

**Digital Artifacts: A Museum's Best Underutilized Resource and How Museums May Best
Take Advantage of Them**

A Research Paper submitted to the Department of Engineering and Society

Presented to the Faculty of the School of Engineering and Applied Science
University of Virginia • Charlottesville, Virginia

In Partial Fulfillment of the Requirements for the Degree
Bachelor of Science, School of Engineering

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Spring 2022

On my honor as a University Student, I have neither given nor received unauthorized aid on this
assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Technology shouldn't be seen as the enemy of culture. On the contrary, when used well, technology can help bring visitors closer than ever to a museum, and the history a museum is trying to convey.

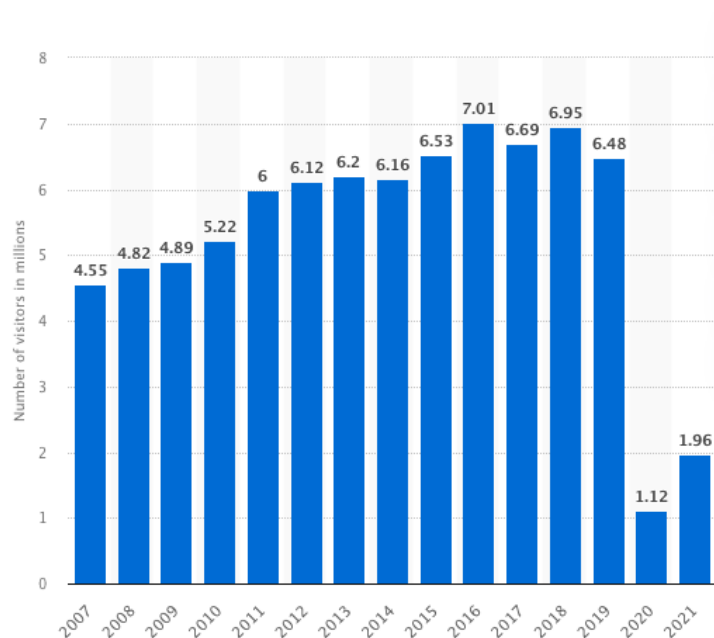
- Manuel Charr, How Technology is Bringing Museums Back to Life

Introduction

In the twenty-first century, technology has been evolving to make our lives easier and more convenient in all aspects of life. The smart phone has connected humanity together in an instant, 3D printing has allowed for the creation of any object the mind can imagine, and cryptocurrency is looking to change the way in which we all use our money. This technological advancement has also occurred in the museum/research sphere, where physical artifacts (such as books, paintings, sculptures, and pottery), which have traditionally served as sources of information of the past, are being redefined and recreated. Recently, a new type of artifact has been created, called the “digital artifact.” Digital artifacts are digital representations of physical artifacts such as 3d models, pictures, or scans of books.

While the creation of digital artifacts is exciting and beneficial for museums to both preserve their artifacts and to distribute knowledge more quickly, their acceptance as viable alternatives to physical artifacts has only recently occurred. In a Smithsonian Council Report on the impact of technology on art museums, the institution said, “Technological advances can be difficult for some curators and museum staff to appreciate... They may be reluctant to recognize that examples of high technology are themselves artifacts, and are often perceived as such by museum visitors. (pg 5)”

Furthermore, COVID-19 has had a drastic impact on museum visitors and digital artifacts may be the answer to encouraging visitors to come back to museums. While



*Number of Visitors to the Metropolitan Museum of Art in New York From 2007 to 2021
-Statista*

digital artifacts may be an innovative step forward for museums, there is very little research into how museums can use digital artifacts and their unique properties to their advantage. By looking at the users, the people who go to museums, it is possible to discover how digital artifacts are being utilized so that their display, presentation, and availability can compliment the needs of the people actually using them.

This paper analyzes the ways in which museums may best utilize the digital artifacts at their fingertips. It will do this by analyzing how digital artifacts are currently being used and consider how museums could best integrate them into their exhibits. It also gathers data and checks if there are any generalizations of why and how people

are using digital artifacts. By finding trends in user data, solutions can be found that actually benefit the users and compliment the actions they are already taking to benefit from museums. This paper analyzes the usefulness of digital artifacts in the museum space, discovers why digital artifacts are not being fully utilized, and ultimately makes suggestions for the integration of digital artifacts into museum culture.

Part 1: Filling the Gap in Knowledge on Digital Artifacts, Their Usage, and How They are Displayed

Digital artifacts come in many different shapes and sizes. This paper will refer to each of these different types of digital artifacts as “forms” of digital artifacts. As already

Forms of Digital Artifacts	Forms of Physical Artifacts
3D Models	Painting
Images	Book
Scans	Fossil

Forms of Digital and Physical Artifacts (nonexhaustive)

mentioned, some examples of the forms of digital artifacts are 3D models, images, and scans of books. Specifically, these forms are ones that are *direct one-to-one recreations of the physical artifact.*

On the other hand, museums also house “exhibits” and that is the name this paper will use to describe *experiences created to display artifacts.* An example of an exhibit which may house a digital artifact is a touch screen monitor that shows a 3D model of a dinosaur. The user can rotate around the model to view it in its entirety and click on certain bones to cause popups or videos to play talking about the dinosaur.

Understanding how the forms digital artifacts can take and how they best translate into exhibits is the way in which museums can best realize and utilize the potential of digital artifacts.

The usage of digital artifacts may not seem important at first, because most people would rather interact with the physical artifact. Because it is the original object, people often believe that it may have more integrity. Likewise, there is a belief that anything other than the original artifact will be distorted in some way. In her article, "Why Collect First Editions," Ginni Chen writes; "Book collectors value first editions because it's the closest one can get to the author's intent (2014, np)." While this quote is on the Barnes and Noble website, and she may have a vested interest in selling expensive books, her quote helps explain why people trust in the original versions of artifacts and fear the potential distortions inherent in their recreation.

While physical artifacts may be more appreciated by the public than digital artifacts, they may be used less than people actually think. Digital artifacts are much more available for the everyday person to use because it takes a matter of seconds to go on a computer and open a file; with cell phones, this can also be done from anywhere on Earth. A quick test I performed on my STS class to verify this belief was just asking them two simple questions. One, "How many people have been to the MoMA and seen Van Gogh's Starry Night?" and two, "How many people have seen an image on the internet of Van Gogh's Starry Night?" The class reacted much as I would have expected. About three people had actually been to the MoMA, while every single person had seen Starry Night on the internet. While this test may not have a large enough sample size nor testing criteria to pass critical peer review, it explains how the internet is something that nearly everyone can and will access, whereas a physical artifact might be much more difficult to gain access to. This paper wants to show that it

is important to understand how these digital artifacts are being used and why, because they may be the primary form of artifact dispersal in the post-modern era.

While museums and their visitors can use digital artifacts in many different ways to advance learning, some forms of artifacts meet the needs of people and others do not. A person who is trying to analyze the contents of a book does not need a picture that was taken of the book, nor a 3D model of the book. This person would need scans of each of the pages or access to the physical book, so they may read it. While the above example may seem pedantic at first glance, of course someone who is analyzing a book wouldn't need a picture taken of its cover, it is important to realize that each of the forms of digital artifacts have strengths and weaknesses. A more technical example of incorrect forms is shown by Molloy when they discuss the inadequacies of images for their own research: "While these media enable us to represent both general and specific features, certain viewpoints of the objects are, out of necessity, placed beyond the reach of the viewer in 2D presentations." (Molloy, 2018, pg 98) Molloy's issue is that they need to analyze an object in 3D, and "2D presentations" are inadequate to suit their needs. One of the central concerns that needs to be discovered is the question of when to use which form of artifact. Furthermore, when is it better to use digital artifacts, in general, rather than physical.

Finally, it is important to establish the goals of museums. Analyzing the vision statement of the Smithsonian Institute helps understand these goals. The statement explicitly states their goals as, "Shaping the future for preserving our heritage, discovering new knowledge, and sharing our resources with the world. (2017, pg 2)" This is a very good description of why museums exist and what their outward goals are.

Florescu argues that museums are places of conflict and controversy. Places where ideas are meant to be challenged and created. She says that it is a museum's purpose to teach and connect people for the purpose of strengthening ideas: "Even though there are numerous controversies and limits set on the concept of public participation to activities organized by museums, it is nevertheless also considered by many authors and practitioners as an option of cultural institutions to reconnect to the public, demonstrating its value and relevance (Florescu, 2020, pg 114)." In addition to "preserving artifacts for the education of the public" and connecting people for the creation of ideas, it is also important to realize that most museums charge money to visit them and they stand to make a profit from their exhibits. Thus, for the purpose of both making a profit and educating the public, museums care about how many people are coming to visit. I fear that museums may be hesitant to accept digital artifacts as equally beneficial because people may not visit the museum if they are seen as such. It is important, not only to discover the best practices and ways museums could utilize digital artifacts, but to also confront the possibility that they may be motivated against using digital artifacts and discover how museums can utilize them without impeding themselves.

Supporting Argument 2: A Three Step Process to Analyze and Engage Users of Digital Artifacts and Understand Their Perspectives

In order to better understand digital artifacts and the world of museums, in which they may be portrayed, I needed to develop a research framework. In order to do this, I figured out what the things were that I needed to solve and what information may be needed in order to go about answering my questions. The specific questions that I

decided must be answered are explained in supporting argument one, but a brief description of my goals are to understand what digital artifacts are and how they may best be integrated into the system of museums.

The framework that I felt best fit for my project is shown by Kerschner and Ehlers in their paper “A Framework of Attitudes Towards Technology in Theory and Practice. (2016)” The two document their pursuit of knowledge and how they applied certain research frameworks to best answer their question of

“How do we categorize a person’s attitude towards technology?” This process can be shown in three distinct steps, each of which progresses the researcher closer to their goal of answering a research question.

The first step in Kerschner and Ehlers’ process of gathering information and research is to do traditional research. This means that the first step when researching should be the traditional method of finding articles, research papers, and other sources that align with my topic and provide insight that may otherwise not be known. It is described by Kerschner and Ehlers as a “literature review.” Utilizing a literature review is a good starting point for research for multiple reasons. Firstly, a literature review is the most obvious and intuitive start for any research paper. People connect the idea of “research” with reading something for the purpose of gaining information on a topic. A



Flow Chart Showing the 3 step method of this paper’s research methods.

literature review is also beneficial because the author is quickly able to determine if their topic or similar topics have already been explored. If they have been explored, then they are able to find direct material to help in their exploration of the topic, or they may determine that the topic has already been explored in its full extent and that they may need to choose a different topic. For these reasons, I decided that the first step for my research on digital artifacts should be a literature review.

In order to conduct my specific literature review, I decided on a few search criteria. I mainly wanted to use resources published in peer reviewed journals because these sources could both be trusted and written at a university level. The main way in which I searched for articles was through the University of Virginia's Library research database called Virgo. Utilizing this database was beneficial because it provided me with access to large databases full of journal publications. The key words I primarily searched for were "digital artifact," "museum," "conservation," and "exhibit." Unsurprisingly, each of these terms ended up becoming extremely important concepts throughout my research. Through Virgo I was able to find multiple articles.

The first article I found was called "3D Models to Educated Museum Interactive Exhibition with Computing Techniques." This article directly relates to my topic because it is specifically exploring museums and how the digitization of museum artifacts, through 3D scanning and 3D printing, can successfully help museums "bring the exhibition of culture relics into a new generation. (Jiang, 2017)" This paper specifically discusses museums, how they have a finite amount of physical space, and how 3D modeling can provide them a vehicle for displaying more artifacts to many more people.

One other amazing article I discovered through my literature review was “Preservation of Digitized Intangible Cultural Heritage in Museum Storage” by Nevra Erturk. This article contributes to my understanding of digital artifacts and their place in museums by providing a strong argument that digitizing artifacts helps preserve history. One key concept that Erturk explores in her article is that museums are only able to house so many artifacts and that the collections being displayed are only a small fraction of what they have. Digitizing these artifacts allows for more people to get access to the vast amount of information being stored in museum archives. Furthermore, Erturk also discusses how all artifacts are not created equal in the eyes of museums, their curators, and preservation team. In some large museums there are millions of artifacts and it is impossible for all of these artifacts to receive the same care and attention. Therefore, some artifacts may deteriorate over time or they may become forgotten in a dark corner of the archives. Digitizing these artifacts will allow for artifacts such as these to maintain their legacy and be useful for future generations when they need them (Erturk, 2020).

The second step of Kerschner and Ehlers’ research process is to categorize each piece of research and assess these different categories and how they each compliment each other to answer the research question. By splitting up the facts and creating multiple categories, the information gained during research can be simplified by creating easy-to-understand groups of sources. This can easily be done by adding subcategories into the text. Kershner and Ehlers do this by splitting up their research into different frameworks of opinions. By splitting up their arguments between different frameworks they organize their thoughts, are able to define clear frameworks of thinking

that someone may align themselves with, and help the reader understand what each framework is because they just have to look at the section discussing any given framework.

For my research paper, I utilize the idea of categorization by splitting my ideas into a few main categories. These have to do with each of the different aspects of museums and their usage of digital artifacts. One of these categories is physical artifacts and their significance. Under this category, I have stored my points concerning what physical artifacts are and how they may be used. This category is important because knowledge of physical artifacts is necessary to compare the usage of digital artifacts. Another category is digital artifacts and their current usage. This category houses all the relevant facts about how museums and their visitors are currently utilizing digital artifacts and is important because I need to know how and why people may use digital artifacts to make recommendations on their proper usage. Third, I have a category that specifically discusses the benefits of digital artifacts for museum preservation. While it is important to understand how digital artifacts are being used, my research is constantly bringing up reasons for digital preservation other than mere usage. Evaluating all the reasons for the digitization of artifacts is important to get a full scope of the topic. Finally, I have a category where I store my facts that have nothing to do with any of the other categories. An example of a fact in this category is discussed by Reynolds in his paper “A Theoretical Approach to the Application of 3D Technology in Anthropology Museums.” On page 22 Reynolds discusses the idea of “new museum theory,” which is an idea that modern museums will step away from “mastery” over knowledge to the “service” of providing knowledge to society. (2014, pg 22) A fact like

this does not fit into the other two categories and is best set outside of that system. Creating this third, open, category allows for the inclusion of many facts without the restriction of fitting them into a category they may not belong.

Finally, the third step in the research process is to go out and gain new information. This step is important because it can fill in the gaps of knowledge needed to come up with conclusions. It can also allow the researcher to go and find a supporting datapoint which specifically fits their research question. I interviewed a UVA librarian. I wanted to know, in their opinion, how many people actually use physical books and how many people utilize the online libraries and resources. This is a direct comparison of digital and physical artifacts, providing excellent supporting evidence for if/how people use the resources at the UVA library.

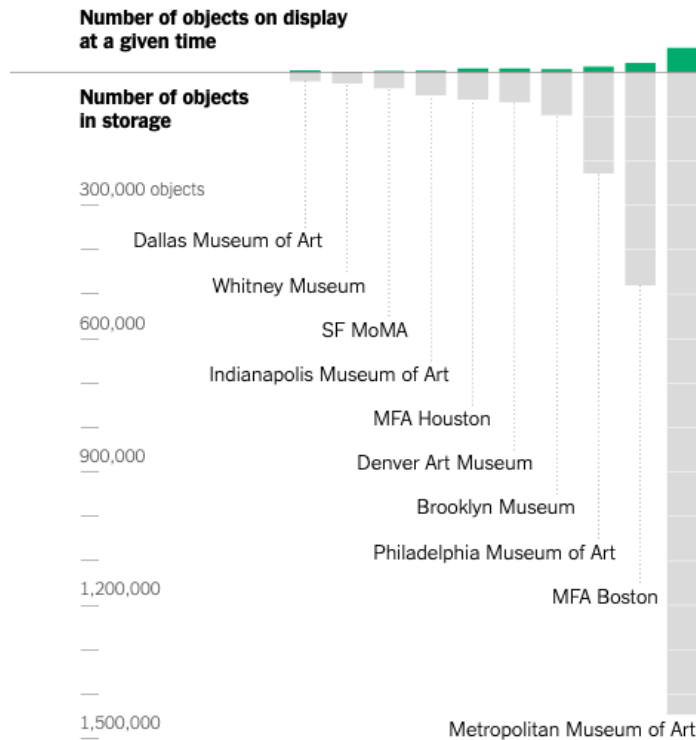
The usage of literary review, categorization, and questioning real people enabled me to perform the necessary research for my project and provided me with a broad range of evidence.

Supporting Argument 3: Findings and Recommendations for Digital Artifact Usage in Museums.

After conducting research and analysis of digital artifacts, their usage, and their place in museum culture, this paper is now ready to discuss how these artifacts can be best utilized by museums. These conclusions will be phrased as broad recommendations for museums so that they may better engage their community and allow people to study and learn about their vast collections.

Solution 1: Embrace Databases

Major museums are only able to display a small portion of their collection.



The above image shows a chart of how many artifacts a variety of museums have in their collections vs how many are actually displayed. (Pogrebin, 2019)

The first recommendation for museums is to create a database, so that the vast collection of artifacts stored in museums may be accessed by the public. This is the quickest, easiest, and often the cheapest way to engage users with their collections. One big finding gained through this paper's literature review was that museums often have a small percentage of their collection on display. According to Robin Pogrebin in her study, some museums display as little as one percent of their collection, while the rest sits in storage for many years (Pogrebin, 2019, np). If museums have an interest in

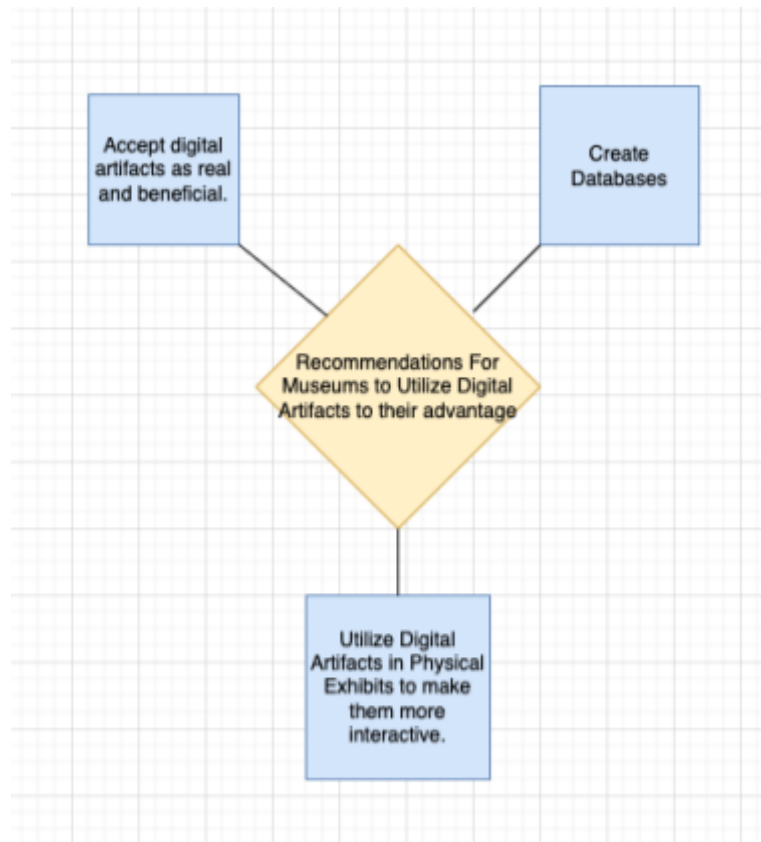
teaching people about art, history, or science, then they are intentionally handicapping themselves by not using all of their resources. For many museums, it is not possible to display every artifact because of space restrictions. However, one may argue that there is a museum practice called “rotation,” where exhibits change and some artifacts are put back into storage, while new ones get put on display (Harvard, 2015, np). While this paper agrees that rotations help display more artifacts, rotations are extremely slow, expensive, and usually only occur on schedules of about four to six months.

Furthermore, some artifacts don’t rotate out. For example, the Mona Lisa receives regular maintenance and is kept in a very strict environment due to its fragility, but does not rotate (Guenfound, 2019, np). Since museums do not have enough space to display all of its artifacts and the practice of rotation does not completely solve this problem, the solution to viewing the millions of artifacts kept in storage is to create a database.

There are many benefits to databases, other than that they allow people to view millions of additional artifacts. One benefit is that creating a database also creates a clear, logical, easy-to-use ledger of all the items in the collection. A person doing research on Edgar Allen Poe can quickly search through a database containing millions of artifacts and find the ones they need. Another benefit is that more people will be able to access the museum’s wealth of information. This paper already discussed how databases enable the museum to display more artifacts, but they also allow more people to view all of their collections. Because more people are able to view the collections, the initial goal of the museums, sharing knowledge with the world, is able to succeed.

Solution 2: Include Digital Artifacts Into More Museum Exhibits

The second recommendation this paper has is to incorporate digital artifacts into physical museum exhibits. This paper has already briefly discussed how this practice is



Three recommendations for museums to better utilize digital artifacts.

already happening in some places, but many museums are not utilizing the digital artifacts they have, and technology to improve their exhibits. In addition to incorporating digital artifacts into their exhibits, making the exhibits interactive will improve them. Exhibits that are interactive give the guest an opportunity to *experience* the artifact and learn a lesson about it. It is more than merely viewing a piece of art, an ancient pot, or

a statue. People are more likely to remember and learn from the exhibit that allowed them to interact with it in some way than a painting they looked at in a traditional museum. Digital artifacts can be displayed on TVs, interacted with on kiosks, or manipulated with types of motion capture technology, all leading to more dynamic exhibits. Many museums do not have to look far for a plethora of examples of how to make their exhibits interactive. Children's museums solely exist for the purpose of

teaching kids by giving them experiences with art, history, or science. There are differences to the types of exhibits an adult museum can logically put on, due to incorporating million-dollar artifacts, but emulating some of the core ideas behind children's museums and how they teach kids would make exhibits more memorable.

Solution 3: Change the Narrative

The third and final recommendation that this paper makes is that museums should change the narrative surrounding technology, technological advancement, and digital artifacts. There is a common misconception that digital artifacts aren't "real" and that they are not as valuable as the physical artifacts. There are two parts of this argument and they each need to be addressed. First of all, "real" is a nondescript term. If the person is saying that an image of a painting isn't the original work, therefore it is not "real," then they would be correct. The issue is that pictures of images or 3D models of figures are real data points. They may not be the "original," but most of the information is retained. If learning and engaging with artifacts is one's goal, then digital artifacts would meet the needs of that person. The person can engage with a painting through an image and see the things that the artist wanted to portray and learn from it. The second part of the argument is that digital artifacts aren't as valuable as the physical artifacts. The value in digital artifacts is that they can be interacted with quickly and from anywhere. They may often be recreations, but the inherent value in the artifact is maintained. When the broader museum community can finally come together and say digital artifacts are beneficial and authentic, museums will be able to engage a larger audience and provide new and innovative exhibits.

While it is important for museums to admit that their work is authentic, there is one counterargument that should be brought up. There are inherent biases and alterations that sometimes appear in the process of creating a digital artifact from its physical source. These alterations can sometimes affect the integrity of the artifact, leading to users of said artifact misinterpreting its value and meaning. It is not common for the alterations to be extremely pronounced, but it does sometimes happen. This paper would be remiss in not discussing how digital artifacts are not always perfect representations of their physical counterparts and it should be taken into consideration.

Conclusion:

This paper has discussed the importance of digital artifacts and their role in museums. These forms of artifacts have a lasting impact on museums collections, their exhibits, and how the public's interactions with the museum. It has been discussed how digital artifacts are currently being used in museums, such as with interactive exhibits even and sometimes with accessible digital archives. These artifacts are much more widely distributed than physical artifacts and provide accessibility to people around the world who may not be able to travel and interact with the physical creations. Museums are focused on stimulating thought in their communities and digital artifacts let them achieve that goal quicker and more efficiently.

The world is constantly changing and more things are transitioning to the internet and computer technology every day. Digital artifacts are the way of the future and museums should, at least, engage in their use to meet the needs of the internet-focused society we are living in.

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