

A Guide to Mobile Apps for Small Cultural Heritage Non-Profits:
Leveraging Mobile Technologies to Guide and Engage Visitors

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Abstract

Constrained by limited staffing and tight budgets, small, cultural heritage non-profits may struggle to promote visitation and engage visitors who do make on-site visits. This paper identifies the opportunities mobile technologies can provide to bridge the gap between cultural heritage organizations and their visitors. Current research on the use of digital media and mobile technology in the museum field, as well as research on museum visitor motivations and learning, are explored. Based on study findings and expert recommendations, key design factors for a mobile app to be used at all stages of a visit are determined. The design themes of wayfinding, personalization, multimedia, and relationship-building are explored. Small historic non-profits can benefit by leveraging these mobile design features to enrich the visitor experience. This thesis project consists of the design and development of Web-based guide (Web site) including a case study and an example Request for Proposal (RFP) to educate historic non-profit administrators on the opportunities for implementing these features at their organizations.

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Mobile Apps for Small Cultural Heritage Non-Profits:
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Introduction

Problem Statement

In the southeastern Pennsylvania region, some small, cultural heritage organizations struggle to attract visitors and raise awareness of the historical significance of their sites. Several of these historic properties are functioning solely through volunteer-based Friends organizations that must rely on donations and grants to fund initiatives and operating expenses. Frequently, these locations do not have the resources to staff their sites on a regular basis or to staff multiple locations within the property. For example, staffing may be limited to a few weekends out of the entire year or to a single building.

If the location is unstaffed, a single kiosk board at the parking lot may be the only option the organization has to present its message and significance to the visitor. This approach often falls short in helping visitors connect with the site. It also does nothing to engage with visitors as they explore the property. Even if the kiosk board references the organization's Web site for more information about the location, the Web site is usually designed as a 100% online experience. These sites are missing opportunities to raise awareness and cultivate the interest and support that is vital to their survival.

How can the authentic, physical experience of "being there" be merged with the information-rich experience of digital media to take back those missed opportunities?

How can small cultural heritage organizations leverage mobile technologies to enrich on-site experiences and build on-going relationships with visitors?

According to the Pew Research Center, 77% of Americans own smartphones with the percentages being higher for individuals under 50 years old or with some college education. The ubiquity and affordances of smartphones can be leveraged by organizations to create more engaging and meaningful on-site visitor experiences.

For my thesis project, I will create a Web site about the design considerations for mobile apps specifically for cultural heritage museum administrators and Friends organization members. The Web site will explore the key themes of wayfinding, personalization, multimedia, and relationship-building, as well as basic technology concerns, based on current research. It will include a case study and sample RFP (request for proposals). The case study will be representative of the target audience's organizations. The sample RFP will provide an example of how the information and recommendations presented in the Web site can be applied. The RFP will outline specifications for an app designed to create an engaging visitor experience before, during, and after the visit.

Literature Review

Wayfinding & Augmented Reality

According to Mason (2013), helping visitors orient themselves within the physical space is a crucial element of the visitor experience. Visitors must be able to determine where they are and where they might want to go next without any prior knowledge of the location. A wayfinding system should be a core element of museum or cultural heritage mobile app. Proper orientation and wayfinding enable the visitor to explore at will and create their own experience rather than being limited to the pace, sequence, and topics dictated by an in-person guide. Research by Katz and Halpern (2015) has found that by enabling the visitor to control their

experience, he or she can construct his or her own learning. A visitor can maintain the flow of the experience by choosing the sequence and proceeding at the pace that best fits his or her needs.

To provide the context necessary to build an understanding of the points of interest (POIs), such as objects within an exhibit space or locations within the historic location's boundaries, a mobile tour must ensure that the correct information is offered at the correct location (Mason, 2013). Mason suggests three methods of "visitor location awareness" (2013, p. 6):

1. Alphanumeric, visual cue, or QR code: The visitor specifies their current location by typing or scanning a code (Mason, 2013, p. 6). This method mimics the traditional audio guide approach.
2. Static imagery or interactive digital map: The visitor relies on a "simple still image" of the floor plan or an interactive map that allows the visitor to access information about embedded markers (Mason, 2013, p. 6). The responsibility is on the visitor to determine where his or her current location on the map.
3. Geo-location system: The visitor's location is determined using "Wi-Fi triangulation" or beacons within a museum space (Mason, 2013, p. 7) or GPS-based technologies for outdoor spaces.

Geo-location can be used to display the visitor's current location as a point on a map, such as a user's current location marker in Google Maps. The technology can also be used to provide an augmented reality (AR) experience in which layers of content are displayed over a mobile device's camera view, such as in the Pokémon Go game. A study by Galatis, Gavalas, Kasapakis, Pantziou, and Zaroliagis (2016) compared map-based, AR, and combined map-based

and AR orientation approaches at the Knossos archaeological site. The findings suggest that visitors find map-based only approaches easiest to use (Galatis et al, 2016, p. 8). However, the approaches that incorporated AR are seen as more pleasant with more prominent markers for POIs (Galatis et al, 2016, p. 8). In terms of general usefulness, visitors prefer a combined map-based and AR interface (Galatis et al, 2016, p. 8) if space allows. The study also identified occlusion of POIs as a major challenge for AR navigation (Galatis et al, 2016, p. 5). Occlusion occurs when a POI is not within the visitors field of view because it is blocked by another object, such as a building. For their study, the researchers developed a “geolocative raycasting technique which enables real-time detection of surrounding buildings” to overcome the issue the hidden POI challenge (Galatis 2016, p. 9). Overall, their findings suggest that AR navigation creates a more enjoyable experience for visitors.

The importance of wayfinding and impact of navigation on the visitor experience may lead one to think that more navigation options available to the visitor, the better the experience will be. However, “high navigability... might lead to confusion among users about what actions to perform” and negatively impact the visitor experience (Sundar, Kim, and Zhang, 2015, p. 389). Mason’s “fear threshold” (2013, p. 13) also recognizing the need to balance the navigation and interactions against the experience level of the visitor. The interface must provide enough options to provide a good sense of control without overwhelming the visitor with too many choices or a complicated layout.

Personalization

In addition to orienting the visitor spatially, a mobile app should provide “cognitive orientation” as well (Mason, 2013, p. 10). The app’s tour feature should introduce the

site/exhibit and explain the ways in which the visitor can explore it. Incorporating opportunities for personalization can support self-directed learning and meaning making for the visitor.

Research by John Falk has revealed “how deeply personal museum visits are, and how deeply tied to each individual’s sense of identity” (2013, p. 111). Given this deeply personal nature of the experience, it makes sense to focus on why individuals seek out museum experiences. Falk has identified five types of museum visitors based on motivations and needs:

1. Explorers: “curiosity driven” with a general interest in learning. (Falk, 2013, p. 118)
2. Facilitators: “socially motivated” with a focus on helping others learn. (Falk, 2013, p. 118)
3. Professionals/hobbyists: “motivated by...a content-related objective” based on personal interests. (Falk, 2013, p. 118)
4. Experience seekers: driven by a “been there, done that” need for the experience. (Falk, 2013, p. 118)
5. Rechargers: “seeking... contemplative, spiritual, and/or restorative experience” that provides a break from everyday life. (Falk, 2013, p. 118)

To help the visitor identify points of interest that would be most meaningful to him or her, a tour could offer multiple paths through the content based on the identified motivating factors. For example, a tour path that focuses on guiding children through the site would address the needs of a facilitator. A high level, highlights style tour path would appeal to experience seekers. Paths based on particular themes, such as architecture or time periods, would address the special interests of professionals or hobbyists. Although visitors always have the freedom to

move to any point of interest at any time, the path options offer more structured experiences built to address common needs.

In addition to providing tailored paths through the POIs, personalization can be implemented by leveraging social media techniques. For example, allowing visitors to tag objects or locations can offer another layer of personalization and support social engagement as well. Visitors can explore other objects or points of interest that have similar tags based on other visitors instead of specialized museum staff. Bartolini et al (2016), promote a more advanced use of tagging for a “general multimedia recommender system” that creates “dynamic visiting paths” (Bartolini et al, 2016, p. 3814). To develop recommendations, a system can use content-based filtering which uses the visitor’s feedback on similar items or collaborative filtering which uses the feedback of other, similar visitors (Bartolini et al, 2016, p. 3815) and then continually monitor and adjust recommendations as the visitor progresses.

Personalization can extend beyond the wayfinding and recommendations. Opportunities to customize the experience increase the visitor’s “sense of agency... perceived control... [and] positive attitudes” (Sundar et al, 2105, p. 387). Beyond choosing where they go, visitors should be able to create their own digital assets. Ardissono, Kuflik, and Petrelli suggest that visitors have the ability to “become curators of [their own] content” (2012, p. 88) by building “virtual galleries.” Other opportunities for personalization include providing an ending summary or story based on the visit or digital product created during the visit. For example, a cultural heritage location that discusses immigration could allow visitors to “pack” a virtual trunk with what would be most important to them if they were moving to a new country. This virtual trunk could be emailed or posted on social media. An activity like this not only provides personalization and

self-expression, but also promotes social engagement and continued interactions with the organization.

Social interactions can provide another level of personalization and support meaning-making (Sundar et al, 2015, p. 386). Visitors frequently arrive in groups, so activities that promote on-site interactions can be included. However, interactions with the broader community can be fostered through social media or interfaces provided by the organization. For example, the *QRator* project from the University College London provides an interface for “living labels” on objects that incorporate comments from visitors in real-time (Gray, Ross, Hudson-Smith, Terras, and Warwick, 2013, p. 45). Its parent *Tales of Things* project encourages visitors to post their personal memories about objects in the exhibit (Gray et al, 2013, p. 45). Visitors and others who view the online posts can incorporate the additional insights into their own meanings for the objects.

Engagement

Mobile guides are able to simultaneously present possibilities and engage visitors more meaningfully. A study by Eghbal-Azar, Merk, Bahnmueller, and Schwan (2016) found that visitors who use a mobile guide spend approximately 60% more time exploring an exhibit. Although mobile guide users visited less POIs, they spent more time at the POIs they did visit (Eghbal-Azar et al, 2016, p. 137). These findings suggest that mobile guides enable visitors to be more selective in how their time is spent while also encouraging visitors to invest more of their time. The richer experience provided by digital media more successfully connects to emotions than static displays of information do (Kolay, 2015).

Digital media can help “bridge the gap between cultural heritage and... the larger community” (Kolay, 2015, p. 319) by providing an interactive, “gamified” experience for sharing information. Gamification, which applies elements of game design to non-game experiences, can be effective in keeping visitors engaged and progressing through the property or exhibit. According to Döpker, Brockmann, and Stieglitz, “game design elements should be meaningful to the user and result in positive change in the user’s mind” (2013, p. 5). Traditional game elements, such as experience points, scores, levels, and badges are commonly used, but may not effectively motivate individuals who frequently encounter these same ludemes in other experiences and view them as over-used (Kelly, 2012). According to Kelly, the most successful gamification elements are validation (likes), completion (progress tracking), and tangible rewards (points leading to money or physical prizes). Including “trivia, puzzles, and mini-games” in cultural heritage tours (Mortara et al 2014, p. 3) also increase visitor engagement without introducing an overall gamified approach. Although including mini-games within a digital project does not typically convey additional information, the entertainment value can keep visitors engaged in the experience.

When possible, multiple forms of digital communication should be used including graphics, audio, and video to engage different styles of learners. The type of media used depends on the desired visitor experience at the POI. For example, if the intent is for the visitor to observe the markings on a structure, an audio snippet could be provided instead of a written paragraph so the visitor can remain focused on the object itself. According to Rodley, “looking down” experiences which focus the visitor’s attention on his or her phone are appropriate for “immersive, introspective” situations, while “looking around” experiences which focus the visitor’s attention on the physical location are useful for “contextualizing” points (Rodley, 2011,

p. 2). Using the appropriate approach engages, rather than distracts, the visitor because it is intentionally crafted into the overall experience.

Ciurea et al (2014) have explored using a virtual component to give online visitors access to artifacts, documents, and locations that are otherwise not available. For example, the interiors of out buildings at a cultural heritage site may be off limits because of staffing issues or safety concerns. To create a more engaging experience than just looking at the outside of an old structure, the site could incorporate photos of the “forbidden” interiors into the tour. Making digital content available via mobile devices which can be used at the physical location “brings the user [even] closer” to what he or she is seeing (Ciurea et al, 2014, p. 25). Providing a complementary mobile-based counterpart to a physical location adds another dimension to the experience to on-site experiences. For example, in a historic house museum, small objects are commonly stored in view, but out of reach of visitors for security reasons. High resolutions images of the objects can be provided as part of the digital tour so visitors can see the object in greater detail. For objects that might be interesting to observe in use, such as an old pump organ, audio or video recordings of the instrument being played could be provided. The study by Eghbal-Azar et al revealed that visitors showed more interest in “personal memorabilia or handwritten manuscripts” than in printed items (2016, p. 140). This suggests that POIs that incorporate personal items may resonate more with visitors. If possible, the collateral digital materials offered through mobile guide should incorporate personal items and writings.

Although discussed earlier as a location-based wayfinding approach, location-based augmented reality (AR) can be leveraged to create more engaging learning experiences for specific POIs. Harley, Poitras, Jarrell, Duffy, and Lajoie suggest that AR can enhance the visitor

experience by incorporating immersive sounds, historical image overlays, or other supportive information (2016, p. 360). The richer experience helps visitors to “situate historical phenomena or objects in a spatial and social context” (Harley et al, 2016, p. 368). For example, AR can be used to superimpose a drawing or photograph onto an existing ruin of an 18th century hospital. This would allow the visitor to better compare the present ruin and the past hospital and to “see” both meanings. For cultural heritage locations that often span several eras and have multiple layers of history, AR can be used to bring each stage of the POIs existence to life. The study by Harley et al found that mobile AR contributes to “positive learning outcomes and emotions” (2016, p. 384).

Relationship-Building

Ideally, an app should be more than just a guide used during a visit. It can assist the prospective guest who is planning a visit, the visitor who is on-site, and also the supporter or past visitor who wants to remain up-to-date. Barry has championed this “virtuous circle” (2006, p. 2) that promotes the continuous relationship between an organization and a visitor made possible by opportunities for engagement within the physical and virtual spaces. All of the organization’s communication channels, such as the Web site, the mobile guide app, social media posts, and email list messages, should refer to and promote each other.

To support the planning/pre-visit phase of the relationship, the organization’s Web site should provide all of the necessary visitor information such as address, fees, parking, etc. In addition to the basic information, the Web site should promote the mobile guide app specifically. This is especially significant for sites that have open grounds, but limited staffing. The

availability of a mobile guide app may be the deciding factor in whether a visit to an unstaffed location will be worth the time and effort.

In terms of after-tour experiences, visitors showed the most interest in finding out how well they did on quizzes and viewing “personal, self-generated mementos” such as photos or other digital materials created during the visit (Barry, 2006, p. 6). Social media can play a significant role in fostering the after-tour relationship because it can be used as a repository to keep and share the self-generated content and memories of the visit.

Creating a truly memorable visitor experience will not only support learning, but also encourage visitors to continue their relationship with the organization, such as re-visiting the site or recommending the site to others. While there are a variety of characteristics that contribute to a memorable experience, Falk (2009, p. 109) has identified the four visitation elements that impact memory the most: alignment with desires, novelty, emotional impact, and reinforcement. Alignment with desires is addressed through personalization, such as visitor paths based on motivations or social input. Novelty and emotional impact can be addressed through engaging multimedia and content. Reinforcement can be addressed by follow-up communications with the visitor.

Instilling curiosity is another technique that can persuade the visitor to continue the relationship with the organization. For example, a mobile app can build curiosity to encourage the visitor to complete the tour to find an answer. The app can also leave some questions unanswered to encourage the visitor to come back for other events. A qualitative study by Sharron and Abraham supports the role of curiosity in creating “offline engagement through online virtual reality” (2015, p. 260). Their research found that enough information must be

provided to establish trust with the visitor by meeting the visitor's basic content expectations; at the same time, images and "elements of uncertainty, such as unique and mysterious facts" (Sharron & Abraham, 2015, p. 264) should be incorporated to arouse curiosity and desire to learn more. For example, some cultural heritage sites have special events focused on certain seasons, such as Christmas. Through the mobile app or social media, an organization can create a compelling "teaser" historical Christmas fact or sneak-peak photo of a richly decorated room that will inspire the visitor to re-visit the location during the holiday season.

Technical Considerations

A mobile app can be native or Web-based. A native app is platform specific and meant to be installed on the mobile device (Mason, 2013, p. 3). Native apps must be downloaded from the appropriate app store such as the Google Play Store or the Apple's iTunes App Store. This means that a separate app must be developed and deployed for each device operating that must be supported. If updates are made to an app, the user can choose if and when to install the update. Although native apps allow for more sophisticated technical features, they may be cost prohibitive for many smaller organizations (Forbes, 2011, p. 2). In 2015, Savvy Apps, a professional app development company, estimated that the cost of a single platform, simple app started at \$25,000, but would increase based on features and complexity.

A Web-based app is basically a responsive Web site that is optimized for mobile delivery. It is platform agnostic and updates are available as soon as they are published to the site. The features of HTML 5 allow for a fair amount of interactivity including animations and Web-based games. However, because this type of app will be interacting with a Web site, the

visitor will need to connect to the organization's Wi-Fi or will need to use his or her cellular network and mobile data plan.

Review Conclusion

Small cultural heritage non-profits often operate with limited staffing and limited funding. These sites can become trapped in a cycle of limited funding, leading to limited resources, leading to limited visitation and supporters, leading to limited funding and so on. Implementing a mobile app can begin to disrupt the cycle by providing engaging and meaningful visitor experiences even when staff members are not available. The mobile app has the potential to boost visitation and raise awareness and support.

An effective cultural heritage mobile app interweaves wayfinding, personalization, multimedia, and extended relationship features. At its core, the mobile app must provide an easy-to-use wayfinding system that clearly identifies the POIs. Depending on financial resources and the desired experience, wayfinding can be addressed through traditional audio tour techniques such as entering codes, through the use of a static or interactive image, or through a geolocation system. Ideally, mobile location-based AR should be used for outdoor explorations, while beacons or Wi-Fi triangulation can be used to support an AR wayfinding system indoors of when pinpoint accuracy is essential.

The best visitor experiences are those that fulfill the visitor's motivations, so multiple visitor paths should be designed to create a more personalized visit. In addition to following predefined paths, the visitor should be able to explore the location at will or switch to other paths if desired. Additionally, the content related to each POIs should be a choice, not a requirement forced onto the visitor, to enable for self-directed learning. Social media techniques, such as

tagging, liking, or commenting, encourage the visitor to make personal contributions and social connections. Activities that allow the visitor to create a digital object, such as an enhanced photo or memory book, enrich a personal, unique experience.

The mobile app should emphasize a multimedia approach and incorporate text, audio, graphics, and video to accommodate visitor preferences and learning styles. A multimedia experience fosters more enjoyment, more engagement, and better learning. Using a variety of digital media also allows organizations to bring value beyond even a personally guided tour by enabling the visitor to interact with objects or view locations that are not possible in the physical world. AR, such as visual overlays of the physical space and atmospheric sounds, can create an immersive experience that is only possible when the visitor is at the actual location using the mobile app. It is the ultimate intersection of physical location and digital media.

In addition to features that help the visitor to create a personalized, engaging tour, the mobile app should include features that cultivate an ongoing relationship with the visitor from helping the visitor plan his or her visit to reflecting on the experience afterwards. Posting about the experience on social media right from the app should be easy and encouraged. The visitor should also be encouraged to follow the organization through a variety of social media platforms, sign-up for mailing lists, view upcoming events, and learn about ways to support the site, such as through volunteering or donations. The organization should take a holistic view of their communication channels and look for ways cross-reference them to increase awareness and use.

Project Design, Implementation, and Challenges

Design

The project's target audience is small, historic non-profit site administrators and Friends organization members. The audience is comprised of individuals with a passion for and expertise in public history. As in any field that is not focused on technology at its core, the knowledge of and comfort-level with technology may vary for these individuals. Because the goal of the project is to help these individuals learn about how mobile technology can improve the visitor experience in a way that is meaningful to them, the style will be simple and straight forward. The overall tone of the writing will be informal and friendly to minimize any intimidation that could occur.

The case study will be presented to help the learner understand how the technology discussed in the Web site can be applied in the real world. Key factors of the case study include the organization's mission, size, staffing, buildings and structures, collections, events, and existing Web and social media initiatives. These elements help paint a picture of the type of organization that the Web site is seeking to help. The case study will tell the story of a realistic, relatable organization. Because the case study will include the concerns, limitations, and characteristics that are common to many of the target audience organizations, learners will be able to identify with the case study organization and relate the findings back to their own organizations. The corresponding sample RFP will capture how the content in the Web site can be put into action. It can serve as a springboard for the learner's own organization's approach.

The topics and content in the Web site will be organized around the themes identified in the literature review: wayfinding, personalization, engagement, and relationship-building. The Web site will introduce basic theme concepts to provide a starting point for each theme. Then,

child-level pages will discuss the related features that should be considered when designing a mobile app for cultural heritage organizations.

The following content and features will be addressed, with each list item on its own page:

1. Wayfinding
 - a. Overview of Approaches – Cues/Codes, Static Maps, Geo-location
 - b. Geo-location - Augmented Reality vs. Map View, Occlusion
2. Personalization
 - a. Visitor Paths by Visitor Type – Explorer, Facilitator, Professional/Hobbyist, Experience Seekers, Rechargers
 - b. Visitor Paths via Social Sourcing - Tagging
 - c. Self-Expression – Takeaways, Curators of Content
 - d. Social Interactions – On-site Interactions, Social Content
3. Engagement
 - a. Multimedia – Type of Media, Behind-the-Scenes/Off-Limits, Looking Down/Looking Around
 - b. Interactions & Games – Polls, Trivia, Mini-Games
 - c. Augmented Reality - Immersion
4. Relationship-Building
 - a. Pre-Visit – Planning
 - b. Visit - Curiosity
 - c. Post-Visit – Mementos, Social Media, Follow-up
5. Other Considerations

- a. Web-based vs. Native Apps
- b. QR Codes On-Site

In the case of mobile apps, when so much is possible and so many features are interesting and exciting, it can be difficult to determine which features are worth an organization's effort. For each design feature, the value it brings to the visitor experience will be identified. For example, providing a visitor path based on visitor type has been proven to create a more memorable experience. With this insight, learners are able to choose features based on desired outcomes rather than on what seems to be the newest trend. This information is also important for learners who may need to present information to a board or governing group because the knowledge provides the justification for the recommendation.

Even if the learner does not have an immediate need for the feature, the case study will encourage the learner to consider the feature "in the real world." How the feature will be used, or why it will not be used, by the case study organization will be discussed and the corresponding excerpt from the sample RFP will be included. When possible, multiple ideas for how the feature could be applied in the cultural heritage sector, beyond the case study, will also be presented. These additional examples may spur learners to reflect on the opportunities within their own organizations. For example, multimedia can be used to give the visitor an experience that is typically off-limits. For some organizations, this could be allowing a visitor to see a small object up-close by providing a high-resolution photo. For other organizations, this could be allowing a visitor to hear a musical instrument being played by providing an audio clip. For organizations focused on historic industries, this could be allowing visitors to see workers in action by providing a video clip of living history interpreters. References to current research or

to organizations using the feature will also be included to support the learner in expanding his or her own research.

Project Deliverables

Web Site	https://mobileculturalheritage.wordpress.com/
Case Study	https://mobileculturalheritage.wordpress.com/case-study/
Sample RFP	https://mobileculturalheritage.wordpress.com/case-study/sample-rfp/

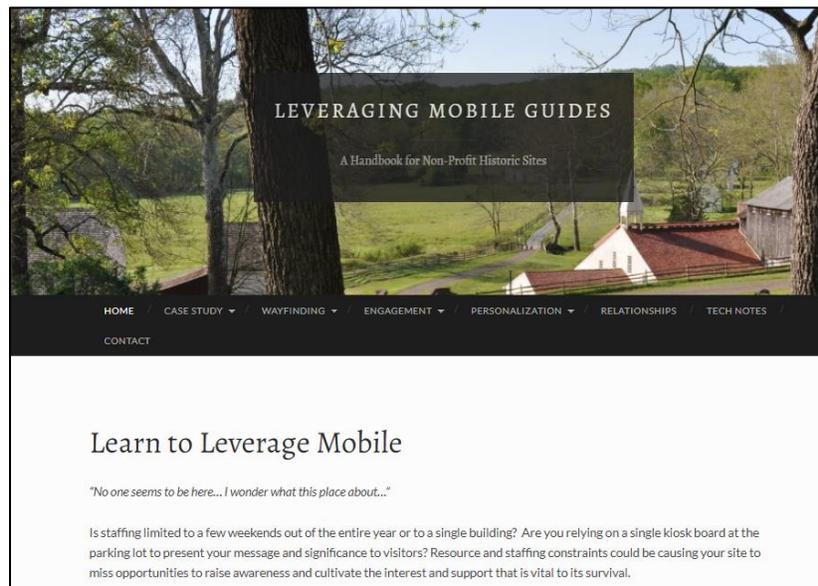


Figure 1. Landing page in desktop view.

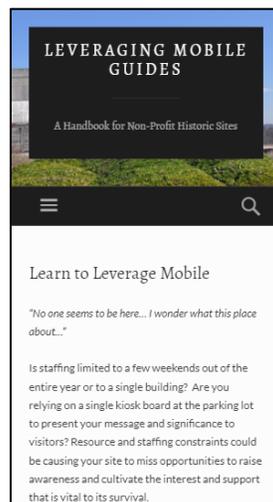


Figure 2. Landing page in mobile view.

Project Implementation

Web Site

The Web site was created using WordPress. I chose to use WordPress because of the ability to easily apply and change themes to a site. I wanted to be able to focus on the site content rather than on designing the look and feel of the site from scratch. I tried several themes over the course of the project creation to see which theme worked best for the content I was creating and the overall aesthetic I desired. When vetting potential themes, I was particularly interested in a theme's responsive design. A Web site about Mobile guides should display well on mobile devices. I used Google Chrome's Developer Tools feature to quickly determine how well a theme would display on mobile devices. I also tested my chosen theme on actual devices.

Another key factor that I considered when selecting a theme was the navigation. A few themes did not include drop-downs for child-level pages in the main navigation bar. Although I was including links to the child-level pages within each parent page, the child-page drop-downs within the main navigation are important because they allow site users to quickly see all the content that is available on the site.

I ultimately chose the *Hemingway Rewritten* theme because it best met my requirements for appearance, responsiveness, and navigability. It also supports randomized header images. I saw this as an opportunity to provide multiple visual cues that reinforce the target audience for the site. I uploaded several photographs that I took at actual historic sites that fit the target audience. My goal is that Web site users will see an image that reminds them of their own organization. It is a subtle way of conveying to the users that I understand their types of organizations because I have experience with them myself.

The site structure and the content included follows the content outline proposed.

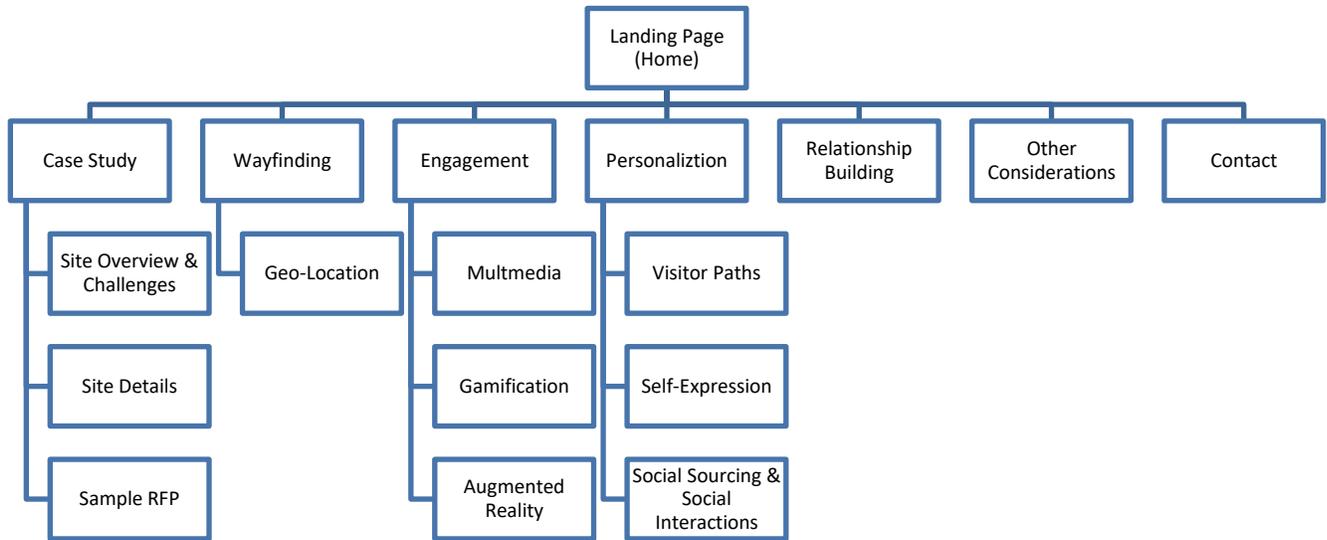


Figure 3. Site structure for mobileculturalheritage.wordpress.com

The feature pages are organized as follows:

- *Introduction to the theme/feature*

This section describes the feature and how it functions. It includes any caveats or additional considerations. This section also explains how the feature contributes to the visitor experience. For example, a feature might increase enjoyment or support meaning-making.

- *Putting it to use*

This section provides ideas for how the feature could be applied by an organization. For example, an organization could implement AR technology to allow visitors to see the building that once stood at what are now ruins.

- *Applying it to the case study RFP*

This section explains why and how the case study organization plans to incorporate it into the RFP for the mobile app. It will also include the appropriate specification excerpt from the RFP so the learner can see the sample verbiage without having to open the full RFP document. I edited the source code for these sections to include inline CSS. The CSS applies a border, text color, and shadow to the excerpt. I wanted to be sure that the excerpt was visually differentiated from the rest of the content to better convey that it is from a separate document.

- *Looking for more information?*

This section includes links to the supporting research. It also include links to organizations that use the feature.

Case Study

The fictitious cultural heritage site created for the case study models the organizational structure, characteristics, and assets that are typical for the non-profit historic organizations that comprise the intended audience. I separated the site overview and challenge from the site details so the information was not as overwhelming.

The Site Details page contains the information needed to gain a fuller understanding of the organization by describing realistic POIs and a plausible event calendar. My hope is that site administrators, board members, or other individuals using the Web site will be able to relate elements of the case study organization. Identifying and describing the POIs is an important part of the case study because the POIs directly influence how the themes and features can be leveraged for the historic property.

RFP

I chose to include the RFP directly in a Web page instead of providing it as a downloadable Word document. I made this decision for several reasons. Requiring a download inserts another click between the user and the content he or she wants. Some users may be reluctant to download a file from an unfamiliar Web site. Many organizations use a standard Word template with organization-specific header and footer information, so the user would need to copy and paste the content anyway.

It was challenging to decide on the content and level of detail for the RFP. Based on my research and RFP samples that I found online as well as informal discussions I had with business professionals, RFPs can vary greatly. As planned, the RFP includes an organizational overview, project goal, target audience, and specifications. I also decided to include sections for proposal requirements/delivery instructions and the proposal evaluation timeline to promote the importance of these sections as well. I thought it was important to include a caveat of sorts before the sample that encourages users to refer to a Web site with many RFP examples so that users can view additional components that might be important for their organizations.

Project Evaluation

The effectiveness of the project will ultimately be determined by how it helps site users. My goal was to create a useful tool to help administrators and supporters of small non-profit historic sites build better visitor experiences using mobile technology. The project presents concepts and suggested features based on the current research. I created it as a Web site so that it

is available to anyone who may benefit from it. I designed it to be well-organized and easy to use. However, the true test of the project will be in its use.

The WordPress Dashboard includes a Stat pane that allows me to track the total views for the site as well as individual pages. The stats provide basic visitation information, but not much else. To connect with site users, I included a poll on the Personalization page regarding visitor types. I am interested in their votes and I think they will be interested in the votes of others, too. It provides a bit of interaction and also serves as a touchpoint for me regarding site usage. I also included a contact form so that users can contact me if they have questions or comments. Share icons are included on the bottom of each page to encourage users to spread the word.

Through this project I learned about which Mobile app features are most effective based on research findings instead of anecdotes and assumptions. It was especially interesting to read about how different organizations addressed the challenges they faced and the issues that were most important to them. The biggest take-away for me is that there is no single solution. What works for one organization might not work for another because of a different blend of visitors, POIs, and resources. Although different features have been proven to enhance the visitor experience, a one-size-fits-all model does not apply.

Future Research

This project created a Guide to Mobile Apps based on research in the cultural heritage field primarily within the past three to four years. Because mobile technology changes so quickly, future research must keep abreast of the most current technologies and affordances. Surprisingly, gamification of mobile guides for these particular types of outdoor properties was

not a dominant theme in the research I reviewed. The research tended to focus more on gamified experiences for indoor museums and focused more on keeping children and young adults motivated to move through exhibits, sometimes using museum-provider technology. There is an opportunity to study how a gamified guide would contribute to the adult visitor experience of unstaffed outdoor locations. Specifically, does gamification result in a better visitor experience than a non-gamified guide? Also, because there are multiple elements of game design that could be applied, which elements are most effective for this audience and purpose?

The true cost of mobile apps is another area that could benefit from future research. For many organizations with limited financial resources, the cost associated with a feature may be the main determining factor for whether a feature is included or not. In my research, I was only able to find fuzzy answers that point to the many variables and complexities that make accurate estimates impossible without detailed requirements. Perhaps an itemized feature-by-feature analysis could provide a starting point for rough estimates as to work effort and costs.

A final factor that requires further research is obsolescence and/or abandonment. While searching for example projects that use the features explored in the Web site, I found several situations in which interesting projects, which appeared to incorporate important key features, are no longer being supported or are no longer in existence. Given the amount of time and resources invested in these types of projects, it seems strange that organizations would discard them. Research is needed to determine the on-going challenges posed to cultural heritage organizations related to maintaining mobile apps and to identify why worthy projects fail.

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