# The Value of Mobile Phone Applications in Heritage Interpretation

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## Abstract

The aim of the thesis is to study the value of mobile phone applications, or 'apps', in heritage interpretation. The study assesses current heritage sector apps and looks at both the potential benefits and downsides of using apps.

Many heritage sites are currently investing in apps, yet there is not any concrete evidence for how effective apps are in interpreting heritage sites to visitors. Do they deliver the key aims of interpretation for heritage organisations? What types of apps work best and what are the challenges?

The research has been carried out by some qualitative interviews with heritage professionals and quantitative surveys with heritage app users. Whilst results show that apps are good for sharing information, engaging and offering enjoyment, they struggle to offer more meaningful learning experiences. Technology not working is the biggest downside for app users.

This study seeks to aid heritage organisations and people in charge of curating, managing and interpreting heritage sites, to make informed decisions about the methods they use in presenting and interpreting their sites to the public.

I would like to thank my supervisors Dr Roger White and Dr Henry Chapman for their guidance over the past years of my study. I would also like to express my gratitude to my husband, Lars Wicks, and my parents, Arvi and Salme Lappalainen, for their support, patience and encouragement over the last two years. This work is dedicated to my three daughters, two of whom were born while I was writing the thesis.

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# CHAPTER 1
# INTRODUCTION

## 1.1 Research question

This research looks into the value of mobile phone applications in heritage interpretation. Many heritage sites have invested in mobile phone applications or are currently considering doing so, but there is little, if any, concrete evidence for how effective they are in interpreting heritage sites to visitors. This study assesses how effectively heritage sector applications are currently delivering interpretation to visitors and looks at both the strengths and weaknesses of using them. In addition, the results of the study will reveal some useful information regarding how well different types of applications work and what challenges are faced when using mobile phone applications. The value, in the context of this study, is thus about the benefits apps can bring to heritage interpretation in providing meaningful experiences to visitors, as outlined by the interpretation priorities in Chapter 2. The conclusions of this study seek to aid heritage organisations and people in charge of curating, managing and interpreting heritage sites to make informed decisions about mobile phone applications as they present and interpret their sites to the public.

It is a new research topic as neither mobile phones, nor mobile phone applications have been around for very long and to date there has been very little published formal study into mobile phone applications in the heritage context. As such, this study touches and borrows from various fields of academic research from heritage studies and museum studies, cultural tourism, education, digital sociology and media studies.

## 1.2 Context

Although a relatively new phenomenon, mobile phones have rapidly become part of every day life for the vast majority of people in the UK and elsewhere. In 2012, 92% of adults in the UK owned a mobile phone (Ofcom, 2012). As well as being as common as they are, mobile phones are small and incredibly powerful tools. 'Even the simplest, voice-only phones have more complex and powerful chips than the 1969 on-board computer that landed a spaceship on the moon' (Prensky, 2005).

Most people regularly use mobile phones now, but not everyone is as familiar with mobile phone applications, which are a more recent addition to phones. Mobile phone applications, commonly called and referred to in this thesis as 'apps', are downloadable software applications which require a smartphone or a tablet to work on. Take-up of smartphones has risen over the last few years, and according to a Deloitte consumer review in 2013, 72% of people in the UK owned one, compared to 58% just ten months earlier (2013). Tablet ownership is also on the rise, and according to Ofcom (2014a): 'Over four in 10 households (44%) now have a tablet - up from a quarter (24%) a year ago'.

Some apps are ready on the phone or tablet, whereas others need to be downloaded. Phones by different manufacturers utilise different operating systems, therefore apps need to be developed for different operating systems and downloaded from the appropriate online stores. For phones and tablets developed by Apple, iPhones and iPads, apps need to be downloaded from the AppStore. Android phone users currently download apps from Google Play. Blackberry apps can be downloaded from BlackBerry World (BlackBerry, date unknown) and Windows Phone apps from Windows Phone Store (Microsoft, date unknown). Most mobile

phone applications are currently developed for iPhones and Androids, as they hold the biggest market share (Contantinou, 2013).

The first smartphones were introduced by IBM in 1993; these phones had applications such as a calendar and a calculator on them (Appschopper, date unknown). But it was not until 2008 when Apple launched AppStore (Apple, 2008), that apps became more mainstream. Bowling (2012) summarises that the first apps were made available to the wider public in 2008, with both Apple's AppStore and Android Market launching that year. Other platforms opened their 'shops' in the following years. BlackBerry App World and Nokia's OVI both launched in 2009, while Windows Phone Market Place was launched in 2010. In the meantime, 5 billion apps were downloaded from AppStore by 2010, and 1 billion from Android Market. Today, the figures are much higher. In 2013 Gartner forecast that app downloads would reach 102 billion by the end of the year (Gartner, 2013).

The first apps were similar to a one way, static, internet experience; one dimensional apps, with users viewing content. The internet moved on with Web 2.0 websites, which allow users to input content back in and interact with the content. Virtual communities emerged, social networking sites, blogs and wikis are all examples of Web 2.0 sites. Apps also evolved, allowing users to contribute back to the system; this has been called Web 2.0m (Constantinou, 2013). One of the big issues for mobile developers at the moment is the choice between an app and a mobile accessible website. The introduction of the latest html (hyper text mark up) language update, html5, means that the web can offer a lot more for mobile users. This and other technological features and issues will be discussed in more detail in Chapter 4.

Mobile phones, particularly smartphones, are having a big impact on the way we live our lives. Not only can we be available and in touch with people 24/7, almost anywhere we go, both for private phone calls and work, but phones are not just used for calls now. New features, such as the camera, notes, GPS, maps, all the various apps and access to the internet mean that phones are used for a great variety of activities. Depending on one's view point, they are either enhancing our lives or damaging them; but in any case they are changing the way we live our daily lives.

Not just limited to simple tasks, apps can be used for a wide variety of purposes. It is common place now to pay for your parking using your mobile phone, one such example is the PayByPhone parking scheme at Westminster (City of Westminster, date unknown). Meyer (2014) reports that a new payment app, Zapp, will enable 18 million UK current account holders to use their mobile phones to pay for purchases. Other examples include apps that track our activity levels (Bupa, 2013) or help us to brush our teeth as well as possible (Oral B, 2013). Some theatres offer subtitles for the hard of hearing or subtitles in other languages via visitors' smartphones (Helsinki National Theatre, 2014). Smartphones can also be used as remote controls in the home, controlling the television and other technology and even getting live reports on your children's internet use. Whilst many of these developments still seem gimmicky, some offer genuine solutions for everyday activities and entertainment, and are likely to be used more widely in the future. Many people now rely on the phone's clock to tell the time and alarm to wake them up; email, news and social media are all regularly accessed via phones. In September 2014 the three most popular types of apps in the AppStore were: 1. Games, 2. Learning apps, 3. Business apps (Statista, 2014).

The heritage sector has woken up to the mobile boom and the possibilities that apps offer in heritage interpretation, and consequently there are many examples of mobile developments and apps in the heritage sector. Most of the major museums and galleries in the UK now offer an app or a whole host of apps for their visitors, often launching one to coincide with the opening of a new exhibition (Museum of London, date unknown, a; Tate, date unknown, a; Science Museum, date unknown; V&A, date unknown). Some examples of these apps include: Museum of London's hugely popular Augmented Reality app Streetmuseum (Lee, 2012) and the Tate's game app Tate Trumps (Tate, date unknown, b). All these apps and others will be discussed in more detail in the following chapters. (Details of all the apps can be found in Appendix 4).

The San Jose Tech Museum in America found that 65% of their visitors were using mobile phones during their visit to the museum. Lath Carlson, the museum's top exhibit designer explains that as the museum could not stop visitors from using their phones, it made sense to provide them with content that would 'enrich their experience' instead (May, 2015).

The National Trust and English Heritage both have an app that works as a handbook, helping users locate a site near them and access visitor information (National Trust, 2014; English Heritage, 2014a). Both organisations are also investing in further apps to some extent. The National Trust has five further apps and is currently developing a suite of apps which can be used by the various National Trust properties to add their own content (Scott, pers. comm., 2014). Howard Scott, Head of Digital at the National Trust (Scott, 2014) explains that the Trust is using various digital media to create 'special moments' and to 'help build meaningful connections between people and places'. He goes onto explain why mobile development is

important to the Trust:

> 'Before Christmas last year, around August, mobile traffic to our website was 40%. It then spiked after Christmas and reached 58% on 2nd January. That really got us thinking. We saw that people were coming to us from different devices. We also noticed patterns from different parts of the country. So we're working to capitalise on mobile and address the needs of the mobile consumer and the life they have with us.' (Scott, 2014)

Robert Campbell, Head of Interpretation (pers. comm., 17 September 2014) explains that English Heritage have taken a somewhat more cautious approach: the two further mobile phone applications created so far, have not been part of an overall strategy, but have answered individual business needs. An example of this is the Stonehenge Audio Tour, available on both iTunes and Google Play (English Heritage, 2014b). It is a free application which visitors can download and use on their visit to Stonehenge instead of hiring an audio guide on location. Stonehenge gets around 1.2 million visitors in a year, and at busy times the organisation has not got the capacity to hold enough audio guides on site, explains Campbell. So the application is intended to act as a supplement to the audio guides on site. If every visitor used the mobile phone application instead of the traditional audio guide device however, there would be concerns about the amount of downloads happening simultaneously, clogging up bandwidth, explains Campbell.

The Heritage Lottery Fund does not offer specific advice for smartphone applications, but includes them under digital technology. Their document 'Using digital technology in heritage

projects' (2012, p.4) explains that HLF can fund both projects where the main focus is the creation of digital materials for 'public engagement' or projects where digital 'is used for one specific element', playing a part of a wider interpretation picture. Smartphone applications are mentioned as two examples of suitable projects.

So there are many mobile and app developments in the heritage sector, but as new strategies are being formed to include mobile, there is a lack of information and evidence to base them upon. The Museum Association's Mobile Surveys (2012; 2013a) have been carried out among museum and heritage sites and give a very useful insight into current apps and future aspirations in the sector, but no indication of how well the apps are received by visitors and what kind of a visitor experience they provide. This study looks at the value mobile phone applications can add to heritage interpretation, by carrying out a quantitative survey among heritage app users. The results of the survey offer some evidence for how well current apps are addressing interpretation aims and will, therefore, help anyone planning their own organisation's strategy.

### 1.3 Thesis structure

The following chapters will discuss the research aims and methodology in more detail, explore the intellectual context of apps in heritage interpretation as well as the technological context and look at aspirations and possibilities in app development, before getting to research results and conclusions. Numerous examples of heritage sector apps will be included throughout the thesis.

Chapter 2 discusses the research aims and methodology in more detail, introducing the online heritage app survey and the paper based questionnaire for students, explaining the reasoning behind their use and the questions included. The scope and limitations of the study are also included here.

Chapter 3 explores the intellectual context of this study, drawing on relevant and recent research and literature, establishing the context of mobile phone applications in heritage interpretation and interpretation priorities today, as well as offering a definition for the word 'value' in the context of this study.

Chapter 4 looks at the technology behind mobile phone applications, outlining technological factors for organisations to consider before starting app development, explaining the development process and introducing the various technological features currently utilised in applications, with examples of the features in use in current heritage-related applications. This overview will help anyone considering app development for their own heritage organisation, in determining app characteristics which technologically answers their intended purpose.

Chapter 5 looks at the aspirations and possibilities in using apps in heritage interpretation, considering what potential benefits and opportunities mobile phone applications can bring to heritage sites and how they could add value to heritage interpretation, including: the potential of attracting a wider visitor demography, attracting younger generations, augmented reality, helping to keep the authenticity of the historic environment unspoiled, enabling users to become 'produsers', visitor participation and visitor generated marketing via social media, rich media, play, making archives accessible and accessing interpretation off site. This chapter includes several examples of apps on offer today, providing ideas and showing what can be

achieved.

Chapter 6 looks at the results of the research carried out for this study, including app survey results and school survey results.

Chapter 7 presents the conclusion of this study, including a summary of findings highlighting the strengths and weakness of apps in heritage interpretation, recommendations for further research and finally recommendations for practitioners.

# CHAPTER 2

# AIMS & METHODOLOGY

## 2.1 Research aims

Mobile phone applications are becoming more common place and many heritage organisations are producing their own apps. They are still, however, expensive to develop (Constantinou, 2013) and often the development process and budget does not allow for user testing and piloting. This was the case with the popular Streetmuseum app from the Museum of London (Lee, 2012) and Ian Tearle, the founder of Heritage App, confirms that clients' budgets are not big enough to stretch to user testing and piloting (2014). There also seems to be a lack of understanding and evidence for the value of apps in heritage interpretation, in terms of how well they answer key interpretation priorities and add value to the end user. Because of the lack of understanding, this research aims to find out how successful current apps are in answering some of the key priorities in interpreting heritage sites by evaluating app users' experiences.

A short list of top priorities was drawn together, based on the literature review, the findings of the Museum Association's Mobile Survey (2012) and communications with heritage organisations and managers (Berry, pers. comm., 2013; Kay, pers. comm., 2013; McBride, pers. Comm., 2013). In order to better understand the value of apps in heritage interpretation, this research looks at how effectively apps deliver the following interpretation priorities. The ability of apps to:

1. Offer good learning experiences
2. Engage visitors
3. Offer enjoyment
4. Offer more of the venue & objects on display
5. Make visitors value the heritage site more.

The strengths and weaknesses of apps will become clear as their ability to deliver these priorities is assessed. In addition, the research results will reveal useful information regarding how well different types of applications work and what challenges are faced when using them. The aim of the research is to use the data gathered in researching these priorities to formulate recommendations and insight for heritage interpreters, curators and managers, as they develop new interpretation strategies, especially their digital strategy and consider mobile development. This will enable them to successfully pursue their goals in developing heritage assets for the wider enjoyment of visitors.

Specific guidance is not possible as each heritage attraction is different, but the conclusions of the research offer some helpful recommendations for those working in heritage management and interpretation. These recommendations can then be translated into models of working and strategies, which will help practitioners present cultural heritage in a form that engages the 21st century visitor.

## 2.2 Research methodology

### *2.2.1 The online heritage app survey*

The research has been carried out by means of an online heritage app survey. Denscombe (2006, 2008, 2009), Sue and Ritter (2012), Tourangeau et al. (2013) (cited in Denscombe 2014, p. 14) have all found evidence which indicates that the quality of data gathered via web based surveys does not significantly differ from that gathered via more traditional methods, but there are many advantages for an online survey for a small scale study, such as this. The online survey enabled the gathering of feedback for a variety of apps, from different heritage sites around the country (and around the world), as well as feedback from a variety of people from varying locations and backgrounds. The survey took the form of a questionnaire with both multiple choice questions and an open question.

Face-to-face interviews and onsite data gathering would have been impossible for many apps and locations, such as town and city centre apps - for example Eye Shakespeare in Stratford upon Avon (Coventry University, 2013), Streetmuseum by the Museum of London (Thumbspark Ltd, 2014) and Cheshire Walls Quest (Imagemakers Design & Consulting, 2012) (a full list of apps mentioned is available in Appendix 4, with appropriate addresses). The sites/locations these apps cover are so widespread that users would be impossible to find. This would also be the case for any handbook type apps, such as the Natural Trust Handbook or English Heritage Days Out (National Trust, 2014; English Heritage, 2014a). Likewise, download figures for many apps are not high enough for onsite and face-to face data gathering to be realistic.

Purposive sampling (Denscombe 2003, p.15-16) is used in the sense that the target group is not representative of the whole population, but of people who had already used a heritage related app out of their own initiative and were able to fill in an online questionnaire. This sample represents people who showed an interest in both heritage sites and in mobile phone applications and owned the technology and know-how required to be able to download and use a mobile phone application. It was thought that this group of people would provide information that is most useful to heritage professionals considering app development. Other than this the online questionnaire meant that the target group was random and self-selecting. Defining the target group further would have been almost impossible as there are so many variables. These include the type of app used, the quality of the app used (a subjective choice), the type of heritage site visited, the age, gender, socio-economic background of the user, as well as whether they used the app on their own or with family and friends. Therefore, an online survey was designed and carried out using Survey Monkey, a copy can be seen in Appendix 1. Sourcing people to fill in the survey was achieved through a variety of means:

- Approaching people via Twitter. This included both people who work in the heritage sector and people who had tweeted about an appropriate app. Many museum and heritage professionals and researchers retweeted the request to their followers.

- Approaching people who used the app at the National Trust property Attingham Park, in Shropshire, and filled in an online feedback form.

- Approaching friends, family and acquaintances who have used heritage apps.

- Approaching other students at Ironbridge Institute.

Twitter was the most successful way of finding respondents. A total of 55 surveys were filled in and the results can be found in Chapter 6. Participants had the option of staying anonymous, hence a list participants is not available, not a breakdown of surveys completed by each of the sourcing methods.

The results of the multiple choice questions were analysed using the software and graphical tools provided by Survey Monkey. Answers to the open-ended question were divided into different categories with the same theme (Chapter 6 and Appendix 3) and counted. They were often also supporting information for the multiple choice questions, hence helping analyse those results further. All the results are presented in Chapter 6.

The first five questions of the survey assessed learning. Measuring learning is a problematic concept in many respects, as different cultures, authorities and individuals all have different views on what learning encompasses and what outcomes learning should deliver. The most appropriate way to measure learning, for the purposes of this research, seemed to be the use of Generic Learning Outcomes (Museums, Libraries and Archives Council, 2008). The Generic Learning Outcomes, or GLOs, were designed by the Inspiring Learning for All framework (ILFA). In the Arts Council Research Summary 'Future of Museum Learning enquiry' Cairns explains (2013, p.26):

> 'The need to evidence the social good being provided by museums, and so justify the investment by government and other funders influenced the development of the

> Inspiring Learning for All framework (ILFA) which has been widely adopted by the museum sector in the UK and adapted by international colleagues.'

Cairns explains further that ILFA was a product of the Learning Impact Research Project (LIRP), which was run by the Research Centre for Museums and Galleries at the University of Leicester and was initiated and funded by the Museums, Libraries and Archives Council.

> 'Generic Learning Outcomes were developed and used in large scale studies to measure outcomes experienced by children and young people 2002-2006. The results of these studies, the first large scale work in the UK, allowed the MLA to demonstrate to government in the terms of Generic Learning Outcomes the impact of museum learning on visitors' (Cairns, 2013, p.26).

Although the MLA has been disbanded and its remit passed over to Arts Council England (MLA, 2012; Graham, 2013, p.4), the ILFA website is still supported by the Arts Council, and the GLOs are still the only established tool for measuring learning in the sector, and have consequently been used by this research. Graham (2013, p.6) reports that the GLOs are used extensively across the sector, by museums to measure learning, to plan policy and develop exhibitions. The GLOs are also used as part of the government-funded Museums and Schools Programme's evaluation framework.

The Generic Learning Outcomes encompass five different areas as follows (MLA, 2008):

'a. Enjoyment, inspiration, creativity

b. Knowledge and understanding

c. Skills

d. Attitudes and values

e. Action, behaviour, progression.'

MLA states (2008) that the results '… will give a broad overview of the types of learning outcomes that respondents strongly agree / agree with after a visit', which in this instance can be translated to 'after using a heritage app'. The existing survey provided on the ILFA website was used for this research, including a question for each of the five areas above. The words 'mobile app' or just 'app' were added to each question, to make them specifically about apps.

The five questions/statements about learning were as follows:

1. Using the mobile app made my visit very interesting.
2. I discovered some new information because I used the app.
3. I found out how to do some new things using the app.
4. Using the app, I learnt some things that made me change my mind.
5. Using the app will encourage me to visit again.

Each question could be answered by clicking on one of five choices:

a. Strongly agree

b. Agree

c. Neither agree nor disagree

d. Disagree

f. Strongly disagree.

Moving on from learning to the next priorities, the following two questions/statements, sought to discover the value of apps in offering engaging and enjoyable experiences to users:

6. I found using the mobile app an engaging experience.

7. I had an enjoyable time using the app.

Question eight aimed to find out if users felt that they had seen more of the site and 'behind the scenes' which they would not have seen without the app. This could include museums archives and collections not on display, closed cupboards in a National Trust property, introduction to the decision making process of people working at the site, or simply walking further at a historical or archaeological site than one would without the encouragement of an app.

8. I saw 'behind the scenes' or more of the site using the app than I would have done without it.

Question nine aimed to find out if using the app had made a difference to how much users valued the heritage site:

9. Using the app has made me appreciate and value this heritage site more than I did before.

As all the questions so far have been positive statements, it was thought that there might be a risk of people agreeing with them, rather than disagreeing. Question ten is by contrast a negative statement, so that anyone who has had bad experience could indicate so by agreeing with this statement:

10. I found the app a distraction rather than a benefit.

Question eleven is an open question which allows people to write down any further comments they would like to make:

11. Likes & dislikes and any other comments you would like to make.

Remaining questions ask for information about the heritage site and the specific app used, as well as for users' age, gender, whether they have a disability and contact details if they are happy to be contacted about their answers.

### 2.2.2 *Paper based questionnaire for Barr Beacon School students*

An additional paper based questionnaire was filled in by 25 students at Barr Beacon School in Walsall. The students were all doing a media course and were between 16 and 18 years old. This questionnaire was designed to give an indication of the popularity of mobile phone applications compared to other forms of interpretation and the extent of mobile phone ownership and app downloads amongst this particular age group. It also looked at what app features this age group would most like to try. The questionnaire can be seen in Appendix 2 and the findings are used as supporting evidence in Chapter 5, for apps being a potentially effective method of interpretation for younger generations. The data gathered from the surveys was uploaded into Survey Monkey and analysed using the software and graphical tools provided by the website. The results can be seen in full in Chapter 6.

Barr Beacon School is located near Barr Beacon, a local landmark and nature reserve in Walsall, where a Heritage Lottery funded project called 'Raising the Barr' is being carried out. As well as restoration, the project includes the creation of new interpretation (Walsall Council, 2014). The questionnaire was linked to this project. In implementing the survey, it is important to situate the social and environmental context of the group. According to an 2012 ONS report Walsall and Wolverhampton had the highest figure, 28.1%, of people in the UK who have never accessed the internet (Harte, 2012). Statistics for mobile ownership and usage by area were not available but one could expect there to be some correlation between access to the internet and access to smartphones. As such, Walsall is a good place to carry out a survey amongst young people, as they are likely to have less access to expensive devices and possibly less likely to choose apps over more traditional methods of interpretation.

### *2.2.3* ***Interviews with heritage professionals***

A small amount of interviews with heritage professionals were carried out via various methods. As mobile phone applications in heritage interpretation is a new research topic with little published literature available, these interviews supplemented existing publications where required.

It was difficult to find  any information regarding the use of mobile phone apps within English Heritage, so the researcher contacted them directly, carrying out a phone interview with Robert Campbell, Head of Interpretation at English Heritage. The questions asked were:

1. Does English Heritage have a strategy for mobile phone apps/other mobile developments and if so what is it? (If not any thoughts instead?)
2. How do / will apps support English Heritage's wider aims & objectives?
3. 16-24 year olds are under-represented as visitors to EH sites, are you taking active steps to try attract this age group?

This interview is quoted extensively.

Vicky Lee, Marketing manager for the Museum of London was contacted via the Museum's website to ask further questions. These were to do with the collection of user feedback and latest download figures for the Museum's Streetmuseum app. Both answers are referred to in the text.

Howard Scott, the then Head of Digital at the National Trust, was contacted via email

regarding the latest developments of mobile phone applications within National Trust.

Several heritage professionals were contacted via email regarding their organisation's/project's interpretation priorities, in order to help define the interpretation priorities researched by this study. Replies were received from Tony Berry, the Visitor Experience Director at the National Trust; Sarah Kay, property Curator with the National Trust and Jeff McBride, heading Raising the Barr restoration and interpretation project for Walsall Council. These replies supported the literature review in choosing the interpretation priorities to research.

### 2.3 Limitations of the research

This research includes some limitations. The survey was filled in by 55 people, which does not make it a large target group but, however, significant enough for statistical analyses. The survey was only available online, not as a paper form at a heritage site. The questionnaire was aimed at people who had already used a heritage related app out of their own initiative, otherwise the target group was random.

A random target group seemed the best option, as it was thought to be infeasible to collect responses from a specified target group, because of the many variables involved. These variables include:

- age
- gender
- location
- socio-economic background

- device used
- alone or with family
- type of app used
- quality of app used
- type of heritage site app used at.

Some people filling in the survey were from abroad. These people gave lower scores across the survey compared to the average, and if they had not been included, the overall feedback would have been more positive. It was thought, however, that as apps can be downloaded by anyone, anywhere and hence are not only available for national visitors, but for international visitors too, a proportion of feedback from abroad was appropriate.

The researcher works in the field of media production and heritage interpretation and while working on this research, she was producing an app for a heritage interpretation project. Her personal and commercial interest in apps could be seen by some as a limitation. She was involved in the production of the Attingham Park app and is involved in producing some of the interpretation for Barr Beacon.

### 2.4 Scope of research

Apps discussed in this thesis include any mobile phone applications developed for use at all types of heritage sites (many can be used offsite as well), and for the various mobile platforms, such as iPhone, iPad, Android and BlackBerry.

QR codes are also included, although they are not apps as such. They rely on the use of a QR code reader app, however, so visitors are still using an app to access material. There is more information on QR codes in Chapter 4. Web apps or websites which are optimised for mobile use and available via mobile phones are not part of the study, but will also be discussed in Chapter 4. Apps developed for heritage interpretation can be as simple as a QR quote linking to a soundscape or as complex as location-based games, incorporating tangible prizes and augmented reality. Despite these various formats and purposes apps are technically the same: they are downloadable software applications for smartphones and tablets.

This research covers different types of heritage sites: museums, historic houses, galleries, churches, castles, ruins, outdoor spaces, historic town centres and landscapes. The research refers to the whole list when talking about 'heritage sites'. The thesis refers to heritage sites within the UK unless otherwise stated. Some quantitative surveys have been filled in by people from other countries, using apps in other countries. These will be pointed out in the research findings.

# CHAPTER 3

# INTELLECTUAL CONTEXT

## 3.1 Existing work

The previous chapter discussed the research aims and methodology of this study, and this chapter will look at existing academic work related to this study. Given the recent invention of apps, and the diversity of their use, it is unsurprising that there has not been any specific research published on the value of apps in heritage interpretation to date. There have, however, been many related research projects in recent years, some of which have been useful for this study. Additionally, theories of digital engagement in schools and among young people, media studies, as well as museum and heritage studies have all provided useful background information for this study.

The Museum Association has carried out Mobile Surveys (2012, 2013a), which offer some helpful insights into the current landscape of mobile usage in museums and at historic sites. The surveys reveal some of the priorities of museum and historic site curators and managers, but do not include any visitors' comments, so do not triangulate the value of mobiles in interpretation. The surveys will be quoted extensively in the next section, which considers interpretation priorities today. A similar survey on visitors' experiences of using mobiles in museums and at historic sites would be a logical next step following on from this survey. A primary aim of this thesis will be to assess visitors' experiences of using mobiles at historic/heritage sites, so as to establish users' perspectives on the value of developing apps

and mobile features for interpretation.

Some museums have carried out their own research into mobile use at the museum, such as the one carried out by Fusion Research & Analytics and Frankly, Green + Webb for the V&A in 2012. This research is of course specific to the V&A, but offers some helpful insights to anyone considering mobile developments. The research summarises that smartphones offer a significant opportunity to engage with museum visitors, particularly with younger audiences. Younger visitors are less keen to make use of the museum's traditional audio guide, and would prefer to use their own devices. However, as they are not 'traditional tour takers', the type of content and activity they would prefer was still unclear. Visitors with smartphones were already found to be using their phones to enhance their visit to the V&A. Tablet-based activities were thought best for home use, as visitors were not bringing their tablets with them to the museum. WiFi was thought to play an important part, and making visitors aware of its availability, was considered key. Practical aspects, such as offering facilities for visitors to charge their phones and headphones need to be considered. Visitors wanted easy to use features with access to basic information. The 'most immediate opportunities' were thought to be in relation to taking photographs and finding information, whereas games and activities were thought to be more suitable for specific audiences (Fusion Research & Analytics and Frankly, Green + Webb, 2012, p.4-5).

University of Leeds' research project 'Experiencing the Digital World: The Cultural Value of Digital Engagement with Heritage' (2014) is closely related to this work, but encompasses a variety of digital media not just mobile phone applications. The project ran from March to August 2014, and included a review of current literature as well as a questionnaire to museum

and heritage professionals. The aim of the project was to provide a critical review of digital engagement and its impact in shaping '… cultural experiences in the context of museums, galleries and heritage' (University of Leeds, 2014a). This research offers a host of recommendations for heritage professionals (University of Leeds, 2014b), mentioning that '… creating apps allows visitors to use their own devices, potentially making their experience more familiar.' And the headline finding read: 'Digital has the power to detract from, as well as enhance the value of heritage'.

University of Surrey has carried out a research project about apps which use augmented reality in indoor exhibition spaces, titled: 'Beyond the Visual: Augmented Reality in Spaces of Exhibition' (University of Surrey, 2013a). The research project was a collaboration between the Department of Computing and the School of Hospitality and Tourism Management, and explored the potential and difficulties of using augmented reality within indoor spaces. Existing methodology is dependent on GPS, which does not work in indoor spaces or image recognition, which can work in an art gallery, but not for example with 3D objects viewed from any angle. This project explored '… the type and form of the augmented content that should be displayed, based on the context of the location and the tourist within the room.' The project ran public trials at two local galleries, with a purpose-built app that combined augmented reality and indoor localisation. The localisation was achieved by '… using existing or low-cost Wi-Fi routers within the gallery' (University of Surrey, 2013b).

Caitlin Calhoon's MA dissertation about QR code use in heritage interpretation (2011) is a good insight into this specific topic. Calhoon worked with the National Trust property Attingham Park to incorporate QR code technology into an existing interpretation scheme.

The QR codes linked to ten short videos produced for this project and a Flickr album. Calhoon found out that visitors were keen to try out the new technology, but as not every visitor had a smartphone and the mobile signal was often weak or non existent at Attingham Park, QR codes worked best for extra 'added value' information and should not be relied on as the main source of interpretation. Onsite WiFi would have been beneficial. Calhoon concluded: 'A project such as this could easily be implemented at another National Trust site with better mobile reception and would likely work in many other heritage and museum settings as well' (p.15).

From a pedagogic perspective, Mark Prensky's work, including 'Digital Natives, Digital Immigrants' (2001) and the article 'What Can You Learn from a Cell Phone? Almost Anything!' (2005) offer important insights into the possibilities of the use of mobiles in education. As heritage sites also want to offer learning experiences to their visitors, some of Prensky's work can be applied to this study. In 'What Can You Learn from a Cell Phone? Almost Anything!' Prensky argues that formal educators in the USA see computers as an essential part of 21st century education, but look down on mobile phones. Prensky argues that mobile phones are, in fact, mini versions of computers, only more powerful in some ways. They are like small computers that are always with us and always switched on. Prensky writes: 'So rather than fight the trend for kids to come to school carrying their own powerful learning devices – which they have already paid for! – why not use the opportunity to our advantage?' (2005, p. 2). Finland has long been one of the leading countries in terms of educational achievement, although the recent PISA results have shown a downward curve in student achievements (OECD, 2013). The Finnish government's 'Uusi Oppiminen' (Eduskunnan tulevaisuusvaliokunta, 2013, p. 12) report, looks at the future of education and

recognises a need to keep on improving. It paints a picture of a future learning environment in which students access learning materials via iPads, use smartphones to take pictures and create virtual collections. New technologies and smartphones are used to find and access latest information as well as to produce school work. The same strain of thought can be applied to mobile phones at heritage sites, especially when used by young people. If young people arrive at heritage sites with their phones in their pockets, switched on and most probably used several times during their visit for a variety of activities, why not make use of them as part of their visiting experience? Since young people often engage with the world via a mobile phone, perhaps it can offer learning experiences and enjoyment as well.

Unfortunately, Prensky does not offer much research data to back up his arguments, but relies on generalisations and observations, and thus can be accused of lacking a necessary academic rigour. He endorses the use of computer and video games in learning, without much reference to the harmful effects that they have been found to have on the young. Recent research shows that both smartphones (Roberts, 2014) and computer games affect the brain (Kühn et al., 2011), but whether this change is a positive or even unavoidable progression of modern life or is wholly negative, is still debatable. Many would disagree with Prensky about the extent to which technology, including the amount of screen time, should be used, especially in terms of educating children. Numerous researchers argue that too much screen time for children can have negative effects on them. Dr Aric Sigman (Boseley, 2012) warns that children can get addicted to screen time and as a consequence depressed, with social skills and health also suffering.

There are still no clear answers as to whether mobile phones are completely safe to use. Researching the possible link to brain cancer is problematic, because cancers can take a long time to develop. Some research still suggest caution, especially when it comes to children (Ahonen and Koppel, 2012; World Health Organisation, 2011). Unless new research shows definite risks, this is not a consideration for the heritage sector, as any heritage apps used would only be used for a relatively short period of time, unlike technology used at home or at school.

Marshall McLuhan is considered the father of media and communication studies. His reputation was at its lowest around his death in 1980, with his theories being questioned, but today his books and theories are back in fashion and it even seems as if his message 'the medium is the message' is coming to fulfilment through mobile phones and the internet (Benson, 2011).

> 'In a culture like ours, long accustomed to splitting and dividing all things as a means of control, it is sometimes a bit of a shock to be reminded that, in operational and practical fact, the medium is the message. This is merely to say that the personal and social consequences of any medium - that is, of any extension of ourselves - result from the new scale that is introduced into our affairs by each extension of ourselves, or by any new technology' (McLuhan, 1964, p.7).

Federman (2004) explains that by 'message', McLuhan refers to the change of scale or pace or pattern that a new invention or innovation introduces into human affairs. He writes: 'It is not the content or use of the innovation, but the change in inter-personal dynamics that the

innovation brings with it.' Technology affects our lives and can even be life transforming, yet we often take up latest technologies without much thought on the impact they will have on us. The change in pace of life, availability and connectivity, all brought to us especially by mobile phones, have made a huge difference to our lives. These are the obvious changes but as Federman (2004) writes: 'A McLuhan message always tells us to look beyond the obvious and seek the non-obvious changes or effects that are enabled, enhanced, accelerated or extended by the new thing.'

Another useful branch of work for this thesis has been interpretation theory and museum studies. Freeman Tilden's book 'Interpreting Our Heritage' from 1957 (2007, 4th ed.) is already old, but is still very much the basis of modern interpretation theory and practice. This thesis uses his six priorities for interpretation as background material to define the interpretation priorities of today, against which to measure the effectiveness of apps.

Graham Black's 'The Engaging Museum' (2005) has been especially useful for the theories of learning and engagement in museums, which can also be applied to a large extent to heritage sites. He also discusses the Generic Learning Outcomes (GLOs), which have been used as a basis for evaluating learning in this thesis. Further information on the GLOs has been acquired from the Inspiring Learning for All website (Museums, Libraries and Archives Council, 2008).

## 3.2 Interpretation priorities today

### *3.2.1 Interpretation theory roots*

The widely established theory of Interpretation has its roots in the American National Parks Service (NPS) and in the museum sector, but has now been adopted across the whole heritage industry. John Muir, Enos Mills and Freeman Tilden were early American pioneers in natural and cultural interpretation (Black, 2005, p. 179-180; Smaldone, 2003, p.2). Amongst the magnitude of definitions, Freeman Tilden's six principles for interpretation have had an enduring influence, and he can be described as one of the founders of modern interpretation theory. Tilden described interpretation (2007, p. 33) as: 'An educational activity which aims to reveal meaning and relationships through the use of original objects, by first-hand experience, and by illustrative media, rather than simply to communicate factual information'. Tilden's work refers mainly to national parks, but is relevant across all heritage sectors. His six principals have been influential around the world for the past fifty years.

Tilden's six principals for interpretation are (2007, p. 34):

1. 'Any interpretation that does not somehow relate what is being displayed or described to something with the personality or experience of the visitor will be sterile.

2. Information, as such, is not interpretation. Interpretation is revelation based upon information. But they are entirely different things. However, all interpretation

includes information.

3. Interpretation is an art, which combines many arts, whether the materials presented are scientific, historical, or architectural. Any art is in some degree teachable.

4. The chief aim of interpretation is not instruction but provocation.

5. Interpretation should aim to present a whole rather than a part and must address itself to the whole man rather than any phase.

6. Interpretation addressed to children (say, up to the age of twelve) should not be a dilution of the presentation to adults but should follow a fundamentally different approach. To be at its best it will require a separate program.'

Tilden could not have foreseen the digital revolution and the way in which it has influenced the way we think and act today. Thus his perspective on the potential of 'gadgets' or electrical devices used to help carry out interpretation is coloured by the technology and the extent of its use of the day. He perceived the role of ‘gadgets’ as offering an interpretation that is a 'shade towards the worse' compared to a personally performed interpretation (2007, 4th ed., p. 133). That said, he agreed that a good electronic interpretation was better than no interpretation at all or a 'poor performance by an individual' (2007, 4th ed., p. 134). Often (although not always) the reason for electronic devices is the lack of people and resources to carry out personal interpretation, so his comment is probably a pragmatic recognition of this.

Interestingly, today there are extensive map-based mobile phone apps for the USA National

Parks, published by the National Park Service, National Geographic and other third parties. Many of them are mainly information and way-finding apps and some offer interpretation (National Park Service, 2013). The apps have received mainly positive feedback at the time of writing (5 December 2013), except for when the app has not worked on the user's phone or tablet for whatever reason (National Park Service, 2012; National Geographic, 2013).

### *3.2.2 From Veverka to today*

John Veverka, an American interpretive planner and trainer, and the author of the influential 'Interpretive Master Planning' (1994), has developed Tilden's six principles into what he calls 'Tilden's Tips' (Veverka, 2005)**:**

- 'Provoke the interest of the audience.
- Relate to the everyday lives of the audience.
- Reveal the main point through a unique ending or viewpoint.
- Address the whole (focus on illustrating a theme).
- Strive for message unity (use the right illustrations, vocabulary, etc. to present the message).'

According to Veverka (2005, p.2), the key to interpretation is to 'Provoke, Reveal and Relate' the message or story to visitors using a variety of different media. An information panel is not 'interpretive' if it only contains information and does not follow Tilden's six principles. The same could be applied to other media such as audio, video and mobile apps. This thesis will,

however, look at both heritage apps that are interpretive and those that are purely informational. For example, the Churches Conservation Trust app and the National Trust handbook app are purely informational apps, helping users locate properties and find useful information such as opening times. They exist purely for that purpose and are useful as such. Several people filling in the survey had used these apps. Where the lack of interpretation has affected the results of the survey, this will be mentioned.

Graham Black (2005, p. 185) has designed 'A model for interpretive planning' based on Veverka's ideas (1994). This model seems a good starting point for any interpretation, and should equally be taken into consideration when designing a mobile phone application:

> 'Plan:
>
> WHAT you wish to present – such as specific site/resource issues, themes, etc.
>
> WHO you are targeting the presentation at – consider the nature of the target audiences, their needs and expectations.
>
> WHY you wish to develop/change the presentation – by identifying specific objectives and *outcomes*. What are the *benefits* for the visitor, for the site/collections, for the organisations, and how are these benefits to be *evaluated*?
>
> HOW you intend to present the museum – the interpretative strategy and *gallery concepts* – to achieve the objectives set and the outcomes required.'

The following chapters of this study should help heritage organisations to answer the questions 'WHAT', 'WHO', 'WHY' and 'HOW' as they plan their mobile apps.

Moving onto how interpretation is described today, and the particularly to-the-point description offered by The Association for Heritage Interpretation (2013) which reads as follows: 'Interpretation enriches our lives through engaging emotions, enhancing experiences and deepening understanding of people, places, events and objects from past and present.' This statement reflects the perception that engagement is a critical element in successful interpretation. Graham Black explains that the 'one size fits all' approach has been the foundation of most past and present museum exhibitions, but is not acceptable to the 21st century museum visitors (2005, p.6). He writes: 'Museums must seek to provide both a palette of display approaches and a layering of content, to meet the needs of different audiences and support their engagement with collections.' Black goes on to write that the central challenge for museums at the start of the twenty-first century is to understand their audiences and '… to develop and retain new audiences' (2005, p.7).

### *3.2.3 Education and learning for life*

Another top priority for interpretation has always been education. Hill (2001) (cited in Black 2005, p.9) puts it this way: 'Our mission is to educate. We cannot do that if we are not serving visitors. We cannot survive if we are not assessing and satisfying the needs of our constituents.' Instead of 'educating', 'learning' might be a more useful word for heritage interpretation. Education often refers to formal, school-like, activity, to do with information and facts, whereas learning can refer to learning for life, acquiring new skills and changing your mind about something because of what you have found out or experienced. Eilean Hooper-Greenhill has done extensive research into learning and education in museums and writes (2007, p.3) that there has been a move from using the term 'museum education' to using

'museum learning' instead. And of course it is not just about terminology, but about a 'philosophical change' in what is expected of museums and how their task of educating is understood. 'The use of the word “learning” indicates an increased focus on the learning processes and outcomes of users, and a shift away from thinking about the museum and its educational delivery' (p.4).

The Heritage Lottery Fund's 'Thinking About Interpretation' (2009, p.4) document explains why the HLF funds interpretation projects. One of the reasons is to '… help people to learn about their own and others' heritage. Interpretation can support formal education and help visitors to learn new skills.' So this learning does not just include learning new information and facts but also: '...opportunities for people to gain new or increased skills.'

Hooper-Greenhill expands (2007, p.33) that learning is often thought of and described as the 'acquisition of new knowledge', but in fact encompasses more than that, learning '… includes the acquisition of skills, the development of judgement, and the formation of attitudes and values. It includes the emergence of new forms of behaviour, the playing of new roles, and the consolidation of new elements of personal identity.'

Hooper-Greenhill has also influenced the Museums, Libraries and Archives Council's Generic Learning Outcomes (GLO) which explore learning further, building 'on a broad and inclusive definition of learning, adapted from the Campaign of Learning' (Museums, Libraries and Archives Council, 2008).

This campaign identifies learning as follows:

> '- Learning is a process of active engagement with experience.
> - It is what people do when they want to make sense of the world.
> - It may involve the development or deepening of skills, knowledge, understanding, values, ideas and feelings.
> - Effective learning leads to change, development and the desire to learn more.'

This thesis uses the MLA's GLO's as a basis for measuring the value of apps in delivering learning for heritage sites. The MLA's quantitative research questions were adapted to include apps in the wording and assessed as per MLA instructions.

Hooper-Greenhill (2007, p. 9) explains the potential impact of learning in cultural organisations:

> 'If culture is understood as a process of signification, a means of producing meaning that shapes world views, then learning in museums and other cultural organisations is potentially dynamic and profound, producing self-identities.'

This potential is so much more profound than just learning facts, and consequently the power of museums and heritage sites to change lives has been a topic of recent research.

### *3.2.4 'Museums change lives', the social impact of museums*

A new initiative in 2013 was the 'Museums Change Lives', the Museum Association's vision for museums, encouraging increased social impact of museums and positive social change in communities. Maurice Davies explains that the Museum Association's vision follows the consultations carried out as part of the Museums2020 initiative, which looked at the future of museums and their wider impact, but Museums Change Lives does not '… slavishly follow the research but aims to lead thinking' (Davies, 2013, p.17). The report argues that museums '...can build on their existing strengths and look to the future by putting societal impact at the heart of what they do.' They '… must do more to reach out to potential audiences, make a difference to communities and address social problems' (Sharp, 2013a, p.32).

This vision is a mix of visionary thinking and, no doubt, the need to justify funding in an increasingly competitive market. Museums and heritage organisations want to show that economic contribution is not the only one they make to society. This is perhaps even more timely after the speech by Culture Secretary Maria Miller earlier in 2013. She said (BBC, 2013a) 'When times are tough and money is tight, our focus must be on culture's economic impact.' As well as proving their economic impact, museums are making a stance for the social impact they deliver.

The report has come against criticism from some in the sector, claiming it puts too much emphasis on one aspect of museums' work and not enough on other aspects, such as the collections (Sharp 2013b).

### *3.2.5 Making heritage come alive*

A trend certainly taking place at historic properties, and specifically within the National Trust, is to allow visitors to touch and try, to take ownership of the properties they visit, 'making houses come alive', a cause championed by the Trust's previous chairman Sir Simon Jenkins (The Telegraph, 2010). Examples of this are rooms where visitors can sit down and read a book, play the piano, stand by a lit fire or play billiards. Kitchens are often in action with volunteer guides dressed in historic clothing and cooking authentic food. Outside spaces offer opportunities for playing croquet, other garden games and children's activities. Conservation issues are also presented to visitors and work is often carried out in front of them, allowing visitors to take ownership and take part in the life of the property. In museums the same trend is being made possible with the use of new technologies. 3D laser scanning and 3D printing means that artefacts can be replicated for visitors to touch and feel.

Community archaeology has become more popular in the recent years, and can include anything from '… work carried out by professional archaeological organisations in which public involvement is encouraged, through to the many activities that are initiated and led by local communities themselves, such as historic building conservation, landscape survey projects, and of course excavations' (Council for British Archaeology, date unknown). Again, the aim is to make history come alive to the public and enabling the public to take ownership of archaeological projects.

Digital communities are emerging with the aid of social media. Visitors, and even potential visitors, are following heritage sites on Facebook, Twitter and other social media. And what's

more, not just following, but actively engaging in discussion about conservation, interpretation and other visitor engagement issues.

> 'Today mobile and ubiquitous technologies are ... enabling users to participate, spontaneously and continuously, in activities of collection, preservation and interpretation of digitized heritage content and new digitally mediated forms of heritage practice' (Giaccardi, 2012, p. 2).

Unlike more traditional methods of communication, social media platforms facilitate not only a one or even a two way stream of communications, but a three way stream, where visitors are able to interact with both the heritage organisations and with each other. This changes the way the public engages with heritage, increasing participation, ownership and discussion beyond what has been possible before.

### *3.2.6 Emerging technologies including mobiles*

Emerging technologies have long affected the way interpretation is carried out. Audio trails, multimedia guides, video displays and even touch screens are established parts of many heritage sites. Later additions to the digital family are 3D experiences created with the help of 3D laser scanning, augmented reality, smartphone applications and off-site engagement carried out via websites and social media. Many heritage organisations now have a person responsible for social media engagement and smartphone apps are becoming more and more a consideration, if not already in place.

Some examples of emerging technologies in action at heritage sites include the following: At the new visitor centre at Stonehenge, opened late 2013, the visitor experience includes a 360 degree projection, which gives visitors a virtual experience of being in the middle of the stones, which in real life is not allowed any longer. The projection also moves through millennia and from sunshine to snow. The projection was created by taking 3D laser scans and making the most accurate digital model of the stones to date (English Heritage, 2011; Kennedy, 2013).

Museum of London's Streetmuseum (2010a) is one of the best known heritage apps currently around. It is an augmented reality app that allows users to select a destination from a London map or use their phones' GPS function to locate an archive image near them. Users hold their phones' camera up to the present day street scene and an archive photo of the same location from a different era appears on their screens with accompanying information about the scene (Museum of London, 2010a). Users with more advanced phones can also use the 3D function to see past images appear as an overlay over the present scene (Museums, Libraries and Archives Council, 2010).

Macleod (2013) writes about exciting developments in America where an app by Audio Tour Hack was in use by visitors to the Guggenheim museum, before the museum knew of its existence. 83% of visitors to the V&A use their smartphones to take pictures of objects, 29% of visitors are checking visitor information with their phones (Atkinson, 2013). Museum Association's Mobile Survey (2013a) shows that half of the respondents (museums and heritage sites) provided visitors with a mobile offer, either on visitors own devices or on handheld devices provided by the museum/site. QR codes were the most popular technology

in use, with 63% of those with a mobile offer, offering them. 45% had a mobile-optimised website with 70% planning to develop one in the next 12 months. By far the most popular objectives for providing a mobile offer were:

'- to provide additional content to visitors 68%

- to provide a more engaging visitor experience 67%'

How well those, and other aims, are met through the various developments and apps is still unclear. Mobile phone development is a growing area in heritage interpretation. As shown by the Museum Association's Mobile Surveys (2012 and 2013a), a big percentage of both museums and heritage sites have already invested in it, and are looking to invest more. Not only that, mobile phones have become more and more important to visitors, and used daily for various activities. There has not, however, been much research into how effective and valuable apps are in delivering interpretation. There is only little evidence to show how effective they are in delivering key interpretation priorities, which is the goal of this research.

### 3.3 A question of values

Value is a contentious word, and as it is part of the title of this thesis it requires some attention. Value, as a word, covers both the monetary value of something and the importance or benefit we perceive something to have. When it comes to the cultural sector and heritage sites, this contention is even more obvious. Different people see the value of heritage sites differently. Recently this tension has surfaced in government policies. The Conservative

Culture Secretary Maria Miller suggested that the arts must prove their worth to the economy in order for them to receive public funding. She said (BBC, 2013a): 'When times are tough and money is tight, our focus must be on culture's economic impact.' Her speech was followed by much outrage from journalists and cultural organisations. The Shadow Culture Secretary Harriet Harman reacted by saying (BBC, 2013a):

> '… and she needs to promote the fact that arts and creativity is about much more than the economy: they're about a sense of identity, of community and the potential of each and every individual.'

This is, indeed, what most cultural organisations themselves argue, that arts have a value, other than monetary value, for example in building identity and community, giving us pleasure and improving our lives. The Museum Association's new vision 'Museums Change Lives' (2013b) aims to encourage and promote the social impact of museums. A study commissioned by The Happy Museum (Fujiwara, 2013) concludes that museums and arts have a positive impact on people's happiness even when all other variants have been taken into account.

In terms of this thesis, the term value has been taken to mainly cover not the monetary value apps can offer, but the benefit apps can bring to heritage interpretation, in providing meaningful experiences to visitors, as outlined by the interpretation priorities the study assesses. In some cases the benefit can cover both ideals, when, for example, a popular app increases publicity, widens media coverage and attracts more visitors to a museum or heritage site.

# CHAPTER 4

# TECHNOLOGICAL CONTEXT

The previous chapter looked at the intellectual context of this study, including interpretation theories, mobile phones in education, related work by past and present researchers and interpretation priorities today. This chapter looks at the technology behind mobile phone applications, the technological considerations for organisations to think through before starting app development, the development process and the various features that can the utilised in applications, including some examples of the features in use in current heritage-related applications. This overview will help anyone considering app development for their own heritage organisation, in creating an app which technologically answers the intended purpose.

In 2012, 1.75 billion mobile phones were sold worldwide (Gartner, 2013b). As the market has such a big commercial value, inevitably some of the most innovative technological development work is going into new features for mobile phones. What started off as phones, that were mobile, as opposed to landline phones, now include a whole host of innovative features, such as GPS positioning, maps, still and video cameras, internet accessibility, various apps and augmented reality features. It is impossible to predict what innovations will take place in the future and what can be achieved via those innovations, but it is clear that the current pace of innovation will continue for some time, which implies that mobile technology will become ever more powerful, ubiquitous and, increasingly, perceived to be an essential component of modern life.

### 4.1 What are mobile phone applications?

Mobile phone applications are software programmes which are developed to work on mobile phone or tablet operating systems: most require a smartphone or tablet to work on. Smartphones are not only phones, but they '...perform many of the functions of a computer, typically having a touchscreen interface, Internet access, and an operating system capable of running downloaded apps' (Oxford Dictionaries, date unknown). Take-up of smartphones has risen over the last few years, and according to a Deloitte consumer review in 2013, 72% of people in the UK owned one, compared to 58% just ten months earlier. 25-30 year olds were most likely to own a smartphone with 89% ownership, followed by 16-24 year olds with 85% ownership (Deloitte, 2013). Some applications can be ready installed on the phones at purchase, such as the calculator, maps and calendar, or downloaded by users from appropriate stores. There is a vast variety of applications on offer, such as live news feeds, social media applications, games, educational tools and shopping apps.

The most downloaded free iPhone apps of 2013 were:

1. Candy Crush Saga (a game)
2. YouTube (for watching videos)
3. Temple Run 2 (a game)
4. Vine (Twitter's video loop app)
5. Google Maps (maps)

(Bushey, 2013; Feinberg, 2013).

These are, however, most probably not the most popular or most used apps, compared to social media apps like Facebook, which most users would already have on their phones and not download again, hence it not showing on this list.

Apps can be free or require purchase. Typical prices vary between £0.69-4.99 (App Store Top Charts, 2014), although some can cost more. The app publisher can decide if they want to offer the app for free or charge for it. Some offer a cut-down free version and charge for the full version. There is more on monetisation later in the chapter.

## 4.2 Technological considerations for app developers

### *4.2.1 Choosing the operating system*

One of the first steps for any organisation planning to develop a mobile phone application is to decide which phones to develop it for. Different phones use different operating systems, and an app needs to be developed for a specific operating system or for several of them.

Today the main two operating systems for mobile devices are iOS and Android, which together represent approximately 89% of the market share at present (Page, 2014). Although Android's market share at 71.4% was larger than iOS at 28.1% in June 2014 (Page, 2014), iOS users had until then been more active online. Android users have, for the first time, taken over in terms of online usage in July 2014, despite Android's large market share for some time (Hamill, 2014). Consequently most applications are now developed for the iOS and/or the Android operating system. An application can only be downloaded on a device which uses the

appropriate operating system.

Android is owned by Google and the back-end platform for developing applications is open source, which means the source code is openly available for anyone to work with. Android apps are sold in Google Play (previously in Android Market) (Android Developers, date unknown). Apple's iOS platform is not freely available, but requires users to register annually for a developer account, for which they have to pay a small fee. As part of the fee, developers get a software development kit (sdk), which includes the various tools that enable them to create, programme, test, simulate and release applications (Apple Developer, date unknown). iOS apps are sold in AppStore.

There are other platforms as well, such as the Windows Microsoft mobile phone platform and Blackberry. Both of these platforms require a separate programming process. There is less and less development for Blackberry, and there is still no clarity on the success of the Microsoft platform. A significant investment is required if organisations want to develop for these platforms as well.

The market share between different platforms will most probably change in the future, due development successes and failures, marketing strategies and affordability, so latest statistics should be reviewed at the time of commissioning a new mobile phone application. Different devices also have different user groups. It has been hard to locate a UK-based survey into user groups but an American survey by Battery Ventures (2014) (cited in Schenck, 2014) categorises users by the following descriptions: iPhone users are more likely to have white collar jobs, travel by air and drink wine, whereas Android users are more likely to have blue

collar jobs, use public transportation and drink beer. This may seem a somewhat simplistic categorisation, and may mainly imply that most Apple products are more expensive than Android equivalents and targeted at a brand-conscious market.

There is no one simple right answer in choosing the platform or platforms to develop apps on, but this is something that requires careful consideration and a look at the latest statistics. Currently it would be advisable to develop both Apple and Android versions.

### *4.2.2 Screen size and resolution*

Another issue, mainly for the technological development team to deal with, is the difference between the screen size and resolution of different devices. Different phones have different screen sizes and the difference is even greater between phones and tablets. A good example is the difference between iPhone 6, which has a larger screen at 4.7 inches and the iPhone 6 + at 5.5 inches compared to previous models, which were all more similar in size; iPhone 4s for example were 3.5 inches (Swaddle, 2014). Larger phones and tablets have bigger screens, higher resolution and more vivid colours. They are delivering a different user experience compared to smaller phone screens. The development process for both is similar, but because of the shape and size graphical elements will be displayed differently and may need to be redesigned. The developers have the difficult task of offering a good design that will work on a variety of devices, including those that have not yet been launched.

### *4.2.3 Future proofing*

As with other technologies, there is the inevitable issue of future proofing. PDA's, Personal Digital Assistants, were the forerunners of smartphones. They were first used as pocket computers, with mobile phone functionality added later (Jundi, 2014), and were considered a useful tool for heritage interpretation and used accordingly. However, the introduction of iPhones and Android smartphones, with superior technology, meant that PDA's quickly fell out of favour. Interpretation projects designed for PDA's were well received by visitors (Walker, 2008, p.114), but have now become irrelevant. As this example demonstrates, it is of course impossible to predict the future and one day a new technology could take over from smartphones.

For now, smartphone and tablet technology is still really in its infancy and it is hard to predict what future developments might take place and how the market segmentation will work out. Unfortunately, it is inevitable that not every application will work on every device. It is possible, however, to update apps to work on more recent devices, without starting to build them from scratch. When commissioning an app, one has to think carefully about the required 'shelf-life' and, if necessary, leave a proportion of the budget for future upgrades.

A 'safer way' to develop an app would be to produce a so-called web app, which is an internet abled app, accessible via the phone's web browser. Web apps can be customised to phone resolution and made to act, as much as possible, as native apps. Web technology has been established for much longer and is not as likely to change over a short period of time. The application can also be updated at any point when developed in this way. There is more about

the downsides and benefits of using web technology instead of native apps in the following subsection. Another way to try to future-proof your app is develop much of the coding in html, which is more transferrable across platforms compared to native code.

### *4.2.4 Mobile-optimised websites and web apps*

One of the big issues for mobile developers at the moment is the choice between a native phone application and a mobile-accessible website or a web app. The introduction of the latest html (hyper text mark up) language update, html5, means that the web can offer a lot more for mobile users. Before investing in an app, heritage interpreters should consider the use of mobile-optimised websites or web apps instead. They are generally cheaper to develop, but often serve a different purpose to apps.

As a starting point the organisation's/heritage site’s main web page should be mobile-optimised, as more and more people are accessing websites from their mobile devices. Howard Scott, Head of Digital at the National Trust writes (2014):

> 'Before Christmas last year, around August, mobile traffic to our website was 40%. It then spiked after Christmas and reached 58% on 2nd January. That really got us thinking. We saw that people were coming to us from different devices. We also noticed patterns from different parts of the country. So we're working to capitalise on mobile and address the need of the consumer and the life they have with us.'

Robert Campbell (pers. comm., 17 September 2014), Head of Interpretation at English Heritage explains that the organisation's priority is to develop a really good mobile web offer, and a responsive website is currently under development.

Tijana Tasich from Tate and Charlotte Sexton from the National Gallery reinforce the importance of a well-developed mobile-optimised website (Lewis, 2013) reporting on the results of a user survey:

> 'The responses from the survey shows that users expect the same resources from mobile as they do from desktop and that this implied that one-off apps and reduced-content separate mobile websites are no longer suited to users' needs. Both Tate and the National Gallery, are working with colleagues to create unified digital experiences on web and mobile web.'

In America, the San Jose Tech Museum has built a website which looks like an app rather than a native phone app. Lath Carlson, the museum's top exhibit designer has found that '… most visitors won't take the step and download it [an app], especially if they're just coming in for one visit' (May, 2015).

Mobile-optimised websites and web apps can be developed by web developers, who add lines of programming to an existing or a purposefully built website. This new script enables the website to detect when it is been accessed by a mobile device. When the software detects that it is been viewed on a smaller screen it delivers a different view, specifically for that device, whether it be a tablet or a smartphone.

The percentage of web browsing done via mobile devices 'more than doubled between 2010 and 2013, from 24% to 53%' (Office for National Statistics, 2013), thus over half of all internet browsing is now done via mobile devices. Websites, which incorporate a lot of data, can be hard to access on mobile devices, as users will need to 'pinch' and 'zoom' and resize the screen in order to access all the data and view it at a reasonable size. Mobile-optimised websites fix this problem by feeding content in the right format for a good mobile browsing experience. Many well-built museum websites demonstrate this, meaning that visitors to the website have a good experience whether they access the site via a computer or a smartphone. The British Museum's website is one good example of this in practice, as seen in illustrations 1 and 2 (British Museum, date unknown).

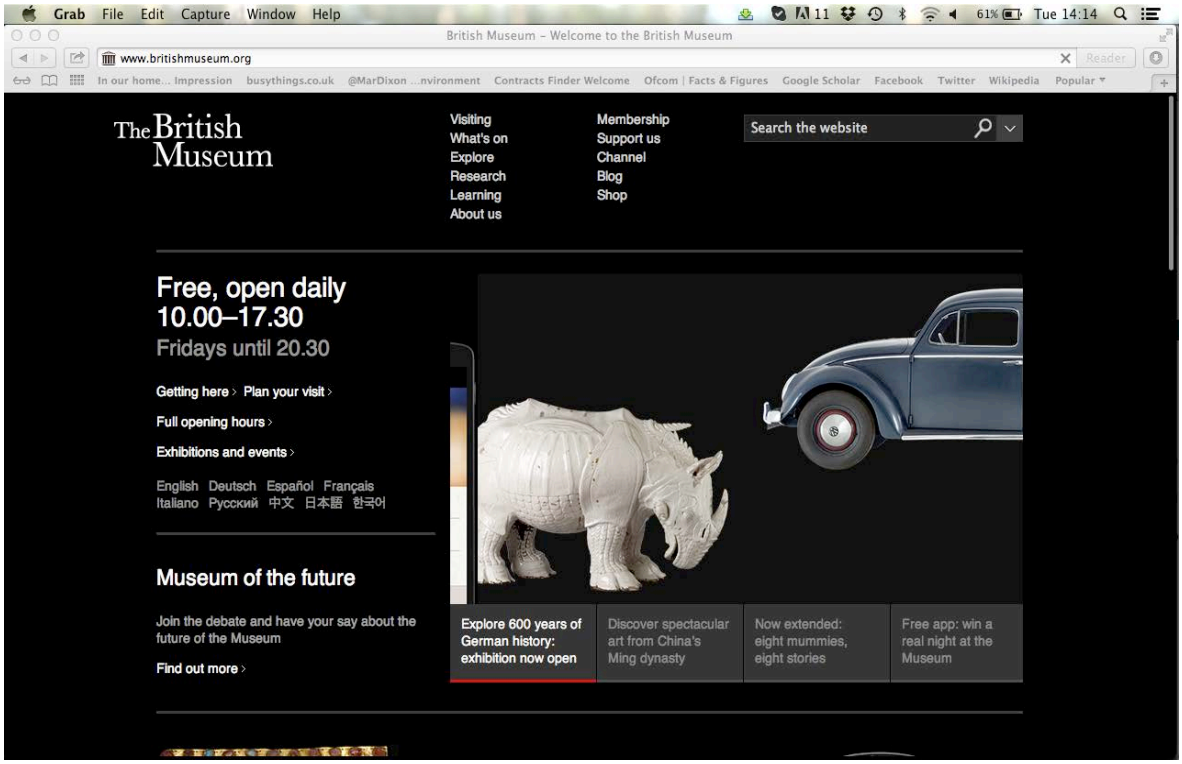



**Illustration 1:** British Museum's website homepage as viewed on a computer.

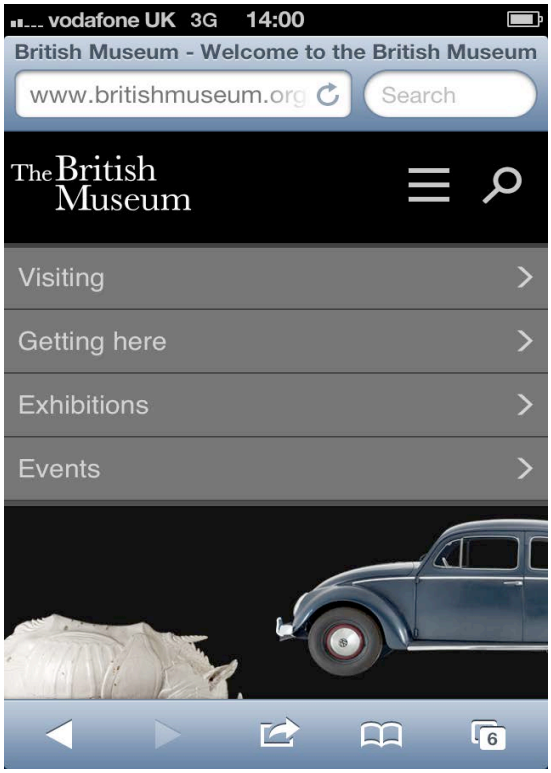



**Illustration 2:** British Museum's website homepage as viewed on a smartphone.

Mobile-optimised websites have some advantages over mobile phone applications. These include being cheaper to develop, easier to maintain and future proof, and viewable by anyone with access to a mobile device connected to the internet, no matter what device or operating system they are using.

Apps also have other benefits over mobile-optimised websites: Once downloaded they can be used offline, the design elements and user interface can look superior, and more functionalities are available for apps, as they can utilise all the phone's or tablet's hardware. Importantly too, it is easier to create chargeable apps than it is chargeable websites.

Alastair Somerville from Acuity Design (2013) suggests the following differentiation between app and mobile-optimised web offer: '… use apps for stories & experiences. Use mobile web for visitor info & artefact archive.'

Some apps are popular because they are more user-friendly than websites and tie into the users' needs. Dave Klein (2012) explains that people tend to download apps that they use regularly or apps which:

'...tie into their lifestyle. That's why so many smartphone users download the Facebook app instead of using the mobile version of the website. It offers a better experience for frequent activity, which makes the small time investment of searching for and downloading the app worthwhile. It also adds value by tying into the phone's mobile capabilities, such as making it easy to take a photo and instantly share it with friends.'

Apps are often developed for a specific purpose, such as a game that would not work on a website, a tour guide that uses the devices GPS for navigation, or an app implementing an augmented reality feature, none of which would currently be possible to provide on a website.

### *4.2.5 Accessibility*

Visitors' access to the technology required for running an application is something that needs to be carefully considered when commissioning an application. The first obvious question is access to devices. Many visitors do not own the required device to run an application, whether this is by preference or because the cost of the devices is an obstacle. The latest model of iPhone, currently iPhone 6, costs around £540 without a contract. People on contracts with mobile networks often get a phone as part of the package or at a discounted price. Cheaper models, such as an iPhone 4s currently costs around £150, whereas Android phones come in a wider price range.

It would seem that the best way to address accessibility is to develop mobile phone

applications which, where possible, offer an extra form of interpretation for those that are able and keen to make use of it, rather than offering the main form of interpretation at a site. The audio tour application for Stonehenge is a good example of this. The English Heritage visitor centre at Stonehenge hires audio tour devices for visitors. The centre does, however, not have the capacity to hold enough audio guides on site for busy visitor months, so the application supplements this and is also an option for those who prefer to use their own devices (Campbell, pers. comm., 17 September 2014).

Ability to download the application is another issue to consider. Some visitors will have an app already downloaded at home before they arrive on site, which is ideal, but many will not. For them download speed is an important factor. If it takes too long to download the application they will probably not end up using it during their visit. Factors that affect download speed are size of the app and the phone's connection to the internet at the time of download. Ideally WiFi would be offered by the heritage site. Free WiFi is becoming more and more expected, not only of heritage sites, but of all public spaces. Offering free WiFi at heritage sites can be a real benefit to visitors, who increasingly use their smartphones and tablets for a variety of purposes during a visit. It is important to test the 3G signal on site before starting app development, if no WiFi will be made available, and the WiFi speed when WiFi is available. Applications can be built in two ways: all the content can be made downloadable at the start or some of the content can be downloaded from the internet as the app is being used. The latter way will make the initial download faster, and enable the app to be used sooner, but requires constant connection to the internet as visitors move around the site.

Robert Campbell from English Heritage (pers. comm., 17 September 2014) points out that Stonehenge has 1.2 million visitors a year, and if all visitors used a mobile phone application rather than the audio guides on hire, there would be a massive volume of downloads going on at the site, clogging up bandwidth and making the download slow.

Different operating systems on visitors' phones, as discussed earlier, will mean that not all visitors, even with a smartphone, will be able to access and use the app, if their phones are not using the operating system the application has been developed for.

Many applications include audio and at most sites this would require visitors to have earphones with them in order to listen to the audio files without disturbing other visitors. An option for sites is thus to sell or hire out headphones for those wishing to use them, but there will the attendant problems of managing and resourcing this. At open sites, with no staff attendant, disturbing others is not so much the problem, but the surrounding sounds of traffic, wind etc. may make listening without headphones difficult.

Some applications can be draining on the battery. This is mainly the case for apps which rely on GPS use, as GPS requires heavy battery consumption. GPS features are very popular however, and users should to some extent be used to this by now.

For international visitors, data roaming charges are an issue to consider. Mobile providers charge different amounts for data roaming when you use your phone abroad. Charges vary depending on your phone provider, your contract and the country you are visiting. Many holiday makers have had an unwelcome surprise on their return home as their phone bill has

been more than they expected.  Data roaming charges within the EU are capped and providers cannot charge more than 46p per a MB of data downloaded (Smith, 2014). Data roaming charges could still be considered inhibiting for foreign visitors, but offering a WiFi connection on site would eliminate the cost, as downloads would be free that way.

The internet has a standard web accessibility code (W3, date unknown), which has been established for some time now, but mobile devices are a new technology, hence accessibility standards lag a little behind. However, many of the web accessibility rules apply to mobile accessibility as well, and in fact the devices, particularly iPhones, have many inbuilt accessibility features. Only a small amount of additional design and development is required to create an accessible app for people with various disabilities (Moore, date unknown).

### 4.3 Development process

Usually a professional team of developers is required to build an application, including programmers and designers. Apps can be either built using the operating systems' back-end platform— these apps are referred to as native apps— or using authoring tools available, with preset frameworks, where users can select templates to build apps quickly and easily. This is a quicker and cheaper solution but does not often allow the required customisation to create a quality application. Using 'html', a more well-known programming language for webpages, can also speed development process, which might take anywhere from a week to months, depending on what the organisation want to achieve and which platforms the app is delivered on.

George Constantinou (2013) from the Series Games Institute (SGI) explains the process:

> 'A typical process in our organisation would be a round about 12 weeks. A client would come to us with a concept. We would then spend the first two weeks storyboarding and planning that particular concept...a functional specification will be generated, which will be handed over to the programming team. They would then spend time programming the software that would allow the app to function on a particular device. Towards the end of that section of work we would put the app out for testing, we would then evaluate it for usability and performance. Once we are happy we would then submit to the appropriate store.'

Constantinou (2013) goes on to explain that SGI charge anything from £3000 to in excess of £30,000 for an application depending on the complexity and the time that is required to develop it. They recommend developing for Apple and Android platforms currently.

Getting the technology, the content and the user interface right is a key factor in app development. Pramis (2013) explains: 'While 79 percent of users will give apps a second chance after it failed to impress them on the first go, that number plummets to just 16 percent that will go back for a third attempt.'

**4.4 Some of the technological features currently used in apps**

According to research carried out by Nielsen (2013a), smartphone owners in the UK used their phones in a set 30 day period for:

- 92% text messaging/SMS
- 68% email
- 66% web browsing
- 63% social networking
- 56% applications
- 37% instant messaging
- 34% location-based services GPS
- 28% mobile banking
- 26% mobile shopping
- 20% streaming online music
- 19% video/online tv
- 18% barcode or QR scanning
- 4% NFC/mobile wallet.

As well as the basic building blocks, such as text, images, audio and links, apps can utilise a host of different technological features, tapping into the different features and applications available on smartphones and tablets - some of the most popular ones are introduced below.

### *4.4.1 GPS*

GPS, Global Positioning System, is an USA-owned utility, which uses satellites to provide users with positioning, navigation and timing services. GPS was originally developed for military and intelligence purposes but the civilian service is now freely available to all users

worldwide. Users need to be within unobstructed line of sight of at least four GPS satellites for the utility to function (National Cooridination Office for Space-Based Positioning, Navigation, and Timing, date unknown; Mio, date unknown). Some years ago, GPS was only available on the high-end mobile phones but has now spread to mid-range phones. Together with maps, it can pinpoint phone users within meters of their actual location. GPS is frequently used on apps for several purposes: to pinpoint users' location on a site map, to offer location-appropriate content and to help users navigate to a point of interest or around a trail.

**Examples of apps that use GPS:**

The National Trust app (Ill. 3), English Heritage Day's Out app and Visit Churches app by Churches Conservation Trust (National Trust, 2014a; English Heritage, 2014a; Serious Games International, 2012), and other similar apps, all use GPS to locate the user on a map and pinpoint the organisations' nearest visitor sites. Tapping and swiping actions move the map further from the user's current location, pinpointing further sites. When users select a site they are offered useful visitor information, such as opening times, how to get there and facilities. These are very functional apps, which people find helpful. Several people filling in the questionnaire for this study had used one of these 'handbook' type apps. They found the apps useful and convenient, but did not score them highly for 'engagement' and 'enjoyment', as they are mainly serving a specific purpose of finding a site and offering visitor information, rather than interpretation.

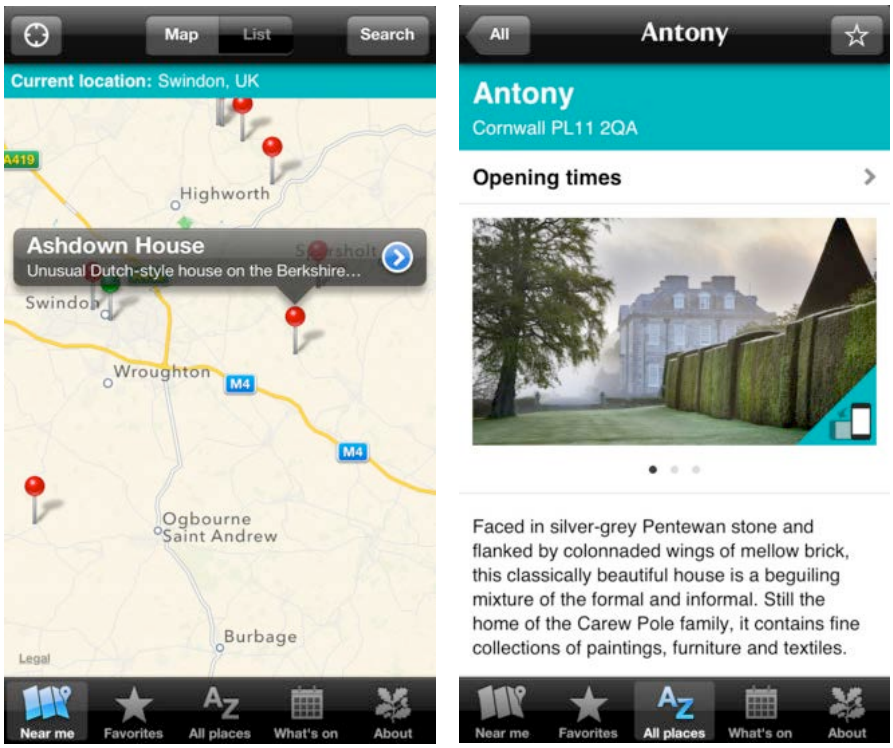



**Illustration 3:** Screenshots of the National Trust app from iTunes.


**Illustration 4:** Screenshot of the Historypin app from iTunes.

Another example is the Historypin app, which will be looked at more closely in the next chapter (We Are What We Do, 2014). Users can upload photos, videos, audio and text and 'pin' them on an appropriate location on a map (Ill. 4). Or users can also explore the Historypin maps, either remotely or by using their phone's GPS locator, to explore what images, stories, videos and audio have been pinned at a location near to them. Another way of using the app is to hold the phone up to the street and

the app will use GPS and the camera view to display nearby images. ‘By selecting an image, it can be overlaid onto the modern view to create an historical comparison...’ (Historypin, date unknown).

Tour & trail apps often utilise the GPS functionality of mobile phones to direct people along the route. Outside trails generally make use of GPS, whereas inside this is not possible due to GPS signals not moving easily through solid objects. The signal weakens when it travels through solid objects or provides either no information or inaccurate location information (Fredrick, date unknown), GPS is also often not accurate enough for indoor dimensions. Image recognition can work in a gallery with good lighting conditions and one-dimensional objects, but not, for example, with 3D objects viewed from any angle. Currently most indoor tours rely on maps and other wayfinding information to bring visitors around, although a recent research, carried out by the University of Surrey, managed to use a combination of augmented reality and indoor localisation, by using WiFi routers with the location (University of Surrey, 2013b).

### *4.4.2 Augmented reality*

Augmented reality (AR) offers a unique tool for heritage interpretation, which has not been available before, and is ideal for use on mobile phones. AR allows users to see a digitally enhanced live view of the real world. The real world view is augmented by computer-generated elements, such as sound, images, video, or graphics. When using smartphones and tablets, AR adds a layer of digital information over the camera view provided by the device (Layar, date unknown, HowStuffWorks, date unknown; Wikipedia, 2014).

Augmented reality apps often use the devices' GPS feature to find the users' location, and the compass feature to find their positioning. Some apps use the camera for image recognition and analysis. The app then finds relevant information and displays it over the live view of the real world using the device's camera (Augmented Reality On, 2012).

Atkinson (2013) reports:

> 'Although only 10% of museums taking part in the Museums Association’s 2013 Mobile Survey currently offer augmented reality to visitors, this could more than double in the future. When asked what mobile offer they planned to provide in the next 12 months, 32% answered augmented reality.'

Museum of London's Streetmuseum app (Thumbspark Ltd, 2014) is the best known heritage app and is one that uses AR. The app allows users to select a destination from a London map or by using their own GPS to locate an image near them. Users hold their phone camera up to the present day street scene and an archive photo of the same location from a different era appears on their screens with accompanying information about the scene (Museum of London, 2010a). Users with more advanced phones can also use the 3D function to see past images appear as an overlay over the present scene (Museums, Libraries & Archives, 2010). This is the feature that created the buzz around the app.

The app was a success in many respects (Museums, Libraries & Archives, 2010):

- 'it was downloaded 65, 000 times in the first four weeks
- it had extensive media coverage
- it increased social media and other online activity

- it raised the profile of the Museum among audiences and within the sector
- it increased visitors to the Museum – monthly target achieved in first week of opening new galleries'.

However, the feedback left in the AppStore is varied. Of all versions (since the first version was launched) users have currently left (iTunes as of 22 December 2013) the following star ratings:

- 442 ***** (highest rating)
- 294 ****
- 491 ***
- 408 **
- 601 * (lowest rating).

So an average rating of 2.8 stars and the most common rating being 1 star. Although the app was a success in many ways, particularly in raising profile, encouraging participation and bringing more visitors to new galleries, the actual user experience has often been poor (Ill. 5 & Ill. 6). The latest download figure is over 450,000 in January 2014 (Lee, pers. comm., 2014), quite an achievement for a museum app and it represents Museum of London's most successful marketing campaign to-date (Lee, 2012).

When examining the survey results gathered for this thesis and the user feedback on iTunes, AR apps do not get the best reviews and feedback. They can still be hard to use and often fail to deliver technologically. Expectation management for AR applications is something that

should be considered, although it may take away from the buzz that can be created otherwise. It is also worth taking into consideration that users are more likely to leave feedback if they have had either a very good experience or a frustrating experience and are keen to complain. As the Streetmuseum app shows, innovative apps can, however, create the best marketing opportunities, which can result in big download numbers, publicity and increased visitor numbers. Augmented reality will be discussed again in Chapter 5 – Aspirations and Possibilities, with some further examples of apps using AR.

**Illustration 5:** A screenshot of the Streetmuseum app from iTunes.


**Illustration 6:** The best AR image the researcher managed to get using the Streetmuseum app from the front stairs to Tate Britain.

### *4.4.3 QR codes*

QR codes were invented in Japan and first adopted by the automobile industry (History of QR code, date unknown). QR codes, or Quick Response codes, are not apps as such, but require a QR code reader app to function. They are matrix codes, similar to barcodes, which can be scanned with a QR code reader on a smartphone or tablet. Some devices are pre-installed with inbuilt readers, where as others require a QR code reader application to be downloaded. Free apps are readily available for the various devices. QR codes typically open a web site, thus obviating the need for users to type in a url address.

QR codes are currently the most common mobile features offered by museums. 63% of the museums and heritage sites offering a mobile feature for visitors provide QR codes, according to the Museum Association's Mobile Survey (2013a). They are a low-cost investment compared to bespoke apps and are often created in-house, as they are relatively easy to produce with free software. In addition, they can easily be made to link to existing or specially created web content. Some museums even link to wikipedia articles.

**Benefits of QR codes:**

- They are small, but powerful. They can be placed at locations where there's no space for extensive interpretation panels.
- Users don't need to have downloaded an app in advance, or even at the location, in order to be able to use a QR code, as long as they have a QR code reader on their phone and have a network connection that is fast enough to download the content

provided.

- QR codes are ideal when visitors/passers-by stumble on it at a historic site, and use the QR code to find out more.
- QR codes are easy and cheap to set up and maintain.

**Downsides of QR codes:**

- Many people consider them ugly.
- Lighting conditions have to be acceptable for QR code readers to work. Too little light or reflection on the code means the reader will not be able to work.
- QR codes require access to the internet in order to download content, whereas many apps can be downloaded in advance. Sites providing WiFi can make a big difference for usability.

**Examples of effective use of QR codes:**

A QR code outside a Denbighshire church helps explain the rows of graves for Canadian servicemen and women (BBC, 2013b). The code was created by a community-based project HistoryPoints.org. Scanning a QR code by the Canadian graves allows visitors to the site to learn the story, in English, Welsh or French, of how thousands of Canadian servicemen and women were stationed nearby after the end of World War I and how many of them died in the flu pandemic of 1918/19 and a few in mutinous riots, waiting for passage back home. The BBC article goes on to quote Rhodri Clark of HistoryPoints.org:

'It would be hard to visit the church in Bodelwyddan and not notice the rows of war graves outside. For many visitors, the graves have been baffling... We hope our QR codes will inform many people about what happened during the difficult winter of 1918/19. Anyone who reads the story as they stand beside the graves cannot fail to be moved by it.'

The website accessed by the QR code also provides the personal details of each of the men and woman buried in the graves, including next of kin, where known (BBC, 2013b).

Individual people have occasionally also adopted the QR code. A recent headline in the news read: 'Son fits QR code on war hero father's gravestone' (BBC, 2013c). The son wanted visitors to the graveyard to be able to learn about his dead father's remarkable life. A display on the graveyard is out of the question so a simple code provides a link to a website that tells the story. This is likely to become more common place in the future.


**Illustration 7:** The first interpretation board for a cycle route at Vantaa, with a QR code at the bottom.

Another interesting example of QR code use is from Finland, where the Evangelical Lutheran Congregation of the town of Vantaa created a cycle route to the oldest and most significant church in the region (Evangelical Lutheran

Congregations of Vantaa, date unknown). The route follows the historically important 'Kuninkaantie' ('King's Road'), a medieval postal route across the country. There are seven points of interest (POI) on the route, each displaying a small interpretation board with the name of the POI, map of the route with directions to the next POI and a QR code, as seen in Illustration 7. The QR codes link to a website with an aphorism, a photo, the historical context of the POI, a reflection and prayer.

More commonly QR codes are used in museums to link to extra information about the exhibits. New technologies have emerged which could replace the use of QR codes in the future, including Near Field Communication (NFC). NFC is a 'wireless radio communication standard' (Chandler, date unknown) which together with smart tags offers a powerful tool for sharing information. Smart tags incorporate memory which they are able to share with mobile devices at a close enough proximity (Chandler, date unknown). Museum of London is again leading the way in using this innovative technology. They have introduced NFC to enable visitors to find out more about the exhibits, link to social media, collect vouchers and coupons and download apps (Museum of London, date unknown, b).

> '...the MoL has made many of their exhibits interactive by including NFC tags in the actual exhibit, so the visitor simply taps their phone to the tag and is taken to videos, audio, games, or other information about whatever it is they are viewing. This helps to make the visitors experience far more interesting and enjoyable, and hopefully leading to more visits in the future' (Boyle, 2013).

### *4.4.4 Monetisation options*

One of the decisions facing heritage professionals developing smartphone applications is whether to offer them for free or whether to charge for them. Apps can be expensive to develop and the potential to recoup money is attractive. The sustainability of digital technology offer is also an important consideration. There is, however, no evidence for how much money visitors are willing to pay for apps. A paid-for app may get fewer downloads and less exposure, which could be counterproductive from a curator's point of view. Online resources are still very much free of charge and newspapers, for example, have struggled to attract a paying audience online, with latest figures showing that 9% of the UK population have used paid-for online news content (Kelion, 2013). Although perhaps encouragingly for newspapers and others wanting to charge for their content, the figure has more than doubled in the last 10 months and younger people are more likely to pay for online news content than older people.

Currently most museums are looking at developing free apps. The Museum Association's mobile survey (Atkinson, 2013) found out that: '… just under half of those surveyed plan to introduce free apps for Android and Apple phones (43% and 39%). About 10% of those surveyed plan to launch paid apps, and 5% intend to provide a mix of both.'

The other option for monetisation is to offer in-app purchases. According to Apple (date unknown) there are four types of in-app purchases (Table 1):

| 'Type | Example | Description |
|---|---|---|
| **Consumable** | Extra health<br>Extra experience points | You need to purchase these items every time you want them, and you can't download them again for free. |
| **Non-consumable** | Bonus game levels<br>City guide maps | You purchase these items one time, and you can transfer them to multiple devices authorized with the same iTunes Store account. |
| **Non-renewing subscriptions** | One-month subscriptions<br>Location service subscriptions | You can purchase these items again after the subscription period ends. |
| **Auto-renewable subscriptions** | Weekly newspaper subscriptions<br>Weekly magazine subscriptions | You can purchase these items with different renewal periods.' |

**Table 1:** In-app purchases as categorised by Apple.

In-app purchases, especially the ones where users can purchase virtual content for the app, have to some extent a bad reputation, mainly due to inadvertent purchases, usually made by children without their parents' permission or knowledge (Dredge, 2014; Walker, 2014). Some apps provide a free 'light' version but charge for a full version. The National Geographic City Guides app (2013a) is an example of this. The app description reads:

> '… free with each city are local tips, current weather, fun facts, and a selection of iconic photos. Purchase the complete guides for the richest travel experience: curated point-by-point walks, customizable itineraries, city secrets, stunning photo galleries, and much more' (National Geographic Society, 2013a).

Some apps offer a free first edition and charge for further editions, such as Museum of London's Dark Dickens London app (Brothers and Sisters Creative ltd, 2012). The first edition is free and the four subsequent editions cost £1.49 each (Museum of London, 2012). Lee writes (2013): 'To make our modest budget go further, we experimented with a new way of working, introducing a download charge and agreeing on a commercial venture with the agency in return for reduced fees.' Other options for monetisation include offering a way of purchasing souvenirs or making donations.

**Benefits:**

- Possibility of recouping some of the money spent developing the app or even generating income.

**Downsides:**

- Possibility of fewer downloads and fewer visitors using the app.

**Examples of in-app purchases in heritage apps:**

**Eye Shakespeare** (Serious Games International, 2012)

Eye Shakespeare app is '… an innovative, free smart phone application (app) designed for iPhone and iPad, which showcases the treasures of the Shakespeare Birthplace Trust in a unique street guide to Shakespeare's Stratford' (Shakespeare Birthplace Trust, date unknown), see Illustration 8.


The app was a partnership project between the Shakespeare Birthplace Trust, the Serious Games Institute (SGI, Coventry University), Hewlett Packard and Danwood. The project ran from July 2011 – June 2013 and was funded by project partners and by the Technology Strategy Board (Hopes, 2014).

**Illustration 8:** Screenshot of Eye Shakespeare from iTunes.

Users of this app can buy Stratford souvenirs on their phones and a personalised picture of themselves with William Shakespeare, using the phone's camera. 'The resulting souvenir pictures can be digitally printed at the Shakespeare Birthplace Gift Shop. It is the first time this form of technology has been available from a mobile device' (Shakespeare Birthday Trust, date unknown). The developers, however, have no clear insight into how many souvenirs have been sold via the app, as the '...app's retail section is integrated with the e-commerce part of the Shakespeare Birthplace Trust website' (Hopes, 2014). The innovative idea of selling personalised pictures of users with William Shakespeare has not resulted in any sales (Hopes, 2014).

**Dickens' Dark London** (Brothers and Sisters Creative Ltd, 2012)


**Illustration 9:** Screenshot of the Museum of London's Dickens' Dark London app.

Dickens' Dark London is Museum of London's app, following the hugely successful Streetmuseum and Streetmuseum Londonium (Ill. 9). The app was built to coincide with the 'Dickens and London' exhibition. The iPhone/iPad app '… takes users on a journey through the darker sides of Charles Dickens' London' (Lee, 2013). The app comprises of specially commissioned illustrations, audio descriptions of Dickens' Victorian London, read by well-known actor, Mark Strong, and includes factual information about London. The app instalments were published monthly during the exhibition, replicating how Dickens released his own writings. 'All editions of the app were brought together on an 1862 map of London, overlaid on a modern satellite map of the capital, allowing users to compare the city that Dickens knew with the London of today. The first edition was made available free of charge, while each subsequent edition could be downloaded for £1.49' (Lee, 2013) or for free at the museum or at selected locations on the map.

This app, like the earlier ones by the Museum of London, was a success, meeting and exceeding expectations. Projected app download figures were exceeded, the 'Dickens and London' exhibition visitors targets were exceeded, as well as the annual museum visitor

numbers, and the app also had substantial media coverage (Lee, 2013). However, the museum team came to the conclusion that apps do not offer a realistic revenue stream. Vicky Lee (2013) explains that a surprisingly large proportion of users visited the museum or one of the locations where the app could be downloaded for free. She carries on to explain:

> 'This was positive in terms of driving footfall but didn't help us recover costs. If you're developing an app to raise your profile then think of it as a piece of advertising or PR. As long as the campaign has met its objectives, any income generated is just a bonus. In the museum sector you generally don't develop apps with the sole intention of making money.'

More experience is needed to find out the best way forward, but from these two examples, it would seem that monetisation of heritage apps does not currently provide a financial return, but trends may change in the future.

#### *4.4.5 Camera*

Many people now use their smartphone, instead of cameras, for taking photos. It is simply more convenient to use one device for several purposes than to carry several devices with you. The picture quality of mobile phone cameras is compromised compared to dedicated camera devices but the technology is constantly improving. Pictures are also easier to share, on social media, or via text and email, which makes the use of phones attractive compared to cameras. In America, 85% of mobile phone users take photos with their phone, which makes it the most popular activity on a mobile phone! The next most popular activities were sending

and receiving text messages, which were used by 80% of people and then accessing the internet, a feature used by 56% of mobile phone users (Duggan and Rainie, 2012).

Using smartphones for photography applies to heritage sites just the same as anywhere else. Visitors to the Tate can be seen taking photos of art work, photos of the statues of Paddington Bear around London from Visit London's 'Paddington Trail' are arriving on social media as people spot them (Visit London, 2014) et cetera.

Fusion Research + Analytics survey (2013) among visitors to the National History Museum reports that:

> 'The majority of smartphone users report having used their smartphone in a museum/gallery or cultural site. Top museum related smartphone activities include taking photos and sharing experience via social media.'

Given the popularity of smartphones for taking photos, it makes sense for heritage sites to engage with visitors in this activity. This obviously requires a policy which allows photography in the first instance, which is not always possible. Many apps make use of the camera function on phones, including augmented reality apps, which rely on the phone's camera for displaying an augmented view over the real world view seen through the camera lens. Some apps also include features for taking photos with an augmented element on the screen, such as the Eye Shakespeare app (Serious Games International 2012), which allows users to take a photo of themselves with a William Shakespeare re-enactor. The photo will, however, not appear in the camera's photo album but has to be purchased at the Shakespeare Birthplace Gift Shop (Shakespeare Birthday Trust, date unknown).

Another application allowing users to take photos with augmented reality is the Visit Island of Wight's Dinosaur Island app (2014). Visitors can use the augmented reality feature to watch 3D dinosaurs walking in front of them via the phone's camera and take pictures of '...family and friends walking alongside the dinosaurs that roamed the Isle of Wight 130 million years ago' (Visit Island of Wight, date unknown).

In the age of 'selfies', photographs taken on site are often shared on social media, providing free marketing to the heritage site. But are there any downsides to this new craze? Psychological scientist Linda Henkel argues that people often bring out their cameras '… almost mindlessly to capture a moment, to the point that they are missing what is happening right in front of them' (Association for Psychological Science, 2013). Some curators may side with this argument and prefer their visitors to have a more traditional experience. However, if photography is allowed, phones will no doubt be used for photography, so it could be argued that it is better for heritage sites to engage with this phenomenon in arranging meaningful and engaging activities for visitors.

### 4.5 Conclusion

In this chapter we have looked at what mobile phone applications actually are and the technological considerations for those planning to develop an app. These include choosing an operating system, addressing issues to do with various resolutions for different devices, the difficulty of future proofing, the choice between apps and mobile-optimised websites and accessibility. We have also discussed the development process of an app and looked at some of the technological features currently used in applications. These include: GPS, augmented

reality, QR codes, monetisation and use of the phone's inbuilt camera. There would be host of further topics to delve into, such as data capture, the recording of visitor information as they use an app, which can be utilised in market research and offering visitors considered suggestions of further ways of engagement.

The next chapter will examine the possibilities that app development offers for heritage sites. What potential benefits and opportunities can mobile phone applications bring to heritage sites in order to add value to their interpretation offer?

# CHAPTER 5

# ASPIRATIONS AND POSSIBILITIES

The previous chapter looked at the technology behind mobile phone applications and some of the features often used by apps, as well as the technological challenges faced by app producers and users. This chapter will consider the aspirations and possibilities in app development, again, specifically in the context of heritage sites and organisations. What potential benefits and opportunities can mobile phone applications bring to heritage sites and how could they add value to heritage interpretation? This chapter will include several examples of apps on offer today, provide ideas and show what can be achieved.

## 5.1 The potential of attracting a wider visitor demography

Visiting heritage sites is a very popular pastime activity for many people in the UK. The Heritage Counts 2013 report (English Heritage, 2013, p. 29) includes some of the latest figures for the sector and reports that 'the number of visitors to historic attractions has increased by 28% since 2002. Historic houses attracted the most visits, followed by gardens and places of worship.'

The National Trust had 20 million visits to its pay-for-entry properties in 2013/14 and 4.1 million members (National Trust, 2014b, p.1, 5). There were 4.1 million visits to English Heritage staffed properties in 2012/2013 and individual membership stood at 831,000. Churches Conservation Trust churches had 1.9 million visits and Historic Houses Association

members' properties had 11.2 million visits (English Heritage, 2013, p. 36).

However, when visiting a heritage site, it is quite easy to make an observation about the type of visitors that are most represented on site. The majority of visitors are from a similar socio-economic background and of white ethnic origin. Importantly, the Heritage Counts report tells us that participation in heritage is becoming more inclusive, as groups which have been underrepresented in visitor numbers have seen above average increases in recent years (2013, p. 35):

- 'Black and ethnic minority individuals (up 6.6 percentage points to 57.2% visiting at least one heritage site in the last 12 months).
- Social tenants (up 4.1 percentage points to 50.5%).
- Lower socio-economic groups (up 5.2 percentage points to 62.3%).
- People with limiting illness or disability (up 5.5 percentage points to 69.4%).'

Dame Helen Ghosh, the Director General of the National Trust writes (National Trust, 2014b, p.2):

> 'I am also clear that we need to present and explain our historic buildings in a way that engages visitors of all kinds, and reinforces the importance of their history in the lives we live today.'

Many heritage organisations take active steps in trying to attract non-traditional visitors. Therefore, a heritage interpreter's task is to keep the main audience happy while trying new

ways of appealing to people groups who visit less. Any new ideas for attracting non-traditional audiences are worth considering, but mobile phone applications are perhaps limited in addressing these issues. The ability to address multiple audiences can, however, be utilised, with distinct tours and options to choose from. Different tours could be created for people with mobility limiting disabilities, for example, taking them on a physical tour of the downstairs and a virtual tour of the upstairs with a mobile phone application. Some sites already do so with a computer based downstairs. Special interest tours could be created for ethnic minorities, where appropriate. Some National Trust properties, for example, have collections with a link to different parts of the world, which may offer an opportunity for a special interest tour. One such example is Kedleston Hall in Derbyshire, where 'Lord Curzon's Eastern Museum is a treasure trove of fascinating objects acquired on his travels in Asia and while Viceroy of India' (National Trust, date unknown, a). Another example property is Osterley House and its interiors, which '… were shaped by the luxury items from the East India Company' (National Trust, date unknown, b).

The option of using different tour guides is also appealing and can help to cater for different types of visitors. Each tour guide could, for example,  imitate a different newspaper in its style, varying from The Daily Mail to the Times, hence offering information in both a familiar and a relevant manner. A short tour guide introduction would enable visitors to choose one that they find most interesting and engaging and one which will hopefully be most fitting for their reading style and areas of interest. Here the writing style is key and may require specialist editorial involvement, in order for the relatively short introduction to enable visitors to choose the most appropriate tour guide for them. The content of each tour needs to be carefully thought through and, again, offered in the right style of writing. The field of

education and adult learning is utilising different 'pathways' for different learning styles, such as the ones stemming from David Kolb's 'experiential learning cycle' and Honey & Mumford's 'Learning Style Questionnaire' (Cassidy, 2004). When tour guides are utilised, these and other learning styles theories may be worth taking into consideration. These special features in mobile phone applications offer a great way of catering for a wider visitor demographic. Although unlikely to dramatically change visitor demographic, they may help to some extent.

Another group that is less likely to visit heritage sites are young people, 16-24 year olds (English Heritage 2006, Hayward 2010). 16-24 year olds do not necessarily follow their parents any longer and do not visit of the own accord, whether it be due to economical constraints, lack of transportation or lack of interest. This is something that mobile phone applications may help towards, and it is looked at more closely next.

### 5.2 Generation gap – Digital Natives versus Digital Immigrants

> 'The differences in participation by age group follow an inverted u shape – attendance is significantly lower for younger people aged 16-24, highest for prime working age adults, but then falls off for older adults and especially those aged 75 plus.'

This inverted u shape was described in an older Heritage Counts report from 2006 (English Heritage, 2006, p. 35).

In 2009, 16-24 year olds represented a mere 3% of English Heritage visitors (Hayward 2010, p.12). English Heritage is not alone with the challenge to improve participation among 16-24

year olds. Neither English Heritage nor the National Trust segment their visitors by age, however, but by motivation (Campbell, pers. comm., 17 September 2014; Berry, pers. comm., 2013). So their marketing and segmentation does not necessarily take into account young people's needs and preferences.

Older generations are more familiar with traditional methods of communication and often also more content with them. At a heritage site, traditional ways of communicating usually mean information boards, leaflets and information sheets, guided tours, volunteer guides and audio tours. Younger generations, although familiar with reading text, often have higher expectation of interaction and entertainment. They are used to looking into interesting tangents and often enjoy experiencing several media simultaneously, e.g. listening to music while reading. Heritage professionals have to think of new ways of providing information for these visitors in order to meet their expectations.

Watson (2011, p.13) describes the younger generation as 'screenagers':

> 'Screenagers have a desire for personalized experiences, and a preference for reading text in a nonlinear fashion and for images over words. They also want speed. They expect things to happen quickly and, as a result, have next to no patience. Digital content is usually available almost immediately and this mindset of instant digital gratification is translated to the nondigital world. Waiting 90 seconds for a hamburger is ridiculous to the average screenager. So too are queuing in a bank and physically interacting with someone you don’t know.'

Implementing some form of digital interpretation seems an obvious solution to the generation of 'digital natives', as described by Marc Prensky (2001). 'Digital Natives', according to Prensky, are people born after 1980, with sophisticated knowledge of digital technology and the skills to use it. Digital natives often have different learning styles and preferences compared to previous generations. Prensky explains (2001, p. 2):

> 'Digital Natives are used to receiving information really fast. They like to parallel process and multi-task. They prefer their graphics before their text rather than the opposite. They prefer random access (like hypertext). They function best when networked. They thrive on instant gratification and frequent rewards. They prefer games to “serious” work.'

Leaflets, information sheets, guided tours, volunteer guides and audio tours do not seem something that would alone satisfy either 'screenagers' as described by Watson, or 'digital natives' as described by Prensky.

Prensky (2001, p.2) also describes 'digital immigrants', the generations that did not grow up using digital technology and are not native speakers of the 'digital language'. 'Digital immigrant' teachers often think 'digital natives' are wrong rather than try to adapt their own teaching style to help their pupils. Prensky goes on to argue that teachers often try to get their students to learn by using 'structure, text and logic', but 'digital natives' use a new language. As we move into the 21st century, the majority of people are becoming more familiar with digital technology, therefore Prensky (date unknown, p. 1) suggests a new term, 'digital wisdom', to describe wise use of digital technology by both 'digital natives' and 'digital

immigrants'.

Mobile phone applications are one of several digital solutions and, perhaps, increasingly a good choice for not only addressing younger audiences but also getting them to participate and contribute.

Computers are seen as an important tool in education, and in the UK computer skills are already introduced at foundation stage, the earliest years of education (Foundation Years, 2012). Mobile phones, on the other hand, are seen as a distraction - and of course they can be that! They are, however, powerful tools, just like computers, only cheaper, smaller and more portable, and of course also work as phones. Most children and young people are very familiar with their phones and often very attached to them. Mobile phones have become the main tool for young people to communicate with friends and the wider world. In 2012, 99% of 16-24 year olds used a mobile phone, this was the highest percentage of any age group in the UK (ONS, 2012). And in 2014 '… almost all those aged 16-24 (96%) had used a mobile phone or portable device to access the internet “on the go”' (ONS, 2014). As such, they offer a tool that is worth considering for communicating with the younger generation.

Some argue, however, that there is reason to be cautious of the way technology is changing the way we live our lives. Should we let technology dictate our behaviour or make choices for us? What about making choices for our children and young people as they grow up? Toddlers are attracted to mobile phones but most parents do not want their toddlers to be spending hours playing games. With teenagers this question becomes harder. Does constant access to technology and the internet affect us negatively? Carr (2008) argues just that. He writes that

the way we read and think has changed, that we have lost our ability to read lengthy articles or concentrate in thinking, as it is in the economic interest of web site providers to drive us to distraction and jump from one page to the other. Carr refers to computer use and the internet, but mobile phones work really as mobile mini computers, so the comparison between the two is justified. In fact, reading anything of length is even harder on the smaller screen of mobile phones.

Miller (2014, p.12) makes a point against the use of excessive technology and in favour of an 'analogue' experience in the context of young people engaging in the arts:

> 'There are often misconceptions that programmes for young people need to be made "cool" or that contemporary art and digital platforms are key to engagement, rather than art and analogue experience. What young people from any background want is the opportunity to progress, broaden horizons and gain a sense of ownership.'

Campaigns which are decidedly 'anti-technology' and 'back to nature' have been popular amongst families, and are mainly aimed at families with young children rather than teenagers. National Trust's '50 things to do before you are 11 3/4' campaign (National Trust, date unknown, b) has been one of their most successfull campaigns to date (PR Week, 2013). It encourages families with young children to get out and about and experience nature and outdoor activities. The campaign was a response to the Natural Childhood Report (Moss, 2012) commissioned by the National Trust, which presented evidence to show that British children are becoming disconnected from nature and the outdoors and the worrying consequences of this.

Greenhalgh (Palmer, 2014, p. 82) is one of National Trust's Outdoor Experience Coordinators and explains the need for the campaign: '... we're living in a transitional age now, where technology's becoming ever more important. You don't really go anywhere without smartphones and tablets any more. It's the perfect time to get people reconnected with nature ...'

'50 things to do before you are 11 3/4' is just one of the things the National Trust is doing to encourage children and adults to reconnect with nature and the outdoors. Moss (2012, frontispiece) points out right at the start of the Natural Childhood Report though that '... to cry out for the return of some mythical golden age would be as ineffective as it would be misguided' and states that '... the benefits of modern techonlogy are many.' In fact the '50 things' campaign has now published its own mobile phone application (Ill. 10) in AppStore and GooglePlay (National Trust, 2014c). The application is described as '...a companion for every child's outdoor adventures. Including a bucket list of activities, best places to do them and top tips – it brings nature to life in a fun and learning way' (National Trust, 2014c).

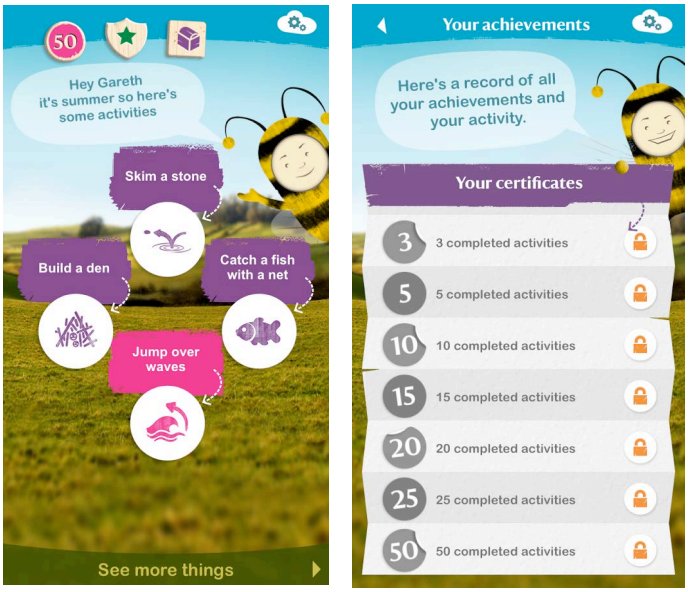



**Illustration 10:** Screenshots of National Trust app, 50 things, from iTunes.

In GooglePlay users have given an average 2.9 star rating (20 September 2014), the most common rating being just one star, mainly due to tehnical problems and users being annoyed at a complicated registration process. Overall users seem to love the concept of the app but not the way it has been implemented so far. In AppStore the average rating is 2.5, with similar issues being mentioned.

Research for this study has carried out a survey among young people about their mobile phone use. The survey was carried out among 25 young people aged between 16 and 18 years at Barr Beacon School in Walsall. The results showed that out of 25 students, everyone owned a mobile phone. 22 out of 24 students had downloaded a mobile phone application (one answer was disqualified). 22 out of 23 (two answers were disqualified for this question) thought that either a new website, new videos or a new mobile phone application would be the most exciting part of new interpretation planned at a site near them. Seven out of these thought that a mobile phone application would be the most exciting interpretation. Just one student thought that new information boards and leaflets would be the most exciting interpretation. The results of this limited survey indicate that digital media is popular among young people, and mobile phone applications are equally so among other media. The results can be seen in full in Chapter 6.

Whatever our views on the dangers of screen time, it would seem that mobile phone applications offer a solution for engaging with younger audiences. Apps can be used not only for sharing information with them, but also getting them to participate and contribute. A study of mobile phone use in museums, carried out for the V&A (Fusion Research & Analytics LLC and Frankly, Green + Webb Ltd 2013, p. 11) came to the same conclusion: 'In the short term

smartphones present a significant opportunity to connect with younger audiences.'

Another point made by the same study, expands on the issue, explaining that although younger visitors have expressed a preference for using their own devices, as compared to 'museum audio guides', they are not the traditional users of audio guides and the content 'they would find appealing is less clear'. So care will need to taken in not simply translating traditional interpretation methods into mobile phone applications but creating tools that are authentic for both the devices and the people who are the intended users.

### 5.3 Augmented reality – AR

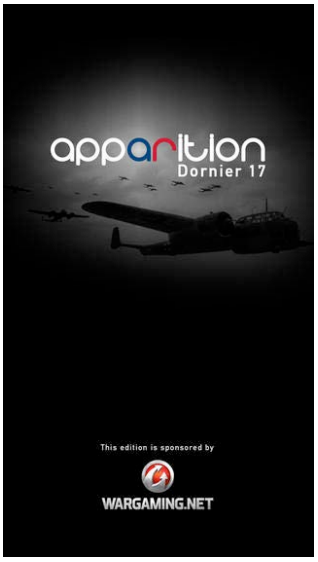
Retailers, advertisers and industry are all using augmented reality technology, which overlays computer-generated content – such as photos, video, graphics, 3D models, text, sound or GPS data - on to real-world images as seen through smartphones, tablets or purpose-built devices (HowStuffWorks, unknown; Wikipedia, 2014). The furniture retailer Ikea is expanding its popular augmented reality offer, which allows shoppers to see what pieces of furniture, from the shop's catalogue, would look like in their own home, through their mobile screens, before committing to buying (Ikea, 2014) (see app details in Appendix 4).

Augmented reality, or AR for short, has been a buzz word in the museum and heritage sector for some time and most apps commissioned now seem to offer an AR component (examples to follow later). AR undeniably offers a tool for heritage interpretation which has not been available before, and it is ideal for use on mobile phones. The possibilities of AR applications are endless, with the producers’ creativity being the limit. An example is the mobile phone application released by Universal Pictures and Aurasma in 2012 (see details in Appendix 4)

which saw movie characters appear and interact with landmarks around London (Lloyd, 2012). Users direct their phones towards the attractions to see a character emerge; examples include King Kong climbing up Nelson's Column and a Tyrannosaurus rex, from the film Jurassic Park, heading towards Buckingham Palace.

More obvious applications show historical events happening on users' screens, or historic sites and objects appear at actual locations where they would have been in the past. The most obvious example, again, is the Museum of London's Streetmuseum app (Thumbspark ltd, 2014), which overlays archive images of locations around London, as seen in Illustration 11, over the current views on users phones and tablets.


**Illustration 11:** Screenshot of the Museum of London's Streetmuseum app from iTunes.




Other examples include apps like the Royal Air Force Museums's 'Apparition Dornier 17' app (Bob Fields, 2013) (Ill. 12). This application enables users to view a full size 3D model of a Dornier 17 aircraft at various locations around the world (RAF Museum, 2013).

**Illustration 12:** Screenshot of the Royal Air Force Museum's Apparition Dornier 17 app from iTunes.

Shelley Mannion, Digital Learning Programmes Manager at The British Museum, reports about the museum's first experiences of using AR as part of learning programmes:

> 'Our experience confirmed that AR – although technically still immature – has both the unique ability to engage visitors and quantifiable learning outcomes. It is a useful tool in our arsenal of interpretive tools and techniques' (2011, paragraph 1).

One of the applications produced by the British Museum was an integral part of the 'Passport to the Afterlife' family trail. The museum provided children with mobile phones to use on the trail around the museum. Children were instructed to scan markers around the museum to reveal 3D models of ancient Egyptian objects on their mobile phone screens (Mannion, 2011).

Mannion concludes her report by writing:

> 'As a technology platform and interaction style, AR is still in its infancy. Many applications are mere proof-of-concept rather than robust solutions integrated into museums' existing programmes and interpretative strategies. But this does not diminish its potential for creating engaging and meaningful experiences for visitors. AR may have been overhyped to begin with but we are now entering a more serious phase during which its usefulness will become evident' (2011, paragraph 8).

As discussed in Chapter 4, AR applications can fail to deliver at times, due to technological issues, but nevertheless, AR is potentially a powerful tool for heritage interpretation, offering engagement, enjoyment and learning opportunities.

### 5.4 Helping to keep the authenticity of the historic environment unspoiled

A great advantage of mobile phone applications is that they do not spoil the authenticity of the historic environment they take visitors into. Visitors are getting a multimedia experience without modern technology being incorporated into the environment, or without large information boards installed into the space. There is no need for screens and speakers being installed into a 19th century room, for example. This preserves the authenticity of the environment, both conservationally, since no additional technology has been installed and wired into the space, as well as aesthetically to the visitor, by not spoiling the visual appearance of the historic environment.

There can be a downside however. Other visitors may not appreciate people walking around using their phones, especially if the audio is on and the user does not have headphones. Using mobile phones in public spaces is, however, becoming more and more common and at the same time more and more accepted. As this is happening, a new etiquette will either emerge naturally, or need to be created by heritage sites, in order to keep all visitors equally satisfied. The existing etiquettes (Debretts, date unknown; Parkinson, 2014) are concerned mainly with making and receiving phone calls, which is worth taking into consideration, but mobile phones are being used for much more than talking, and especially so in this instance. The trend taking place in other public spaces should be considered when thinking through this etiquette.

Offering interpretation at a remote archaeological site can be very challenging. Outdoor information boards only last for so long and can be vandalised. Onsite presence is costly, but

without it, it is nearly impossible to keep up a supply of leaflets or to offer portable devices for visitors. The cost of maintaining facilities and paying staff to oversee a site can be far more expensive than the creation of a mobile phone application, which can be used independently by visitors. The frustration and expense of maintaining portable device hardware is omitted, as visitors use their own devices, which they are familiar with. The problem with remote sites, however, is often 3G/4G coverage not being available. Applications can be downloaded in advance, and developed to work offline without connecting to the internet. This, however, requires advance planning from the visitors, which does not always happen. As the mobile coverage improves over the next years, mobile phone applications will become a more useful and advantageous offer for such sites.

Campbell (pers. comm., 17 September 2014) , Head of Interpretation at English Heritage confirms this. The difficulty of being able to offer WiFi within properties and the lack of good mobile coverage at outdoor sites, are still holding English Heritage back from creating more apps, but when coverage gets better this may change.

### 5.5 Enabling users to become 'produsers' and user generated content

The public are no longer just silent consumers, but with the help of the internet, mobile phones and social media, have also become 'produsers'. This is not just a trend in the heritage sector, but across different sectors.

Journalism has changed into what The Guardian’s former Social and Communities Editor, Joanna Geary, calls a 'two way conversation' (Halliday, 2013), where members of the public,

locally and globally, are able to contribute to mainstream news. The Guardian launched an official channel 'GuardianWitness' a website and mobile phone application (Guardian New and Media ltd, 2013), for readers to upload their own text, photos and videos for Guardian journalists to peruse and use in their reports (Halliday, 2013). Most of this news gathering is happening on mobile phones. People carry their phones with them at all times and so have a camera with them, and also a convenient means of posting content. McHugh, director of brand at EE says (Halliday, 2013): 'Smartphones have changed the way in which news is covered and shared around the world as ground-breaking mobile technology breaks down the barriers between journalists and the public.' Video footage filmed on mobile phones by citizen journalists is appearing in mainstream news broadcasts. Often the footage is sent from conflict zones abroad where foreign journalists and cameramen are unable to enter or at times sent by witnesses at accident sites.

User generated content in heritage-related mobile phone applications is not very common yet, but there are some noteworthy examples to look at. Historypin is described as 'a global community collaborating around history' (Historypin, date unknown). It was developed by a UK registered not-for-profit company, We Are What We Do, with support from technical partner Google, the Nominet Trust and the Heritage Lottery Fund. It is available as an app on three platforms: iPhone, Android and Windows Phone 7 (see Appendix 4 for details).

Users can upload photos, videos, audio and text and 'pin' them on an appropriate location on a map (Ill. 13). At the time of writing this, '374,920 materials, memories and contributions to mysteries have been added by 58,210 users and 1969 institutions' (Historypin, date unknown).


**Illustration 13:** Screenshot of the Historypin app from iTunes.

Users can also explore the Historypin maps, either remotely or by using their phone's GPS locator, to explore what images, stories, videos and audio have been pinned at a location near to them. Another way of using the app is to hold '… your phone up to the street, the app uses your camera view to display nearby images. By selecting an image, it can be overlaid onto the modern view to create an historical comparison...' (Historypin, date unknown). The 'Shake history up' feature brings a random piece of content from anywhere in the world, when you shake your phone!

The possibility for user generated content is there, it is the responsibility of heritage sites, organisations and other interest groups to create mobile phone applications which utilise the functionality in meaningful and creative ways. Users could generate their own trails around a heritage site, for example around a historic town, with photos, videos, suggestions and recommendations for others to follow.

User generated content is described as 'digital community curation' by Chilcott (2013, p.71) and he described the value of it as follows:

> 'This emphasis on personal yet shared knowledge can unlock often previously inaccessible or intangible cultural heritage and provides rich digital content of both local and global value and resonance.'

One of the factors that may put organisations off user-generated content is the question of moderation, the resources required to moderate possibly vast amounts of content and the risks of unmoderated content causing offence.

In the example of The Guardian's 'GuardianWitness', all the content submitted is vetted by 'community co-ordinators' before being published and journalists will choose submissions to include in their articles (Halliday, 2013). Historypin users can flag up content that is inappropriate to be removed by the team behind the resource. Inaccurate content, metadata and inaccurately positioned pins can also be flagged up by other users and be amended by the team (Historypin, date unknown).

It is not just user-generated content, but other methods of user involvement and engagement in curatorial processes are possible too. This will enhance ownership and participation from visitors' point of view and help curators make decisions that their visitors support. For example, a tour of a stately home could let users interact with conservation issues and dilemmas. The Attingham Park app (Stem Pixel Ltd, 2013), for a National Trust mansion in Shropshire, offers users three different tour guides to choose from. One of these is the current curator, who explains conservation procedures, techniques and dilemmas. A similar app could ask for visitors' opinions via an open text field or a multiple choice answer for the question: 'What would you like to see happen?' or 'What would you do?'. This would involve visitors in a new way and provide the curatorial team with helpful insight from the visitors.

### 5.6 Visitor participation and visitor generated marketing via social media

Social media has grown hugely in popularity over recent years. In 2014, 91% of 16-24 year olds used the internet for social networking. The popularity goes down with each age group, with 80% of 25-34 year old engaging with social media, and down the list 13% of over 65s using the internet for social networking (ONS, 2014).

55% of mobile phone users in the UK now use social networking sites or social networking apps on their phones (Ofcom, 2014b). Social media platforms like Facebook, Twitter, Flickr and YouTube, have to some extent also revolutionised the way heritage sites communicate with both their existing and potential visitors. Most heritage organisations have taken steps to have a presence on at least one, if not several, social media platforms. 'Facebook and Twitter are now “must haves” for most museums, many are also using YouTube and Flickr, and some have branched out to newer sites such as Pinterest, Instagram and Tumblr' (Atkinson, 2014).

Some examples of heritage sites being active on social media include:

- National Trust property Attingham Park's YouTube channel at www.youtube.com/user/AttinghamParkTV, with the most popular video having received 11,920 views to date (1 November 2014).

- The English Heritage Facebook page at www.facebook.com/englishheritage has 178,869 'likes' or followers to date (1 November 2014). The page has daily updates with comments and likes from followers.

- @OisinTheDeer Twitter feed for Heritage Culture Warwickshire at https://twitter.com/OisinTheDeer. The feed has several daily updates and is currently being followed by 3227 other Twitter account holders (1 November 2014).

Unlike more traditional methods of communication, social media platforms facilitate not only a one, or even a two way stream of communications, but a three way stream, where visitors are able to interact with both the heritage organisations and with each other. This changes the way the public engages with heritage, increasing participation and discussion beyond what has been possible before.

> 'Today mobile and ubiquitous technologies are ... enabling users to participate, spontaneously and continuously, in activities of collection, preservation and interpretation of digitized heritage content and new digitally mediated forms of heritage practice' (Giaccardi, 2012, p. 2).

This new participation is not only different in terms of how it allows people to engage, but also in terms of who is able to take part. Social media attracts a younger audience and also enables a worldwide audience, even for smaller local museums (Pett, 2012). This increasing participation also enables some news or feeds to 'go viral'. 'Going viral' is described by TechTerms (2011) as:

> '... a digital video, image, or article that has spiked in popularity and has reached a large number of users in a short period of time. While there is no exact number of views that makes something "go viral," most viral media is viewed by more than a million people in less than a week.'

Research in the field of social media in heritage context has emerged in recent years. The 'Heritage and Social Media' book was published in 2012 and it discusses heritage as a participatory culture enabled by social media. Fairclough summarises the issue well in the prologue:

> 'Social media starts by offering a way to 'widen the audience', 'reach new constituencies' but it ends by changing heritage and by asking everyone to participate in its construction, encouraging openness not closure of interpretation and valuation, making flux, uncertainty and doubt critical. The permanently-always-connected lifestyle facilitates this, so that heritage becomes a daily culture not something you buy and consume while on holiday' (2012, p. xvi-xvii).

This new participatory culture of course includes risks, as the public's comments and content can only be moderated to a certain extent. But often the biggest risk comes from within organisations, as shown by many examples of failed Twitter campaigns and other social media blunders in the corporate world (Burn-Callander, 2013; Business Matters, 2014; Lanier, 2014). Burn-Callander has drawn a list of the top ten corporate social media blunders for the Telegraph, which include Tesco's failure to check its pre-scheduled tweet in the middle of the horse meat scandal that it was embroiled in. The pre-scheduled tweet sent out read: 'It's sleepy time so we're off to hit the hay. See you at 8am for more #TescoTweets' (2013, paragraph 4).

An example of charity blunder includes an American Red Cross employee's tweet, as reported by Lanier (2014, paragraph 2) '… an American Red Cross employee talked about how she was drinking beer and “getting slizzered.” Not exactly something that you want to hear from

an organization that prohibits donators from consuming alcohol and other potentially harmful substances before giving blood.' Unfortunately for the Red Cross, the hashtag #gettngslizzered went viral after the tweet.

New protocols and guidelines are being drawn together by businesses, charities and heritage organisations to try and avoid social media mistakes. There is a temptation to leave a work experience person or a junior team member in charge of social media updates, but people with access to social media accounts should have appropriate training and guidelines to operate within. Even with the risks involved, businesses and brands have noticed the potential of using social media for promotion and brand building. The best type of marketing is recommendation from people whom we know. When choosing a holiday destination, a restaurant to eat in, a gym to join, or a good day out, people still trust their friends rather than other, more official sources of marketing.

A Nielsen survey (2013b) proves this:

> 'Word-of-mouth recommendations from friends and family, often referred to as earned advertising, are still the most influential, as 84 percent of global respondents across 58 countries to the Nielsen online survey said this source was the most trustworthy.'

Similarly, social media can be a powerful tool in marketing a heritage site. A research carried out by Nielsen (2013a) on what smartphone owners around the world used their phones for in a set 30 day period, found that in the UK 63% used their phones for social networking. Many of those will be sharing photos and comments of places they have visited, food they have

tasted and experiences they have had, including at heritage sites. All of this is of interest and value to tourism and heritage managers.

The role of social media as a facilitator of wider participation and as a marketing tool in the heritage sector is becoming increasingly important and mobile phone applications tie in naturally with this trend.

### 5.7 Rich media

Mobile phone applications offer heritage professionals and app producers the flexibility of several media to choose from or to mix and match as required, in order to cater for different tastes and for a variety of interpretation needs. They can utilise text, images and graphics, audio, video, interactive game components, augmented reality, GPS, camera and link to social media and the internet. No other tool is offering this flexibility currently.

Marsh (2014) offers some useful tips for writing news articles for mobile devices, some which can be borrowed from for any writing for mobiles. 'Provide maximum information with minimum words'; 'Focus on strong introductions and compelling summaries'; 'Use the medium to benefit your message.' Mobile screens are smaller than average paper-based interpretation or computer screens, so mobile interpretation needs to include less text, but still as much as possible, convey the same amount of information. Not only that, as the name suggests mobile phones are mainly being used on the move, where there is a host of other distractions and movement to consider. It can be difficult to delve into in-depth long text when using a mobile phone.

A good balance and mix of different media being used on an app is sensible, to make most of the platform, and offer visitors an engaging experience.  Images and graphics, audio and video all need to be optimised for mobile devices. This means that they are uploaded with the optimised balance between quality and size, looking and/or sounding good while not being too big a file size, and requiring too long a download time. Developers and producers need to decide whether to make the files part of the initial app download or whether some components are downloaded on the go. This will depend on signal coverage and the way the app is being used.

### 5.8 Play

Play or gamification in learning and education has become a popular and often discussed concept, and many researchers have looked into the topic (Kapp, 2012; Nicholson, 2012; Marczewski, 2013; Muntean, 2011). Marczewski (2012, p. 4) describes gamification as follows: 'The application of gaming metaphors to real life tasks to influence behaviour, improve motivation and enhance engagement.'

The term gamification may be new, but the concept is old. In the field of education, a gamified lesson can offer a more engaging learning experience; in the field of marketing, it can engage customers with products and in public campaigns, it can change behaviour for the better. Scoreboards are one of the more common features people connect with games, but Kapp explains that they are not a key element of games, instead important are (2012, p. 12): '… engagement, storytelling, visualisation of characters, and problem solving. Those are foundations upon which gamification needs to be built.' These are traits that form much of the

bedrock of heritage interpretation too. So a heritage organisation using gamification in its interpretation needs to add elements, such as storytelling, rules, tasks and rewards, to the interpretation it provides. Many examples of this in place exist, including local museums and National Trust properties offering children with treasure trails (Ill. 14), where they have to find certain objects hidden in the displays, and on completing the task, are offered a small reward.


**Illustration 14:** 'Find the hippo' trail in Allhallows Museum of Lace and Local Antiquities in Honiton, Devon.

Nicholson (2012, p. 6) explains how meaningful gamification works best:

> '...meaningful gamification puts the needs and goals of the users over the needs of the organization. If users have a positive and meaningful game-based experience that is well-connected to the underlying non-game setting, then the organization will benefit in the long term.'

Several mobile phone applications in the heritage sector have already utilised gamification features, including the following examples:

**Illustration 15:** Screenshot of Tate Modern's Tate Trumps app from iTunes.


Tate Modern's 'Tate Trumps' iPhone app (Tate Gallery, 2012) is a good example of a game app in the heritage sector. It is a free app which you can play either at the gallery or elsewhere. If played at the gallery you can play it with a group of friends. The aim is to look for artworks which you think will score highly in one of three categories. 'Battle mode – if this artwork came to life, how good would it be in fight?' See Illustration 15, 'Mood mode – you're looking at artworks you think are menacing, exhilarating or absurd' or 'Collector mode – find pictures which are famous, recently produced or practical to house' (Tate, date unknown, b). When the user has finished selecting their artworks, they can play a game of trumps against imaginary or real opponents. Player can find out more information about each artwork as they are playing.

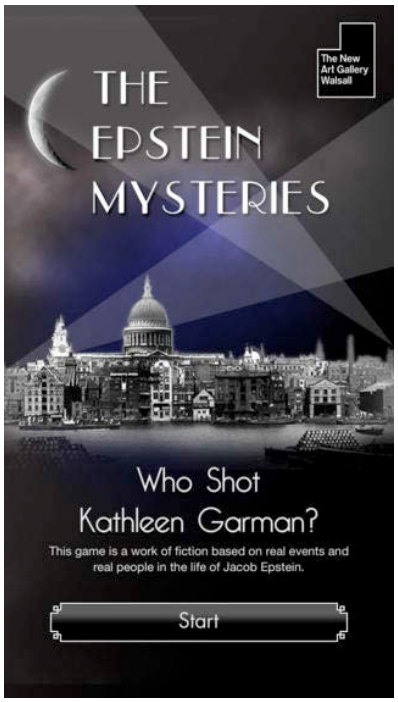



**Illustration 16:** Screenshot of The New Art Gallery Walsall's Epstein Mysteries app from iTunes.

Another example of an app which encourages play is The New Art Gallery Walsall's 'The Epstein Mysteries' application (The Connected Set Ltd, 2012). This application is similar to a murder mystery game, with users having to solve who shot the artist, Jacob Epstein's, lover (Ill. 16). While playing the game, they

learn about the life and work of Epstein. This app can also be played either in the gallery or elsewhere (The New Art Gallery Walsall, date unknown). The app is available on iTunes and on Google Play. There are not enough reviews on iTunes, but on Google Play it has received 3.9 stars, with some very positive comments.

Play or gamification seems to adapt itself very well to mobile phone applications. Both the examples, and no doubt many other applications, are good examples of playful heritage site apps working well in practice and engaging people in a lighthearted way, while helping them learn about heritage.

### 5.9 Making archives accessible

One of the main concerns for heritage professionals currently is the amount of archives they hold in storage and how to make those archives accessible for visitors. Digitisation of archives has become an important job to carry out, not only to preserve cultural heritage but also to be able to make it more accessible to the public. After digitisation is finished comes the obvious question: What to do with all this material, and how to offer the archives for visitors to peruse and engage with in a meaningful way? Mobile phone applications can offer one of many ways to do so. Because of download time and screen size, they are not ideal for offering large amounts of material to search and look through, but are best at offering either bite size junks of relevant material or a small selection of appropriate content. Some examples of applications that can be cited do just that include:


**Illustration 17:** Screenshot of the Museum of London's Streetmuseum app from iTunes.

Museum of London's Streetmuseum application (Thumbspark Ltd, 2014) uses GPS and AR to offer users specific relevant archives images relating to their physical location (Ill. 17):

> 'Hundreds of images from the Museum of London's extensive collection showcase both everyday and momentous occasions in London's history, from the Great Fire of 1666 to the swinging sixties.'

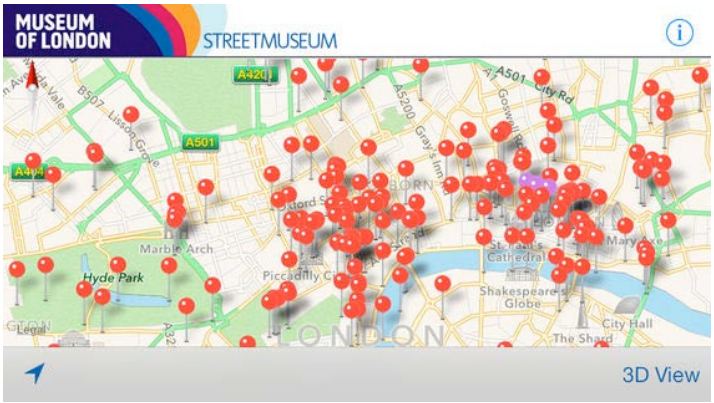



**Illustration 18:** Screenshot of the map view of the Museum of London's Streetmuseum app from iTunes.

Users can either select a destination from a London map (Ill. 18) or use their GPS to locate an archive image near them. They then use the AR component by holding the phone towards the scene and the archive image of the same location will overlay the camera image on their screens. As described earlier, the application has had mixed reviews due to usability issues,

but the concept has been very popular and something that can currently only be uniquely utilised by mobile phones.

The V&A's 'Played in Britain: Modern Theatre in 100 Plays, 1945-2010' (VAE, 2012) is another app using archive photography and newspaper articles (Ill. 19). Users get to try a taster edition, with three plays, for free or pay £7.99 for the full app, which is only available in the AppStore. The description in iTunes (VAE, 2012) reads:


'Played in Britain' uses the V&A's rich collection of photography to illustrate 100 Key Plays of the postwar period. Unique essays explain each play's significance, impact and afterlife; first night reviews from the Guardian and Telegraph newspapers show what critics thought at the time.'

**Illustration 19:** Screenshot of the V&A's Played in Britain app from iTunes.

Reviews left on iTunes (2012) describe the app as '… a must for anyone interested in contemporary theatre'. The app has received 13 ratings in iTunes, with an average rating of four stars. It is an app for the specialist audience, especially with the cost involved. Some users have experienced technical problems, but the majority of ratings are high.

### 5.10 Onsite versus offsite

Many mobile phone applications developed for heritage sites work just as well offsite as onsite. They can be used meaningfully not only at a heritage site, but also from the comfort of the users' own home, at school or even on the road, or in other words, in the visitors' own time and space. This does depend on the way the application has been built. Some applications require the user to be onsite, and applications using augmented reality as one of the main components usually require users to be on location. Many applications, however, offer both options, with onsite users at times getting guidance and directions as to the route they should take, but offsite usage still being possible as well.

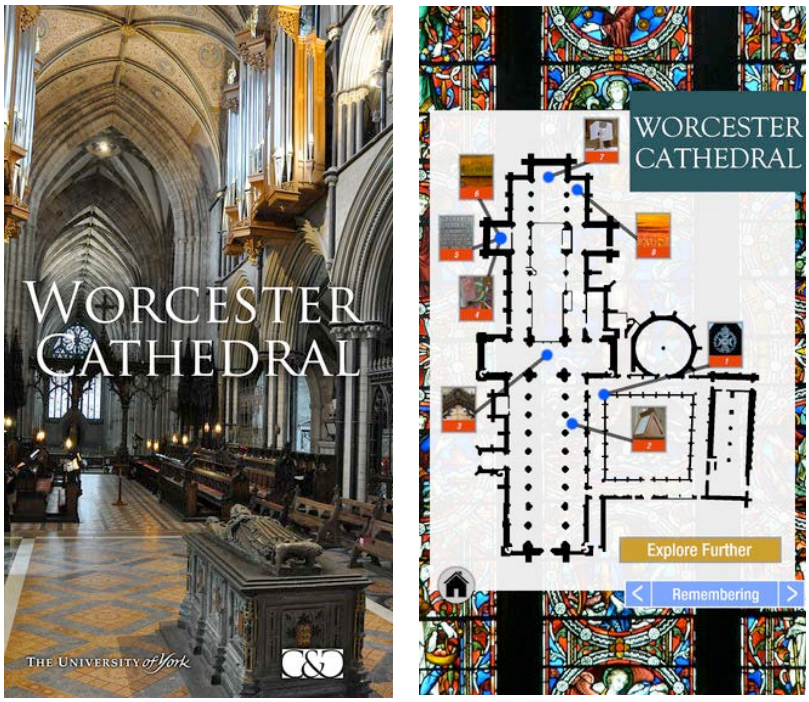
The choice for interpreters, heritage site managers and curators in the digital age is, do you want visitors to be on site, enjoying the 'real' experience, looking at physical objects or is an offsite experience either online, using the internet or using a mobile phone, as valuable, or at least of some value?

Parry (2010, p. 1) describes the choice for museums like this:

> '...museums might recall some of their initial defensiveness to internet technologies that appeared to encourage an arm-length proxy contact with collections and that seemed to threaten even the primacy of the physical visit event itself. And yet, two decades after the birth of the Web, museums increasingly see their distributed online audiences as important as those physically on site.'

This is a worthwhile consideration when developing a mobile phone application. Applications that work offsite can make heritage sites accessible to people with limited means of transportation, or a limiting disability or illness, which are often a hinderance for visiting heritage sites (English Heritage, 2013). Applications are often downloaded in advance at home, and can therefore act as a taster of what is to come or after the visit, offer a chance for a more in depth look or act as a reminder of where one has been.

Research has proven that online visits do not deter people from coming to visit the location as well; in fact, the opposite is more often the case (Thomas and Carey, 2005). A good online experience often inspires people's onsite visit as well. A similar research hasn't been carried out for mobile applications specifically, but the same conclusion could be drawn, that good quality applications used offsite are likely to inspire people to visit onsite.




There are many examples of applications that work well onsite and offsite. One good example is the Worcester Cathedral application (The Centre for the Study of Christianity and Culture, 2014).

**Illustration 20:** Screenshots of the Worcester Cathedral app from iTunes.

This application offers a Cathedral trail, where users tap on points of interest on an outline map of the Cathedral (Worcester Cathedral, date unknown) (Ill. 20). Users can do this equally well from home or on location. If on location, the benefit is being physically present to explore the Cathedral by following the trail laid out on the map, seeing each point of interest in real life before finding out information about it. There is, however, nothing to stop users from enjoying the trail from elsewhere, perhaps before or after a visit.


**Illustration 21:** A screenshot of the V&A's The Medieval and Renaissance Galleries app from iTunes.

Another example of an application that works both onsite, in this case at a museum, namely the V&A, and offsite, is 'The V&A Medieval and Renaissance Galleries' app (The Victoria & Albert Museum, 2012) (Ill. 21). The app is available on AppStore only, and offers users two half-hour tours to choose from, each tour taking them on an audio journey with an expert guide, as well as additional shorter commentaries with V&A curators (V&A, 2011).

This application has only received 3 reviews on iTunes (2014), two of which state that it doesn't work. Unfortunately, this researcher had the same experience of the app just not starting. This perhaps suggests that it is not supported on later iPhone models, although this has not been made clear in the description.

The notion of both onsite and offsite heritage site visits being valuable experiences has been taken a step further by Arvanitis (2010, p.172), who explains that mobile media has the potential of not just being '… an extension of the museum content into the everyday environment' but also be used in the opposite way of bringing '… everyday voices into the museum'.

> 'Been regarded as everyday technology, mobile media allows museums not only to create exceptional 'museum moments' in the everyday, but attempt to disclose the largely inaccessible everyday knowledge, that usually goes unnoticed... In accessing a range of understanding that belong to the ephemerality of everyday life, yet conveying deeper understanding and perceptions of material culture, museums may enhance the way they interpret material culture and provide richer experiences to both on-site and remote visitors' (Arvanitis (2010, p.172).

## 5.11 Conclusion

To conclude, mobile phone applications offer a host of potential benefits in heritage interpretation, including:

- The potential to cater for different visitor demographics, especially for younger visitors.

- Augmented reality, AR, is especially suitable for mobile devices and offers a unique

tool for heritage interpreters.

- Using apps as part of the interpretation strategy can help maintain the authenticity of the historic environment unspoiled as there is no need to install displays in the space when visitors are using their own mobile devices.

- Apps can enable users to become 'produsers' by allowing users to generate and input their own content for others to enjoy.

- As well as content, users can also generate marketing via social media linked to apps. A social media link also facilitates further visitor participation.

- Various media can be included in apps to cater for all tastes and to answer specific interpretation needs.

- Apps can be made into games, which offer playful experiences to users, engaging visitors in a lighthearted way, while helping them learn about heritage.

- There is a push to digitise archives and apps offer one of many ways to make them accessible to visitors.

- Unlike most interpretation, the majority of apps, like websites, can be used both onsite and offsite.

The next chapter will look at the results of the research carried out for this study, including app survey results and school survey results.

# CHAPTER 6

# RESULTS

## 6.1 App survey results

The online questionnaire was designed to find out how well current mobile phone applications at heritage sites meet interpretation priorities. The priorities that this study looks at were defined by the literature review and interviews with heritage professionals, and are as follows.

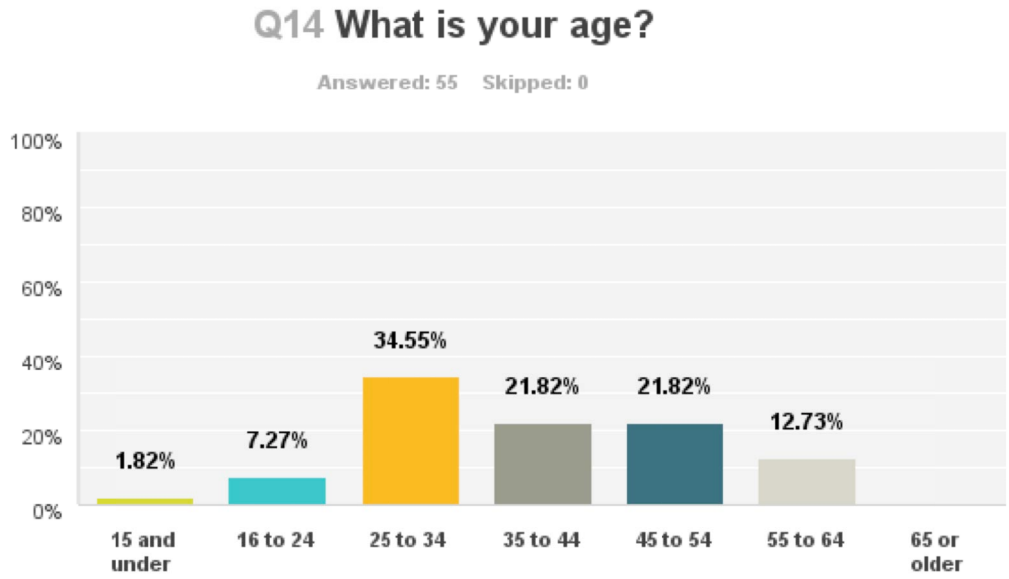
The ability of apps to:

1. Offer good learning experiences
2. Engage visitors
3. Offer enjoyment
4. Offer more of the venue & objects on display
5. Make visitors value the heritage site more.

The most appropriate way to measure learning for the purposes of this research seemed to be the use of the Museums, Libraries and Archives Council's (MLA) Generic Learning Outcomes, GLOs (2008). The results look at each of the five aspects of learning (the GLOs) separately rather than as whole. The remaining priorities were covered by one question each, but enjoyment is also part of the GLOs, so no repeat question was added for it.

The questionnaire was filled in by 55 people, split into 27 females and 28 males. Two respondents described themselves as having a disability and the respondents included people from different age ranges, apart from 65s and over, as demonstrated by the Graph 1.

**Graph 1:** Survey participants' age.




It was hard to find people who had used a heritage app; many heritage professionals and students studying a related subject had not used an app, or had only used the app commissioned for their own site (@BarrBeacon 2013, @GraegoMuse 2013, @Projectbook 2013, @WsomRailway 2014).

For example @Barr Beacon (2013):

> '@Sanna Wicks once I've used one I'll fill it in : )'

And @WsomRailway (2014):

> *'@WsomRailway Hello, how is your app working for visitors and has your team tried any other heritage apps? Doing a thesis about heritage apps'*
>
> *'@SannaWicks One or two minor teething problems, but all okay otherwise. Not tried any others.'*

Several others retweeted the request to fill in the survey but did not do so themselves, which might indicate that they themselves had not used an app. One of the methods to find app users was to scout Twitter but several people tweeting about apps hadn't tried the one they tweeted about themselves. For example @GraegoMuse (2013):

> *'I had a look, but I don't think I have ever used an app at a site, I stick with books & tend to distrust tech with generic info', 'I just know other people like these things :) so i post when they look interesting for others'*

On this basis, it could be suggested that many people use social media, especially Twitter, to share news about apps, but do not actually use apps themselves or have only used an app they have worked on themselves. This online traffic may make apps look more popular than they actually are in reality. The survey findings themselves, however, are for the most part positive.

### *6.1.1 Learning*

The first five questions of the survey assessed learning and followed the Museums, Libraries and Archives Council's Generic Learning Outcomes (2008) survey format, with the word 'app' added to each question. There are five questions, each covering one of the GLO areas (MLA, 2008):

'a. Enjoyment, inspiration, creativity

b. Knowledge and understanding

c. Skills

d. Attitudes and values

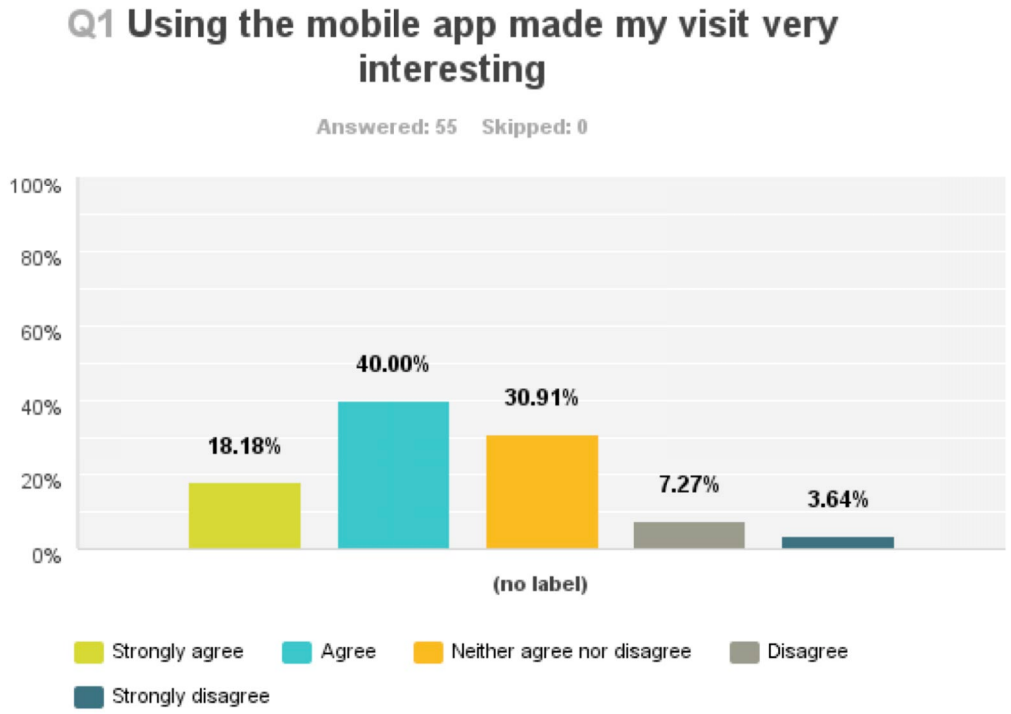
e. Action, behaviour, progression'.

The results look at each of these five GLOs separately, rather than as a whole. It was thought this separation would offer a clearer and more insightful picture of the strengths and weaknesses of apps.

***a. Enjoyment, inspiration, creativity***

58% of respondents agreed or strongly agreed with the statement: 'Using the mobile app made my visit very interesting', as seen in Graph 2. This was the second highest scorer of the five questions related to learning. 31% neither agreed nor disagreed, leaving just 11% to disagree or strongly disagree.

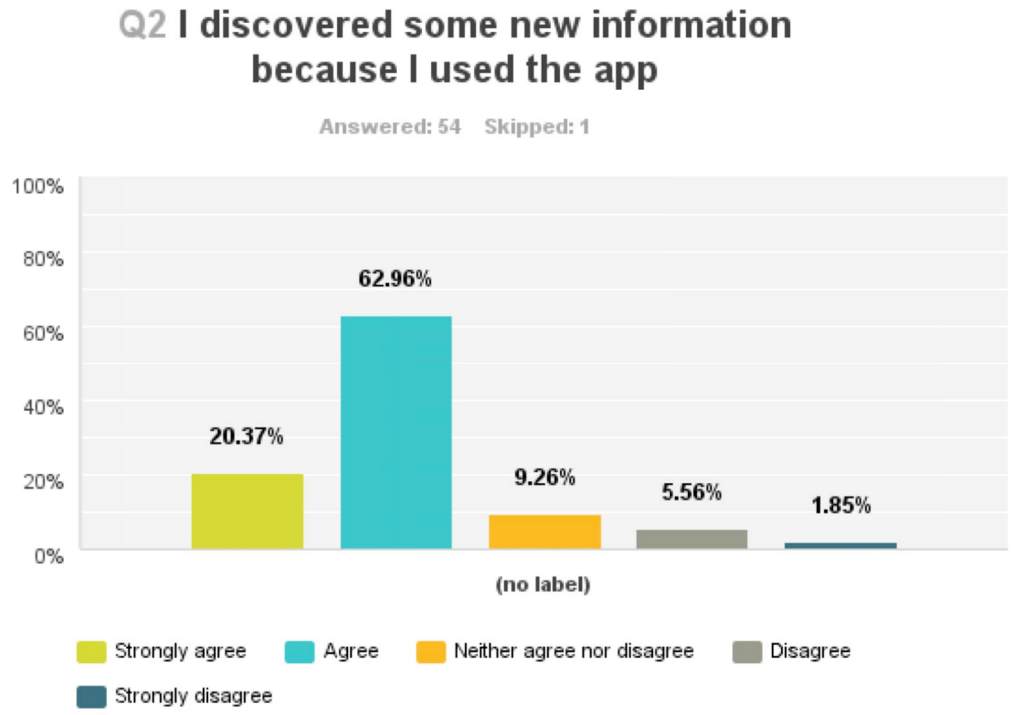
**Graph 2:** Survey question 1: Using the mobile app made my visit very interesting.



***b. Knowledge and understanding***

83% of respondents agreed or strongly agreed with the following statement: 'I discovered some new information because I used the app' (Graph 3). This was the highest scorer of the five questions relating to learning and of all the questions in the survey. This result indicates that apps are a good method for sharing information. The only 'strongly disagree' response was for an augmented reality app which the user struggled to get to work.

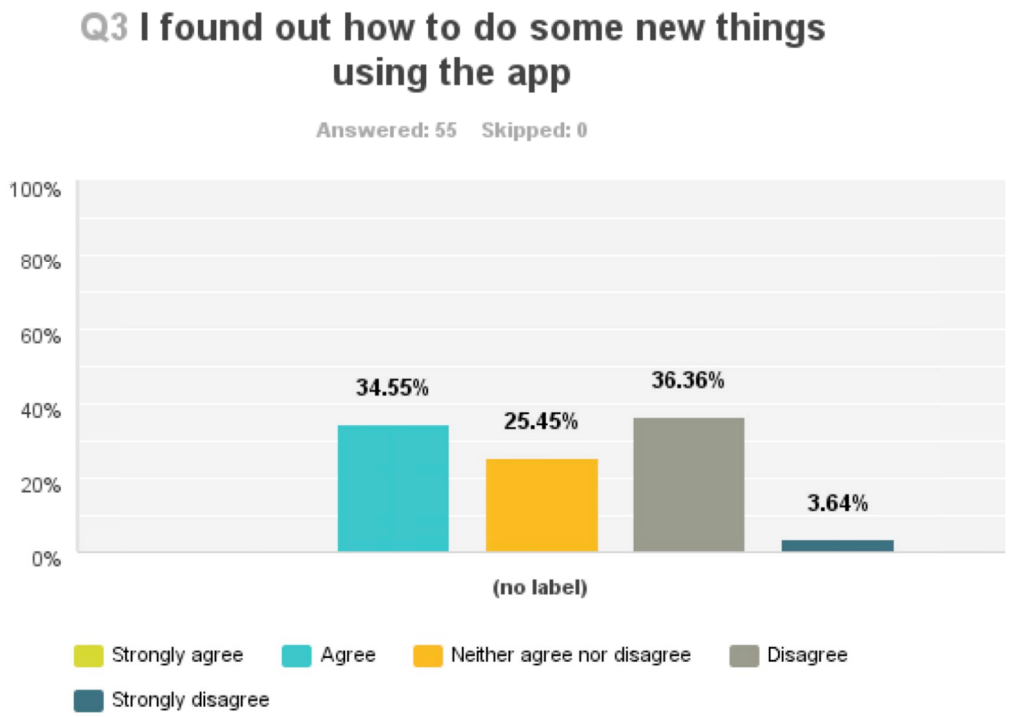
**Graph 3:** Survey question 2: I discovered some new information because I used the app.



**c. *Skills***

35%  of respondents agreed with the statement (none strongly agreed): 'I found out how to do some new things because I used the app' (Graph 4). This question is one of the few to get more negative feedback than positive, with 40% disagreeing or strongly disagreeing with the statement. Perhaps, together with other research findings, these results indicate that although apps are good at sharing information, the information itself can be somewhat superficial, purely knowledge which doesn't contribute towards new skills or alter opinions.

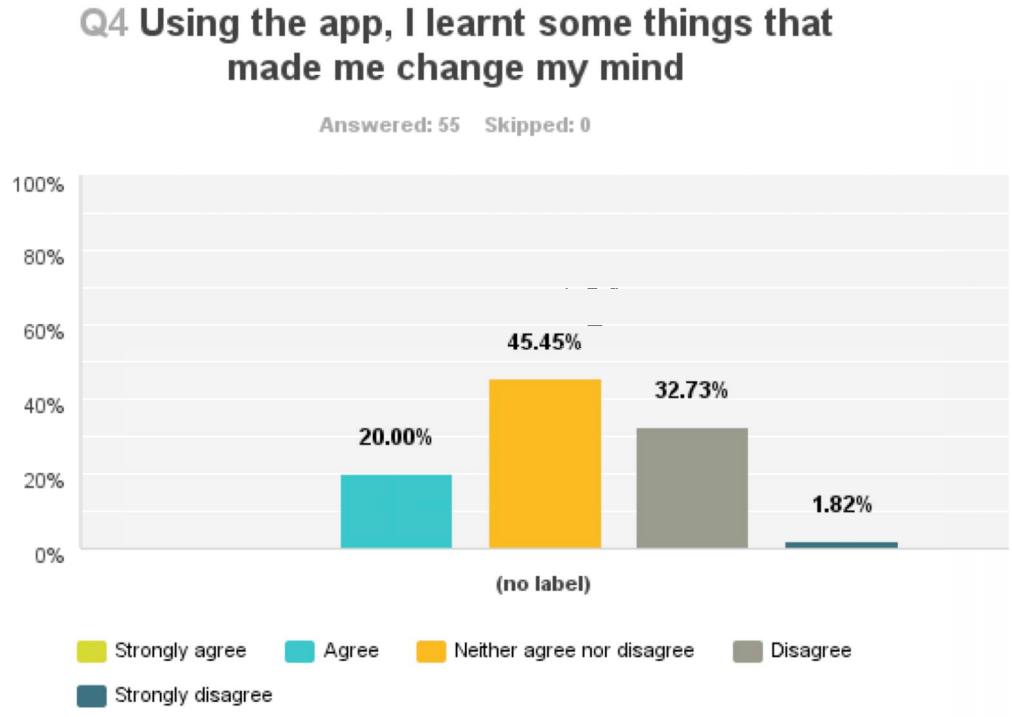
**Graph 4:** Survey question 3: I found out how to do some new things using the app.



***d. Attitudes and values***

Only 20% of respondents agreed with the statement (none strongly agreed): 'Using the app, I learned some new things that made me change my mind' (Graph 5). 35% disagreed or strongly disagreed with it and 45% neither agreed nor disagreed. This was the lowest scorer of the five GLO questions, as well as of all the questions in the survey. It seems to indicate that although apps are good at sharing information, this may be at a somewhat superficial level, just information rather than life-changing and life-impacting information. Although, this may of course be what current apps are designed to do, there may be potential for more. This thought is discussed further in Chapter 7. Additionally, this area could be considered a challenge for all of interpretation, not just apps.

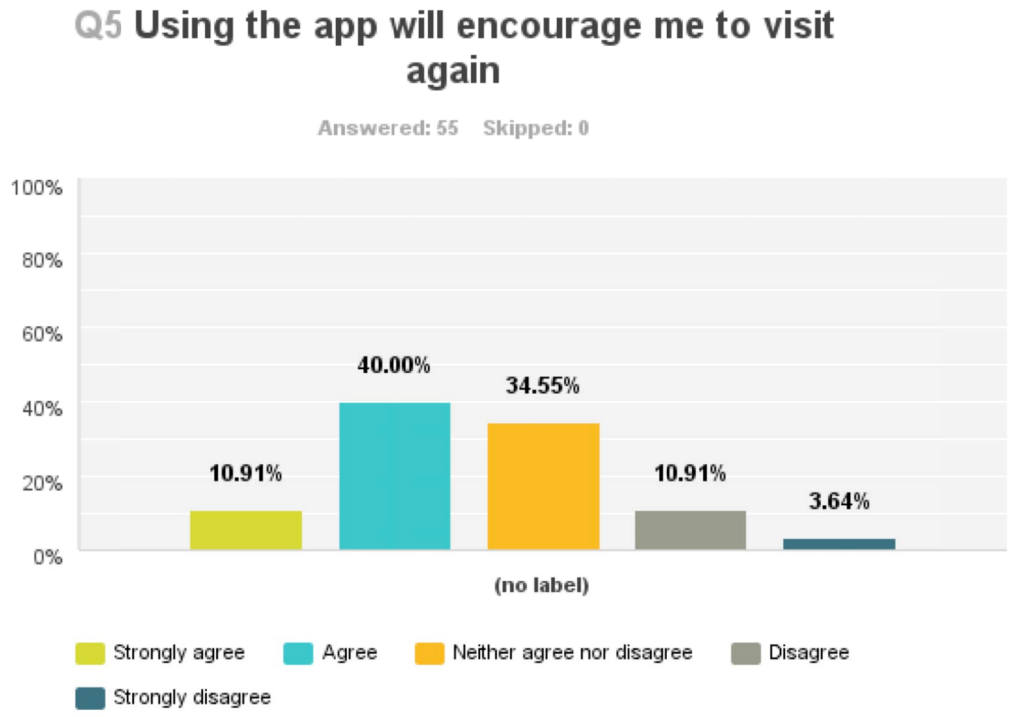
**Graph 5:** Survey question 4: Using the app, I learnt some things that made me change my mind.



***e. Action, behaviour, progression***

51% of respondents agreed or strongly agreed with the statement: 'Using the app will encourage me to visit again' (Graph 6). 35% neither agreed nor disagreed and 15% disagreed or strongly disagreed.

**Graph 6:** Survey question 5: Using the app will encourage me to visit again.




Out of those who chose' Strongly agree' three had used a tour guide or museum guide app, two had a used a 'handbook' type app and one a children's game activity:

- Survey no. 8, Church Conservation Trust, Visit Churches app – handbook app
- Survey no. 10, Herbert Museum & Art Gallery, Coventry – museum guide
- Survey no. 19, V&A, dive and design for pearls - children's game activity

- Survey no. 26, National Trust Handbook - handbook app
- Survey no. 38, Worcester Cathedral – tour guide
- Survey no. 46, Attingham Park – tour guide

People who chose 'disagree' or 'strongly disagree' gave low scores for other questions too. They reflect a mix of usability and technological issues and people who prefer other methods of interpretation. It is also worth noting that all the answers from abroad received a 'disagree' or 'strongly disagree' to this question.

Disagree:

- Survey no. 3, Norwich Heritage app
- Survey no. 11, Streetmuseum
- Survey no. 25, Curio, State Library, Sydney
- Survey no. 31, Seoul Walking Tour
- Survey no. 37, Dinosaur Island
- Survey no. 55, Watts Gallery

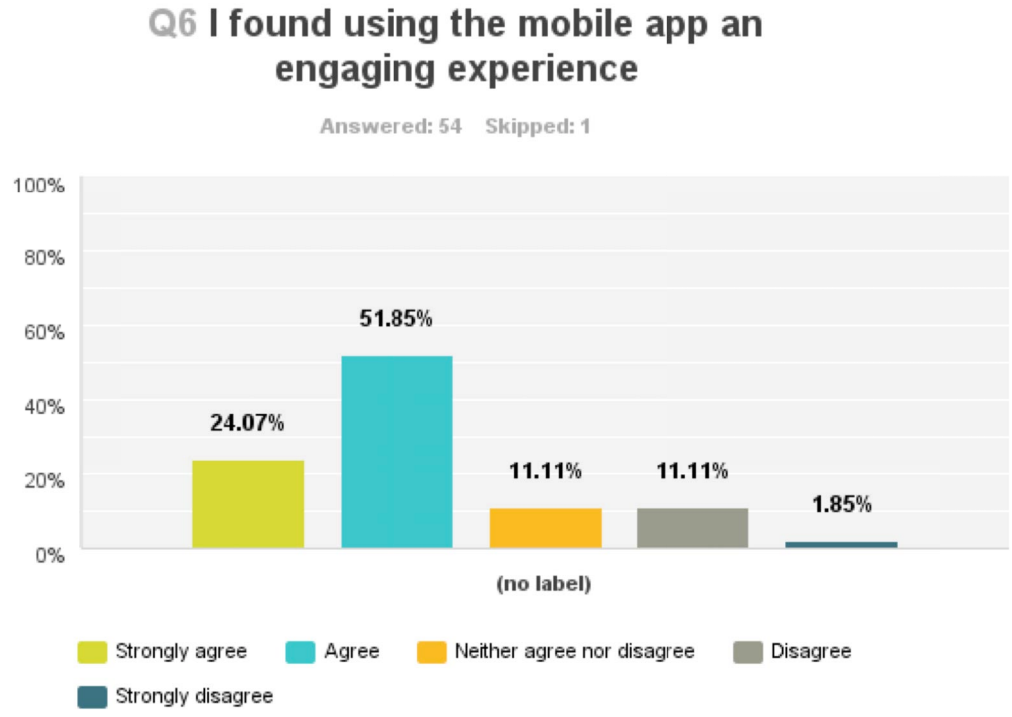
Strongly disagree:

- Survey no. 14, Imperial War Museum Scan and Share
- Survey no. 28, Gold Rush Museum, Yukon, Canada

### *6.1.2 Engagement*

The first five questions relating to learning were followed by question that cover the remaining interpretation priorities as described in the Research Aims chapter. The first of these is engagement. The statement read: 'I found using the mobile app an engaging experience'. A clear majority were engaged through using apps: 24% people strongly agreed with this statement and 52% agreed with it, so altogether 76% of people had an engaging experience. 13% of people had a negative response either disagreeing or strongly disagreeing with the statement (Graph 7). This statement provided the second highest positive finding after 'finding out new information'.

**Graph 7:** Survey question 6: I found using the mobile app an engaging experience.




'Agree' was the most common answer, so it is advantageous to take a closer look at the

answers that differ from the norm. 13 respondents chose 'strongly agree'. No one app or one type of app stands out as being the most engaging one. The list below shows the apps that were used by people who selected 'strongly agree' and an indication of what types of apps they are:

- Survey no. 15 Historypin, user generated location based content
- Survey no. 16 Soho Stories: audio tour
- Survey no. 17 Carnaby Echoes, audio tour
- Survey no. 19 V&A dive and design for pearls kids activity app on iPads, game
- Survey no. 27 MOMA app, museum tour and information
- Survey no. 32 Chester, a game based guide to the walls of Chester
- Survey no. 34 Epstein Mysteries, murder mystery game
- Survey no. 36 Chester, a game based guide to the walls of Chester
- Survey no. 37  Dinosaur Island: augmented reality trail
- Survey no. 44 Attingham Park, tour guide app
- Survey no. 48 Attingham Park, tour guide app
- Survey no. 52 Attingham Park, tour guide app
- Survey no. 56 Birmingham Museum and Art Gallery, Grayson Perry app, artist's audio commentary.

Most respondents who selected 'disagree' or 'strongly disagree' to this question, had encountered usability issues, relating to technology while using an app. This negative experience is reflected in their answers across all questions:

- Norwich Heritage app (survey no. 3): 'Using the Bluetooth information was a huge faff, it would have been easier to use a leaflet with the same information on it that I could pick up from the tourist office.'

- Streetmuseum (survey no. 11): 'The idea of a virtual overlay of the past across the present day street scene sounds great, in reality it completely failed to deliver on my expectation. I found it hard to position myself in the right place on the street to benefit from the overlay, the times I tried it I was always out of position. The app should have been able to help me walk to the correct position, as busy London streets are not always easy to negotiate.'

- Imperial War Museum North, IWM Scan & Share (survey no. 14): 'App relied on scanning QR codes, but it was dark in the galleries and this proved really hard. 4G should have been available but wasn't as soon as you entered gallery and the wifi was very slow.'

- Eye Stratford (survey no. 33), user comment: 'Could not get the AR feature to work.'

- Dinosaur Island (survey no. 41), user comment: 'Had been looking forward to using the app, but ran out of phone battery on arrival and couldn’t really use the app.'

Two respondents did not give any indication of why they scored the apps so low:

- A State Library of NSW Sydney app user (survey no. 25)

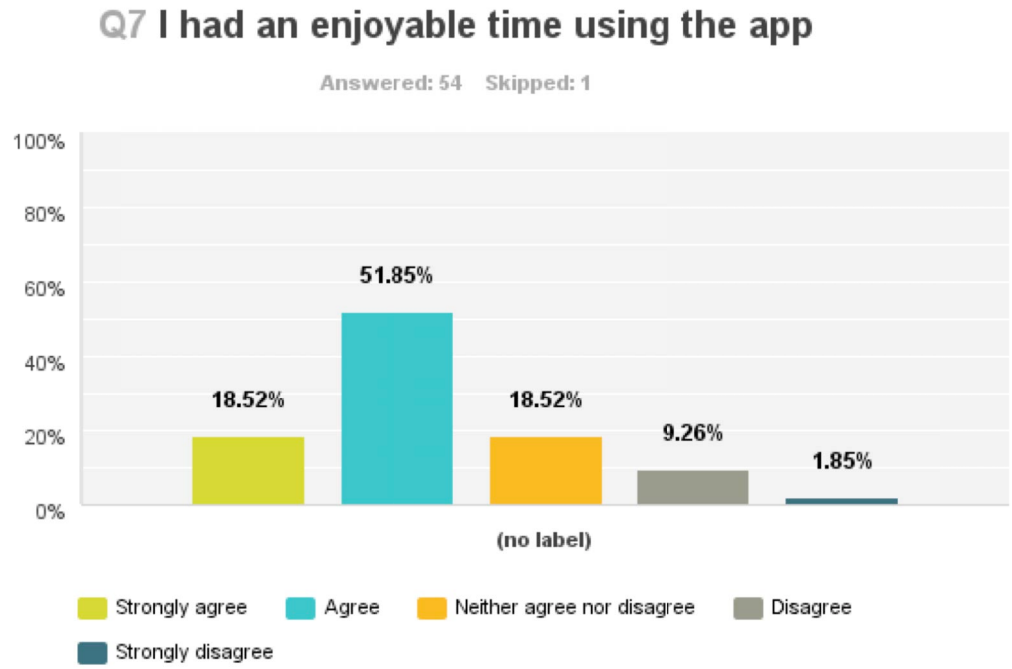
- National Trust Handbook (survey no. 42)

Several respondents selecting 'neither agree nor disagree' had used the main National Trust app, which is a handbook type app. The main features of this app include a GPS enabled map that locates the user and all the National Trust sites on the map, and offers visitor information for each site. The app does not contain interpretation, just information, so it does not engage visitors as such, which explains the low score for this apps to most questions.

### *6.1.3 Enjoyment*

Most people found using apps an enjoyable experience, although engagement scored marginally higher. The statement read: 'I had an enjoyable time using the mobile app'. 70% of users enjoyed their app experience, with 19% of people strongly agreeing and 52% agreeing. 19% of people neither agreed or disagreed (Graph 8). Many people answered the same as to the previous statement.

**Graph 8:** Survey question 7: I had an enjoyable time using the app.




Below is a list of the apps that were used by those who selected 'strongly agree'. The list is a mixture of different types of apps for different types of heritage sites. This seems to emphasize that enjoyment is a subjective experience, even when it comes to apps:

- Historypin (survey no. 15), user generated location based content
- Soho Stories (survey no. 16), audio tour
- Carnaby Echoes (survey no. 17), audio tour
- V&A dive and design for pearls (survey no. 19), children's activity game
- Streetmuseum Londonium (survey no. 23), augmented reality app of Roman London
- MOMA (survey no. 27), museum tour & information
- Chester Walls (survey no. 36), game based guide to the walls of Chester

- Dinosaur Island (survey no. 37), augmented reality trail
- Attingham Park (survey no. 50), tour guide app
- Attingham Park (survey no. 52), tour guide app

People who 'disagreed' or 'strongly disagreed' were mostly the same as to the previous statement:

- Imperial War Museum North, IWM Scan & Share – not getting QR codes to work due to low light levels.
- State Library of NSW, Sydney – no indication of why the experience was not enjoyable.
- English Heritage Days Out – handbook app.
- Eye Shakespeare – not getting AR to work as expected.
- National Trust Handbook – handbook app.

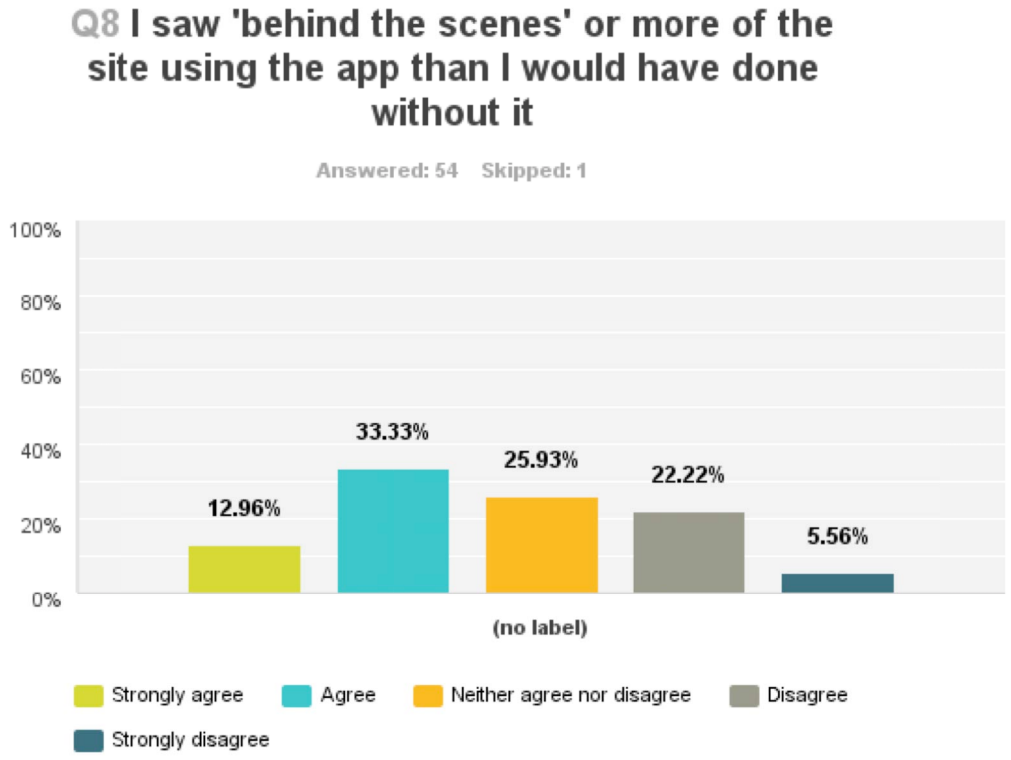
Strongly disagree:

- Streetmuseum – not getting AR to work as expected.

### *6.1.4 Seeing 'behind the scenes' or more of the site*

Nearly half of respondents agreed or strongly agreed with the statement: 'I saw “behind the scenes” or more of the site using the app than I would have done without it' (Graph 9).

**Graph 9:** Survey question 8: I saw 'behind the scenes' or more of the site using the app than I would have done without it.




The apps that were used by those who chose 'strongly agree' were all trail/tour apps (see list below), which seems to indicate that this type of app is the best app when a key aim is to show visitors more of the site and 'behind the scenes' content. The Attingham Park app, for example, shows photos of what can be found behind closed cupboards and drawers, photos of the backs of miniature paintings containing flocks of the models' hair, a video of a music box in action, photos of conservation work in progress and explanations for the thought processes

behind curatorial decisions.

People who chose 'strongly agree' had used the following apps:

- Soho Stories (survey no. 16), audio tour
- Carnaby Echoes (survey no. 17), audio tour
- MOMA (survey no. 27), museum tour & information
- Attingham Park (survey no. 52),  tour guide
- Attingham Park (survey no. 48), tour guide
- Attingham Park (survey no. 46), tour guide
- Attingham Park (survey no. 44) tour guide.

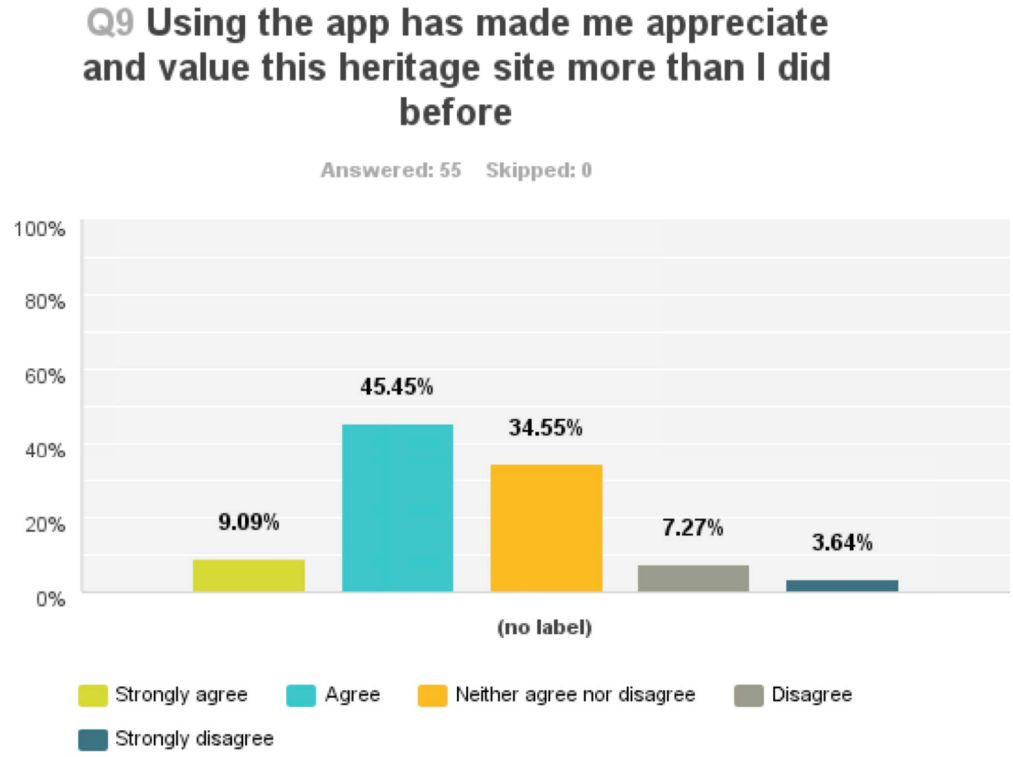
People who strongly disagreed had used the following apps:

- Worcester Cathedral, cathedral trail & reflection app
- English Heritage Days Out, hand book app
- Streetmuseum, augmented reality app.

### *6.1.5 Appreciating the heritage site more*

55% of people 'agreed' or 'strongly agreed' with the following statement: 'Using the app has made me appreciate and value this heritage site more than I did before'. 35% neither agreed nor disagreed, leaving just 11% to 'disagree' or 'strongly disagree' (Graph 10). There does not seem to be any link between the apps that scored the same answer.

**Graph 10:** Survey question 9: Using the app has made me appreciate and value this heritage site more than I did before.




People who strongly agreed had used the following apps:

- V&A dive and design for pearls (survey no. 19), children's activity app
- Attingham Park (survey no. 46), tour guide
- Attingham Park (survey no. 52), tour guide

- Carnaby Echoes (survey no. 17), audio trail
- Herbert Museum & Art Gallery, Coventry (survey no. 10), museum guide.

People who disagreed had used these apps:

- National Trust Sizergh (survey no. 1), National Trust handbook app
- State Library of NSW, Sydney (survey no. 25)
- Dinosaur Island (survey no. 41), augmented reality trail - usability issues
- Seoul Walking Tour (survey no. 31).

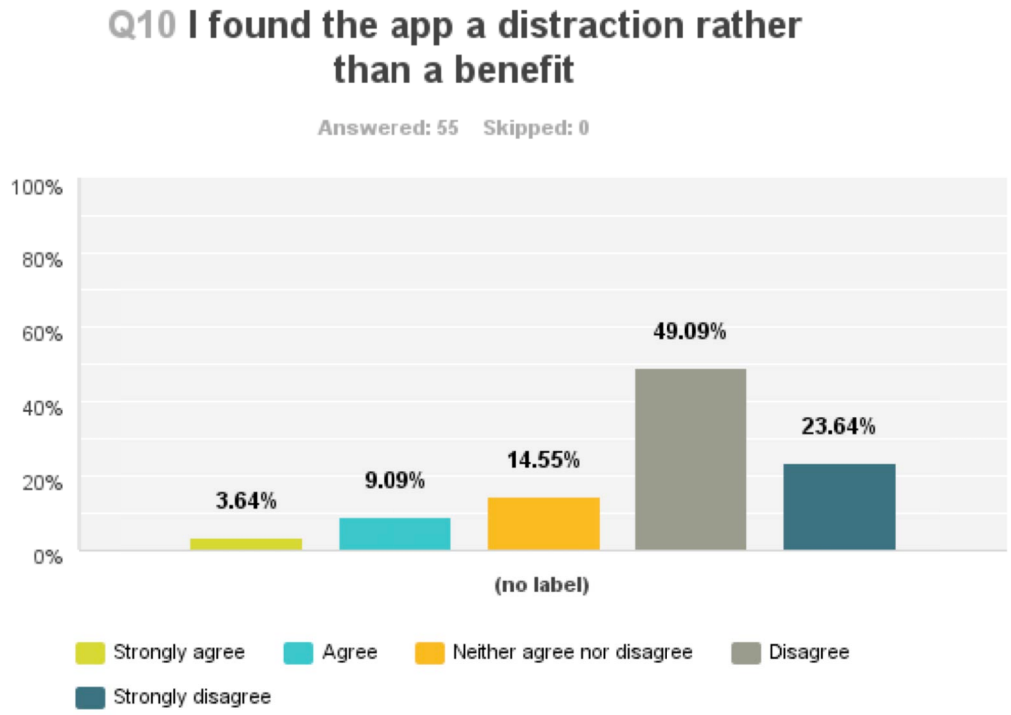
And people who strongly disagreed had used the following apps:

- The Gold Rush Museum, Yukon, Canada (survey no. 28)
- Streetmuseum (survey no. 11).

### *6.1.6 Distraction*

73% of people disagreed or strongly disagreed with the following statement: 'I found the app a distraction rather than a benefit' (Graph 11). 13% agreed or strongly agreed and 15% neither agreed nor disagreed.

**Graph 11:** Survey question 10: I found the app a distraction rather than a benefit.




Below is a list of the apps used by those who chose 'strongly disagree'. Perhaps most notable on this list is that most of the apps are tour/trail type apps and that the list includes only one AR app (which is also a trail) and one game. Handbook apps feature on this list again.

- Survey no. 8, Visit Churches, The Churches Conservation Trust - handbook

- Survey no. 10, Herbert Museum & Art Gallery, Coventry – museum tour guide
- Survey no. 17, Carnaby Echoes - audio trail
- Survey no. 19, V&A dive and design for pearls - children's activity game
- Survey no. 38, Worcester Cathedral - trail
- Survey no. 39, Dinosaur Island – AR trail
- Survey no. 43, National Trust Handbook – handbook
- Survey no. 44, Attingham - tour guide
- Survey no. 46, Attingham - tour guide
- Survey no. 48, Attingham - tour guide
- Survey no. 50, Attingham - tour guide
- Survey no. 52, Attingham - tour guide
- Survey no. 56, Grayson Perry – artist audio commentary.

People who chose 'agree' or 'strongly agree' were the same who gave negative feedback to earlier questions. Some of the reasons were: usability issues and user's preference to have a real life guide or even a booklet rather than an app.

Agree:

- Eye Shakespeare (survey no.33) - Problems getting AR working
- Curio, State Library of NSW, Sydney (survey no. 25) - No reason given
- Smithsonian (survey no. 12) - No reason given
- No 1 Crescent (survey no. 6) - No reason given
- Norwich Heritage Rail (survey no. 3) - User would have preferred a leaflet than the 'faff' of using an app.

Strongly agree:

- The Gold Rush Museum, Yukon, Canada (survey no. 28) - 'I'm a people kind of a person. Wouldn't it be a splendour if the curator or a heritage site manager gave a tour of behind the scenes. It's more work for them but an amazing experience for the visitor.'

- IWM Scan and Share, Imperial War Museum North, Salford Quays, Manchester (survey no. 14) - Usability issues with poor lighting that hindered QR code scanning.

### *6.1.7 Additional comments*

The app survey also included an open question with a suggestion to write down any additional comments, such as likes and dislikes. Answers to the open question offer some helpful insights. There are too many comments to include all here, but a summary of trends has been drawn together. The full list of comments is included in Appendix 3.

The following is a list of the themes of the comments and the number of times they were mentioned, this gives some insight into the trends that were picked up. Single mentions are not included in this list.

- 11 mentions: The most mentions were about maps and location based apps, people liked using maps and/or location based apps. Eleven people commented on maps being a good feature.

- 8 mentions: Eight people wrote that the apps they had used were either useful or convenient. These mentions were mainly for handbook type apps.

- 6 mentions: Six people commented on issues to do with long download time and issues with 3G, 4G or WiFi coverage.

- 5 mentions: Five people mentioned apps being good for the whole family or for children.

- 5 mentions: Equally five people found apps fun.

- 2 mentions: Two people wanted to see the Attingham Park app extended to the rest of the house (it currently covers one wing) and to other National Trust properties.

- 2 mentions: Two people could not get the AR feature to work as they expected to. This could be either a technical issue or a user expectation issue. Both of these comments came from people who work in the digital media sector, including with apps.

- 2 mentions: Two people mentioned problems with device compatibility, they had used a Samsung Galaxy and a Blackberry.

- 2 mentions: Two people mentioned that they would have preferred an on-site guide giving a tour instead of an app – interestingly both of these comments came from abroad (Canada and China).

- 2 mentions: Two people wrote that they like apps as supplemental, not integral to their visit, not wanting to spend their entire visits using and app but keeping them for specific activities. Both these comments were from heritage professionals.

- 2 mentions: The fact that an app could be used offsite as well as onsite was mentioned as positive twice, both times by the same person about different apps.

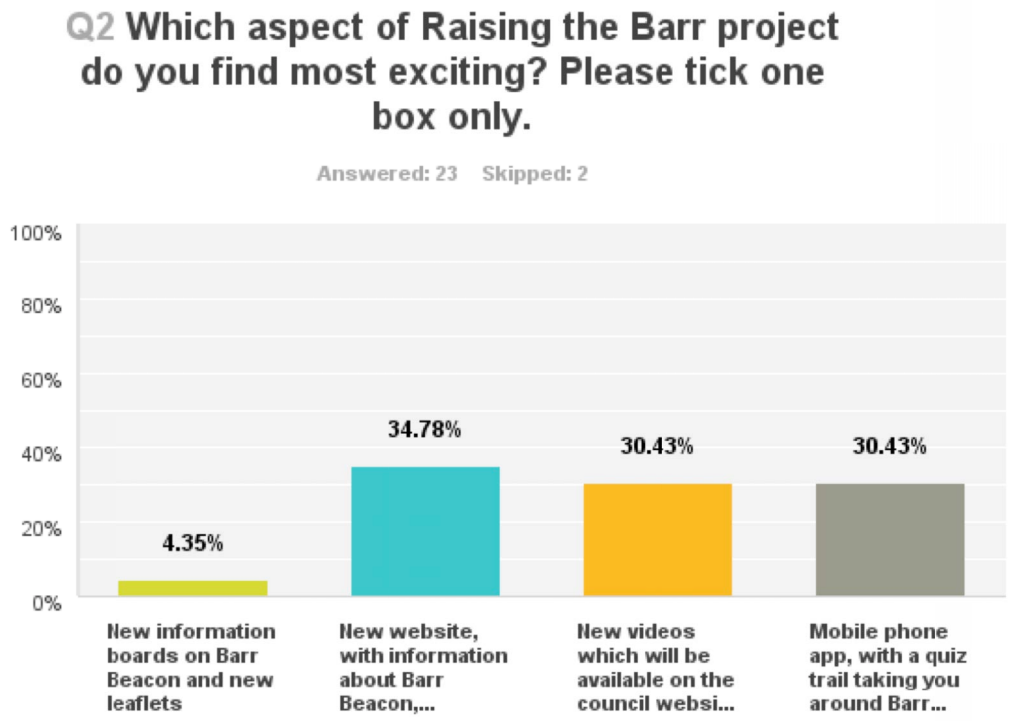
- 2 mentions: Two people mentioned that they like QR codes.

### 6.2 School survey results

A paper based questionnaire was filled in by twenty-five 16-18 year old students at Barr Beacon School, including fourteen boys and eleven girls. Barr Beacon School is located near Barr Beacon, a local landmark and nature reserve in Walsall, where a Heritage Lottery funded project called 'Raising the Barr' is being carried out. As well as restoration, various events and an archaeological excavation, the project includes the creation of new interpretation (Walsall Council, 2014). The questionnaire was linked to this project. Five students had heard of the project and twenty had not. Some answers had to be disqualified, due to the forms not being filled in as requested.

The survey started by trying to establish which method, of the planned interpretation for Barr Beacon, was the students' favourite and how the idea of a mobile app would be received amongst other forms of interpretation. The results can be seen in Graph 12.

**Graph 12:** School survey question 2: Which aspect of Raising the Barr project do you find most exciting?




- 35% (8 students) chose: New website with information about Barr Beacon, including news & events, history, heritage, wildlife, geology and some specific pages for schools.

- 30% (7 students) chose: New videos which will available on the council website and on the Barr Beacon website. Covering topics such as: events, restoration, archaeology/history, wildlife.

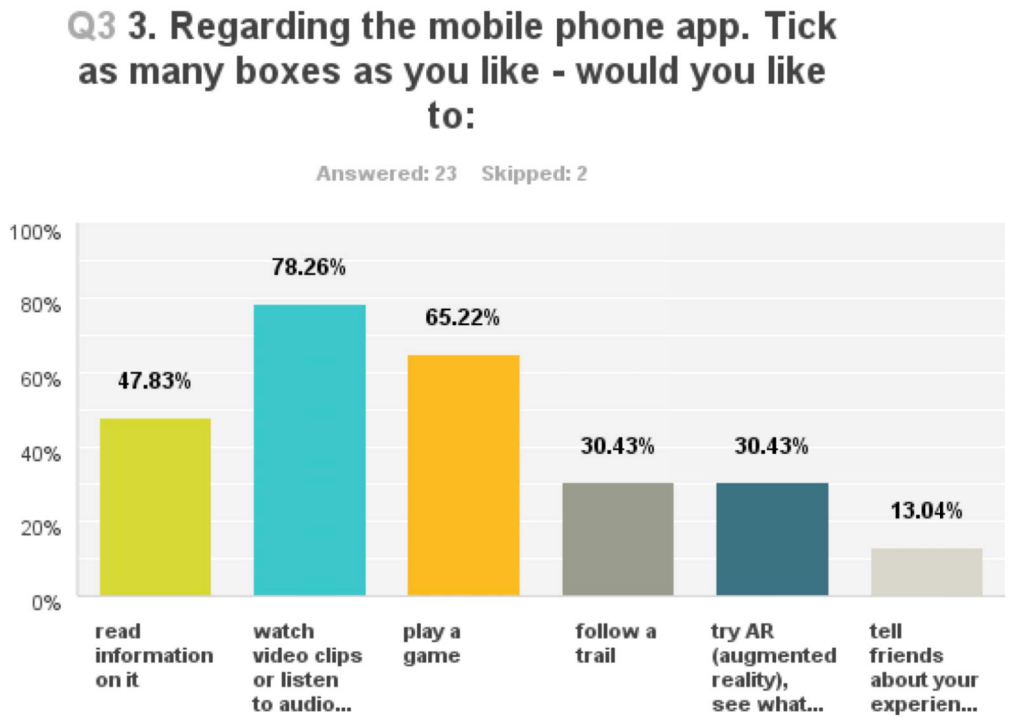
- Equally 30% (7 students) chose: Mobile phone app, with a quiz trail taking you around Barr Beacon and an Augmented Reality component.
- 4% (1 student) chose: new information board on Barr Beacon and new leaflets.

- 2 replies to this question were disqualified.

This answer indicates that the three digital methods of interpretation are almost evenly matched in popularity, with leaflets a long way behind. Apps are not the one favourite interpretation method for young people at Barr Beacon school, but they are right at the top with other technology.

The next question asked the students to tick which activities they would like to do with the app, being able to tick as many options as they wished to (Graph 13).

**Graph 13:** School survey question 3: What would you like to do on the mobile app.



Watching videos, listening to audio and playing games were the two favourite activities as chosen by the students:

- 78% (18 students) ticked: Watch video clips or listen to audio files.

- 65% (15 students) ticked: Play a game.

- 48% ticked: Read information on it.

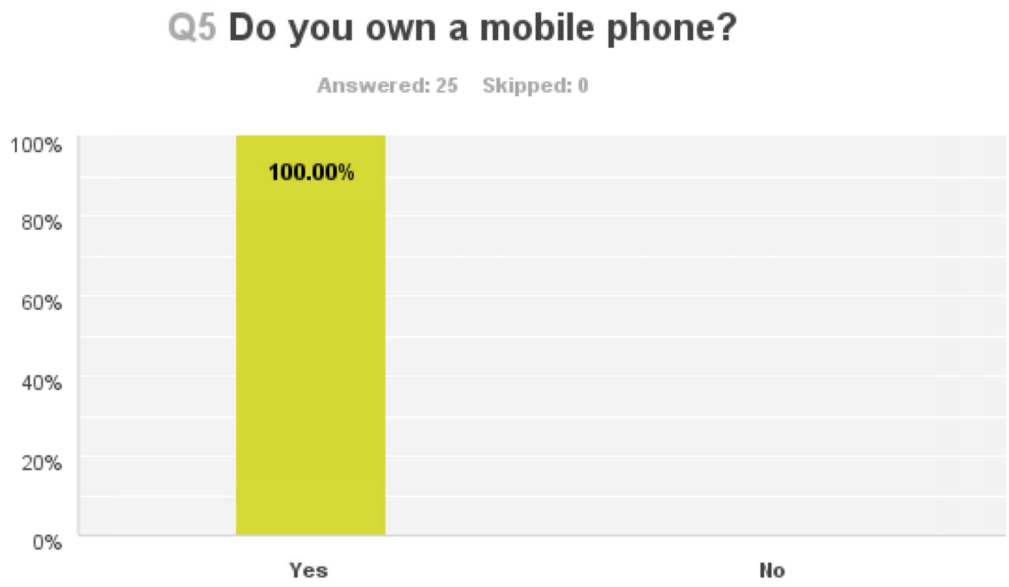
- 30% (7 students) ticked: Follow a trail.

- Equally 30% (7 students) ticked: Try AR (augmented reality), see what you are looking at in each direction from the top of a hill.

- 13% (3 students) ticked: Tell a friend about your experience on Facebook/Twitter or other social media.

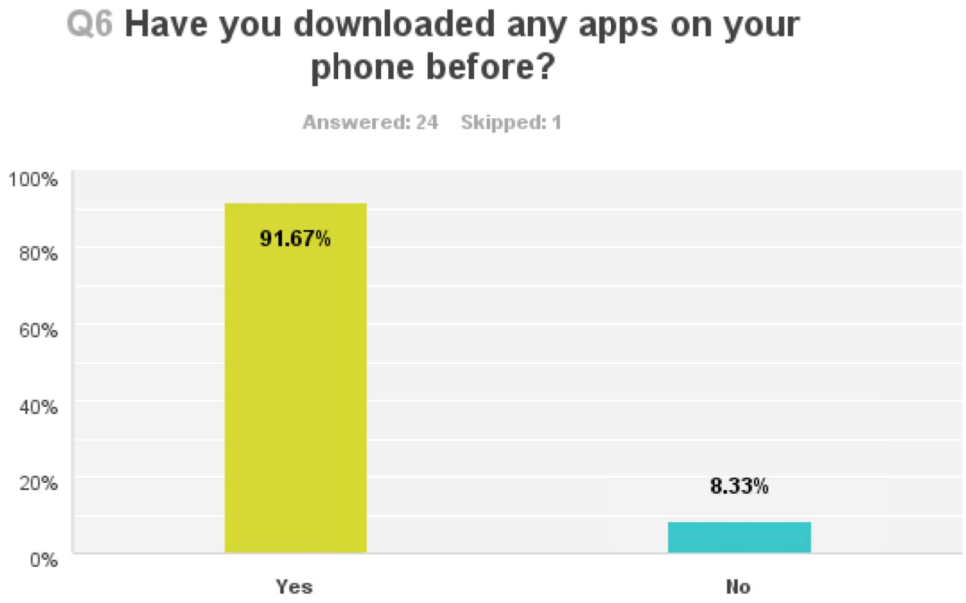
The questionnaire then asked about mobile ownership and everyone of the twenty-five students owned a mobile phone (Graph 14).

**Graph 14:** School survey question 5: Do you own a mobile phone?



The students were also asked if they had downloaded any apps on their phones (Graph 15).

**Graph 15:** School survey question 6: Have you downloaded any apps on your phone before?




92%, that is 22 students had downloaded apps and 8%, that's two students had not. One did not answer. The percentage of those who had downloaded at least one app is high and seems to indicate that apps are something that young people 'do', and as such a suitable method or a 'native environment' for engaging with young people.

# CHAPTER 7
# CONCLUSION

## 7.1 Summary of findings

The results of the heritage app survey have been summarised below by highlighting the strengths and weaknesses of apps as per the survey findings. The survey was designed to find out how well current mobile phone applications at heritage sites meet interpretation priorities as defined earlier in Chapter 2; including the ability of apps to offer good learning experiences, engage visitors, offer enjoyment, offer more of the venue and objects on display and make visitors value the heritage site more. The first question about learning used the Museums, Libraries and Archives Council's (MLA) Generic Learning Outcomes (2008) with the results looking at each of these five GLOs separately, rather than as a whole.

### *7.1.1 Strengths*

According to the survey, the top three strengths of apps in interpreting heritage sites are:

**1st place: Finding new information**

83% of respondents found some new information while using an app. This was the highest score of all the questions in the survey and indicates that apps are a good method for sharing information.

**2nd place: Engaging**

76% of people had an engaging experience using an app. This statement received the most 'strongly agree' responses with 24% people strongly agreeing and 52% agreeing with it.

**3rd place: Enjoyment**

70% of users enjoyed their app experience. People who selected 'strongly agree' to the question about enjoyment had used a mix of different types of apps for different types of heritage sites. This seems to emphasize that enjoyment is a subjective experience, even when it comes to apps. Those who did not enjoy they experience had mainly struggled with technological and usability issues.

Answers to the open questions indicated that interactive maps were a popular feature, many citing them as convenient. Handbook apps scored low on the questionnaire, as they do not offer interpretation as such, but had a lot of positive feedback in the open question. They were thought to be more convenient than websites and paper based handbooks.

Handbooks are a good example of a product which can work better as an app rather than a paper-based product. Most people today do not carry their handbooks with them but will take their phones wherever they go. The phone's GPS feature will enable users to find heritage sites nearby, wherever they are. Visitor information will be up to date, as it is downloaded 'as you go' from the internet. These apps do not usually offer interpretation, but useful information. The National Trust Handbook is possibly one of the most used heritage apps.

Apps suitable for the whole family were also popular. They can offer a structured way for

families to do an activity together. Tour and trail type apps scored highest for 'seeing behind the scenes' and more of the site as well as for being the least distracting.

### *7.1.2 Weaknesses*

**1st place: Technological issues and not meeting user expectations**

This is not a result of any specific question but a combined outcome of the survey. Technological issues or app functionality not meeting users' expectations were the reason for most of the low scores. Several people commented on technological issues in the open-ended question. People who experienced either technological problems (download time, compatibility, battery life) or struggled to get AR or QR codes to work, gave lower scores across all questions and had the poorest experiences over all. AR failed to deliver for some people. This could be either due to technological problems or to user expectations not being met.

**2nd place: Learning things that make us change our minds**

20% of the respondents indicated that they learned things that made them change their minds. But 35% of people did not learn anything that made them change their minds, and on top of that 45% neither agreed nor disagreed.

**3rd place: Learning new skills**

35% indicated that they had learned new skills, but 40% of people did not learn any new skills using an app, and on top of that 26% neither agreed nor disagreed with this statement.

These results seem to indicate that although apps are good at sharing information, this may be at a somewhat superficial level; just information rather than life-changing and life-impacting information. It is hard to determine whether apps are weak at delivering these outcomes or whether they are not currently developed to answer these 'deeper learning' outcomes, but to be fun and engaging.

Apps that offer pure information, such as the handbook type apps, were considered useful but they do not offer interpretation as such. Tilden (1957, p.34) wrote:

> 'Information, as such, is not interpretation. Interpretation is revelation based upon information. But they are entirely different things. However, all interpretation includes information.'

The challenge therefore, for the next generation apps, could be to offer more variety and for some to offer a more meaningful learning experience. On the other hand, different types of interpretation and technology may be best suited for certain purposes. Apps may be best suited for finding new information, and offering enjoyable and engaging experiences, as per the findings of the survey. And other forms of interpretation may naturally offer a better solution for the Generic Learning Outcomes (MLA, 2008) that scored low in the survey: 'learning new skills' and 'learning things that make us change our minds', or in other words, life changing learning. The Heritage Lottery Fund document 'Using Digital Technology in Heritage Projects: Good Practice Guidance' (2012, p.17) makes the point regarding different technology solutions:

> 'Different types of technology, like mobile apps, will be more appropriate for activities on the go, while activities that require more in depth exploration of content may be more suited to home computers.'

Apps should be integrated as part of the bigger picture, the interpretation plan for a site, offering one of the activities visitors can engage with, and with other activities covering different interpretation priorities. The Heritage Lottery Fund document (2012, p.19) encourages blended learning solutions:

> 'Audiences benefit the most from projects in which their needs have been put first ... Activities which offer a blended learning approach, for example, where computer or mobile-based activities are integrated with practical, hands-on or classroom based situations, tend to engage a wider audience.'

Some of the museums which have used the GLOs to measure the learning that is taking place, have come to similar conclusions about their interpretation. Their interpretation has often been seeking purely to deepen understanding and therefore the GLOs have revealed a narrow approach to learning which has consequently been widened to offer different types of learning experiences (Graham, 2013).

The Chiltern Open Air Museum's new interpretation strategy, for example, is '...moving away from a didactic approach to providing information towards offering a more emotional engagement for visitors.... For the Museum, this wider definition of learning outcomes has inexorably lead to a widening of learning approaches, with the displays becoming much more

interactive and immersive and visitors having a much greater choice of ways to engage' (Graham, 2013, p. 31).

Could the same change be possible for apps or is the technology inherently better for sharing information, enjoyment and engagement? This question can only be answered after more apps, with a different approach, have been developed and assessed. One of the people responding 'agree' to the relevant questions on the survey had used the Worcester Cathedral app (The Centre for the Study of Christianity and Culture, 2014), which offers a selection of trails and pilgrim trails, with each point of interest offering a spiritual reflection. This app offers more than pure information and engages users on several levels and hence had positive feedback for the relevant questions. Most heritage sites will have a connection to issues, such as war, health, spirituality and poverty, and could use apps to highlight these issues, not only in playful game-like ways, but in a serious manner, allowing time for reflection, pondering and learning.

### 7.2 Recommendations for further research

A possibly useful area of research would be to look at how visitors use apps, observing them as they operate them. What technological, user interface and content problems do they have, what do they spend the most time on etc. and carry out qualitative interviews afterwards. This might reveal some useful further information, which would be beneficial for anyone commissioning and producing apps.

Another topic to research are apps that offer more than just fun, engagement and information – do they exist and how well do they work? Another digital medium, namely films, are well known for making people experience all the possible emotions from fear and sadness to happiness. Tony Berry, the Visitor Experience Director at the National Trust (Berry, 2012), looks at films as an example for taking people on a journey around a National Trust property or site, telling the stories that interest people and engage with them at different levels. Can apps as a technology deliver something similar? Can apps make you sympathise with a character to the extent of crying with them, reflect on your own experience, change your mind about how you see something and more? Or are apps best for what they are currently achieving at heritage sites?

### 7.3 Recommendations for practitioners

We have touched on arguments for (Prensky 2001, 2005, 2009) and against (Carr 2008, Watson 2011) digital technology changing the way the read and think and discussed Marshall McLuhan's theory of 'the medium becoming the message' (1964), and moulding the way we live our lives. Is it, however, a heritage organisation's job to decide what media and technology is good for visitors, or to offer them a wide range of engaging options to choose from?

Mobile phone applications are not currently a must-have feature for heritage sites like websites are, but with the growing smartphone and tablet markets, and the changes in lifestyle that they bring, mobile development is becoming an area that cannot be ignored by heritage professionals. Mobile solutions are becoming a part of everyday life for the majority of

people, helping them deal with everyday tasks such as finding information, communicating, shopping, taking notes, setting an alarm and taking photographs to mention a few. The popularity of smartphones and tablets means that a large proportion of visitors enter heritage sites with a powerful device, ready in their pocket or bag. This means that apps can offer multimedia interpretation to visitors without additional investment in technology.
A mobile-optimised website should be the first port of call for anyone starting with mobile development, as more and more of traffic to websites is coming via mobiles (Scott, 2014). At times, web apps can work as well as mobile phone apps, and should be considered as an alternative solution. Beyond that QR codes are the cheapest way to implement a mobile activity, but are limited in what they can offer. Apps themselves are still expensive to develop, but a successful app can be worth every penny (Lee, 2012).

Apps are suitable for any heritage site, but may offer more value to sites where there is less human interaction and other interpretation available, such as museums without many volunteer guides, archaeological sites, city centres and nature reserves. Apps require a considerable investment both financially and in terms of time spent on development, but a well-developed app can offer added value to any heritage site.

Apps are not likely to create a considerable income revenue currently. They can be charged for but free heritage apps are more common. More experience is needed to find out the best way forward, but from the case studies this research looked at, it would seem that monetisation of heritage apps does not currently provide a financial return. This trend may, however, change in the future.

This research established that learning new information, engagement and enjoyment were the strongest features of current heritage apps. Technological issues and not meeting user expectations, learning things that make us change our minds and learning new skills, which are part of the wider view of learning as per the now disbanded Museums, Libraries and Archives Council's Generic Learning Outcomes (2008) were the main weaknesses. Technology still causes problems. Issues vary from download time to compatibility and battery life, and insufficient lighting for scanning QR codes. Apps get bad feedback when a specific feature does not work, such as audio in an audio tour, augmented reality or when user expectations are not met.

GPS (global positioning system), augmented reality (AR) and the phone's camera have the potential to be powerful tools if used well within applications. Augmented reality apps have perhaps the most potential to offer something that other technology cannot. According to the Museum Association's Mobile Survey in 2013, only 10% of museums are currently offering AR, but this is the one area that is particularly growing. 32% of respondents planned to provide a mobile AR feature in the next 12 months (Atkinson, 2013).

Great care needs to be taken, however, with AR. As much as it can deliver something special, it can also fail to deliver anything at all. Apps offering AR and other innovative technologies get most media coverage and most downloads but often the worst user experience. AR is still expensive to develop and when the technology does not work, visitors can be left very frustrated. User expectations are also high and not always met with the reality of current technology. Innovative apps have been good for publicity (Lee, 2012), but not always great

for delivering content to majority of people. Carefully crafted creative apps, without latest innovation, often get less downloads but may offer a better user experience and receive better reviews.

Other features worth utilising in apps, are the ones that give mobile phones an advantage compared to other types of interpretation tools. One of these is the GPS feature, which can, for example, locate users and points of interest on a map or show visitors a route. The GPS feature is utilised in apps which help users locate a heritage site near them, such as the National Trust app, English Heritage Days Out and the Churches Conservation Trust's Visit Churches app (National Trust, 2014a; English Heritage, 2014a; Serious Games International, 2012), or apps that locate a points of interest near the user, such as the Museum of London's Streetmuseum app (Thumbspark Ltd, 2014). But the GPS feature is also good for showing the user's location on a map, and showing them the way to the next point of interest. Another way of using GPS is to trigger content at specific points of interest, as done by the Island of Wight Dinosaur Island app (Visit Island of Wight, 2014). The app is '… available to download from anywhere in the world, but will *only* be triggered into life at six coastal locations on the Isle of Wight' (Visit Isle of Wight, date unknown, a).

The phone's camera is one of the most popular features. In America 85% of mobile phone users use the camera, which makes taking photos the most popular activity on a mobile phone! The next most popular activities were sending and receiving text messages, which were used by 80% of people and accessing the internet, which was something that 56% of mobile phone users did (Duggan and Rainie, 2012). Apps, such as the Isle of Wight's Dinosaur Island, let people take pictures of themselves with augmented reality added to the

scene, in this case 3D dinosaurs.

This study highlights a number of considerations that those responsible for running heritage organisations or sites, ought to hold at the forefront when planning to develop an app:

1. Consider if a mobile optimised website or web app would work equally well for your situation and if its benefits would outweigh the benefits of a mobile phone app.

2. Choose a specific purpose for the app and integrate it with the other interpretation offer for the site, both on location and online. Apps, mobile technology and other digital resources should not be seen as something separate but included in learning and engagement strategies: neither retrofitting new technology into old strategies, nor rewriting a new strategy based only on mobile technologies, but they should be thought of as part of the whole.

3. Create something that works best as an app and cannot, or cannot easily, be achieved by other methods of interpretation, making use of a smartphone and tablet's unique functionalities.

4. Augmented reality is currently a very popular feature in heritage applications, but not necessarily the best functionality for every app. It could be advisable to include a solid user experience that is not as reliable on AR working, even in an AR app, so as not to disappoint those who struggle to get it to work or are disappointed by the results.

Marshall McLuhan wrote that the medium becomes an extension of our bodies (1964) – and never has this been so true as today with the emergence of mobile phones, smartphones and tablets. They affect the way we live our daily lives and look to be here to stay. Their shape and size may vary, the way we carry them with us may change, but mobile technology, connected to the worldwide web, is the new way of life. The heritage sector cannot afford to ignore it. It is time for each heritage and cultural site to think through their mobile offer. It may that a mobile-optimised website is enough, perhaps a URL or a QR code displayed in a suitable position, or an app with a more traditional audio tour. For some sites a more creative app which delivers a solid and engaging user experience may be more appropriate. Others will want to lead the way in innovation, and like the Museum of London, may find success in terms of user downloads and exposure.

Mobile solutions are becoming an important part of everyday life for a significant majority of the UK population, offering the means to take care of many daily tasks, communicate, as well as enhance recreational activities. As heritage site audiences change, so too must the ways in which heritage organisations interpret and present their interpretation in order to offer valuable experience to each and every visitor. The 'one size fits all' approach is not acceptable for the 21st century visitor, but 'palette' of interpretation is required '… to meet the needs of different audiences' (Black, 2005, p.5). A balance is needed between new ways of communicating with visitors, which include mobile phone developments, and traditional ways, in order to offer as many as possible with a meaningful visitor experience and help all audiences to engage with collections.

Will mobile phone applications become the 'betamax' of the mobile world? It is of course impossible to predict the future. It may well be that mobile-enabled websites and web apps will be sufficient for heritage sites, if the technology advances and they can offer more functionalities than they do presently. But apps do currently provide an exciting opportunity for visitor engagement, and as such cannot be ignored by heritage organisations.

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# Appendices

**Appendix 1 Online heritage app survey, copied from Survey Monkey**

This questionnaire is part of my research project at University of Birmingham, looking at the value of mobile apps at heritage sites.

It can be filled in by anyone who has used an app (on your own device, mobile or tablet) at a heritage site (or remotely), for example archaeological site, museum, historic property, town centre, gallery, just write down the site when asked below.

If you have used several different apps - please fill the survey again for each app separately!

Please be honest with your answers - I'm not trying to gather positive or negative comments but record real life experiences.

Thank you for your time,

Sanna

If you have any further comments/queries I can be contacted at:
sanna@treehouse-media.co.uk

*** 1. Using the mobile app made my visit very interesting**

| Strongly agree | Agree | Neither agree nor disagree | Disagree | Strongly disagree |
|---|---|---|---|---|

*** 2. I discovered some new information because I used the app**

| Strongly agree | Agree | Neither agree nor disagree | Disagree | Strongly disagree |
|---|---|---|---|---|

*** 3. I found out how to do some new things using the app**

| Strongly agree | Agree | Neither agree nor disagree | Disagree | Strongly disagree |
|---|---|---|---|---|

*** 4. Using the app, I learnt some things that made me change my mind**

| Strongly agree | Agree | Neither agree nor disagree | Disagree | Strongly disagree |
|---|---|---|---|---|

*** 5. Using the app will encourage me to visit again**

| Strongly agree | Agree | Neither agree nor disagree | Disagree | Strongly disagree |
|---|---|---|---|---|

*** 6. I found using the mobile app an engaging experience**

| Strongly agree | Agree | Neither agree nor disagree | Disagree | Strongly disagree |
|---|---|---|---|---|

*** 7. I had an enjoyable time using the app**

| Strongly agree | Agree | Neither agree nor disagree | Disagree | Strongly disagree |
|---|---|---|---|---|

*** 8. I saw 'behind the scenes' or more of the site using the app than I would have done without it**

| Strongly agree | Agree | Neither agree nor disagree | Disagree | Strongly disagree |
|---|---|---|---|---|

*** 9. Using the app has made me appreciate and value this heritage site more than I did before**

| Strongly agree | Agree | Neither agree nor disagree | Disagree | Strongly disagree |
|---|---|---|---|---|

*** 10. I found the app a distraction rather than a benefit**

| Strongly agree | Agree | Neither agree nor disagree | Disagree | Strongly disagree |
|---|---|---|---|---|

*** 11. Likes & dislikes and any other comments you would like to make.**

*** 12. What location/heritage site was the app for?**

**13. Name of the app (if you know it):**

* 14. What is your age?

15 and under

16 to 24

25 to 34

35 to 44

45 to 54

55 to 64

65 or older

* 15. What is your gender?

Female

Male

* 16. Do you describe yourself as having a disability?

Yes

No

* 17. OPTIONAL: Your name and preferred contact details:

**Appendix 2 Raising the Barr Questionnaire for Barr Beacon School**

Raising the Barr is a 3 year project, run by Walsall Council in partnership with the Barr Beacon Trust, which aims to reinstate the well known landmark as a shining beacon of community pride with a full restoration of the site's heritage features – including a rare design of flagpole, a historic tree plantation, and its landmark war memorial. The project will see more activities on offer for visitors, schools and colleges including wildlife walks and fun days, a Time Team-style archaeological dig, astronomy events and services of Remembrance.

1. Have you heard of Raising the Barr? □ Yes □ No

2. Which aspect of Raising the Barr project do you find most exciting? Please tick **one** box only.

□ New information boards on Barr Beacon and new leaflets

□ New website, with information about Barr Beacon, including news & events, history, heritage, wildlife, geology and some specific pages for schools.

□ New videos which will be available on the council website and on the Barr Beacon website. Covering topics such as: events, restoration, archaeology/history, wildlife.

□ Mobile phone app, with a quiz trail taking you around Barr Beacon and an Augmented Reality component

3. Regarding the **mobile phone app**. Tick as many boxes as you like - would you like to:

□ read information on it
□ watch video clips or listen to audio files
□ play a game
□ follow a trail
□ try AR (augmented reality), see what you are looking at in each direction from the top of the hill
□ tell friends about your experience on facebook/twitter or other social media

4. Any other comments you would like to add:

5. Do you own a mobile phone? □ Yes □ No If yes, which phone?

6. Have you downloaded any apps on your phone before? □ Yes □ No

7. Your age:

8. Tick one – are you: Male □ Female □

**Appendix 3 App survey – answers to open question**

Here is a list of all the comments from the app survey's open question, each categorised into a group with the same theme. Some answered have been cut into half, in order to include them in the right group.

**Generic comments:**

**Fun:**

- For me it was just a bit of fun.
- It was quite fun but didn't really add a huge amount to the visit.
- This was an augmented reality app highlighting the dinosaur heritage of the Isle of Wight. The augmented reality features were good but focused on fun rather than education.
- This was an iPad app to dive for pearls collect them and design a treasure. This was emailed home. Learnt facts in fun hands on way.
- Great design; fun and easy to use.

**Family/all ages:**
- Appeals to all ages.
- And it is for children as is a more interactive way for them to get involved in what they are looking at.
- It was exciting for the kids, so I think if they were answering this questionnaire, they would say it made the exhibit more appealing.
- A good family app.
- 7 yr old son enjoyed it.

**Maps/GPS/location based:**

- Liked it included a map feature so it was easier to find in the city centre.
- Interactive maps were a good way to explore the site.
- Intelligent use of location-based markers (heritage plaques, signs, etc) and audio from an interesting array of participants in the music scene across the 20th century to open up the musical history of the area around Carnaby Street.
- Enjoyed use of maps, less keen on features that tell narratives.
- This was an augmented reality app highlighting the dinosaur heritage of the Isle of Wight. It was location based so it forced me to explore locations on the Island which I would not have otherwise visited.
- Likes – can search for upcoming events near by. Easy to find properties.
- But it also provided a sense of collecting all the dinosaurs by visiting all locations.
- Like: as a visitor to the city of Seoul, it is convenient to use the app to look for the location of the sites. In fact, the app only functioned as a GPS rather than providing me more information of the places I visited.
- Liked the map functionality to help me find the heritage sites.
- Good for maps and navigation of the historic site.
- Like: ability to view overlay maps of the town from different periods.

C**onvenient/useful:**
- Very useful, provides your own personal tour.
- LIKES - Being able to read as I go and when required and having photos as a support.
- Like: as a visitor to the city of Seoul, it is convenient to use the app to look for the location of the sites.
- Easy to find properties.
- I like having useful information, such as opening times and events, on an app as it is easier than searching the website due to its mobile nature.
- Able to find opening times and facilities without taking my handbook.
- The app was a quick way to locate property in the area, even when I didn't know it's name.
- I use the National Trust app, I find it convenient. I don't feel it enhances my visit to a NT property it is simply a convenient alternative to the paper NT handbook.

**Eco friendly:**
- I liked the fact that it was more like a paper free guide which is more eco friendly especially as most people own a smart phone/small tablet device.

**More visits, app should be extended:**
- Free WiFi is a great idea, that and the App will definitely encourage more visits.
- Would like to see this sort of app at other NT houses.
- Would be good if it extended to the rest of the house and park.

**Other likes:**
- Like the integration of modern technology in storytelling.
- Strong design & mobile user experience, good use of audio. Compelling integration of reminiscences from people who were there and meaningful hyperlocal focus combined to make an excellent app (I used the Android version).
- Liked the additional information. Would have preferred the addition of verbal dialogue rather than just written information and pictures.
- Like the way the app suggested parts of the museum I should explore first.
- Enjoyed interacting with streetscape and historic images.
- Enjoyed being guided by artist's own voice and words.
- Lovely images and good additional information.
- Easy to use.
- Great design, fun and easy to use.
- Great to be able to share photos on twitter.
- I have made use of QR codes to add value to my visit to museums and find out more about them/their collections.
- Use of QR codes is a good idea.
- Great to bring back dinosaurs and be pictured with them

**Works offsite:**
- Great that it can also be accessed off-location; therefore benefiting a wider audience and being more usable post-visit as well.

- All the content also works off-site / remotely.

**Apps as supplement:**
- I like apps that are supplemental not integral to my visit.
- I don't want to spend my entire visit using an app - it's best for specific activities

**Dislikes:**

- Disliked it being too simple, could have had some more interesting functions.

- It's important that the graphics and visualisations of the app are good (especially with AR) Poor or blocky graphics tends to be off-putting.

- Poor use of screen real estate.

- The app only functioned as a GPS rather than providing me more information of the places that I visited. Also, the descriptions in the app were also generic, I would rather prefer having an on-site guide providing interpretation.

- I'm a people kind of a person. Wouldn't it be a splendour if the curator or a heritage site manager gave a tour of behind the scenes. It's more work for them but an amazing experience for the visitor.

**Technology issues:**

**Download time & internet coverage**
- Downloading the App was slow - several minutes.
- Didn't really use it until I had left due to slow download time and 2 attempts to download. It was taking so long I couldn't stay waiting so moved on, then went out of range of the wifi so when I came back into range it started again rather than carry on where it left off. Once loaded it was very good.
- Dislikes – quite slow, can be temperamental.
- Worked well, but only with 3G coverage which was intermittent. Nothing to dislike!
- 4G should have been available but wasn't as soon as you entered gallery and the wifi was very slow.
- Using the Bluetooth information was a huge faff, it would have been easier to use a leaflet with the same information on it that I could pick up from the tourist office.

**Battery life:**
- We were excited about using the app, but had technical issues – mobile phone run out of battery when we got to the site, so couldn't really use the app.

**DEVICE COMPATIBILITY:**

- I've not found many app's that work for me as I am a blackberry user and there don't seem to be any I can access/use. I have however made use of QR codes to add value to my visit to museums and find out more about them/their collections.
- Doesn't work well on a Samsung tablet.

**QR codes:**

- App relied on scanning QR codes, but it was dark in the galleries and this proved really hard.
- Use of QR codes is a good idea.

**AR:**

- Like: ability to view overlay maps of the town from different periods. Dislike: couldn't get AR feature to work
- The idea of a virtual overlay of the past across the present day street scene sounds great, in reality it completely failed to deliver on my expectation. I found it hard to position myself in the right place on the street to benefit from the overlay, the times I tried it I was always out of position. The app should have been able to help me walk to the correct position, as busy London streets are not always easy to negotiate.

**Handbook type apps:**

- I use the National Trust app, I find it convenient. I don't feel it enhances my visit to a NT property it is simply a convenient alternative to the paper NT handbook.
- Likes - can search for upcoming events nearby. Easy to find properties Dislikes - quite slow, can be temperamental. Doesn't work properly on a samsung tablet Could improve - would be great to find properties by type/facility (e.g family friendly, playground on site etc)
- I like having useful information, such as opening times and events, on an app as it is easier than searching the website due to its mobile nature.
- Able to find out opening times and facilities without taking my handbook.
- The app was a quick way to locate property in the area, even when I didn't know its name.
- Liked the map functionality to help me find the heritage sites. Great to be able to share photos on twitter.
- Mainly use this sort of app to find out timings of events/ opening hours. Also good for maps and navigation of the historic site. I don't think I've ever seen a site specific app in the UK, they all tend to be sub-sections of the larger heritage organisation's national App**.**

**Appendix 4 Mobile phone applications mentioned in this research and where they can be found:**

**Apparition Dornier 17**
https://itunes.apple.com/gb/app/apparition-dornier-17-edition/id717940736?mt=8
https://play.google.com/store/apps/details?id=uk.ac.mdx.apparition.Do17

**Attingham Park**
https://itunes.apple.com/gb/app/attingham-park-national-trust/id663993747?mt=8

**Dickens' Dark London**
https://itunes.apple.com/gb/app/streetmuseum-dickens-dark/id483346931?mt=8

**Dinosaur Island – Isle of Wight**
https://itunes.apple.com/gb/app/dinosaur-island-isle-of-wight/id656752695?mt=8
https://play.google.com/store/apps/details?id=com.viow.dinosaurisland&hl=en

**Epstein Mysteries**
https://itunes.apple.com/us/app/epstein-mysteries-presented/id569510424?mt=8
https://play.google.com/store/apps/details?id=com.theconnectedset.epstein&hl=en_GB

**GuardianWitness**
https://itunes.apple.com/us/app/guardianwitness/id587343125?ls=1&mt=8
https://play.google.com/store/apps/details?id=com.guardian.witness

**Historypin**
https://play.google.com/store/apps/details?id=com.historypin.Historypin&feature=search_result
https://itunes.apple.com/app/historypin/id455228207?mt=8
http://www.windowsphone.com/en-us/store/app/historypin/05638072-742e-460c-ab97-18d2b47ef06b

**IKEA Catalogue**
https://itunes.apple.com/us/app/ikea-catalog/id386592716?mt=8
https://play.google.com/store/apps/details?id=com.ikea.catalogue.android&hl=en

**National Parks by National Geographic**
https://itunes.apple.com/us/app/national-parks-by-national/id518426085

**NPS National Mall**
https://play.google.com/store/apps/details?id=gov.nps.nama

https://itunes.apple.com/us/app/nps-national-mall/id447866739?mt=8&ign-mpt=uo%3D4

**National Trust**
https://itunes.apple.com/gb/app/national-trust/id360792792?mt=8
https://play.google.com/store/apps/details?id=uk.org.nt.android.app1&hl=en_GB

**Played in Britain: Modern Theatre in 100 Plays, 1945-2010**
https://itunes.apple.com/gb/app/played-in-britain-modern-theatre/id570182331?mt=8

**Streetmuseum**
https://itunes.apple.com/app/id369684330
https://play.google.com/store/apps/details?id=com.streetmuseum&feature=search_result

**Tate Trumps**
https://itunes.apple.com/us/app/tate-trumps/id371670940?mt=8

**Universal 100**
No longer available in iTunes.
GooglePlay: http://goo.gl/k4uar

**The V&A Medieval and Renaissance Galleries Guide App**
https://itunes.apple.com/app/the-v-a-medieval-renaissance/id427911093?mt=8&ls=1

**V&A Played in Britain: Modern Theatre in 100 Plays, 1945-2010**
https://itunes.apple.com/gb/app/played-in-britain-modern-theatre/id570182331?mt=8

**Worcester Cathedral**
https://itunes.apple.com/gb/app/worcester-cathedral/id811124074?mt=8
https://play.google.com/store/apps/details?id=com.cnc.worcesterDroid&hl=en

**50 things to do before you are 11 3/4**
https://play.google.com/store/apps/details?id=com.nationaltrust.nt50things.app
https://itunes.apple.com/gb/app/50-things/id888646159?mt=8