scrolled when text was not on screen

User tried to zoom the map but this did not work

The help page was found and read through, and call button tested to find that it works

Notification found, qr code tested from close and far including testing navigation seemed quick

2ST REVIEWER OF THE CATHEDRAL APP

TALKING OUT LOUD PROTOCOL

Likes the nav bar

Can you zoom ? text is not as readable as it could be

When the user scanned they said image needs to be bigger and centred.

OBSERVATIONS

Help found and call action

User found the scanner and scanned,

You could gamify this, children would take more interest

Potential use to monetize it / convert to donations gamifying could be a good way forward

Header could be a home button

Map forces the nav bar down (jquery touch thing)

User found a nav bar device quirk causing icons to not be as they were described in code and on other devices

From the notification bring up the map and plot / highlight to show where it will be

3RD REVIEW OF THE CATHEDRAL APP

TALKING OUT LOUD PROTOCOL

What does this bell mean?

How does it know I'm near the café?

How close do I have to be for the scan to work?

OBSERVATIONS

The user rotated their device when scanning as the picture was not oriented correctly.

User was confident with the navigation and scanning. However unsure how to zoom in

REFLECTIVE LOG

26/01/2017

Caught up with lecture materials to understand the module content, CRG, Brief and assignment themes. If you copy an existing app you cannot get a first, needs an exciting twist!

Food or Fashion

Data or Dialogue

Lincoln or Lincolnshire

Productivity or Procrastination

30/01/17

Workshop content

Ideation excercises

We used padlet to create some word association taking rounds of the themes of Nouns, verbs, problems and apps
Pitch excercises

01/02/2017

Introduction to phone gap and cordova, why native / hybrids. And what are they

06/02/2017

Workshop introducing phoegap.build first attempt at creating an app, refresher of html and css along with the config.xml

13/02/2017

After discussing the ideas that had been moodboarded the previous week 2 ideas emerged.

Food roulette - take away or eat out, why have arguments with freinds when you want to go out, let the app decide what cuisine and show you locations that serve it near by

Tourism apps, lincoln is a tourist hotspot recieving tourists from around the world to see the city and its herritage sites such as the castle and cathedral. People also visit for the universities. Mobile apps can support these visits and are used by cathedrals and universities around the countries

Giving this more discussion thinking about the user experience the food app would be cool but is a companion app to other services and providers, it also does not have any pinning to mobile. One thing also noted was in the authors experience ordering takeaway as a group is usually done on a laptop or pc rather than a mobile app. Cool and quirky idea that could be expanded into a real roulette where you input number of people and press go, to then recieve either a table booking or take out food right to your door. With no choice of food, risky.

The tourism idea seemed to make more sense and could really fit the theme. The Cathedral in lincoln is ran by the diocese of lincoln but is primarily a charity. Unlike purpose built museums they do not have the capital to invest in technology such as audio description trails or handheld technology to provide all of their information. The idea behind this app is specificaly mobile, users

can obtain the app and then when in situ not near a computer can find more information about an artefact or an area of the cathedral. The main feature being the application knows where the user is based on some inexpensive technology like QR codes. Allowing the cathedral to provide a better experience for foreign visitors, without spending on paper, or specialist technology.

User stories began to be created as well as mobile and micro moments imagined. With the intention to begin designing in the next coming week. The cathedral has a specific house style which if the project were to be taken on by the cathedral as a client would need to be adhered to, hopefully the mood board will reflect this at a later date

20/02/2017

This workshop contained more usage of java script and jquery In order to modify css and other elements on the fly. Considerations were made as to when to do things and to ensure that the functions were only called after the device ready() fires.

Struggled at this point to understand how the DOM Loads, if the function is not in the device ready or doc ready braces it will fire at run time, rather than after document load.

Another issue encountered was the issues found in the hierarchy of CSS and styling elements that had a parent or higherarchical style.

27/02/2017

Review of Lo-fi prototypes and general catch up on user stories. Discussions with the module team on how to implement the scanning feature but also in terms of iterations is scanning the best way forward. That requires users to have their phone out and perform an action. Where it could be the case that they may be better off with a much more passive experience that could be offered by iBeacons.

Pitched my app to another student and visa versa to gain feedback and critical views on what had been created

Main points were

- colour scheme was good
- Concept is good and would be interactive for kids
- Could be developed and gamified to improve the concept

06/03/2017

Huge issues getting barcode scanner to work

Managed to fix it, cordova was not being referenced properly

Ui elements changed around and looking into the method behind changing pages with jquery on barcode capture

Scan button removed and nav bar now handles this

Persistent nav and header researched and now working.

13/03/2017

Review with richard -

MENTION CORPORATE IDENTITY

CLEAN AND MINIMALISTIC

Noticed that the house style colour was a little off, edited to match lincoln cathedral website

Barcode functionality still not working past the loading scanner point. Working on getting the scanner working and then showing content on screen

Luke Thompson

THO13378493

In terms of other functionality, I am unsure whether to add some weather information for the tower tours it seems a bit unnecessary. But the only thing left for ajax calls would be translation

Beginning on getting the service information from the website, got service times working, need to add local storage for fall-back. JS fiddle useful for testing the parsing

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1 <div class="the-content" itemprop="description">
2   <p>Please note: There are several days where access to the Cathedral will be
3     restricted due to events taking place. If this is the case, these dates can be found
4     below.</p>
5   <h2><strong>March</strong></h2>
6   <p><strong>Saturday 18<br/>
7     </strong>Free admission all day for Discover Greater Lincolnshire Weekend. Charges will
8     still apply for tours.</p>
9   <p>'Come and Sing', restricted access to St Hugh's Choir throughout the day. No floor
10    tours available.</p>
11   <p><strong>Saturday 25</strong>
12     <br/> Concert Rehearsal in the Nave 1.30pm to 4.00pm. No afternoon floor tours.</p>
13   <hr>
14   <h2><strong>April</strong></h2>
15   <p><strong>Wednesday 5</strong>
16     <br/> Service in the Nave 2.30pm until 4.00pm. Access to the Nave will be restricted
17     during the afternoon from approx. 1.30pm. Entry to the Cathedral will be via the
18     judgement door at the East End, entry by donation. We will be charging as normal in the
19     morning, however <strong>no joint ticket sales.</strong></p>
20   <p><strong>Tuesday 11</strong>
21     <br/> Restricted Access to St Hugh's Choir from approx. 10am until 12.30pm.
22     Restricted access to the Chapter House due to a function taking place. Ticket sales as
23     normal.</p>
24   <p><strong>Friday 14<br/>
25     </strong>Good Friday. The Cathedral will be closed to visitors all day. All are welcome
26     to attend any of the services during the day.</p>
27   <p><strong>Saturday 29</strong>
28     <br/> Restricted Access to St Hugh's Choir from 1.30pm until 3.30pm. Restricted
29     access to the Chapter House due to a service taking place. Ticket sales as normal.
30   <hr>
31   <h2><strong>May</strong></h2>
32   <p><strong>Wednesday 5</strong>
33     <br/> Restricted Access to St Hugh's Choir from 1.30pm until 3.30pm. Restricted access to the Chapter
34     House throughout the day due to a service taking place. Ticket sales as normal.
35   <hr>
36   <h2><strong>May</strong></h2>
37   <p><strong>Wednesday 29</strong>
38     <br/> Restricted access to St Hugh's Choir all day. Cathedral will close to the public from 2.30pm due to a
39     service taking place.

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20/03/2017

iBeacons idea actually helps along with the idea of being a wayfinding app. Bluetooth push notification random facts about what is around you. Barcodes help you look into it more.

Maybe the ability to locate in the transepts and let people know where they are on the maps

Push notifications - for the services

Look into parsing the dates and removing the ones that have passed today. And the collapsible stuff
Wordpress v2 api endpoints could be a way of getting the information easier.

Storage isn't too important.

Services could disappear when they have passed?

25/03/2017

Functionality

Services now disappear when they have passed

Changed the source of the data to be able to get the location too for use in notifications later

Began work on the notification setting

Added svg of the map from cathedral website,

Design

Background image placed on the bdy rather than the page to stop it resizing and working towards sliding transitions with fixed nav and header

Modified help icon to be more recognition rather than recall

Used a service to add splash and sized icons for each device size, with .pgbomit file to only use the files needed

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THO13378493

Modified call button for same reason

27/03/2017

Peer review day

<https://evothings.com/quick-guide-to-writing-mobile-ibeacon-applications-in-javascript/>

<https://github.com/mikaelkindborg/cordova-plugin-ibeacon>

<http://jaukia.github.io/zoomooz/> investigated possibility of using a plugin / library to zoom map

Because not native can develop in the browser, which is good but means you are not fully in charge of what happens in the environment compared to in a native environment.

01/04/2017

From showing the application to a number of people concerns we raised with the visibility of the background. This was due to the start of the month coming around and the cathedral being very busy in april and the notices stretching past the screen.

Next iteration the main content has been padded away from the sides using css. To reduce the amount of information on screen any more notices than the first 2 have been hidden using nth child jquery.

04/04/2017

Looking into the setup of the iBeacons I was using the wrong method (ranging vs monitoring) Not only that I had put my code in the wrong block therefore the notification was firing when the beacon was created rather than when it was detected. Working through this was problematic but as soon as the issue was found it was fixed and tested. Working with great success on IOS and android both old and new.

After trying all avenues within the time frame I decided to try a basic css zoom by enlarging the image with an on click event. Although not a perfect solution it allows the map to be both zoomable and scrollable. The zoom was not customizable to the user but this could happen in future iteration .

08/04/2017

Development in the browser and using 1 device instead of many meant losing sight of functionality that did work. The phonegap platform is constantly updating and mid project a change happened, suspected to cause barcode scanner issue on Lollipop android devices. Nougat and IOS unaffected.

10/04/2017

Testing the app with user of the target audience showed that there was a permissions issue resulting in location being manually granted to the application after install, although time will not allow this to be fixed, it will be worth knowing for testing and evaluation.. The mock cathedral setup in the lounge of my house was perfect to test out the app in the field and get photographs of a user navigating.

BREAK FOR OTHER ASSIGNMENTS

26/04/2017

The risk of the cathedral changing its website was realised this week. Part of the data that is pulled from the website for the home screen of the app was completely blank. The page location and structure had been modified. This meant revisiting ajax code to deal with the changes. If this were to continue the app would require constant updates, this is where a restful api would be a much better source of data.

Daylight saving time was still proving to be an issue for notifications. The app would not be of use if the notifications remained an hour late. This was fixed programmatically but in future applications determining the time zone would have to be added to ensure the correct time every time.

Users were uncertain why the navigation bar and behaviour of the app did not look consistent. Firstly due to the squareness of the nav bar but also the load bounce seen on ios. Config changes dealt with the bounce visual and then modifications to the css to round the nav bare were made to complete this.

Noted user issue with rotating images remedied for the prototype. Exif data from the device captured was being used when not needed on android devices. Worked around by re saving the original images at the same time compressing them to save application space