

# **Going Mobile: A Review of Smartphone Applications in Museums**

Julia Dougherty  
Museum Communications  
The University of the Arts

December 2012

A thesis submitted to The University of the Arts in Partial fulfillment of the requirements for the degree of Master of Arts in Museum Communication.  
© December 2012 Julia Dougherty All Rights Reserved


No part of this document may be reproduced in any form without written permission of the author. All photographs and drawings produced by and are the property of Julia Dougherty unless otherwise noted. Copyrights to images are owned by the copyright holders and should not be reproduced under any circumstances. This document as shown is not for publication and was produced in satisfaction of thesis requirements for the Masters of Arts in Museum Communication in the Department of Museum Studies, The University of the Arts, Philadelphia, Pennsylvania under the Directorship of Joseph Gonzales.

For more information, contact:

Julia Dougherty  
1736 Morgan Lane, Collegeville, PA 19426  
(610) 247-5228  
JuliaTDougherty@gmail.com

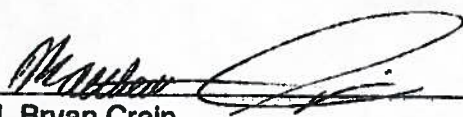
To the Faculty of the University of the Arts:

The members of this Committee appointed to examine the thesis of, Julia Dougherty, Going Mobile: A Review of Smartphone Applications in Museums, find it satisfactory and Recommend it to be accepted.



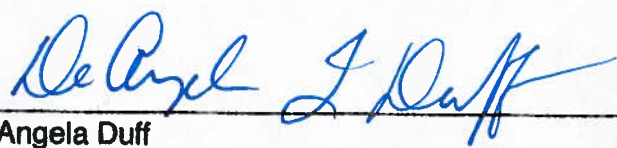
---

Joseph Gonzales  
Committee Chair  
Director of Museum Communications  
The University of the Arts



---

M. Bryan Crain  
Senior Audience Development Manager & Editorial Producer  
ARTINFO.com, New York, NY



---

De Angela Duff  
Multimedia Program Director  
Interim Co-Director, School of Design  
Associate Professor, The University of the Arts

## **Abstract**

Since their creation, museums and other cultural institutions have tried to keep up with the many advancements of technology. The increasing popularity of Smartphone applications in society and in cultural institutions has brought about a new wave of questions and considerations for these institutions. This thesis provides information, data and case studies to help contribute to the awareness of this technology.

First, the thesis reflects on how institutions adapted the technology of modern times . From film to computers to cellular technology, cultural institutions have had the opportunity to engage new audiences in inventive ways. With the invention of the Smartphones and mobile browsing, technology is taken to a new level. Museums, from the very large, and very prestigious Solomon R. Guggenheim to small historical sites, can benefit from this new technology. The development of this is studied in this thesis.

Second, the thesis explores two data studies that provide important and intriguing information about Smartphone technology. The Nielsen Mobile Media Report illustrates the increase in Smartphone ownership and important demographics about applications (apps) and mobile web usage. The American Alliance of Museums Mobile Survey provides facts about current technology in cultural institutions, including, goals, challenges, and deterrents to development and implementation. It gives institutions considering implementing applications



the data necessary to make educated decisions about the future of smartphone applications.

Finally, the thesis presents case studies of local institutions. The first three institutions are good models of smartphone applications development and implementation. The final two institutions are a study of institutions that at the time of the interview was not using smartphone technology, the reasons for not doing so and their thoughts and plans for future implementation of mobile technology.

My research finds that museums and cultural institutions need to seriously consider the opportunities and challenges presented by mobile technologies. Though there is always the possibility that certain technology can be considered a “fad”, studies show that mobile technologies are the trend, in museum operations, communications and visitor expectations. In conclusion, this thesis presents a set of questions to help institutions consider and organize the information necessary for a basic mobile technology needs assessment. I also provide a list of companies and organizations that have the expertise to help institutions with the development and implementation of smartphone and other mobile web technologies.

This thesis is dedicated to all the individuals who have supported me during this journey. It would have been impossible to succeed without their love, support, and encouragement. In particular this thesis is dedicated to my mother and father, for pushing me to create a project that I am proud of. Also, this thesis is dedicated to my friends, without their encouragement, I would have lost my mind. Thank you for your constant support and much needed humor. I promise the comments and fun facts about cultural institutions will subside.

## **Acknowledgements**

I would like to acknowledge all of the museum professionals and University of the Arts staff that participated in this thesis. I would particularly like to thank my advisor, Joseph Gonzales, for all the useful and consistent feedback. Your comments helped me concentrate my ideas, and focus on the bigger picture.

I would also like to thank Bryan Crain, for working with me this past summer, encouraging me and reminding me about the relevance of my topic.

I would also like to thank De Angela Duff, for taking the time to apply her expertise to this thesis. My committee members really rounded out my topic and helped me create a successful project.

I would like to thank the many museum professionals generously shared their time with me for interviews. Especially Kara Callahan, Laura Heemer, Jeff Paolini, Lauren Otero, Marla Shoemaker and Michael J. Williams. Their insights and comments greatly influenced the outcome of my project.

Finally, I would like to thank NielsenWire, The American Alliance of Museums (Formerly American Association of Museums) and all the authors I cited for their important findings and insights about this topic.

## Table Of Contents

<b>Introduction</b>	<b>1</b>
<b>Literature Review</b>	<b>2 – 15</b>
Museums and Media: An Introduction	2 – 3
Films to Smartphones: A Time Line	4
<b>Smartphone Applications</b>	<b>5 – 15</b>
Early Development	5 – 6
Smartphones Capture the Imagination of a Generation	6 – 7
Social Networking	7 – 9
Current Museum Application Models	9 – 15
<b>Review of Smartphone Data Analysis</b>	<b>16 – 33</b>
Introduction to the Studies	16
Nielsen Mobile Media Report	17 – 27
Application Specifics	23 – 27
American Association of Museums: 2011 Mobile Survey	27 – 32
Characteristics of Respondents	28 – 29
Mobile Technology	29 – 31
Longevity and Challenges	32
Conclusions	33
<b>Case Studies</b>	<b>34– 62</b>
Smartphone Applications Make their Mark on Pennsylvania	34
The Rodin Museum Application	35 – 42
The Philadelphia Zoo Application	42 – 52
The PA Marker’s Application	52 – 58
Making Connections	58 – 59
Institutions Without Applications	59 – 62
<b>Conclusions</b>	<b>63 – 71</b>
<b>Recommendations</b>	<b>72 – 84</b>
Museum Smartphone Assessment	73 – 77
Resources	77 – 82
Do and Don’ts: Tips for Clients and Providers	83 – 84
<b>Implications for Further Research</b>	<b>85</b>
<b>Works Cited</b>	<b>86 – 90</b>
<b>Appendices</b>	<b>91 – 101</b>
History of Smartphones	91 – 98
Interview Questionnaire	99 – 101

## Nomenclature

The definitions for the technical and industry specific terms used in the thesis are from the PC Magazine Technical Encyclopedia online.

1. **Apple App Store:** Apple's online store for downloading free and paid iPhone, iPod touch and iPad applications from third-party developers as well as Apple itself.  
  
([http://www.pcmag.com/encyclopedia\\_term/0%2C1237%2Ct%3DApple+App+Store&i%3D62463%2C00.asp](http://www.pcmag.com/encyclopedia_term/0%2C1237%2Ct%3DApple+App+Store&i%3D62463%2C00.asp))
2. **Baby Boomer:** A person who was born between 1946 and 1964.  
  
([http://www.investopedia.com/terms/b/baby\\_boomer.asp#axzz2DMGYedcx](http://www.investopedia.com/terms/b/baby_boomer.asp#axzz2DMGYedcx))
3. **Facebook:** The most popular social networking site. Founded in 2004 by Mark Zuckerberg, the site is free to members and derives its revenue from ads. The name comes from the paper document with names and faces issued to college freshmen to help them get acquainted with each other.  
  
([http://www.pcmag.com/encyclopedia\\_term/0%2C1237%2Ct%3DFacebook&i%3D57226%2C00.asp](http://www.pcmag.com/encyclopedia_term/0%2C1237%2Ct%3DFacebook&i%3D57226%2C00.asp))
4. **Cellular Technology:** This term, often used for all wireless phones regardless of the technology they use, derives from cellular base stations that receive and transmit calls. Both cellular and PCS phones use cellular technology.  
  
([www.fcc.gov/glossary.html](http://www.fcc.gov/glossary.html))

5. **Generation Z:** members of the generation of people born since the mid-1990s who are seen as confident users of new technology.  
(<http://www.collinsdictionary.com/dictionary/english/generation-z>)
6. **Google Play:** Google's online store for downloading music, games, movies, e-books and Android apps.  
([http://www.pcmag.com/encyclopedia\\_term/0%2C1237%2Ct%3DGoogle+Play&i%3D64138%2C00.asp](http://www.pcmag.com/encyclopedia_term/0%2C1237%2Ct%3DGoogle+Play&i%3D64138%2C00.asp))
7. **Instagram:** A mobile app that lets users snap a photo and change its appearance before sending it to a social networking site.  
([http://www.pcmag.com/encyclopedia\\_term/0%2C1237%2Ct%3DInstagram+filter&i%3D64157%2C00.asp](http://www.pcmag.com/encyclopedia_term/0%2C1237%2Ct%3DInstagram+filter&i%3D64157%2C00.asp))
8. **Laserdisc:** An earlier optical disc used for full-motion video and interactive training. ([http://www.pcmag.com/encyclopedia\\_term/0,1237,t=laser+disc&i=45934,00.asp](http://www.pcmag.com/encyclopedia_term/0,1237,t=laser+disc&i=45934,00.asp))
9. **Media:** Materials that hold data in any form or that allow data to pass through them, including paper, transparencies, multipart forms, hard, floppy and optical discs, magnetic tape, wire, cable and fiber. Media is the plural of "medium."  
([http://www.pcmag.com/encyclopedia\\_term/0%2C1237%2Ct%3Dmedia&i%3D46707%2C00.asp](http://www.pcmag.com/encyclopedia_term/0%2C1237%2Ct%3Dmedia&i%3D46707%2C00.asp))
10. **Pinterest:** A socially oriented photo-sharing site in the form of an online pinboard. ([http://www.pcmag.com/encyclopedia\\_term/0%2C1237%2Ct%3DPinterest&i%3D64546%2C00.asp](http://www.pcmag.com/encyclopedia_term/0%2C1237%2Ct%3DPinterest&i%3D64546%2C00.asp))

11. **Personal Communicator:** The personal communicator was conceived to provide always-on, wireless connectivity to a nationwide, packet-switched communications network that would enable mobile information retrieval and online transactions (banking, stock market, reservations, weather, etc.) as well as appointment calendar synchronization, messaging and e-mail. It would also provide daily personal information manager applications such as contacts and to-do lists.

([http://www.pcmag.com/encyclopedia\\_term/0,1237,t=personal+communicator&i=49132,00.asp](http://www.pcmag.com/encyclopedia_term/0,1237,t=personal+communicator&i=49132,00.asp))

12. **Personal Digital Assistant (PDA):** A lightweight, handheld computer, typically employing a touch-sensitive screen rather than a keyboard, generally used for storing information such as addresses or schedules. Many PDA's include handwriting recognition software, some support voice recognition, and some have an internal cell phone and modem to link with other computers or networks.

(<http://www.thefreedictionary.com/PDA>)

13. **Smartphone:** Cellular telephone with built-in applications and Internet access. In addition to digital voice service, modern Smartphone's provide text messaging, e-mail, Web browsing, still and video cameras, MP3 player and video playback and calling. In addition to their built-in functions, Smartphone's run a myriad free and paid applications, turning the once single-minded cell phone into a mobile personal computer.

([http://www.pcmag.com/encyclopedia\\_term/0,2542,t=Smartphone&i=51537,00.asp](http://www.pcmag.com/encyclopedia_term/0,2542,t=Smartphone&i=51537,00.asp))

14. **Social network:** An association of people drawn together by family, work or hobby. The term was first coined by professor J. A. Barnes in the 1950s, who defined the size of a social network as a group of about 100 to 150 people.

([http://www.pcmag.com/encyclopedia\\_term/0%2C1237%2Ct%3Dsocial+network&i%3D55313%2C00.asp](http://www.pcmag.com/encyclopedia_term/0%2C1237%2Ct%3Dsocial+network&i%3D55313%2C00.asp))

15. **Technology Acceptance Model:** A Model that explains perceived usefulness and usage intentions in terms of social influence and cognitive instrumental processes. (Davis, **PAGE**)

16. **Tumblr:** A microblogging Web site founded in 2007 by David Karp. Noted for its ease of use, people can create their blog and post their first entries in a matter of minutes. ([http://www.pcmag.com/encyclopedia\\_term/0%2C1237%2Ct%3DTumblr&i%3D63739%2C00.asp](http://www.pcmag.com/encyclopedia_term/0%2C1237%2Ct%3DTumblr&i%3D63739%2C00.asp))

17. **Twitter:** A very popular instant messaging system that lets a person send brief text messages (up to 140 characters in length) to a list of followers. Launched in 2006, Twitter was designed as a social network to keep friends and colleagues informed throughout the day.

([http://www.pcmag.com/encyclopedia\\_term/0%2C1237%2Ct%3DTwitter&i%3D57880%2C00.asp](http://www.pcmag.com/encyclopedia_term/0%2C1237%2Ct%3DTwitter&i%3D57880%2C00.asp))

18. **World Wide Web (WWW):** An Internet-based system that enables an individual or a company to publish itself to the entire world, except to countries or locations



that prohibit the free interchange of information. The major service on the Internet, the World Wide Web is the world's largest online shopping mall and the world's largest source of information, news and commentary.

([http://www.pcmag.com/encyclopedia\\_term/0,1237,t=World+Wide+Web&i=54867,00.asp](http://www.pcmag.com/encyclopedia_term/0,1237,t=World+Wide+Web&i=54867,00.asp))

19. **Web 2.0:** An umbrella term for the second wave of the World Wide Web, which was coined in a conference on the subject in 2004 by O'Reilly Media and CMP Media (later taking its parent name of United Business Media). Sometimes called the "New Internet" as well as "Internet 2.0," Web 2.0 is not a specific technology; rather, it refers to two major paradigm shifts. The one most often touted is "user-generated content," which relates more to individuals. The second, which is equally significant, but more related to business, is "cloud computing."
- ([http://www.pcmag.com/encyclopedia\\_term/0%2C1237%2Ct%3DWeb+20&i%3D56219%2C00.asp](http://www.pcmag.com/encyclopedia_term/0%2C1237%2Ct%3DWeb+20&i%3D56219%2C00.asp))

## **Preface**

The inspiration for this thesis comes from my love of technology. Since I was little, my father always introduced my family to the newest forms of technology. I remember the excitement of getting my first AOL email and screen name in first grade. Since then, I have had the privilege of owning and using many different devices from digital cameras, to music players, to an absurd amount of cell phones. In 2008 I received my first smartphone (A Blackberry World), and ever since have been a prime supporter of smartphone technology. When I first began exploring this topic, I was focused on the use of social media in cultural institutions. In the course of my literature search, I learned that the topic of social media was already well explored and documented beyond what I planned to include in my project and decided to change my topic to a newer trend - smartphone technologies.

As an Intern at the Solomon R. Guggenheim Museum this past summer (2012), I was able to work at an institution that is a leader in museum smartphone application development and implementation. As I started to research the literature I noticed that very little of what was written was about museums and cultural institutions in Philadelphia. Also, when visiting different institutions for class or for leisure, I found myself expecting the technology, and wondering why certain institutions didn't offer it. Starting with that observation, I asked myself "why" (or in some cases "why not") are local museums using smartphone technologies? And depending on the answer, are there implications and lessons

learned that can be generally applied to the field? These questions are the basis for my topic. With the “why” question in mind, I designed by project

## **Introduction**

This thesis considers current and future development of Smartphone applications in museums and cultural institutions. Smartphone applications, as defined in this thesis, are a software application that runs on a mobile device. Individuals and groups use Smartphone applications everyday for many different functions including email, news, entertainment, banking and business.

This paper examines how museums have treated technology in the past, how this technology is currently being used in museums, and the potential for growth and development in the future. Museums have often been slow on the uptake of technology. In the past decades, mobile technology has skyrocketed in popularity. To date, Museums have only begun to explore the many opportunities available through mobile technology. This thesis will explore those opportunities along with providing relevant examples, compelling data and recommendations for the future.

Many different topics are covered within this thesis. It looks at the history of museum technology, and how the past has shaped current trends. The thesis also looks at two different studies to provide data on global mobile technology trends and current trends of Smartphone applications in museums. Finally, this thesis presents case studies of multiple institutions that currently do and do not have Smartphone applications, their reasoning, and their views of the subject.

## LITERATURE REVIEW

### Museums and Media: An Introduction

For the past 50 years, museums and cultural institutions have adopted, adapted and developed different forms of technology in their exhibits, marketing communications and development efforts. Over time, museums have seen different types of technologies develop, and have worked to implement them in dynamic, proactive ways. At The Intrepid Air, Sea and Space Museum, interactive designers used a decommissioned aircraft to create a flight simulator. At the New York City Police Museum, visitors can participate in a simulated gunfight. From film to computers to cellular technology, cultural institutions have always had the opportunity to engage audiences in new, inventive ways. But despite that opportunity, Scott Sayre and Kris Wetterlund's journal article, *The Social Life of Technology for Museum Visitors*, explains how "very little has been written about the potential of museum technology [...]" (Sayre- Wetterlund 1). My literature search produced a number of important and relevant sources that I will discuss in detail in the course of my written thesis. I describe the most relevant of these papers and their usefulness to my thesis in this literature review.

From the baby boomers to generation Z, digital technology has become a part of everyday life. The up and coming museum professionals most likely cannot remember a time without cell phones and the Internet. According to the Pew Research Center's Internet & American Life Project, "By 2020, most people will have embraced and fully adopted the use of smart-device swiping for

purchases they make, nearly eliminating the need for cash or credit cards”(Pew). Technology for purchasing and other daily functions will automatically bring Smartphone usage into cultural institutions. This trend makes it increasingly important for museums to have a practical strategy to capitalize on Smartphone technology.

Following is a brief timeline that shows the progression of technology in museums. This timeline shows how from films to Smartphone applications, museums implemented the newest technology to engage visitors. A deeper discussion on the history of museum technology can be found in the appendix (page 92) of this paper. The history gives an in depth look at how each piece of technology helped museums advance their mission, and ultimately led them to today’s technology, smartphone applications.

# Films to Smartphones: The History of Technology in Museums

## A Time Line

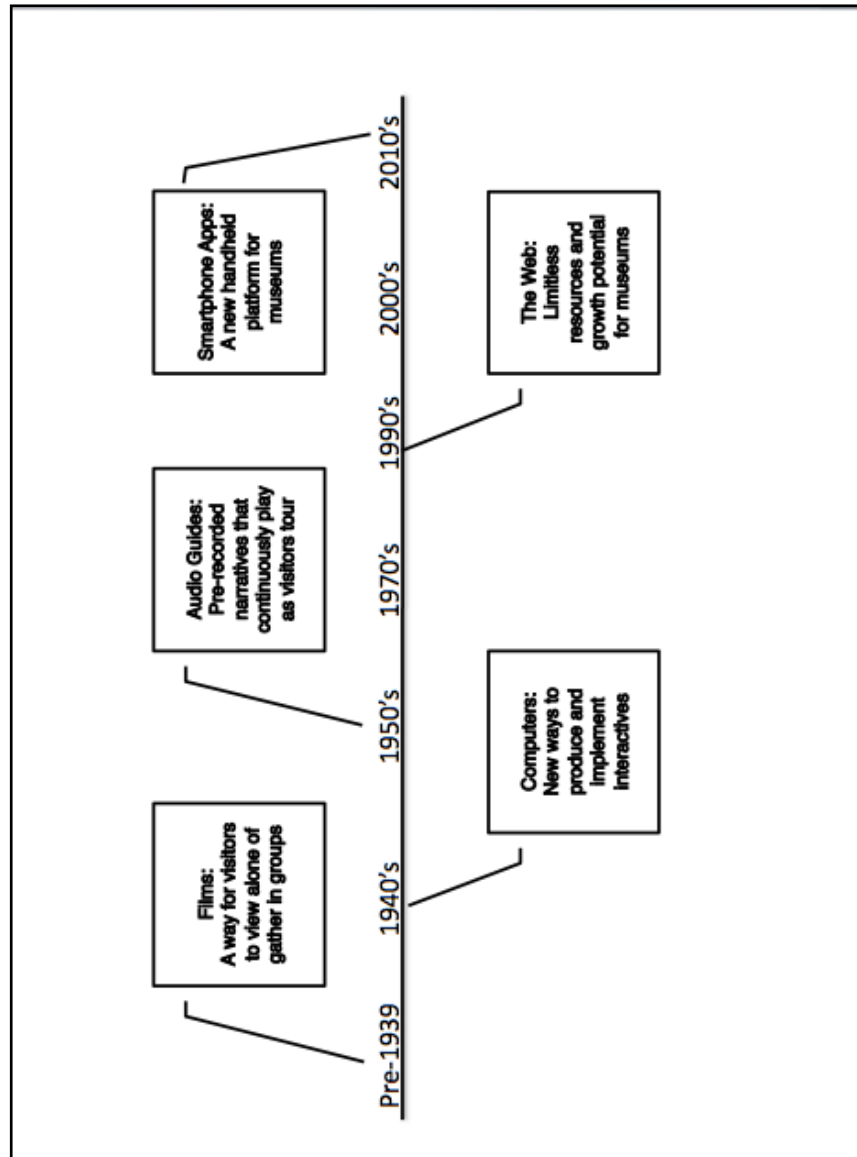


Figure 1 Timeline of Museum Technology

## **Smartphone Applications**

### **Early Development**

In the early 1990s, before the development of the iPhone, Blackberry or Android, IBM and BellSouth introduced The Simon Personal Communicator to the mobile field. Simon was the first Smartphone and according to Ira Sager of Bloomberg Business week, Simon

(Simon) envisioned our app-happy mobile lives, squeezing the features of a cell phone, pager, fax machine, and computer into an 18-ounce black brick. The touch screen (monochrome) had icons you tapped, or poked with a stylus, for e-mail, calculator, calendar, clock, and a game called Scramble in which you moved squares around the screen until you formed a picture. (Sager)

Way ahead of its time, the web browsing and application capabilities needed to keep Simon relevant had not yet been developed. Mobile web browsing would not be introduced until the late 1990s, and the cost of producing Simon outweighed the profits. The product was quickly discontinued but as the first cellular device, it is important to the history and story of Smartphone Technology and applications. This original technology is mirrored in today's mobile devices.

The rest of the 90's saw Americans using mobile phones without Internet access but pared them with a separate device called a Personal digital assistant (PDA). Nokia's PDA, the 9000 Communicator, became Nokia's best selling phone and initially allowed PDA services with voice calls. (Nokia) These devices



lead way for the development in 2001 of the first official Smartphone, the Kyocera 6035. Similar to the 9000 Communicator, the Kyocera combined the capabilities of a PDA with a mobile phone, in a smaller, more manageable size. This ushered in a new era of Smartphone technology, ultimately creating a base for the now popular operating systems.

### **Smartphones Capture the Imagination of a Generation**

In 2007, Steve Jobs gave a keynote address at the Macworld 2007 conference in San Francisco that caught the imagination of a generation of computer program developers, business and consumers. Introducing the iPhone to conference attendees, Job described the phone as “a widescreen iPod with touch controls”, “a revolutionary mobile phone”, and “a breakthrough Internet communicator”(Jobs). Jobs continued express how “today Apple is going to reinvent the phone.” The introduction of the iPhone not only created a push towards touch screen technology, it also introduced the “app store.”

The introduction of Smartphone applications, created a new, handheld platform for the worlds businesses. In 2011, Nielsen Mobile Media Report reported that since 2009, Smartphone ownership has more than doubled (18%-45%). As of 2011 the Android OS operating system (available across multiple platforms) and the iPhone iOS platform (available only on Apple products), dominated the market with over 70% of sales. Smartphone device users engagement in the use of rich media has also increased with over 31 million

users watching videos and 95% of users playing games. Accordingly, Android and iPhone users also dominated the application downloads for 2011.

Nielsen reported that iPhone app downloaders had an average of forty-four applications on their phone, and Android users had an average of thirty-two applications per phone. The report discovered that across all age groups, Facebook and Google products were the most downloaded. Most users spent an average of 69% of their time using apps compared to 31% of their time on the Internet. Most of these users reported finding these applications through the app stores (63%), through recommendations (53%-61%) and through third party websites (17%-21%). The Nielsen Report gives insight into the trends affecting Smartphone application downloads in the United States.

Among other important statistics, the report also showed that though the under 24-age group “received the greatest volume of messages” that “older folks are the fastest growing segment and have shown consistent growth over time” (Nielsen). These are important statistics for cultural institutions to consider when developing Smartphone applications for marketing and other outreach. App development style and content must target all age groups to make the most of this type of marketing strategy.

### **Social Networking**

The proliferation of Smartphones applications has also increased the use of social networking sites in the United States. Social networking has taken over the digital marketing scene with the creation of networks like Facebook (2004)

and Twitter (2006). In September of 2012, Pew Internet updated their Social Networking Statistics. According to Pew, 66% of all Internet users engage in one or more social networking sites. Of these 66%, 66% claim to engage in Facebook, 20% engage in LinkedIn and 16% engage in Twitter. The report also states that, as of August 2012, many adults are also users of Pinterest, Instagram, and Tumblr.

It is commonly understood that social networking sites have social impact and Pew used their survey to examine how “the use of technologies is related to trust, tolerance, social support, and community and political engagement” (Brenner). Pew found that the average, social networking users were less likely to be socially isolated and that sites are “increasingly used to keep up with close social ties”(Brenner). Facebook users were found to be more trusting of others and have satisfying close personal relationships. This study and others similar to PEW present important statistics about social networking. The influence and impact of social networking correlates to Smartphone applications in both audience and content. Many applications integrate social networking aspects into the applications to create sharing and connecting opportunities for users.

Studies like those done by Pew and Nielsen illustrate the importance of understanding age and social trends considering implementation of Smartphone applications. Ignoring or not recognizing the importance of including social networking in an app or not being aware of the most popular platforms would waste costly development time and effort. In addition to research and surveys it is

important to study cultural institutions that are on the forefront in developing and using Smartphone technology.

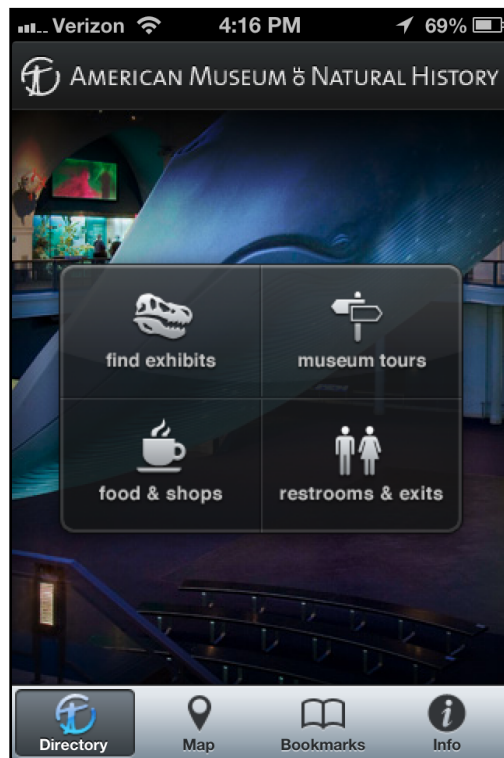
### **Current Museum Applications Models**

In the New York Times article “An Extra Set of Eyes at the Museum” by Joshua Brustein, Mr Brustein quotes Philip M. Katz, Assistant Director for Research at The American Alliance of Museums as saying that, “Half of its (AAM) member museums will be using mobile devices in some way by the end of the year”(Brustein). According to Brustein, this process for many museums is still focused on developing successful audio tours. Many museums do not have the budget or staffing capabilities to tackle Smartphone application, and are thus at a disadvantage. In *Multimedia Tour Guides on Your Smartphone*, Sam Grobart, of the New York Times, points out that:

Many apps, serving up more information than the traditional audio tour, enhance a trip to the museum by providing maps, schedules and wall-card information in one place. The best museum apps go beyond that, frequently updating content and even serving as a useful resource on the museum’s collection when visitors are back home. (Grobart)

One highly regarded app is the American Museum of Natural History’s “AMNH Explorer” app (fig.1). The AMNH Explorer is a multi featured free app. According to Gobart the navigation feature is one distinguishing capability of the app. Using the museum’s Wi-Fi network “The app functions much like a car’s GPS unit,

offering step-by-step directions (“Take the elevator to the first floor; exit toward the Great Canoe”) with arrows and maps”(Grobart). The museum’s Wi-Fi has a triangulation feature that allows the GPS to work inside the building (out of sight of the satellites). This is a particularly useful feature for visitors to a museum as the size of the AMNH with its 26 buildings, and 46 halls.



**Figure 2 AMNH Home Page**

Another interesting app is the one created by, The Solomon R. Guggenheim museum, for the 2011 / 2012 Maurizio Cattelan exhibit (fig. 2). The app focused on hosts text, artwork, videos and audio presentations about Maurizio Cattelan. The app was the museum’s first effort but it received raved reviews from critics for its “wonderful supplementary and background information on the show” (Jacobson).

In The New York Times article “A Digital Art Space,” Joshua Brustein, talked to Elizabeth Levy, Director of Publishing and Digital Media at the Guggenheim. Levy, “predicts that these multimedia tours will become more popular as these types of apps continue developing because they create a more comprehensive experience”(Brustein). Still, there are logistical issues and other problems that make development difficult. Levy went on to say that:

It’s difficult and expensive to outfit an entire museum with Wi-Fi, some museums, such as the Guggenheim, try to combat this by creating apps that are native to smart devices and don’t require additional Wi-Fi beyond the initial download. (Brustein)

AMNH, was able to avoid this problem through a special grant from Bloomberg LP, which outfitted the entire building with Wi-Fi.



**Figure 3 Guggenheim Cattelan Application**

Creating applications and making them accessible has only been half the battle for these institutions. Apps need to be constantly updated in order to stay relevant and keep audiences interested and engaged. In The Chronicle's article "Get Smart (phones)" Laura Donnelly- Smith points out that " Smartphone users are still primarily technology early adopters, and their feedback is helping to redefine the museum- going experience, making it more interactive and social"(Donnelly-Smith). The article quotes Kristin Prestegaard, Director of Marketing at the Minneapolis Institute of Arts (MIA),as saying "We want to provide a variety of tools, and a lot of people are really receptive to this technology"(Donnelly, Smith).

In 2009 MIA launched a free (iAfrica) application in support of its African art collection. The app provided visitors with in-depth collection information (history, provenance, aesthetics ect.), and an interactive exhibit map. A virtual thumb piano (fig. 3) s modeled on a real thumb piano from the Republic of Congo. The app also provided visitors with a convenient and timely platform for providing feedback (fig. 4).



**Figure 4 iAfrica Lamellophone**



**MINNEAPOLIS INSTITUTE OF ARTS** "iAfrica: Connecting with Sub-Saharan Art" experiments with different ways to interpret African art. Your feedback and reactions are crucial to this experiment.

**1a. Which best describes your primary reason for visiting the museum today?**  
*Check only one*

- ☐ Visiting from out of town
- ☐ Learning about art
- ☐ Entertainment / enjoyment
- ☐ Seeing a special exhibition
- ☐ Attending a lecture / class / tour
- ☐ Completing a class assignment
- ☐ Shopping in the Museum Shop
- ☐ Dining in the restaurant or coffee shop
- ☐ Other:

---

**1b. If you select "Seeing a special exhibition," which exhibition did you come to see?**

---

**2. What attracted you to "iAfrica: Connecting with Sub-Saharan Art?"**  
*Check all that apply*

- ☐ The works of art
- ☐ The exhibition title
- ☐ Word of mouth
- ☐ Article in ARTS magazine
- ☐ I was already at the MIA and walked by
- ☐ Web site
- ☐ Advertising
- ☐ Other:

**Figure 5 iAfrica Application Feedback Page**

Museums and other cultural institutions recognize the importance of visitor feedback. Asking for feedback engages users and helps the museum understand its audience. Giving feedback helps the visitor reflect on their experience and provides the information museums need to continue to meet the needs and interest of its audience. Typically, - institutions use this information to develop new exhibits, to continue to support established collections or understand the need for improvements to the physical space. But also, museums can now solicit and receive feedback about apps and other technology used to interact with visitors. Unlike in-person museum evaluations, online feedback can be given after a visitor leaves the museum and has had time to think about the experience. On the negative side, some visitors might have the "out of sight, out of mind"

mentally and not provide feedback once they leave the museum. This too is something that can be monitored through the use of apps and technology alerting museums to the need to follow-up in more traditional ways.

Mobile technologies are an exciting opportunity for museums and other cultural institutions. If projected Smartphone penetration rates are correct, their influence on cultural institutions will be significant. Traditionally, museums may be seen as slow to adopt technologies. But institutions with the necessary resources are developing interesting and quality applications, such as those developed by the Guggenheim and American Museum of Natural History. For small (and even some large) museums problems with budgets and development expertise will persist into the foreseeable future. But like with films, these problems will eventually be overcome and Smartphone technology will be invaluable to these institutions.

## **REVIEW OF SMARTPHONE DATA ANALYSIS**

### **Introduction to the Studies**

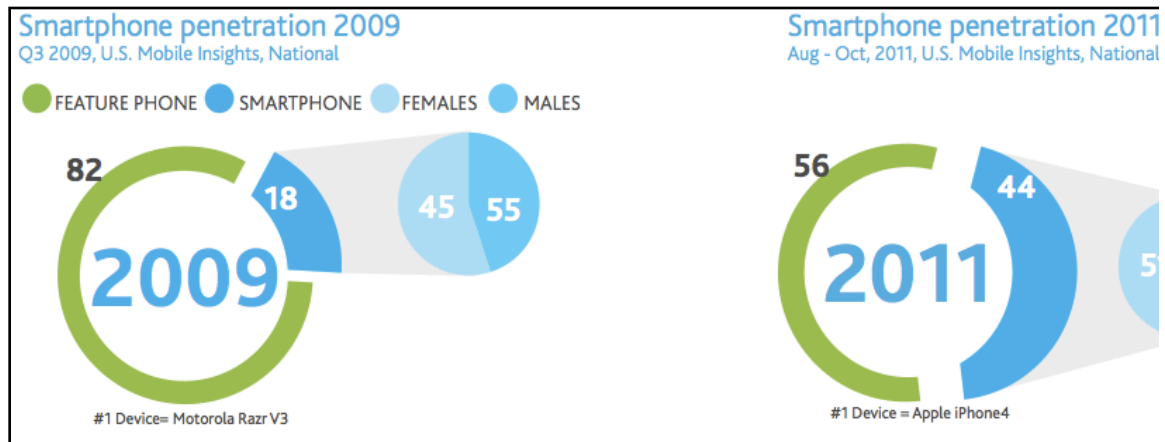
The implementation of Smartphone applications by cultural institutions cannot be a decision made lightly. Cost, timing, development and technical support are all challenges that arise when considering certain mobile technologies. In order to understand the opportunities that surround mobile technology, it is important to analyze studies that focused on these topics. The two studies presented below give statistics that institutions can use when considering mobile technology.

The first study, the Nielsen “State of the Media: The Mobile Media Report,” provides information about the types of platforms and applications currently leading mobile technology. Nielsen surveyed around 300,000 mobile consumers for the study. The second study, The American Association of Museums (AAM) “2011 Mobile Technology Survey,” surveys 2,285 AAM members, representing 1,090 individual museums currently engaged or not engaged in mobile technology. The AAM survey also reports on current trends, insights and attitudes specific to museums and other cultural institutions. Through a review of their surveys, a selection of their graphs, the data analysis provides critical information about future Smartphone development and users in cultural institutions.

### **Nielsen Mobile Media Report**

In 2011, The Nielsen Company (Nielsen), recognized as a global leader in measurement and information, released the “State of the Media: The Mobile Media Report.” The report surveyed mobile consumers, defined as people who are “ social, always connected, and rely on their phones more than ever before” (Nielsen, 3). The report analyzes findings related to smartphone technology in the U.S mobile market. The key findings presented in this study are important for institutions considering, or currently using, smartphone technology. This section highlights important statistics that are especially interesting when applied to cultural institutions.

According to Nielsen, “Smartphone ownership has more than doubled in two years” (Nielsen, 4). In 2009, 18% of mobile users were Smartphone owners, compared to 2011, where the percent nearly doubled to 44% (fig 5). Along with the increase in Smartphone ownership, an increase in the trend of female users also emerged. In 2009, 55% of users were male, compared to 2011 where 51% of users were female.



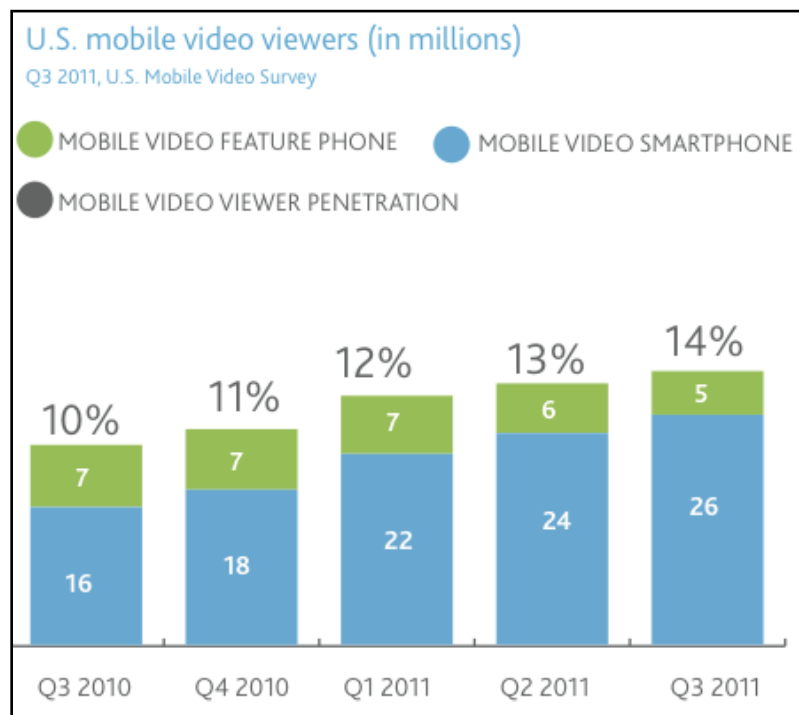
**Figure 6 Smartphone Penetration 2009 and 2011**

These statistics are important for cultural institutions to consider, as they make clear that the market will continue to grow. According to Nielsen, in 2011, the majority of users landed in the age range of 18-34. This is important for several reasons. First, this age range group is the bulk of the current and future audience and therefore must be the priority in the programs and marketing strategies. Also, the cost of supplying devices is sometimes prohibitive, so having the audience bring its own device, could free up money for development or other application implementation costs. Popular jargon is “Bring your own device” (BYOD) and according to recent Business Insider article, the results are clear: “if your web experience isn’t optimized for your growing mobile audience, you’re missing a key opportunity for audience growth and engagement” (Mulder). Cultural institutions must consider where their current and future target audience fits into these statistics, when considering a Smartphone application.

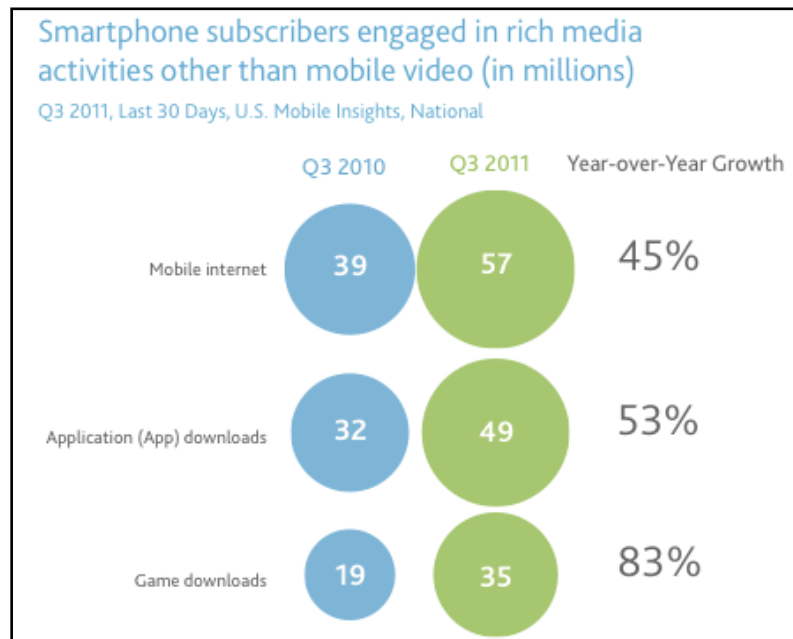
The Nielsen report also investigated how Smartphone users are engaging in “rich media activities.” According to the report, rich media activities include

mobile video, Internet, application downloads, game downloads, music streaming, music downloads, and online game playing. As an activity, mobile video has seen a jump from 23 million viewers to 31 million viewers, a 35% increase in just one year (fig. 6). Substantial increases are seen also in engagement with mobile Internet (45% growth), application download (53% growth), and game downloads (83% growth) (fig. 7).

When creating applications, institutions must consider research about how 18 -34 year olds use their Smartphones. Applications should have features that are not only unique to the collection or exhibit, but must also be delivered in a form that is intriguing to the person using the app. For example, according to Nielsen, these users prefer watching videos and playing games, so content and delivery method could reflect these popular trends.



**Figure 7 Mobile Video Views**



**Figure 8 Engagements in Rich Media Activities**

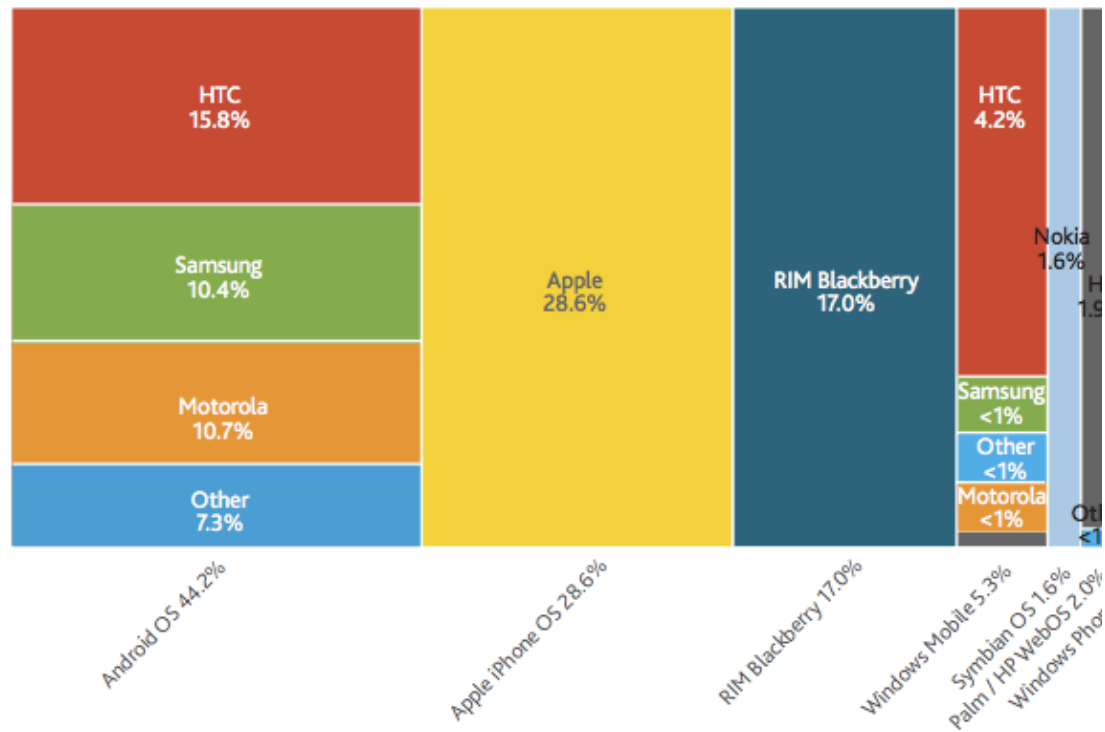
1

The Nielsen study also released statistics on which Smartphones are winning in the “battle for the market.” According to the report, “in 2009, RIM’s Blackberry Smartphone was the most popular mobile device. Today (2011), the fight for operating system market share is between Android OS and Apple iOS Smartphones” (Nielsen, 5). With the Android operating system offered on many different platforms, they control the largest share of the operating system market (44.2%.) Apple products, only produced by Apple, are the top Smartphone manufacturer in the United States with (28.6%) of the market (fig.8). Other Smartphone devices that deserve consideration are, the RIM Blackberry and Windows Mobile.

<sup>1</sup> Nielsen, U.S. Mobile Insights, National (Q3 2011)

## Manufacturer operating system share-smartphones

Aug-Oct 2011, U.S. Mobile Insights, postpaid mobile subscribers



**Figure 9 Operating Systems Share in Smartphones**

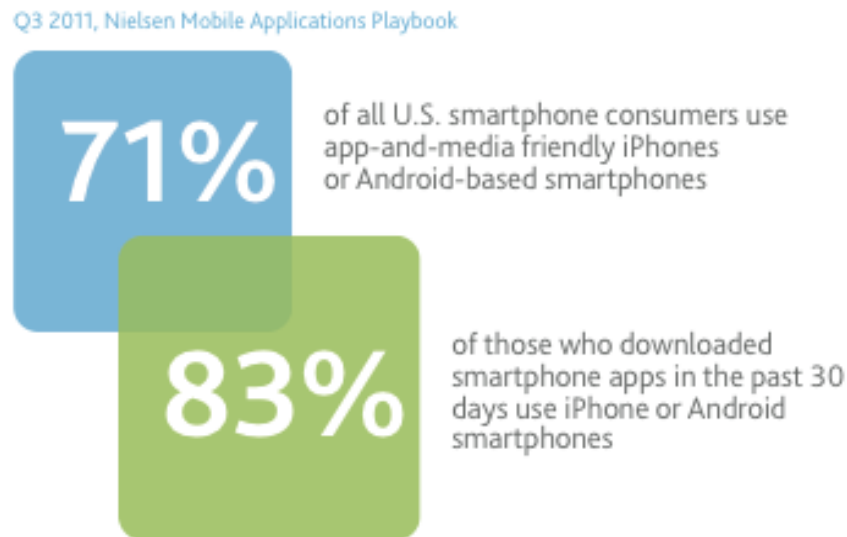
Not only do Android and iOS dominate the phone market, they also lead in application downloads (fig.9). According to the report,

Smartphone app downloader's report having an average of 33 apps on their mobile phone, up 22 percent since 2010. Apple iPhone app downloader's have an average of 44 apps on their phones, while those with Android OS smartphone's report having an average of 32. (Nielsen, 14)

Nielsen gathered these specific statistics through a survey of users age 13 and older who have downloaded some type of application in the past 30 days. A

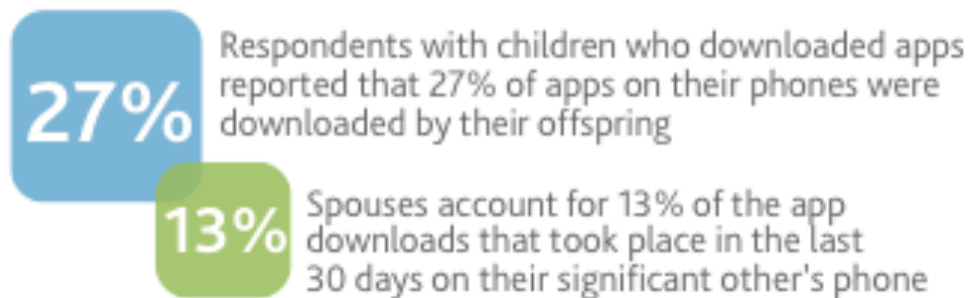


notable finding was the number of individuals reporting that some of their application downloads came from applications first acquired by children or spouses (fig.10).



**Figure 10 Android and iPhone application downloads<sup>2</sup>**

## CHILDREN AND SPOUSES ARE GETTING INTO THE "APP" AC



**Figure 11 Children and Spouse Application Usage**

What does all this mean for cultural institutions? First, museums and other cultural institutions must understand application development is a lengthy

<sup>2</sup> Nielsen, Applications Playbook (Q3 2011). Nielsen's Applications Playbook Q3 2011 is based on a survey of 4,705 mobile subscribers who reported having downloaded a mobile app in the past 30 days. The respondents completed an online, self-administered survey in September and early October 2011.

and expensive process. It is important that enough time is allotted to conduct a proper “due diligence”. Institutions must also decide on platforms. Applications can be built to run on one platform, or to be compatible across several platforms. One consideration is accessibility. Developing only for iOS could potentially prohibit a large portion of visitors from accessing the application. Tracking the number of times an application is downloaded and by having some indicators about the “who” (e.g. age or other demographic), creates an opportunity for targeted application development. It is also important to remember that children are the visitors of the future and should be considered in the development and delivery of content. Depending on the institution, the application can deliver components or complete tours geared to a younger age group.

### **Application Specifics**

Nielsen asked survey respondents four important questions about applications – to rank popular applications, to tell where users are discovering new applications, to indicate which applications, they use most, and questions to help discover the evolution of how individuals interact with their phones. These statistics provide clues when creating successful content for applications. Cultural institutions can use these models as examples of the types of applications that engage users.

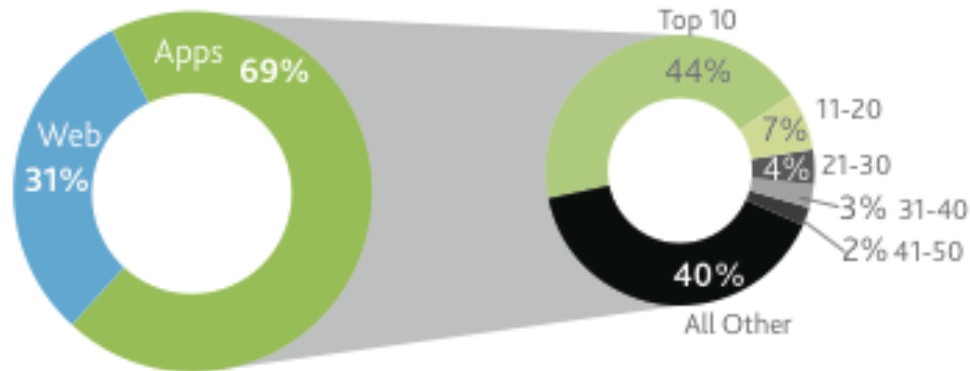
The report shows that across three different age groups, 18-24, 25-34 and 35-44, that Android market, Facebook and Google lead smartphone application usage. Google, though third behind Android and Facebook, accounts for 3 of the

top 5 applications used with Gmail, Google Search and Google maps. Nielsen also reported on how individuals discover these applications. According to the report, 63% of applications are downloaded by a direct search of application stores. High responses also included recommendations from friends and family, third party websites, apps promoting other apps and apps advertised in newspaper or magazines and on the radio.

An interesting statistic about Android phones is that the “Top 50 apps account for the majority of time spent on Android Smartphones” (Nielsen, 10). According to the report, 69% of time spent on the Android is spent using applications (fig. 11). In addition, within that 69%, 53% of those applications are ranked in the top 50. The report continues, however, to state that the top 50 applications are always changing.

### Proportion of time spent on web/apps—Android

### Distribution of time spent in apps—Android



September 2011, Nielsen Smartphone Analytics, Device Metering Data

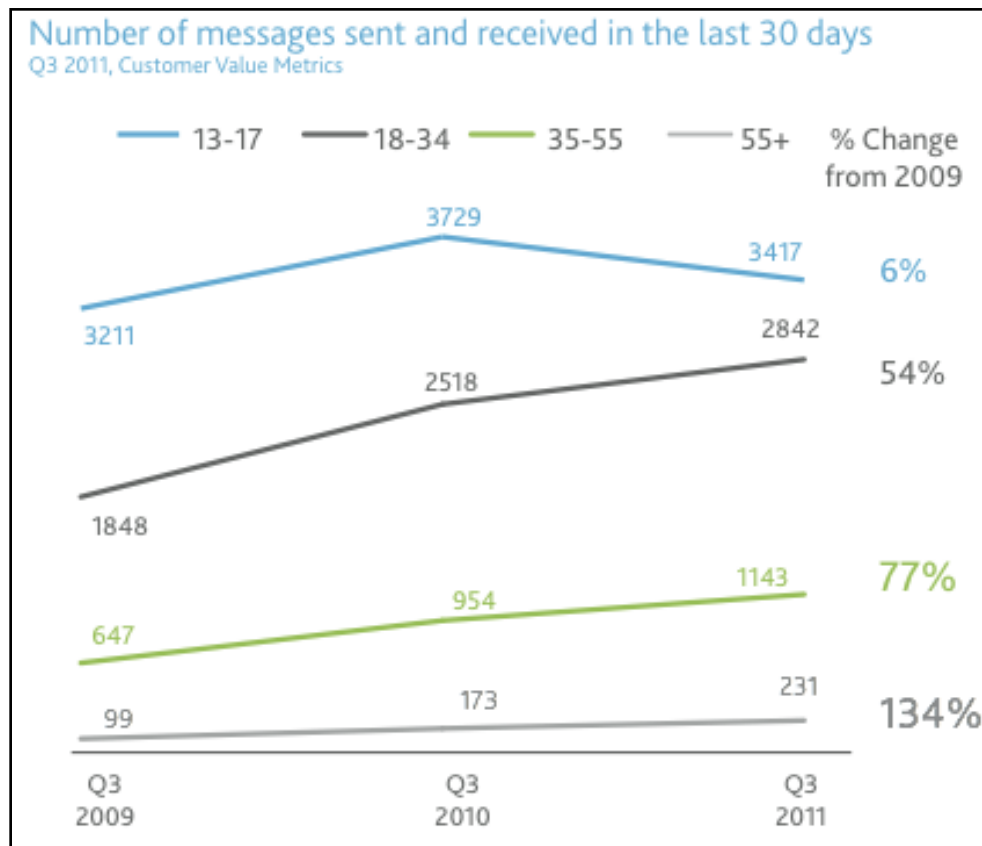
Of the 69 percent of the time spent on Android applications, users spend 53 percent interacting within those in the top 50.

**Figure 12 Android Application Usages**

These statistics are important when considering direct marketing of applications for cultural institutions. With an always-changing landscape of popular applications, institutions have the opportunity to create unique, engaging opportunities to help drive their application into popularity. Android users, per the statistics, constantly use applications and are very interested in adopting and using new ones.

The final statistics of this report look at the ability for devices, and applications to evolve. The opportunities for applications to fill certain needs grow with the invention of new technology. When looking towards the future, institutions must consider how younger generations grow up with technology. Consistently, women have shown greater usage in terms of voice usage and

messaging then men. Younger generations are more likely to send and receive text messages. But the older generations (55+) are the fastest growing segments of app users, and according to Nielsen “have shown consistent growth overtime” (fig.12)



**Figure 13 Number of Messages Sent/ Received by Age**

When considering smartphone statistics, cultural institutions must examine the big picture. Demographics, popular phone models and top applications are all important considerations when developing an application. These statistics help determine whether a new application can even reach a specific institution’s target audience. The high cost, and time constraint of applications will deter many, but if

trends continue to move forward, and there is not much doubt that they will, it will be hard for institutions to ignore this technology.

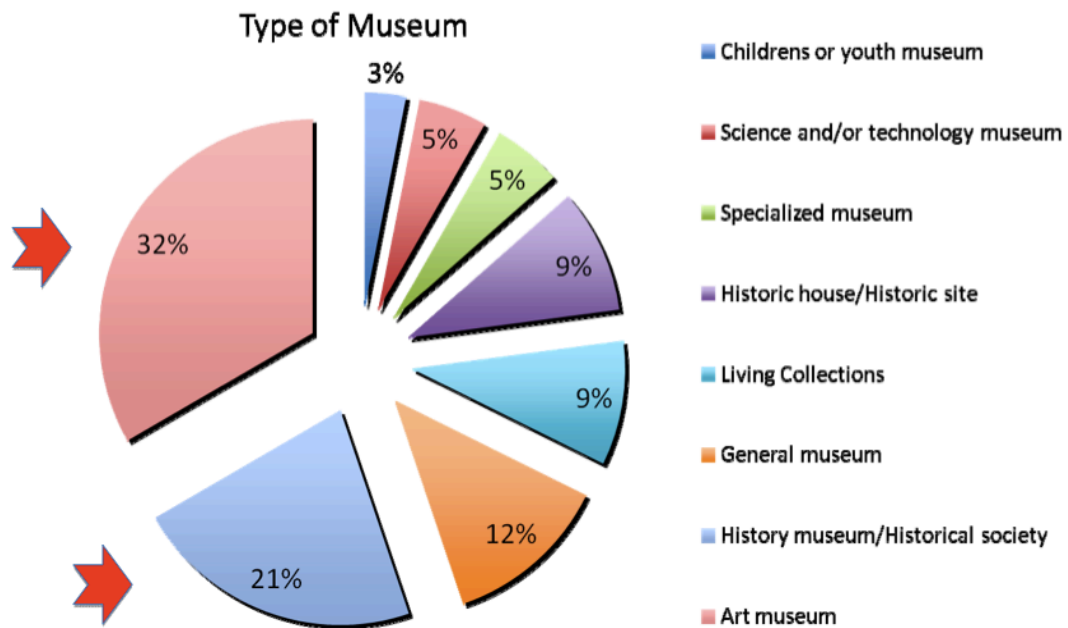
### **American Association of Museums: 2011 Mobile Technology Survey**

The importance of smartphone technology in cultural institutions does not just depend on the attitudes and decisions of general smartphone users. The attitude of the museum world, individual institutions and their staffs creates important variables to consider for smartphone application development. In 2011, The American Association of Museums commissioned Fusion Research + Analytics to release the “2011 Mobile Technology Survey,” a research report to “Assess the use of mobile technology in museums and the attitudes that museum professionals have towards mobile technology” (AAM, 2).

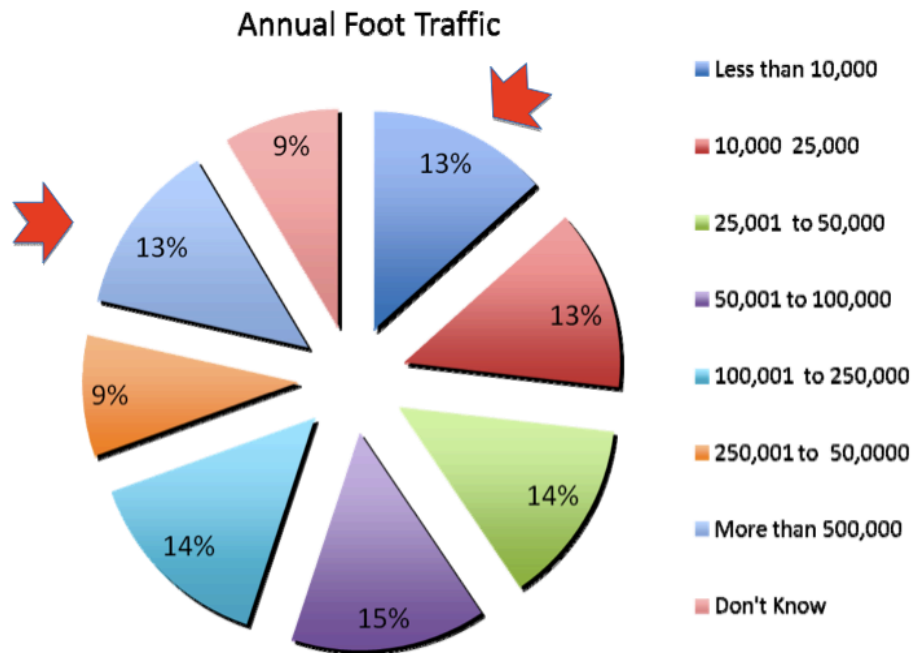
The report’s main objectives were to explore existing and future mobile usage in museums. It aimed to determine what types of goals museums are setting for their individual mobile programs and to identify the “key challenges in establishing and running a mobile program” (AAM,2). In addition, AAM wanted to gauge the interest of their members, on “mobile technology insights and best practices”(AAM,2). AAM invited a large number of members to participate in the survey and received 2,285 individual member responses and 1090 museum responses, with an overall response rate of 14%. The results provide a detailed look at current museum attitudes and how they can be applied moving forward.

### Characteristics of Respondents

The first section of the report presented the types of institutions, sizes and departments that participated in the survey. In terms of type of museum, Art Museums (32%), History museums/ historical society (21%), and institutions identifying as “General museums”(12%) made up the majority of responses (fig.13). The institutions responding were divided among all ranges of annual foot traffic, ranging from less than 10,000 to more than 500,000 (fig. 14). In terms of what types of museum professionals responded, the top departments were Education, It/Web, Curatorial and those who identified as “other.”



**Figure 14 Type of Museum Breakdown**



**Figure 15 Participant Museum Foot Traffic**

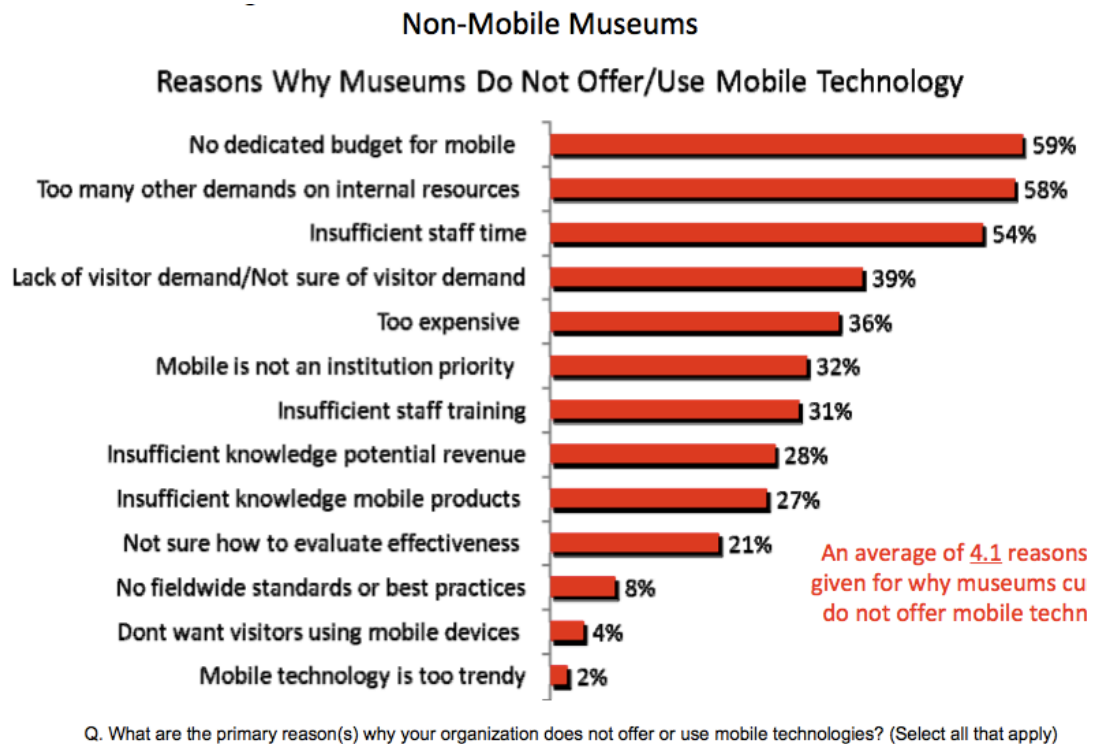
### **Mobile Technology**

AAM's first question was written to gain an understanding of how many institutions currently offer some form of a mobile technology to visitors. This could include handheld devices provided by the museum, or visitor's personal devices. The report yielded that less than half of AAM Museums (42%) currently engage in some form of mobile technology. Of the 42% respondents reporting use of mobile technology, 20% described their usage as "Museum provided device, audio tour only," 16% as "Cell phone-guided audio tours," and only 5% responded "smartphone applications."

Given a high number of museums reporting no usage, AAM, asked a follow-up question about what specifically deterred these institutions from offering mobile technologies. Of those museums that responded, the most cited reason

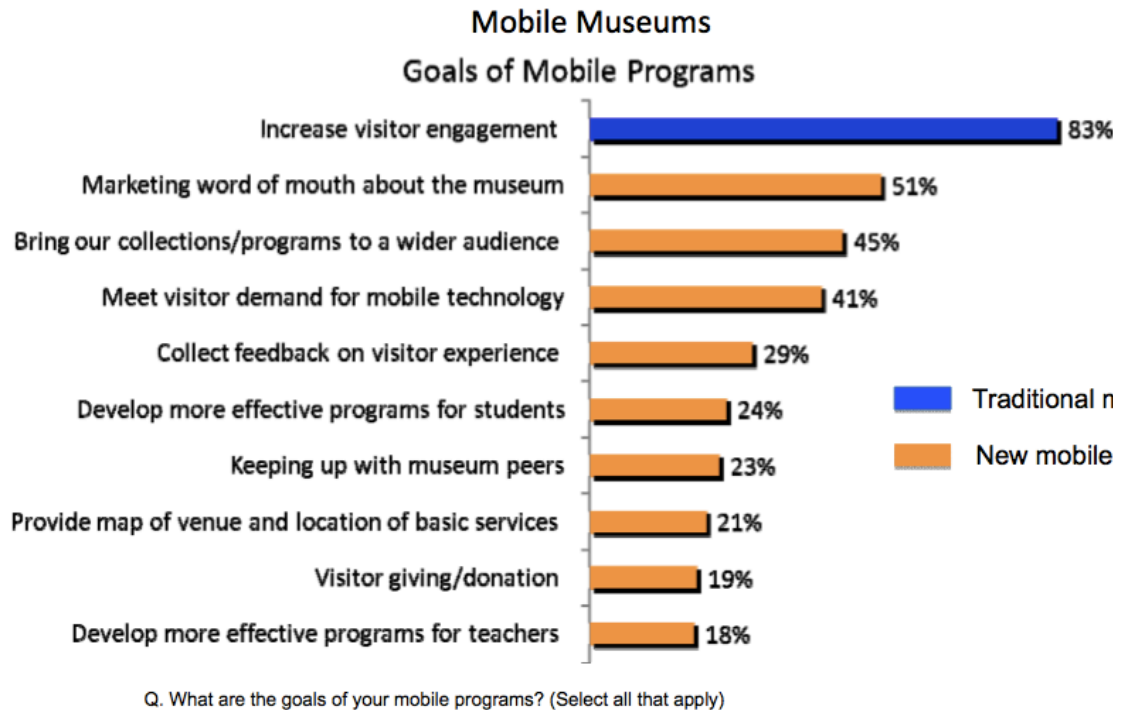


(over 59%) was the lack of mobile budget, 58% offered that they were too busy with other daily demands. Similarly 54% cited insufficient staff time, 39% lack of visitor demand and 36% too expensive. Not surprisingly, only 2% cited that “mobile technology is too trendy” and only 4% “don’t want visitors using mobile devices” as issues. (fig.15)



**Figure 16 Reasons for Not Offering Mobile Technology**

The AAM report also focused on reasons why mobile museums engaged in this new technology. When asked about program goals, an overwhelming 83% cited “increase visitor engagement” as a main reason for implementing mobile technology. Marketing the museum, access for a broader audience and meeting visitor technology demands were also cited as main goals (fig. 16).



**Figure 17 Mobile Goals**

One especially interesting topic in the AAM Report is the idea of “Mobile Giving or Donation.” Mobile giving can potentially utilize mobile platforms to engage visitors to donate to the museum. According to the report, many of the museums currently using mobile technology consider mobile giving an important goal. Specifically they feel that mobile technology can reach a younger audience, provide new platforms for giving, and keep current donors engaged. For museums slow to adopt mobile technologies, the idea of asking for donations via cellphones must be a little daunting. But with much of the worlds banking already moving towards smartphone applications and the trend to pay for purchases by cellphone increases, mobile donations will eventually become a viable option.

## **Longevity and Challenges**

AAM questioned respondents on their attitudes toward the longevity of mobile technology and the many challenges associated with mobile technology. When presented with the idea that mobile technology is a fad, only 4% of respondents agreed. These respondents did however note that lack of knowledge on mobile platform and structural barriers are main threats when it comes to this technology. Additional question about challenges included funding (58%), internal resource (47%) and time commitment (39%). An interesting statistic is that only 3% of respondents cited visitor demand as a major challenge. This statistic reflects the response discussed earlier that museums do not feel that there is a lack of demand for mobile technology among visitors. This along with the 96% believing it is not a fad speaks to the future of museum mobile technology.

Moving forward, the report shows that mobile and non-mobile museums are both keenly interested in access to industry insights- especially “case studies” and “research on mobile users” to help inform mobile program development at their own institutions. Survey respondents noted that “about one-third planned to introduce a new mobile platform in 2012” (AAM, 52).

## **Conclusions**

The Nielsen and AAM surveys provide important information for museums currently utilizing mobile technology, and for museums still considering mobile technology. The survey's responses highlight the current trends of mobile technology in these institutions, and where museums see the technology in the future. These statistics could be especially useful for those institutions with a specific concern, or particular institutional needs to address. Though many museums cited a lack of funds and staffing as challenges, the majority of museums viewed mobile technology as growing and as an important part of the future. It is interesting to consider that a museum facing fundraising issues could potentially combat this by introducing mobile giving. The large amount of interest surrounding industry insights creates a need for informative case studies about current successful models of mobile technology.

## **CASE STUDIES**

### **Smartphone Applications Make Their Mark in Pennsylvania**

With the increasing relevance of mobile devices, mobile technology and Smartphone applications, cultural institutions are in a position to engage new audiences and reengage established visitors. In the Greater Philadelphia region, the use of Smartphone technology is relatively new. There are however, a few successful and creative examples of these applications in the Philadelphia area. I had the privilege of being granted interviews with representatives from five local institutions in the forefront of developing and implementing these technologies. Using the information gathered from the interviews and evaluating applications, I will point out the various tools, needs and constraints of these applications, along with highlighting unique features and accessibility. This review serves as a tool to pinpoint successful models, and basis for need assessment and recommendations. My evaluations and interviews focus on applications from The Rodin Museum, The Philadelphia Zoo, and the PA Markers. I also look at two local institutions not currently using Smartphone technologies, The Wharton Esherick Museum and The Franklin Institute, and discuss their reasons for not using Smartphone technology, and how they see using this technology in the future.

## **The Rodin Museum Application**

The Rodin Museum opened its doors to the Philadelphia community in 1929. Boasting an impressive collection by Auguste Rodin, the museum quickly became a staple of the city. Since the Rodin opened, the neighboring Philadelphia Museum of Art (PMA) has overseen the museum's building and collection. In 2012, the Rodin reopened after a 3-year renovation project supported by the Philadelphia Museum of Art, Pennsylvania Horticultural Society, and the City of Philadelphia Department of Parks and Recreation, along with generous public and private funders. With the re-opening, the Rodin museum launched a new Smartphone application. A review of the application and an interview with Marla Shoemaker, The Kathleen C. Sherrerd Senior Curator of Education, gave insight about the development, usage, goals and implementation of the application.

To understand why and how a museum decides to implement new technologies for visitors and administrative functions, it is useful to understand how they used technology in the past. Ms. Shoemaker discussed 50 years of museum technology with me. The initial use of cassette tape devices and Walkmans held a certain advantage for museums, Shoemaker stated "The advantage of that introductory technology was that you could tell a whole story and know your visitor would listen to the whole story, before being able to get to the next one"(Shoemaker). This ability to present a "continuous thread" allowed museums to select and focus the visitors attention on the information the

museum felt important to convey. It gave the museum the power to control the pace and content of the experience.

With the creation of random access tours, museums visitors were given the option and the power to select the stops where they wanted more information. Ms. Shoemaker recalled how “In 1983, as long as they were free, the random access device had very high usage. In the new medieval galleries, 35% of people took them. They could call up a number to hear the information. After a year. They (The PMA) started charging, and less than 5% took the tour” (Shoemaker). Random access tours, slowly developed into cellphone tours. Allowing visitors to use their own phones if they chose, instead of the museum providing all the devices, benefited the museums and visitors.

The introduction to smartphones offered a huge opportunity for the Rodin and the PMA. In July of 2012, The Rodin, in conjunction with the PMA, launched its first smartphone application (fig.17). The Rodin application, an “on-site” and “off-site” experience, targeted an adult audience, with broad knowledge. When developing the application, Shoemaker and the developers kept the museums mission and goals in mind. Shoemaker stated, “We knew the big questions at the Rodin. With our big interpretive plan we knew where we were going. Who is Rodin? How come [the museum] is in Philadelphia, and is that the real thinker (Shoemaker)? The developers wanted to make sure that museum visitors found the application useful, and would continue to use the “off-site” piece of the application after leaving the museum.

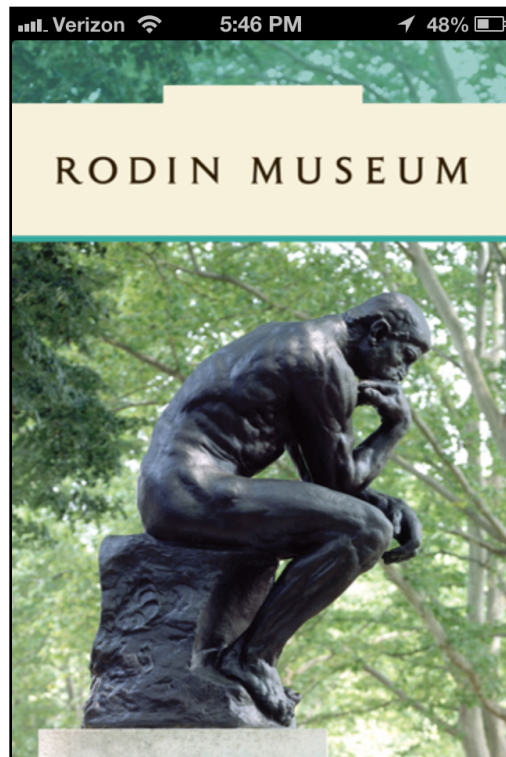


Figure 18 Rodin Application Opening Page

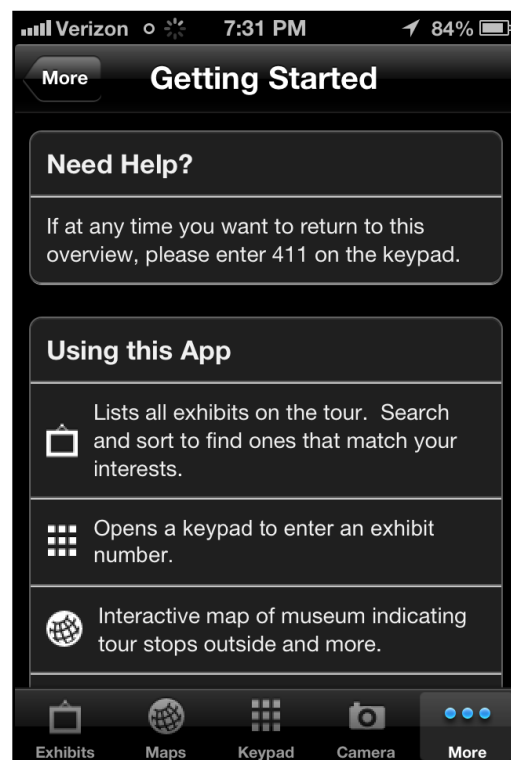


Figure 19 Rodin Application Introduction



The Rodin application invites visitors to explore a variety of options while visiting the museum. The museum allows a free download of the application to personal devices, or gives visitors the option of renting an Ipad Touch to use during their visit. The application is visually appealing, and easy to navigate. The first screen addresses the common concerns about how to get help and how to navigate the 4 main sections of the application, including the exhibits, keypad function, interactive map and camera component (fig. 18).

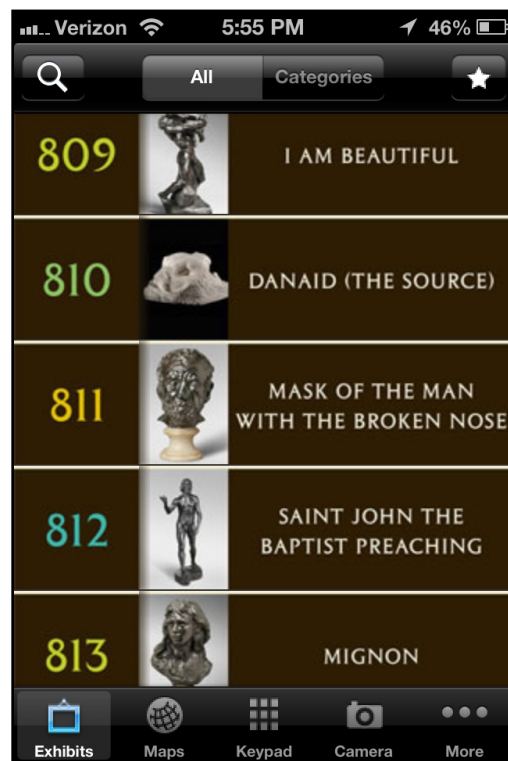
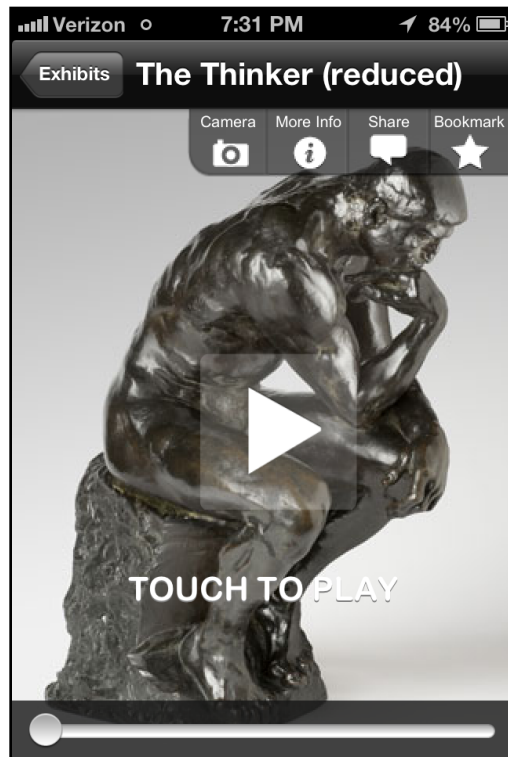


Figure 20 Rodin Application Exhibit Page



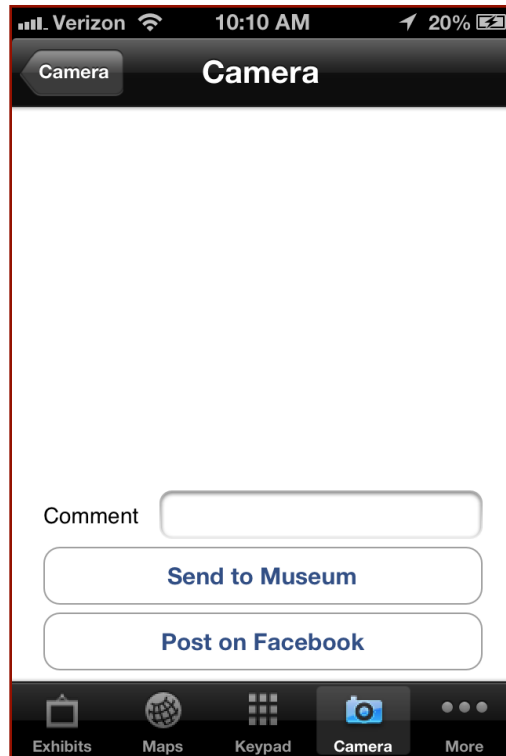
**Figure 21 Rodin Application "The Thinker" Audio Page**

The exhibits section (fig. 19), gives a selection of 30 different audio segments that can be selected for different pieces of art and areas of the museum. An introduction from the Philadelphia Museum of Art Director, Timothy Rub, gives visitors a quick overview of Rodin as an artist, the museum, and the individuals who will speaking on the audio tour. This selection, among others, gives users at the end of the audio tour the opportunity to learn more information. For example, at the conclusion of the main audio for the “The Thinker (reduced)” (fig. 20), users have the opportunity to select additional audio and to explore additiuonal images of the work. The keypad function allows users to type the number at each stop into the application, to directly pull up audio tours. In

addition, the Rodin gives those visitors who would like a deeper experience, the opportunity to go beyond what other visitors may experience.



**Figure 22 Rodin Application Interactive Map**



**Figure 23 Rodin Application Camera Feature**

The application has multiple interactive features that engage visitors in different ways. The interactive map displays an outline of the museum, and highlights different pieces in the collection that link directly to the corresponding audio tour (fig.21). The camera function allows visitors to take photos during their tour (fig.22). Visitors are encouraged, through different screen prompts, to send the photo to the museum or to post it on Facebook. Similarly, in the audio section, visitors can “share” by sending an email, Facebook post, or Tweet of the artwork they are currently viewing.

The smartphone application at The Rodin, is not only easily accessible and simple to use, but also creates an opportunity for advanced learning and a

better understanding of the museum collection. As Ms. Shoemaker pointed out it is not easy for non-profits to produce an application.

To produce that kind of app, it is about \$40,000. (...) I learned that producing multimedia stops versus audio stops is not twice as much work, its ten times as much work. Now the stops have to be designed and look beautiful. (...) They(the apps) are really expensive, but the public expects it, it's tough for non-profits.

(Shoemaker)

But the time and cost is worthwhile. Since its release in July 2012, the Museum has had around 725 Itunes store downloads, along with 190 Google play downloads. "This fall (The Rodin App) will be updated with more video and different things. People are really enjoying it," (Shoemaker) Ms. Shoemaker said. Looking forward, the Rodin plans to continue to update and upgrade the App for optimum user experience. Shoemaker hopes that in the future the museum can produce a mobile experience specifically for kids, and applications for special exhibitions. The Rodin mobile experience is an example of a well thoughtout and well executed application.

### **The Philadelphia Zoo Smartphone Application**

The Philadelphia Zoo, renowned as America's First Zoo, opened its gates on Girard Avenue in West Philadelphia in 1847. The Zoo hosts over 1,300 animals that are supported and cared for by a large staff. The Zoo's mission is "connecting people with wildlife, the Philadelphia Zoo creates joyful discovery

and inspires action for animals and habitats”(Philadelphia Zoo Mission Statement). With over one million visitors yearly, the zoo strives to engage visitors and members in new and inventive ways. One-way the Zoo targets visitors and members are through a Smartphone application. A conversation with Jeff Paolini, the Zoo’s online marketing and communications manager highlighted some of the important features and thought process behind the development and implementation of the App.

Zoos are unique in having living collections and high number of visits from families with young children. Having been a part of the Zoo’s staff for three years, Jeff Paolini helped the zoo and their partner, Invictus Mobile Media; create a Smartphone application tailored to the unique collection and visitor base of the zoo.

The App cost \$1.99 to download and is available for all smartphone application platforms, including the most popular Android OS and iPhone iOS.

Paolini cited the main features as:

- GPS enabled map to help visitors navigate Zoo grounds
- Alerts of live parking updates handled by parking attendants (done simply by clicking a radio button) (fig. 25)
- Access to general information about daily events such as feeding times, keeper chats, and upcoming events
- Additional animal information, videos and pictures. (Paolini)

The App strives to make visits easier and more informative. Parking can be a challenge so the live parking updates make an impromptu trip to the Zoo easier for visitors with small children. Paolini believes it is important to cater to these groups saying that, “initially we wanted to help people navigate the Zoo grounds, and help them to find parking, which can be a challenge on busy days.” (Paolini) Paolini wants to “enhance the visitor’s experience by helping them navigate throughout the grounds, learn more about the animals, and be kept up to date with the most recent happenings” (Paolini). Going forward, the Zoo wants to enhance the App to expand to offer more interactive learning opportunities.

Currently the zoo does not rent devices unless you are part of a special school or educational group. In the future, however, with the creation of the children’s zoo, the team hopes to make the experience accessible and available to more visitors, with potentially providing the opportunity to rent devices to use while exploring the Zoo.

One of the best features of the App is the opportunity to compensate for the unpredictability of a “live” exhibit. Paolini pointed out that if an animal is sleeping or not on exhibit, the App can be used to watch a video or view pictures of the animal. In dealing with live exhibitions, its hard to predict what visitors will experience, an app provides an opportunity for supplemental and more targeted information.



Figure 24 Philadelphia Zoo Application Home Page

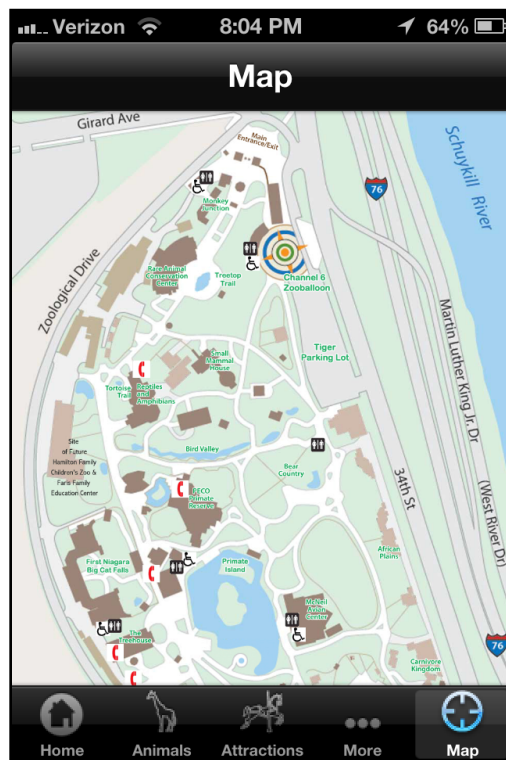


Figure 25 Philadelphia Zoo Application Interactive Map



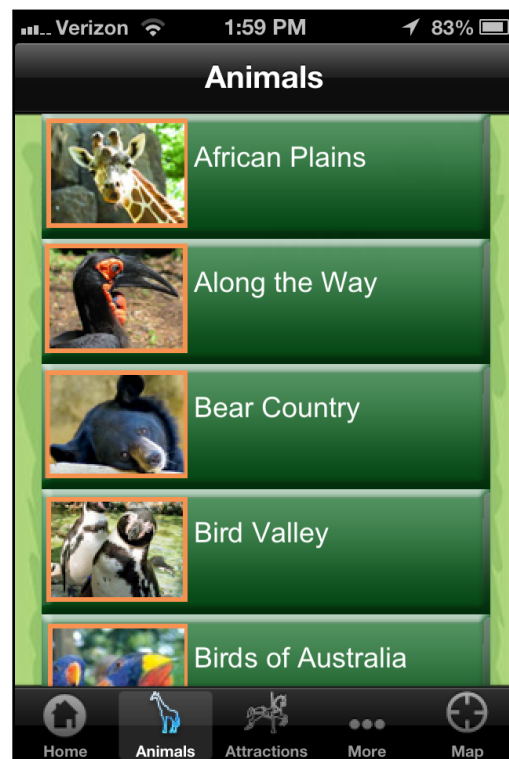
The home page of the application (fig.22) has five main tabs on the bottom of the screen: Home, Animals, Attractions, More and Map (fig. 23). The home screen provides general information including parking, a daily schedule, hours and information. The home screen provides quick links to information that visitors in the past would expect to find on an informational brochure or a website. The next tab, Animals, provides links to the different animals attractions throughout the zoo. Some of the areas you can explore are “African Plains”, “Bird Valley” and “PECO Primate Reserve.”(fig.26) Clicking into these sections allows visitors to explore different animals in each exhibition, and get more information.



Figure 26 Philadelphia Zoo Live Parking Updates

It can be disappointing if an exhibit is closed because an animal is unavailable or sleeping, but the app can fill the gap with supplemental information

about the animal. In “African Plains”, clicking on Hippopotamus opens a new screen with expanded information. Visitors can elect to learn an overview of the animal, about the specific hippopotamus at the Philadelphia Zoo, and read fun facts about the animal (fig.27). The screen also has a rotating number of pictures of the animal to give visitors a visual representation. This resource and others like it are a valuable way for parents to share information and overall Zoo experience with their children.



**Figure 27 Philadelphia Zoo Application Animal Exhibits**



**Figure 28 Philadelphia Zoo Application Hippopotamus Exhibit**

The “Attractions” tab presents information about eating areas and menus, featured gift shop items, rides, and programs in the Zoo’s “Tree house” (fig. 28). Last is the “More” tab and the “Map” tab. The “More” tab provides miscellaneous links to the Zoo’s social media websites, emergency services, contact information and membership information. (fig. 29 and fig. 30)

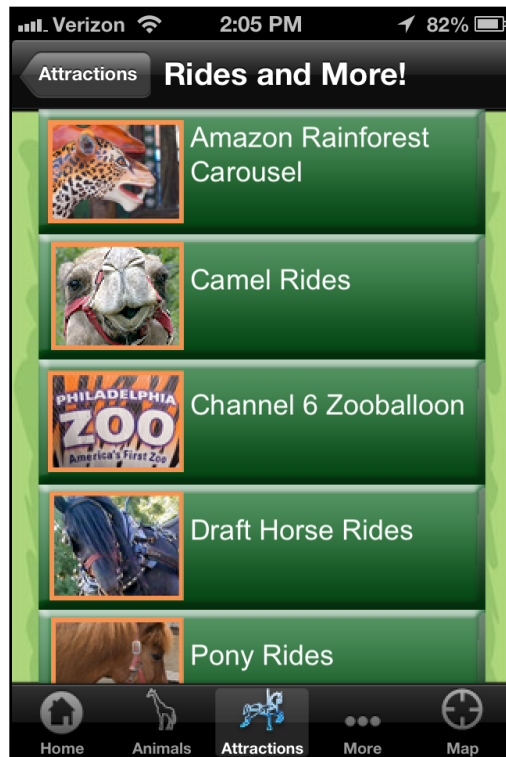
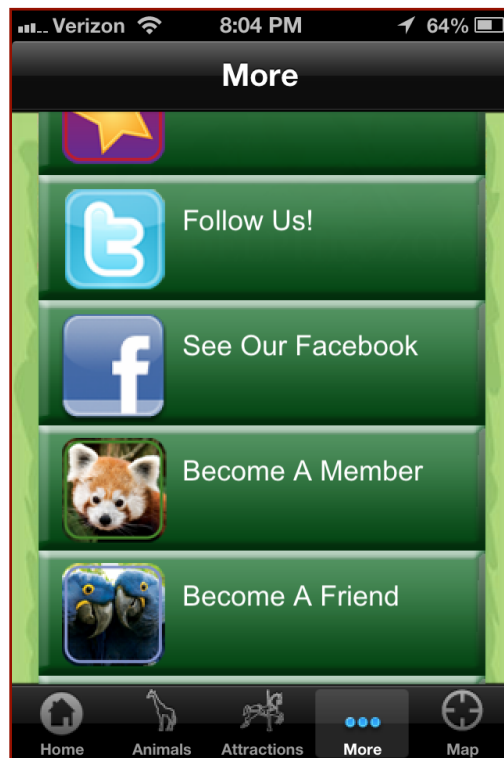


Figure 29 Philadelphia Zoo Application Rides and More Page



Figure 30 Philadelphia Zoo Applications "More" Page

Collecting visitor information is an important functionality in all cultural institution applications. Paolini noted, “the goal is always to reach a new audience, to collect email addresses and to help visitors become members” (Paolini). Through the application, the zoo can outline membership levels and link users back to the website (fig. 31).



**Figure 31 The Philadelphia Zoo Application Social Media Links**



**Figure 32 The Philadelphia Zoo Application Membership Levels**

Going forward, the Zoo plans to create a more comprehensive experience and a new app is scheduled to launch in February 2013. The goal is to create a mobile friendly website that will allow the application to capture more visitor information. The application hopes to shift its focus and provide more information targeted at a younger audience. Paolini stated that,

The new app, we want to focus on the younger group, some of the features we want to include is a trip planner push notifications on zoo grounds, numerous social media interactions and some forms of games. (Paolini)

With the creation of the children's Zoo, and the adaption of technology in the younger generation, the Zoo will be able to provide information to a group that will expect it.

Like other cultural institutions, The Philadelphia Zoo has to work within its budget to create Smartphone applications. When asked about the future of applications, Paolini remarked,

I think Smartphone applications will continue to be very strong. It is challenging for some museums, specifically non-profits, because of budget. Development is extremely expensive and what is the return? If an app is free, how are you judging and monitoring? I think a lot of museums are really fighting with this issue. (Paolini)

The Philadelphia Zoo, like other institutions, must overcome many obstacles to create an effective Smartphone application. The Zoo's application provides an important example and resource for other institutions in the Philadelphia area.

### **The PA Markers Smartphone Application:**

The PA Markers Smartphone application, administered by Witf<sup>3</sup>, is a free mobile application that gives users the opportunity to access the information on Pennsylvania historical markers from a mobile device. Even though it is not directly associated with a cultural institution, the PA Markers application provides a service that relates directly to the services cultural institutions are trying to provide through Smartphone applications. These markers, located throughout the

---

<sup>3</sup> A television and radio station, that administers two separate websites, [www.witf.org](http://www.witf.org) and [www.explorePAhistory.com](http://www.explorePAhistory.com)

state, provide information about significant people, places and events in Pennsylvania history. The application offers information on over 500 of the more than 2000 markers located throughout the State, with additional markers added monthly.

Michael J. Williams, Interactive Services Project Manager at Witf, has been instrumental in the development of the PA Markers application (fig.32). A discussion with Williams resulted in interesting and informative information about a cultural application implemented by an outside organization. According to Williams, the award-winning website, ExporePAHistory.com, “uses the state’s historical markers system as an entry point to bring history to life for visitors, students, teachers and history buffs” (Williams). Williams states that the “PA Markers [application] is a perfect application for anyone interested in learning more about American history, Pennsylvania history and the people, places and stories that helped shape our nation” (Williams).





Figure 33 PA Markers Application Opening Page

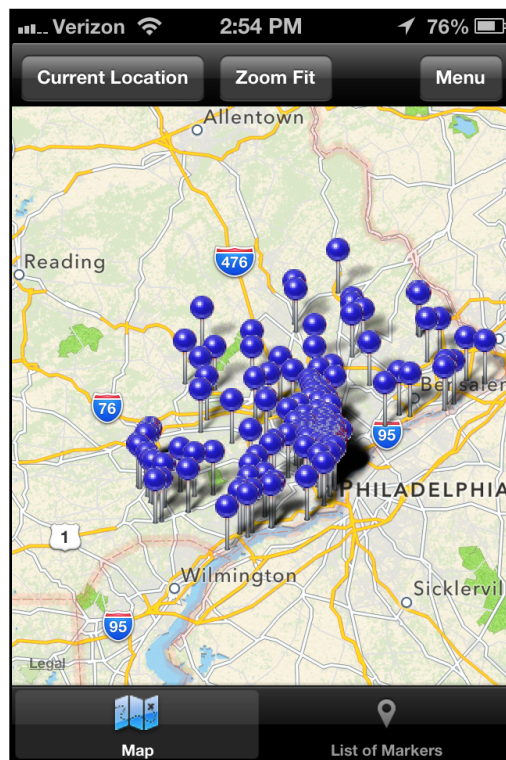
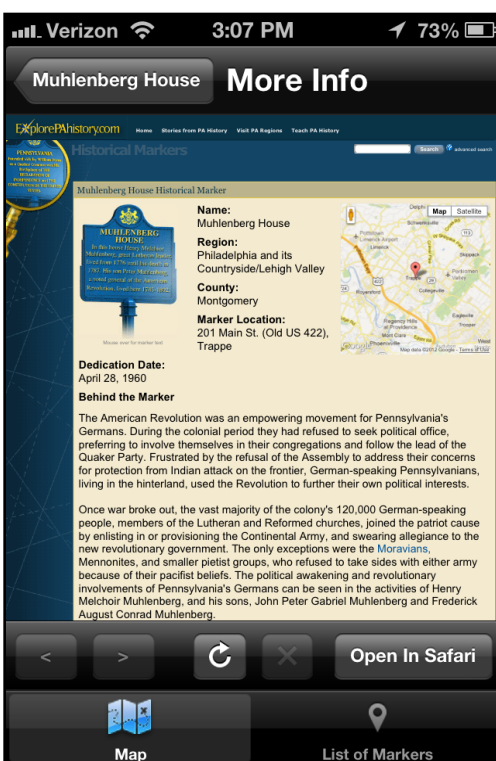


Figure 34 PA Markers Application Interactive Map

The Markers, colored blue and gold, can be spotted in various locations throughout the state (fig. 33). The 500 markers featured on the application include the marker name, location details, dedication date, marker text and “Behind the Marker” story. The application allows users to read the complete text on the marker, and then access additional information, images and links (fig. 34 and fig.35). The application provides GPS location services and driving directions to specific markers. The Markers, that are trademarked by the Pennsylvania Historical and Museum Commission, are used by the website and application with permission.



**Figure 35 PA Markers Application Example**



**Figure 36 PA Markers Application More Information**

Since not associated with a cultural institution, access and promotion of the application comes through the Witf and ExplorePAhistory websites. Williams feels that the PA Markers application provides both an on-site and off-site experience. To access the information on the free application, users are required to have their own device. Though the website itself is compatible with all mobile devices, the application only runs on Apple software including iPhones, iPads and iPod Touches. As an on-site experience visitors can come across a Marker and use the application to learn additional information on the spot. Speaking about the off-site experience, Williams noted about the educational value an online resource brought to the Pa Markers,

The new website would make Pennsylvania and American history more exciting and available for public audiences, while providing educational resources for K-12 teachers and promoting visitation to the state's many historic sites and museums. (Williams)

Though not directly related to a cultural institution, the PA marker application is a prime example for institutions looking for a way to engage their target audiences with Smartphone application material.

The application, like those used in museums and cultural institutions, has constraints. According to Williams, "Programming knowledge and the expense of paying an outside source to create the app" (Williams) is a large constraint. "PA Markers was particularly expensive because it was custom made." (Williams) Institutions must consider the budget for design, programming and execution of an application. They must ensure that the quality of application that the budget can deliver will attract and provide value to their audience.

Pa Markers, has a widespread range of potential users with a specific 'history' orientation. Williams described the target audience as,

Anyone interested in learning more about American history, Pennsylvania history and the people, places and stories that helped shape our nation. Tourist, adults, students, anyone interested in history or who wonders about one of the state's historical markers. (Williams)

According to Williams, “The trend is everything is going mobile.” When asked about the future of applications, Williams remarked, “[Apps] are not only a good idea, apps are a requirement. All web content must be mobile ready now and in the future. If not part of or attached to an app, website content must be mobile ready”(Williams).

### **Making Connections**

Cultural Institutions in the Philadelphia region need to realize the significance and prominence of non-cultural institution applications. These applications are both examples of success and models of competition. Witf has provided a service that attracts not only Pennsylvania residents, but also all tourist and history buffs. The usefulness of similar applications could potentially take away from content provided from individual cultural institutions. Consider the possibility of building a knowledge base that could potentially be shared across organizations. For example, could the information provided for a historical marker is available to a related exhibition at another institution? Information and connections made could potentially draw in new visitors and create a dialogue between different organizations.

With regard to the previous application, it would be interesting to see what connection could potentially be made. Is there a PA historical Marker that relates to an artist or exhibition at The Philadelphia Museum of Art or The Rodin? Institutions have already engaged in marketing strategies through their Smartphone applications. The next step could be connecting through other

applications. The high cost of applications makes it difficult for certain institutions to create their own application. Partnerships through applications could provide a new opportunity for revenue and new visitors.

### **Institutions Without Applications**

As noted before, the Philadelphia region supports hundreds of different types of cultural institutions. Many of these institutions do not have the budget, time, or expertise to create and implement Smartphone application. When reviewing successful models, it is important to consider those institutions who do not, or who cannot utilize this technology. A short interview with Kara Callahan of The Franklin Institute and Laura Heemer and Lauren Otero of The Wharton Esherick Museums, provided a valuable look at the decisions and discussions surrounding Smartphone applications in these institutions.

The Franklin Institute, located only a few short blocks from The Rodin Museum, attracts more visitors than any other institution in the State of Pennsylvania. A search on *The Internet Archives Wayback Machine*<sup>4</sup>, a tool that shows the historical content from older websites, uncovered the 1996 website for The Franklin Institute. In 1996, the website gave users the opportunity to explore online exhibits, follow links to educational and informational resources, and find information about upcoming programs and events at the museum. Since then the museum has gone through constant updates and in 2011 launched a new website, boasting the new identity of the institution.

---

<sup>4</sup> The way back machines is a website that allows users to go back and look at different websites at certain points in time.

Though the museum has an impressive website, it lacks a Smartphone application similar to its neighboring institutions. Kara Callahan, Director of Marketing at the museum, answered a few questions about her thoughts on applications, and their future in the institution. The staff at The Franklin has discussed the possibility of an application, but like other museums, Callahan cited “budget and consensus on what the app should accomplish” (Callahan) as the biggest constraints for application development. Callahan, however, does not believe that this puts the museum at a disadvantage. When asked she responded “No, but we could benefit. It won’t increase sales, but can positively impact visitor experience.” (Callahan) In this sense, the Franklin views smartphone applications as something that does not provides fiscal benefits for the institution, but instead provides more opportunities for the visitors. In the upcoming years, Callahan suspects that the institution will implement an application, but as of now, one is not being developed.

The Wharton Esherick Museum, located in the suburbs of Philadelphia, provides another example of an institution without a smartphone application. A small staff of three runs the museum, which includes a collection of art and woodwork by Wharton Esherick. Laura Heemer, Director of Programs and Membership, and Lauren Otero, Director of Business and Programming, sat down and gave me insight on their current situation, and their wishes for a smartphone application.

Until, 2008, the Museum was completely devoid of technology. The current website launched in 2010, and in recent months the museum has made a large push to integrate the museum on different social media sites including Facebook, Twitter, Instagram and Pinterest. Being a small museum, the duties of these accounts is often shared, as are other museum jobs such as giving tours and communicating with donors and members. The constant pressure to be part of different roles is something that both Heemer and Otero believe could potentially be addressed by a smartphone application.

As an institution, the two directors look forward at future generations. Heemer believes that “We [Wharton] are moving into having a tour of some type, with the generations getting older, if we are not at a disadvantage now, we definitely will be.” (Heemer) Otero followed up stating “ In the few years I have been here, I have seen a huge change in demographics. Our Facebook went from 200 to 895 by upping our online presence. We would really like to do something with education.” (Otero) The importance of their online presence was apparent in the directors’ discussion, and like other institutions, budget proves to be the biggest constraint.

Unlike bigger institutions with large staffs, budgets and donor bases, Wharton works on limited resources, and dreams of tools, such as applications, that could help. When asked about a wish list for a dream application, the directors at Wharton expressed the many ways in which they would utilize an application. The directors remarked on how they would “love to do an app tour



without a guide, that you can use throughout the museum. An application with preloaded information where people can walk around on their own.” (Heemer & Otero) They continued stating,

We want their attention to first be on art, but post activities, like questions, or videos would be great. This would be especially useful for wood workers who visit. When they come here and ask a specific question, we don’t always know the answer, an application could give us the opportunity to provide links, videos, or even oral histories. (Heemer & Otero)

Based on their answers, if budget and development were not an issue, the Wharton Esherick Museum would use Smartphone applications to directly address missed opportunities, or particular problems within their institution.

## **CONCLUSIONS**

As illustrated by the research presented in this thesis, Smartphone applications are becoming an important element of cultural institution experiences. Though many challenges exist in the implementation of Smartphone apps, there is no doubt that that Smartphone applications are central to the future of museums. This is evidenced in literature, scholarly research, and Smartphone data studies. The thesis also proves this through conversations with museum professionals in the greater Philadelphia region and an examination of their institutions current Smartphone applications.

History shows that the growth of technology influences museums and visitor interaction. From film to the development of Smartphone technology, museums and cultural institutions remain relevant by keeping pace with changing trends. The development of the computer and the Internet especially affected cultural institutions.

New interactive programs and devices allowed visitors to exert a certain level of control over the information they received. Audio guides changed from pre-recorded fixed narratives to random access tours giving the visitor control over where to stop and the pace of viewing an exhibit. Cell phone tours further developed this technology, giving visitors new options by allowing them to use their own devices. As these technologies grow and become more popular, they redefine what visitors expect and accept as quality exhibits.

The visitor outlook toward museums and mobile devices is best explained through the Technology Acceptance Model (TAM), developed by Fred Davis. TAM considers visitor approaches toward devices used within museums and cultural institutions. Creating applications that are perceived by users as simple and will increase visitor usage of devices, including smartphone applications.

Through the use of cellular technology and the web, museums are presented with the opportunity to expand the “conversation” to visitors and non-visitors. Museums can now deliver communications through various digital channels, directly into the handheld smart device of museum visitors. The Smartphone industry (especially Apple and Android) have made a push to develop the market for touch screen technology and established “app stores” that simplify the distribution of apps to the consumer. The appeal of the touch screen and the distribution system, have driven the demand for apps and made a profound effect on society, including museums.

According to Philip M. Katz, assistant director for research at The American Alliance of Museums (AAM), “Half of its (AAM) member museums will be using devices in some way by the end of the year.” Current museum apps are utilizing the technology to deliver audio tours, maps, schedules and wall card information in one place. Apps like the American Museum of Natural History’s “Explorer” app, and The Solomon R. Guggenheim’s “Maurizio Cattelan” app, have attracted praise in the museum world. The Minneapolis Institute of Art’s

“iAfrica” app focuses on the museum audience, providing tools and surveys to attract and retain visitors.

The Literature shows that mobile technology provides a bright future for cultural institutions. However, some museums have proven slow to adopt new technologies, even as the use of mobile technology has accelerated into our culture. As the younger generation ages, museums must accelerate their adoption to remain relevant.

The data presented in The Nielsen “State of the Media: The Mobile Media Report,” and The American Association of Museums “2011 Mobile Technology Survey”, illustrates the movement of smartphone technology trends in the United States, and smartphone application usage in museums. These reports are important studies that give statistics that museums considering mobile technology can use.

The Nielsen report surveyed over 300,000 mobile users to provide important data about the types of platforms and applications currently leading the mobile industry. According to Nielsen, the percentage of cell phone owners using Smartphone owners has more than doubled in two years jumping from 18% in 2009 to 44% 2011. The majority of these users are between the ages of 18-34. This is a critical demographic for cultural institutions now and in the future. It must be the priority in the programs and marketing strategies. The majority of this age group owns their own devices, which is important to the cost consideration of implementing applications.

The Nielsen report also provides important information about leading smartphone providers, and the most popular applications. According to Nielsen, the Android OS controls the largest share of the operating system market, but Apple is the top smartphone manufacturer in the United States. These two providers also dominate application downloads with Apple iPhone users having an average of forty four apps on their phones, and Android users having an average of thirty two applications per cell phone. The report also shows that 63% of these applications are “discovered” through a direct search of application stores.

The final statistics of the survey look at the ability of devices and applications to evolve. The opportunities for applications to fill certain needs grow with the invention of new technology. When considering smartphone statistics, cultural institutions must examine the big picture. Demographics, phone models, and top applications are all important considerations when developing applications. High costs and time can often deter an institution, but if trends continue to move forward, it will be hard for institutions to ignore this technology.

The American Association of Museums: 2011 Mobile Technology Survey surveyed 2,285 AAM members. These members, represent 1,090 individual museums included some engaged and some not engaged in mobile technology. This report gave insight into the attitudes and decisions of museum professionals toward mobile technology. According to the report, less than half of AAM museums (42%) engage in some form of mobile technology. When those without

mobile technology were asked what specifically deterred them, the main responses included lack of mobile budgets, insufficient staff time and lack of visitor demand.

Those museums that did identify as having mobile technology cited various goals when engaging in the new technology. Most institutions mentioned increasing visitor engagement as a main reason for implementing mobile technology. Marketing the museum, access for a broader audience and meeting visitor technology were also cited as main goals.

According to the report, the longevity of mobile technology and the challenges associated with it are important factors to both users and non-users of mobile technology. In general, museum professionals agreed that this technology is not a fad. However, they see a lack of knowledge about mobile platforms and structural barriers as main threats when it comes to this technology. Respondents also cited funding, internal resource, and time commitment as major challenges. Interestingly, however, only 6% cited visitor demand as a major challenge.

The report illustrates that museums do not feel there is a lack of demand for mobile technology among visitors. According to AAM, the majority of respondents (mobile and non-mobile users) were highly interested in access to more information about the subject. The respondents were especially interested in case studies of existing applications and research about the app usage habits

and preferences of mobile users - information critical to the development of their own mobile programs. A need targeted, in the thesis.

Each report provided important information regarding smartphones and smartphone applications. The statistics surrounding current trends of mobile technology, and the future of the technology, strengthen the belief that mobile technology will continue to grow within cultural institutions. The majority of museums viewed mobile technology as an important part of the future, and though many issues may arise, they are interested in moving forward.

The case studies presented in this thesis focused on museums from the Greater Philadelphia region and illustrate excellence in the development and use of mobile technology. Smartphone applications developed for the Rodin Museum, the Philadelphia Zoo and the PA Markers application can serve as resources and models for other institutions. The Rodin Museum case study provided a look at the history of technology in the museum. Marla Shoemaker provided information about the development of the museum's "on-site and off-site" experience that used the museum's mission and goals to target an adult audience. The well designed Rodin app is easy to use and provides the tools necessary to have a guided, well informed trip to the Rodin. The app gives visitors the option to learn additional information about various stops, and also encourages them to connect and share their experiences over social networks. The Rodin app has been very successful, with over 900 downloads in the 2 months since its release.

Institutions looking to make an application that engages users during and after a visit should use the Rodin application as a model

The Philadelphia Zoo application goal is to be a resource for all its members, but especially for visitors with small children. The application differs from the Rodin and the PA Markers apps, as it is not free but costs only \$1.99 to download. The fee helps offset the cost of development and implementation, as budget constraints are an issue. This application is a good example of the technology acceptance model (TAM), because it is easy to use and offsets costs. The GPS-enabled provides visitors with live parking updates. In addition, it lists information about daily events, and additional information about the animals, such as feeding schedules. According to Jeff Paolini, the main goal of the current app is to provide the tools to make a visit as simple as possible, an important goal for any institution, but especially for one catering to families with young children. The Zoo, like other institutions, cites budget as a main constraint, but has overcome that obstacle by creating a model application, that benefits its users.

Anyone who has ever stopped at one of the over 2000 Pennsylvania roadside historical markers, can appreciate the PA Markers app. Another excellent example of TAM, the app is easy to use and provides detailed information “on demand” for over 500 of the Markers. The application not only provides location and text, but also gives visitors a deeper understanding of each individual story. The application directly engages its target audience, and is



constantly updated to continue expanding its educational value. PA Markers app is unique because it is not directly related to a specific institution, making it a model for museums interested in developing apps in partnership with other institutions. Partnerships lessen the burden of budget and staff constraints frequently cited as barriers to development and are explored in more detail in the recommendations section of this thesis.

While it is important to consider prominent applications in the region, it is just as important to consider why some institutions have not elected to implement mobile technology. The Franklin Institute, the most visited museum in the Commonwealth of Pennsylvania, does not currently have a smartphone application. The Franklin currently does not see an application as something that could provide fiscal benefits to the museum, but instead as an opportunity for the visitors. The Franklin does however see their museum developing some mobile experience in the next two years.

The Wharton Esherick Museum, a small museum outside Philadelphia, also does not currently have a mobile experience. Their lack of mobile website or application however comes from a lack of funds and the staff to support its development. However, the directors at Wharton do feel that their museum could benefit from an application, and dream of an app that could address certain issues within their institution.

Museums in Philadelphia with mobile experience and those without are all important models when considering mobile technology. Those with a mobile

presence have shown that there are many benefits to having mobile technology. Though there are constraints, museums that can overcome budget and staffing issues should consider implementing this technology. The opportunities for post-visitor engagement and possible partnership opportunities will benefit museums in the long run by providing new channels for communication and access to new audiences.

History has proven that technology always changes. Though there is always the possibility that certain technology can be considered a “fad”, the data studies showed that rapid adoption trends for mobile technology continue moving forward, and museum professionals agree that this technology will be important in the future. As visitors begin to expect the added value of mobile applications, those museums without mobile offerings risk decline with the changing demographic. Moving forward, museums need to weigh their options and consider the possibilities for smartphone technology in their specific institution.

## **RECOMMENDATIONS**

Based on my findings, I strongly recommend that museums and cultural institutions consider implementing Smartphone applications. Institutions should evaluate their individual situation to determine whether or not an application is currently viable, and if not, what must change to make it viable. If constraints prevent the development of Smartphone applications, institutions at the very least make sure their websites are mobile optimized and that the content serves some of the functions of the missing app. By this I mean, that when the site is accessed from a mobile device, the museums most important information is presented in a mobile list form, viewable from a Smartphone type device.

When considering applications, I recommend that museums take a few different steps. First, institutions should ask themselves a set of questions to determine the feasibility of developing and implementing an app. These questions, which I have listed below, will determine if the individual institution has the need and the means to support a Smartphone application. If an institution determines they do want to implement an application, I recommend that they create a strategy that targets their specific needs.

Finally, I recommend various resources for Smartphone developers, again listed below, that institutions can utilize to further develop their applications. I have also listed recommended resources for those institutions that cannot sustain an application, but want to make their website mobile-friendly.

In order for museums to determine their needs as an institution, I recommend that they answer the questions presented in this assessment list.

### **Museum Smartphone Assessment:**

#### **1. Audience Specific Questions:**

- Who is the target audience? Will that change in the future? Who are your museum's current and future target audience?
- Does the current or future target audience fall into a category of Smartphone users?
- Is there a demographic that you have been missing and want to reach?
- Does your Institution have a need for increased visitor engagement?
- Would your audience be receptive to new technologies or device?

#### **2. Institution Technological Specific Questions:**

- Have you had success with other types of technology?
- Does your museum currently provide an audio tour on a different device, aside from Smartphones?
- Does your museum have Wi-Fi? If not, do you have funds to equip the museum with Wi-Fi?

#### **3. Budget and Development Specific Questions:**

- Are there readily available funds for Smartphone development?
- If not, could funds be reallocated for Smartphone development?
- Is there staff available to lead the development of the application, and continue updates after it has been created?
- Could your museum benefit from a mobile giving program that could target audiences not reached by traditional methods (mail, print media, radio or TV ads)?

- Would it be a benefit if visitors could use the app to apply for membership while at the museum (avoiding having to return to the main lobby or waiting in line at the membership counter)?

#### **4. Institution Need Questions:**

- Does your museum have a need unique to the collection type or audience that can be filled by the app?
- Is there a global need your museum could fill?
- Are your direct competitors or neighbor institutions offering this technology?
- Do you already use social networking to connect with different audiences?
- Is there a potential for partnerships with other neighboring institutions for applications?

If after answering these questions, museums determine that they have a need and the means, the institution should consider implementing a Smartphone application. The benefits of addressing issues such as visitor engagement, mobile giving or even membership, could provide value beyond the costs of developing the application. By finding the time, staff and budget to create an app, institutions will put themselves on the forefront of this technology.

Once the institution decides that it needs an application, the next step would be moving forward and creating a strategy for developing a smartphone application. For those institutions looking to develop a smartphone application, I recommend that they prioritize and strategize their individual institution needs and goals.

Specifically museums should consider what type of application they are going to make, and what the application will include. First, the institution should answer these specific questions:

1. Will the app be provided free of charge or at a cost?
2. What is the goal for this application? Will it be an on-site experience, off-site experience, or both?
3. At which demographic or audience is this application targeted?
4. Does the museum have Wi-fi, and is it open to visitors?
5. On which platforms will your application run?
6. Will visitors be able to rent devices, or do they need to provide their own?
7. Where can visitors download this application? Will the app be available from the device manufactures market place or from the museums website?
8. What is the budget for this application?
9. Are there employees on staff capable of this type of development work or available to work with an outside development company?
10. After development and implementation, who will provide ongoing technical support and content updates? Who on your staff will be responsible for development, implementation, and content updates?

Once institutions answer these logistical questions, they need to decide on what the app will specifically offer its users. There are many different needs that museums can address, and the opportunities will vary with each institution. Some considerations for museums include:

1. What type of content will the application include? This will vary by the individual institution. A fine art institution may elect to include an audio tour about prominent pieces, and give its users an opportunity for expanded learning such as more information, pictures or video. A small historical house

may elect to include audio or videos of oral histories.

2. Will there be content for different demographics? Will your specific institution have parts of the application geared towards children? Institutions like a science and technology museum may elect to have engaging games that parents could present to their children for additional learning.
3. Are there problems that could be addressed with an application, such as navigation or parking? Institutions could choose to include interactive maps, or live parking updates to help visitors navigate the institution during their visit.
4. What types of rich media can the application provide (games, video, and pictures)? Will the application provide opportunities for advanced learning? Can users link with online museum resources or other websites from this application to further their experience? For example, could teachers pull up resources on the application to help with a school tour, or for post-tour engagement in the classroom?
5. What types of social networking opportunities will the application provide? Examples include allowing visitors to post pictures from the application to different sites, such as Facebook, Twitter or Instagram, or being able to send their own user photos to the institution.
6. Will the application provide an opportunity for visitors to become a member? How will the application prompt this? Can they pay for a membership from the application, or does it link them back to the website?

The final part that museums must strategize is post-visitor engagement. An important aspect of ongoing improvement involves tracking the effectiveness of their application, and creating opportunities for post-visit conversations.

1. Will the application prompt visitors to take surveys or provide feedback? How will this information be sent to the museum and what specifically will it survey?
2. Will the application have the ability to prompt users of new updates to the application? For example, museums could potentially create interactive calendars that could alert users of new exhibitions or programs happening at the museum.

Mobile devices, through their relative affordability have helped bridge the digital divide for the public, and can do the same for museums. Museums should at a minimum seek to understand how they could utilize this technology to assist in delivering their mission, enhancing visitor experience, and providing the opportunity for additional nodes of engagement for smartphone users.

### **Resources for Smartphone Application Development**

Once museums and other institutions have made the decision to pursue an application these institutions must take the next step and begin developing the application. I have listed resources below, focused broadly and in the Philadelphia area that will be helpful for institutions exploring Smartphone applications.

**1.** The iOS developer library for Apple Smartphones contains resources for developing applications for the iPhone, and also for developing universal applications.

iOS App Programming Guide: Advance App Tricks. 19 September 2012. 14 November 2012

<<https://developer.apple.com/library/ios/#documentation/iPhone/Conceptual/iPhoneOSProgrammingGuide/AdvancedAppTricks/AdvancedAppTricks.html>>

**2.** In 2010, The Greater Philadelphia Cultural Alliance released a report that provides information on mobile app development firms in the area. The report presents resources to help arts and culture groups who seek information on mobile applications.

Group Of Minds. 8 April 2011. 15 November 2012

<<http://groupofminds.com/articles/arts-marketing/greater-philadelphia-cultural-alliance-releases-groupofminds-mobile-app-vendor-selection-research/1180>>

**3.** Mobile Orchard is a popular blog that is frequented by mobile developers. The website updates often with tips and tricks and would be a good beginning resource for institutions moving forward.



Mobile Orchard. 15 November 2012 <<http://mobileorchard.com/>>

**4.** Big Nerd Ranch is a website that provides training, consulting and literature on application development and company training. The website boast a commitment to education, especially in the field of application development.

Big Nerd Ranch. 2012. 15 November 2012  
<<https://www.bignerdranch.com/index>>

**5.** App Design Vault is a website that hosts thousands of application templates. These templates can be used to create applications without hiring outside designers. This could be especially useful for low budget, in house applications.

App Design Vault. 20 November 2012 <<http://www.appdesignvault.com/>>

**6.** Urban Airship is a website that powers push notifications, in-app purchases, and subscriptions for mobile applications. Urban airship could be used when implementing mobile giving, or visitor evaluations through museum applications.

Urban Airship. 2012. 20 November 2012.<<http://urbanairship.com/>>

**7.** Keynotopia is a website that provides cheap prototypes for various applications. It also provides templates, tutorials and other applications.

Keynotopia 2012. 20 November 2012<<http://keynotopia.com/>>

**8.** The iOS 6 developers Cookbook, author Erica Sadun, provides solutions for iOS 6 developments. The book, gives tutorials and information on interface elements, graphics, touches, and views.

Sadun, Erica. *The Core iOS 6 Developer's Cookbook*. Boston: Addison-Wesley Professional, 2012. Print.

**9.** Programming in Objective- C is a renowned programming book that makes programming simple for even beginning developers. The book provides tutorials that teach concepts without requiring developers to understand underlying programming techniques.

Kochan, Stephen G. *Programming in Objective-C*. Boston: Addison- Wesley Professional, 2011. Print.

**10.** Learning Cocos 2D is a resource that provides tutorials for creating simple games for smartphones. Popular games such as Tiny Wings and Angry Birds

were made using Cocos 2D.

Strougo, Rod and Ray Wenderlich. *Learning Cocos2D: A Hands-On Guide to Building iOS Games with Cocos2D*. Boston: Addison- Wesley Professional, 2011. Print.

### **Resources for Mobile Website Development**

For those institutions that do not have the ability to develop a smartphone application, they must ensure that a mobile version of their website exists, preferably one that automatically detects the user device. Mobile websites allow visitors to access key information about your institution, such as times, prices and directions, on a mobile friendly platform. Often websites that are not mobile compatible do not properly function on smartphone browsers or the text is so small as to be unusable, and thus prevents users from attaining proper information. To create these websites, museums must consider responsive web design.

Responsive web design is an approach to website design that creates the best possible viewing experiences for its user. Meaning, institutions could potentially use this approach to create a mobile website experience that is compatible with both mobile phones and newly popular, tablets. According to mashable.com “tablet sales are expected to exceed 100 million” in 2013. With mobile phone and tablet usage on the rise as the web browsing platform of choice, institutions will need to optimize their websites to be viewed on those platforms.

To optimize this effort, technology institutions should consider having a mobile website that is automatically recognized by a browser when accessed.

Meaning, when the museum website is searched on a mobile phone or tablet, the website will recognize what type of device is gaining access, and switch the mobile design. This way users will be able to browse the website with ease.

In comparison to smartphone applications, mobile websites present an option at a lower cost, with an easy platform for updates. Institutions can create these websites in-house and update information more frequently than they could on a smartphone application. These websites do have certain disadvantages though. Image size, videos and interactive content may not run as well on these designs, and thus limits what can be utilized on the website. In the end, it is not whether or not museums should use this technology, it is more about how they can stay relevant and be able to communicate their mission to visitors through the latest technology. As smartphones and tablets continue to grow, a lack of mobile website will put institutions at a great disadvantage.

Those institutions that have not set up mobile browsers should consult the following resources:



**Scan me to see some examples!**

1. *What the Heck is Responsive Webdesign?* is an online presentation that presents the importance of designing for multiple platform. The presentation gives examples of popular models, resources, and best practices.

What The Heck is Responsive WebDesign. 21 November 2012.  
<<http://johnpolacek.github.com/scrolldeck.js/decks/responsive/>>

2. Duda Mobile is a website that makes creating a mobile website quick and simple.

Duda Mobile. 21 November 2012. <<http://www.dudamobile.com/>>

3. Make Your Site Mobile Ready Without Creating a Mobile Site, an article by David Gitonga, gives recommendations for how to update a website to be mobile ready, without creating an actual mobile site. This information could be used as a quick fix for institutions who don't currently have the time to create a mobile website.

Gitonga, David. *Make Your Site Mobile Ready Without Creating a Mobile Site*. 6 June 2012. 21 November 2012. <<http://www.techrepublic.com/blog/smbit/make-your-site-mobile-ready-without-creating-a-mobile-site/259>>

### **Unique Resource for Smartphone or Mobile Development**

Recognize that employing either smartphone apps or mobile websites brings the museum to a new interactive experience with their audience. The web

offers a special opportunity to actually engage the audience in the development, improvement and even the funding of apps or mobile sites. This approach can not only improve the final product, but also address shortfalls in funding or staffing.

This activity comes under the general heading of ‘Crowdsourcing’. Jeff Howe, a contributing editor at Wired Magazine, defines Crowdsourcing as “...the act of taking a job traditionally performed by a designated agent (usually an employee) and outsourcing it to an undefined, generally large group of people in the form of an open call.” (Condon)

Using the web, museums that lack marketing research departments or fundraisers can quickly and inexpensively survey users on app ideas, mobile page examples, etc. to obtain feedback that was impossible in the past. In a Wired article, Howe describes how the National Health Museum benefited from the crowdsourcing-based iStockPhoto website. Institutions can also employ a variant of crowdsourcing called ‘crowdfunding’ to ask many, many people for small donations to fund focused efforts that would have exceeded their internal budgets. The website Kick Starter ([www.kickstarter.com](http://www.kickstarter.com)) provides mechanisms for crowdfunding. It has helped a small museum near Seattle to fund new exhibits.

### **Do and Don'ts: Tips for Clients and Providers**

- **Do** create a strategy prior to development
- **Do** know your audience and create engaging content for them
- **Do** keep it simple
- **Don't** create a mobile experience just to have one, create one for a purpose
- **Do** consider measuring effectiveness and usage early
- **Don't** make the user work harder to use the app than necessary to
- **Do** design the app to be intuitive and user friendly
- **Do** recognize opportunities within your organization and with outside sources
- **Do** avoid awkward pop ups and advertisements
- **Do** ensure that user privacy concerns are addressed
- **Do** recognize that you are the museum expert, the web developer is the software expert – Don't allow the web developer to make content decisions that you have not approved!
- **Don't** assume that users have used this technology prior to their visit
- **Don't** underestimate local competition. An app that helps solve parking problems or makes it easy for families to find restrooms might encourage repeat visits.
- **Do** consider partnering with other local institutions. Some developments benefit by “economies of scale”, which can allow several small institutions to pool resources to achieve a mobile presence that would outstrip the resources of each individual institution.

- **Do** consider crowdsourcing as an option for development
  - **Do** use crowdfunding as a means for fundraising for application development
  - **Do** use crowdsourcing as a way to fill staffing gaps

## **IMPLICATIONS FOR FUTHER RESEARCH**

Based on my research, I feel that the use of Smartphone applications and mobile websites by museums is in its very early stages. There is still much to explore and learn about creating engaging content.

We need more research on the theories behind application usage across different generations and demographics. Research on why visitors do or do not use applications could provide significant benefit to new application developers in the field. Research based on content and what best engages individuals would also be interesting.

Museums are at the forefront of an exciting time. Assuming trends continue, mobile development will only become more popular and useful. Museums must explore and implement this technology to remain relevant. The newly released 2012 American Alliance of Museums mobile survey gives new data and insight into the trends within museums.

Further research on mobile websites will also be important for future development. As mobile trends continue to increase, it will be important for institutions to adapt their websites to be compatible with new technologies, such as the tablet. Mobile websites are both simple to make and easy to update, and work across all browsers. As these websites grow in features, it will be interesting to see how they can be used in lieu of smartphone applications.



## WORKS CITED

- Atkins, Leslie J. and Lisanne Velez and David Goudy and Kevin N. Dunbar. "The unintended effects of interactive objects and labels in the science museum." *Science Education*. Print. Jan 2009. 24.
- Barni, Dominique. " The Handheld Museum: Mobile Devices & the Visitor Experience" *Wordpress*. Web. 31 May. 2011. <  
<http://museumsandmobiledevices.wordpress.com/>>
- Brenner, Joanna. "Pew Internet: Social Networking." *Pew Internet*. Web. 13 Nov 2012. <<http://pewinternet.org/Commentary/2012/March/Pew-Internet-Social-Networking-full-detail.aspx>>
- Brustein, Joshua. "A Digital Art Space." The New York Times. Web. 22 June 2012. < <http://www.nytimes.com/2012/06/24/nyregion/moma-art-lab-offers-a-digital-art-space-for-children.html>>
- Brustein, Joshua. "An Extra Set of Eyes At the Museum." The New York Times 20 Nov. 2011: 10. *OmniFile Full Text Mega (H.W. Wilson)*. Web. 4 Oct. 2012
- Chaitonos, Koula and Canan Blake and Eileen Scanlon and Ann Jones. " Museum Learning via social and mobile technologies; (how) can online interactions enhance the visitor experience?" *British Journal of Educational Technology*. Print. September 2012. 802-819.

- Chan, Patrick Y. K. "An Empirical Assessment of a Modified Technology Acceptance Model." *Journal of Management Information Systems*. 1996, 185-204.
- Condrón, Seamus. "Badges: And Then There Were Three." *Crowdsourcing*. Web. 10 May 2010 < <http://www.crowdsourcing.com/>>
- Davis, F. "Perceived usefulness, perceived ease of use, and user acceptance of information technology." *MIS Quarterly*, 13, 3 (September 1989), 319-340.
- Davis, F.; Bagozzi, R.; and Warshaw, P. "User acceptance of computer technology: a comparison of two theoretical models." *Management Science*, 35, 8 (August 1989), 982- 1003.
- Donnelly - Smith, Laura. "Get Smart(Phones.)" The Chronicle. *The American Alliance of Museums*. Web. June 2010 < [www.aam-us.org/pubs\\_mn\\_get-smart.cfm.html](http://www.aam-us.org/pubs_mn_get-smart.cfm.html)>
- Jacobson, Sara. "Guggenheim's First App: Maurizio Cattelan Retrospective." *Core77*. Web. 7 Nov 2011.  
<[http://www.core77.com/blog/exhibitions/guggenheims\\_first\\_app\\_maurizio\\_cattelan\\_retrospective\\_\\_20959.asp](http://www.core77.com/blog/exhibitions/guggenheims_first_app_maurizio_cattelan_retrospective__20959.asp)>
- Grobart, Sam. "Multimedia Tour Guides on Your Smartphone." The New York Times. Web. 16 March 2011. <  
[http://www.nytimes.com/2011/03/17/arts/design/apps-give-museum-visitors-multimedia-access.html?\\_r=0](http://www.nytimes.com/2011/03/17/arts/design/apps-give-museum-visitors-multimedia-access.html?_r=0)>

Kennedy, Randy. "Art and Smartphones: The Met Remakes Its Web Site." *New York Times* 27 Sept. 2011: 3. *OmniFile Full Text Mega* (H.W. Wilson).

Print. 21 Sept. 2012.

Mulder, Steve. "Optimizing for Mobile Web Leads to Increased Listening and Reading." *NPR Digital Services*. Web. 11 October 2012. <

<http://digitalservices.npr.org/post/optimizing-mobile-web-leads-increased-listening-and-reading>>

Mobile in Museums Study 2012. *American Alliance of Museums*. 2012. Fusion

research and Analytics, LLC. December 2012. <[https://aam-us.org/docs/.../mobilemuseums2012-\(aam\).pdf](https://aam-us.org/docs/.../mobilemuseums2012-(aam).pdf)>

"Nokia Unveils World's First All-In-One Communicator For The Americas." *Nokia*.

Web. 12 September 1996. < <http://press.nokia.com/1996/09/19/nokia-unveils-world%C2%92s-first-all-in-one-communicator-for-the-americas/>>

Parry, Ross. *Recoding the Museum: Digital Heritage and the Technologies of Change*. London: Routledge, 2007. Print

Jobs, Steve. "Transcript of the iPhone Keynote by Steve Jobs." *European*

*Rhetoric*. Web. 2007. < <http://www.european-rhetoric.com/analyses/ikeynote-analysis-iphone/transcript-2007/>>

Jones- Garmil, Katherine eds. *The Wired Museum: Emerging Technology and Changing Paradigms*. Washington D.C.: American Association of Museums, 1997. Print

Allison, Jesse and John Fillwalk. "Hybrid Realities: Visiting the Virtual Museum."

*Museums and the Web 2009*. Toronto: Archives and Museum Informatics, 2009. Print.

"Overview and Mission." *The Philadelphia Zoo*. Web. 2012.

<<http://www.philadelphiazoo.org/about/AboutZoo/Overview---Mission.htm>>

Parry, Ross. *Museums in a Digital Age*. London: Taylor and Francis, 2010. Print

Sayre, Scott and Kris Wetterlund. "The Social Life of Technology for Museum Visitors." *Visual Arts Research*. The Board of Trustees of the University of Illinois, 2008.

Sharpe, Emily. "There Really is An App For Everything." *Art Newspaper* 16.

(2011): 37. *OmniFile Full Text Mega (H.W. Wilson)*. Web. 4 Oct, 2012.

Shoemaker, Marla. "Rodin Smartphone Application Interview Transcription." Julia Dougherty. September 2012. Print

"Smartphone Account for Half of all Mobile Phones, Dominate New Phone

Purchases in the US." *Nielsenwire*. Web. 29 March 2012. <

[http://blog.nielsen.com/nielsenwire/online\\_mobile/smartphones-account-for-half-of-all-mobile-phones-dominate-new-phone-purchases-in-the-us/](http://blog.nielsen.com/nielsenwire/online_mobile/smartphones-account-for-half-of-all-mobile-phones-dominate-new-phone-purchases-in-the-us/)>

Smith, Aaron and Janna Anderson and Lee Rainie. "The Future of Money in a Mobile Age" *Pew Internet Research*. 17 April 2012. <

<http://pewinternet.org/Reports/2012/Future-of-Money/Overview.aspx>>

State of the Media: Mobile Media Report 2011. The Nielsen Company, 2011.

September 2012. <<http://www.nielsen.com/us/en/insights/reports->

[downloads/2011/state-of-the-media--mobile-media-report-q3-2011.html](http://www.nielsen.com/us/en/insights/reports-downloads/2011/state-of-the-media--mobile-media-report-q3-2011.html)>

Thomas, Selma. "Media in The Museum: A Personal History." *Curator* 50.1

(2007): 159-165. *OmniFile Full Text Mega (H.W. Wilson)*. Web. 4 Oct.

2012.

2011 Mobile Technology Survey. American Association of Museums, 2011.

Fusion Research and Analytics, LLC. September 2012. <[www.aam-](http://www.aam-)

[us.org/...museums/aam\\_mobile\\_technology\\_survey.pdf](http://www.aam-us.org/...museums/aam_mobile_technology_survey.pdf)

## **APPENDIX**

### **Films to Smartphones: The History of Technology in Museums**

#### **Film**

In the early stages of media in museums, institutions began to adapt film into their exhibitions. Selma Thomas' article "Media in the Museum: A Personal History" describes film as "a grand presentation tool showing off a depth of field, an accuracy of color, clarity of sound [...]" (Thomas). With this form of media, visitors could view alone or gather in groups for a new type of educational experience. Along with the increased use of film came the need for high quality content and presentation. Museums explored ways to present an image or a narrative with a specific dialogue, targeted at groups, delivering targeted information.

A common theme in the literature about this implementation of technology is that along with the benefits came problems. For film, production costs, dirty film reels and unreliable equipment caused problems and made the medium costly. The development of digital film technology is a major improvement in the production and use of film in museums.

#### **Computers and Laser Disks**

The 1970s ushered in a new era of museum media with new developments and increased availability of the computer. The laserdisc, originally invented for the United States Army, gave museum professionals a new way to produce and implement interactive programs. Visitors could now exert a certain level of control over the information recorded on laserdisc interactives. In her

2007 article, Thomas notes, “Visitors could choose a selection from a pre-programmed menu and pursue a more in-depth relationship with an idea, an artifact or an individual.” (Thomas) This new visitor-museum relationship created more personal experiences for visitors and added to the amount of information museums could provide. The precursor to CD and DVD technology, laserdiscs were more user-friendly and less subject to the problems associated with older film projector technology.

### **Audio Guides**

Parallel to the creation of film and digital media came the development and usage of early audio tours. Through the 1980s, museums offered fixed-route audio tours to visitors on museum owned equipment. These tours were pre-recorded narratives that played continuously as visitors walked through the exhibit. Walkman devices and other small, personal players made these tours viable and attainable. The development of digital recording technology was a major step forward in audio tours. These devices gave the visitor the ability to decide where to stop, view and listen to information about the exhibit.

Dominique Barni’s May 2011 article, “The Handheld Museum: Mobile Devices and the Visitor Experience,” discusses the development of digital recording devices for audio guides. The paper describes the 1990s and early 2000s, “when random access tours delivered via digital audio wands, cell phones and digital musical players were king” (Barni). These developments illustrate how

quickly technology can change and redefine what visitors expect and accept as quality exhibits.

The Technology Acceptance Model or TAM provides an in depth explanation for visitor outlook toward museum mobile devices.

### **Technology Acceptance Model**

The Technology Acceptance Model (TAM), developed by Fred Davis, explains computer-usage behavior. Davis explains the goal of TAM as follows:

To provide an explanation for the determinants of computer acceptance that is general, capable of explaining user behavior across a broad range of end- user computing technologies and user populations, while at the same time being both parsimonious and theoretically justified. (Davis, 985)

Davis breaks the theory into two “constructs,” *perceived usefulness* and *perceived ease of use*. The two constructs refer to whether a user believes a certain piece of technology will help improve job performance (perceived usefulness) and whether a particular technology is “free from effort”(Davis, 320)(perceived ease of use). This theory benefits cultural institutions in developing new technologies because it is important to consider the visitor’s approach toward devices used inside the museums. The number of visitors deciding to use a device could be increased by the implementation of devices that are perceived as familiar or not confusing or difficult to operate.



### **Museums and The World Wide Web:**

Katherine Jones- Garmil states it perfectly in the book, The Wired Museum,

These are exciting times for museums. With new technologies such as digital imaging and local and global networks, it is now practical to capture and share information on collections in ways that have only become possible in the last few years. (Jones-Garmil 35)

Though published in 1997, The Wired Museum's essay's still resonate with today's technological generation.

As a resource, the Internet is unparalleled in its impact in today's cultural institutions. Limitless resources and growth potential create an opportunity for institutions to connect on more levels and provide a range and depth of information not possible before in museums. One author in the book, Maxwell Anderson knew that "today's prognostications will fuel tomorrow's ironic reminiscences, which is both a daunting challenge and an exhilarating fact of the electronic environment "(Anderson 15). However, in the face of this excitement and the possibilities, museums and cultural institutions have a slight disadvantage. Many smaller institutions do not have the human or financial capital to stay up to date on technological trends easily. Given the role digital technology currently plays and will play in the lives of the general and museum-going public, these trends are at the forefront of museums success. With the

introduction of the Internet, these institutions were given new opportunities for outreach and education.

In 1993, the introduction of Mosaic and soon after, Netscape Navigator ushered in a new era of opportunities for business. In another recurring theme in the literature, cultural institutions followed the lead from business and also used these tools to improve their operations and communications allowing staff “to communicate with one another as never before” (Anderson 18). Interoffice communication improved as well as communication with large numbers of outside resources, other institutions and visitors could be made with a click of a mouse. Emails and online newsletters supplemented the use of brochures and newsletters; updates to information now took only minutes, and could reach thousands of potential visitors.

Along with user-friendly browser technology, came the opportunity to integrate museum resources with the Internet or World Wide Web. Just as they had to do with film, institutions were now challenged to create user-friendly, engaging content compatible with web technology. Diane M. Zorich remarks,

As more museums become content providers on the Internet, they need to ask what they can do to offer context that will add true value to their content. How can museums usefully contribute information in a networked environment? How can they participate in a way that distinguishes them from other providers? (Zorich 172)

And again adopting web technologies developed for other sectors of society, the potential use for museums and other cultural institutions grew with every new development. One example is the Exploratorium: the Museum of Science.

The Exploratorium became one of the first institutions to utilize the World Wide Web. Along with a general website, the museum began promoting scientific events online, such as viewing eclipses and exploration trips around the globe. Opportunities similar to these continued to develop with the growth of the web. Similarly, new opportunities for visitor interaction and user generated content arose.

### **User Generated Content: Visitors Are Given a Voice**

Prior to the creation of the Internet, museums and cultural institutions found multiple ways to allow individuals to interact and create content in the institution. In Recoding the Museum, Ross Parry states how the museum has already given visitors a voice,

[...] The museum had already been prepared to let go of both its authorship and its authority. People's shows' community galleries, visitor books, comment boards, gallery tours [...] and visitor evaluation, had all given museum audiences the opportunity to participate and to express themselves in the museum and to make their views and responses known. (Parry 109)

With the web came the opportunity to expand this conversation to a broader, possibly more diverse external audience. On a digital network, all visitors could

become authors and user-generated content grew with each new development. Visitors from across the globe could now leave comments, participate in surveys, create exhibitions and access online collections. Web 2.0 created a place where voices could be heard and preserved; the online museum became as personal as the on-site museum. With the development of cell phones with Internet access, the “Media Museum,” has been taken to a whole new level.

### **The Media Museum:**

As cell phones became mini computers, museums have been presented with the opportunity to communicate through various digital channels, all potentially in the hands of a single museum visitor. Parry describes the emergence of computer technologies as becoming a phenomenon that,

[...] Will become a defining (innate) part of what it is to be a museum. And as the ‘media museum’ acquires more and more properties of the computer, so it will become more and more difficult to see where the museum stops and where the computer begins.

(Parry 136)

In the 21<sup>st</sup> century, cell phone usage, particularly among Americans, skyrocketed. In “A Brief History Of The Mobile Phone”, NPR’s Wendy Kaufman points out how, “back n the early days of cell phones, experts predicted about 900,000 Americans would be using the device by the turn of the century. They were wrong [...] the number as skyrocketed to 100 times that number” (Kaufman). According to Nielsenwire, as of February 2012, smartphones accounted for half

of all mobile phones in the United States. According to Nielsen 49.7% of the United States population owns a Smartphone, which is a 38% increase since 2011. The study showed that there is “increasing Smartphone adoption” with 48% of Smartphone users claiming to use the Android OS device and 32.1% using an Apple iPhone.

The adoption of Smartphone technology among Americans has created an increase in the development and usage of mobile sites, mobile applications and social media platforms. This technology creates a new era of technology in cultural institutions.

Going Mobile  
Interview Questionnaire  
Julia Dougherty

**Name of Interviewee:**  
**Institution:**

1. Could you give me a little background on your museums history and experience with technology and digital tools for visitors?
2. Is your museum currently offering or in the process of developing an on-site or off-site mobile/ smart phone experience?

**If Yes (If No, please scroll down):**

3. In detail, could you explain the main functions of your mobile/smart phone experience?
  - i. Is your experience free, or does it come at an additional cost?
4. Would you consider your mobile experience an on-site experience, off-site experience, or both?
  - i. If an on-site experience, are visitors required to provide their own device? Does the museum offer devices for visitors to use? At a cost?
    1. What considerations about access went into the decision and design of the app?
  - ii. IF an Off-site experience, at what point does the museum target visitors? Before their visit, after or all of the above?
5. What are the main objectives of your mobile experience?
  - a. Are there any objectives to collect visitor information or promote membership?
6. What are the biggest constraints in developing and creating an app?

7. Who creates and maintains the technology and when was it first implemented?
8. What kind of platform does your mobile experience run on?
9. Who would you consider the target audience of these technologies?  
Tourist? Adults? Visitors in general? Ect
  - i. In what ways do you think visitors are using the mobile technology?
  - ii. Have you had problems getting visitors to use the mobile experience? What kinds of issues?
10. When developing the mobile experience, did you keep your museums mission and goals in mind? How?
11. Can you explain how the museum tracks these technologies effectiveness?  
Have there been any prominent trends?
12. Along with current experiences, is your museum in the process of developing any new types of mobile experiences?
13. If budget were not a constraint what would your dream app be?
14. In your own opinion, do you think mobile apps are a good development?  
DO you see them expanding, narrowing or not impacting the access and appeal of your museum or museums in general?
15. Anything else you could tell me about your mobile experience??

**If No:**

1. Has your museum ever discussed the possibility of using mobile or smart phone technology? To what extent?
2. What are the biggest constraints keeping you from developing an app?

3. Do you feel that your museum is at a disadvantage because of your lack of mobile experience?
4. If budget were not a constraint what would your dream app be?
5. In your own opinion, do you think mobile apps are a good development? DO you see them expanding, narrowing or not impacting the access and appeal of your museum or museums in general?
6. Anything else you could tell me about your museum in terms of mobile or smart phone technology??