

Understanding Modern History Museum Smartphone Mobile Guides and Apps

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Abstract

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The purpose of this study was to better understand smartphone mobile guides and their use in US history museums. This study sought to answer three core questions. First, what features are shared by smartphone mobile guides in history museums? Second, what do history museum staff think are the factors associated with successful guides? Third, in what ways does the use of smartphone mobile guides in history museums impact exhibit development practices? Smartphone mobile guides were defined as phone-based applications that guided users on scripted tours. This study was significant for two reasons. First, previous studies of smartphone guides were not conducted in history museums. Second, the rapidly advancing capabilities of smartphones rendered many of those studies obsolete. Data collection was done through semi-structured interviews of history museum professionals who worked with smartphone guides as well as document analysis of the guides themselves. Zoom was used to conduct and record the interviews. The interview transcripts and mobile guides were analyzed using emergent coding. There were four significant results for history museums to understand when considering the use of smartphone mobile guides. First, smartphone mobile guides were defined by high usage rates and a focus on enhancing the visitor experience. Second, common features of smartphone mobile guides were: they were free of charge, allowed data to be gathered on users, designed for individual use, classified as heads-up experiences, included some form of navigation aid, and

included an alternative tour. Third, smartphone mobile guides did not impact the development of exhibits. Fourth, history museum smartphone mobile guides were not viewed as a source of revenue. When combined these findings suggested that there was a baseline set of expectations successful mobile guides in US history museums followed. There were three limitations to this study. First, the sample size was small. Second, many of the mobile guides had inaccessible location-based features. Third, the sample was biased towards guides whose existence was acknowledged online through third party websites.

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Introduction Chapter 1

Smartphones, basically hand-held computers, were introduced into the US market in 1994 and have evolved at an increasing pace since, and the pace of technology adoption was speeding up as well. Mobile guides have been used in museums for over a decade and smartphone-based mobile guide systems since 2009.¹ A “smartphone-based mobile guide system” was defined as a smartphone-based technology used to lead museum visitors through an exhibit. Museums implemented smartphone-based mobile guide systems without proven guidance on their usefulness. Literature about specific benefits that history museums could expect to gain from smartphone-based mobile guide systems was limited. Additionally, the rapid development of technology made earlier research studies unreliable for smartphone-based mobile guide systems. To put this in perspective, the iPhone XR (2018) had more than six times the processing power of the original 2007 iPhone.²

The purpose of this study was to better understand smartphone mobile guides and their use in US history museums. This study sought to answer three core questions. First, what features are shared by smartphone mobile guides in history museums? Second, what do history museum staff think are the factors associated with successful guides? Third, in what ways does the use of smartphone mobile guides in history museums impact exhibit development practices?

The research conducted in this case study will hopefully benefit historical museums looking to implement mobile guide systems in their permanent galleries. Finally, this study

¹ PatrickJ. *Want to See The Louvre? Yup, There's a (gorgeous) App for That*. November 9, 2009.

² iPhone User Guide for iPhone and iPhone 3G, Apple 2008; <https://www.apple.com/iphone-xr/specs/>

aimed to fill a gap in the literature about the use of smartphone-based mobile guide systems in history museums.

Three bodies of literature were explored in the creation of this study. First, literature on smartphone-based mobile guide systems was examined. Second, general literature about smartphone technology was explored. Finally, literature that dealt with how to make trade-offs and compare benefits of decisions was included.

This was a case study. Two methodologies that were used in this study were semi-structured interviews with museum professionals who were responsible for their museum's mobile guides, and document analysis of eight museum mobile guides. Data gathered was analyzed using emergent coding.

Chapter 2 Literature Review

Smartphones

Smartphones have existed for longer than most people remember. The first smartphone was the IBM Simon introduced in 1994. The device was innovative, but poor battery life led to IBM abandoning the product having “spent a mere six months on the market, with around 50,000 units sold.”³ Unlike today’s smartphones, the Simon’s apps were all pre-programed. There was no way to download additional applications.⁴ The introduction of the iPhone 3G in 2008 introduced devices with many applications available to be downloaded from an online marketplace.⁵

By late 2009, museums had begun to introduce their own apps. Art museums took the lead with museums such as the Louvre⁶ and the Portland Art Museum⁷ being some of the early adopters of guides for mobile devices.

Mobile Devices

What is a mobile device? In the publication, *Mobile Apps for Museums: The AAM Guide to Planning and Strategy*, Nancy Proctor and Jane Burton defined “device,” as “a term used to describe computer hardware. Devices include computers, phones, game systems, media players and other physical electronic aides.”⁸ Proctor and Burton also identified mobile devices as

³ Aamoth, Doug. *First Smartphone Turns 20: Fun Facts About Simon*. Time. August 18, 2014.

⁴ Ibid

⁵ Pierce, David and Goode, Lauren. *The Wired Guide to the iPhone*. Wired. December 7, 2018.

⁶ PatrickJ. *Want To See The Louvre?*

⁷ Turoczy Rick. *Tours: Is that the Portland Art Museum in your pocket or are you just happy to see me?* November 11, 2009.

⁸ Proctor, Nancy, and Burton, Jane. *Mobile Apps for Museums: The AAM Guide to Planning and Strategy*. Washington, DC: AAM Press, 2011. p.104

devices that were either “pocketable and portable devices,”⁹ “smartphones that run apps and access the internet, and older cellular phones that do nothing more than make voice calls and send text messages,”¹⁰ “podcasts of audio and video content, and other downloadable content including PDFs and eBooks,”¹¹ “mobile websites, optimized for the small screen and audiences on the go, and ‘desktop’ websites designed for large fixed screens but which are increasingly visited by mobile devices,”¹² and “BYOD (bring your own device) mobile experiences, designed for visitor’s personal devices, and traditional on-site distribution for visitors who do not have or do not care to use their own phone or media player.”¹³

Some museums preferred not to introduce mobile guides into their interpretation, preferring the use of traditional audio guides. According to Koven Smith, author of *The Future of Mobile Interpretation*, “The failure of the majority of handheld projects to date has been blamed on their trying to do too much, using technology that is too complex, too expensive, or “not ready for prime time.”¹⁴ At a 2009 symposium on handheld devices held at Tate Modern titled *From Audiotours to iPhones*, simplifying handheld applications and devices, was a key topic.¹⁵ The symposium recommended that smartphone tours should remain scripted with a single narrative. “In effect bringing them into line with traditional audio tours but adding a few visuals.”¹⁶ Smith disagreed with this approach to using mobile devices based on the traditional audio tour. He argued that “there is a portion of the museum-going public who will probably

⁹ Ibid p. 8

¹⁰ Ibid

¹¹ Ibid

¹² Ibid

¹³ Ibid

¹⁴ Smith, K., *The Future of Mobile Interpretation*. In J. Trant and D. Bearman (eds). *Museums and the Web 2009: Proceedings*. Toronto: Archives & Museum Informatics. Published March 31, 2009. Consulted February 16, 2019. <http://www.archimuse.com/mw2009/papers/smith/smith.html>

¹⁵ Ibid

¹⁶ Ibid

always crave this led-by-the-hand, explicitly curated approach. The problem, however, is that the tour model appeals only to this relatively small segment of the museum-going public.”¹⁷ Smith also argued that because modern information consumers were used to having large quantities of data at their disposal, being limited to a traditional tour made museums seem stingy with their information.¹⁸ With an audio guide, “An entire stop must be consumed, from start to finish, or not at all. The audio is either on, or it's off. The net effect is that museums are forcing people who are accustomed to digesting a lot, and quickly, to digest very little at a snail's pace.”¹⁹

Smith favored a mobile guide experience that was much more expansive in its scope than traditional audio guides. “A mobile interpretive device should have some kind of searchable content available for every single object on display (and preferably even for those objects that aren't).”²⁰

One of the major questions facing the museum field as they transitioned from audio guides to mobile guides, according to Smith, was “is the target audience for multimedia devices the same as the target audience for traditional audio guides? If it is, then best practices developed to this point still apply. If it is not, then museums must focus further research and development towards understanding this new (or at least different) audience.”²¹

Technology

Many mobile guides required the museum visitor to possess a smartphone to use them. In 2011, the same year that *Mobile Apps for Museums: The AAM Guide to Planning and Strategy*

¹⁷ Ibid

¹⁸ Ibid

¹⁹ Ibid

²⁰ Ibid

²¹ Ibid

was published, Aaron Smith, in his article “Record shares of Americans now own smartphones, have home broadband,” found that “That year, 35% of Americans reported that they owned a smartphone of some kind.”²² Since then, smartphone ownership has increased. In 2017, Smith found that “roughly three-quarters of Americans (77%) now own a smartphone.”²³ In general, younger Americans were more likely to be smartphone owners: “92% of 18- to 29-year-olds owning one.”²⁴ Yet ownership was rising among both older and poorer Americans. “Nearly three-quarters (74%) of Americans ages 50-64 are now smartphone owners (a 16-percentage-point increase compared with 2015), as are 42% of those 65 and older (up 12 points from 2015). There has also been a 12-point increase in smartphone ownership among households earning less than \$30,000 per year: 64% of these lower-income Americans now own a smartphone.”²⁵ In the United States, almost all smartphones ran on two operating systems, iOS and Android. In 2018, 63.08% of American smartphones ran on iOS while 36.74% ran on Android according to DeviceAtlas.²⁶ DeviceAtlas described itself as “the leading provider of device intelligence to several industry verticals ranging from major online brands, advertising platforms, financial services, gaming, analytics providers and mobile telecoms focused companies.”²⁷

Location Based Devices

In addition to having a large database of information that was searchable and easy to navigate, Smith argued that “the handheld device must provide appropriate wayfinding. If the visitor is able to discover objects potentially of interest, but not successfully locate those objects

²² Smith, Aaron. “*Record shares of Americans now own smartphones, have home broadband*”. Pew Research Center. Jan. 12, 2017.

²³ Ibid

²⁴ Ibid

²⁵ Ibid

²⁶ Jkielty. *Android v iOS market share 2019*. DeviceAtlas.

²⁷ *About Us*. DeviceAtlas

in the gallery space, the handheld device has failed. Object locations should be explicitly mapped, appropriate travel vectors within the gallery space could be defined, and the devices themselves should be location-aware.”²⁸ Location-based services (LBS) determined the location of the user by using one of several technologies for determining position, and then used the location and other information to provide personalized applications and services.²⁹

Deborah Howes in her article, *Handheld and Expansive: Mobile Platforms Help Museums Foster Better Visitor Experiences*, asserted that stress associated with wayfinding, such as a lost child or looking for a bathroom, was a factor in keeping some people from visiting a museum.³⁰ Smith identified three cases where a location-based service could help a museum better serve visitors.

1. A museum spread out over a large area (such as a sculpture park) might elect to limit additional recommendations to objects that are within comfortable walking distance of the object being currently viewed.
2. A traditional art museum might elect to do exactly the opposite, in that a visitor already in a given gallery might not need to have objects from that same gallery recommended to him or her. If a visitor is traveling along a pre-selected or pre-determined route, the recommendations might be limited to objects with a proximity relation to that route.
3. A ...museum may wish to feature certain content in its gallery space, and indicate a preference to recommend that content when the visitor is nearby.³¹

How did museums address the problem of navigation in museums? Maps could be useful but showing the user’s location was a more complex problem. Meliones Apostolos and Sampson Demetrios found in their case study of a mobile guide for blind visitors, "Blind Museum Tourer:

²⁸ Smith, K., *The Future of Mobile Interpretation*.

²⁹ Zibuschka, Jan, Kai Rannenberg, and Tobias Kölsch. "Location-based Services." Lecture Notes in Computer Science (including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics) 6545 (2011): 679-95.

³⁰ Howes, Deborah. *Handheld and Expansive: Mobile platforms help museums foster better visitor experiences*. Museum. January February 2019. Print. P.19

³¹ Smith, K., *The Future of Mobile Interpretation*.

A System for Self-Guided Tours in Museums and Blind Indoor Navigation,"³² that "unlike outdoor navigation, which exploits GPS technology to accurately resolve the problem of dynamic location determination and modern geo-information systems for routing determination, such as OpenStreetMap, Google Maps and Apple Maps services, there is no global solution to the indoor navigation problem. Especially regarding the problem of blind outdoor pedestrian navigation, there are several high-precision and reliable research and commercial systems available."³³

A solution that Apostolos and Demetrios proposed was a "GPS-like solution to the indoor location detection problem employing multiple Wi-Fi access points. Many such solutions exploit a feature of smart phone/tablet devices, which calculates the signal strength received at the device from WLAN transmitters operating in the internal space. Both the Android and iOS frameworks provide relevant system calls."³⁴

An example of a mobile guide that utilized wayfinding was the explorer app at the American Museum of Natural History. It utilized "sensors distributed throughout the 25 interconnected buildings"³⁵ of the museum to help the visitor navigate in the museum.

Navigation could also be done through audio cues such as navigation instructions.³⁶ One guide that did this was NavCog at the Andy Warhol Museum in Pittsburgh, PA.³⁷ This allowed the museum to accommodate low-vision guests, a demographic that was often hard for all

³² Apostolos, Meliones, and Demetrios, Sampson. *Blind Museum Tourer: A System for Self-Guided Tours in Museums and Blind Indoor Navigation*. Technologies 6, no. 1 (2018): 4.

³³ Ibid

³⁴ Ibid

³⁵ Howes, Deborah. *Handheld and Expansive* P.19

³⁶ Ibid

³⁷ Ibid

museums to serve.³⁸ Guests who used the system reported their experience was “more independent and enjoyable.”³⁹

Mobile guides and money

Proctor described various payment methods that museums used to pay for mobile guides in their museums. The first payment method she described was the omnibus method. In this method, a museum that set to host a blockbuster touring exhibit ordered the creation of a tour for both the touring exhibit and the permanent gallery.⁴⁰ In blockbuster tours, “usually over 15% of visitors take the tour, up to 85% or more in the most successful tours.”⁴¹ Unlike blockbuster exhibits, mobile tours in permanent galleries were less profitable. By producing the two guides at the same time, the museum could use the blockbuster tour to subsidize the permanent gallery tour.⁴²

The second payment method mentioned by Proctor, freemium, is based on app-based guides.⁴³ Apps are made available for download through online marketplaces such as Apple’s App Store or Google’s Play Store. As of early 2018, both of these companies took a 15% cut of all transactions in these virtual marketplaces.⁴⁴ In their study of apps available on Google’s Play Store, *Effects of Freemium Strategy in the Mobile App Market: An Empirical Study of Google Play*, Charles Zhechao Liu, Yoris A. Au and Hoon Seok Choi defined freemium as:

...a business model by which a service or a product is offered free of charge, but a premium is charged for advanced features, functionality, or related products and

³⁸ Ibid

³⁹ Ibid p.20

⁴⁰ Proctor. *Mobile Apps for Museums*. p.15.

⁴¹ Ibid

⁴² Ibid

⁴³ Ibid

⁴⁴ Statt, Nick. “Google matches Apple by reducing Play Store fee for Android app subscriptions.” *The Verge*. October 17, 2017.

services. This strategy is widely utilized in the offering of digital-based products or services, including software, games, and web services. In the mobile app market, freemium apps are free to download but typically include offers to upgrade to the paid version, which is ad free or has richer features, to buy additional content or services within the app (i.e., in-app purchase), or to unlock additional levels of game stages.⁴⁵

An example of a museum using this model was Philadelphia's National Constitution Center's app. It was free to download and contained basic information about the site. Themed tours were also available for \$0.99 each.⁴⁶

The next funding methods Proctor described were all free to the user. The first was advertising based. In this style of tour, advertising on the app was sold to pay for the cost of developing the tour. Some museums used advertising in print media, but as of 2011, there were no museums who had used this strategy.⁴⁷

Another funding strategy used by some museums was sponsorship. In this funding method, an outside donor paid for the needed technology so that the guide could be offered for free or reduced price.⁴⁸ This strategy could dramatically increase the number of visitors who used a guide. In 2004, the MoMA received a grant from Bloomberg Philanthropies that allowed them to offer a free audio tour. As a result, "tour usage rate went from 5-8% of visitors to 31%" when switching from a paid tour.⁴⁹

Museums could also offer free guides as a benefit of membership.⁵⁰ One of the newer forms of funding was a donation-based model. In this model the guide was offered for free, but a

⁴⁵ Liu, Charles Zhechao, Yoris A. Au, and Hoon Seok Choi. "Effects of Freemium Strategy in the Mobile App Market: An Empirical Study of Google Play." *Journal of Management Information Systems* 31, no. 3 (2014): 326-54.

⁴⁶ Proctor. *Mobile Apps for Museums*. p.15-16.

⁴⁷ *Ibid* p.18-19

⁴⁸ *Ibid* p.18

⁴⁹ *Ibid*

⁵⁰ *Ibid* p.19

message was displayed, which asked the user for a donation.⁵¹ Procter argued that this form of funding could help museums foster new donors.⁵²

Native apps and Web-based apps

Smartphone based guides came in two forms: native apps and web-based apps. “Native apps are designed to be installed directly on to the mobile device and are found in Apple’s App Store or the Android Market (Play Store), for example.”⁵³ “Web-based’ applications work inside the web browser. Rather than going to an online store to browse, download and install the application, the browser is used to navigate to a website that is optimized for use on the mobile device and offers app functionality.”⁵⁴ Procter argued that web-based applications better suited museums. Web-based applications were able to be used on any device, unlike native apps.⁵⁵

Native apps ran only on the operating system they were designed for.⁵⁶ “If you want your app accessible on the iPhone, Android and Windows mobile platforms, you’ll have to develop three different applications.”⁵⁷ Web-based apps also updated immediately while users’ native apps had to download each update.⁵⁸ This drove up costs as native apps could cost tens of thousands of dollars to produce and had to be updated each time the operating system changed.⁵⁹ Additionally, “user acceptance to install unknown software on a personal device is rather limited. Established cultural institutes like museums will achieve a higher level of trust; nevertheless,

⁵¹ Ibid

⁵² Ibid p.20

⁵³ Ibid p.25

⁵⁴ Ibid

⁵⁵ Ibid

⁵⁶ Ibid p.26

⁵⁷ Ibid

⁵⁸ Ibid p.27

⁵⁹ Ibid

most visitors will avoid the additional overhead of setting up software on their own device or learning to interact with a new device while starting their museum tour.”⁶⁰ Web-based apps on the other hand cost relatively little to produce and used technologies already used by most museums.⁶¹ The main drawback with web-based guides was that visitors needed to have consistent internet access during their visit.⁶² Visitors might not want to use their cellular data plans, so Proctor argued that a museum using a web-based app should make sure they offered free Wi-Fi with good coverage of all the gallery spaces.⁶³ Web-based apps might also require providing more information to visitors on how to access the app than native apps, whose model benefits from advertising campaigns such as Apple’s “an app for that.”⁶⁴

Mobile Experiences

In a 2017 study by Culture Track, *Handheld and Expansive: Mobile Platforms Help Museums Foster Better Visitor Experiences*, 4000 people were asked what they wanted in a museum experience. The most common answers were having fun (81%), interest in content (78%), experiencing new things (76%), feeling less stressed (75%), learning something new (71%), feeling inspired (69%), interacting with others (68%) and feeling transported (67%).⁶⁵ Based on this study, what kind of mobile guide experiences should museums design? Procter divided the types of experiences audience members had with mobile guides into two categories: heads-up and heads-down.⁶⁶ A heads-down mobile experience was one where the user’s focus

⁶⁰ Al Takroui, Bashar, Karen Detken, Carlos Martinez, Mari Oja, Steve Stein, Luo Zhu, and Andreas Schrader. "Mobile HolstenTour: Contextualized Multimedia Museum Guide." Proceedings of the 6th International Conference on Advances in Mobile Computing and Multimedia, 2008, 460-63.

⁶¹ Procter. *Mobile Apps for Museums*. p.28

⁶² Ibid

⁶³ Ibid

⁶⁴ Ibid

⁶⁵ Howes, Deborah. *Handheld and Expansive* P.18

⁶⁶ Procter. *Mobile Apps for Museums*. p.35

was on their device's screen. An example of this would be a mobile game. A well-designed game held the user's attention.⁶⁷ The user, however, paid less attention to the exhibit itself. Tsvi Kuflik, Oliviero Stock, Massimo Zancanaro, Ariel Gorfinkel, Sadek Jbara, Shahar Kats, Julia Sheidin, and Nadav Kashtan, in their study, "A Visitor's Guide in an Active Museum: Presentations, Communications, and Reflection," stated that this type of experience was incompatible with museums.⁶⁸ They wrote, "multimedia content should not divert the visitors' attention from the actual objects in the museum, which should remain the focus of the visit."⁶⁹ A heads-up experience, also called a looking around experience, directed the user's experience to their surroundings. An example of this would be a traditional audio guide.⁷⁰

Proctor argued that mobile experiences were "relevant first to visitors, not the institution."⁷¹ To achieve this, Proctor argued museums should understand what people already did with mobile devices. People used mobile devices to "communicate with other people (voice, text, email), listen to audio and watch videos, access digital information (onboard and streamed), play games, navigate the real world (GPS, AR), and take and share pictures and video."⁷² One suggestion Proctor gave for improving the user's sense of involvement was to allow visitors to take pictures of and report broken things to the maintenance team.⁷³

⁶⁷ Ibid p.36

⁶⁸ Kuflik, Tsvi, Oliviero Stock, Massimo Zancanaro, Ariel Gorfinkel, Sadek Jbara, Shahar Kats, Julia Sheidin, and Nadav Kashtan. "A Visitor's Guide in an Active Museum: Presentations, Communications, and Reflection." *Journal on Computing and Cultural Heritage (JOCCH)* 3, no. 3 (2011): p.3

⁶⁹ Ibid

⁷⁰ Procter. *Mobile Apps for Museums* p.36

⁷¹ Ibid p.37

⁷² Ibid

⁷³ Ibid p.38-39

Another suggestion that Proctor gave for improving the visitor experience was to have a story that tied a mobile device guided tour together.⁷⁴ An example of this given by Proctor was mobile tour developer Walking Cinema's walking tour of Boston, *Murder on Beacon Hill*.⁷⁵ The tour used an 1840's murder to guide users around Boston.⁷⁶ Proctor argued that having high quality audio and video was another aspect of the Walking Cinema's guides that made them attractive to visitors. Because of the limitations of mobile devices, mainly their size, Proctor recommended that video made for large screens, such as movies, should be avoided as it was impossible for small details to be resolved.⁷⁷ One of the things that turned people away from using smartphone mobile guides was price. This applied mainly to native apps. Proctor recommended that guides should be offered for free.⁷⁸

Reaching Target Audiences

According to Koven Smith, "the goal of a successful mobile roll-out strategy should not be to reach more users, but rather to reach more of the right users."⁷⁹ "Mobile guides designed for a small subset of a museum's public shouldn't be marketed to every single person who walks in the door."⁸⁰ Smith identified three styles of marketing museums used when rolling out their guides: broad appeal, stealth, and third party.⁸¹ The broad appeal was designed to reach the largest number of visitors possible. This style was marketed to all visitors who entered the

⁷⁴ Ibid p.39

⁷⁵ Ibid

⁷⁶ Ibid

⁷⁷ Ibid p.40

⁷⁸ Ibid

⁷⁹ Ibid p.83

⁸⁰ Ibid

⁸¹ Ibid p.83-86

museums.⁸² This style was best used when the user did not already know that a mobile guide was available when they arrived at the museum.⁸³

The second roll-out strategy Koven Smith introduced was stealth. “A stealth roll-out meant that the museum decided to market its mobile experience to a niche group without an overt information campaign.”⁸⁴ Sometimes the mobile application attracted visitors by itself.⁸⁵ The application should be designed for the target demographic. Word of the new application could be spread either by introducing it to influential people in that community or by hiding clues in the exhibit or other materials that the public would not understand.⁸⁶ In this strategy, the target demographic should know about the mobile guide before they arrived at the museum. This type of campaign “should guarantee user interest and engagement long before the application itself is downloaded.”⁸⁷ A successful model of this occurred in 2002, when Sony Ericsson Mobile Communications Ltd. launched a stealth campaign called *Fake Tourist* in which “trained actors and actresses haunted tourist attractions such as the Empire State Building in New York and the Space Needle in Seattle. Working in teams of two or three and behaving like tourists, the actors and actresses asked unsuspecting passersby to take their pictures.”⁸⁸ They would use this opportunity and other scripted stunts to show off the features of the phone. “Such as an actress's phone ring while she's in the bar -- and having the caller's picture pop up on the screen. In another scenario, two women sit at opposite ends of the bar playing an interactive version of the

⁸² Ibid p.84

⁸³ Ibid

⁸⁴ Ibid p.85

⁸⁵ Ibid

⁸⁶ Ibid p. 86

⁸⁷ Ibid

⁸⁸ By, S. V. (2002, Jul 31). *That guy showing off his hot new phone may be a shill --- new campaign for Sony Ericsson puts actors in real-life settings; women play battleship at the bar*. Wall Street Journal Retrieved from <https://search.proquest.com/docview/398803296?accountid=14784>

Battleship game on their phones.”⁸⁹ The campaign was so successful that Sony Ericson launched spinoff campaigns on college campuses the next year.⁹⁰

The third type of roll-out strategy that Smith identified was third party. In this scenario, a third-party company designed the mobile guide as well as its accompanying roll-out advertising.⁹¹ This was done often without the museum being aware of its existence. The museum could try to influence the development of the guide by offering incentives to developers such as the possibility of promotion if certain standards were met.⁹² Smith asserted that if this type of guide was implemented that the museum must be careful to differentiate its own content from the content designed by the third party.⁹³

Case Studies of Individual Guides

According to a study by Kira Eghbal-Azar, Martin Merkt, Julia Bahnmueller, and Stephan Schwan, “several studies and evaluations have demonstrated that the use of mobile guides substantially prolonged visitor’s stay in the exhibition by increasing exhibit’s attraction power and holding power. Also, visitors using mobile guides not only frequently reported higher satisfaction with the exhibition, but also indicated noticing more relevant details and developing a better understanding of the exhibits.”⁹⁴ These studies were conducted over the past 30 years.

⁸⁹ Ibid

⁹⁰ Wasserman, Todd. "Sony Ericsson Dialing Students, Bows First TV: 'Campus Connectors' to Spotlight Sony's 'Wheel'. (Guerrilla Marketing). (college Students Will 'sell' Phones That Can Play 'Wheel of Fortune') (Brief Article)." Brandweek 44, no. 20 (2003): 6.

⁹¹ Procter. *Mobile Apps for Museums*. p.86-87

⁹² Ibid p. 87

⁹³ Ibid p.88

⁹⁴ Eghbal-Azar, Kira, Martin Merkt, Julia Bahnmueller, and Stephan Schwan. "Use of Digital Guides in Museum Galleries: Determinants of Information Selection." *Computers in Human Behavior* 57 (2016): 133-42.

“Research prototypes of multimedia museum visitors’ guides and other mobile guides started as early as the late 1990s.”⁹⁵

Examples of Research

The study conducted by Kira Eghbal-Azar, Martin Merkt, Julia Bahnmueller, and Stephan Schwan, *Use of Digital Guides in Museum Galleries: Determinants of Information Selection*, tested the behavior of visitors using the mobile guide vs. those without a guide. They found that having the guide increased the duration of stops visitors made, but not the frequency of stops. The order in which the visitors navigated the exhibit also did not change when they were given a guide. Additionally, the researchers found that at the early stops in the exhibit, visitors spent more time than they did at later stops.⁹⁶

To the Castle! A Comparison of Two Audio Guides to Enable Public Discovery of Historical Events, a study by Elizabeth Fitzgerald, Claire Taylor, and Michael P. Craven, compared two audio guide tours of Nottingham Castle.⁹⁷ One of the findings was “the issue of authenticity: for example, one of the narrators of the digital audio clips had a foreign accent, which participants felt was not appropriate since they would have preferred a regional accent, so they felt more immersed in the local surroundings.”⁹⁸

The researchers of *To the Castle!* made recommendations to developers of other guide systems. They recommended that guide systems “restrict the size of the audio file that can be uploaded, which results in a spoken audio clip of around 3–4 min long. This was a conscious

⁹⁵ Kuflik Tsvi. *Visitor’s Guide*. p.3

⁹⁶ Eghbal-Azar, Kira *Use of Digital Guides*

⁹⁷ Fitzgerald, Elizabeth and Taylor, Claire and Craven, Michael P. (2013) *To the Castle! A Comparison of Two Audio Guides to Enable Public Discovery of Historical Events*. *Personal and Ubiquitous Computing*, 17 (4). Pp. 749-760. Issn 1617-4909

⁹⁸ Ibid

design decision, based on their belief that this is the maximum amount of time that someone wants to listen to an audio clip whilst in one physical location.”⁹⁹ They also recommended that developers of audio tours could “provide different audio tours geared towards different target end–users, for example, children/adults; families/couples/ individuals; non-native English speakers; and tourists/local inhabitants. In this case, it is more scalable to produce the tour using the technology-led approach, rather than run separate people-led walks.”¹⁰⁰

“Both BlindHelper, now renamed Blind RouteVision and MuseumTourer, state-of-the-art navigation applications... comprise the MANTO BlindEscort Apps (in ancient Greek mythology, Manto was a daughter and blind escort of famous blind seer Tiresias).”¹⁰¹ “The MANTO applications aimed to resolve the accessibility problems of BVI during pedestrian transportation and navigation in outdoor and indoor spaces.”¹⁰² “Independent living makes a key contribution to the social and professional inclusion, education and cultural edification and quality of life of BVI.”¹⁰³ These apps used location based technology to aid navigation. As they put it: “MANTO apps aim to provide an unparalleled aid to BVI all over the world, so that they can walk outdoors safely and experience self-guided indoor navigation, including tours in museums.”¹⁰⁴ Although this was an android app it required several additional pieces of hardware to properly function.¹⁰⁵

A mobile guide developed in 2011 for the Archeological Museum of Volos, Greece called iMuse was designed by Athanasios Fevgas, Panagiota Tsompanopoulou, and Panayiotis

⁹⁹ Ibid

¹⁰⁰ Ibid

¹⁰¹ Apostolos Meliones, and Demetrios Sampson. *Blind MuseumTourer*. p.2

¹⁰² Ibid p.2

¹⁰³ Ibid p.2

¹⁰⁴ Ibid p.2

¹⁰⁵ Ibid p.10

Bozanis to be used by groups rather than individuals.¹⁰⁶ They chose to do this “as has been identified by previous works, people tend to visit museums in small or bigger groups.”¹⁰⁷ Due to Greece’s location as a tourist attraction for visitors from all over the world, the guide was designed to accommodate diverse audiences. In Fevgas, Tsompanopoulou and Bozanis’s words: “The members of a group may have different needs and expectations from a museum tour (adults, children). It is not even unusual to speak different languages (e.g., cruise ships tourists). Thus, most of the modern mobile guides support multilingual and multi-audience content.”¹⁰⁸ One of the ways the developers of the guide addressed younger viewers was by including games. The response to the guide was positive. “The participants reported that iMuse Mobile Tour stimulated their interest on the exhibits.”¹⁰⁹ “Moreover, they are planning to recommend the usage of the system to their family/friends.”¹¹⁰

One finding of this case study was the power of pre-planned routes. “The archaeologists’ pre-defined routes were found to help the deeper understanding of the discussed particular subjects.”¹¹¹ Guests also viewed “the games... as amusing.”¹¹² The study concluded by postulating that “The wide acceptance of the Group Support service indicates that visitors are willing to use their own devices to access exhibit information.”¹¹³

¹⁰⁶ Fevgas Athanasios, Tsompanopoulou Panagiota, and Bozanis Panayiotis. "iMuse Mobile Tour: A Personalized Multimedia Museum Guide Opens to Groups." 2011 IEEE Symposium on Computers and Communications (ISCC), 2011, 971.

¹⁰⁷ Ibid 973

¹⁰⁸ Ibid

¹⁰⁹ Ibid 974

¹¹⁰ Ibid

¹¹¹ Ibid

¹¹² Ibid

¹¹³ Ibid 975

While games were an additional feature of the iMuse guide, a smartphone guide was developed at the National Museum of History in Taipei by researchers Yao-Ting Sung, Kuo-En Chang, Huei-Tse Hou, and Pin-Fu Chen that was entirely a game. The guide allowed the user to take on the role of a Tang dynasty Princess as she planned a rebellion. The participants were young with the average age being 20 to 25 years old.¹¹⁴ The results were positive, but the study, “Designing an Electronic Guidebook for Learning Engagement in a Museum of History,” consisted of college students who participated voluntarily and were rewarded for doing so.¹¹⁵

Another guide whose content varied significantly from the traditional audio guide was described in the study, “The “Non-Places” Meet the “Places:” Virtual Tours on Smartphones for the Enhancement of Cultural Heritage,” in 2014. The system, installed in three European cities, allowed users to create their own tours based on reviews left by previous tourists. The system was designed to appeal to both smartphone users and travel experts and general tourists.¹¹⁶ “The experts can make improvements to the system based on feedback from the user community.”¹¹⁷ At the same time, “the general users also enrich the quantity and quality of information by posting feedback and comments.”¹¹⁸ As more users participated, the guide improved. The study “has shown, with some evidence thanks to the three different case studies, that it is now possible to offer multiple solutions which involve the visitor, giving him the opportunity to contribute to the development and transmission of cultural heritage and to share

¹¹⁴ Sung, Yao-Ting, Kuo-En Chang, Huei-Tse Hou, and Pin-Fu Chen. “*Designing an Electronic Guidebook for Learning Engagement in a Museum of History.*” *Computers in Human Behavior* 26, no. 1 (2010): 78

¹¹⁵ *Ibid* 81

¹¹⁶ Garau, Chiara, and Emiliano Ilardi. “*The “Non-Places” Meet the “Places:” Virtual Tours on Smartphones for the Enhancement of Cultural Heritage.*” *Journal of Urban Technology* 21, no. 1 (2014): 84

¹¹⁷ *Ibid*

¹¹⁸ *Ibid*

content of interest with other users who do not identify exclusively with museum institutions.”¹¹⁹ The trade off with this type of guide was that control over the tour’s content now rested with the users not the museum.

Another departure from the traditional tour was the use of augmented reality (AR) guides. The Museum of Fine Arts in Rene, France tested such a guide in 2008. The study, “The “Non-Places” Meet the “Places:” Virtual Tours on Smartphones for the Enhancement of Cultural Heritage,” by Chiara Garau and Ilardi Emiliano noted that with the introduction of AR, “visitors demanded even more consistency regarding the multimedia presentations.”¹²⁰ The results of the study were mixed when it came to the usefulness of AR. When asked if the use of 3D was helpful or an interference to the museum experience, “Half of them answered that they were helped, while the other half was equally divided between the “interference” choice and the open ended answer, to which all implicated participants answered that they were sometimes helped and some other not.”¹²¹ Among visitors who were regular museum visitors, AR was more likely to be seen as distracting.¹²²

AR guides were successful at other institutions, such as the “Riddle Mia This” app offered by the Minneapolis Institute of Art that “turns the museum into a mystery.”¹²³ The guests could use their smartphones to play games and search for clues.¹²⁴ Also unlike many other AR guides, the user’s own device could be used. AR guides at other museums such as the Detroit

¹¹⁹ Ibid 86

¹²⁰ Damala, Areti, Pierre Cubaud, Anne Bationo, Pascal Houlier, and Isabelle Marchal. "Bridging the Gap between the Digital and the Physical: Design and Evaluation of a Mobile Augmented Reality Guide for the Museum Visit." Proceedings of the 3rd International Conference on Digital Interactive Media in Entertainment and Arts, 2008, 125.

¹²¹ Ibid

¹²² Ibid

¹²³ Howes, Deborah. *Handheld and Expansive* P.21

¹²⁴ Ibid

Institute of Art's Detroit Industry exhibit's guide utilized iPads or other equipment rented from the museum.¹²⁵

Problems with Studies

The previous studies listed above had to contend with the challenges of researching mobile guides. Kuflick Tsvi identified several of these challenges that researchers faced when trying to research mobile guides in museums.

The first problem was "Multimedia presentations preparation."¹²⁶ Presentations should be "composed so that they stand alone as self-contained components on the one hand, while on the other, a subset of them can be presented as a collection providing a rich content space allowing every visitor to pursue specific interests."¹²⁷

Problem number 2 was the "User interface design"¹²⁸. "A fundamental issue has been how to provide the visitor with a nonintrusive, intuitive device that includes personal adaptation."¹²⁹

Problem number three was "Ubiquitous user modeling." Because many visitors were first time visitors, "personal information, possibly available from external sources"¹³⁰, "is requested so the visitor may get personal support at the onset of the visit."¹³¹

Problem number four was "Intragroup communication."¹³² "Generic communication mechanisms that standardize and ease the development of intragroup communication services"¹³³

¹²⁵ Ibid

¹²⁶ Ibid

¹²⁷ Ibid p.6

¹²⁸ Ibid

¹²⁹ Ibid

¹³⁰ Ibid

¹³¹ Ibid

¹³² Ibid

¹³³ Ibid

are needed “to allow developers of museum visitors guides to foster interaction and enhance the overall visit experience.”¹³⁴

Problem number five was “Post-/within-visit group support.”¹³⁵ Visitors need “supporting groups of visitors”, and systems “to allow them to revisit the experience.”¹³⁶

Problem number six was “that extensive work with self-motivated real visitors will be possible only with a complete and well-engineered guide.”¹³⁷

¹³⁴ Ibid

¹³⁵ Ibid

¹³⁶ Ibid

¹³⁷ Ibid

Chapter 3 Methodology

The purpose of this study was to better understand smartphone mobile guides and their use in US history museums. This study also sought to answer three core questions. First, what features are shared by smartphone mobile guides in history museums? Second, what do history museum staff think are the factors associated with successful guides? Third, in what ways does the use of smartphone mobile guides in history museums impact exhibit development practices?

As this was a case study, two methodologies were employed to gather data: semi-structured interviews and document analysis. The first set of data was compiled from interviews with three museum professionals at three US history museums. A semi-structured interview would allow each participant to go into detail with each interview question. As the number of institutions that fit the parameters of this study was limited, it was hoped that more extensive data could be collected. The second set of data was compiled from document analysis of eight publicly available history museum smartphone mobile guides.

Methodology 1: Semi-structured Interviews

Selective sampling was used to determine potential sites. In order to be selected as part of this study a potential site had to: 1) use a smartphone based mobile guide, 2) be a history museum, 3) provide some acknowledgement online themselves or through a third party that their guide exists, 4) be in the United States.

Potential sites were identified by visiting websites of three mobile guide companies, Guide by Cell, OnCell, and Cortina. These companies were chosen because each of these companies listed museums who were clients. Many of the museums contacted in this study did not list their mobile guide on their website, which meant that if not for third party websites such

as the ones from the companies listed above, there would be no way to tell if each museum had a guide. As time was limited, it was not possible to contact all history museums in the hopes that they might have a guide that fit this study. Therefore, history museums whose guides were developed by third party companies became the subjects of this study. These companies maintained a list of museum clients on their website. In addition to these three companies, applications, which were listed on the two major North American smartphone application marketplaces, Google's Play Store and Apple's App Store, selected as potential sites as well. The final list can be seen in Appendix E.

Once the list was compiled, the potential sites were numbered according to the order they were identified. Next a random number generator website, Random.org, was used to choose the order in which potential sites were contacted.¹³⁸ This was done to avoid bias as much as possible. It was expected that the sample would be biased towards larger institutions as they were more likely to have a staff member with the time for an interview. The list of potential sites for this study contained 60 museums. Initially, a larger sample of 10-20 interviews was expected. In the end, three history museums agreed to participate in the study: the Los Angeles Maritime Museum (LAMM), The Henry Ford, and the Oklahoma City Memorial and Museum (OKCMM).

Once a museum had agreed to participate, the staff member who was either currently in charge of their museum's smartphone-based guide technology or was in the recent past was chosen by the museum to be interviewed. After agreeing to participate, they were asked how their guide technology had benefited their institution if at all and if they felt the technology was worth the cost among other questions.

¹³⁸ <https://www.random.org/>

The semi-structured interview instrument consisted of 17 questions. (See Appendix C for the instrument.) Each interview took roughly 20 minutes to complete. The time and date of the interview was decided by each interviewee's schedule. A consent form was sent to each interviewee prior to the interview. It was completed beforehand, and it was read and agreed to prior to the beginning of the interview. The interviews were conducted on the videoconferencing website Zoom. Zoom's automatic transcription feature was used to record the contents of each interview.

The data sets were divided into three sections based on the core question for analysis purposes. The interview data was analyzed using emergent coding. Emergent coding was described as a type of analysis "in which researchers can develop a preliminary set of questions about a body of content as they begin to analyze the content. For example, by examining the verbal results of usability participants, practitioners might sense several common themes among the participants and can then develop a systematic, empirical way to explore those themes."¹³⁹ "It entails creating coding categories during the analysis process."¹⁴⁰ Emergent coding was "useful in exploratory content analysis."¹⁴¹

Analysis was achieved by word counts, coding and emergent thematic investigation. Word counts were used to determine frequently used terms. Coding identified identifying relationships and commonalities and graphs were created to visualize this data. Evaluation of this

¹³⁹ Thayer, Alexander, Mary Evans, Alicia McBride, Matt Queen, and Jan Spyridakis. "Content Analysis as a Best Practice in Technical Communication Research." *Journal of Technical Writing and Communication* 37, no. 3 (2007): 268

¹⁴⁰ Ibid p.270

¹⁴¹ Ibid

data led to the emergence of themes and concepts. The terms identified can be seen in Appendix G.

The data sets were divided into sections based on the core question that each question best fit. The interview data was analyzed in two ways using emergent coding. As each of the interviewees were asked the same set of questions, their answers could be compared. Then similar phrases were selected from each of the interviewees answers to be compared.

The second way the answers were compared was by looking at phrases used across the entire interview. The frequency of these phrases was recorded and compared against each other. This data would be used to infer suggestions about the sample.

Methodology 2: Document Analysis

The second set of data, the document analysis of museum mobile guides, was informed by the findings of the first set of data. The terms, which were identified as important to the three interviewees, was used as the basis for analysis of the mobile guides. Therefore, this data was gathered after the analysis of the interviews had been completed.

Eight American history museum apps were downloaded from the Google Play Store. The Google Play Store was chosen because it contained a list of apps that could be downloaded by any android phone, which allowed a wide audience to access it. Additionally, the store could be searched for multiple museum apps from different museums. Finally, it contained ratings and reviews that gave a measurement of how users felt about the guides. Only American museums were used in order to match the three interviews from the first set of data, which were only collected from US museums. Eight museum apps met the criteria for this set of data.

Data was collected from the apps on the Google Play Store in two ways. First, data was collected from the app itself. The list of key terms compiled from the first section as seen in Appendix H was used to identify elements of the apps to compare. Each of the apps was recorded through screenshots and all available features were explored. Not all apps were able to be fully recorded as several contained location-based elements that were unavailable outside of the museum itself. The categories used to analyze the app content were derived from the interview portion of the analysis. Fourteen points of analysis were developed. Some of this data was qualitative while others were quantitative. Once the raw data had been recorded, it was examined to identify patterns in the data.

Second, data was collected from the app's page in the Google Play Store. The number of ratings, and reviews each app received, average user rating given to each app, and the app creator were recorded.

Once both sets of data were analyzed, the findings that emerged from the document analysis was compared with findings emerging from the interviews. This produced a set of combined findings. These combined findings were used to make suggestions about how smartphone based mobile guides are used.

Chapter 4 Results and Discussion

The purpose of this study was to better understand smartphone mobile guides and their use in US history museums. This study also sought to answer three core questions. First, what features are shared by smartphone mobile guides in history museums? Second, what do history museum staff think are the factors associated with successful guides? Third, in what ways does the use of smartphone mobile guides in history museums impact exhibit development practices? This study had a case study design and as such, utilized two methodologies: semi-structured interviews and document analysis.

Interviews

Of the 60 potential sites contacted for the interview portion of this study, six confirmed that they had a mobile guide at some point. Three museum staff members agreed to participate. The participants in this study were Marifrances Trivelli, the Director of the Los Angeles Maritime Museum (LAMM), Matt Elliot, Manager of Digital Experience at the Henry Ford in Dearborn, Michigan, and Dustin Porter, Chief Technology Officer at the Oklahoma City Memorial and Museum (OKCMM).

The LAMM had used a smartphone mobile guide system in the past, but no longer did. OKCMM currently had an app-based smartphone mobile guide. The Henry Ford was in the process of introducing a new app-based smartphone mobile guide for iOS at the time of this study.

Participant Interviews (Questions in bold)

The interviews have been divided based on the three core questions. The order of the questions below is not the same as the order of the questions in the instrument. To see the original order of the questions, see appendix C.

Factors associated with success

The first section of the analysis sought to address core question one of this study: what features are shared by smartphone mobile guides in history museums? questions sought to understand how museum professionals defined a successful guide and if the choices made in designing their own guide were successful.

How would you define a successful mobile guide? /Do you feel your guide has met that standard?

Trivelli defined a successful guide as having high usage rates and providing more than just the information on the label. She did not feel the LAMM's guide had met this standard, which was why the guide was not renewed when the museum's grant funding ended.

Elliot listed usage, retention time, and usefulness to the visitors as signs of a successful guide. He believed that the Henry Ford's guide had met that standard and would continue to improve.

Porter described the ideal guide as something that enhanced the visitor experience, and something that made it easier for a visitor to digest the content. He felt that the OKCMM's guide had accomplished both of those goals.

The two interviewees with current guide systems were remarkably similar in their visions of an ideal guide system. Both highlighted an enhancement of the visitor experience and high usage numbers as the hallmarks of a successful guide. They felt that their systems reached the ideal for mobile guides.

The goal of enhancing the experience that each museum saw as the ideal guide fit with what audiences want from museums as well. The 2017 study, “Handheld and Expansive: Mobile Platforms Help Museums Foster Better Visitor Experiences,” by Culture Track revealed that museum visitors were more interested in experiences than simply learning new information.¹⁴² While 81% of those surveyed listed fun as one of the reasons why they visited museums and 76% cited experiencing new things, only 71% listed learning something new as the reason they visited museums.¹⁴³

Overall would you recommend this guide to a similar institution.

Trivelli did not recommend that similar institutions implement a similar guide.

Elliot stated he would recommend the programs and consultants who worked with the Henry Ford to similar institutions.

While Porter did recommend the guide to similar institutions, he stated that there were parts of the app that would likely not apply to many other sites.

The two museums who currently still utilized a guide recommended that similar institutions investigate guides like the ones they had. The LAMM did not recommend that other smaller history museums install a call-in guide system. Some of the advantages that were found at the larger museums, most notably wayfinding, were not possible with a call-in system. They

¹⁴² Howes, Deborah. *Handheld and Expansive* P.18

¹⁴³ Ibid

also might not have been necessary at a smaller museum where guests were less likely to become lost.

Core Question 1 review

These questions sought to address core question one: what features are shared by smartphone mobile guides in history museums? High usage rates and an enhanced experience were associated with success by the interviewees. The satisfaction with a guide system tended to be higher with guides that used apps to enhance the visitor experience rather than try to replace an already existing part of the experience. While the two museums whose guides were app-based were satisfied with their guides, the museum that used a call-in system was disappointed by lack of use. Additionally, the two museums that used the app-based systems were larger institutions who sighted navigation as one of the most important needs of their guide. This was helpful to the visitors and possibly encouraged higher usage rates.

As Smith suggested in *The Future of Mobile Interpretation*, the mobile guide systems that utilized the unique abilities of smartphones were more successful than the highly scripted guides suggested in the *From Audiotours to iPhones* conference.¹⁴⁴ At LAMM, the one site to use a highly scripted tour guide, was unsuccessful, while at the other two sites additional functions were used and the guide was popular. Marifrances Trivelli, the Director of LAMM attributed the failure of her museum's guide to the relationship that people had with their phones. "People have this freedom with their phones that they're going to decide what information they want and how they're going to access it. And then how they're going to interact with that artifact, which most of the time is taking a funny photo in front of it." Her sentiment was echoed by Smith who argued

¹⁴⁴ Smith, K., *The Future of Mobile Interpretation*

that because modern information consumers were used to having access to large amounts of data at their disposal that they could digest quickly, a museum guide that forced them to digest very little at a snail's pace was unappealing.¹⁴⁵

What each museum felt their guide had accomplished differed for each institution. OKCMM felt that their guide helped to engage younger visitors as well as help with wayfinding. LAMM felt their guide accomplished very little; if anything, it was rarely used. The Henry Ford had not yet fully released their app, but early test results showed that it helped with wayfinding. The interviews also suggested that any experience an app provided must enhance the audience's experience or there would be little enthusiasm towards taking the time to download it.

Common Factors

The second section of the analysis sought to address core question 2, what do history museum staff think are the factors associated with successful guides? The following questions were asked in order to gain a better perspective of common practices related to smartphone mobile guides in history museums. All questions asked were written in bold.

Why did your institution decide to implement a mobile guide in your museum? / What were the initial goals for your guide?¹⁴⁶

Trivelli stated the LAMM's guide aimed to offer visitors "more information than what was on the label." The guide was implemented to address a problem the staff saw in their museum. Trivelli explained, "The way people look at labels was changing, and people were not

¹⁴⁵ Smith, K., *The Future of Mobile Interpretation*.

¹⁴⁶ Note: These two questions did not receive significantly different answers, so they have been combined.

reading lengthy labels. So, we wanted to offer additional information and we thought maybe the audio tour would be the way to do that.”

Elliot explained that wayfinding was the main concern for the Henry Ford. “We are actually four different venues within the umbrella of the Henry Ford. It is a 12-acre Museum. We have a lot of people asking where things are all the time, we do give out like paper maps to everyone at the door...my personal hope is that we start to push more and more people into the digital map.”

The OKCMM had a twofold objective with their guide. The first, Porter explained, was that The OKCMM “wanted to get a younger audience.” The museum wanted to reach younger visitors who had not lived through the 1995 bombing. They felt that this audience required a different approach than their existing exhibits provided. The second goal they hoped to achieve was to offer different tours based on the amount of time each visitor had to visit. As Porters illustrated, “If someone were to come through and they only had 30 minutes, we can take them through some of the high points of the museum.” This was developed in response to potential visitors choosing not to view the exhibits after hearing that most visitors spent two hours at the museum.

Each of the sites had a different reason why they wanted to install a guide system in their museum. There was, therefore, no clear answer as to which reasons were common within this dataset as to why US history museums chose to install smartphone mobile guides. LAMM wanted to address the fact that people were not reading the labels in their exhibit. The director had seen audio tours demonstrated at AAM and wanted to see if they could solve this problem. This goal fit with the more conservative approach to the use of mobile guides advocated for at

the 2009 conference *From Audiotours to iPhones*.¹⁴⁷ At the Henry Ford, the museum's multi-campus layout was confusing to navigate. They wanted an app with a map feature to help navigation of the large campus. This was an example of wayfinding. Both Smith¹⁴⁸ and Howes argued that wayfinding was one of the best uses for mobile guides.¹⁴⁹

Describe your Guide.

The LAMM's guide was a call-in system with each exhibit having a unique number. When that number was called, a pre-recorded description would play back. It was a grant-funded project and was offered for free.

The Henry Ford's Guide was a location-based app for iOS utilizing more than "600 BLE beacons... to provide turn by turn directions" for visitors.

Porter described the functions of the OKCMM guide as the following, "You can buy a ticket. You've got information on when we're open. Then you have a tourist button with our 90, 60, and 30-minute tours. You have the ADA tour, or a Spanish tour, outdoor walking tour, our video tour for families, and the journalism adventure. Then there's two other sections large sections one is at the time on April 19th it sees what time of day it is. And it brings up what was going on April 19 at that time."

The guides used at OKCMM and The Henry Ford were native apps. "Native apps are designed to be installed directly on to the mobile device and are found in Apple's App Store or the Android Market (Play Store), for example."¹⁵⁰ Each user must take time to download the app.

¹⁴⁷ Smith, K., *The Future of Mobile Interpretation*.

¹⁴⁸ Ibid

¹⁴⁹ Howes, Deborah. *Handheld and Expansive*.

¹⁵⁰ Procter. *Mobile Apps for Museums*. p.15

The guide used by LAMM was a call-in system. Within the sample, app-based guides were more common. Procter suggested that web-based apps would be better suited to museums as they required less commitment from the user.¹⁵¹

Who made your guide?

The LAMM built their guide using the Guide by Cell dashboard. There was no outside consultant for the guide. Trivelli stated, “Research recording everything was done in house.” The Henry Ford used software developed by Aruba and HPE. They also hired consultants from Blue Cadet and Forward Technology to assist in developing the app. Cortina Productions developed the OKCMM’s Guide.

The most recent guide at each site was made by a different company. The Henry Ford’s app was built on the Aruba Meridian platform with additional help from HP. The current OKCMM guide was made by Cortina. Additional Cortina guides were examined in the document analysis portion of this study. Both the LAMM and the OKCMM were former users of call-in guides. OKCMM have since switched to their current app-based guide. OKCMM used On-Cell and LAMM used Guide by Cell. These were cheaper options that required more work to be done by the museum staff.

The common factor between all three museums was that each contributed at least partially to the construction of their mobile guide. None of the three used a third-party app. Additionally there was one overlap in the companies used. Both LAMM and OKCMM were former users of Guide by Cell. However, this was expected due to the use of company websites to gather potential subjects.

¹⁵¹ Procter. *Mobile Apps for Museums* p.48

Would you describe your guide as a heads-up (focused on the exhibit) or heads-down (focused on the guide)?

LAMM's guide was a heads-up guide according to Trivelli.

Elliot stated, "We really wanted to create a heads-up experience. People come to the museum to see the stuff, not to like stare at their phone."

The OKCMM's guide was a heads-up experience. Porter estimated that "20-30% of a person's time would be invested in the app while they're in the museum."

All three museums wanted their tours to be heads-up experiences where the visitor's attention would be focused not on their phone, but the exhibit. Most of the examples from the literature of heads-down guides, such as the guide used at the National Museum of History in Taipei, implemented some form of game as part of the experience.¹⁵² That was something that none of these three museums did.

Is it free? If so, why or why not?

Trivelli cited their position in "an underserved community in this district of Los Angeles." That was the reason why they "thought it would be best to offer [the guide] at no charge." According to Trivelli LAMM's mission was to serve its community. She justified offering the guide for free saying "Many people cannot afford to pay, and I think they (Guide by Cell) were suggesting \$8 or \$9. We know that there were many visitors who cannot afford that."

The Henry Ford offered their app for free.

¹⁵² Sung, Chang, Hou, and Chen. "Designing an Electronic Guidebook" p.78

Porter cited making sure the exclusive content of the app such as the ADA and Spanish tours was available to all visitors as a reason why the OKCMM offered its app for free.

All three museums offered their guides for free. OKCMM and LAMM cited their mission as a non-profit as one of the reasons why they chose not to use their guides as an additional revenue stream. Free guides had been shown in other museums to dramatically increase usage of an app. When the MoMA offered a free audio guide in 2004, “tour usage rate went from 5-8% of visitors to 31%.”¹⁵³ In the case of LAMM, OKCMM, and The Henry Ford’s guides, each had been offered free since their introduction. The alternative tours offered by LAMM and OKCMM were another reason why they chose to offer their guide for free. Alternative tours for the purposes of this study were tours that were targeted towards any group other than anglophone adults without physical impairments.

Is it designed to be used in a group or individually?

LAMM’s guide was designed to be used by individuals.

Elliot stated that the app was “designed for individual use.”

The OKCMM’s guide was also designed to be used by individuals.

Each guide was designed to be used by individuals and not groups. According to Elliot, the museum expected users would wear headphones to listen to the audio portion. The Henry Ford’s guide was designed to be used by an individual rather than a group unlike the iMuse tour that was designed for groups.¹⁵⁴ The OKCMM wanted to reach a younger audience than their old audio system had reached. All three guides in the interview portion as well as the document

¹⁵³ Procter. *Mobile Apps for Museums*. 18

¹⁵⁴ Apostolos Meliones, and Demetrios Sampson *Blind MuseumTourer*.

analysis portion of the case study designed their guides to be used by individual users. This seemed to be a common factor of guides at least within this study.

Does your guide allow you to gather data about your visitors such as retention time?

Guide by Cell provided many metrics to the LAMM. Trivelli noted, “how long they stayed on the phone, whether they heard the whole message, where they hung up, and also the area code of the phone that was calling”, as provided by the guide.

The Henry Ford’s app did allow for data collection. Elliot mentioned retention time and traffic areas specifically.

The OKCMM’s app could gather data on its users. It also contained a post-tour survey for each guest.

All three museum guide systems were able to gather data from their applications about their users. This included information such as retention time and area code. The LAMM’s decision to discontinue their guide program was brought on by the usage numbers they received from their guide. The OKCMM’s data showed an increase in participation compared to their old guide system.

Do you offer tours in languages other than English on your guide?

Non-English and low vision tours, which are referred to as alternative tours in this study, are cited as one of the major advantages of mobile guides. For instance, Blind Museum Tourer

was a guide developed to reach a blind audience that could not experience the exhibit as average guests could.¹⁵⁵

The LAMM offered the tour in Spanish. Trivelli mentioned that the ability to learn about the exhibits in Spanish was one of the reasons why the museum decided to implement a mobile guide system. Unfortunately, it was almost never used.

The Henry Ford did not offer the guide in other languages at the time of this study. Elliot said, “Eventually, that's something we'd like to do, but right now it's just in English.”

Porter mentioned that tours were available in Spanish as well as a low-vision ADA version.

Two of the three museums offered their tour in Spanish in addition to an English tour. As seen in the document analysis portion of this study, alternative languages especially Spanish were popular features in mobile guides. The Henry Ford, whose guide was still in the early stages at the time of this study, did not yet have additional languages. The OKCMM designed a tour for low-vision visitors that included step-by-step navigation. Both uses had been shown to be successful in other guides such as iMuse.¹⁵⁶ The OKCMM also felt their guide had helped enhance experience for their audiences. LAMM did not agree as too few visitors used the guide to make any meaningful statement about its usefulness. The Henry Ford's guide was designed to enhance the experience for the audience, but it did not include any alternative tours.

¹⁵⁵ Apostolos, Meliones, and Demetrios, Sampson. *Blind Museum Tourer: A System for Self-Guided Tours in Museums and Blind Indoor Navigation*. *Technologies* 6, no. 1 (2018): 4.

¹⁵⁶ Ibid

Core Question 2 Review

This section sought to answer core question 2: what do history museum staff think are the factors associated with successful guides? Several factors were found that were common across all three interviews. These common factors were tours were offered free of charge, data was gathered on how the guide was being used by guests, guides were designed for individual use, and the guides were heads-up experiences.

Practices and Policies

The third section of the analysis sought to answer core question three: in what ways does the use of smartphone mobile guides in history museums impact exhibit development practices? The following questions were asked to uncover if the use of smartphone mobile guides in history museums caused those museums to rethink policies related to smartphones or exhibit practices.

Did you design your tour to fit your exhibit or the other way around?

LAMM's guide was designed for an already existing exhibit.

The Henry Ford's guide was designed to help the user navigate through already existing exhibits.

Porter explained that while the exhibits were being updated when the guide was under development, the guide did not influence the layout of the exhibit.

The museums were in firm agreement on some points. None of the sites designed their exhibits to fit their mobile tours. The exhibit for the OKCMM was being redesigned at the same time as the app, but they were not designed in sync with each other. History museums seemed to

view mobile guides as post-exhibit tools to enhance an exhibit rather than a part of the exhibit itself.

Do you have a policy on smartphones within your museum?

At the LAMM, the only restriction on phones was no flash photography.

At the Henry Ford, the only restriction was no selfie sticks.

The OKCMM did not restrict smartphone use at the time of the interview. Previously they had not allowed phone use in the exhibits.

None of the three museums studied had policies significantly limiting the use of phones in their museums prior to installing their guide system. The one museum that did previously have restrictions have since relaxed them. This reflected a trend highlighted by Trivelli who said, “visitors want to get information on their own terms.” Having access to online search engines was essential to many modern museum visitors.

Who do you feel is the primary audience for your guide? /Do you feel that the guide has reached this audience?

The LAMM’s guide was designed for general audiences.

According to Elliot, “Initially, it’s most likely going to be our members.” However, they hoped that the testing provided by the members would be useful when the app was made available to general audiences. Elliot stated that enough users had tested the app that they were able to better adjust the content to meet the users’ needs. For example, Elliot explained “we went into it thinking that we would have a lot of video and all this content and we learned very quickly

that people weren't that interested in standing in front of a giant train and watching a video about a train. They just wanted to see the train.”

While Porter acknowledged that the app was for general audiences, he specifically cited one group that the museum hoped to reach. “One of our focus areas was for young people, we wanted to, we really wanted to reach people who weren't alive during the bombings, so they could get an understanding of what happened in the aftermath of the resilience of the city and the community coming together and the unity that they saw after that we wanted. We wanted young people to get a good sense of that. So, I will say, while we use it for everyone. We specifically targeted younger people who weren't alive during the bombing to make it, welcoming to them.” He believed that the app had helped to reach younger visitors.

While all three museums cited general audiences as their target demographic for the guide, two of the three had a specific audience they hoped to reach. OKCMM saw younger audiences as their goal, and they saw an increase in the number of young people using their app-based guide over their old audio guide. LAMM hoped that their guide would be utilized by Hispanophone visitors. They found that like their English guide, participation was low, roughly 17/3000 or just over half a percent. The guide had failed to reach this or any audience. This may reflect that some goals such as navigation were more achievable than others. Another point was the importance of advertising to the intended audience. Trivelli mentioned that LAMM's signage about the Spanish guide was printed in English. On the other hand, OKCMM's guide featured a family tab on the first page.

The two museums who still had their guides, recommended that an institution with similar needs look into the companies that they worked with. LAMM did not recommend that similar institutions install a similar guide system.

Core Question 3 Review

This section of the interview sought to answer core question three: in what ways does the use of smartphone mobile guides in history museums impact exhibit development practices? Regarding the construction of exhibits, the three interviewees were unanimous in saying their guide did not impact the development of their exhibits. Additionally, each of the museums had few, if any, restrictions on the use of smartphones. At OKCMM the increasing popularity of smartphones caused the museum to change its policy to allow their use, which allowed a guide to be developed.

Results

The four findings that seemed to emerge from the semi-structured interviews were as follows: 1) they were offered free of charge, they allowed data to be gathered on how the guide was being used by guests, they were designed for individual use, and the guides can be classified as heads-up experiences, 2) smartphone mobile guides did not impact the development of exhibits 3) history museums had few if any restrictions on the use of smartphones, and 4) high usage rates and an enhanced visitor experience were signs of a successful guide.

Document Analysis

The second methodology used in this case study was document analysis. Document analysis was performed on eight publicly available apps, which were selected from the Google Play Store because they reached certain criteria. These were: 1) the museum must be a history museum, 2) the museum must be located within the United States and 3) any apps from the interviewee sites would be chosen automatically as this gave a point of comparison between the two sets of data. Eight apps were found that met these criteria; all were included in this study.

Interview Coding

The terms used in the document were derived from data collected in the interview portion of this study. Appendix G lists the terms that were used in more than one of the three interviews. Each of the apps was searched for any applicable terms. In addition to these terms, others such as ratings and reviews were added to the final list of terms.

Individual analysis

In addition to comparisons of responses to individual questions, the entire interviews were compared. In Tables 6, 7, and 8, the most frequently used terms in each interview were listed. These terms highlighted the diverse problems each museum's staff hoped to address with the implementation of their mobile guide system, due to each of the museums addressing different areas of concern with their guides. Their goals were not completely divergent. In Appendix G, all terms that appeared in multiple interviews were listed.

As seen in Table 1, the LAMM's most frequently used terms indicated that the guide was meant to be informative. Additional information was mentioned five times in the interview. The most common term referenced the Spanish tour with 6. The LAMM tour also had difficulty attracting users with low usage being mentioned 5 times in the interview.

Table 1

Most frequently used terms interview 1 (LAMM)

Term	Frequency
Spanish Version	6
Additional Information	5
Low Usage	5
Call Numbers	3
Getting Information on One's Own Terms	3

At the Oklahoma City Memorial Museum, as shown in Table 2, the most mentioned term was timed tours with six. This referred to the museum's tours designed for visitors with limited time. The app offered the choice of a 30, 60, or 90-minute tour. These were meant for guests who did not have the full two hours that most guests found it took to see all the museum's content. The second most popular term was younger audience with five mentions and the third was enhanced experience.

Table 2

Most frequently used terms in interview 3. (OKCMM)

Term	Frequency
Connecting with the Past	6
Timed Tours	5
Enhanced Experience	4
Younger Audience	4
General Audience	3

At the Henry Ford as seen in Table 3, one term stood out with the most mentions of any interview, seven for navigation. The museum's staff wanted to address the problem of lost visitors with their app. The museum was a multi-campus institution and they wanted to help their guests navigate their vast facilities. Another frequently mentioned term was members. This was due to the guide being only available to the museum's members as they prepared for a full launch of the guide. This suggested that the app would have multiple uses as members were more likely to be able to navigate the museum than first time guests.

Table 3

Most frequently used terms interview 2 (Henry Ford)

Term	Frequency
Navigation	7
Members	3
Heads-Up Experience	3

The two successful guides had clear problems that they wanted to address. For the Henry Ford, they found that their guests had trouble navigating their large campus. Therefore, they focused on developing a location-based app that could address the problem. The OKCMM had two problems they addressed with their guide. The first was that some guests had less than the optimal amount of time needed to view all the museum's exhibits and would often miss the most important part of the museum. The second was that younger visitors did not have the same connection to the museum as those who had lived through the attack. The first problem was addressed with the implementation of timed tours for guests with 30, 60, and 90 minutes available to view the exhibits. The second problem was addressed by implementing a mobile tour aimed at younger audiences. As was suggested in the analysis of individual questions, the data suggested that museum mobile guides that enhanced the visitor experience were more likely to be successful. The differences in each of the most frequently used terms for each interview suggested that history museum smartphone mobile guides were implemented for diverse reasons. However, as was shown in the individual question section of this chapter, several factors such as free tours and an individual-user design were commonly implemented in history museum smartphone mobile guides.

Eight history museum apps were selected from the Google Play Store. Only one of these apps, the OKCMM app, overlapped with the participants in the interview portion of the study. The museums in the document analysis sample fell into three groups based on which company was used to develop their guide. The first group consisted of apps designed by Cortina Productions, which included the OKCMM. The second group's apps were designed by the Smithsonian Institution. The third group consisted of apps designed in-house at their respective museums. The list of apps can be seen in appendix F.¹⁵⁷

Terms that appeared in the interview portion of the study were identified and searched for in each of the apps. These terms are listed in Tables 1 through 4. Document analysis included information related to core questions 1 and 2, but there were other findings that were pertinent to the thesis statement in general. Question 3: do smartphone mobile guides impact other practices or policies of the museum? Could not be answered in this section, because there were no prior versions of the apps available for study that could highlight changes in practices or policy related to smartphones.

Core Question 1: Success

The first core question of this study was: what features are shared by smartphone mobile guides in history museums? One way to determine how successful a guide was involved surveying users. Apps, unlike some other forms of documents, had a built-in way to survey how the public felt about them: ratings and reviews. Among the three app makers, Cortina, the Smithsonian and in-house apps, the Smithsonian received the highest average rating of 4.5 out of 5. Cortina apps received an average of 3.88 out of 5 and in-house apps had the worst

¹⁵⁷ Note: Apps from the app store were not used due to lack of access to an iOS enabled device.

performance with 3.6 out of 5. The overall average was 3.96 out of 5. Because the Google Play Store's ratings and review system already provided a place for feedback, it was not surprising that only a quarter of the surveyed guides offered an in-app survey. Table 4 below showed the ratings and reviews for each guide as well as if the app itself contained a survey.

Table 4

Feedback

The potential ways in which each app could gather feedback were compared in this table.

Oklahoma City	George W Bush	Yorktown	Postal	9/11 Memorial	NMAAHC	Milwaukee Public Museums	Reagan	App Name
Yes	No	No		No	No	Yes	No	In-App Survey
4.8	3.7	3	4.4	4.2	4.6	3	4	Ratings
16	39	4	5	472	135	4	88	Reviews

Mobile Guides Ratings vs Reviews

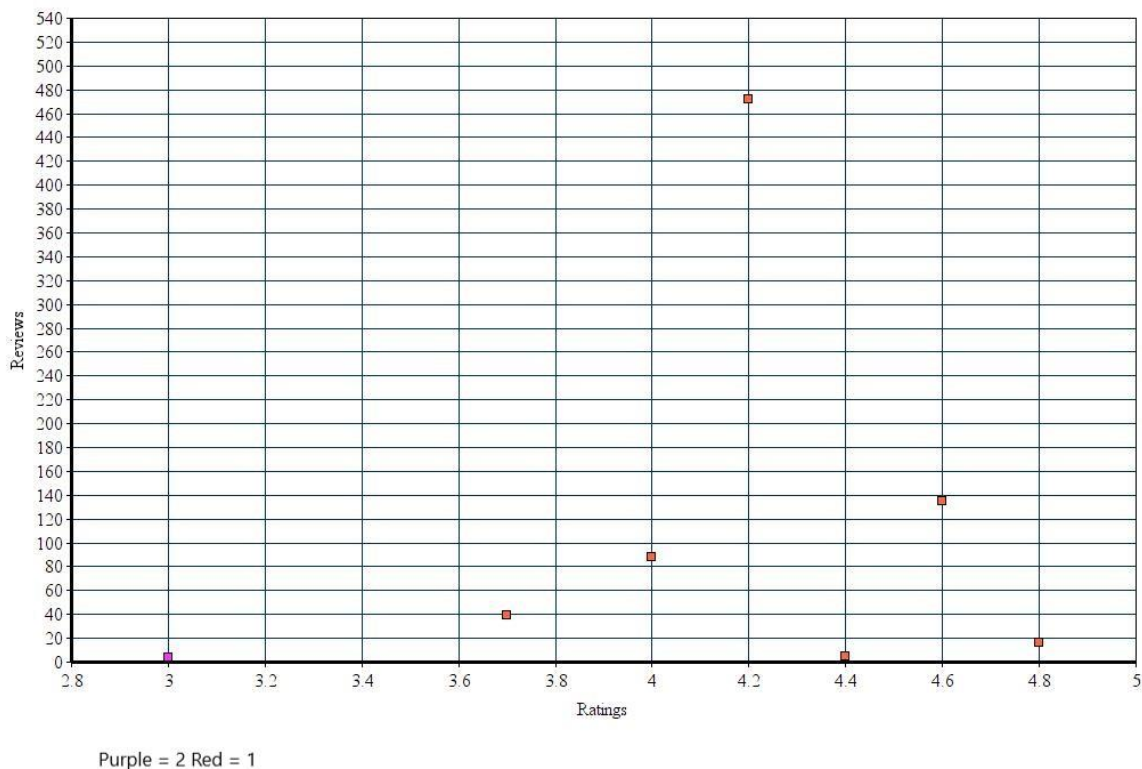


Figure 1 Average number of reviews vs the average rating for each guide

In figure 1 above, the apps that received more reviews tended to be higher rated. Apps with a high number of reviews (100 or more) had an average rating of 4.4 out of 5. Apps with 10 to 99 reviews had an average of 4.17 out of 5, while apps with less than ten reviews had a much lower average of 3.47 out of 5.

Half of the apps analyzed had some form of location-based programming, which prevented the tour from being played outside of the museum itself. All but one of the guides offered an alternative tour through their guide. Alternative tours included tours aimed at audiences other than general audiences. In table 5 below, the alternative tours offered in each app were shown. These could be non-English tours (50%), tours for children (62.5%), or tours for low-vision

visitors (50%). Three out of the eight guides provided all three of these tours. These three museums averaged 4.23 out of five in reviews, 0.43 stars higher on average than apps that offered some or no alternative tours.

Core Question 2: Common Factors.

Table 5

Alternative tours

The Alternative tours offered by each app were listed below.

Oklahoma City	George W Bush	Yorktown	Postal	9/11 Memorial	NMAAHC	Milwaukee Public Museums	Reagan	App Name
Yes	Yes	No		Yes	Yes	No		Additional Languages
Yes	Yes	No		Yes	No	Yes		ADA
Yes	Yes	Yes		Yes	Yes	No		Kids/Youth

Mobile guides that were primarily designed by museum professionals generally performed worse overall. In both data sets, guides that functioned to reach different audiences with the same exhibit performed well. For instance, the OKCMM guide, the highest rated guide in the sample, used all three forms of alternative tours. In the interview, they frequently mentioned these tours, in particular the youth tour, as a focus of the development effort.

Table 6

Developer/Features

The developer of each app as well as multiple possible features were compared in this table.

OKCMM	George W Bush	Yorktown	Postal	9/11 Memorial	NMAAHC	Milwaukee Public Museums	Reagan	App Name
Cortina	Cortina	Cortina	Smithsonian	In-House	Smithsonian	In-House	Cortina	Developer
	Yes	Yes		Yes	Yes	No	Yes	Map
Yes	Yes	No	Yes	No	No	No	Yes	Location- Based
Yes	No	No		No	No	No		Timed Tours
Yes	No	No			No			Group Use
No	Yes	No		No	No	Yes	No	Interactive

Several features identified in one or more of the interviews were also examined in the hopes of finding common features among smartphone mobile guides. These features were listed above in Table 6. The most commonly implemented of these features was the use of a map. Five out of the six apps that could be fully explored included a map. The lone exception was the Milwaukee Public Museum's app, which unlike the others was used with multiple museums. One feature that was prominently featured in one of the interviews but was not common in this sample was the use of timed tours. OKCMM, the only overlapping museum in the two data sets, was the only museum that used this technique. Group tours were also uncommon with OKCMM being the only app to offer this as well. In regard to other features of smartphone mobile guides

there was no consensus on the use of location-based elements as only half of the guides featured location-based elements. These were parts of the tour that only worked when the user's device was located inside of the museum.

The Henry Ford's guide used such technology to help the user navigate their multi-campus museum. Only two of the tours featured interactive guides with non-interactive tours being more common. Interactive guides in this case were guides where the user's input changed the tour script. An example of a non-interactive guide was the Yorktown app, which consisted of a series of audio recordings numbered to correspond to points in the exhibit. This more closely resembled traditional audio guides as opposed to the game-like guides described in Sung, Chang, Hou, and Chen's study *Designing an Electronic Guidebook for Learning Engagement in a Museum of History*.¹⁵⁸

Practices and Policies

The only museum practice that was relevant to the document analysis was gathering revenue. Raising revenue through the mobile guide was discussed by Proctor in *Mobile Apps for Museums*.¹⁵⁹ Apps could cost thousands of dollars, Proctor described several strategies museums could use to gain that revenue back.¹⁶⁰ Through document analysis of the apps listed in Table 7 below, different funding strategies currently in use were compared.

All but one of the apps were offered for free. The one app that did charge, the Ronald Regan Presidential Library and Museum, utilized the freemium method. As mentioned in the literature review, freemium apps were free to download, but certain features, in this case access

¹⁵⁸ Sung, Chang, Hou, and Chen. "*Designing an Electronic Guidebook for Learning Engagement in a Museum of History*."

¹⁵⁹ Proctor. *Mobile Apps for Museums*. p.15.

¹⁶⁰ Ibid

to the audio tours, required payment. None of the apps had ads or sponsorships built into them. Only two had a method of donating to the museum through the app. This meant that 75% of the apps had no means of earning revenue. Only two of the apps, the Ronald Regan Presidential Library and Museum and The George W Bush Presidential Center apps, had revenue potential from their apps as seen in table 7 below.

Table 7

The potential revenue sources and which apps used them were listed below.

Oklahoma City	George W Bush	Yorktown	Postal	9/11 Memorial	NMAAHC	Milwaukee Public Museums	Reagan	App Name
Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Free Tour
No	No	No	No	No	No	No	No	Sponsored
No	Yes	No		No	No	No	Yes	Giving Opportunity

Document analysis findings

In the document analysis portion of this case study, four findings were suggested. First, smartphone mobile guides with higher engagement were more likely to be rated higher by users. Second, most smartphone mobile guides offered some form of alternative tour. Third, some form of navigation aid, such as a map, was common in history museum smartphone mobile guides. Finally, most US history museums did not view their smartphone mobile guides as a source of revenue.

Discussion

This study used two methodologies to try to better understand smartphone mobile guides and their use in US history museums: interviews and document analysis. Each of these two methods yielded a set of findings. These findings were related to this study's three core questions.

Core question one was; what features are shared by smartphone mobile guides in history museums? In the interview portion it was found that high usage rates and an enhanced visitor experience are signs of a successful guide. In the document analysis portion, it was found that, according to the data smartphone mobile guides with higher engagement were more likely to be rated higher by users. These two results fit well together as the guides that were used more were rated higher than those with less downloads just as the interviewees had expressed.

Core question 2 was: what do history museum staff think are the factors associated with successful guides? In the interview portion it was found that the following factors are common in history museum smartphone mobile guides: they are offered free of charge, they allow data to be gathered on how the guide was being used by guests, they were designed for individual use, and the guides can be classified as heads-up experiences. In the document analysis portion, it was found that most smartphone mobile guides offer some form of alternative tour and some form of navigation aid such as a map is common in history museum smartphone mobile guides. For this question the two methodologies highlighted features that the other did not cover to create a more complete list of common features.

Core question three was: in what ways does the use of smartphone mobile guides in history museums impact exhibit development practices? In the interview portion it was found

that according to the interviewees their smartphone mobile guide did not impact the development of their exhibits. In the document analysis portion, it was found that most US history museums do not view their smartphone mobile guides as a source of revenue. The answers to this question implied that in these two respects smartphone mobile guides are not seen as a major part of either exhibit design or fundraising. This could suggest that smartphone mobile guides are not seen as an important part of the museum's operations. More research is needed to answer this.

Chapter 5 Conclusions and Implications

The purpose of this study was to better understand smartphone mobile guides and their use in US history museums. This study also sought to answer three core questions. First, what features are shared by smartphone mobile guides in history museums? Second, what do history museum staff think are the factors associated with successful guides? Third, in what ways does the use of smartphone mobile guides in history museums impact exhibit development practices?

This study suggested four conclusions. The first conclusion was that the success of a smartphone mobile guide was defined by high usage rates and a focus on enhancing the visitor experience. The second conclusion was that smartphone mobile guides had many common features including that they were free of charge, designed for individual use, classified as a heads-up experience, used as a navigation aid, included an alternative tour and could be used to gather user data. The third conclusion was that smartphone mobile guides did not impact the development of exhibits. The fourth conclusion was that history museum smartphone mobile guides were not viewed as a source of revenue. When combined these findings suggested that there was a baseline set of expectations successful mobile guides in US history museums followed.

Recommendations

Two recommendations emerged from this study. First, more research needs to be done with a greater number of history museums and museums of other disciplines related to smartphone mobile guides. Second, history museums looking to implement a smartphone based mobile guide system in their museum should favor an app-based guide.

Limitations

There were three limitations to this study. First, this study was limited by a small sample size particularly regarding the interview portion of the study. Second, this study was limited by the composition of the sample. Due to time restraints only a handful of companies that publicly listed which museums they had worked with were used to gather potential subjects for this study. Third, this study was limited by location. Some features of the selected guides were inaccessible due to the necessity of being physically in the museum for such features to function.

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Appendix A

Consent Form for Exemptions

Are They Worth the Cost? Smartphone Guides for History Museum Permanent Exhibits

University of Washington

Researcher's Name: Andrew Kauerauf. Phone: 217-572-0923. Email: akauerau@uw.edu.

Thesis Advisor: Wilson O'Donnell, Associate Director of the Museology Graduate Program.

Phone: 206-543-4642. Email: wilsonod@uw.edu.

I am asking you to participate in an interview that is part of my master's Thesis work at the University of Washington. The purpose of this research is to determine the factors that contribute to the success of recently implemented smartphone guides used in permanent exhibit galleries at history museums. Your participation is voluntary, refusal to participate will involve no penalty or loss of benefits, and you may discontinue participation at any time. This interview will be audio taped for my note taking only. I may use your title and name of your institution in my final paper. If I directly quote you, I will send the quote to you before publication. If you have any questions now or in the future, you may contact me through the information on this document. Do you have any questions? Do you agree to participate in this interview?

Signature: _____

Date: _____

Appendix B

Recruitment Email

Graduate Study on Museum Mobile Guides

To whom it may concern,

My name is Andrew Kauerauf and I am a master's student in the Museology Graduate Program at the University of Washington. Currently, I am conducting a research study on Smartphone-based mobile guide systems used in permanent galleries in history museums to determine what factors contribute to their success. My initial research indicates that your museum, (museum name here) utilizes a mobile guide system in your permanent exhibition gallery.

If possible, I would like to include the staff member who works closest with your mobile guide program for a semi-structured interview that will take approximately 20 minutes. Attached to this email is a consent form for the video call interview. If you or an appropriate member of your staff are interested in participating in this study, please agree to the attached consent form or reply to this email with the contact information of the staff member who would be interviewed.

Don't hesitate to include any questions for me you might have.

Thank you for your time,

Andrew Kauerauf

Appendix C

Instrument

Are They Worth the Cost? Smartphone Guides for History Museum Permanent Exhibits

University of Washington

Researcher's Name: Andrew Kauerauf. Phone: 217-572-0923. Email: akauerau@uw.edu.

Thesis Advisor: Wilson O'Donnell, Associate Director of the Museology Graduate Program.

Phone: 206-543-4642. Email: wilsond@uw.edu.

Interview Protocol

Researchers Statement:

I am asking you to participate in an interview that is part of my master's Thesis work at the University of Washington. The purpose of this research is to discover if recently implemented smartphone guides in permeant galleries at history museums provide a net benefit to those institutions. Your participation is voluntary, refusal to participate will involve no penalty or loss of benefits, and you may discontinue participation at any time. This interview will be audio taped for my note taking only. I may use your title and name of your institution in my final paper. If I directly quote you, I will send the quote to you before publication. If you have any questions now or in the future, you may contact me through the information on this document. Do you have any questions? Do you agree to participate in this interview?

Interview Procedures:

The approximate length of this interview is 20 Minutes. The purpose of these questions is to determine if certain guide elements are indicators of a guide being useful to history museums.

Interview Instrument

What is your name and position in your institution?

Why did your institution decide to implement a mobile guide in your museum?

What were the initial goals for your guide?

Describe your guide.

Who made your guide?

Would you describe your guide as a heads-up (focused on the exhibit) or heads-down (focused on the guide)?

Is it free? If so, why or why not?

Is it designed to be used in a group or individually?

Does your guide allow you to gather data about your visitors such as retention time?

Do you offer tours in languages other than English on your guide?

Do you feel that this guide has helped your institution?

Did you design your tour to fit your exhibit or the other way around?

Do you have a policy on smartphones within your museum?

Who do you feel is the primary audience for your guide?

Do you feel that the guide has reached this audience?

How would you define a successful mobile guide?

Do you feel your guide has met that standard?

Overall would you recommend this guide to a similar institution?

Confidentiality and Research Information:

I want to thank you for taking the time to have this conversation with me. Do you have any questions? If you have any questions, please contact me through the information on this document. Thank you very much for your time.

Appendix D

Q2

LAM More than what was on the label

HF Digital maps

OKC Younger audience

Q3

LAM Free, grant-funded

HF turn by turn directions

OKC different tours what was going on April 19

Q4

LAM everything done in house guide by cell

HF Aruba + HPE Blue Cadet Forward Technology

OKC Cortina

Q5

LAM heads up guide

HF heads up experience

OKC heads up guide

Q6

LAM yes free underserved community

HF yes free

OKC yes free ADA + Spanish content exclusive to guide

Q7

LAM individuals

HF individuals

OKC individuals

Q8

LAM yes, stayed on phone whole message hung up area code

HF yes traffic areas retention time

OKC. Yes survey

Q9

LAM yes Spanish

HF no something we'd like to do

OKC yes Spanish and ADA (low vision)

Q10

LAM exhibit already designed

HF exhibit already designed

OKC being redesigned but no impact on guide

Q11

LAM no flash

HF no selfie sticks

OKC none

Q12

LAM General audiences

HF members general audiences in the future

OKC younger audiences' general audiences

Q13

LAM no usage rates more than the label

HF yes usage retention time usefulness

OKC yes enhances visitor experience

Q14

LAM no

HF yes

OKC yes but parts are proprietary

Appendix E

List of Potential Interview Sites

Henry Morrison Flager Museum
Abraham Lincoln Presidential Library and Museum
Allman Brothers Band Museum at The Big House
Arab American National Museum
Bennington Museum
Breman Museum
California Ag Museum
Commonwealth Museum
GLBT History Museum
Henry Ford Museum
Hiller Aviation Museum
Japanese American National Museum
Kohler Museum
Los Angeles Maritime Museum
Martha Vineyard's Museum
Martin Guitar Museum
Mayborn Museum
Museum of American Finance
Museum of the City of New York
Mutter Museum
National Cryptologic Museum
National Great Rivers Museum
Oakland Museum of California
Old Capitol Museum
Petersen Automotive Museum
9/11 Memorial and Museum
Sam Houston Memorial Museum
Chicago History Museum

National Railroad Museum
Maritime Museum of San Diego
American Revolution Museum at Yorktown
George W Bush Center
Baseball Hall of Fame
Basketball Hall of Fame
Bob Bullock Texas State History Museum
Clinton Presidential Center
College Football Hall of Fame
FDR Presidential Library
Fort Worth Air & Space
Frazier Historical Arms Museum
Indiana State Museum
International Tennis Hall of Fame
Jimmy Carter Presidential Library
LBJ Presidential Library
Little League Museum
Museum of Tolerance
National Civil Rights Museum
National Museum of African American History & Culture
National Museum of the U.S. Army
National World War II Museum
Newseum
Oklahoma City National Memorial & Museum
Ronald Reagan Presidential Library
Smithsonian Institution's National Museum of American History
Tampa Bay History Center
The Museum at Bethel Woods
U.S. Holocaust Memorial Museum
University of North Carolina's Basketball Museum

Upcountry History Museum
Virginia Sports Hall of Fame

Appendix F

List of Apps analyzed

Oklahoma City Memorial and Museum

George W Bush Presidential Center

American Revolution Museum at Yorktown

Postal Museum

9/11 Memorial and Museum

National Museum of African American History and Culture

Milwaukee Public Museums

Ronald Reagan Presidential Library and Museum

Appendix G

Coding Terms

category					LAM	HF	OKC
improving exhibit					2		1
not reading labels					1		
additional information					5		
grant funded					2		
free to user					2	1	2
free museum					2		
developed in house					2		
underserved community					2		
designed for individual					2	1	2
not for school tour					2		
self guided					1		2
spanish version					6		2
high cost					2		
low useage					5		
general audience					1	1	3
music					1		
enjoyment					1		
call numbers					3		

enhanced experience				1	1	4
staff size				1		
user's own device				1	1	2
getting info on own terms				3		
ios only					1	
marketing					1	
museum size					2	
navigation					7	
digital map					2	
layered content					2	
audio tours				1	2	2
interactive					1	1
location based					2	
heads up experience					3	1
english only					1	
members					3	
disinterest in video					1	
survey					1	
younger audience						4
timed tours						5
video tour						1
ADA tour						2

Connecting with the past						6
technology requiremnts						1
sponsorship						1

Appendix H

Terms used in multiple interviews.

All terms that appeared in multiple interviews. A full list of coding terms can be seen in Appendix G.

Institution →	LA Maritime	Oklahoma City	Henry Ford
Terms ↓	Museum	Memorial and Museum	
Improving Existing Exhibit	2	1	0
Free to User	2	2	1
Designed for Individual Users	2	2	1
Self-Guided	1	2	0
Spanish Tour	6	2	0
Designed for General Audiences	1	3	1
Enhanced Experience	1	4	1
User's own Device	1	2	1
Audio Tours	1	2	2
Interactive	0	1	1
Heads-Up experience	0	1	3

Appendix I

Core Questions and Subgroups

Core question 1

How would you define a successful mobile guide? /Do you feel your guide has met that standard?

Overall would you recommend this guide to a similar institution.

Core question 2

Why did your institution decide to implement a mobile guide in your museum? / What were the initial goals for your guide?

Describe your Guide.

Who made your guide?

Would you describe your guide as a heads-up (focused on the exhibit) or heads-down (focused on the guide)?

Is it free? If so, why or why not?

Is it designed to be used in a group or individually?

Does your guide allow you to gather data about your visitors such as retention time?

Do you offer tours in languages other than English on your guide?

Core Question 3

Did you design your tour to fit your exhibit or the other way around?

Do you have a policy on smartphones within your museum?

Who do you feel is the primary audience for your guide? /Do you feel that the guide has reached this audience?

Appendix J

Document analysis terms

In-App Survey

Ratings

Reviews

Additional Language tour

ADA tour

Kids/Youth tour

Developer

Map

Location-based

Timed tours

Group use

Interactive

Free tour

Sponsored

Giving opportunity