Analyzing Visitor Perceptions of Personalization in Art Museum Interactive Technology

Gracie Loesser

A dissertation

Submitted in partial fulfillment of the

Requirements for the degree of

Master of Arts

University of Washington

2016

Committee:

Jessica J. Luke

Brock Craft

Katie Headrick-Taylor

Program authorized to offer degree:

Museology

University of Washington

Abstract

Analyzing Visitor Perceptions of Personalization in Art Museum Interactive Technology

Gracie Loesser

Chair of the Supervisory Committee:
Jessica J. Luke, Ph.D.
Museology

Although art museums are increasingly exploring the use of interactive technology to engage visitors, very little research has explored visitor perceptions of these technologies and the specific strategies employed through the technology to achieve increased engagement. This study investigates visitor perceptions of personalization strategies in art museum interactive technology, using interviews conducted with average museum visitors to understand their perceptions of technologies that attempt to make the visitor's experience more personal and unique. Thirty-four visitors were interviewed in Gallery One at the Cleveland Museum of Art in Cleveland, Ohio. Results show that personalization did matter to museum visitors in the Gallery One space, but that despite the technology's perceived value among visitors, most visitors did not engage with the personalization features. These results expand the available research on interactive technology in art museums, suggesting visitors value personalization features, and calling for further research into the difference between valuation and use.

Table of Contents

CHAPTER 1: Introduction 7

Rise in Art Museum Interactive Technology 7

Personalization in Art Museum Interactive Technology 8

Call for Research 9

Purpose and Research Questions 10

Implications 10

CHAPTER 2: Literature Review 11

Technology-based Interpretation in Art Museums 11

Defining Personalization 13

What We Know about Personalization 15

Future Research into Personalization 17

CHAPTER 3: Methods 18

Research Site 18

Data Collection Procedures 22

Description of Sample 23

Data Analysis 24

Limitations 24

CHAPTER 4: Results and Discussion 25

In what ways are visitors using the personalization options featured in art museum interactive technology? 25

In what ways do the personalization strategies utilized in art museum interactive technology matter to art museum visitors, and why? 27

***Reactions to personalization features* 27**

***Personalizing experiences with art* 29**

How and why personalization matters **31**

How personalization influences interactions with artwork **32**

How do visitors perceive of different digital personalization strategies? Which elements of personalization matter most to visitors? **34**

CHAPTER 5: Conclusions **36**

Conclusions **36**

Further Research and Implications **38**

REFERENCES **40**

APPENDICES **43**

Appendix A: Interview Guide **43**

Appendix B: Coding Rubric **44**

List of Figures

Figure 1: Personalization Strategy Rankings by Visitor (n=34) 34

List of Images

Image 1: Visitors walking through the Gallery One space. 19

Image 2: Visitor using the Make a Face feature of the Sculpture Lens 19

Image 3: Visitors using the Collections Wall in Gallery One 20

Chapter 1

Introduction

Art museums are increasingly embracing technology as a method for engaging visitors with their collections. The Metropolitan Museum of Art is introducing virtual-reality goggles for viewing Jackson Pollock paintings, the Louvre is using Nintendo 3DS devices to provide interactive elements, including rotating 3D models of artworks and guided tours that supplement their exhaustive audio content, and the Getty is employing interactive, augmented reality, webcam technology to allow visitors to see inside a 17th century cabinet. These are just a few of the innovative ways art museums are using technology in their museums to encourage visitor engagement with collections. Interactive technology is being implemented in art museums across the world, as cultural heritage institutions search for new and exciting ways to engage their visitors (Schiele & Koster, 2000; vom Lehn, Heath, & Hindmarsh, 2005; Templeton, 2011).

The topic of digital interactives in art museums is frequently referenced in journals, newspapers, conference proceedings, and other published materials. The most recent edition of the Association of Art Museum Director's "Next Practices" series, which aims to share innovative initiatives in the museum field, focuses on "Next Practices in Digital and Technology" (AAMD, 2015). Containing 41 submissions from art museum directors on the various uses of digital technology in art museums from mobile apps to in-gallery interpretation, the publication highlights the importance art museum directors place on the increasing role of digital technology in the museum field. The recent surge of digital technology initiatives in art museums has also received significant media attention, with articles focusing on the rise of digital interactives in art museums written by the Atlantic, the New York Times, and the

Washington Street Journal among others (Stevens, 2012; Lohr, 2014; Gamerman, 2015; Meyer, 2015).

Although there has been significant media coverage on and grant funding of digital technology initiatives, personalization in the museum field has still not fully been described. There is a lack of publically accessible research that focuses on visitor perceptions of these personalized technologies, and how the technology may or may not affect the visitor's experience with art. Initiatives such as the $83 million Bloomberg Connects aim to "support the development of technology that transforms the visitor experience…encouraging interaction" (Bloomberg Philanthropies, 2016). Yet, more research is necessary in order to demonstrate how various digital strategies transform the visitor experience and encourage interaction as intended.

It has been shown that interactivity in a museum environment "promotes engagement, understanding and recall of exhibits and their content" (Allen & Gutwill, 2004). Research has also shown that when using interactives in art museums, visitors value certain experiences over others. Adams and Moussouri (2002) found that museum visitors desired interactive experiences that "enable them to engage in genuine exploration, follow their own interests and facilitate social interaction" (p. 3).

One element of this new technology has been a focus on providing, unique personalized experiences for every museum visitor. Using creative design, participatory strategies, and innovative technological programming, art museums have begun integrating technology into their galleries that allow visitors to design their own tours or websites, create their own digital artworks, and share their favorite pieces and new creations with friends and family via social media.

There has been some research into personalization technology in the cultural heritage sector. Experiments in the use of personalization strategies in museums and other cultural institutions have been conducted since the 1990s, with developments such as ILEX or Intelligent Labelling Explorer, which was a system for generating object labels taken from material within a defined database (O'Donnell et al, 2001; Ardissono, Kuflik, & Petrelli, 2011). The system was designed in collaboration with the National Museums of Scotland. Some research has been conducted on the technical usability of personalized or adaptive systems (Weibelzahl, 2005; van Velsen, van der Geest, Klaassen, 2007; Kuflik et al, 2011). These studies have shown that users appreciate adaptive technology, but often do not recognize the personalization strategies implemented. As Weibelzahl (2005) highlights, personalization is good when it goes unnoticed by the user.

However, despite over twenty years of innovation and experimentation with personalized digital interactive technology, there is still very little publically available research that articulates the various strategies that museums take to achieve personalization, or the ways that personalized technology in art museums affect the visitor experience. As Ardissono, Kuflik, and Petrelli (2011) astutely state in their article on personalization strategies in cultural heritage, "Concerning personalization, while there is room for continuing experimentation with new ideas and new technology, the real issue is to support realistic scenarios—real visitors and users, as individuals and groups in daily interactions with cultural heritage." By studying the effect these digitally mediated experiences have on visitors' experiences, the field can broaden their understanding of how visitors engage with art.

The purpose of this study is to understand visitor perceptions of personalization strategies utilized in art museum interactive technology and its perceived effect on the visitor's experience and engagement with art. The study is guided by three research questions:

1. In what ways are visitors using the personalization options featured in museum interactive technology?
2. In what ways do the personalization strategies utilized in art museum interactive technology matter to art museum visitors, and why?
3. What are visitors' perceptions of different digital personalization strategies? Which elements of personalization matter more to visitors than others?

Results from this research add to the existing publically accessible data on the nature of visitor engagement with art through the use of digital mediation, allowing the field to better understand what connections visitors are making with art and how personalized digital interactives can facilitate a variety of visitor-driven methods of collections engagement. These results will inform not only digital interactive designers, but also interpretive and educational specialists within art museums so that they can better understand the role that personalization strategies found in digital technology affect the visitor's engagement with art.

Chapter 2

Literature Review

This literature review outlines the development of digital art engagement and interpretation strategies in museums, to give the reader a sense of how museums have approached the task of engaging audiences with their art collections, specifically exploring technology-based interpretation in art museums. Then, the section reviews the strategies museums have taken to create unique, personalized experiences for their visitors, discussing what the research tells us about the use and effectiveness of personalized interactive experiences in museums.

As a place for the public to view and appreciate art, art museums have continuously pursued new strategies for engaging their visitors. Non-digital strategies include exhibit labels, docent-led tours, and even the inclusion of benches from which to view artwork.

Technology-based interpretation in art museums

One recent strategy for engaging visitors with art has been through the integration of technology. Indeed, the topic of engaging the public with the arts through the use of technology has received substantial attention, even inspiring the creation of Bloomberg Connects, an initiative aimed at "supporting the development of state-of-the-art technology, from mobile applications to immersive galleries and other dynamic tools, designed to transform the visitor experience, encouraging interaction and exploration of cultural institutions on and offsite" (Bloomberg Philanthropies, 2016, para. 2). Through this initiative, the Solomon R. Guggenheim Museum, the Metropolitan Museum of Art, the Art Institute of Chicago, the New York Botanical Garden, and the Museum of Modern Art received $15 million dollars to integrate mobile technology into their institution. In general, technology is seen as indispensable to arts

organizations, as evidenced by a recent Pew Charitable Trust survey of 1,256 arts organizations, which found that 78% of the organizations felt that technologies were "very important" for increasing audience engagement (Pew Research Center, 2013).

This implementation of technology has occurred in various dimensions. One way in which art museums have integrated technology into their organizations is through the development of an online presence. The same Pew study found that 99% of organizations surveyed had their own website, and 97% had some form of social media presence, such as an account on YouTube or Facebook (Pew Research Center, 2013). Research demonstrates that not only do visitors appreciate the existence of a website, but also expect online, "user-friendly" access to arts collections (Getty Foundation, 2007; Marty, 2008). This access to collections online has proven very valuable to visitors (Kravchyna & Hastings, 2002), and art museums are increasingly digitizing their collections in order to provide access remotely to the general public. Although additional research can still be conducted, a substantial collection of research has been conducted on visitor interest in and perceptions of online collections, concluding in a general understanding of who uses online collections databases, the frequency of usage, and user search strategies and preferences, among others (Hughes, 2011; Wickell, 2014).

Another method of integrating technology into museums has occurred on site, with institutions introducing computer stations, mobile apps, and other interactive elements to encourage engagement. Much of the research that has been conducted on interactive technology in museums has been focused on science centers and other related institutions. However, that research tells us that technological integration in exhibits does attract visitors and holds their attention (Sandifer, 2003). However, a 2005 study by Heath et al. explored the use of stationary touch stations in museums, finding that these stations may limit the complexity of visitors'

collaboration and co-participation (Heath, vom Lehn, & Osborne, 2005). The study hoped to explore how exhibits can facilitate interaction and collaboration among visitors. Researchers analyzed approximately 500 hours of video data collected at the Wellcome Wing of the Science Museum in London as well as the Explore@Bristol science center, which both featured "cutting-edge" interactive technology. In addition, interviews were conducted with designers, educators, and museum managers as well as visitors. The researchers suggest that the limited nature of visitors' collaboration and co-participation is due in large part to the design of the interactives themselves, which privileged individual usage.

The use of digital technology in art museums has also been explored. The American Alliance of Museum (2012) study on mobile technology in museums stated that "art museums have traditionally been at the forefront of mobile offerings," and the study found that 35% of all art museums surveyed were using new mobile technology to engage visitors. A 2003 study examined the ways in which visitors to a contemporary art gallery used Personal Digital Assistant devices to navigate an exhibition, focusing on the ways the visitors used the device to examine objects, alone and with others, and how the PDA may have affected the way visitors organized their own visit (Von Lehm & Heath, 2003). The researchers conducted field observations and video recordings of visitors using a PDA in the galleries over a four-week period. They found that the PDAs changed the way that visitors navigate through the museum, significantly increasing dwell time in areas highlighted by the device.

Defining personalization

Personalization as a technological strategy has differing definitions within various disciplines and industries. On a technological level, personalization is "a process of providing relevant content based on an individual user preferences" (Kyung Lee, 2013, p. 25). More

generally, and more applicable for the purposes of this study, personalization strategies allow museum visitors to have unique experiences, by leveraging technology to allow visitors to customize their tours through the galleries, navigate through a museum's large collection, or design and share their own personal creations, to give a few examples. Rather than a typical museum experience, in which a visitor is confronted with a series of interpretive devices aimed at a large, diverse audience, a personalized museum experience is focused on the needs and desires of the individual.

A number of art museums have begun incorporating personalization strategies into their interpretative plans, including the Cleveland Museum of Art, the Cooper Hewitt Design Museum, and the Dallas Museum of Art. These initiatives can vary, with the Cleveland Museum of Art and the Cooper Hewitt Design Museum focusing on collections, and the Dallas Museum of Art centering their initiative on membership. There has been much theory focused on the relevance of personalization strategies in museums to visitors. Nina Simon (2010), in her much-read book "The Participatory Museum," states that "visitors need to see how cultural institutions are relevant and valuable to their own lives, and the easiest way to deliver that is via personalized entry points that speak to people's individual needs and interests" (p. 35). Additionally, John Falk (2006) has expressed the need for personalized experiences in museums, stating that

> the more tightly aligned the experience is with individuals' own fundamental needs, the more profoundly and intensely satisfied they will be...our research would suggest that any movement toward customization based upon motivation and identity will help ensure that the experiences your public has lead to a significantly enhanced perception of value (p. 103).

Overall, customization and personalization in museums has been highlighted by many prominent museum studies theorists as an effective and necessary engagement strategy.

What we know about personalization

In terms of the research that has been conducted on personalization in museums, Colleen Dillon (2015) has recently released data on visitor perceptions of non-digital personalization in museums. Drawing on a research conducted at an undisclosed organization that partners with the predictive technology company IMPACTS, Dillon looked at the effect that PFEs, or personal facilitated experiences, have on the museum visitor. A PFE is a *"*one-to-one or one-to few interaction that occurs between an onsite representative of the organization and a visitor." Dillon analyzed visitor perceptions of perceived value of admission when visitors had a PFE and when visitors did not. She found that non-digital, personally facilitated experiences have an impact on visitor levels of satisfaction, increasing visitor's perceived value of admission, perceptions of entertainment experience, and educational experience. Dillon also highlights research that demonstrates that standardized experiences are in decline, with fewer and fewer visitors valuing those experiences. From 2008 to 2014, IMPACTS presented visitors with the statement "Group tours are a fun way to visit a museum," and asked visitors to respond with a level of agreement on a 1 to 100 scale. Over six years, perception has steadily declined, now under 50. Although her study does address visitor perceptions of personalized experiences in museums, it does not address the use of technology to achieve this aim.

An Adams & Moussouri (2002) case study focused on three institutions: Eureka! The Museum for Children in Halifax, the Archaeological Resource Center in New York, and the Xperiment! Gallery at the Museum of Science and Industry in Manchester. Interviews were conducted and visitors were asked to describe their experience in interactive spaces in

comparison with their experiences in traditional museum spaces. The study found that "museum visitors value interactive experiences that enable them to engage in genuine exploration, follow their own interests and facilitate social interaction" (p. 3).

One evaluation study conducted at the Fine Arts Museum of San Francisco analyzed how visitor engagement with art was altered by the use of a mobile app. The app is designed as an immersive audio experience featuring the voices of museum curators, experts, and museum visitors as they interpret the institution's outdoor art and architecture (Girardeau et al., 2015). The app is customizable, as visitors choose which perspectives they'd like to hear, and is also participatory, as visitors are encouraged to add to the discussion with their own recordings. Visitors who used the app were asked to fill out a survey with questions on a Likert scale regarding art engagement. The results showed that the majority of visitors were engaged with art while using the app, with 92% of visitors stating that they look more closely at works of art.

Some studies have highlighted the issue of museum fatigue, or information overload, which refers to the decrease in visitor attention and interest with successive or prolonged viewing of objects (Bitgood, 2009). As Bitgood discusses, this decrease in visitor interest may in fact have an effect on visitor learning and engagement with art. Some researchers have suggested that personalization strategies could potentially mitigate some of the information overload that occurs in a traditional museum visit (Itmazi & Megias, 2008; Huang et al., 2012).

Future research into personalization

Despite the existing research on personalization technology in museums, there is still little research that addresses visitor perceptions of these strategies and how or if they facilitate visitor engagement with art. Many of the research studies do not focus directly on the personalization element of interactivity, and those that do often address personalization as an

overarching strategy. There is very little research that has been conducted on the different elements of personalization in art museums, such as curatorial control or social media integration, and how visitors value these particular elements.

This lack of research is particularly striking, as art museums expand their use of personalization strategies. The Cleveland Museum of Art has plans to extend their technological integration, specifically the elements that target personalization, as they "devise digital strategy…to examine the way we track individuals across all touch points and personalize not just their visit, but our array of interactions with them" (Alexander, 2014, Gallery One 2.0 section, para. 3). As well, the San Francisco Museum of Modern Art is currently undergoing an extensive redesign that will incorporate on-site technologies that deliver personalized experiences, such as geolocation games and a participatory Photography Interpretive Center. These personalization strategies are being implemented and expanded, and yet there is very little data that addresses what effect these strategies have on the visitor's relationship with artwork.

Chapter 3

Methods

The purpose of this study is to understand visitor perceptions of personalization strategies utilized in art museum interactive technology and its perceived effect on the visitor's experience and engagement with art. The study is guided by three research questions:

1. In what ways are visitors using the personalization options featured in museum interactive technology?
2. In what ways do the personalization strategies utilized in art museum interactive technology matter to art museum visitors, and why?
3. What are visitors' perceptions of different digital personalization strategies? Which elements of personalization matter more to visitors than others?

This chapter describes the study's methods, in particular the research site, data collection procedures, data analysis procedures, and methodological limitations.

Research Site

First open to the public in January 2013, Gallery One is the Cleveland Museum of Art's interactive art gallery that incorporates cutting-edge technology to engage visitors with the collection and facilitate the visitor experience. The gallery was named Gallery One because it was designed to act as a starting point of the museum visitor, as they became acquainted with the vast collection of the CMA through interactive games and multimedia activities, interspersed with actual objects from the collections. The space consists of two rooms: the first space, located just to the left of the main museum entrance, features six interactive, touch-screen displays organized by various themes, such as Globalism or Sculpture. These interactives, called Lenses, utilize various engagement strategies, including allowing visitors to create their own works of art inspired by an Abstract Expressionist work and using gestural recognition software to map a visitor's facial expressions or body movements and identify an artwork within the collection that matches their movements.

Image 1: Visitors walking through the Gallery One space. Photography: Local Projects

Image 2: Visitor using the Make a Face feature of the Sculpture Lens. Photography: Local Projects

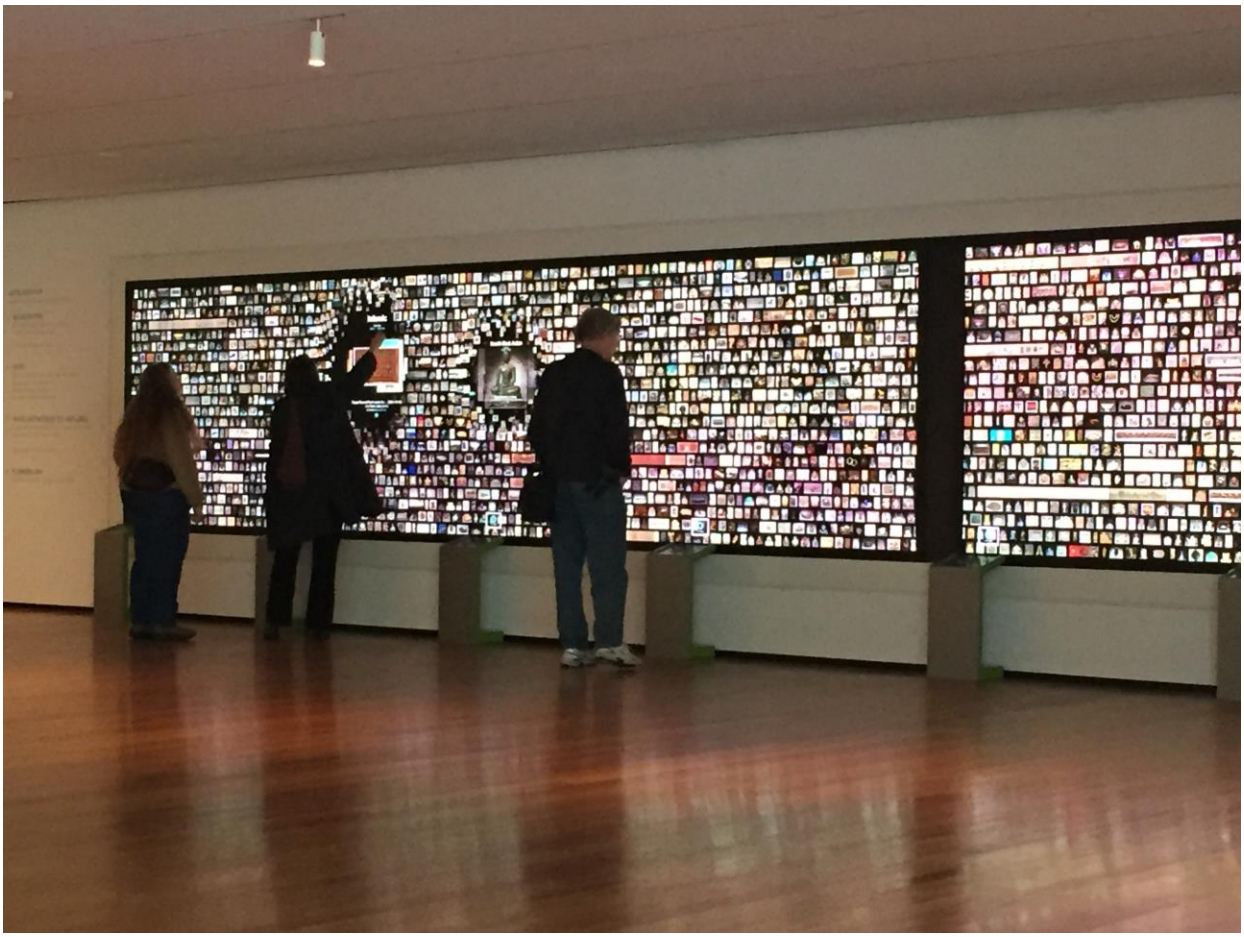

Image 1: Visitors using the Collections Wall in Gallery One. Photography: Gracie Loesser

The second room within Gallery One at the Cleveland Museum of Art features a 40-foot, multi-touch wall called the Collections Wall that displays, in real time, every object currently on view at the museum. The screen rotates every 30 seconds from an all-encompassing view of the roughly 4,500 artworks on view to a thematic grouping of artworks curated by the Cleveland Museum of Art staff, which highlight various themes from “Love and Lust” to “Portraiture.” The Collections Wall is designed to function alongside the CMA’s ArtLens app, downloadable on the iPhone or iPad, which gives visitors the opportunity to create favorites collections, design personal tours, or discover more information about artworks in the collection. The Wall also

allows visitors to "favorite" any items they enjoy, which can then be referenced later on the downloadable app. If a visitor chooses not to use the mobile technology feature, he/she can still favorite an object, and the tally of total "likes" is visible next to each item on the Collections Wall.

The Cleveland Museum of Art cites some key motivations for developing the gallery and guiding goals for implementing the space. The museum hoped that visitors might "feel empowered to browse, explore, and create personal meanings about the museum's collection…enjoy an organic, visitor-driven experience in the space…[and] create a personalized profile driven by their interests" (Alexander, Barton, & Goeser, 2013, Goals of Gallery One section, para. 4). The literature that informed the museum's effort to build a dedicated gallery for digital interpretation included John Falk's *Identity and the Museum Visitor Experience* (2009), which highlighted visitors' motivations over demographic information as a critical component to understanding a museum audience. In addition, the Dallas Museum of Art's 2011 research initiative *Ignite the Power of Art* helped the Cleveland Museum of Art better understand how visitors engage with art and what triggers cause engagement (Pitman & Hairy, 2011). Finally, the museum looked at their own internal studies, mainly the 1994 publication *The Visitor's Voice*, which focused on visitor experience in the CMA's Renaissance and Baroque galleries, and a more recent 2009 study conducted by Marianna Adams of Audience Focus, Inc. that focused on visitor meaning making in the reinstalled European and American art galleries. (Schloder, Williams, & Mann, 1993; Adams, 2013). The latter study informed the museum that their visitors were mostly interested in browsing and were "not seeming to have a predefined agenda for their visit other than gravitating to the works of art to which they respond strongly based on

their tastes and prior knowledge" (Alexander, Barton, & Goeser, 2013, Audience Research section, para. 4).

The Gallery One space at the Cleveland Museum of Art was chosen due to its specific focus on personalizing the museum visit through various technological strategies, including gestural recognition, social media integration, curatorial features, and creative production capacities. A relatively new and highly-praised addition, Gallery One is also recognized as one of the more innovative and cutting-edge technological galleries in current art museums.

Data Collection Procedures

With the approval of the University of Washington's Institutional Review Board, semi-structured interviews were conducted with 34 adult visitors at the Cleveland Museum of Art in Cleveland, Ohio. Visitors were chosen using a continuous random sampling method, and all interviews were conducted on-site at the museum in the newly implemented, technology-focused Gallery One space. Data were collected through audio-recorded, semi-structured interviews with adult visitors during regular museum hours on March 18th, 19th, and 20th of 2015. Interviews were conducted with visitors as they left the Gallery One space through the exit facing the Cleveland Museum of Art's central atrium. Visitors were approached while exiting and asked if they would participate in the research project by answering questions regarding their experience within the Gallery One space. Of the visitors interviewed, 27 were return visitors, whereas 7 were first-time visitors.

The interview began with general questions regarding visitor motivation for attendance, followed by a series of questions addressing visitor actions while engaging with the technology (see Appendix A for the interview guide). The interview then asked visitors to reflect on the interactive technology, asking whether the technology personalizes their experience with art,

whether this matters to them, and what influence, if any, these personalization strategies may have on their relationship with art. Breaking the personalization strategies into four separate categories (Curatorial Control, Gestural Recognition, Creative Production, and Social Media), visitors were then asked to rank these categories in terms of their importance.

Description of Sample

As part of the data collected in this study, visitors were asked about their motivations for visiting the museum. Visitors were not confined to a single answer, and a number of visitors had multiple reasons for choosing to visit. Of the visitors interviewed, 12 responded that they attended the museum as an outing with a family or friend. One visitor mentioned *"It's my wife's birthday…and we decided to come here."* Another visitor responded that they were here for "*a birthday lunch*." In addition, 11 visitors responded that they came to the Cleveland Museum of Art to see a particular object or exhibit. Most of these visitors responded that they were there to see the newly installed *Pharaoh: King of Ancient Egypt* exhibit which had opened that previous weekend. Some visitors mentioned that they came to the museum because it was convenience, with 5 interviewees responding that the museum was either free or close by. Finally, 2 visitors stated that they came to the museum for fun or entertainment, with one visitor stating it was *"something fun"* to do. In addition to the coded motivations, 6 visitors had responses that did not fit into the aforementioned categories, with visitors giving a variety of reasons from "*for a school project"* to "*because its cold outside."*

Data Analysis

Interviews were qualitatively analyzed using the content analysis method. The researcher identified emergent themes using a coding rubric designed based on responses received from visitors (see Appendix B for coding rubric). The content analysis and subsequent coding rubric

were developed based on the methodology outlined in John W. Creswell's *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (2014). All interviews were coded using this rubric.

Limitations

For this study, limitations include the absence of input from visitors who did not engage with the interactive technology while visiting the Cleveland Museum of Art. Results gathered in this study on are only applicable to visitors who chose to engage with that technology without the cuing or encouragement of the researcher, and is thus not representative of visitors as a whole. Additionally, this study collected data on what visitors perceived, rather than direct behavioral data. Interviews are only representative of visitors' self-reported perceptions of and engagement with the technology, and do not represent actual use or engagement. Finally, visitor observations and interviews were only conducted at one site. This makes the data limited in its applicability to museums, or art museums, in general. Instead, the data should act as a foundation for further research.

Chapter 4

Results and Discussion

This chapter summarizes the study results, and is organized according to the study's research questions. Data were analyzed according to the coding rubric (see Appendix B).

Research Question 1: In what ways are visitors using the personalization options featured in art museum interactive technology?

Gallery One consists of two distinct spaces. The first space is a large room with six interactive touch screens, called Lenses, which utilize games and other multimedia to highlight specific elements or topics related to the collection, such as the "Sculpture Lens or "Globalism Lens." The second space is a smaller room which contains the Collections Wall, a 40-foot multi-touch screen that displays all of the works currently on view in the museum. The multi-touch screen transitions periodically from displaying the entire visible collection to smaller, focused groups of objects organized by themes which are curated by the museum.

In order to address this research question, visitors were asked a series of closed-ended questions regarding their use of the technology within the Gallery One space. First, visitors were asked if they had visited the museum previously and, if so, whether they had ever used any of the interactive technology during a previous visit. Of the visitors interviewed, 27 had previously visited the Cleveland Museum of Art, whereas 7 interviewees were visiting for the first time. Of those visitors who had previously attended the museum, 16 had used at least one of the interactives within Gallery One during a previous visit. Of those individuals who had used one of the interactives in Gallery One on a previous visit, 14 had used the Collections Wall, and 8 had used one of the Lenses within Gallery One.

Visitors were also asked whether they "favorited" any objects during their experience, which is a unique feature of the Collections Wall that allows visitors to choose their favorite works by pressing a small heart icon located below each object. Visitors are able to see how many times an object has been "favorited" by referencing the number located next to the heart icon. The "favoriting" feature can also be used in conjunction with a downloadable app available on the iPhone or iPad called the ArtLens app, which allows visitors to make favorites collections and personalized tours. When visitors were asked about their use of the "favorite" feature, 13 visitors said that they had "favorited" at least one item during their visit. Visitors were also asked if they shared any objects on social media during their experience in the gallery. In order to share an object on social media, visitors must download the ArtLens app on their iPhone or iPad, through which they can send high definition photographs of objects to friends or family through Facebook or Twitter. Only one visitor responded that he/she shared an object using the Collections Wall interactive.

Visitors were then asked whether they were aware of the ability to create a personalized tour of the museum using the ArtLens app, downloadable on a mobile phone or available on an iPad that can be rented through the museum for a $5.00 fee. Of those visitors, 21visitors responded that they were not aware of the ability to create your own tour using the app, while 13 visitors responded that they were aware of the feature. Only 2 visitors reportedly made their own personalized tour while they were in the gallery. One visitor responded that he/she planned to create his/her own tour later in the visit, and two visitors said they would consider creating their own tour, but were ultimately not sure if they would. Of these visitors who were not aware, 1 visitor indicated that they planned on creating their own tour later during their visit, and 3 visitors indicated that they would consider the possibility.

Research Question 2: In what ways do the personalization strategies utilized in art museum interactive technology matter to art museum visitors, and why?

In order to address this research question, visitors were asked a series of open-ended questions regarding their perceptions of personalization strategies utilized in art museum interactive technology.

Reactions to personalization features

Visitors were asked whether features like creating their own tour or favorites collection appealed to them. Of those interviewed, 19 responded that these personalization features appealed to them. Of these 23 visitors, 10 said that it appealed to them because of the capacity for tailoring the visit to fit their interests or needs. Visitors in this category appreciated the way that the tour creation and favorites collection features allowed them to focus on artwork they already know or focus on styles, periods, and genres of art that they gravitate towards. One visitor responded,

> *When I'm coming today, what I want to see probably changes…so today maybe Egyptian and Impressionist stuff. Maybe another time, I want to look at American stuff, so if there was something that said, 'Okay today I'm interested in A, B, and C,' and boom, it just gave me my tour around the museum, that would be really great.*

Another visitor commented, *"Just the idea that you can already know what you want to see and pick out – so you don't have to just sort of wander through and get an idea of what you want to see."*

Similarly, 7 visitors responded that tour creation features appealed to them because it allowed them to clarify or focus their visit, making the visit less confusing, time intensive, and

more streamlined. Although this category is similar to the previous one, visitors in this case focused specifically on the overwhelming aspect of the museum's vast collection, and the technology's ability to provide clarity. One visitor responded, *"I understand this is a very big art gallery and I only know so much about art, so I believe it would be better if I can set a tour based on arts that I know and absolutely love."* Another visitor responded, *"It gives you some sense of purpose."*

Lastly, 3 visitors indicated that tour creation appealed to them because it allowed them to be introduced to new content, whether it be additional information from experts on objects the visitor found interesting or the introduction to objects the visitor was previously unaware of. In one case, a visitor responded that the technology allowed them *"to find art objects that I might not be aware of that are in the museum."* Focusing on educational content, another visitor stated, *"I still think that there's things that other art historians can bring to the painting in that perspective in what was going on in that time period that I might not necessarily be aware of."*

Although the majority of visitors found the personal tour and favorites collection features appealing, 13 visitors stated that the ability to create their own tours did not appeal to them. Of the visitors interviewed, 5 found it unappealing because they preferred a non-technological experience in the museum. One visitor stated, "*I don't really love the technology aspect of the museum. I'd rather kind of just walk through and see actual art."* Another visitor mentioned, *"I'm not very excited about having that technology in the museum."* Many of these visitors seem to indicate that the technology interfered with or was in opposition with their desire to explore the wander, browse, or experience art "in person."

Additionally, 3 visitors cited issues with technology as a reason for their lack of interest in a tour creation feature. One visitor mentioned, *"I don't really want to have to use my phone to*

do it, because I'm pretty maxed out on my memory as it is." Another stated they might take be interested in a tour creation feature *"if I were a little more able to do that,"* indicating a lack of ability to use the technology. Another stated that the technology could be confusing, explaining *"you have to be glancing at the right part of the screen to find something that is interesting."*

Finally, 3 visitors cited their own familiarity with the museum as a reason for their lack of interest in a tour creation feature. One visitor stated, *"Probably not. Well, I've been to this museum, because I grew up in Cleveland, so many times. I almost kind of know it by heart."* Another said, *"I've been to the museum so many times, and I studied art, that I can pretty much do my own tour."*

Some other reasons for lack of interest in the tour creation feature was a lack of knowledge of the feature, and the visitor preferring the perspective or guidance of others when touring the museum, rather than relying on their own interests. Two visitors were unsure how they felt about the tour creation feature.

Personalizing experiences with art

When visitors were asked whether the technology allowed them to personalize or customize their experience with the art specifically, 31 visitors responded that they felt the interactive technology did allow them to personalize their experience with art. Of the visitors interviewed, 10 emphasized that the technology allowed them to collect works or design tours that appealed to their own personal interests in art. Visitors seemed to appreciate the ability to focus on one particular style, genre, or period of art that truly interested them, giving them more time with the artwork they enjoyed. Some visitors were able to identify a personal connection with the artwork, such as the visitor who stated that the technology allowed them to personalize their experience because *"I just went to the one of the sections, and it had Ganesh, which is from*

South Asia where I from, so I felt like if I could browse and see more sections related to that, that would be…interesting to see" Another visitor stated, *"There's a lot to see, but if you want to look at things that appeal to you, that's a very personal touch, instead of just kind of digging through everything and finding what really appeals to you."*

Similarly, 7 visitors said that the interactive technology allowed them to personalize or customize their experience with art, because it gave them the ability to structure or clarify their visit in some way. Visitors appreciated the ability to structure their time spent with art, because of the museum's large collection and physical size. One visitor mentioned this specifically, stating, *"depending on how much time you set aside to come here, it can be overwhelming*." Visitors seemed to prioritize certain items they wanted to see, with one visitor stating that they liked being able to clarify their visit, because *"you may not be able to go see [it] tomorrow."*

Of the thirty-four visitors interviewed, 6 said that the interactive technology gave them the ability to personalize or customize their experience with art by providing them with more information than they might otherwise have. One visitor stated that the technology allowed them to see more of the object than they were previously able to, saying *"like when you would bring up one piece, and then it would show you parts of it that you didn't even notice."* Another visitor mentioned, *"It gives you a stronger connection to the art and a better understanding, because you're reading about it and seeing it as well."*

Visitors also mentioned that the interactive technology personalized their experience with art by giving them the opportunity to browse through the collection and be introduced to new content. As well, some visitors mentioned the technology's appeal to younger audiences, engaging a new generation of museum-goers.

Only 3 visitors did not feel that the interactive technology allowed them to personalize or customize their experience, citing their preference for browsing the collection without technology or their lack of knowledge of the technology. One visitor stated, *"I don't think it makes a difference, because part of the charm of the museum is walking around the museum."* Finally, 5 visitors had answers that did not fit into any discernable category.

How and why personalization matters

Visitors were asked whether the ability to personalize or customize their experience with art mattered to them. Of the visitors interviewed, 20 responded that the ability to personalize their experience with art mattered to them. Some visitors offered reasons why the ability mattered to them, with 7 visitors stating that it allowed them to guide or customize their visit. Visitors felt that the technology prevented them from missing any important information or artworks, with one visitor responding, *"I feel it's very helpful, rather than just browsing around and missing a few things."* Another visitor answered that it was nice to be able to have a highly individualized experience with the art, stating, *"everyone likes different things, so if you can find your own things and customize your experience."*

Another 3 visitors responded that the ability to personalize their experience with art mattered to them, because it was a source of entertainment, making the museum visit more fun and exciting. One visitor stated, *"It makes it more fun coming to the museum."* Another said, *"When I come here, it's more fun to do it that way."* Some visitors highlighted the element of play that the technology afforded and the hands-on nature of the interpretation. Finally, 7 visitors did not give a reason for why the personalization ability mattered to them.

When asked about the ability to customize or personalize their experience with art, 14 visitors responded that the ability did not matter to them, while 6 felt that the ability to

personalize was irrelevant to their visit, and was generally unimportant to them. One visitor stated, *"I probably would have came anyway."* Another visitor said, *"I don't know if it matters, if it's [an] interesting little extra that you can get."*

Lastly, 3 visitors stated that the personalization feature did not matter to them, because they preferred to browse. One visitor mentioned, *"I kind of just like wandering through the museum and looking at stuff rather than being on a predetermined course."* Other visitors cited the technology's redundant nature, or their personal familiarity with the museum as a reason for their lack of interest in the personalization technology, and 4 visitors did not state a reason for their lack of interest in the ability to personalize or customize their experience with art.

How personalization influences interactions with artwork

Visitors were asked how the interactive technology influenced the way they interacted with artwork. Of the visitors interviewed, 12 stated that the technology deepened or increased their knowledge and awareness of objects. Some visitors mentioned the technology's ability to compare objects, which they felt allowed them to learn more about the items on display. Other visitors mentioned that the technology allows them to learn a variety of information from different sources and senses, whereas traditional interpretation might only feature a picture or a label. One visitor stated that *"instead of just looking at a picture and having only my interpretation, I can maybe compare it to what other people have thought of or things like that."* Another mentioned, *"I ended up seeing things – I've gone through this museum countless times, and I ended up seeing things there that I didn't remember seeing in the actual galleries."*

Another 6 visitors stated that the interactive technology allowed their experience with art to be more focused. Visitors felt that the personalization elements gave them the ability to narrow in on exactly what their interests were, and explore those throughout the museum, rather

than browsing without concrete direction. This was both a negative and positive influence for different visitors. One visitor mentioned, *"It has the danger of having me focus on things that I'm already familiar with."* On the other hand, another visitor highlighted the positive elements of a more focused visit, stating, *"I need to see everything in the museum before closing time, now I can select and I can focus on a few. I don't have to remember what I looked at. At my age, that gets increasingly difficult."*

Rather than focusing on themselves, 4 visitors said that the interactive technology attracted younger audiences and helped to engage them with art. One visitor said, *"I think for the younger crowd that they're used to that technology and stuff moving, so it helps draw them in too and they'll be able to find things here for them."* Another visitor reiterated this point, stating *"I think it might attract kids more, because they're all about being able to use their phone to do whatever they want to do with them, so I think it would attract a younger audience."*

Additionally, 6 visitors said that the interactive technology had no effect on their experience with art, while 3 visitors felt that the technology gave them a sense of the scope of the collection, so that *"it gives you an idea what you have and everything you have available you can see there."* Visitors also mentioned the convenience of the technology and its ability to draw comparisons between works of art.

Research Question 3: How do visitors perceive of different digital personalization strategies? Which elements of personalization matter most to visitors?

In order to address this final research question, visitors were given four examples of different personalization strategies used by the Cleveland Museum of Art within their Gallery One space designed to make visitor's experiences feel personal and unique, including: 1) curatorial control; 2) gestural recognition; 3) creative production; and 4) social media. These

categories were devised by the researcher during the initial design of the study, and before data were collected. These categories were developed and articulated based on existing research and discussion around personalization in museum technology (Valoriani, 2013; Gorgels, 2013; Rodney, 2016). Visitors were given a short description of each strategy as referenced below, and asked to rank these strategies on a scale of 1 to 5 in terms of the importance to their overall visit, with 1 being "not at all important" and 5 being "very important."

Figure 1: Personalization Strategy Rankings by Visitors (n=34)

Curatorial control included the ability to create or "curate" your own artwork collections or design your own tour. Figure 1 shows the distribution of visitors' rankings in terms of how important they thought this strategy was to their visit. Visitors tended to rank this strategy highly

on a scale of importance for their overall visit, with 26 visitors either indifferent or valuing curatorial control.

Gestural Recognition is the ability for technology to recognize your body movements or facial expressions and identify artwork that matches your body positioning. For example, a visitor might stick out their tongue, and learn about the art historical depiction of the Aztec earth deity Tlaltecuhtli with its tongue out. This element is featured in the Gallery One Sculpture Lens, which features the Make a Face and Strike a Pose game. This feature was relatively unpopular with visitors, with 26 of visitors finding the strategy to be unimportant or indifferent.

Creative Production is the ability to create your own works of art using the interactive technology, which is featured in the Make Your Mark activity within the Painting Lens. This interactive gives visitors three examples of Abstract Expressionist paintings, and then invites them to create a work of their own using the touch screen. Visitors did not find this particular feature important, with 13 visitors ranking the strategy as neutral.

Finally, Social Media is the ability to share favorite artworks or personal creations online with friends and family. In Gallery One, visitors can share high resolution images of their favorite objects through Twitter or Facebook by accessing the ArtLens app downloadable for free on an iPhone or iPad. Visitors valued this feature, with 18 visitors ranking this strategy as either More Important or Very Important to them.

Chapter 5

Conclusions and Implications

With the increasing use of both interactive digital technologies and personalized interpretation strategies in art museums, this study aimed to provide a foundation for understanding visitor perceptions of personalization utilized in interactive digital technology. By interviewing visitors at the Cleveland Museum of Art's Gallery One space, the study examined the effect that personalization and interactive technology has on both the museum visitor's overall experience and their own engagement with artwork.

Conclusions

Data from this study suggest that personalization matters to art museum visitors. Visitors stated that not only did the interactive technology allow them to personalize their experience in the museum in general, and with art in particular, but that the ability to have that personalized experience was important to them. This expands upon Dillon's (2015) research that highlights visitors' decreased interest in standardized experiences, and valuation of personal facilitated experiences, demonstrating that visitors value these personalized elements in digital technology as well. Although there were visitors who felt that the personalized interactive technology did not appeal to them, many of these same visitors expressed that they knew the technology improved the experiences of those around them. Additionally, many visitors highlighted the technology's ability to engage young people with art.

Of particular interest is the fact that a significant percentage of visitors stated that the tour creation feature and personalization options in general appealed to them because it allowed them to focus their visit. This relates to previous studies on the topic of museum fatigue, which comment on the decreased attention and interest experienced by visitors after successive

viewings of art (Bitgood, 2009). As stated in the literature review, many scholars believe personalization strategies help to mitigate this feeling of information overload. The data collected in this study strengthens this argument, as many visitors commented on the overwhelming nature of the collection, or the time commitment necessary to view art, and the personalization features' ability to provide much-needed structure to their visit.

Although personalization matters to art museum visitors, many of them are not using those elements of the technology. Only a couple of visitors in this study shared objects on social media or created their own tours using the ArtLens app. One possible reason for this was the large data size of the iPhone app, which was too large for many visitors to download. Additionally, the download time was approximately 5 to 10 minutes, which is a substantial time commitment. However, even in the case of the "favoriting" feature, which did not require visitors to download the app, less than half of visitors participated in this feature. This may be due, in part, to the technical issues mentioned above, which echoes the results found in Heath, von Lehm, and Osbourne's (2005) study that highlighted the issues of collaborative usage of technology designed for the individual.

Interestingly, although the vast majority of visitors did not use the social media or tour creation elements of the Gallery One interactive experience, visitors found these strategies to be important to their overall museum experience.

Further Research and Implications

As a base for further research, this study contributes to building theory around personalization as a strategy for museums, a concept that is becoming increasingly important as museums continue to integrate personalized technology into their exhibits and interpretation.

There is great value in museums better understanding what personalization is, what visitors think about it, and how visitors value personalization as a strategy for engagement.

Calling for further research, this study highlights the need for further research into the discrepancy between use and value in art museum interactive technology. Although many visitors valued social media and curatorial control, these options were more often than not unused. Further studies might investigate the relationship between perception of value and use, and what barriers visitors face when interacting with art museum interactive technology.

In addition, due to the limited scope of this study, further research could focus on expanding the analysis of visitor perceptions of interactive technology and personalization initiatives to other art museums. It would benefit the field to have a more robust collection of data on the topic of personalization strategies in digital technology, as many of the larger art institutions around the world are beginning to implement these kinds of initiatives.

Although this study investigated the perceived values of various personalization strategies in art museum technology, there is still much more research that can be done on the topic of separating various approaches to personalization. Future research could focus either specifically on a strategy, or continue to compare different approaches to better understand visitor perceptions and valuation of these methods.

References

Adams, M. & Moussouri, T. (2002). The Interactive Experience: Linking Research and Practice. Paper prepared for *Interactive Learning in Museums of Art and Design Conference.* London: Victoria & Albert Museum.

Adams, M., et al. (2009). Cleveland Museum of Art Permanent Collection Reinstallation Formative Evaluation Study. Unpublished 75-page report; PDF available through the Cleveland Museum of Art.

Alexander, J. (2014). Gallery One, the First Year: Sustainability, Evaluation Process, and a New Smart Phone App, Museums and the Web, Baltimore, MD, April 2-5, 2014. http://mw2014.museumsandtheweb.com/paper/gallery-one-the-first-year-sustainability-evaluation-process-and-a-new-smart-phone-app/.

Alexander, J., Barton, J., & Goeser, C. (2013, February). *Transforming the Art Museum Experience: Gallery One*.

Allen, S., & Gutwill, J. (2004). Designing with multiple Interactives: Five common pitfalls. *Curator: The Museum Journal*, *47*(2), 199–212.

American Alliance of Museums, Museums Association, & Fusion Research and Analytics. (2012). *Mobile in Museums Study*. Retrieved from https://aam-us.org/docs/research/mobilemuseums2012-%28aam%29.pdf

Ardissono, L., Kuflik, T., & Petrelli, D. (2011). Personalization in cultural heritage: The road travelled and the one ahead. *User Modeling and User-Adapted Interaction*, *22*(1-2), 73–99.

Association of Art Museum Directors. (2015). *Next Practices in Digital and Technology.* New York: Association of Art Museum Directors.

Bitgood, S. (2009). Museum fatigue: A critical review. *Visitor Studies*, *12*(2), 93-111.

Bloomberg Philanthropies. (2016). Enhancing the visitor experience through technology. Retrieved from http://www.bloomberg.org/program/arts/bloomberg-connects/.

Cannell, M. (17, March 2015). Museums Turn to Technology to Boost Attendance by Millenials. *The New York Times.* Retrieved from http://www.nytimes.com/2015/03/19/arts/artsspecial/museums-turn-to-technology-to-boost-attendance-by-millennials.html.

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches*. Los Angeles: Sage

Dillon, C. (2015, May 6). Six Ways Personalization Trends are Affecting Museums and Cultural Centers. Retrieved from http://colleendilen.com/2015/05/06/six-ways-personalization-trends-are-affecting-museums-and-cultural-centers-data/.

Falk, J. (2009). *Identity and the museum visitor experience*. Walnut Creek, California: Left Coast Press.

Falk, J. (2006). *Thriving in the Knowledge Age: New Business Models for Museums and Other Cultural Institutions.* Lanham, MD: Altamira Press.

Gamerman, E. (2015, October 16). A look at the museum of the future. *Washington Street Journal*. Retrieved from http://www.wsj.com/articles/a-look-at-the-museum-of-the-future-1444940447

Getty Foundation. (2007). *L.A. Art Online: Learning from the Getty's Electronic Cataloguing Initiative.* Los Angeles, California: Schneider, A.

Girardeau, C., Beaman, A., Pressley, S., & Reinier, J. (2015, February). *Voices:FAMSF: Testing a new model of interpretive technology at the Fine Arts Museums of San Francisco*.

Gorgels, Peter. (2013). Make Your Own Masterpiece! In *Museums and the Web 2013*, N. Proctor & R. Cherry (eds). Silver Spring, MD: Museums and the Web. Published January 28, 2013. Consulted May 31, 2016 .

Heath, C., vom Lehn, D., & Osborne, J. (2005). Interaction and interactives: Collaboration and participation with computer-based exhibits. *Public Understanding of Science*, 14(1), 91–101.

Hornecker, E & Stifter, M. (2006). *Learning from Interactive Museum Installations about Interaction Design for Public Settings.* Australian Conference on Human-Computer Interaction 2006.

Huang, Y. M., Liu, C. H., Lee, C. Y., & Huang, Y. M. (2012). Designing a Personalized Guide Recommendation System to Mitigate Information Overload in Museum Learning. *Educational Technology & Society, 15*(4), 150-166.

Hughes, L. (2011). *Evaluating and Measuring the Value, Use, and Impact of Digital Collections.* London: Facet Publishing.

Itmazi, J. A., & Megías, M. G. (2008). Using Recommendation Systems in Course Management Systems to recommend Learning Objects. *Int. Arab J. Inf. Technol.*, *5*(3), 234-240.

Kelly, L. (2000). *Use of Computer Interactives in Museum Exhibitions: Literature Review.* AMARC – Australian Museum Audience Research Centre.

Kravchyna, V. & Hastings, S. (2002). Informational Value of Web Sites. *First Monday, 7.* http://dx.doi.org/10.5210/fm.v7i2.929.

Kuflik, T., Stock, O., Zancanaro, M., Gorfinkel, A., Jbara, S., Kats, S., ... & Kashtan, N. (2011). A visitor's guide in an active museum: Presentations, communications, and reflection. *Journal on Computing and Cultural Heritage (JOCCH)*, *3*(3), 11.

Kyung Lee, M. (2013). *Designing Personalization in Technology-Based Services* (Doctoral dissertation). Retrieved from ProQuest.

Lohr, S. (2014, November 12). The met and other museums adapt to the digital age. *New York Times*. Retrieved from http://www.nytimes.com/2014/10/26/arts/artsspecial/the-met-and-other-museums-adapt-to-the-digital-age.html

Marty, P. (2008). Museum websites and museum visitors: digital museum resources and their use. *Museum Management and Curatorship*, (23)1, 81-99.

Meyer, R. (2015, January 20). Finally, the museum of the future is here. *The Atlantic*. Retrieved from http://www.theatlantic.com/technology/archive/2015/01/how-to-build-the-museum-of-the-future/384646/

National Endowment for the Arts. (2015). *A Decade of Arts Engagement: Findings From the Survey of Public Participation in the Arts, 2002–2012* (NEA Research Report #58. Washington, D.C.

O'Donnell, M., Mellish, C., Oberlander, J., & Knott, A. (2001). ILEX: An architecture for a dynamic hypertext generation system. *Natural Language Engineering*, *7*(03), 225–250.

Pew Research Center. (2013). *Arts Organizations and Digital Technologies.* Washington, D.C.: Thomson, K., Purcell, K., and Rainie, L.

Pitman, B., & E. Hairy. (2011). *Ignite the power of art: Advancing visitor engagement in museums*. Dallas: Dallas Museum of Art Publications.

Rodney, Seph. (2016). The Evolution of the Museum Visit, from Privelege to Personalized Experience. *Hyperallergic.* Retrieved from http://hyperallergic.com/267096/the-evolution-of-the-museum-visit-from-privilege-to-personalized-experience/.

Rosenbaum, L. (2015). The Brave New Museum Sputters Into Life. *The Wall Street Journal.* Retrieved from http://www.wsj.com/articles/the-brave-new-museum-sputters-into-life-1441657298.

Sandifer, C. (2003). Technology novelty and open-endedness: Two characteristics of interactive exhibits that contribute to the holding of visitor attention in a science museum. *Journal of Research in Science Teaching*, *40*(2), 121-137.

Schiele, B., Koster, E. H., & Koster, E. H. (2000). Science centers for this century.

Schloder, J., M. Williams, & C. G. Mann. (1993). *The visitor's voice: Visitor studies in the Renaissance-Baroque Galleries of the Cleveland Museum of Art*. Cleveland: Cleveland Museum of Art.

Simon, N. (2010). *The participatory museum.* Santa Cruz, California: Museum 2.0.

Stevens, H. (2012, April 19). Museums want to entertain you (and that's not a bad thing). *The Atlantic*. Retrieved from http://www.theatlantic.com/entertainment/archive/2012/04/museums-want-to-entertain-you-and-thats-not-a-bad-thing/256042/

Templeton, C. A. (2011). Museum Visitor Engagement Through Resonant, Rich and Interactive Experiences.

Valoriani, Matteo. (2013). Technological and Methodological Tools for Personalized Interactive Applications. In *CHItaly (Doctoral Consortium)* (pp. 23-32).

Van Velsen, L., Van der Geest, T., & Klaassen, R. (2007, October). Testing the usability of a personalized system: comparing the use of interviews, questionnaires and thinking-aloud. In *Professional Communication Conference, 2007. IPCC 2007. IEEE International* (pp. 1-8). IEEE.

Vom Lehn, D., Heath, C., & Hindmarsh, J. (2005). Rethinking interactivity: design for participation in museums and galleries. *Work, Interaction & Technology Research Group, King's College London. Retrieved January*, *26*, 2006.

Weibelzahl, S. (2005). Problems and pitfalls in the evaluation of adaptive systems. *Adaptable and adaptive hypermedia systems*, *11*, 285-299.

Wickell, C. *Great Expectations: Researching Usability of Online Museum Collections.* Retrieved from ProQuest Dissertations Publishing.

Appendices

Appendix A: Interview Guide

1. Have you been to this museum before?
    a. IF YES, Have you ever used any of the interactive technology before? Which ones?
2. Why did you come to the museum today?
3. Did you "favorite" or "save" any objects during your experience today?
4. Did you share any objects on social media during your experience today?
5. Are you aware of the ability to create your own tour using the ArtLens app?
    a. IF YES, Have you created your own tour?
    b. IF NO, do you plan on doing so today?
6. Do features like creating your own tour, website, or "favorites" collection appeal to you?
    a. Why or why not?
7. Do you feel this kind of technology allows you to personalize your experience with art?
    a. How so?
8. Does having the opportunity to personalize your experience with art matter to you?
9. How do you think this kind of technology influences the way you interact with artwork?
10. This museum uses different technological strategies for making their visitors' experiences feel personal and unique. I'm going to give you four examples of different strategies. Please rank these in terms of importance on a scale of 1 to 5, with 1 being "not at all important to me" and 5 being "most important to me."
    a. Curatorial Control: i.e., the ability to create your own artwork collections, or design your own tours

        1 2 3 4 5

    b. Gestural Recognition: i.e., the ability for technology to recognize your body movements or facial expressions and identify corresponding artwork

        1 2 3 4 5

    c. Creative Production: i.e., the ability to create your own works of art

        1 2 3 4 5

    d. Social Media: i.e., the ability to share your favorite objects and personal creations online with friends and family

        1 2 3 4 5

11. Is there any aspect of the technology that I haven't mentioned that contributes to personalizing your experience with art?
12. Do you have any plans to use or reference any of the artworks you saved after you leave the museum today?

Appendix B: Coding Rubric

Question 2: Why did you visit the museum today?

Column 1	Category	Description	Examples
1	Specific Object/Exhibit	Motivation is described as based on seeing a particular item or exhibit within the museum, for example the recently opened "Pharaoh" exhibit	• "Specifically to see the Pharaoh exhibit" •"To see Tut"
2	Convenience	Motivation is described as based on proximity of the museum, time factors, free admission, or other factors that relate to the museum's convenience	• "We were at the Botanical Gardens and we parked in this lot, and we figured we'd come in and spend the day" • "We had a free day off, and it's free"
3	Friend/Family Outing	Motivation is described as based on a time to spend with friends and family, as a group social occasion	• "We were visiting my sister-in-law, so we decided we wanted to take her and go do something" • "Oh, I'm bringing my great nephews for their first visit to the museum"
4	Entertainment	Motivation is described as based on the museum's fun or entertaining qualities	• "it's fun, and I haven't been in a while" • "Just for a whim. Just a "Hey, wanna go and check out this museum?" Something fun."

Question 6: Do features like creating your own tour or having your own favorites collection, does that appeal to you? Answer: Yes

Column1	Category	Description	Examples
1	Technology	Focus is on the technology, rather than on the content.	• "It's cool that it's, like, digital."
2	Clarifying	Interest is based on the tour or collection feature's ability to make the museum visit less confusing and more streamlined	• "be able to see things that I'm interested in rather than just wandering" • "I understand this is a very big art gallery and I only know so much about art, so I believe it would be better if I can set a tour based on arts that I know and absolutely love and go around the place"
3	Personalization	Interest is based on the tour or collection feature's ability to tailor the visit to fit the individual's interests or needs	• "it personalizes the visit" • "So when I'm coming today, what I want to see probably changes. Today maybe Egyptian and Impressionist stuff. Maybe another time, I wanna look at American stuff."
4	New Content	Interest is based on the ability to find new objects or content that the visitor was previously unaware of	• "the idea of being able to find art objects that I might not be aware of that are in the museum"

Question 6: Do features like creating your own tour or having your own favorites collection, does that appeal to you? Answer: No

Column1	Category	Description	Examples
1	Technology Issues	Visitor cites inability to use technology as a reason why they are not interested	• "if I were a little more able to do that"
2	Familiarity	Visitor cites existing knowledge of the museum and its collections as a reason why they do not need a digital tour or favorites collction	• "I've been to this museum, because I grew up in Cleveland, so many times. I almost kind of know it by heart"
3	Lack of Knowledge	Visitor cites their unawareness of the technology as a reason for their lack of interest	• "I didn't know much about it until right now" • "I'm not really sure what it is"
4	Prefers Non-Technological Experience	Visitor cites the desire to experience art without the use of technology	• I'd rather just come here and see it in person"
5	Prefers Perspective of Others	Visitor cites an interest in gaining the perspective of other visitors or professionals, rather than their own	• "I'd prefer someone else creating a tour for me, because I'm not quite sure what I would be interested in"

Question 7: Do you feel like this kind of technology allows you to sort of personalize or customize your experience with art? How so?

Column1	Category	Description	Examples
1	Younger Generation	Visitor describes the technology as being better for engaging children and younger visitors.	• "I think it's a great opportunity to get younger people involved, yeah" • "It gives us a reason to bring children here rather than some other place"
2	Structure/Clarification	Visitor describes the technology as allowing them to structure or clarify their visit.	• "if there's certain art that catches your eye, it's nice to be specific and go to that location" • "You usually have something of a time commitment you wanna make in a given day. You want to get as much out of it as you can on the stuff that you want to see that day, so I think it helps a lot"
3	Information	Visitor describes the technology as being able to provide them with additional information.	• "Well, I had just talked to her about being able to get more information about a piece of art that you see at the museum, so that's what I'm hoping to use" • "Where I was looking at, I think the porcelain, and it was saying where it came from and who made it and why they made it. I thought it was pretty neat"
4	Browsing/Introduction to New Content	Visitor describes the ability to browse through artworks, or be introduced to new works related to their interests.	• "it had Ganesh, which is from South Asia where I from, so I felt like if I could browse and see more sections related to that, that would be – it would be interesting"

5	Personal Interests	Visitor describes the ability to collect works or design tours that appeal to their own interests.	• "that if you're interested in some particular theme or some particular period you can quickly put together a list of the items at the museum" • "if you want to look at things that appeal to you, that's a very personal touch, instead of just kind of digging through everything and finding what really appeals to you"
6	Control	Visitor describes the ability to take charge of their own experience.	• "I feel like any situation where someone is able to be more in control of their tourist experience, they like that"

Question 8: Does having the opportunity to personalize your experience with art matter to you? Answer: Yes

Column1	Category	Description	Examples
1	Guidance	Visitor describes the personalization features as being able to guide them through their experience.	• "So, yeah, I guess as far as using it as a map in general, would be nice" • " I feel it's very helpful, rather than just browsing around and missing a few things" • "Just because everyone likes different things, so if you can find your own things and customize your experience"
2	Entertainment	Visitor describes the personalization feature as being fun or entertaining.	• "It makes it more fun coming to the museum"

Question 8: Does having the opportunity to personalize your experience with art matter to you? Answer: No

Column1	Category	Description	Examples
1	Redundancy	Visitor describes the personalization feature as being redundant or unnecessary.	• "No, because when I come here I have – well, I've already customized it"
2	Irrelevant	Visitor describes the personalization feature as being unimportant to their visit, and not a determining factor.	• "Um, not really, because I probably would have came anyway." • "I guess it doesn't like matter"
3	Prefer Browsing	Visitor describes the personalization feature as being too focused or predetermined, and prefer a browsing experience.	• "I kind of just like wandering through the museum and looking at stuff rather than being on a predetermined course." • "Not today, we were just kind of browsing"
4	Familiarity	Visitor describes their existing familiarity with the museum as a reason for their disinterest in the personalization features.	• "if I was probably in a different – like in a city where I hadn't been to the museum, but since I know this one so well, it's not as big"

Question 9: How do you think that this kind of technology influences the way you interact with artwork?

Column1	Category	Description	Examples
1	Deepen or Increase Knowledge and Awareness	Visitor describes the technology as strengthening or deepening their connection with art or increasing their knowledge of the artwork.	• "I think it will help continue to deepen it" • "getting more in depth information about it than just what's in front of you" • "getting to know more about the art that I'm looking at"
2	Scope	Visitor describes the technology as giving them an understanding of all the items as a collection, or in relation to one another.	• "it gives you an idea what you have and everything you have available you can see there"
3	No Change	Visitor describes the technology as having no effect on their relationship or experience with art	• "Probably pretty little for me, at least" • "I get more out of it seeing it in person"
4	Comparison	Visitor describes the technology as allowing them to compare between works.	• "just comparing more objects maybe at the same time"
5	No Idea	Visitor doesn't have an answer, or is unaware of how it may affect their experience with art.	• "I don't know." • "Not sure"
6	Focuses	Visitor describes the technology as allowing them to focus on their particular interests, or limiting their ability to learn about new topics or objects they may have been unaware of.	• "it has the danger of having me focus on things that I'm already familiar with" • "rather than view art going period by period …instead just target some particular items and see those"

7	Convenience	Visitor describes the technology as being convenient and providing them access to information more readily	• "allow for information to be communicated more readily" • "you can quickly put together a list of the items at the museum that you'd like to see, and record that and keep that handy for yourself"