The purpose of this study is to distinguish the way people interact with artifacts in a physical environment versus a digital environment. As technology advances, we are getting closer and closer to having a more ‘realistic’ experience within digital museums. A literature review looks at the pros and cons of these advancements, and discusses what they mean for the future of museums. A study is conducted and concludes that while digital museums are a fantastic resource, they do not perfectly capture the experience one has within a physical museum.

Headings:

Museums

Virtual Museums

Virtual Technology
PHYSICAL VERSUS DIGITAL MUSEUMS: THE USER EXPERIENCE

by
Brian Burns

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Approved by:

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Advisor
Introduction

The purpose of this study is to distinguish the way people interact with artifacts in a physical environment versus a digital environment. Digital collections and libraries are fantastic services because they provide users access to a vast amount of materials that they might not see otherwise. As technology advances, we are getting closer and closer to having a more ‘realistic’ experience in these digital environments. We also have advancements such as Google Art and The ART WORKS Projects that provide a vast amount of information to any user with an internet connection. This study focuses on the experiences people have with artifacts digitally and compares them to the way people experience the same objects in person.

I am mainly interested in the long term effects art has on people. Pieces in a museum can be awe-inspiring, and have a lasting effect on the way people think. This study will explore if the same can be said currently about art experienced digitally.

Literature Review

In order to discover if the digital museum experience can match that of the physical museum experience, we must first look at what benefits each of these formats has to offer the public. Physical museums have been around for a very long time. As they've evolved, they've grown from private collections to public institutions that are
cherished across the world. Today we see the physical museum as not just a building that collects certain artifacts, but a carefully curated establishment that offers its patrons a unique learning experience. In “Beyond Cognition and Affect: The Anatomy of a Museum Visit,” author Deborah L. Perry discusses the important factors that make a museum exhibit successful. She states that there are two criteria that must be met for success: visitors have to enjoy themselves, and they have to learn something. This criteria is hard to argue with. With all the ways we are able to gain access to pieces of art and history today, what makes a trip to the museum worthwhile?

Perry goes on to discuss three more basic expectations patrons seek in a successful trip to a museum. She talks of the importance participation, social interaction and intellectual engagement play in the museum experience. Similar points are made in the article “Museum Visitor Preferences and Intentions in Constructing Aesthetic Experience." In this article, authors Jeffrey K. Smith and Lisa F. Wolf look at the way people interact and digest the information they gain from artifacts in a museum. “When an individual encounters a work of art in a museum, three distinct elements interact to determine the nature of the encounter: the work of art, the presentation in the museum, and the individual.” They discuss the importance of the presentation of the exhibit, and


how organization leads the path for patrons to explore what the exhibit has to offer. Even though exhibits are often thoughtfully organized and laid out, there is no way every individual will look at the collection the same way. “The collection forms a curriculum for the visitor, but even with the curriculum provided, the visitor will interpret and define that curriculum according to his or her own needs.” With this in mind, it is important to remember that as essential as proper curation and organization is, there is no perfect way to present artifacts for everyone to enjoy the same way. This isn't necessarily a bad thing, but is worth noting for this particular study.

What is there to gain from being in the same space as an artifact that is lost in digital translation? Authors E. Margaret Evans, Melinda S. Mull and Devereaux A. Poling discuss the cognitive effects artifacts have on us in the article “The Authentic Object? A Child's-Eye View.” They discuss the importance authenticity plays in our experience with important items by examining the ways children interpret awe-inspiring artifacts presented to them in a museum setting. Also in their article is a discussion of why it is certain items we encounter are able to provide us with a sense of wonder. “Experiencing a work of art in living color, as the artist intended, or nature in the raw is awe-inspiring. Such an act invokes our aesthetic sensibilities, our emotions, our intellectual curiosity, and our astonishment at the accomplishments of others.” They discuss how museums

3 Ibid

help bring these emotions out, and can at times be the cause of awe themselves.

“Reminiscent of the cathedral building of previous centuries, museums of the late 19th and early 20th centuries were built to house objects of reverence." This comparison to cathedrals illustrates the importance of the history of physical museums, from ancient to more modern-designed buildings.

Many of these advantages of the physical museums are discussed in a blog entry on the Utah Museum of Fine Art’s website. The blog post ‘Why Bother Seeing Art In Person?” discusses how often pieces of art are used on t-shirts, greeting cards, etc. When people see these works for the first time in that setting they are not getting any story out of the works, they are simply decoration. The blog post also discusses how distracted people are when using their computers, which also takes away from the experience.

While digital museums may not have made a historical impact on us like physical museums have at this point, they are certainly quite relevant today. They can provide users with access to artifacts a world away with the simple click of a button. They can also allow users to view and study items in a way that best suits their personal needs. In the 1960's, famous French intellectual Andre Malraux talked of designing a “museum without walls.” His ideal museum would be one that provided remote access to visitors

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5 Ibid

via a series of photographic galleries available all over the world. Today's virtual museums are quite similar to what Malraux had in mind.

Certain technological advances are working to make the digital museum experience as close to that of the physical museum experience as possible. Examples of these advantages are highlighted by Brad Hemminger in his article ‘Capturing Content For Virtual Museums: from Pieces to Exhibits.’ In the article, Hemminger talks about how “having a digital copy of items or exhibits allows them to be accessed by anyone, at any time, from any place. It allows any number of people access at any time. It preserves a nearly complete record of the object, which can be accessed without damaging the original.” He also goes on to discuss the many merits of 3D digitization.

Authors Maria Beatriz Carmo and Ana Paula Claudio have written an article titled “3D Virtual Exhibitions” that takes a close look at some of these advances. They point out several advantages digital museums have over physical ones. One of their arguments is that virtual visits can “extend the period of an exhibition.” A museum in the real world only has so much space to work with. With online exhibits, curators don't have to worry about housing physical items so there is no need to limit yourself with what you

7 Battro, Antonio M. "From Malraux’s imaginary museum to the virtual museum." (1999).


bring in. They also have the advantage of being able to leave things up indefinitely, since there is no need to make room for newer exhibitions.

Another advantage Carmo and Claudio point out is that digital users are able to “examine exact virtual replicas of existing spaces or master pieces that can not allow site visitors due to the risk of deterioration or simply because there is no physical space in the museum to expose them.” Artifacts in a museum often require upkeep since they are capable of deterioration and this is simply not an issue with digital items. As long as the media which holds these digital files is kept up to date, the artifacts that they capture will remain as they always have.

A third advantage the authors point out is that virtual exhibits are able to “provide additional information or experiences to on-site visitors before or during their visit to the museum. For instance, a virtual visit can give the possibility of looking at paintings on the screen, finding out additional details and creating their own tour through the museum.” This is basically saying that virtual exhibits can serve to promote physical exhibits by exposing people to items they may end up wanting to seek out in person.

Finally, Carmo and Claudio state that virtual exhibits enable users “to get inside recreated virtual models of cultural and historical places or buildings that no longer exist or that have suffered considerable changes throughout time.” This is an interesting and

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11 Ibid

12 Ibid
exciting idea. Virtual exhibits have the possibility to recreate environments much larger than physical museums can hold. Image being able to virtually walk around Pompeii, while technology provided by a museum serves as your tour guide.

In the article “Adaptive Virtual Exhibitions,” Bill Bonis, Spyros Vosinakis, Ioannis Andreou and Themis Panayiotopoulos discuss the needs and desires of virtual museum users. They point out that “visitors have various goals concerning their experience within an exhibition space, they follow different navigation strategies in browsing the exhibits, and they may be interested only in parts of the collection.”

Earlier it was stated that there is no ideal way to set up an exhibit in a physical museum. People interpret and observe artifacts in different ways, so everybody will essentially have a different experience in a museum. This article points out the ways that virtual exhibits allow users to customize their visits and get just what they’re looking for out of what is on display.

In “Methodology for Design of Online Exhibitions” authors Angeliki Antoniou, George Lepouras and Costas Vassilakis look at how designers of online exhibitions make important decisions about what their exhibit will portray. Much like Deborah L. Perry said of physical museums, Antoniou, Lepouras and Costas state that “museums curators strive to design and implement exhibitions that offer an educational and at the same time

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enjoyable experience. It seems that a physical museum would have a much easier time holding a patron's attention, since they are more likely to be there for the sole reason of learning. Virtual exhibits have to compete with other virtual exhibits, any user can move on with the click of a few buttons. I'm wondering if the ease with which one can retrieve similar information makes a big difference in the amount of time one spends absorbing information in a virtual exhibit.

Also key to virtual museums is the way the art is viewed on screen by the patron. EssentialVermeer.com is a virtual museum of Dutch painter Johann Vermeer’s paintings that nicely summarizes the pros and cons of viewing the pieces online. They talk about how crowds, glare and dim lights can take away from the paintings in a physical museum. Even with these factors working in favor for the digital experience, they also discuss how physical objects are made up of ‘layers of variegated substances which combine in unique and unusual manners. Obviously, even in the best of case, a painting’s dimensions and texture, both absolutely crucial components of the serious viewing significance, are in significant part lost in even the best digital image.’ Their website has precise monitor calibrations for optimal viewing. This is something more virtual museums should include on their websites.


There are several prominent digital museum projects in use today that are worth noting. The first I’d like to discuss is the Google Art Project. This is essentially a giant online museum, which consists of artwork from participating museums all over the world. Users can ‘walk’ through these museums on their computers using Google street-view technology. The images in the museums consist of “very high” resolution pixels, with each museum having one piece as a ‘gigapixel image,’ an image with over 1 billion pixels. Established in 2011, this is a relatively new tool that is continuing to grow.

Another tool I’d like to discuss is the Art Works Projects. Art Works ‘provides visual advocacy tools which produce action on human rights crises at the grassroots, media, and policy levels. Conceptualized and created in conjunction with established humanitarian and human rights advocacy organizations, ART WORKS’ art and design exhibitions, books, recordings, films, and other initiatives provide opportunities for large numbers of the general population to engage in ending major human rights violations.’ This is a unique project in that it working to raise human rights issues in a virtual setting. While not a traditional museum, it works to collect thematic exhibits and exposes these issues to people worldwide.

There are many popular museums that have established or are establishing virtual collections. One impressive collection belongs to the Smithsonian. Their virtual presence offers over 6,000 books online, as well as digitized drawings and photos of pieces in their museums. You can also view rotating exhibits that feature technology such as 3D

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17 http://www.artworksprojects.org/about/what-we-do/
modeling and audio/visual guided tours.

A study exploring how art museums can ‘use interpretive technology to engage visitors actively in new kinds of experiences with works of art’ was conducted by Jane Alexander, Jake Barton and Caroline Goeser in 2013. Their ‘Transforming the Art Museum’ looks at the Cleveland Museum of Art’s groundbreaking ‘Gallery One,’ which is an interactive art gallery built out of extensive audience research. The exhibit features multi-touch screens in front of popular pieces in the museum that allow visitors closer examinations, as well as interpretations and explanations of the pieces and their history. Some of the pieces even include games such as trivia that help the visitors connect to the art. There is also an iPad app called ArtLens that users can interact with during their visits. This groundbreaking exhibit has gathered worldwide attention and might possibly be a glance at what museums of the future will look like. They will soon be having a conference to discuss user satisfaction and opinion on the exhibit.

Though digital museums are on the rise, physical museum attendance is reportedly up as well. David Brieber conducted a study titled ‘Art Affects You More Powerfully When You Visit it in a Museum’ that found that the most distinct memories are made in physical museums. Similar to the study I am conducting, participants were first shown a piece of art digitally and then exposed to it in a physical setting on a later date. He quotes Lisa Barrett in stating that there is something about the physical space

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that changes how our minds respond to what we’re seeing\textsuperscript{19}.

The readings I’ve explored point out the many ways in which both physical and virtual museums must work to be seen as successful. Both types of museums provide a unique experience that users are unlikely to find outside of such an establishment. The artifacts traditionally housed in a museum are revered for the fact that they cause us to feel a sense of wonder and awe. Technology is being created today that is trying to adapt the experiences we have in a physical museum in to a virtual experience that can be had from people anywhere in the world. I will be exploring the possibilities this technology provides to find out if we can truly match the experience of observing awe-inspiring art in a virtual setting.

\textbf{Methods}

For this study I conducted a survey and interviewed subjects to obtain both quantitative and qualitative results from several museum patrons. I had one group of people view a piece of art they had never seen digitally, and another group look at that same piece of art for the first time in a museum setting. Once the groups viewed the piece, I had them fill out a survey to get a feel of the experience they had and emotions they felt. After that I studied their answers, both written and spoken, and drew conclusions about what they had gained from spending time with the art pieces.

\footnotesize{\textsuperscript{19} Brieber, D., Nadal, M., & Leder, H. (2015). In the white cube: Museum context enhances the valuation and memory of art Acta Psychologica, 154, 36-42 DOI: 10.1016/j.actpsy.2014.11.004}
I gathered qualitative data from conducting interviews. Monique Hennink, Inge Hutter and Ajay Bailey describe the “qualitative research cycle” as a three part process that consists of the design cycle, the ethnographic cycle and the analytic cycle. The “design cycle” is the part of the process that consists of doing background research to form a proper question to study. The “ethnographic cycle” is where the actual work starts. This is where I recruited individuals to interview and recorded the results I gathered. Finally the analytic cycle is the part in which the researcher breaks down and analyzes their results

The survey I designed provided me with a set of quantitative results. In “Research Design: Qualitative, Quantitative and Mixed Methods Approaches” John W. Creswell goes over the crucial aspects of designing a research plan. He says that it is important to identify the population of the study. This includes noting the backgrounds and size of the group being surveyed, as these factors speak to how the results represent certain populations. He also says it is important to identify the “selection process for individuals”. A random sample speaks more to the general population. This is important for my study since my question was not about a specific type of person's experience with artifacts, though I worked with specific groups of people.

Since I worked with both interviews and surveys, I have conducted mixed methods research. In the Handbook of Mixed Methods in Social & Behavioral Research, it is pointed out that “methods should be mixed in a way that has complementary

20 Hennink, Monique, et. al. "Qualitative Research Methods" (2011)

21 Creswell, John W. "Research Design: Qualitative, Quantitative, and Mixed Methods Approaches" (2014)
strengths and no overlapping weaknesses. I think this worked out well for my final results. I conducted my interviews based off of the results given on the survey. This helped to expand on the initial results I was presented with.

Results

For this study, two different pieces of art were observed at the Ackland Art Museum by four different groups of individuals. Each piece was observed on a laptop computer by one group of individuals, and in person by another. People observing the pieces on the laptop were able to click on any links available from the Ackland's website if so desired. Those who viewed the piece in the museum setting were not provided any additional resources other than the plaques that accompany the pieces themselves. The idea was to compare how random museum visitors felt about each piece, and to see if opinion differed when viewing the piece in a different setting. I chose random museum visitors as to avoid bias of any sort.

The first piece chosen for the study is titled 'The Mass of Saint Gregory' by Lucas Cranach the Elder. It is an oil on wood panel painting that was created circa 1550. It measures 34 x 24 3/8 in. This piece was chosen because of its flatness.

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The second piece used for the study is a 14th century sculpture simply titled 'Vishnu.' The artist on this piece is unidentified. The sculpture itself measures 39 1/2 x 29 5/8 x 3 11/16 in. This piece was chose because of its three-dimensional nature.
**Group 1- The Mass of Saint Gregory (Digital setting)**

The group that observed 'The Mass of Saint Gregory' digitally consisted of five people, with ages ranging from 19 to 45. There were three females in the group and two males. Their educational backgrounds ranged from High School graduates to Masters Students. On average, the patrons spent one to three minutes observing the piece of art. When asked if they were emotionally moved by the piece, three of the participants reported that they were not, while two reported that they were. When asked if they had any desire to learn more about the artist, three reported that they did while two said they did not. When asked if they had any desire to see more pieces by the artist, three reported
that they did while two reported that they did not. Finally, when asked if they felt they received a proper impression of the piece, only one reported that they did, while four of the participants said they did not.

**Group 2- Vishnu (Digital setting)**

The group that observed 'Vishnu' digitally consisted of five people, with ages ranging from 18 to 44. There were three females and two males. Their educational backgrounds ranged from High School graduates to PHD students. On average, the patrons spent one minute observing the piece of art. When asked if they were emotionally moved by the piece, three of the participants reported that they were not while two reported that they were. When asked if they had any desire to learn more about the artist, three participants reported that they did not, while two reported that they did. When asked if they had any desire to see more pieces by the artist, four reported that they did while one reported that they did not. When asked if they felt they received a proper impression of the piece, four of the participants reported that they did while one reported that they did not.

**Group 3- The Mass of Saint Gregory (Physical setting)**

The group that observed 'The Mass of Saint Gregory' in a physical setting consisted of five people, with ages ranging from 28 to 52. Three were males and two were females. Their educational backgrounds ranged from High School graduates to Masters students. On average, the patrons spent five minutes observing the piece of art.
When asked if they were emotionally moved by the piece, three of the participants reported that they were, while two reported that they were not. When asked if they had any desire to learn more about the artist, three participants reported that they did while two reported that they did not. When asked if they had any desire to see more pieces by the artist, three reported that they did, while two reported that they did not. When asked if they had any questions about the piece that were not answered by the museum plaque, all five reported that they did not.

**Group 4- Vishnu (Physical setting)**

The group that observed 'Vishnu' in a physical setting consisted of five people, with ages ranging from 20 to 55. Three were males and two were females. Their educational backgrounds ranged from High School graduates to Masters students. On average, the patrons spent five minutes observing the piece of art. When asked if they were emotionally moved by the piece, all five reported that they were not. When asked if they had any desire to learn more about the artist, four of the participants reported that they did not, while one reported that they did. When asked if they had any desire to see more pieces by the artist, four of the participants reported that they did not, while one reported that they did. When asked if they had any questions about the piece that were not answered by the museum plaque, all five reported that they did not.

**Discussion**

**The Mass of Saint Gregory**

The first thing that stood out to me when comparing patrons experience with 'The Mass of Saint Gregory' is the emotional reaction that the piece caused. The majority of
digital patrons reported that they were not moved by the piece, while the patrons who saw
the painting at the Ackland Art Museum said that they were. These results are similar to
the findings of David Brieber, who wrote that the students in his study ‘found the actual
art work at the museum more stimulating, positive, and interesting, and they liked it
more, compared with the digital reproductions.’ These are the results that I was
expecting. 'The Mass of Saint Gregory' is a rather large piece, measuring 34 x 24 3/8 in.
In a digital setting, a painting can only be as large as your computer screen so it's
understandable that something might be lost in the translation. There is also the loss of
the dimensional element to be accounted for. Though 'The Mass of Saint Gregory' is a flat
painting, upon close inspection patrons can observe the nuances of the paint used to
create the piece. There are tiny cracks and other slight forms of wear that are not visible
in the online representation. One could say that these elements add to the painting, and
make us feel more connected. Imperfections are unavoidable, so seeing them in pieces of
art can make the pieces relatable. The painting is also quite vibrant. The vibrancy of the
painting's colors in the online setting are based more on the computer settings than what
the actual paint gives off.

Another interesting finding from the study deals with the amount of time patrons
spent with the piece. Digital patrons reportedly spent only one to three minutes with the
painting, while in-person patrons spent closer to five minutes. This leads me to believe
that people who are observing art in a physical establishment are more likely to take in all
a piece of art has to offer. People browsing an online museum might breeze through a

Ibid
collection until something grabs their eye. Since certain pieces do not translate perfectly in an online environment, people easily might miss out on something they find enriching.

It is also worth noting that the majority of online patrons reported that they did not feel they got a proper impression of the piece. The page that displays the painting on the Ackland Digital Collection website provides information such as the size of the piece, the materials it is made of, the name of the artist, and when it was created. This same information is provided in the physical museum, where patrons reported that they had no questions about the piece after they had spent time with it. When writing about how people relate to pieces in a virtual setting, Donovan states that virtual “museums should give up their object-centric manner in the electronic space because the object is only available in a surrogate form. Instead they should present stories of the culture, historical context, people and places the object is related with.”

Vishnu

Like 'The Mass of Saint Gregory,' patrons who observed 'Vishnu' online spent very little time with the piece. Online patrons spent an average of one minute looking at 'Vishnu' while people at the Ackland spent closer to five minutes. 'Vishnu' is a multi-dimensional piece, so it makes sense that people at the Ackland would spend more time observing it. A flat screen cannot recreate the three-dimensional aspects of a statue, so a lot is lost in translation. This is something that technology is working to overcome, as 3D

exhibits are becoming more prominent and popular. In 'The Future of Virtual Museums: On-Line, Immersive, 3D environments' authors Jones and Christal state that “We believe that the future of on-line virtual museums will be on-line immersive 3D rendered environments that place the museum patron in the actual space of a current or past exhibit.” 25 Also like 'The Mass of Saint Gregory,' there are nuances in the materials used to create the piece that are not as visible online. There are imperfections such as chips in the stone that give the statue a relatable feel, even though it is centuries old.

Interestingly, nobody from either group reported that they felt emotionally moved by 'Vishnu.' This could be because of a variety of reasons. 'Vishnu' dates back to the 14th century, and it is possible that people find it harder to relate to pieces that are that old. It is also representative of a culture that is farther removed from most of the patrons that were surveyed than 'The Mass of Saint Gregory' is. When speaking of how ‘appraisal of events’ effects the emotions we feel, Paul Silvia states that “it is hard to explain inter-person and intra-person variability in emotional experience by referring to objective features of events. In any situation, different people will respond with different emotions. And, in similar situations, the same person will have different emotions at different times.” 26


Conclusion

For this paper, I have looked at the history of both physical and virtual museums. The experience we have in a museum is unlike anything else, and certain technologies are working to both enhance and replicate these experiences for museum patrons all over the world. Advancements such as 3D exhibits, adaptive exhibits and Google Art are just some of the ways in which technology is allowing the art world to expand its audience and allow anyone with an internet connection access to things they might not otherwise be able to see.

While these technologies are exciting and impressive, the results of my experiment show that a large number of people prefer the in-person experience to that of the digital-experience. There are certain qualities to art that cannot be recreated or appreciated by people that are not observing the actual object. It’s hard to say if this is something that will ever change, but for now we can state that there is still nothing like enjoying a piece of art in a museum.
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