Considerations and Process in the Development of a Mobile Application for the Jordan Schnitzer Museum of Art

Jessica Irene Hodgdon
Master's Research Project
University of Oregon | Department of Arts and Administration
Research Advisor: John B. Fenn III, Ph.D.
June 2012

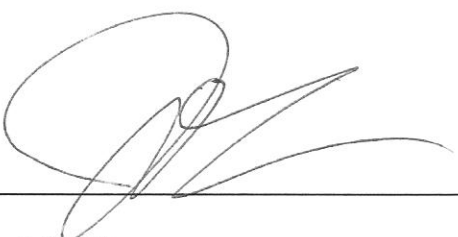## TABLE OF CONTENTS

SIGNATURE PAGE

Submitted: _____

Jessica Irene Hodgdon
Master's Candidate
University of Oregon

Date: _____ 6-7-12 _____

Approved: _____

Dr. John Fenn
Department of Arts & Administration
University of Oregon

Date: _____ 6.7.12 _____

ACKNOWLEDGEMENTS

RESUME

Jessica Hodgdon

214 North Jefferson Street Eugene, OR 97402
323.440.6989
jhodgdon@uoregon.edu

Education

Master's Candidate: MS in Arts Administration, Museum Studies Graduate Certificate
University of Oregon; Eugene, OR
September 2010 to present
Expected graduation: June 2012

BA in English - Creative Writing Emphasis
California State University Long Beach; Long Beach, CA
September 2002 to December 2006
Semester Abroad, Spring 2004, London, UK

Museum Experience

Exhibition Development Student, Jordan Schnitzer Museum of Art, Eugene, OR; September 2011 to June 2012
• Planned "Through Her Lens: Gertrude Bass Warner's Vision of Asia" exhibit as part of small team of four graduate students
• Selected objects for display from museum permanent collection as well as items to be loaned from University of Oregon Libraries Special Collections and Archives
• Conducted research using source materials at the Special Collections and University Archives
• Designed interactive iPad app
• Edited images using Photoshop, recorded and edited audio using Audacity, and combined images and audio to create short videos for use on iPad installed in the gallery
• Painted gallery walls; installed artwork and objects
• Collected evaluation data by conducting visitor observations

Education/SEPIA Intern, Museum of Photographic Arts, San Diego, CA; June 2011 to August 2011
• Assisted in leading photography classes and art talks geared for senior citizens
• Conducted museum tours using VTS techniques
• Developed new curriculum for photography classes
• Performed administrative duties relating to senior programming, including uploading student photos to server, editing grant proposals, and printing handouts and contact sheets
• Set up projector, laptop and photo printers for photography classes and art talks
• Distributed and collected digital cameras in photography classes

Museum Aide, Lancaster Museum/Art Gallery and Western Hotel Museum, Lancaster, CA; June 2005 to June 2007
• Aided in taking down and setting up exhibits, including: storing artwork and artifacts; patching, cleaning and painting walls; hanging artwork; proofreading labels and signs
• Wrote condition reports and loan agreements
• Created items for use in exhibits or city events, including signs and replicas of artifacts
• Completed research in support of upcoming exhibits
• Led tours for local school groups
• Contacted artists and vendors to participate in museum exhibitions and city events
• Planned and led quarterly Kids' Club art activities
• Sold gift shop items and completed gift shop inventory
• Answered phones, made appointments for curator and assistant curator
• Wrote and edited items for quarterly newsletter
• Set up and cleared chairs, tables, and food for exhibition openings and museum events

Gallery Attendant, Norton Simon Museum, Pasadena, CA; February 2008 to May 2008
• Sold audio tours, memberships, and admission tickets
• Tallied cash and receipts in register
• Assembled tour group packets
• Answered visitor questions about museum, artwork, and Los Angeles/Pasadena area
• Informed patrons of museum policies

Education Experience

English Instructor, Nova Group, Koriyama, Fukushima, Japan; June 2007 to October 2007
• Taught private and group English lessons to adults and children
• Planned lessons for students of varying English levels
• Invented new games for children's lessons
• Created ice-breakers and activities for adult student groups
• Documented progress for each student

Writing and Communication Experience

Publicity Coordinator, Cinema Pacific Film Festival, University of Oregon, Eugene, OR; January 2011 to April 2011
• Created copy for use on festival website, printed schedule, and press releases
• Wrote stories about upcoming festival events for publication on local news websites
• Solicited sponsorship from local businesses
• Distributed fliers and information to community at local events
• Co-authored grant proposals for funding
• Picked up and dropped off visiting directors and producers at airport and local hotels
• Acted as support staff at screenings: kept track of tickets sold and amount of space available in theater, ensured films screened without problems, and greeted and assisted film-goers

Technical Writer, Banker's Toolbox, North Hollywood, CA; May 2008 to August 2010
• Created instructional how-to web pages using HTML and CSS
• Wrote, recorded, and edited training videos
• Designed user interface for new software
• Wrote and updated user manuals
• Created internal technical specification documents for new software
• Performed QA testing on new product releases

PR and Marketing Intern, Long Beach Museum of Art, Long Beach, CA; January 2005 to May 2005
• Updated email list and sent out newsletters
• Edited images using Photoshop for website and marketing materials
• Assembled press kits
• Researched new advertising options online
• Organized press clippings and artwork photo slides

Volunteer Projects

Photographer, (sub)Urban Projections, Eugene, OR; October 2011-November 2011
• Took photographs to document (sub)Urban Projections 3 day festival events and promotional projection "art bombings"
• Low-light nighttime outdoor photography
• Edited photos and posted them on (sub)Urban Projections' Flickr and Facebook pages to document and promote events

Volunteer, Oregon Nikkei Legacy Center, Portland, OR; September 15, 2010
• Angels Project Workshop
• Received training on conservation and storage techniques for objects and textiles
• Created foam base with stabilizers to protect a large painted wooden box dated from 1915

Technical Skills

• Experienced with Windows and Mac operating systems
• Microsoft Office (Word, PowerPoint, Excel, Outlook)
• Basic knowledge of HTML and CSS
• Video editing: Techsmith Camtasia Studio, iMovie, Windows Movie Maker, Sony Vegas Pro
• Adobe CS5: Photoshop, Illustrator, InDesign
• Web design: Adobe Dreamweaver and Microsoft Expression Web
• Web 2.0/social media: Facebook, Youtube, Flickr, Twitter, Blogger, Wordpress

Organizations

Member, Emerging Leaders in the Arts Network (ELAN), University of Oregon chapter, 2010-2012
• Planning committee for annual "Beats and Brushstrokes" fundraising event, January-February 2012

ABSTRACT AND KEYWORDS

Museums are always looking for the best way to engage audiences. Mobile technology is advancing quickly and smartphones are quickly becoming commonplace. A museum smartphone application can provide visitors with a more immersive, engaging, and informative experience than can be had with traditional museum learning tools. Mobile technologies are becoming more important as generations of young people are becoming accustomed to absorbing all kinds of information from handheld and electronic devices. By embracing new technologies, museums are indicating that they understand the learning styles and interests of their visitors. Building an application that can run on any smartphone platform will allow the museum to reach the largest possible audience. In this dual research project I read published research in the areas of mobile technology in museums as well as museums and learning and used this information to inform my choices in the building of a smartphone application for the Jordan Schnitzer Museum of Art (JSMA).

Keywords:

Mobile app, museum learning, smartphone, audio guide, visitor engagement, Contextual Model of Learning, mobile technology

CHAPTER 1: INTRODUCTION

PROBLEM STATEMENT AND SIGNIFICANCE

In the spring of 2011 the Jordan Schnitzer Museum of Art (JSMA) expressed a strong interest in developing an application for mobile devices to be used in their galleries. I took on this project with the intention of building a mobile application that will be a valuable learning tool for JSMA visitors. In order to prepare for building this application, I examined research in the areas of museum learning and technology in museums. Ross Parry quotes museologist Tomislav Šola when he claims that the embrace of new technologies must be based in theory, so as to avoid falling into a "technology trap" of pursuing technology for the sake of technology. Parry and Šola are of the opinion that a museum should base its actions on existing theory (Parry 2005, p.333). By rooting my research in the work of museum education experts, I have attempted to provide the rationale for developing museum mobile applications. Even though mobile applications are a relatively new trend in the museum field there is some existing research in this area and there is a great deal of literature published in the more general areas of technology in museums which can be applied to the use of mobile applications in museums.

Museums are always looking for the best way to engage audiences. It is my belief that a mobile application can provide visitors with a more immersive and informative experience than can be had with more traditional and static museum learning tools such as wall labels. With this mobile application I hope to engage visitors in a new learning experience. "Media is already, and will continue to be, critical for interactivity, especially for today's children who are comfortable with technology, and find it easy to use…Media-rich exhibitions create museum-comfort today for tomorrow's museum-

going public" (Dierking and Falk, 1998, p. 59). A recent non-scientific poll reported by Mashable.com claimed that fifty-seven percent of college students use smartphones (Fox, 2011). As the JSMA is located on the University of Oregon campus, using a technology that is familiar to the students will likely make the students feel comfortable in the museum.

It is important that programs occurring at a museum further the institution's mission, and a mobile application has the potential to help the JSMA achieve their mission. The mission of the JSMA is as follows: "The Jordan Schnitzer Museum of Art enhances the University of Oregon's academic mission and furthers the appreciation and enjoyment of the visual arts for the general public" (www.jsma.uoregon.edu). A well-designed mobile application could certainly provide visitors with a great deal of information that could further their appreciation and enjoyment of the artwork on display, thus the development of a mobile application falls within the museum's mission. Because the JSMA's mission is to enhance the University of Oregon's mission, it is pertinent to look at the university's mission statement. One section of the university's mission statement reads as follows: "The university is a community of scholars dedicated to the highest standards of academic inquiry, learning, and service. Recognizing that knowledge is the fundamental wealth of civilization, the university strives to enrich the public that sustains it through ... the acceptance of the challenge of an evolving social, political, and technological environment by welcoming and guiding change rather than reacting to it" (www.uoregon.edu). I found this aspect of the university's mission to be especially applicable to my research project. Mobile applications are still relatively new and thus are not employed universally in museums. Rather than waiting until every museum has adopted this technology, the JSMA is

pushing forward and willing to try something that many museums have yet to attempt. Thus this project is assisting the JSMA and the university in "welcoming and guiding change rather than reacting to it." By moving forward in this way, the JSMA is clearly moving toward its vision statement: "We will become one of the finest university art museums in the world" (www.jsma.uoregon.edu).

This project is quite relevant and timely. As more museums are becoming interested in developing mobile applications, including the JSMA, it is extremely important to take a look at what research has shown to be effective teaching tools in museum learning. I expect that many more museums will be developing mobile applications in the next couple of years and they will want to know the most effective ways to provide information to their audiences.

My hope for this research project is that it will be of great value to the JSMA. I attempted to leave the museum with a mobile application containing interactive activities that will be enjoyed by visitors. The application is relatively easy to change, and I am leaving the JSMA with a list of recommendations for future content for the application; additionally the ease of changing the application will allow the JSMA to update it regularly with changing exhibition information and newly developed content. Ideally the JSMA will continue to use new iterations of this mobile application in upcoming years in order to better educate and engage their visitors.

RESEARCH QUESTION

My main research question is "What is the process of developing a mobile application that will enhance a visitor's learning and enjoyment of a museum exhibition?" Because I consider a mobile application to be a tool for visitors, my

literature review focused on the justification for the use of technology in museum exhibitions. Questions I answer based on my literature review include:

- Why is technology important in museum exhibits?

- Do new technologies aid in visitor learning and/or enjoyment?

- What do visitors want out of a museum mobile application?

Much of my research time was devoted to the actual development process of a mobile application for the Jordan Schnitzer Museum of Art. During the course of this project I asked and answered specific questions for mobile application development, including:

- What types of information should be included on a museum mobile application?

- What should be the overall look and feel of the application?

- How can I use preexisting templates to present different types of information I and still make the application fit the design scheme of the JSMA's other digital media outlets such as their website?

DEFINITIONS

Mobile application – also known as an app. Software that runs on a smartphone, tablet, or other mobile device and performs a specific task.

Smartphone – a mobile phone with advanced computing ability. Smartphones typically include touchscreens, wireless internet access, mobile broadband, GPS navigation, and camera and video capture functions.

Native app – a native app is an application that is built to run only on a single specific operating system. For example, a person may download an iPhone app to use on their iPhone or an Android app to use on their Android phone.

Web app – a web app runs in the browser of any mobile device because it uses browser-friendly code such as HTML and JavaScript.

QR code – short for Quick Response Code, a QR code is a type of barcode made up of square black dots on a white background. Smartphones with a QR code reader installed can scan QR codes to be directed to particular online content.

Meaning-making – the ability of a museum visitor to make information personal to themselves is called meaning-making. Meaning-making implies a visitor has connected exhibition content with their own lives or existing knowledge.

BENEFITS OF THIS RESEARCH PROJECT

The JSMA had an existing interest in developing a mobile application before this project began. This application I worked to develop will provide the JSMA with ways to engage visitors before, during, or after a museum visit. The application will not be released immediately for two reasons: first, most of the audio tour content that the JSMA would like to include does not yet exist, and second, the JSMA needs to find a way to fund this project, as there is a monthly fee for making the application available to visitors. By undertaking this project I have provided the JSMA with a framework for an application that can be updated easily in the future thus it will be ready to launch when the JSMA is prepared to do so. Future visitors to the JSMA will benefit from this project when the application is released because they will be able to engage in a deeper learning experience by gaining new information about objects that interest them.

CHAPTER 2: RESEARCH METHODOLOGY

RESEARCH DESIGN

Literature Review

In order to develop a mobile application that will enhance a visitor's learning and enjoyment I began by conducting a review of the existing literature on the topic of learning in museums as well as a review of literature focused on the use of new technologies in museum exhibition spaces. This research helped me to build a foundation for the types of information I should attempt to include in a mobile application for the JSMA.

Application Comparison

Another integral part of this process of determining which types of information to include in the application took the form of a more subjective type of research: I downloaded many museum mobile applications and explored them, taking notes on what I liked and disliked about each one. I used the design and content of these applications to help me build the JSMA's mobile application.

Meetings with JSMA Staff

I chose the JSMA for this project because I knew that they had an interest in developing a mobile application and I felt that this could overlap with my research. From the beginning I have had frequent meetings with staff members from various departments who had an interest in the development of this application. The input of JSMA staff has shaped the design of this application and their guidance has been invaluable.

Application Development

I used the Toursphere platform to build the JSMA's mobile application. I selected this platform because it was created with museums and heritage sites in mind and it allowed me to build an application using existing templates: I did not need to learn how to write any code for this process. Once I had determined the type of information to include and designed an overall look, I was able to begin adding content to the application and testing it on my own mobile device.

RESEARCHER ROLE

The purpose of this project was to create a mobile application that will be a useful learning tool for visitors to the JSMA and will help the museum fulfill its mission. In order to do this, my research has been both a review of pertinent literature on the topic as well as the actual design and development of a mobile application. Because of these dual aspects to this project, my role as a researcher most closely aligns with what Zina O'Leary calls a "bricoleur." O'Leary describes this type of researcher as a "jack of all trades" and then goes on to describe a bricoleur as "a researcher who sees methods as emergent and dependent upon both question and context. The bricoleur will employ a variety of methodological tools and even create new ones as needed to solve a puzzle or find a solution" (2010, p. 96). This description appears to be an accurate description of my role as a researcher because I needed to utilize a number of different skills throughout the course of this project. I have completed a review of pertinent literature, critically surveyed a number of existing mobile applications, met with JSMA staff members to discuss what types of information should be included in the application,

used Photoshop to create images and other design elements for the application, and built the application using Toursphere.

RESEARCH TYPE

My dual role in this project is as a researcher in museum technology and learning theories as well as a developer of a mobile application for the JSMA. The final outcome of my project is a real and tangible one: a mobile application that may eventually be used by visitors to the JSMA. Because I worked collaboratively with JSMA staff for a specific end-product and my literature review is focused on learning how to best design this end-product, my research can best be described as project-based.

Randy Stoecker defines a project as "a specific implementation of one or more program goals" (2005, p. 64). The JSMA itself can be thought of as the program and the JSMA's mission of "enhanc[ing] the University of Oregon's academic mission and further[ing] the appreciation and enjoyment of the visual arts for the general public" (www.jsma.uoregon.edu) can be thought of as the program goal. This mission is the main goal of the museum and thus the goal of every action undertaken by the museum is to fulfill its mission. This mobile application is a specific device that can be implemented in order to further visitors' appreciation and enjoyment of visual arts, thus helping to accomplish this mission goal. Project-based research was fitting for me because I was excited to be able to combine textual, theoretical research with the creation of a real end-product. I see my role as that of a collaborator with the staff at the JSMA.

RESEARCH CYCLE

Project-based research moves in a cycle. This cycle is made up of diagnosing, prescribing, implementing, and evaluating. Stoeker includes a graphic in his book that

demonstrates the cyclical nature of project-based research; a reproduction of this graphic is included in Appendix A.

Diagnosis is defined as "identifying a change opportunity" (Stoecker, 2005, p. 68). The change opportunity at hand is the opportunity to use new technologies in a museum setting. This opportunity was previously identified by the JSMA and the museum has already embraced the use of technology in the past. Currently the JSMA employs the use of the Guide by Cell program, which provides visitors with audio tour information on their own mobile phones. Additionally, iPads are frequently installed in the galleries in order to provide visitors with additional information about particular objects or exhibitions.

In the prescribing stage one determines which action to take to impact the diagnosis. The JSMA began the prescribing stage in 2011 by expressing an interest in developing a mobile application as a way to continue integrating new technology into the museum. For me personally the prescribing stage centered on my literature review. This literature review provided justification for using technology in general and smartphone applications in particular in a museum setting and guided the shape ultimately taken by this project.

The implementation stage is where the bulk of my work was done. In this stage I planned, built and tested the JSMA's smartphone application. The final stage is evaluation. The Toursphere application developer program I used provides tools for completing evaluation, including user analytics data as well as the option to build a visitor survey into the application. Using these tools will help determine what is and is not working in the application, and the cycle can begin again to develop upgrades. My involvement with this project will end before the mobile application is actually put into

use at the JSMA, thus evaluation and the continuation of the development cycle will be completed by JSMA staff members.

RESEARCHER BIASES

I can admit that I have some personal biases that have influenced this research project. I am interested in new technologies in general and I love finding ways that new technologies can be applied. The thought of a museum mobile application excites me: when I first learned that the Portland Art Museum had developed a mobile application I immediately downloaded it onto my own device and used it when I explored their museum. New technology excites me so much that I think I am likely to be one of the people who would fall into a "technology trap." However, I have tried to put my own personal inclination towards utilizing new technology aside and focus on what other people have to say about its importance. By looking at research into technology tools and learning in museums I hope that I have been able to justify this project. I have attempted to be fair in my review of the literature and address some of the negative consequences of technology. For example, Galani and Chalmers noted that interaction with other visitors decreases when personal mobile devices are used in museums (2010, p.164). Instead of ignoring this concern, I have tried to overcome it by including tips for families in the application, including suggestions for activities parents and children can complete together in the museum.

CONCEPTUAL FRAMEWORK

Using John Falk and Lynn Dierking's museum education theories as a base, I attempted to show that the growing trend of developing mobile applications is not a technology trap as may be suggested by some. Through my review of the literature I

have confirmed my belief that these applications have the potential to engage audiences and give visitors a more immersive and deeper learning experience.

Drawing on Falk and Dierking's contextual model of learning, I designed a mobile application that is intended to aid in learning. The contextual model of learning proposes that there are three types of contexts that aid in learning in a museum: personal, socio-cultural, and physical. Each of these contexts is addressed in the design of the JSMA's mobile application.

One of the aspects of the personal context is choice and control (Falk and Dierking, 2008, p. 24). With a mobile application, visitors are allowed to choose what they hear or see. They can get more information on the objects they finds particularly interesting and skip the ones they do not want to learn about. The socio-cultural context includes the other people a visitor is with as a group in the museum (Falk and Dierking, 2008, p. 24). Learning is influenced by the friends or family members with whom the visitor is with at the museum. For this reason, I chose to include tips for families visiting the museum. Some of these tips are suggestions for activities parents are children can complete in the museum, as well as questions parents can ask their children. If each member of a group of visitors is wearing headphones and looking at their own mobile device they will be interacting less, lowering their social learning. By including these tips I hope to use the application to promote social learning among family groups rather than inhibit it. The design of technology is part of the physical context (Falk and Dierking, 2008, p. 24) and so I have attempted to design a mobile application that is intuitive and easy to use. If the application is easy to use, then the visitor can focus on learning about art rather than having to learn how to use the technology.

Drawing on work by many researchers in the area of museums and technology I have attempted to design an application that will supplement an exhibit and not overshadow it. Andrea Bandelli warns that one concern with new online technology such as social media is that it results in "an overly enthusiastic response to the technology, which shift[s] the focus from the actual content of the conversation to the means of conducting it" (2010, p. 151). The same concern certainly exists for museum smartphone applications: it is possible that visitors could be so excited about using a new piece of technology that they focus more on it than on the artwork and objects on display. However, Bandelli goes on to predict that "as people become more accustomed to the technology, they will also re-create the social barriers to which we're now accustomed in using technologies like the telephone" (2010, p. 151). My aim was to create an application that will help people appreciate and understand the art they are viewing. I want visitors to look at the art on the walls, not at the tiny screen in their hands. By creating an application that can run on any smartphone a large number of visitors will be able to use their own devices that they are accustomed to using instead of borrowing devices from the JSMA. My hope is that by using their own devices the novelty of the technology will not be so strong that it will obscure the art on the walls and the information on the application.

Mobile application development is growing, and by using a technology that is familiar to many people and easy for most others to begin to use I hope to build visitor engagement. Appendix B contains a concept map showing the relationship between technology, learning, and engagement in a museum.

CHAPTER 3: LITERATURE REVIEW

INTRODUCTION

I focused my literature review on museum learning and the uses of new technology in museums. John Falk and Lynn Dierking are major contributors to the fields of museum learning and visitor interaction, thus I looked at a number of their published works as they relate to technology. I found that their Contextual Model of Learning applies not just to museum visits generally but to the use of technology in museums specifically. Regarding technology in museums, I managed to find several recent anthologies on this topic that proved to be quite useful. Ross Parry's *Museums in a Digital Age* covered a wide variety of uses of technology within museums, and several contributions were applicable to this project. *Digital Technologies and the Museum Experience: Handheld Guides and Other Media*, edited by Loïc Tallon and Kevin Walker, proved to be invaluable to my research as it focused directly on handheld devices. A very recent anthology edited by James Everett Katz, Wayne LaBar, and Ellen Lynch titled *Creativity and Technology: Social Media, Mobiles and Museums* provided some of the most up-to-date published research on mobile devices in museums. Reading these published works heavily influenced the final design of the JSMA's mobile application.

HISTORY OF HANDHELD DEVICES IN MUSEUMS — AND THEIR NEW POTENTIAL

Using handheld devices in a museum to enhance the museum visit is not a new idea. Museums, especially large museums with greater resources, are likely to use the latest technologies in handheld devices in order to provide the visitor with additional information and enrich their experience. Recorded audio tours are a common way to

enhance a museum experience, and museum apps tend to contain an audio tour aspect within them. As Loïc Tallon explains in the introduction to *Digital Technologies and the Museum Experience: Handheld Guides and Other Media,* audio tours have been a popular technology in museums for at least the past fifty years, but the devices and the way this technology works has changed greatly over time. The first museum audio tours were recordings broadcast via a radio system within the galleries to a group of visitors all wearing headsets that acted as receivers to the broadcast. Tallon describes the experience of these early audio tours in this way: "the system was such that all visitors with a receiver could only hear a specific piece of commentary at a time; hence, groups of visitors would move through the galleries and look at exhibits as if guided by an invisible force, in complete synchronicity" (2008, pp. xiii-xiv). Tallon goes on to explain subsequent upgrades to audio guide technology, including "Sony Walkman-style taped tour[s]... in the late 1970s" and random access digital guides in the 1990s (2008, p. xiv).

These random access digital guides are the handheld guides that allow visitors to enter the number assigned to individual objects to hear more information about that object. Random access guides are important to the visitor experience because "until the Internet... [they] were the only visitor technology to have been universally adopted by museums" (Tallon, 2008, p. xiv). Mobile applications clearly have the potential to be the newest wave of handheld devices in use by museums and audio tours are just one possible use for museum mobile applications. In the course of my research I have discovered mobile applications that include video interviews with artists and art historians; trivia or quiz questions; information for getting around the museum, including turn-by-turn directions to the nearest restroom location; calendars of upcoming events; and visitor information such as admission costs and parking

locations. Having a variety of types of information such as these allows the visitor to choose the information that is relevant to their needs. Giving the visitor the ability to make choices is crucial — as Tallon explains, "the trend is toward personal relevance and interpretations, interactivity, and easy access and control of content to shape the twenty-first century museum visitor's experience" (2008, p. xiv).

Despite the fact that audio guides have been almost universally adopted by museums, Nancy Proctor of the Smithsonian Institution claims that "audio tours have never gained status as an indispensible part of the museum visit" (2011, p.22). Proctor cites a study that claims only about ten percent of visitors use audio guides for permanent collection tours, and describes most attitudes within museums regard audio tours as "a *nice-to-have* rather than a *have-to-have*" (2011, p.23). I would argue that mobile applications have the potential to be used more frequently than a traditional audio guide. Museum visitors may be more likely to use a mobile application on their own devices than an audio guide on a device loaned from the museum. Anecdotal evidence from the JSMA seems to support this: currently the JSMA employs the use of the Guide By Cell program, in which visitors use their own cellular phones of any type to dial a phone number and hear audio guide content. JSMA staff members have indicated that this program has been quite successful. Additionally, a mobile application offers the visitor the option of accessing information about objects outside of museum visits. A visitor may download the application and explore objects in preparation for visiting an exhibit, or a person may use the mobile application of a museum they do not have plans to visit but want to learn more about despite this. For example, the Van Gogh Museum in the Netherlands produced a mobile application called "Yours, Vincent" in which a voice actor reads excerpts from van Gogh's letters to his brother and pairs these

recordings with images of the paintings he refers to in his letters. This content is interesting whether a person is listening to it inside of the museum or not, and therefore a museum mobile application can be a tool for both visitors and non-visitors.

MOBILE APPLICATIONS AND THE CONTEXTUAL MODEL OF LEARNING

It is often taken for granted that a museum visit is an intellectually stimulating event and the purpose of the visit is educational in nature. As John Falk and Lynn Dierking explain, an implicit visitor assumption is that "museums are, first and foremost, free-choice learning environments, that is, public institutions for personal learning" (2008, p. 19). Existing handheld technologies offer the visitor individualized learning options. Visitors may enter a number in the guide to hear more information about a particular object on display, giving them a personalized experience. Allowing visitors this choice is important. Falk and Dierking claim that the degree of choice given to museum visitors affects visitor "meaning-making" or their personal learning. (2008, p. 21). Mobile applications offer museum visitors options beyond the traditional audio guides to allow for individualized learning experiences. Audio, images, text, video, and games are just a handful of the different types of media that can be used on a mobile application. By offering multimedia experiences, the museum can cater to different visitor preferences and learning styles.

According to Falk and Dierking's Contextual Model of Learning, learning occurs within and is influenced by the personal, sociocultural, and physical contexts. The personal context is the full history of the learner, including their genetic history, past experiences, and prior knowledge (Falk & Dierking, 2008, p. 21). Knowing that each museum visitor has a unique personal context in which meaning-making occurs is

important for museums. Giving museum visitors choices allows them to learn about the subjects or objects that are meaningful to them. A visitor always has the option of reading the wall label about an object of interest, but providing audio or video related to an object via a handheld device such as a mobile application allows a visitor to gain even further knowledge that can build on a that visitor's personal learning.

The sociocultural context includes the interactions and relationships a person has with other people. In museum visits, the sociocultural context is primarily the family or peer group with whom a person is visiting the museum, but may to some extent also include any museum guides, demonstrators, or other visitors with whom the visitor interacts. "Considerable research exists showing that visitors to museums are strongly influenced by the interactions and collaborations they have with individuals within their own social group" (Falk & Dierking, 2008, p. 21). Additionally, in a book chapter entitled "Cross-Context Learning" the authors claim that "conversation drives learning" (Rudman et al, 2008, p. 148) and this certainly seems true of museum visits. Given this information, it seems valuable to include social aspects to a mobile application that will allow visitors to interact with their social groups. Areti Galani and Matthew Chalmers point out that "studies of technology in museums, and especially of use of personal mobile devices, had shown that interaction with technology might inhibit social interaction as well as redirect the attention of the visitor from the museum artefacts to the information that is delivered on his/her device. Among the most reported disadvantages of such technologies is the decline of talk among visitors" (2010, p. 164). One of the ways I have chosen to address the issue of social interaction is the "Family Visit Tips" section of the application, which includes ideas for activities and questions

parents can ask their children during a museum visit. The full text of these tips is available in Appendix I.

Finally, the physical context is the environment in which learning takes place. "Utilizing the Contextual Model of Learning framework, personal handheld devices represent part of the physical context of the visitor" (Falk & Dierking, 2008, p. 22). The design of the application is part of the physical context, and I kept in mind that the design of the application will have an effect on visitor learning when I began the design process. I discuss this process more fully in Chapter 4: Development Process, but it is important to note that one of the reasons I selected the Toursphere platform to build this application is that it would allow visitors to use their own device, regardless of whether they are using an iPhone, Android phone, or any other type of smartphone. I considered what Galani and Chalmers wrote regarding mobile devices redirecting visitor attention from the objects on display and onto the device itself, and I thought that perhaps if most visitors are using their own devices rather than a borrowed device then there would be less of a novelty value associated with using the application and it could be used as a tool for learning as it was intended.

VISITOR WANTS AND NEEDS FROM A MUSEUM MOBILE DEVICE

In Loïc Tallon and Kevin Walker's anthology *Digital Technologies and the Museum Experience: Handheld Guides and Other Media*, Jeffrey K. Smith and Pablo P.L. Tinio report on the findings of audio tour surveys and three large US museums: The Metropolitan Museum of Art, The Jewish Museum, and the Whitney Museum of American Art. The authors claim that the findings in each of these surveys show that "visitors… desire both freedom and structure" (Smith & Tinio, 2008, p. 65). Three types

of audio guide users were surveyed at the Metropolitan Museum of Art: those who had purchased an audio guide, those who had previously used audio guides and were offered the Met audio guide for free, and those who had never used audio guides before and were offered the Met audio guide for free. When asked what types of information they would prefer to hear on an audio tour, roughly fifty percent of each type of audio guide user responded positively to each content type. The types of content listed on the survey were artistic technique, artist's life, subject matter of the work, historical background and context, insight into understanding the work, and history of the object (Smith & Tinio, 2008, p. 68). See Appendix C.1 to view partial results of this survey in table form.

If visitors truly desire both freedom and structure, then a mobile application may be of use. Audio tours in general tend to structure a museum visit in that providing audio content for particular objects encourages visitors to look at that object, but freedom can be provided by including multiple types of information and allowing a visitor to select those types that are of interest to them. A sign indicating an audio tour stop number could be placed near an object, the visitor enters this number into the keypad, and they will then be given the option of selecting different audio or video segments on a few different topics related to the work. Each audio or video segment could be given a name that indicates the type of information that will follow, and the visitor has the option of listening to only the specific types of content that are of interest to them. The JSMA could be a unique testing ground for this type of structure because experts from many academic departments across the University of Oregon campus could record audio segments related to works of art. Professors from the History department could comment on the historical time period from which an object originated, Fine Art instructors or students could comment on the artist's technique, or

professors of Religious Studies could explain the symbolism of a religious work. This would provide visitors with the ability to not only choose which objects to learn about, but choose the specific types of information they would like to learn.

Survey results from The Jewish Museum found fewer than twenty percent of visitors using the audio guide wanted information on the guide to play automatically, and just over twenty percent indicated that they enjoyed audio tours that run straight through to the end. One hundred percent of respondents claimed that they enjoyed the overview information provided at the entrance of each new room or exhibit, and nearly eighty percent agreed with the statement "I like being able to choose what I learn about" (Smith & Tinio, 2008, pp. 70-71). A reproduction of the graph indicating these results is included in Appendix C.2. These results indicate that visitors prefer to have some structure but a great deal of freedom when using an audio guide. This is significant to note because with new advances in geolocation technologies, it would be possible for audio to start playing automatically on a mobile device when a visitor stands in front of a particular object. However, this would severely limit visitor choice, and it is easy to see how it could be annoying to a visitor. Perhaps the visitor stopped in front of an object not because of interest in the object, but because their shoe is untied and they paused to retie it, or they could have stopped near one object, but they are actually looking at an object across the room and discussing it with a companion. Being near an object does not guarantee visitor interest, and therefore it seems more prudent to allow visitors to make their own choices regarding when to learn more about particular objects.

Results of audio guide surveys at the Whitney Museum of American Art seem to indicate that audio tours truly were able to enhance museum visits. On a scale of one to ten, one indicating strong disagreement and ten indicating strong agreement, the

statement "I enjoyed visit more because of audioguide" received an average score above eight (Smith & Tinio, 2008, p.72). For a reproduction of a table showing these survey results, please see Appendix C.3. One item I found significant from this survey was the statement "I enjoyed hearing the different voices on the program," a statement which received an average score of approximately seven and a half. This reinforces my previous suggestion that the JSMA should use their location on the University of Oregon campus to their advantage by including the voices of different professors or students on the audio tour in addition to museum staff members.

ENGAGING AUDIENCES – INSIDE THE MUSEUM AND OUT

The sheer number of museum websites, blogs, Facebook pages, and Twitter accounts seems to be proof enough that museums are very interested in keeping visitors engaged outside of visits to the physical museum. A mobile application has the potential to be a tool for audiences to connect with museums and access interesting information outside of museum visits. In the introduction to *Creativity and Technology: Social Media, Mobiles and Museums* Wayne LaBar writes, "at heart, mobile devices and social media are about being able to respond or engage interactively. With these new methods of engaging the public, new and impactful experiences are possible" (2011a, p. 18).

There is some concern that technology can detract attention from the objects on display. Kevin Walker marvels at the ease with which young visitors become accustomed to using new technology tools and expresses his belief that these tools do not distract and in fact cause the visitor to be *more* engaged. He writes "Dulwich Picture Gallery has found that teenage students are initially engaged primarily by the PDAs given to them, but these soon become almost second nature to them and serve to focus them on

learning about specific aspects of art and art history" (Walker, 2008, p. 112). With young people especially who are growing up using new technology and feel comfortable with it, a mobile application is simply a means of getting information, it is not something that needs attention or focus. A mobile application can enhance the visitor's experience by providing information about objects and allowing visitors to learn more about objects of their own choosing. This makes them an ideal tool for museums because visitors will be more engaged in learning about a topic if it is something of their own choosing: their choice indicates an existing interest or curiosity in that subject.

The design of the JSMA mobile application allows visitors to engage in learning experiences in the museum but there is also potential for visitors to access the mobile application's content outside of a museum visit. The "Family Visit Tips" included in the application contain suggestions for activities for families after a museum visit. One of these suggestions is to display a collection of your own in your own home. This is intended to help visitors with children to make connections between their visit to the museum and their everyday life. Falk and Dierking would refer to this aspect of the application as part of the personal context in the Contextual Model of Learning because it connects to the visitor's life outside of their visit to the museum: it is personally meaningful.

Another way to make learning personal is to share a personal story with which visitors can connect. Mouw and Spock explain the benefit of using narratives to present information in a museum: "Research at MHS [Minnesota Historical Society] has led to the conclusion that museums visitors most readily connect to history through the personal stories of others...Narratives with the kind of telling, and sometimes serendipitous, details...resonate most strongly with museum visitors." (Mouw & Spock,

2007, p. 47). If this is true for how visitors connect to history, then why not art as well? A family audio tour could be narrated by a voice actor pretending to be the artist, or the subject of the artwork on display. Both adult and child visitors would be able to connect to these personal narratives and feel interested and engaged in the experience.

The potential for new technologies to engage museum visitors is widely discussed in publications focused on museums and technology. Wayne LaBar writes, "the internet has afforded many people the opportunity to communicate back to the museum easily and for the museum to solicit input from the visitor," (2011b, pp. 385-386). Because smartphones allow people access the internet anywhere, visitors who are given the opportunity to connect and communicate with a museum can do so at any time, inside the museum or not. Using the suggestion to visitors to display a collection in their homes as an example, this could be taken a step further and the application could suggest that the visitor photographs their display and uploads it to Flikr with a particular tag, such as JSMAcollects. This way all visitor photos of their collections can be viewed by other visitors as well as museum staff as a group, and they can leave comments on the photos. If the visitor uses the camera on their smartphone, they can upload the photo immediately after taking it, making this interaction with the museum instantaneous.

In "The iPhone and Its Use in Museums," Valtysson et al write, "the two-way functionality of the mobile phone also allows users to add their commentaries and interpretations. It is possible to collect these in real time and perhaps display them for museum visitors," (2011, p. 117). This idea could potentially work within the context of a traditional comment book at a museum. A sign in the gallery may ask visitors for comments about an exhibit, or it may prompt visitors to share their thoughts or

experiences in a particular area. The sign could include a phone number, and visitors could text their responses and see previous visitor responses on a screen nearby. Or visitors could call a number to record an audio message to share with others.

Many authors point out that there is the potential for problems when visitors share their own content on an official museum platform. Some photos or comments may be inappropriate or unrelated to the topic at hand. It is important for the museum to have staff assigned to monitor these shared submissions and remove any that are inappropriate or reflect poorly on the museum's image.

CHAPTER 4: DEVELOPMENT PROCESS

PLANNING

Throughout this research process I had semi-regular meetings with JSMA staff members in the Education, Communications, and Media departments. In these meetings I discussed with museum staff what types of content they were interested in having for the application as well as the design and look of the application. These meetings helped to shape the resulting application.

WHY TOURSPHERE?

When I began planning for this project, I investigated several different options for building this application. One option included building the app using HTML, a language with which I have basic familiarity, and using a program to convert the HTML into Xcode, which is the code needed to develop software for mobile Apple products such as the iPhone or iPod Touch. However, that would result in a native application specifically for the iPhone. I wanted to develop a web application because that would allow any visitor with any device to use the JSMA's mobile application. A web application differs from a native application in that it runs using that device's own internet browser, thus allowing it to be used by any smartphone. Being able to run the application on any device is important because it allows visitors who already own smartphones to use their own device, regardless of the type. The use of smartphones is already common, especially among young adults, and according to the International Data Corporation (IDC) the number of smartphones will continue to grow rapidly in the next five years. In 2012 it is predicted that smarthphone sales will increase by thirty-three and a half percent, and they will continue to grow by an additional eighteen point

six percent each year until 2016 (Llamas & Stofega, 2012). As the number of people using smartphones grows, more people will be accessing the JSMA's mobile application on their own device rather than on a borrowed device and they will already be accustomed to using these devices. Instead of being distracted by figuring out how to use a new and unfamiliar device borrowed from the museum, the visitor will already be comfortable using their own device and they will be able to use the application as an aid to learning in the museum as it was intended.

Another reason Toursphere stood out as a feasible option is it requires no knowledge of coding of any type. This made it easy for me to use, but more importantly it will make it easy for the JSMA staff to use. One of goals for this project was to build an application that could be updated easily by JSMA staff or volunteers.

COMPARISON OF MUSEUM MOBILE APPLICATIONS

From the beginning, JSMA staff raved about the Museum of Modern Art (MoMA) mobile application. MoMA has a very well-designed and informative application, and many of the elements present in the MoMA application are also present in the final design of the JSMA application. I sought out other museum mobile applications to get a more broad and balanced view of museum applications. To find museum mobile applications I searched the iTunes app store with the keyword "museum." I downloaded primarily applications produced for art museums, and only applications that were available for free. See Appendix D: Comparison of mobile apps to view the full comparison of these applications. What follows is the abbreviated version of this comparison, focusing on the elements in particular applications that were tweaked for use in the JSMA's application.

Videos

Several mobile applications such as those for the Portland Art Museum and the Van Gogh Museum included very engaging videos. I did not have the opportunity to visit the Van Gogh Museum and test the application in the gallery, but instead explored the application from my own home. The videos included excerpts from van Gogh's personal letters read by a voice actor and paired with images of his works referenced in the letters as well as videos including interviews with experts and family members.

The Portland Art Museum's videos are called "Conversations About Works of Art" and they are also available on the museum's website. These videos feature pairs of curators, educators, docents and others discussing a single work of art while an image of that work appears on the screen. These videos are similar to the JSMA's existing "Art 1:01" videos posted on Youtube. The "Art 1:01" videos feature a curator discussing a single work of art or artist for one minute and one second. I find the videos created by the JSMA, the Portland Art Museum and the Van Gogh Museum appealing because I can see how they would be interesting to listen to in the museum while standing in front of the work of art and looking at it, but they are also interesting to watch when not in the museum. The JSMA currently has five "Art 1:01" videos with plans to create more in the future, thus these existing and future videos seemed to be perfect to include in the application. Videos such as these are an example of how a museum visit can extend beyond the walls of the museum: visitors can watch the videos before a museum visit to prepare themselves, or they may watch the videos after a visit to learn more about objects they did not have time to see or examine as closely as they would have liked.

Family Visit Tips

One of the things in the MoMA application that stood out for me was the "Visiting with a Family" section. This part of the application included text information including resources the museum had to offer, questions to ask children to start conversations about works of art, and ideas for activities to do in your own home. Many of the questions were phrased in a manner similar to that of the Visual Thinking Strategies (VTS) method, a method that I practiced in a Museum Education course at the University of Oregon and used when leading museum tours during my summer internship. I ended up taking quite a bit of the information from this section of MoMA's application, rewording it, and using it in the JSMA's application under the heading of "Family Visit Tips." This tip section provides suggestions for families on activities to complete before, during or after a museum visit. Again, I felt that the inclusion of this content is important and useful for education because it extends the museum experience beyond the walls of the museum. It connects with visitors' everyday lives by including suggestions such as displaying your own collections in your home. This connects the museum visit to the visitor's personal life, meaning it takes place within the Personal Context as explained by John Falk and Lynn Dierking.

Calendar

Most of the applications I explored had a Calendar section. JSMA staff were especially impressed by MoMA's calendar section because it included all types of happenings at the museum, including current exhibitions, film screenings, and other programming such as tours or lectures. It allows the visitor to see everything scheduled for the current day, or to choose a day in the future to see the events for that day.

Toursphere does not include an easy way to update this type of content: there is no built-in calendar option in the program. The best solution JSMA staff and I were able to find was to include a link to the Calendar page of the JSMA website so that visitors can see the upcoming events listed on this page.

Tours

Most of the museum mobile applications I explored included audio guide tours. The Portland Art Museum is one notable example that did not include audio tours. Without this content, the application felt as though it were lacking in substance. There simply was not much to explore on this application because audio tours take up a large bulk of the content on most museum mobile applications.

Two applications included audio tours specifically for children and families: MoMA and the Getty Museum. The Getty's tour seemed to focus on animals in art, and used voice actors to give voice to the animals depicted in various works. The animals spoke about the artist's technique, or asked listeners questions about what they could see in the work. The MoMA tour had a female voice who asked many questions about what the listener saw in the work and paused to allow listeners to answer. There was also background music and sounds effects similar to those found in children's television programs. The JSMA has not yet produced audio tours for families and children, but both of these served as interesting models. The use of questions in the tours seemed especially effective and engaging.

Exhibition Information

Current and upcoming exhibition information was included on most applications. Some applications also included past exhibition information, but this seemed

unnecessary. My personal opinion is that most visitors using the application are going to be inside of the museum when they are using the application and thus will want information about current exhibitions. Providing future exhibition information may encourage them to return to the museum.

One thing I have noticed about the JSMA is that they put on a large number of exhibitions each year. The application is easy to update, but it will be something that must be done regularly because exhibitions change at the JSMA so often.

DESIGN

Because handheld devices are part of the visitor's physical context according to Falk and Dierking's Contextual Model of Learning, the overall design of the application is very important. Most importantly, it needs to be easy to use. Requiring the visitor to read a large amount of instructions before they can use an application is not an option. The JSMA's application needed to be intuitive to use because the visitor's attention should be focused on the art on display, not on learning how to use the smartphone in their hand. If the application is difficult or frustrating to the visitor, it is detrimental to the visitor's experience. The intention of this application is to enhance the visitor's experience, not harm it, and thus the design needed to be straightforward and simple.

I also aimed for the application to have a similar look to the JSMA's website because continuity between the application and the website gives the visitor a sense of familiarity and recognition. If a piece of technology is similar in design to something that is already familiar to the visitor, it seems likely that they will be more comfortable using it, even if it is new.

Overall look and feel

At the time of this writing, the JSMA is redesigning their website. The new design will be released in the near future, but I had the opportunity to explore the new design before its release. The current design in use has a dark gray background, while the content area is white with headings and menus in varying shades of gray and the JSMA's unique shade of crimson red. See Appendix E for a screenshot of the present design. The newly designed website does not include any of these darker gray tones: it has a white background, a white content area, and all headings and menus are in the JSMA crimson color. See Appendix F for a screenshot of the new design.

In designing the mobile application I decided to use a color scheme similar to the new website design: a white background with menu buttons in the JSMA crimson red. See Appendix G.1 to view a screenshot of the home screen in the application.

During planning meetings with JSMA staff members, staff described the desired image of the JSMA to be "fun, fresh, and funky" but the adjective visitors most often use to describe the JSMA is "elegant." Therefore, the JSMA wanted their website and mobile application to be both fun and elegant. I chose to include partial images of galleries and of artwork as the headers for many pages. Modern and abstract works were used most because I felt they had more of the fun, fresh, and funky look that the JSMA is striving for.

GOALS OF THE APPLICATION

This application is intended to be a learning tool used by museum visitors. One of the largest constituencies in mind in this application is families with children. Content such as the family audio tour, scavenger hunt, and family visit tips are meant to provide

activities for visitor groups with children. The intention of this family-centered content is to provide children with fun activities that they will be able to connect with their own experiences. Connecting a museum experience with other experiences is key to meaning-making.

The JSMA is located on the University of Oregon campus, and therefore college students are an important part of the visiting audience. Because the majority of college students have smartphones (Fox, 2011) and that number is expected to grow it seems possible that providing a mobile application will encourage student interest in the museum. This generation of college students has grown up with computers, the internet, and cell phones. These technologies are already a part of their lives and thus the museum can use these technologies to connect with students. The content on the application such as the audio tours and videos are intended to be engaging for visitors in the museum, but the application is also intended to get people interested in the museum and encourage them to visit. By including descriptions of current and upcoming exhibitions the hope is that people who have the application on their phones will be encouraged to visit the museum based on this exhibition information.

WHAT IS INCLUDED: PAGE BY PAGE

Site Map

The following site map shows the location of each screen of the JSMA's mobile application:

Home
Exhibitions
    Current Exhibitions
        Exhibition description A
        Exhibition description B, etc.
    Upcoming Exhibitions
        Exhibition description C
        Exhibition description D, etc
Audio Guides
    Family Audio Guide
    Architecture Audio Guide
    Changing Exhibitions Audio Guide
    Japanese Collection Audio Guide
    Chinese Collection Audio Guide
    Korean Collection Audio Guide
    American/Pacific Northwest Collection Audio Guide
Videos
    Art 1:01 Episode 1
    Art 1:01 Episode 2
    Art 1:01 Episode 3
    Art 1:01 Episode 4
    Art 1:01 Episode 5
Learn & Play
    Scavenger Hunt
    Family Audio Tour
    Family Visit Tips
        Before Your Visit
        At the Museum
        After Your Visit
    Art Classes and Camps
Calendar
Museum Information
    Hours & Admission
    Getting Here
        Address & Directions
        Parking
        Google Map
        Campus Map
    Floorplan
    Café & Store

Home

The Home screen contains six buttons: Exhibitions, Audio Guides, Videos, Learn

& Play, Calendar, and Museum Information. Selecting one of these buttons navigates to

the corresponding screen. There is a Home icon at the bottom of every page of the application; selecting this icon will return the user to the Home screen. See Appendix G.1 for a screenshot of the Home screen.

Exhibitions

The Exhibitions screen contains two buttons: Current Exhibitions and Upcoming Exhibitions. Selecting the Current Exhibitions button navigates to a screen listing the names and dates of each current exhibition, and selecting any one of these items navigates to a screen containing a paragraph-long description of the exhibition. The Upcoming Exhibitions button and screen work in the same way as the Current Exhibitions. The exhibition content will need to be updated on a regular basis as exhibitions open and as new exhibitions are announced. See Appendix G.2: Exhibitions Screens for screenshots of the Exhibitions, Current Exhibitions, and Upcoming Exhibitions screens as well as a sample exhibition detail screen.

Audio Guides

The Audio Guides screen contains buttons with the name of available audio tours. Audio guide content has not been fully developed at the time of this writing, but future audio guides will likely be the following categories: Family, Architecture, Changing Exhibitions, Japanese Collection, Chinese Collection, Korean Collection, and American/Pacific Northwest Collection. Selecting any of these tours will navigate to a screen listing all of the individual tour stops that fall under this category and the visitor can select any individual tour stop to listen to that item. Alternatively, by entering the number of any tour stop into the keypad the visitor may hear that audio. See Appendix

G.3: Audio Guides Screen for a screenshot of the Audio Guide screen and Appendix G.14: Keypad for an image of the Keypad screen.

Videos

The Videos screen lists the five existing *Art 1:01* videos produced by the JSMA. Selecting a video on the list causes that video to begin playing. As additional videos are produced they will need to be added to the application. See Appendix G.4: Videos Screen for a screenshot of the Videos screen.

Learn & Play

The Learn & Play section of the application contains the content that is geared for visitors who are coming to the museum with children. This screen contains four buttons: Scavenger Hunt, Family Audio Tour, Family Visit Tips, and Art Classes & Camps. See Appendix G.5: Learn & Play Screen for a screenshot of the Learn & Play screen.

The Scavenger Hunt section of the application is geared for children of reading age or who can have an adult help them read the text on the application and wall labels in the gallery. This scavenger hunt leads the visitor through the permanent collection of Asian objects. The visitor is asked a multiple choice question whose answer can be found by looking at objects in the gallery or reading the wall label of an object. Selecting the correct answer leads to the next question or clue. To view the full text of this game, please see Appendix H. Screenshots can be found in Appendix G.6: Scavenger Hunt.

The Family Audio Guide has not yet been produced; this will need to be developed by the JSMA.

Family Visit Tips include text suggestions for activities before, during, and after a museum visit as well as questions and discussion points to bring up when looking at art

with children. Screenshots can be found in Appendix G.7: Family Visit Tips and the full text can be found in Appendix I: Family Visit Tips Full Text.

A text screen encourages visitors to send their children to art classes and camps at the JSMA. This screen includes a link to the JSMA website to gain more information; upcoming class information is not included on the application itself.

Calendar

The Calendar button links to the JSMA's website. The visitor is taken out of the application and lands on the Calendar page of the JSMA's website. In the future it would be more ideal to have the information from the calendar on the website be synched to feed into the application automatically rather than have the user be taken out of the application. See Appendix G.8: Calendar for a screenshot of the Calendar screen.

Museum Information

The Museum Information section of the application contains basic information that will be useful to visitors. The buttons on the Museum Information screen are Hours & Admission, Getting Here, Floorplan, and Café & Store. Hours & Admission contains the museum hours and admission prices. Getting Here contains four buttons: Address & Directions, Parking, Google Map, and Campus Map. The Address & Directions screen contains the museum's address and phone number along with directions to the museum from different directions. Additionally, a link to the Lane Transit District website is included for visitors who are planning to take the bus. The Parking screen contains information about metered parking on campus nearest the museum as well as parking lots that are free on weekends. Custom Google maps can be added to the website, and so users of the application are able to view a Google map with a marker indicating the

JSMA's exact location on campus. The Campus map is a map generated by the University; it shows nearby buildings and the location of the entrance of the JSMA. See Appendix G.9: Museum Information, Appendix G.10: Hours and Admission, Appendix G.11: Getting Here, Appendix G.12: Floorplan, and Appendix G.13: Café & Store for screenshots of the Museum Information section of the application.

CHAPTER 5: RECOMMENDATIONS FOR MOVING FORWARD AND CONCLUSION

APPLICATION CONTENT RECOMMENDATIONS

Exhibitions

The content for current and upcoming exhibitions is the information that will need to be updated most often because exhibitions begin and end on a regular basis. This portion of the application should be updated with the opening or closing of each exhibition so that the content is always up-to-date.

I added this content to the application by copying and pasting the exhibition names, dates and descriptions from the JSMA's website into the Rich Text option in Toursphere (see Appendix J: Adding Rich Text Content Screenshot). Both the links giving just the name and dates of the exhibitions and the longer text description to which this link leads were created using the Rich Text option.

Audio Tours

Because very little audio guide content exists for permanent collection objects the JSMA has the opportunity to make this content look any way it likes. Survey results from The Whitney Museum of American Art indicated that visitors enjoyed hearing multiple voices on the audio tours. The JSMA has a unique opportunity as a university art museum because professors and students in a multitude of disciplines are on the same campus. If the JSMA asks professors, students, and its own staff members to record audio guide content about objects on display then a number of different voices can be heard on the audio guide. This can result in a more interesting and informative experience for visitors, especially if there are options to hear multiple people give their

unique perspectives on a single object. It will also allow the museum to address the common concerns in wall labels and audio guides: "Who is speaking? Whose opinions are being expressed?" By introducing each audio segment with the name and occupation or area of study of the speaker, it will be clear to the listener that unique perspectives are being heard on each audio segment.

Videos

Currently there are five *Art 1:01* videos and there are plans to record more. As each new video is recorded it should be added to the application.

Learn & Play

The scavenger hunt should have some kind of prize associated with it. The ending screen text currently reads "Great job! You found many objects that Gertrude Bass Warner saw and collected when she traveled to Asia! Show this screen to the staff at the front desk to collect your prize!" Perhaps stickers could be kept at the front desk and any child who brings their device to the front desk showing the ending screen will be given a sticker for completing the game.

A family tour needs to be produced. It is listed both on the Audio Tours page and the Learn & Play page. Using the MoMA and Getty family audio tours as well as typical Visual Thinking Strategies techniques as examples, it seems that the JSMA's family audio guides should encourage children to look closely at works of art and point out the details. Framing the audio segments as a narrative from the artist or the subject of the art could also help to engage young audiences because personal stories have been found to hold visitor interest.

The Family Visit Tips will be mostly static information, as they are simply ideas for visitors with children. If an update is needed it will be easy to do so because these tips were created using the rich text option in Toursphere.

Art Classes & Camps simply directs the visitor to visit the JSMA website for more information. I chose to do this rather than list classes and camps because it would need to be updated frequently. The instructions to visit the JSMA website are in rich text format, thus if it is decided that class and camp details should be included on the application, this content can be copied and pasted into the application easily.

Calendar

The Calendar section of the application is simply a link to the Calendar page on the JSMA's website. It is not ideal because it takes the visitor out of the application, but Toursphere does not offer any type of calendar event synching, and so there is no easy way to keep this information up-to-date at this time. Toursphere does allow updating via RSS feed, thus if the JSMA chose to do so, the content could be syndicated automatically. I would highly recommend trying this option because it will require less maintenance than entering calendar information manually, and it will allow the visitor to stay in the application rather than leave it and visit the website to gain calendar information.

Museum Information

The information included here will be static for the most part. It will only need to be updated if there are changes in basic information the visitor will need to be aware of, such as new operating hours or admission prices. This information can be edited easily as it was created using the rich text content editor.

UPDATING DESIGN ELEMENTS

Toursphere does not include many color or font options, and so in order to use the JSMA's shade of red and the Akzidenz font for the selection buttons I had to create images in Photoshop that I then brought into Toursphere. I will give the template I created to the JSMA as a Photoshop file. This template can be used to create new JPEG images if other options need to be included on the application in the future.

ADVERTISING THE APP – AND THE MUSEUM – TO INCOMING STUDENTS

An Arts and Administration faculty member mentioned to me that often undergraduate students in her classes have never visited the JSMA and do not even know it exists. Their first visit does not occur until they have to go to the museum for an assignment in her class, and often these students are upperclassmen. Because young people are comfortable with technology and it is a part of their daily lives, the JSMA's mobile application could be a way to reach out to more students. This faculty member suggested to me that if information about the mobile application were included in freshman welcome packets, perhaps they would install the application and be interested in visiting the museum. This is potentially easy to do: as a web app, it can be installed by scanning a QR code with their smartphone. If these QR codes are printed on paper materials or included in emails to incoming students then they can be installed by the student as soon as they see it. The student will then know that there is an art museum on campus and possibly be interested in visiting the museum.

NATIVE APP VS. WEB APP

Throughout the development process I have been operating under the assumption that a web application would be a better than a native application because a

web application runs through a smartphone's internet browser, allowing any visitor to use the application regardless of the type of phone it is. However, I have tested the application in the museum on my own phone and found that the wireless internet and mobile broadband signals are weak in particular galleries. This can cause the application to run slowly, or prevent images or videos from loading. Toursphere also offers a native application option. In this case, the application will be made available for download in the iTunes app store and it will only run on iPhone or iPod Touch devices. This option is more expensive, as it requires a one-time start up fee in addition to the monthly fee.

I still believe a web application is the better option because people with any type of smartphone will be able to use the application, not just iPhone users. Recent Neilsen data suggests that over forty-eight percent of smartphone users in the US have an Android phone, while iPhone users make up thirty-two percent of the market (Neilsen, 2012a). Because more smartphone users have phones other than the iPhone, it does not make sense to develop only for the iPhone platform. Instead, the JSMA should look into improving their wireless coverage in the galleries in order to ensure continuous coverage.

CONCLUSION

The process of researching museum smartphone applications and building an application for the JSMA allowed me to gain a deeper understanding of the importance of technology in museum exhibits. I found many written works on the potential of new technologies such as smartphones to enhance a visitor's learning in a museum as well as engage in learning outside of the museum. I looked at applications that seem to have succeeded in creating an engaging and informative application as well as ones that seem

to have failed; obviously I tried to emulate the techniques of the successful applications. For this reason I chose to include a great deal of variety in content including audio, video, text, and a game.

Smartphones are quickly becoming commonplace: as of March 2012 more than half of US mobile phone subscribers owned a smartphone (Neilsen, 2012a) and that number is surely going to continue to rise. Sixty-two percent of young people aged eighteen to twenty-four owned a smartphone as of January of 2012 (Neilsen, 2012b). It is important for museums to embrace smartphone technologies and other useful new technologies because it can help them remain relevant to audiences who are growing up surrounded by these devices. Providing digital content creates museum-comfort for many young people because they are accustomed to using technology to find information and explore their personal interests. Because digital content is so prevalent in the lives of young people, a museum on a university campus that implements new technologies is showing the students who visit the museum that they are keeping pace with the changing world and the museum is relevant to their lives.

APPENDICES

APPENDIX A: RESEARCH CYCLE

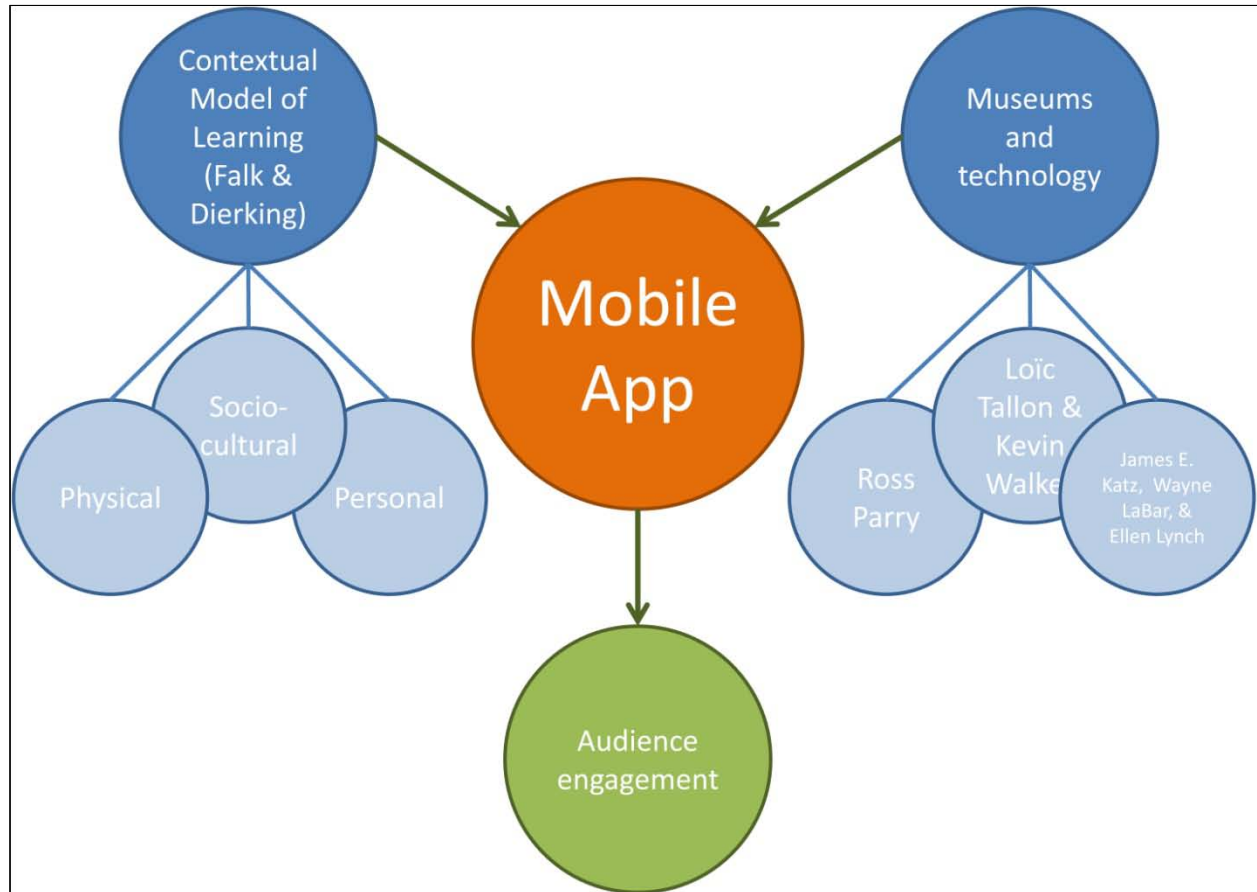Reproduction of Randy Stoeker's diagram of the cyclical nature of project-based
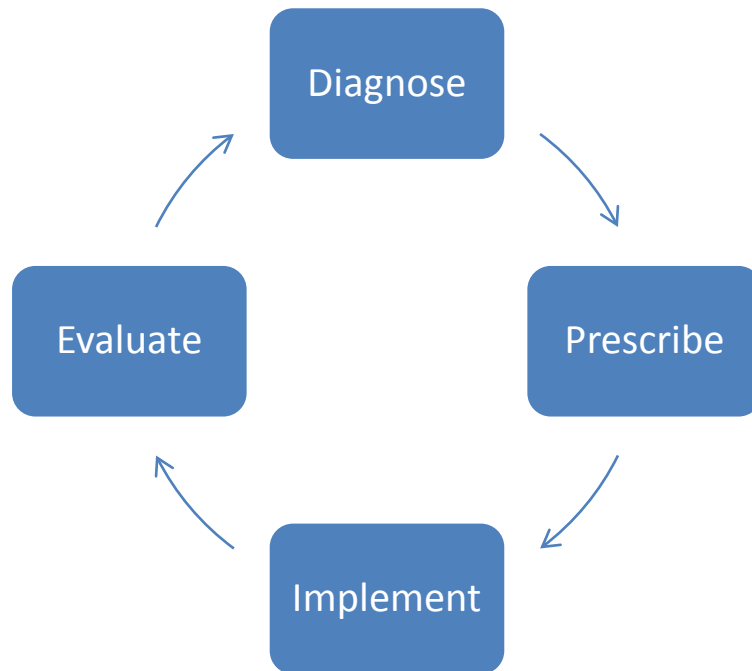
research

Originally published in:

Stoecker, R. (2005). *Research methods for community change: A project-based approach*. Thousand Oaks: Sage Publications.

APPENDIX B: CONCEPTUAL FRAMEWORK/CONCEPT MAP

**APPENDIX C: SMITH & TINIO AUDIO TOUR SURVEY RESULTS**

Appendix C.1: Metropolitan Museum of Art audio tour survey results (abbreviated)

What kinds of information do you prefer on audio guide messages? (Percentage of visitors indicating each)			
	Purchasers	Free (Previous Users)	Free (First-Time Users)
Artistic technique	51	44	46
Artist's life	47	47	48
Subject matter of the work	61	51	43
Historical background and context	68	61	52
Insight into understanding the work	65	62	48
History of the object	56	40	43

Originally published in:

Smith, J.K. & Tinio, P.P.L. (2008). Audibly engaged: talking the walk. In L. Tallon & K.

Walker (Eds.), *Digital technologies and the museum experience: Handheld guides and*

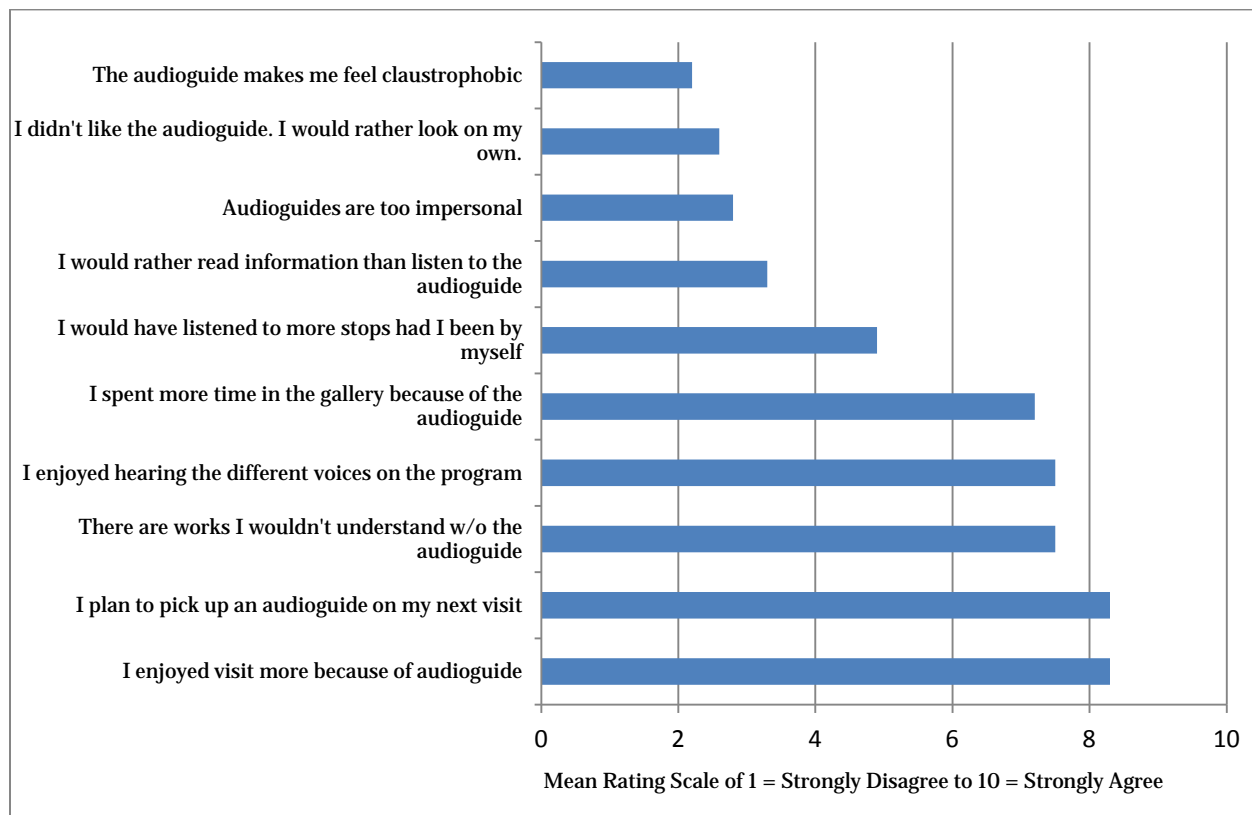*other media* (pp. 63-78). Lanham: AltaMira Press.

Appendix C.2: The Jewish Museum audio tour survey results (partial)
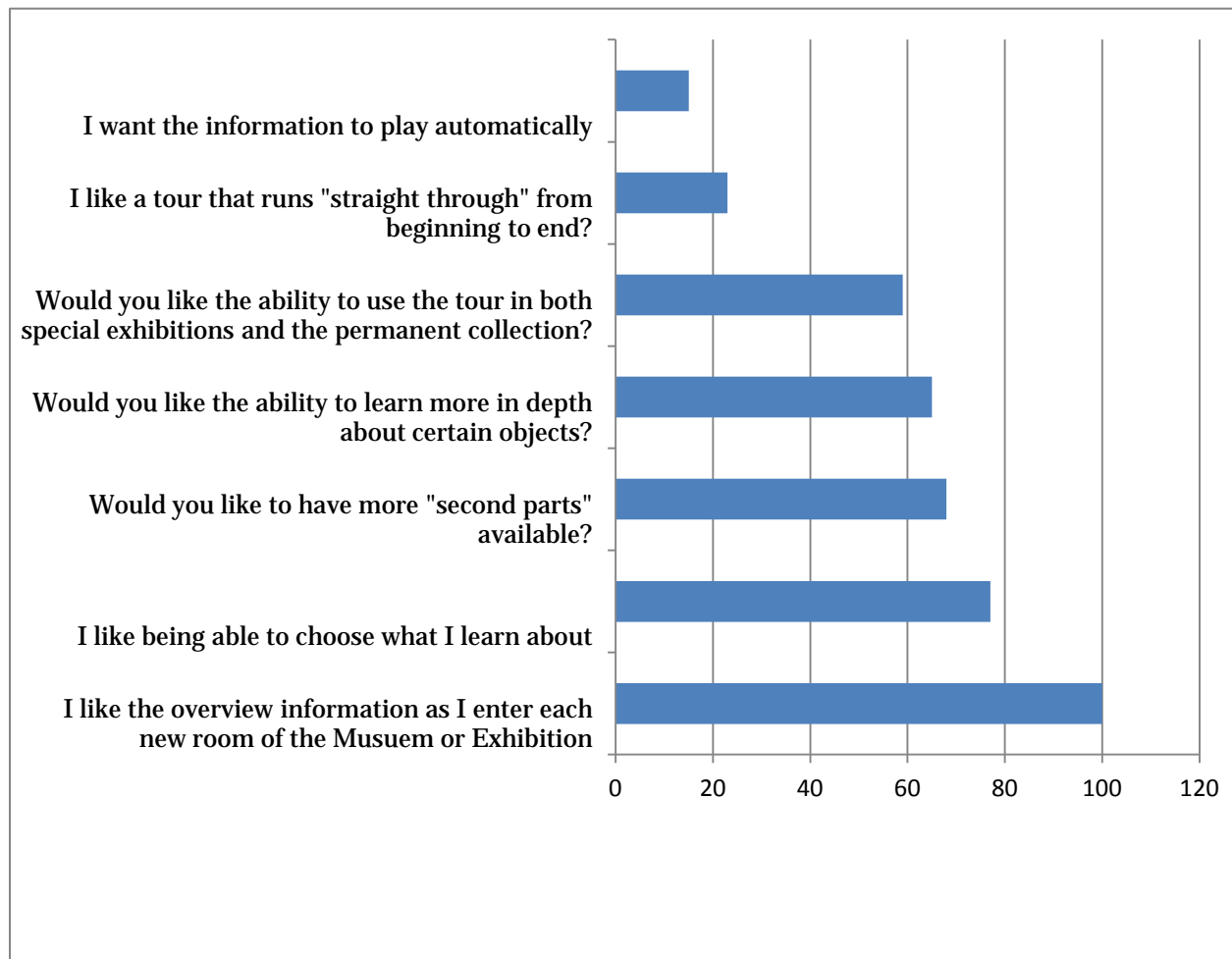
Originally published in:

Smith, J.K. & Tinio, P.P.L. (2008). Audibly engaged: talking the walk. In L. Tallon & K. Walker (Eds.), *Digital technologies and the museum experience: Handheld guides and other media* (pp. 63-78). Lanham: AltaMira Press.

Appendix C.3: The Whitney Museum of American Art audio guide survey

Mean Rating Scale of 1 = Strongly Disagree to 10 = Strongly Agree

Originally published in:

Smith, J.K. & Tinio, P.P.L. (2008). Audibly engaged: talking the walk. In L. Tallon & K.

Walker (Eds.), *Digital technologies and the museum experience: Handheld guides and*

other media (pp. 63-78). Lanham: AltaMira Press.

APPENDIX D: COMPARISON OF MOBILE APPS

	MoMA	Portland Art Museum	Portland Art Museum (Meridian app)[1]
Audio Tours	Includes special exhibitions, permanent collection, kids' tours, and descriptive audio for visually impaired. Can browse by floor, enter keypad number, view all in exhibition or view by floor	Only audio content is from Lee Kelly exhibition from fall 2010	None
Videos	None	Approx. 10 videos about permanent collection objects	Same videos from other Portland Art Museum app
Helpfulness for navigating in museum	Names of galleries identified in exhibition descriptions but these names are not included on gallery maps.	Option on each video to show object's location on map.	Superb. Turn-by-turn directions to the restrooms, cashiers or exits are great. Can search to navigate anywhere.
Helpfulness of general information	Able to buy admission and film tickets using the app. Includes MTA NYC Transit Maps. Subway, bus, car, directions. Parking information.	Exhibition information is out of date – only goes through September 2011.	Basic hours and admission info. Missing directions to location and parking info.
Best feature	"Visiting with a Family" text. Ideas for things to do with children before, during, and after visit.	Videos are very engaging and interesting to watch even when not at the museum	Turn-by-turn directions are unique, not in any other museum apps. Very helpful in a large and confusing museum like Portland Art Museum.
Anything missing?	If anything there is too much information. Even information about artwork not on display is included.	Nothing is up-to-date. App is not up-to-date because Meridian app is used now instead. Should be removed from iTunes app store so that it is not downloaded	Not a lot of content in general. Minimal upcoming exhibition info. No audio tours. No directions to museum or parking info.

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[1] The Portland Art Museum has two applications: one is called "Portland Art Museum" and has not been kept up-to-date. The information about the Portland Art Museum available on the Meridian App is kept up-to-date.

Comparison of mobile apps, continued

	Getty Museum	Yours, Vincent (Van Gogh Museum)	Royal Ontario Museum
Audio Tours	Many options – temporary exhibitions, permanent collection items, family tours, highlights of collection	Not tours, but individual audio segments based on van Gogh's letters	3 audio guides: dinosaurs, ancient Egypt, and Medieval Europe. Each between 20-30 minutes, one long recording about entire gallery.
Videos	None that I recall	Videos showing experts and family members discussing works of art and van Gogh's life	None
Helpfulness for navigating in museum	Great maps. For any item on audio tour, option given to find it on the map.	Not included	Good maps: zoomable, and drawn to be 3 dimensional rather than flat overhead view.
Helpfulness of general information	Maps were useful because Getty has multiple buildings, easy to get confused or lost.	Not included	Includes car, bus and subway directions. Admission prices, hours, contact info.
Best feature	Family tour was well done, focused on animals, used voice actors as animals depicted in works of art. Highlights tour was also great for visitors who do not have much time to visit.	Direct quotes from letters read by voice actor are very interesting and engaging.	Calendar feature lists all exhibitions, tours, and programs happening for selected day.
Anything missing?	App was only available on devices for check out at the museum, can not download the app onto your own device. Disappointing to not have it on own device.	Not a typical museum app – appears to have been created specifically for a 2009-2010 exhibition on van Gogh's letters. Seems to be made with the intention of being used outside of the museum, so no museum info is given.	Audio guides are disappointing because they are one long 20-30 minute recording. No choice in what to learn more about.

Comparison of mobile apps, continued

|	**Hammer Museum**	**Fowler Museum**	**Seattle Art Museum**
Audio Tours	None	Audio content available for semi-permanent exhibition "Intersections." More than 30 audio segments available, narrated by curator and museum staff.	Only audio segments with still image in this app. Arranged in alphabetical order by object title, not sure how you would know if an object had audio associated with it.
Videos	Only 2 videos, in one curator speaks about an artist's life, in the other a different curator speaks in depth about a work of art	None	None
Helpfulness for navigating in museum	There are maps and the galleries are numbered, but they are not labeled to indicate which have permanent collection and which have changing exhibitions	No maps included	No maps included
Helpfulness of general information	Address, hours, admission, parking information	Contains directions, parking, hours and admission information	No general museum information
Best feature	Exhibition descriptions include image galleries. Seems like it would be helpful for the visitor to look at to decide whether they want to come or not.	Good layers of information: audio guide stops are about 2 minutes each, but other sections called "Objects of Encounter" and "Added perspective" include even more text information about objects, so visitors have the option to learn more.	Some segments have background music, which is nice.
Anything missing?	Focus seems to be on giving visitor information before a visit, nothing there to enhance a museum visit.	Not up to date. Current exhibitions are all 2010 dates. Upcoming exhibitions are 2011 dates.	Some segments say who is speaking, others do not.

APPENDIX E: CURRENT JSMA WEBSITE DESIGN
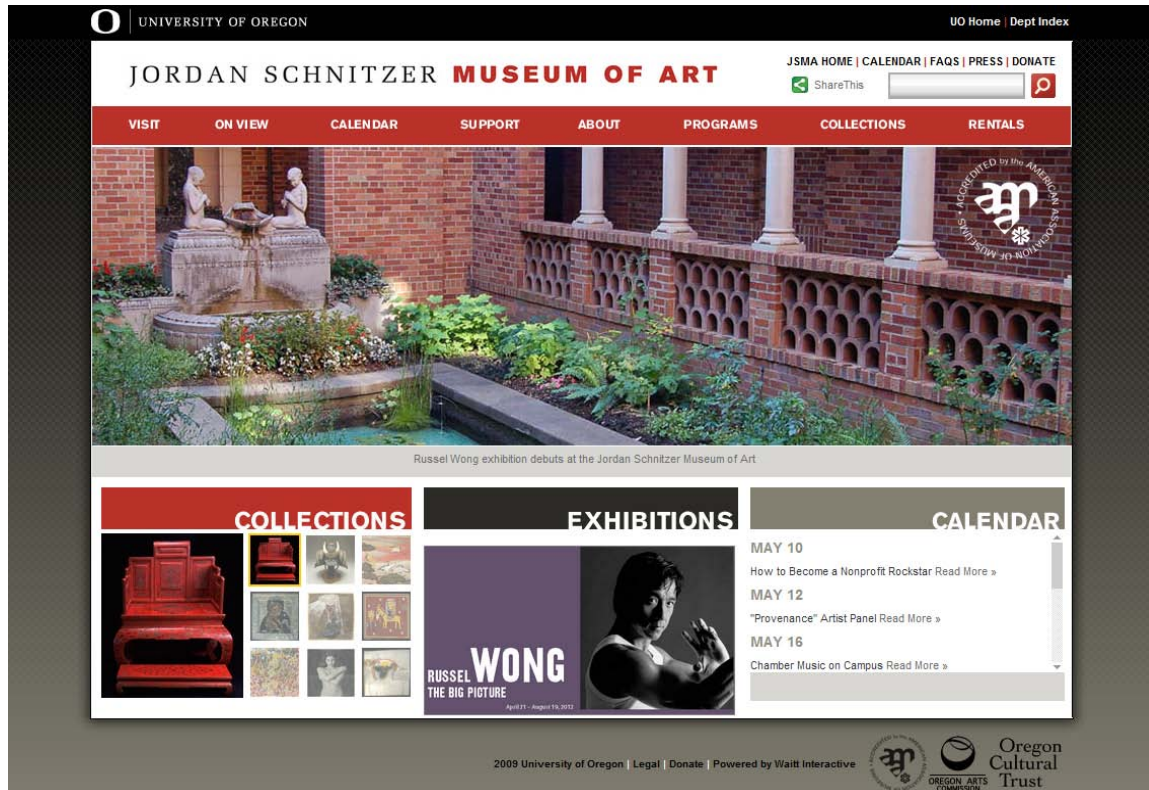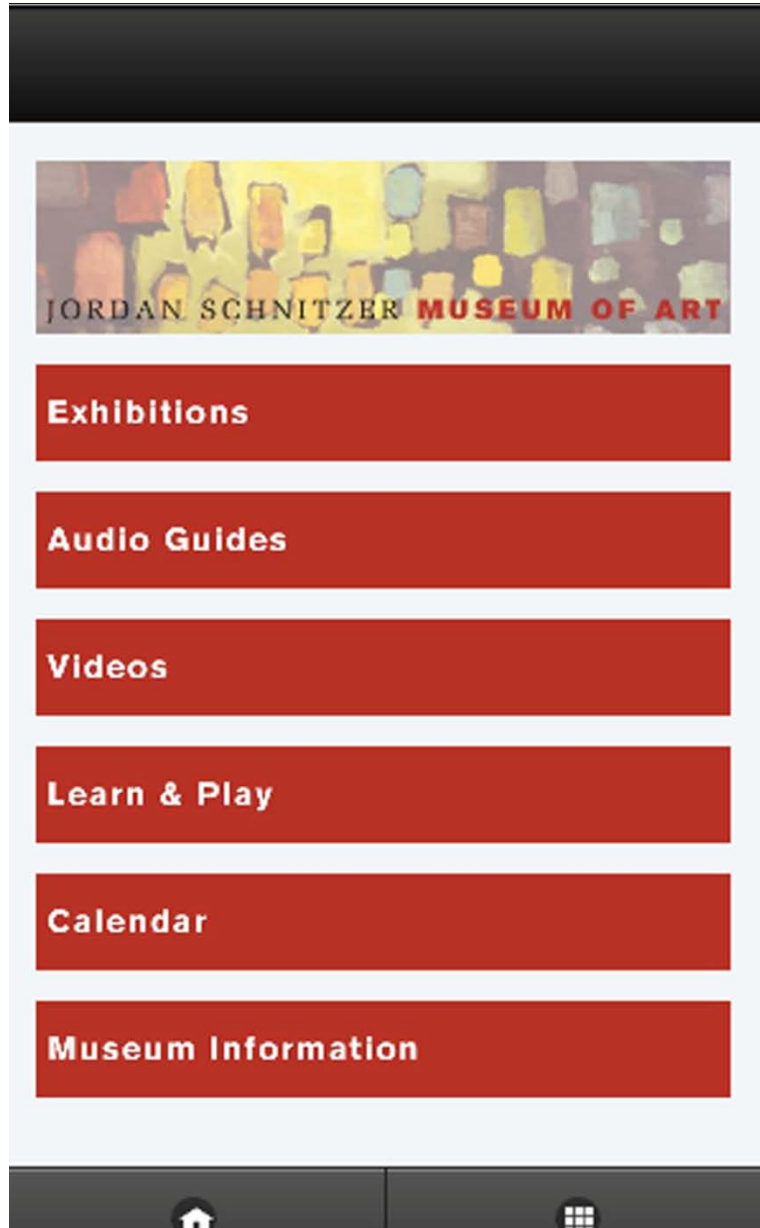

Screenshot taken on May 10, 2012

APPENDIX F: NEW JSMA WEBSITE DESIGN

New website design to be released in the near future
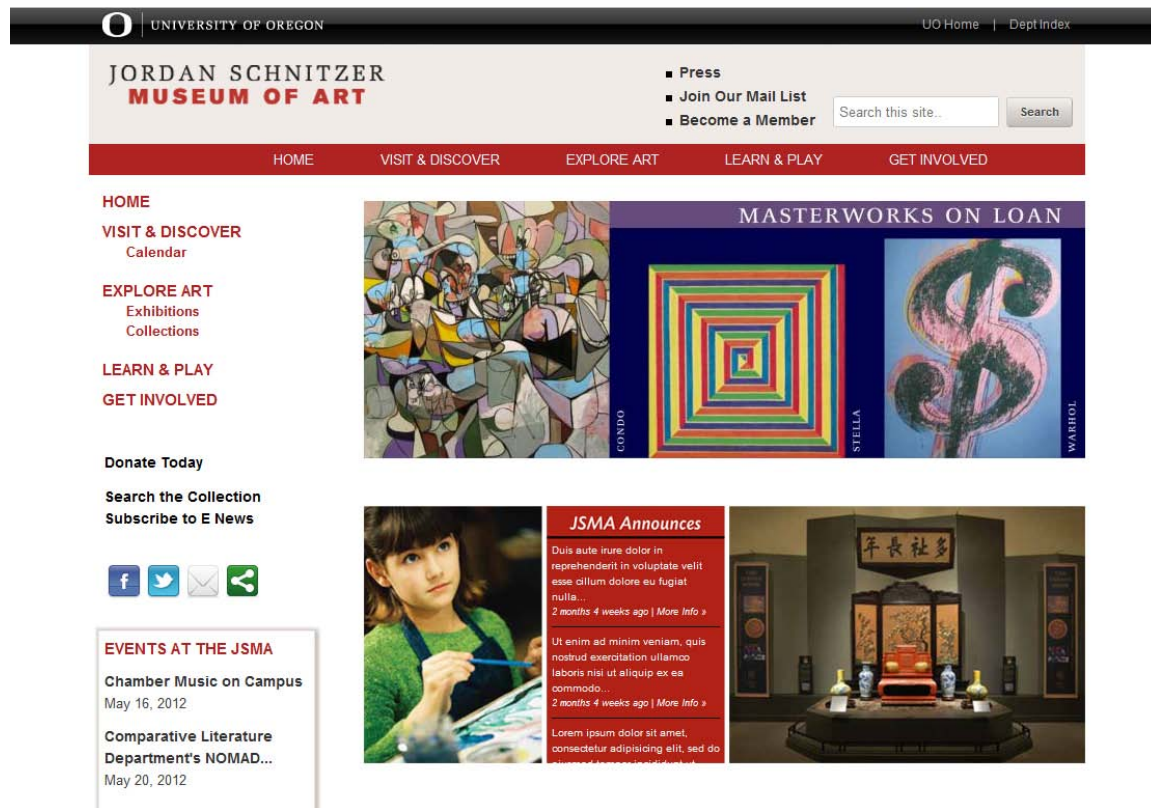
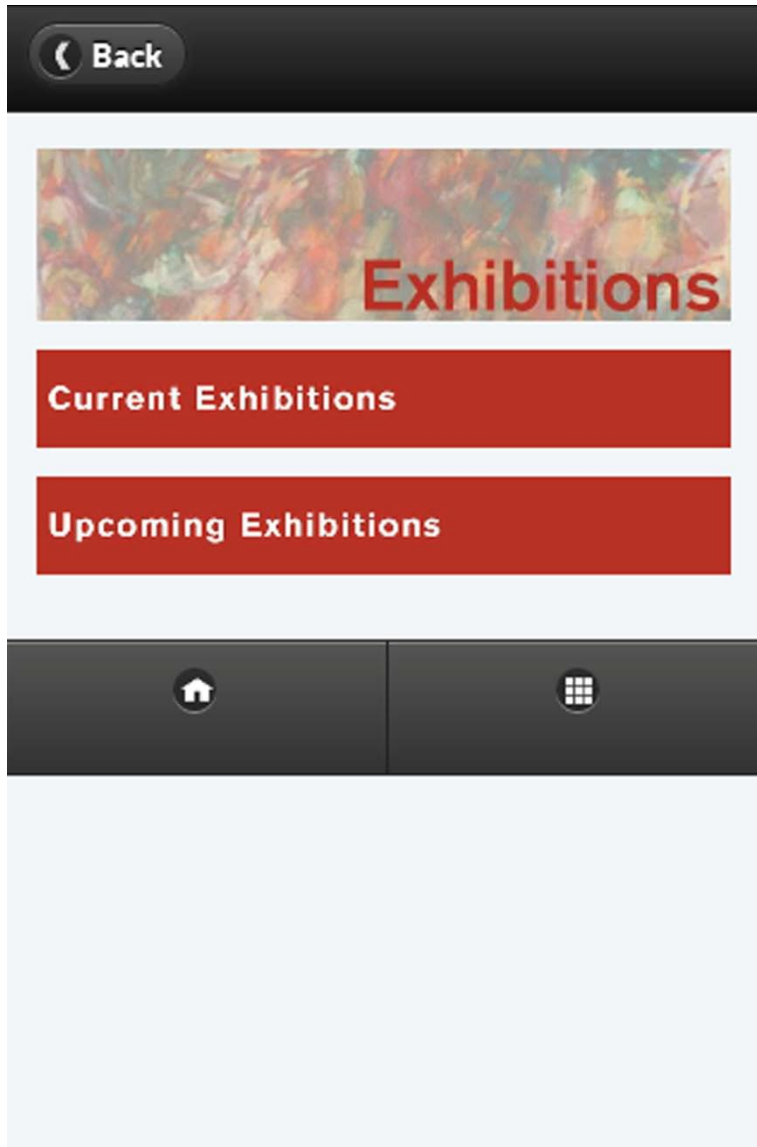**APPENDIX G: JSMA MOBILE APP SCREENSHOTS**

Appendix G.1: Home Screen

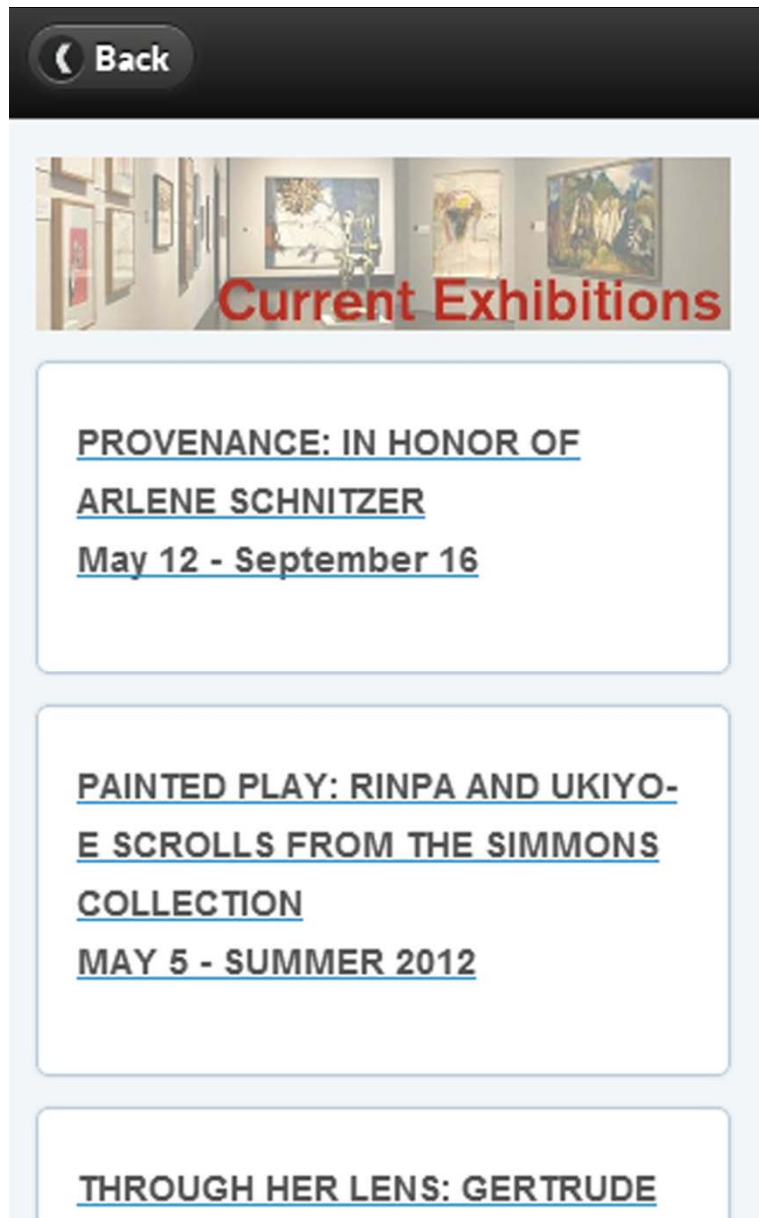*Appendix G.2: Exhibitions Screens*

Exhibitions screen with two buttons linking to Current Exhibitions screen and
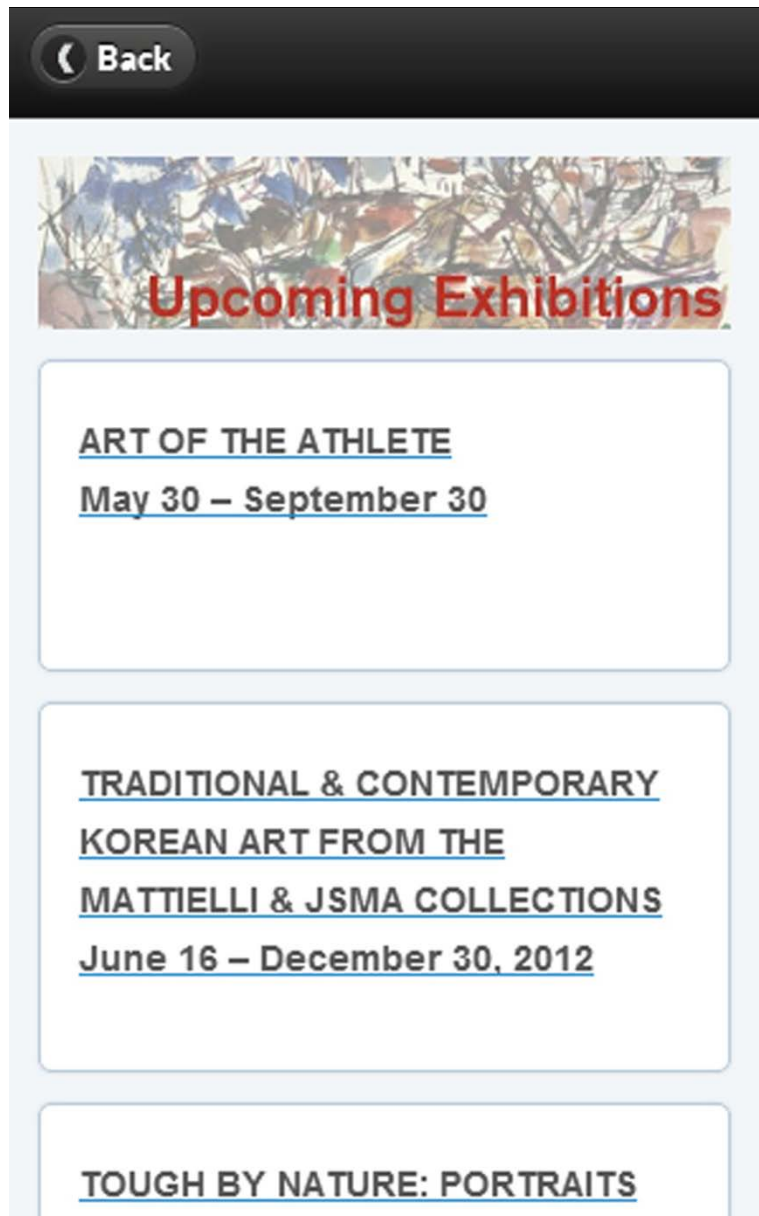
Upcoming Exhibitions screens

Current Exhibitions screen with header and rich-text links of exhibition titles and dates.

Each link navigates to a text description of that exhibit.

Upcoming Exhibitions screen with header and rich-text links of exhibition titles and dates. Each link navigates to a text description of that exhibit.

Rich-text content on individual exhibition description screen

Appendix G.3: Audio Guides Screen

The Audio Guides screen contains buttons linking to the different audio guide tours available. Actual tour content has not been developed at this time.
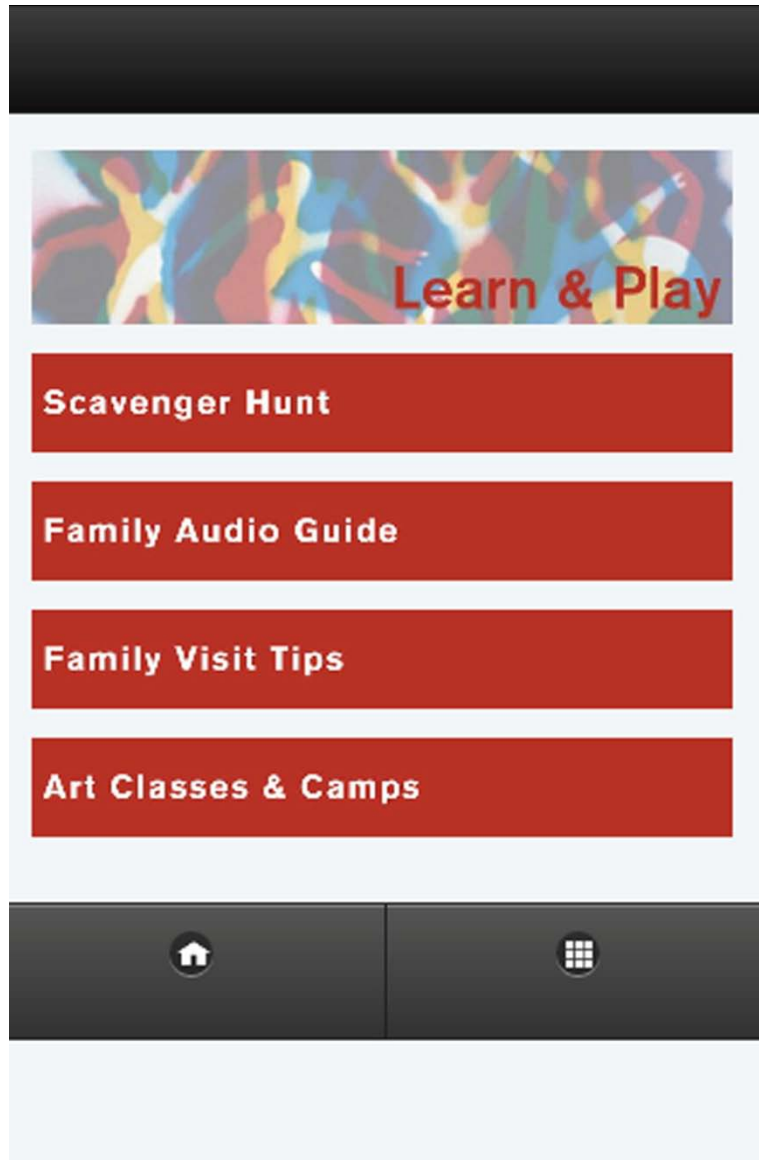
Appendix G.4: Videos Screen

The Videos screen contains rich-text links to each of the Art 1:01 videos that have been
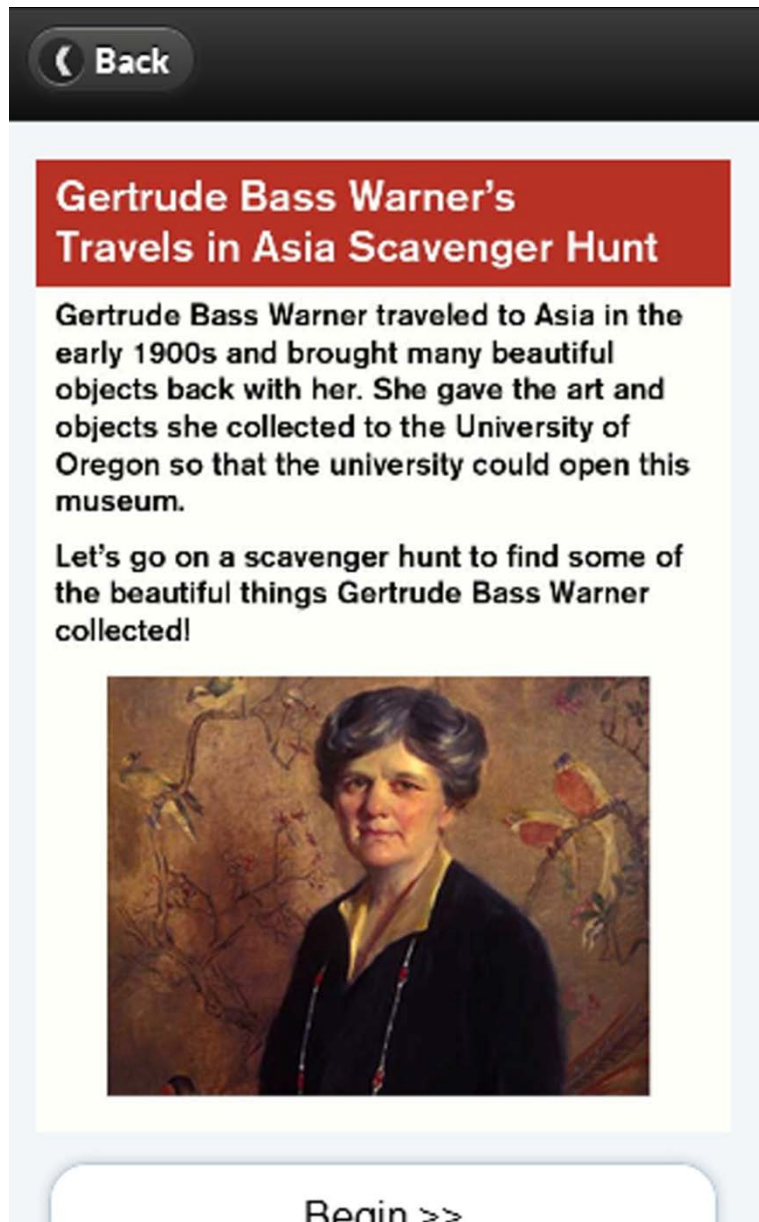
produced.
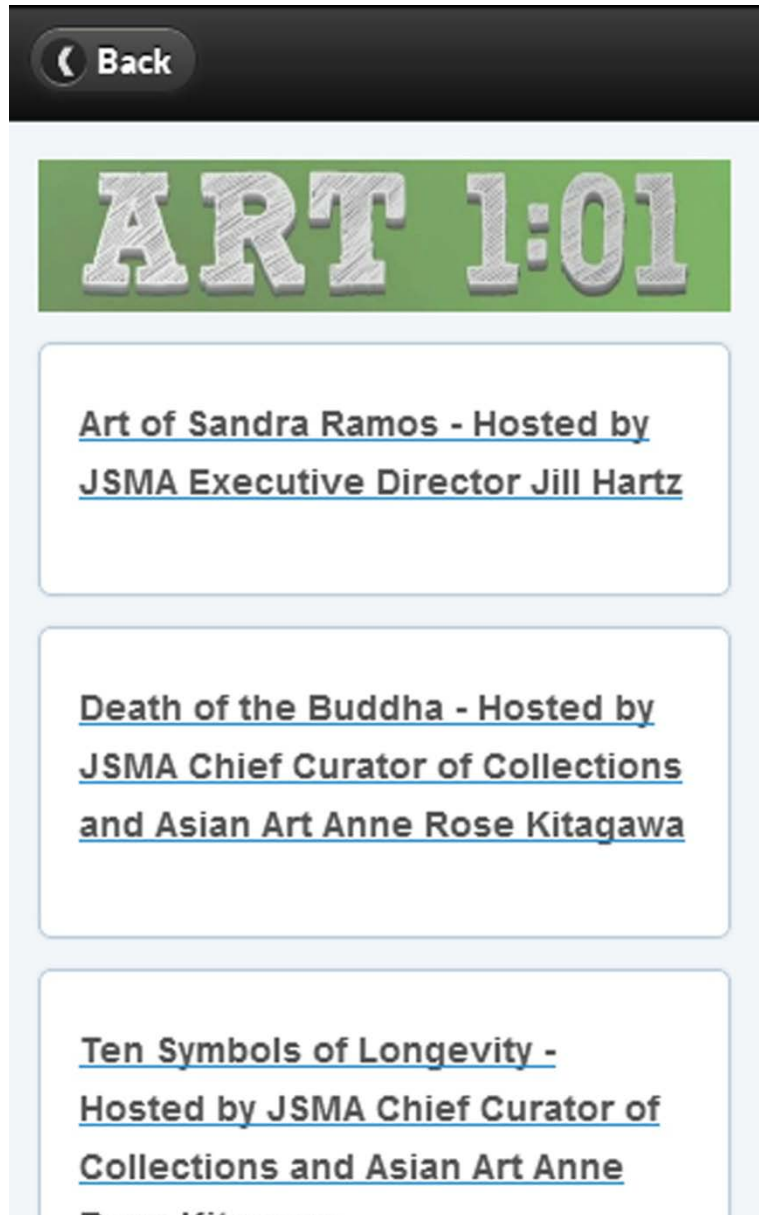
Appendix G.5: Learn & Play Screen

The Learn & Play screen contains links to family content: scavenger hunt, family audio guide, family visit tips, and classes and camps.
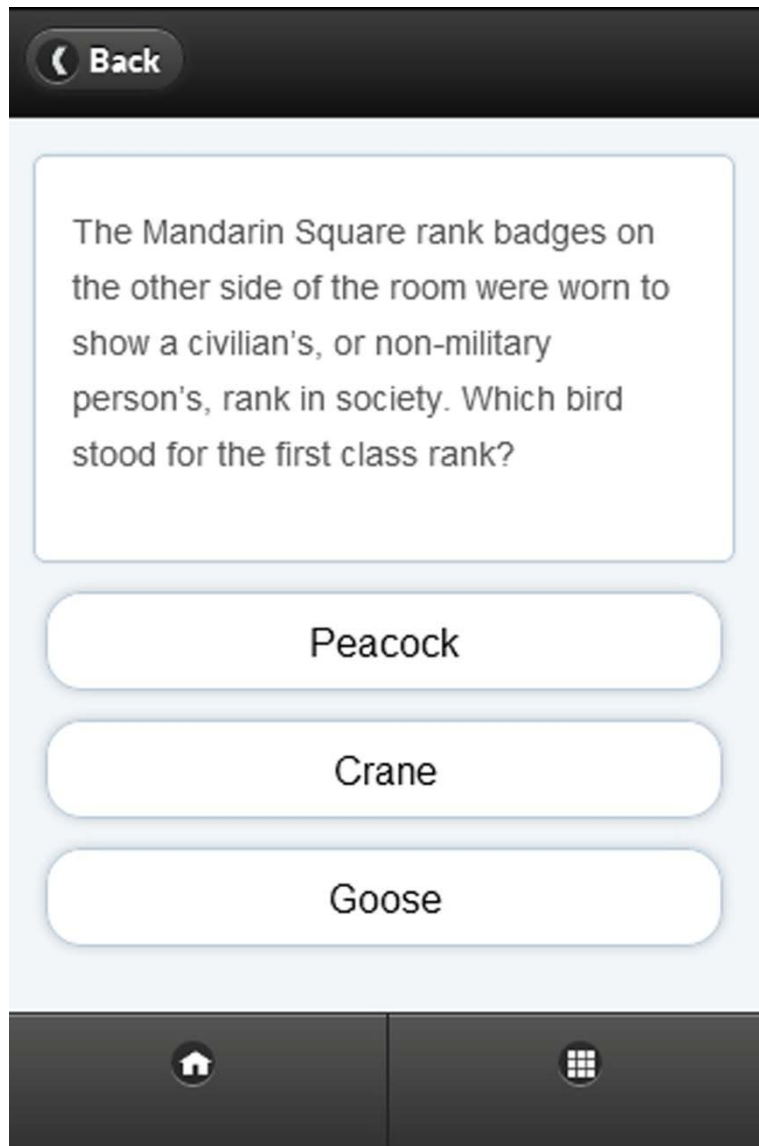
Appendix G.6: Scavenger Hunt

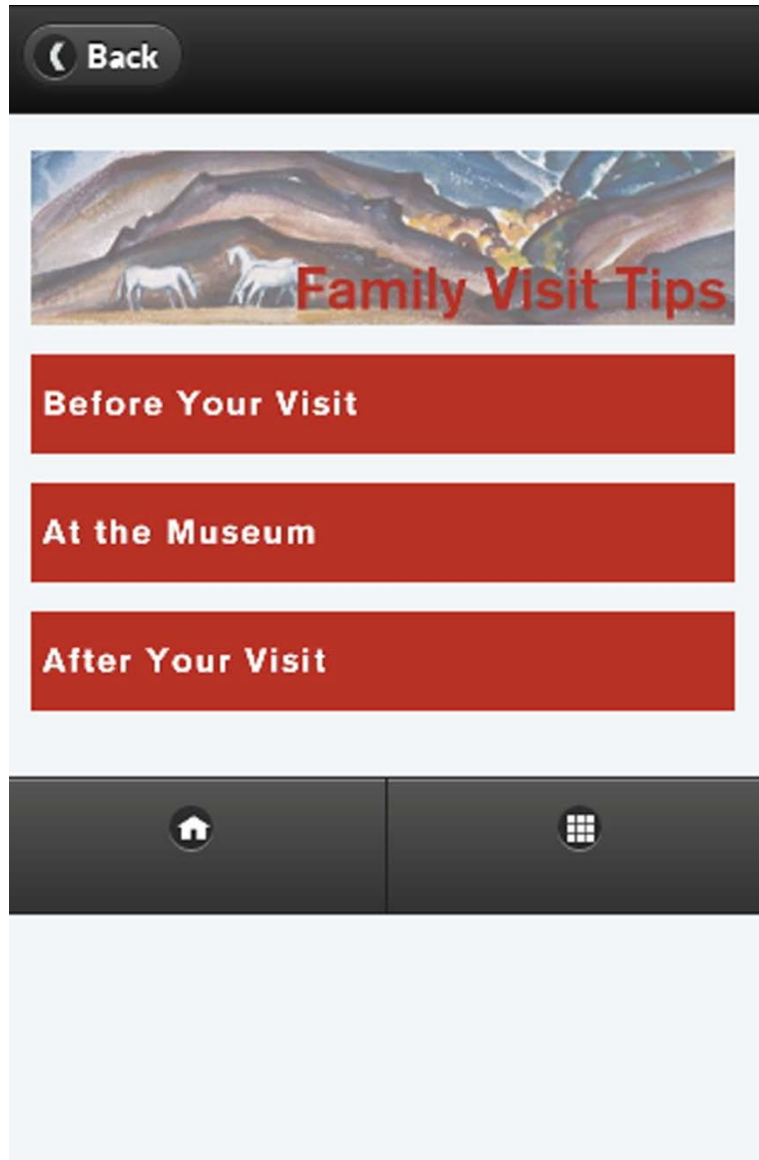The first screen of the scavenger hunt game

A scavenger hunt screen showing one of the questions whose answer can be found in the gallery

The Mandarin Square rank badges on the other side of the room were worn to show a civilian's, or non-military person's, rank in society. Which bird stood for the first class rank?
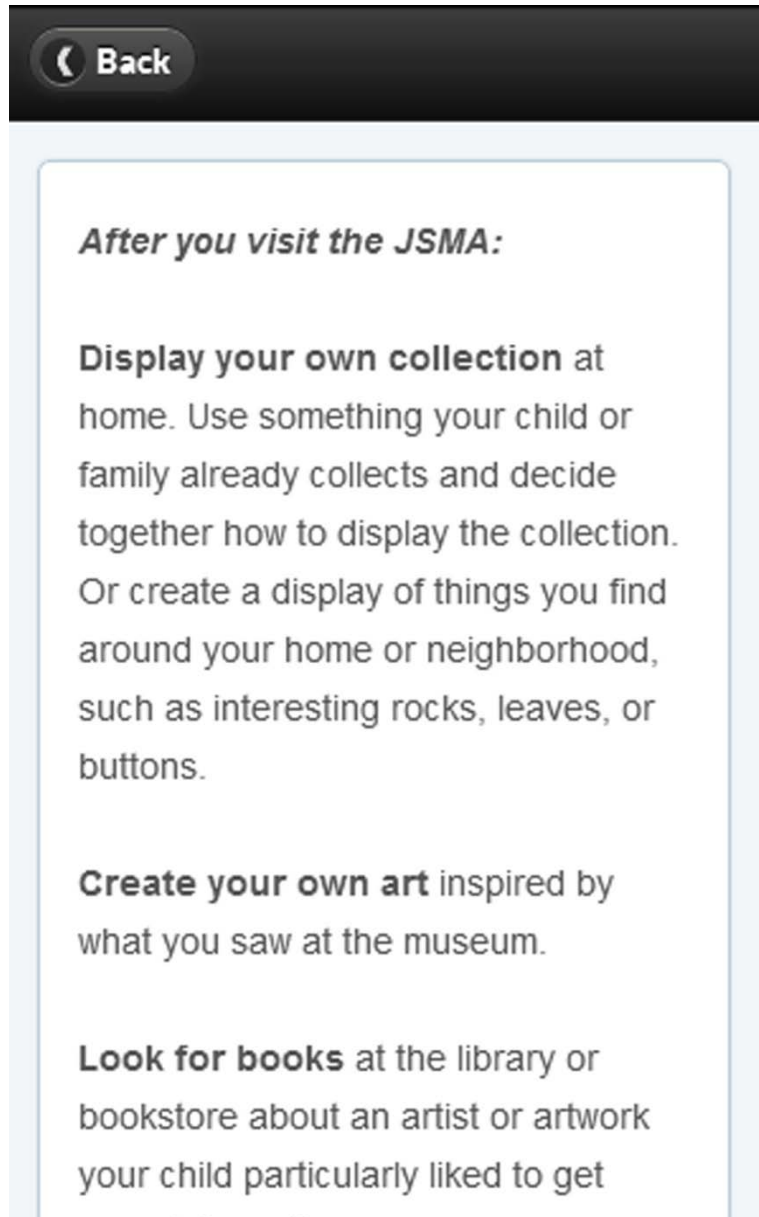
Peacock

Crane

Goose

Appendix G.7: Family Visit Tips

The Family Visit Tips screen with header and Before Your Visit tips, At the Museum

tips, and After Your Visit tips

After Your Visit tips screen created using rich-text

‹ Back

After you visit the JSMA:

Display your own collection at home. Use something your child or family already collects and decide together how to display the collection. Or create a display of things you find around your home or neighborhood, such as interesting rocks, leaves, or buttons.

Create your own art inspired by what you saw at the museum.

Look for books at the library or bookstore about an artist or artwork your child particularly liked to get
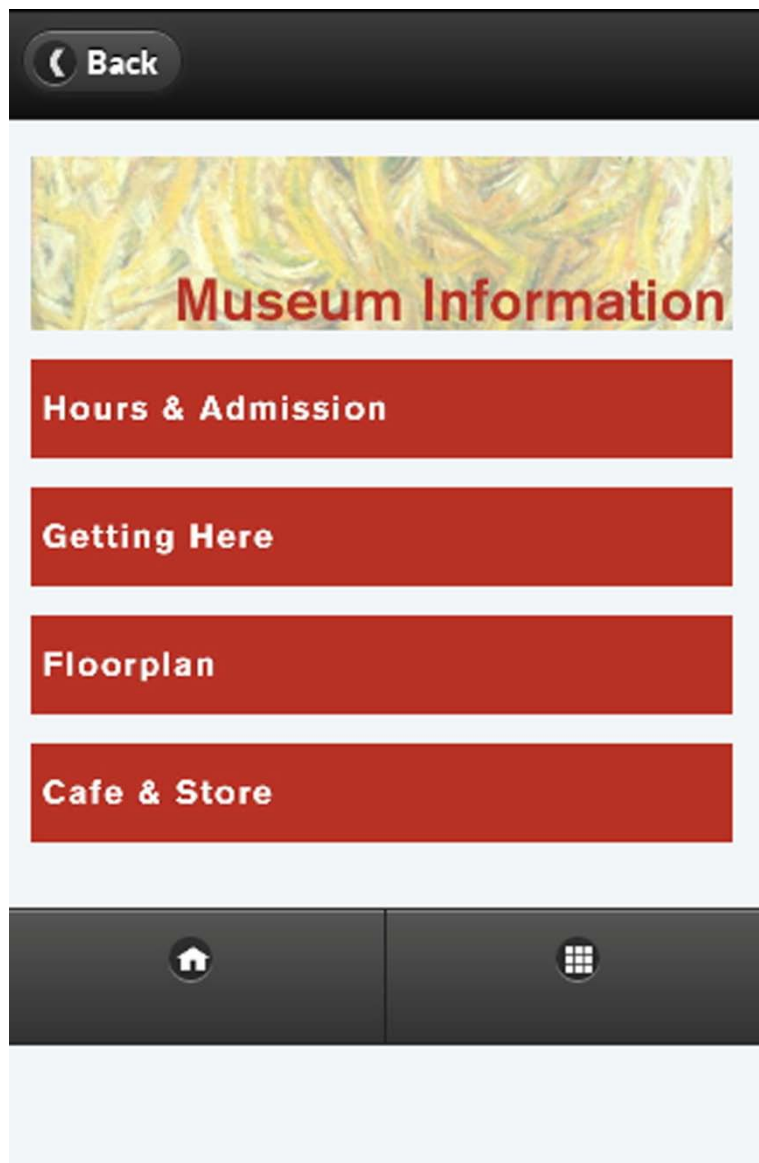
Appendix G.8: Calendar

Clicking the Calendar link on the Home screen redirects the visitor to the Calendar page on the JSMA's website.
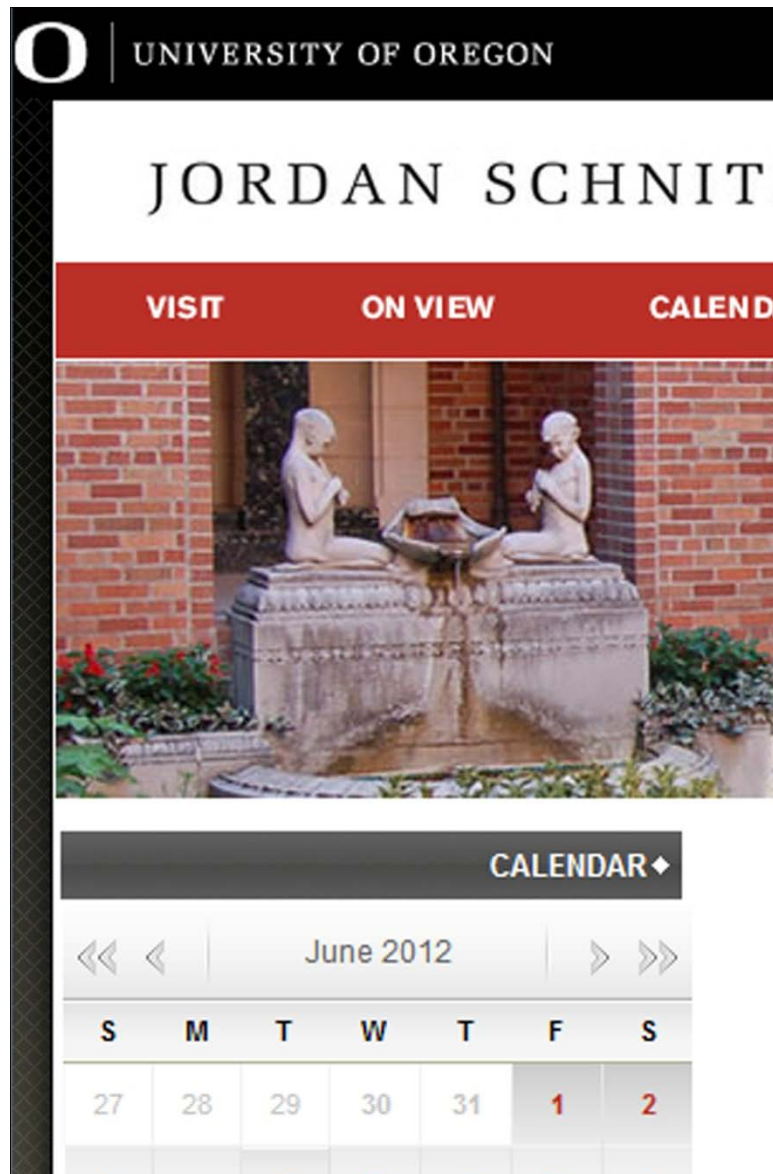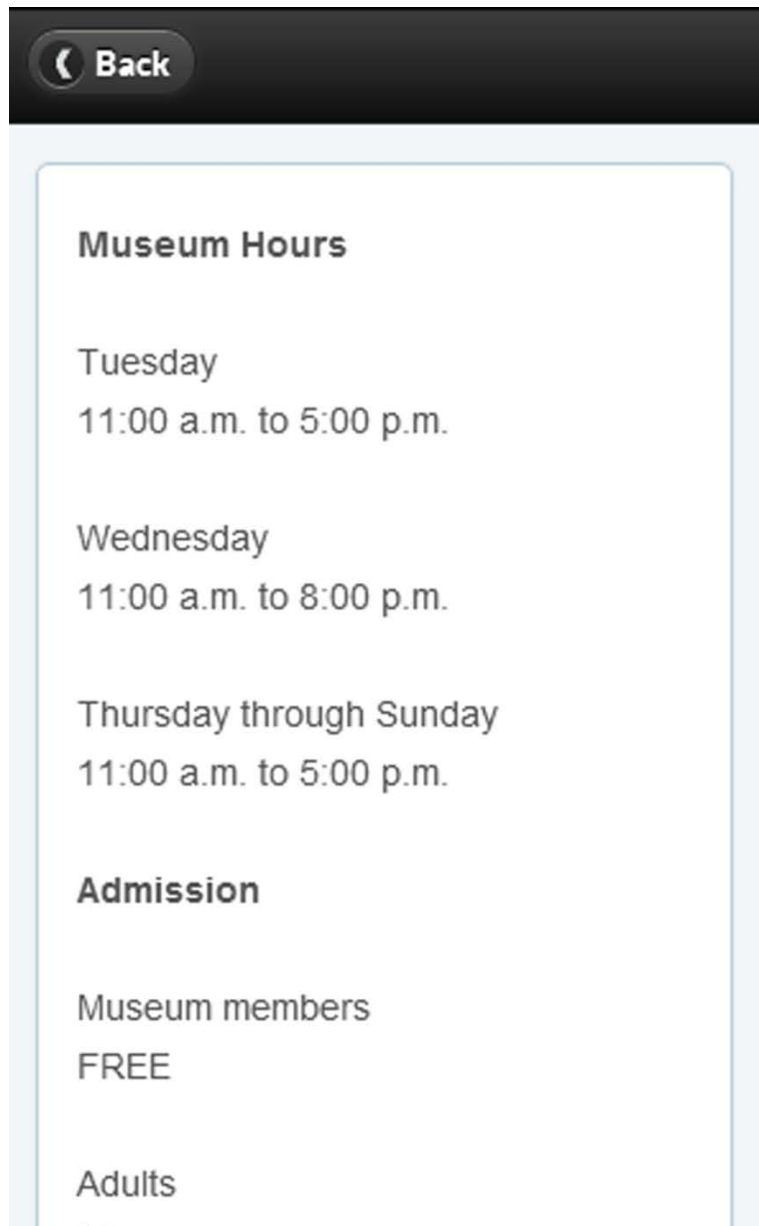
Appendix G.9: Museum Information

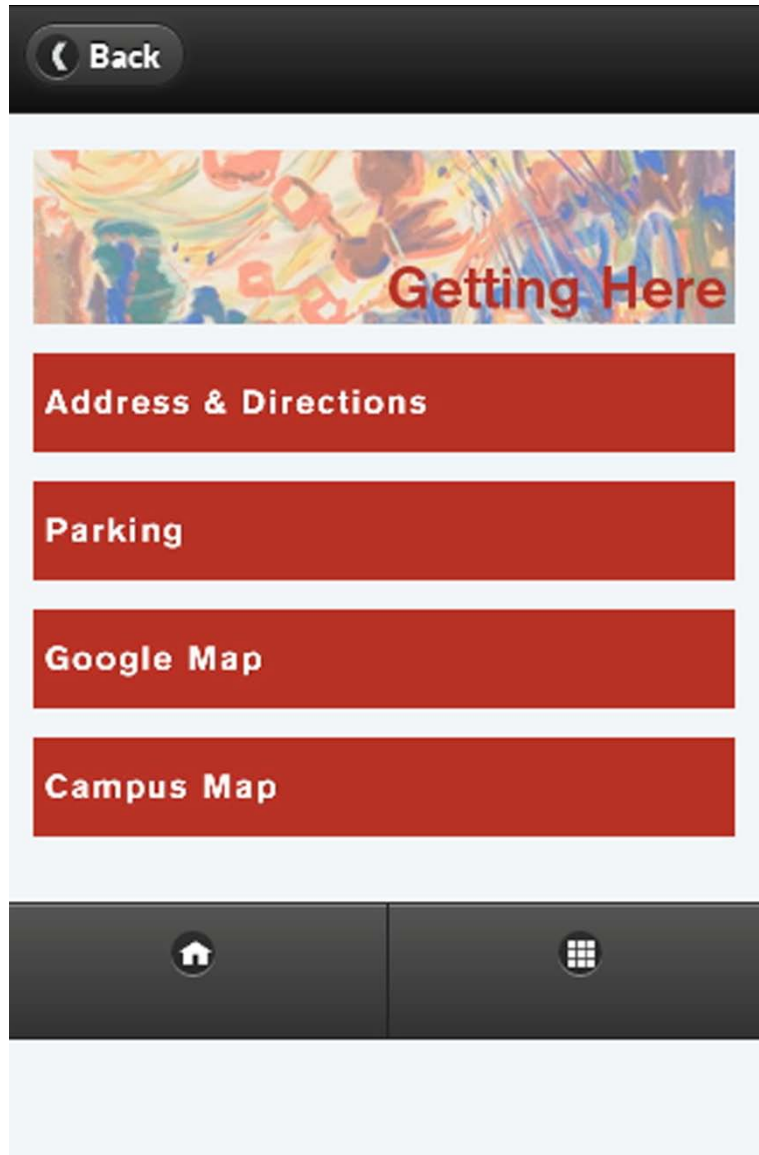**The Museum Information screen with header and links to museum information pages**

Appendix G.10: Hours and Admission

Hours and admission price information created in rich-text
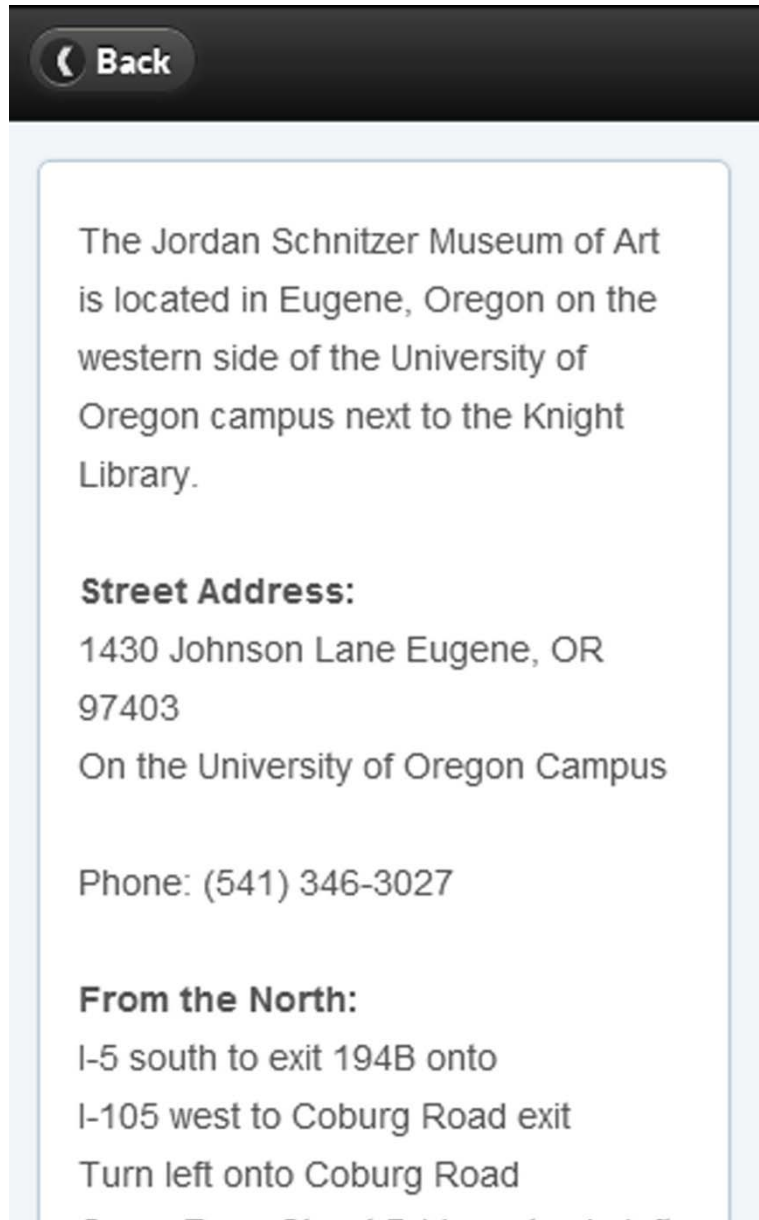
Appendix G.11: Getting Here

The Getting Here screen with links to address and directions information, parking

information, a Google map, and a campus map.

The Address & Directions screen contains text information

The Jordan Schnitzer Museum of Art is located in Eugene, Oregon on the western side of the University of Oregon campus next to the Knight Library.

Street Address:
1430 Johnson Lane Eugene, OR 97403
On the University of Oregon Campus

Phone: (541) 346-3027

From the North:
I-5 south to exit 194B onto
I-105 west to Coburg Road exit
Turn left onto Coburg Road

The Parking screen contains text information

Back

Metered parking is available on Kincaid and University Streets.

Free parking is available on weekends in many areas, including the university lot on Kincaid Street and 14th Avenue.

The passenger drop-off area is located at the rear of the museum at 1430 Johnson Lane.

Toursphere allows for the creation of a custom Google map indicating the location of the museum
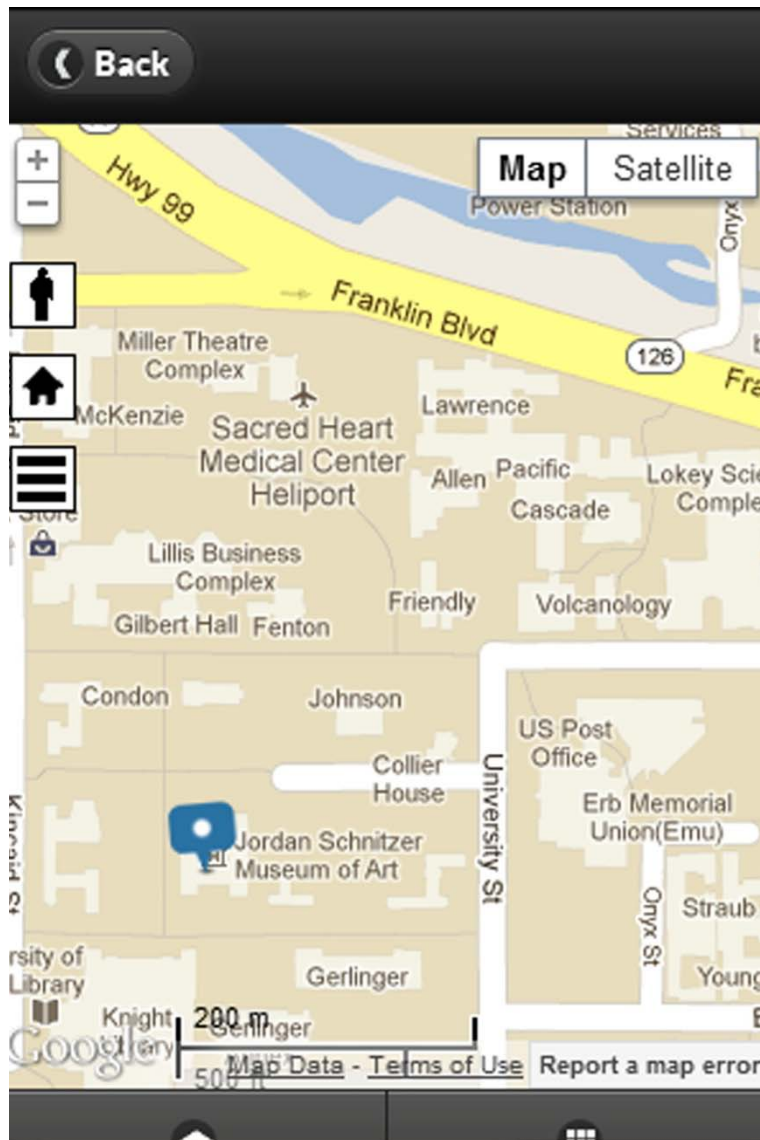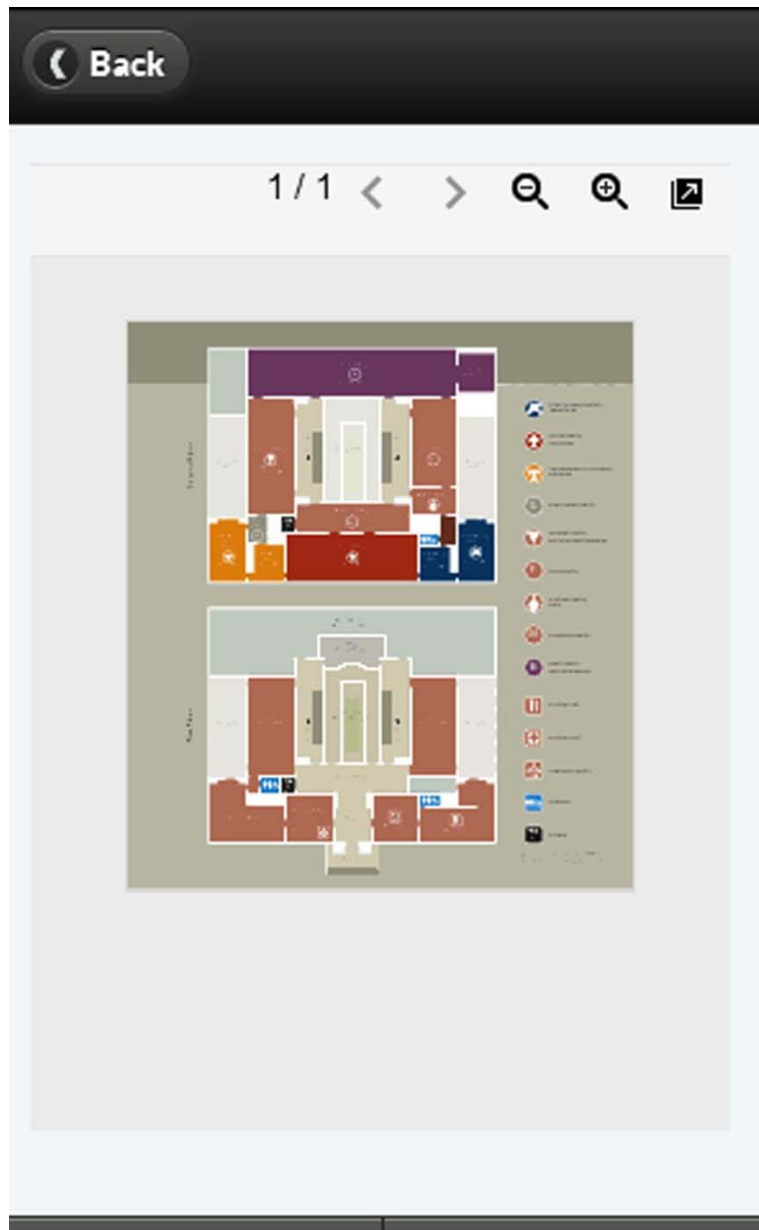
The visitor can use the zoom in and zoom out tools to view this campus map showing

the location of the JSMA's entrance
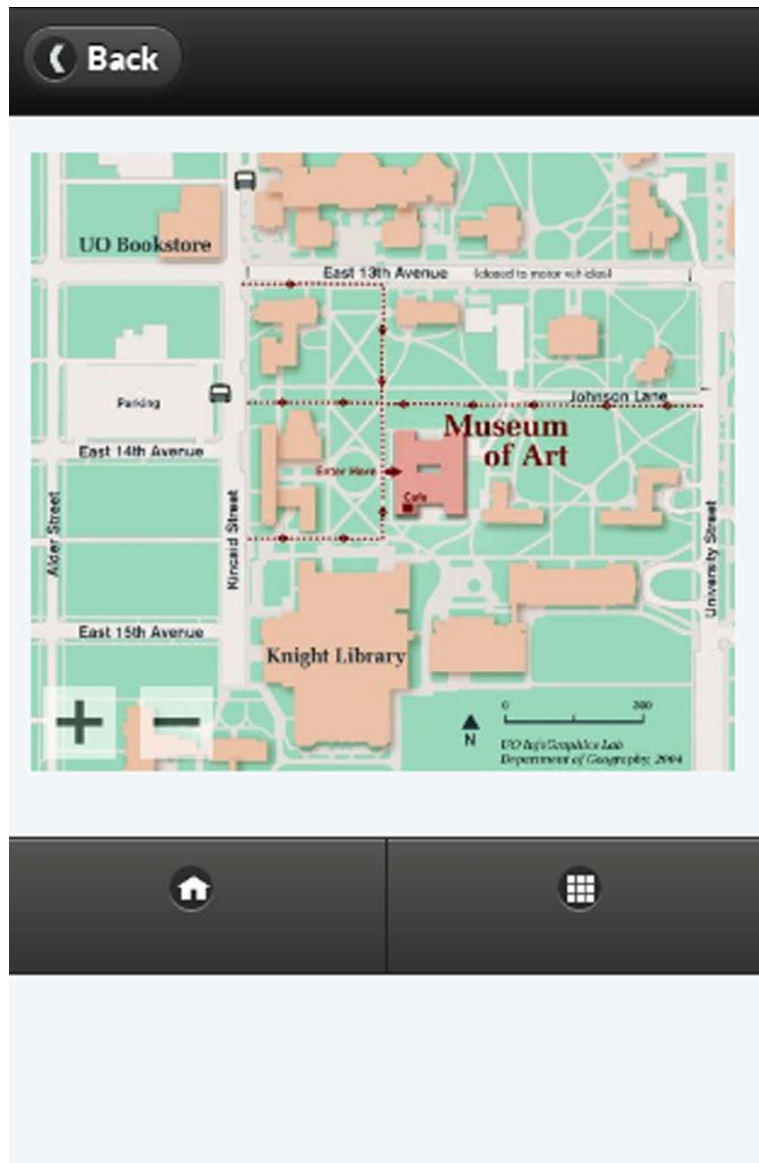
Appendix G.12: Floorplan

The visitor can use the zoom in and zoom out tools to view the floorplan in more detail

Appendix G.13: Café & Store

Text-only café and store descriptions and hours of operation

Marché Museum Café

Marché offers fresh, seasonal, and regional soups, salads, sandwiches, pastries, and coffees.

Café Hours
Monday through Friday
8:30 a.m. to 4:00 p.m.

Wednesday
8:30 a.m. to 7:00 p.m.

Saturday through Sunday
11:00 a.m to 4:00 p.m.

The cafe is closed major holidays.

Appendix G.14: Keypad

There is a link to the keypad screen at the bottom of every screen. When tour content is developed it can be accessed by the visitor by entering the number on the object's label in the galleries into the keypad on the app
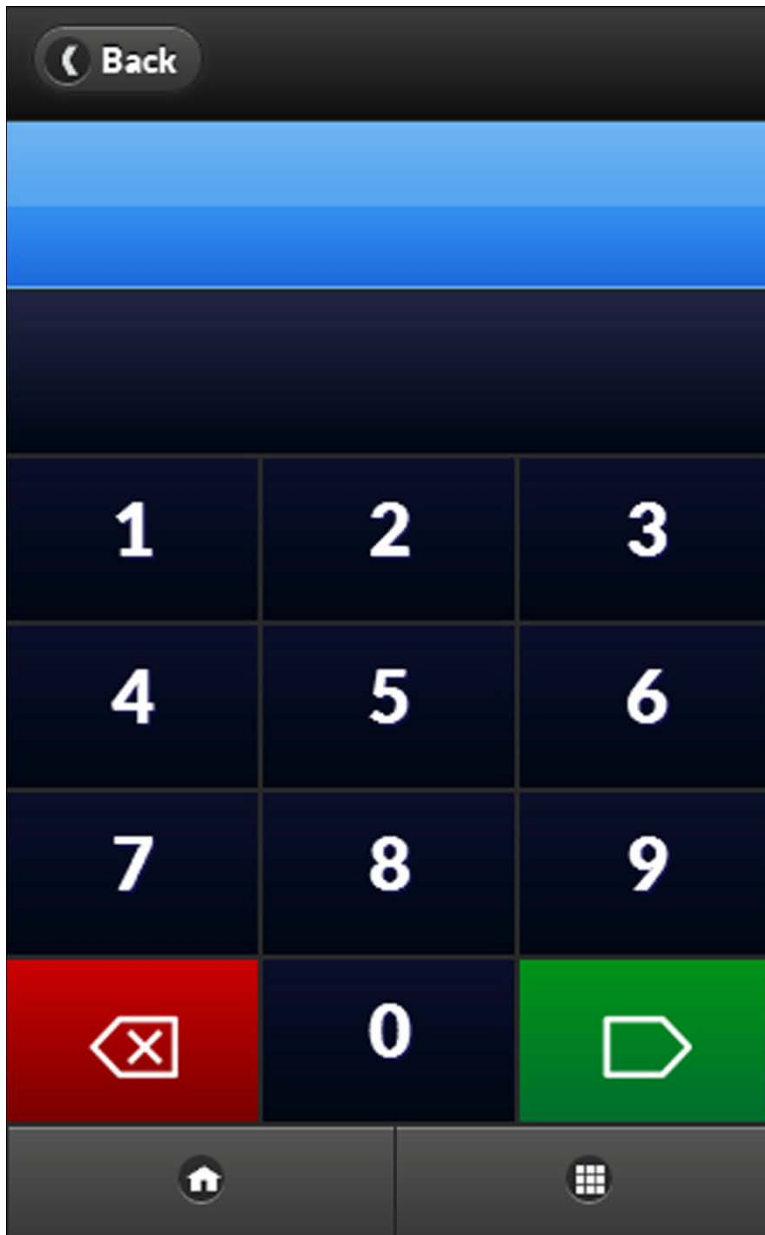
APPENDIX H: SCAVENGER HUNT GAME FULL TEXT

Below is a screen-by-screen listing of the text on each screen of the scavenger hunt

portion of the app. For screens with multiple choice questions the correct answer is

shown in bold. Selecting the correct answer will bring the visitor to the next screen. If an

incorrect answer is selected a page with the following text will appear: "Oops! That

answer is not correct. Please go back to the previous screen and try again."

Screen 1

Gertrude Bass Warner traveled to Asia in the early 1900s and brought many beautiful objects back with her. She gave the art and objects she collected to the University of Oregon so that the university could open this museum.

Let's go on a scavenger hunt to find some of the beautiful things Gertrude Bass Warner collected! [image of Gertrude Bass Warner]

Begin >>

Screen 2

Gertrude Bass Warner loved silk and collected many robes and badges made of silk. She wanted to learn everything she could about silk and how it was made, so she kept silkworms in her apartment when she lived in Shanghai, China!

In the Soreng Gallery of Chinese Art, look for a sign about silkmaking. How long is the thread from a single silkworm's cocoon?

- A. 1 yard
- B. 50 feet
- **C. ½ mile**

[link to image showing Soreng Gallery's location on map]

Screen 3

Correct! Each silkworm creates enough fiber to make a piece of thread a half mile long.

Now let's look at some of the silk objects Gertrude Bass Warner collected.

Continue >>

Screen 4

If you look around this room you will see a festival badge made of gold silk. What does the Chinese character on this badge mean?

    A. Long life
    B. Love
    C. Many riches

Screen 5

Correct! The character on this badge means "long life."

Continue >>

Screen 6

The Mandarin Square rank badges on the other side of the room were worn to show a civilian's, or non-military person's, rank in society. Which bird stood for the first class rank?
    A. Peacock
    B. Crane
    C. Goose

Screen 7

Correct! The crane badge was worn by first class civilians.

Continue >>

Screen 8

When Gertrude Bass Warner traveled to Asia she would have seen many buildings that looked different from the buildings she saw at home in the United States. Gertrude Bass Warner visited and photographed many buildings in Asia; she probably saw many pagodas during her travels.

Look for the jade pagoda in this gallery and count the levels. How many levels does it have?

    A. 9
    B. 10
    C. 11

Screen 9

Correct! There are 9 levels on this jade pagoda.

Continue >>

Screen 10

Gertrude Bass Warner visited many cities in China, including the capitol, Beijing, which was then called Peking.

Look for the display about Beijing's Forbidden City. How many emperors called the Forbidden City their home?

A. *24*
B. 48
C. 60

Screen 11

Correct! 24 emperors ruled from the Forbidden City between 1422 and 1911.

Continue >>

Screen 12

Gertrude Bass Warner traveled to many countries in Asia, not just China. Let's look in the Preble/Murphy Galleries of Japanese Art for our next clue.

Find the case that contains small sculptures called netsuke. Netsuke were made to hang from what?

A. Necklaces
B. *Detachable pockets*
C. Cell phones

[link to image showing Preble/Murphy Galleries on map]

Screen 13

Correct! Men hung small containers called sagemono from their clothing to hold their belongings and netsuke hung on the other side to keep the sagemono from slipping off.

Final question >>

Screen 14

Find the suit of armor in this gallery. What is it made of?

A. Aluminum, cotton, and wool
B. Silver, animal fur, and linen
C. *Iron, leather, and silk*

Screen 15

Correct! This suit of armor is made of lacquered iron, leather and silk.

Finish

Screen 16

Great job! You found many objects that Gertrude Bass Warner saw and collected when she traveled to Asia! Show this screen to the staff at the front desk to collect your prize!

[image of Gertrude Bass Warner]

APPENDIX I: FAMILY VISIT TIPS FULL TEXT

Below is the full text of the Family Visit Tips section of the app

Before Your Visit

Before you visit the JSMA:
Talk to your children beforehand about what they think they might see in an art museum.
Go over museum rules with your child. Explain that touching the art is not allowed because our fingers have natural oils that can damage the art.
Look at our website for information on current exhibitions that might interest you and your family.
Check our calendar for upcoming Free Family Days.

At the Museum

Activities in the JSMA:
Check out an Art Pack backpack from the front desk. These backpacks contain activities and information related to different types of art on display.
Listen to the family audio tour, geared for kids aged 5-12.
Ask your children questions about the art on display. You could ask: what do you see? What is happening in the art? What do you see in the art that makes you say that? What is it made of? How does it make you feel? What do you like/dislike about it?
Look closely! Ask your child to name colors, shapes, or objects they see in the art.
Have your child imagine what it would be like if they were inside of a work of art on display. What would they see, smell, hear, taste, or touch?
Bring a paper pad and pencil and have your children draw a picture of their favorite works of ar. For older children, encourage them to write a poem, sotry, or dialogue inspired by a work of art.
Read the title and wall label. Ask your child, does the title match what you think the art is about? What would you name this art? Why?
Try looking at the art from different distances. Does it look different up close than it did from far away?

After Your Visit

After you visit the JSMA:
Display your own collection at home. Use something your child or family already collects and decide together how to display the collection. Or create a display of things you find around your home or neighborhood, such as interesting rocks, leaves, or buttons.
Create your own art inspired by what you saw at the museum.
Look for books at the library or bookstore about an artist or artwork your child particularly liked to get more information.

APPENDIX J: ADDING RICH TEXT CONTENT SCREENSHOT
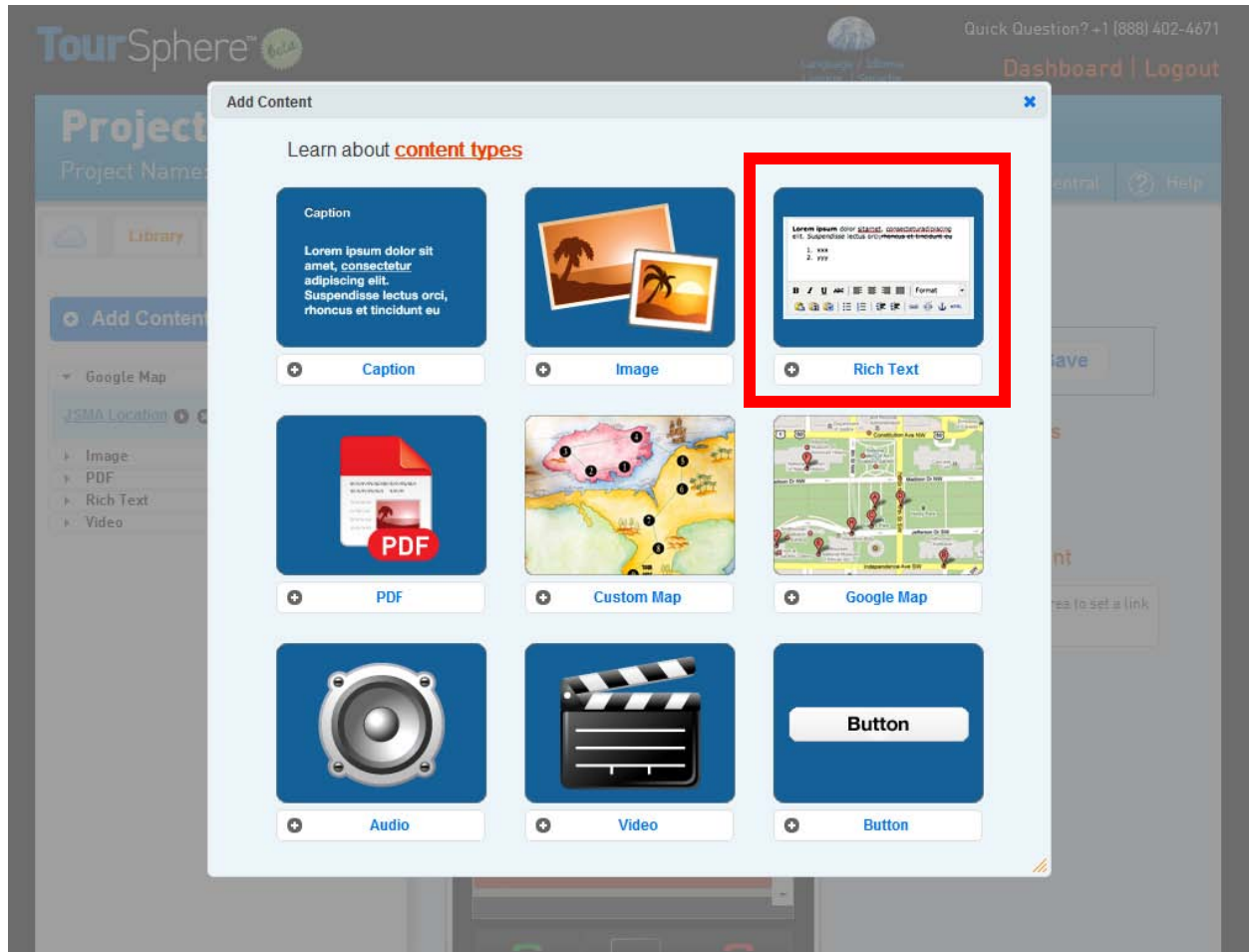
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