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Accessibility and Technology: Remote Access to Art through Telepresence Robotics

Jenna M. Hebert
jmhebert@usfca.edu

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Accessibility and Technology: Remote Access to Art through Telepresence Robotics

Museum studies, accessibility, technology, telepresence robotics, art museums,
art access, remote tours, community partnerships, digital content

by
Jenna Marie Hebert

Capstone project submitted in partial fulfillment of the requirements for the
Degree of Master of Arts in Museum Studies

Department of Art + Architecture
University of San Francisco

Faculty Advisor: Marjorie Schwarzer

Academic Director: Paula Birnbaum

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Abstract

This capstone project details a proposal for a remote tour pilot program and community partnership written for the Art Institute of Chicago, Snow City Arts and the John H Stroger, Jr. Hospital of Cook County. The proposal seeks to provide a model for remote accessibility to art museums for visitors with mobility disabilities. The pilot program utilizes telepresence technology as a tool for providing remote tours and for emulating the social benefits of a museum visit. Within the program, telepresence technology becomes a mechanism for communication and collaboration between the museum and members of the community, allowing individuals previously unable to visit to experience the collection and contribute to the museum's interpretive narrative. The result is a reciprocal relationship between community and museum and a tangible project archived as digital content.

Key words: Museum studies, accessibility, technology, telepresence robotics, art museums, remote tours, community partnerships, digital content

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Chapter 1: Introduction

Museum collections are preserved, protected, and interpreted for the benefit of the public. Yet there are inherent limitations for the public, especially for those who have limited to no mobility, when museum exhibitions and collections are only presented on-site in the physical museum space. If museums strive to serve the widest possible audience, they must consider the needs of a diverse public with varying abilities.

In lieu of a physical museum visit, individuals unable to enter to the galleries may be able to access related digital content online. Museums have been able to create online collections databases on their websites, as a supplemental experience to exhibitions, but the content does not always provide interactivity or social engagement. Some museums also bring resources into the community through their education programs, but this type of programming, by way of design, remains separate from the museum galleries and from a potentially beneficial experience specific to the museum environment. My capstone project explores a potential solution by exploring how remote technology may help people with mobility disabilities visit the museum virtually.

My work with Rebecca Granados on accessible programs and Beam Tours at the Fine Arts Museums of San Francisco inspired this capstone project. Through our

efforts to create better access to the museum for the disability community, I learned that technology holds incredible potential to further accessibility and provide independence and choice within the museum space. As I interacted with program participants, I discovered more about the barriers that prevented them from enjoying the museum collection, such as way-finding issues, lack of accessible interpretive materials (larger text, verbal description, ASL), and being unable to travel to the physical museum space. I began to see how many of these barriers could be lifted through the use of technology. This experience provided the spark for my research on museum accessibility and technology. I set out to discover and how art museums could best utilize technology to serve audiences that are unable to physically visit the museum because of mobility disabilities.

Lois Silverman and Richard Sandell, both of whom see museums as organizations that exist to serve communities through social missions, provide key sources and inspiration for this capstone project. Silverman writes about the importance of social work within museums. In her book, *The Social Work of Museums*, she describes how museums help individuals build and foster relationships with themselves, others, and society as a whole. She details how museums can use their resources to benefit individuals, groups and communities through her research and case studies on museum programs which focus on helping audiences address and overcome challenges or injustices. Richard Sandell's work focuses on how museums can support societal change through

their programs and services. He specifically advocates for activism in human rights and social justice within museums and is a proponent for equal rights for people with disabilities.

I also consider current trends in technology, including telepresence robotics, virtual reality, and augmented reality to discover what works best for audiences with mobility disabilities. I highlight successful examples in museums around the world and describe the potential of virtual technology for social engagement.

The following text outlines a proposal for an accessible museum program employing telepresence technology at the Art Institute of Chicago, in collaboration with Snow City Arts and the John H. Stroger Jr. Hospital of Cook County. The Art Institute of Chicago was founded in 1879 as an art school and museum (Art Institute of Chicago, 2016). The mission is as follows:

“The Art Institute of Chicago collects, preserves, and interprets works of art of the highest quality, representing the world’s diverse artistic traditions, for the inspiration and education of the public and in accordance with our profession’s highest ethical standards and practices” (ibid).

Snow City Arts is an arts organization that serves patients at local Chicago hospitals, providing instruction in visual arts, music, creative writing, theater and filmmaking. Snow City Arts seeks to provide young patients in extended hospital

stay with “educational outlets they definitely lack...[and] exposure to arts and culture” (Snow City Arts, 2016). The organization receives funding from the National Endowment for the Arts and the Illinois Arts Council Agency. The John H. Stroger, Jr. Hospital in Cook County serves as “the primary public provider of comprehensive medical services for the people of metropolitan Chicago” (CCHHS, 2016).

This capstone project addresses the challenge of museum accessibility for visitors with mobility disabilities through the use of remote telepresence robotics. The proposed program brings these three institutions together in collaboration to give hospital patients the opportunity to explore the museum collection and respond to works of art in a meaningful way. The proposed project also aims to open up the museum to a new audience not typically able to access the museum’s resources and to offer the benefit of the social experience of a museum visit.

Executive Summary

In chapter 2, I analyze the literature that has informed this capstone project. I examine case studies and research on museum theory, accessibility, and technology in museums. I frame the research using three guiding questions: why do museums need to be more accessible to individuals and communities unable to physically visit the space; can technology help museums become more

accessible for people with mobility disabilities; and what recent technological advancements are useful for creating better access to museums?

In Chapter 3, I propose a hypothetical pilot museum program at the Art Institute of Chicago that will create better access for individuals with mobility disabilities through telepresence technology and a unique community partnership with Snow City Arts and the John H. Stroger Jr. Hospital. I provide more information about each organization and the benefits associated with the proposed partnership. I outline the goals and objectives of the program and conclude the chapter by describing the potential outcomes of the pilot.

In Chapter 4, I outline the details of the project plan. I include information about the project stakeholders at the Art Institute, Snow City Arts and John H. Stroger and within the community. I list the resources necessary to employ the project. I offer a detailed action plan, highlighting important phases in planning, implementation and maintaining the program. I end the chapter by including a timeline and budget specific to the project plan.

In Chapter 5, I present measurements for successful implementation of the proposed project. I list recommendations on how the Art Institute of Chicago could potentially build on the success of the program. I offer suggestions about how to utilize telepresence technology for other populations and with different programs within the museum. I conclude by expressing my opinion on why

accessible programming should be a priority for museums, as well as the importance of applying technological resources specifically for the benefit of the disability community.

In Appendix A, I provide a list of sources cited within the text, as well as annotations on the most influential articles. In Appendix B, I list the proposed stakeholders for the project and provide more information about Snow City Arts' organizational structure. In Appendix C, I define important terms mentioned in the text. And in Appendix D, I illustrate the technology described in the text with images demonstrating it in use within various museum environments.

Chapter 2: Museum Accessibility and Technology

A Literature Review

The de Young museum was closed. The second floor gallery housing 19th century American paintings and sculpture remained quiet and still. At first glance, the gallery encapsulated the typical assortment of objects representing American art in the 1800's, but centered in the gallery stood something noticeably more modern; a tall grey machine, complete with a small computer screen and motorized wheels. Suddenly, a cheerful computerized "chirp" interrupted the silence, followed by a woman's voice echoing through the space. Her image had appeared on the screen as she logged on from home. She chatted with museum staff and a volunteer in the gallery as she moved the machine's wheels toward a painting in the corner. As she reached the painting she paused. Her emotions swelled. She took a moment to relish in the beauty of the painting and delight in her museum visit; an experience that she believed was no longer viable for her as someone who had a mobility disability. The woman had come to visit the museum for the first time in years through the use of robotic technology (Figure 1).

Can technology, such as the experience described above, create opportunities for art access? This question and the following questions provided the framework for this literature review:

- 1) Why do museums need to be more accessible to individuals and communities unable to physically visit the space?
- 2) Can technology help museums become more accessible for people with mobility disabilities?
- 3) What recent technological advancements are useful for creating better access to museums?

To begin to address these questions, I examined museum case studies and peer-reviewed articles written in the last 20 years that discuss museum theory, accessibility in museums, and technological developments in the field.

Museum Theory and Accessibility

In the years since Congress enacted the 1990 Americans with Disabilities Act (ADA), museums have increased physical access for the disability community by meeting ADA requirements for their facilities. More recently, a smaller number of museums have moved beyond ADA requirements by creating specialized programs and inclusive experiences for people with disabilities (Sandell, 2010; Fletcher, 2013; Center for the Future of Museums, 2016).

Museums that are actively addressing accessibility in their program design have responded to a shift in museum theory, which, according to Lord and Blankenberg, stemmed from the 1992 American Alliance of Museums report *Excellence and Equity: Education and the Public Dimension of Museums*. The report instigated a turning point for museums, as they shifted from a passive,

academic approach to an active, visitor-centered approach in museum education. This transformation coupled with ADA requirements inspired museums to consider the needs of a more diverse audience (Lord & Blankenberg, 2015). Museum professionals started to look outward into the community and investigate how to engage and serve the broader public (McMillen, 2012). Museum experiences became centered around individual needs and abilities; what visitors brought to the table.

As museums began considering individual needs in regard to disabilities, museum theory expanded even further to include social work that addresses the societal constructs that put people at risk. How could museums positively affect lives of people in need or at risk? How could museums be a part of communicating better cultural values to instigate social change? Lois Silverman inspires museums to harness their inherent power to intentionally work towards solving societal issues, including the marginalization of people with disabilities. She sees this work as a “collaborative endeavor” that involves museum professionals and communities responding to the world around them and coming together to create change.

“Museums can view the experience of being at risk as a shared social problem, and not just a shorthand for subgroups of visitors or nonvisitors to whom special programs are marketed...this perspective helps museums recognize the need to address two major systems for change - people at

risk and the social conditions that create and contribute to such risk. Both systems involve us all” (Silverman, 2010).

In her book, *The Social Work of Museums*, Silverman argues that museums have “ventured into social work both knowingly and unknowingly”. Museums provide educational, associational, and reverential experiences, which are essential human needs. If museums had already been helping people realize basic needs, what could they accomplish when working with intention towards this goal?

Both Sandell and Silverman note that this shift in museum theory, to a more socially conscious and equitable museum, has benefited visitors with disabilities, who have historically been marginalized and left out of museum experiences (Sandell, 2010; Silverman, 2010). Museum professionals have to recognize people with disabilities and their ability to actively participate in learning in the museum environment (McMillen, 2012). Today, a handful of art museums have ongoing access programs. The Whitney Museum of American Art opens its doors early for families with children on the autism spectrum, providing gallery and art making programs in a low sensory environment (Whitney Museum of American Art, 2016). Several national and international art museums have created specialized programs for individuals diagnosed with dementia and their care partners (Peacock, 2012). And the Queens Museum in New York established ArtAccess, which includes a program that engages socially isolated populations by taking museum resources out into the community (ibid).

Although museums are making strides toward accessibility and inclusion, most museums lack funding and staff resources to implement access programs or meet ADA requirements (McMillen, 2012). Also, ADA law only applies to organizations that receive federal funding, so private museums are under no obligation to make their spaces compliant. Museums that do satisfy ADA regulations and provide inclusive programming “see design as a means of responding with vision to the facts of the human condition and not just the requirements of accessibility in law and code” (Fletcher, 2013). But, as noted in *Trendswatch 2016*, “examples of good, accessible design are still depressingly rare” and most museums lack accessible resources for people with disabilities, such as way-finding, communications, and digital content. Museums need to respond to the limitations of their physical space and interpretive efforts, especially as the world’s aging population increases. In its 2008 report, *Museums & Society 2034: Trends and Potential Futures*, The Center for the Future of Museums states that by 2034, one in five Americans will be over the age of 65. It is also estimated that currently, about twenty percent of Americans have a disability (CDC, 2015). Museums need to address a more diverse range of abilities, as well as “functional limitations” of an aging audience, in innovative ways (Fletcher, 2013).

Can Technology Bridge the Gap?

Despite efforts to make museum buildings and programs more accessible within the walls of the galleries, many physical, economic, and social barriers beyond those walls still exist, preventing populations from accessing cultural content.

Individuals with mobility disabilities face physical barriers and may find it more difficult to visit museums. A mobility disability is defined as a limitation in independent, purposeful movement of the body due to a physical condition. These disabilities can be temporary or permanent and are most commonly caused by aging, injury, illness, or conditions present at birth. As a population at risk of isolation and loneliness, they can benefit from the social experience of a museum visit (Silverman, 2010). The social experience that occurs in a museum is vital; it can help individuals with personal growth, meaning making, and give individuals a sense of belonging (Silverman, 2010). When a visit to a museum is out of reach, can museums use remote technology to create beneficial social experiences for individuals with mobility disabilities?

Since its inception, museums have harnessed the power of the Internet to increase access to information about their collections and reach global audiences. Museums have used their websites to advertise exhibitions, display educational content, and broadcast footage of museum events (Finkelstein, 2007; Bautista, 2014). Digital content published or broadcast on museum websites provides a supplemental experience in lieu of a trip to the museum, but it lacks the interactivity and social stimulation one may encounter during an actual visit (Finkelstein, 2007). Museums that create more interactive online platforms allowing users to respond to content in real time, such as live virtual tours, online forums, or collaborative webinars, can offer users the feeling of

“shared presence” (ibid) that is usually a benefit associated with a visit to the physical museum space (Silverman, 2010).

Even though live and interactive web experiences can emulate a user’s presence within a museum, access to the physical museum environment remains important in the digital age (Bautista, 2014). If the environment is inaccessible to certain populations, how can museums simulate a museum visit in an engaging way? In 2015, Katz and Halpern conducted an evaluative study of 565 online users of online museum content. A group of users accessed virtual galleries at the Museum of Fine Arts Boston (MFA) and a separate group accessed images of objects in MFA’s collection. Katz and Halpern found that users who experienced the museum collection in three dimensions were more engaged with the content and learned more about museum objects than users who viewed two-dimensional images. The study showed that three-dimensional, virtual experiences enhanced a user’s experience with digital content on a museum website.

Early in the Internet age, museum professionals and engineers saw the potential of online virtual tours to create better access for visitors unable to physically visit the space (Wolfram, et al, 1998; Giannoulis, et al, 2001). In 1998, researchers conducted a field test of an autonomous museum tour-guide robot named RHINO at the Deutsches Museum (Figure 2). Engineers designed RHINO to do two things: 1) give tours to physical museumgoers; and 2) allow online users to

log on and see the galleries, using the robot as an avatar. The online users could send the robot to specific locations in the gallery, therefore giving them some control over their experience in the space (Wolfram, et al, 1998).

A few years later, a separate group of engineers explored the potential of another telepresence robot, TOURBOT, for virtual museum visits. They envisioned that TOURBOT would help people gain access to the “aura” of the museum, “the living and changing space where other humans are present” (Giannoulis, et al, 2001). The technology could become an instrument for people to connect to a social experience as well as the evolving space of the museum (ibid). This robotic technology could potentially offer people with mobility disabilities opportunities to experience the physical museum space without having to travel to the museum site. There were kinks to work out, however, as both robot tour-guide projects encountered issues with navigation and object sensors in crowded gallery space. It would be a number of years until museums again explored the potential of this technology.

More recently, museums such as the Tate Modern (London), National Museum of Australia (Canberra), and Balboa Park (San Diego, California) have utilized robotic technology for distance learning. Over the course of five days at the Tate Modern, online users from all over the world could visit the museum after hours by logging onto a specially designed robot and driving it through the dark galleries for a short period of time (Tate, 2014). Experts from the Tate provided

live commentary for the virtual tours, giving visitors insight into the objects they encountered in the galleries. The museums at Balboa Park allow online visitors to access their BeamPro telepresence robots to explore the nineteen different museums housed in the park through docent-lead tours (Figure 3). The museums at Balboa Park specifically advertise that these tours are for individuals with mobility disabilities, who are unable to travel to the museum (San Diego Air and Space Museum, 2016). The National Museum of Australia's Robot Tour program may be the ultimate experience in telepresence touring. Individuals and groups can log onto "Kasparov" and "Chesster", two telepresence robots in use by the museum, for "live, immersive, interactive, guided tours" (National Museum of Australia, 2016) (Figure 4). The robots feature 360-degree cameras and visitors are able to access additional content during docent-lead tours, such as exhibit label text, just by clicking on objects in their field of view (ibid).

Telepresence robotic technology is not the only platform on which online visitors have accessed museum sites. Virtual Reality (VR) and Augmented Reality (AR) can also be useful for creating interactive experiences that imitate reality. Three-dimensional virtual content can be so engaging that doctors have started to utilize virtual reality technology to distract patients during painful procedures (Matchar, 2016). Psychiatrists have also adopted the immersive technology as a treatment tool for phobias and PTSD (ibid). Currently, museums and cultural sites are partnering with Google Arts and Culture to create online exhibitions of their collections and virtual tours of their space (Google Arts and Culture) using

360-degree videography compatible with VR technology (Figure 5). Google has also created tours for students using a Smartphone app and Google Cardboard, an inexpensive virtual reality tool (Google Expeditions).

Telepresence, VR, and AR are interactive technologies that help individuals understand and explore the world around them. Telepresence robotics can be beneficial tools because they give users an opportunity to freely roam in a given space. AR and VR are more accessible in terms of costs than ever before (Rigby, 2013). AR content can be seamlessly integrated onto mobile apps, making content creation easy (ibid). But there are some challenges with navigation and GPS tracking technologies. Tracking in AR technology is not perfect, and it's necessary for a user to be able to activate content based on their location.

Conclusion

As a result of the research synthesized in this review, I have concluded that museums have concentrated on how to better serve broad audiences and communities in need. Many museums are creating access programs on-site and in their communities to engage underserved audiences. Yet, more work needs to be done to open up museum experiences to visitors with mobility disabilities and visitors with functional limitations. Meanwhile, technological advances in digital, robotic and virtual technology are allowing people to access content, cultural sites, art and experiences on a global scale. How can museums embrace this immersive technology to provide audiences with mobility disabilities opportunities

to remotely visit their space? In the next chapter, I propose a solution for art museums to incorporate a remote tour program to engage visitors and increase access to their collections.

Chapter 3: Project Proposal

Remote Access at the Art Institute of Chicago

In the previous chapter, I discussed why museums should be more accessible and use technology as an accessibility tool. Many museums have reached out to and embraced audiences with disabilities but most of the programs I researched are offered on-site. These include major art museums like the Whitney Museum of American Art and the Museum of Modern Art in New York. Others, such as the Queens Museum, bring museum resources to underserved audiences in the community through organizational partnerships. Offsite museum programs can serve audiences that face physical barriers to a museum visit, but the museum space will continue to remain inaccessible. My project seeks to circumvent these barriers and bring communities into the museum through technology.

Technology is often used both on-site in art museums and in off-site programs as a way to supplement a visitor's experience. Digital content on-site, such as audio guides, apps, augmented reality, and interactive kiosks, can provide an immersive and engaging experience. Digital content presented in off-site programs can stand in for the physical museum space, allowing participants to view images of artwork and interact with museum collections. But digital content does not provide the same social experience of a museum visit. In the last twenty years, museums have explored the potential of telepresence technology and virtual reality as tools to open up their collections to a wider audience. These technologies are becoming more affordable than ever before and I believe they

can be powerful instruments in creating more accessible museums for people with mobility disabilities or functional limitations. Telepresence or virtual technology can bridge the gap between communities off site and museum spaces by allowing users to interact with the museum environment and gain a valuable social experience. I propose a museum program that will give off-site audiences who are physically unable to visit the museum a chance to explore an art museum remotely through the use of these technologies.

Project Outline

My proposed project brings museum professionals, artists and medical professionals together through a collaborative arts and technology pilot program. The pilot is directed toward patients in an extended hospital stay, with the goal of bringing the museum experience directly to them. This program would utilize the latest technological advancements in telepresence robotics to allow patients to explore the collection and galleries. These virtual tours would be overseen and implemented by trained museum educators as well as the teaching artists on site at the hospital. Museum educators lead a conversation and inquiry-based tour for participants, leading into a specific art project. The tours and art project would be developed in collaboration with teaching artists and museum educators.

Teaching artists on site at the hospital facilitate the art project after the virtual museum visit. The pilot program would last one year and result in a collaborative project to incorporate artwork created by participants as part of the museum's

interpretive content. Participant artwork would be integrated as digital content on the museum web app on-site at the museum and on the website.

The Proposed Collaborators

The Art Institute of Chicago

The Art Institute of Chicago (AIC) is a world-renowned art museum and art school. The mission of the Art Institute of Chicago is as stated:

“The Art Institute of Chicago collects, preserves, and interprets works of art of the highest quality, representing the world’s diverse artistic traditions, for the inspiration and education of the public and in accordance with our profession’s highest ethical standards and practices”

The Art Institute of Chicago’s mission demonstrates a responsibility to interpret, inspire and educate a broad and diverse public. Accessibility for visitors with disabilities is a priority, both in ADA requirements and programmatic access. AIC’s website states that the museum “welcomes all visitors and affirms its commitment to making its programs and services accessible to everyone. Access programs on-site at AIC include ASL gallery talks, verbal description tours for visitors who are blind or have low vision, the Elizabeth Morse Touch Gallery, and TacTile kits featuring five works in the collection. Access at AIC is limited to on-site resources and programs. AIC has an opportunity to expand its programming to include community partnerships and engage more individuals in the disability community.

My project proposal fits within the mission of the Art Institute of Chicago because the program would exist to educate a new audience and inspire creative responses to the museum's vast collection. By incorporating virtual technology, the museum will be able to reach a broader population and increase arts access and education within Healthcare settings.

Snow City Arts

Snow City Arts is an arts organization that partners with four local hospitals in the Chicago area. Snow City Arts "inspires and educates children and youth in hospitals through the arts". The organization provides programs in visual arts, music, theater, creative writing and media arts. They offer bedside workshops as well as communal studio space called the "Idea Lab". The Idea Lab has art supplies, musical instruments, computers, filmmaking equipment, and an art library. Teaching artists instruct groups and individuals in this setting.

I chose Snow City Arts as the community partner for this remote tour program because they have existing relationships with hospitals and the existing infrastructure for extensive arts programming within that environment. Snow City Arts also has a history of partnering with cultural institutions to better serve participating patients and enhance their educational experience. These partnerships resulted in long term collaborative projects, such as filmmaking, sound recordings, photography, and professional development that benefited their participants as well as the teaching artists and cultural professionals

involved. This history of collaboration along with their established presence in the healthcare field makes them the perfect partner for AIC.

John H. Stroger Jr. Hospital of Cook County

Snow City Arts partners with The John H. Stroger Jr. Hospital of Cook County. This hospital is the chosen site for this collaborative art and technology program. I chose this hospital as the site because patients of all ages and socioeconomic backgrounds are treated here. The museum will be able to reach a diverse audience.

Goals and Objectives

The proposed project has six goals: 1) to create a museum experience for people who face barriers to visiting the museum space; 2) to provide an interactive experience that relates closely to an actual museum visit; 3) to give individuals and groups opportunities for social and creative experiences to relieve stress and pain; 4) to foster a reciprocal relationship between an art museum and the broader community, gaining value from new audience perspectives and encouraging continued engagement with the museum and its resources; 5) to incorporate audience perspectives into an art museum's digital content 6) to explore the potential of remote programs as valuable museum experiences to be offered to more community partners and individuals.

The Art Institute of Chicago (AIC) and its community partners will consider how to best create a museum experience for people who face physical barriers by meeting with stakeholders in this community. The museum will also explore accessible digital tools, web and telepresence technology with insight and evaluation from members of the disability community.

The museum will explore technology that allows visitors to connect live to the museum in order to introduce an interactive experience that relates closely to an actual museum visit. The right technology will allow participants to view objects of their choosing as well as communicate with museum staff during their visit. The technology will become a tool for social interaction and allow participants the freedom to explore and discuss art that captures their interest.

AIC and Snow City Arts will create themed remote tours that focus on careful looking and conversations about artwork to give individuals and groups opportunities for social and creative experiences to relieve stress and pain. Possible themes include “Mind over Matter: Abstraction”, “Human Expressions”, “Exploring the Sounds in Art”. AIC and Snow City Arts will also create an arts activity based on the theme/subject of the tour. Snow City Arts teaching artists will lead the art activity on site at the hospital. The art activity will lead into a collaborative digital project.

After the tours, AIC will work with Snow City Arts and program participants to create a collaborative project, with the goal of creating a reciprocal relationship,

gaining value from new audiences and perspectives and encouraging continued engagement with the museum and its resources. Participant artwork from the pilot program will be incorporated as digital content at the museum and on the museum website. Museum visitors will be able to experience participants' unique creative contributions to the collaboration. Participants will be able to view their contributions off-site through interactive digital content published on the museum website.

AIC and Snow City Arts will gather quantitative and qualitative data to determine the value of remote museum experiences for this community. AIC and Snow City Arts will gather this data through program observation and feedback from participants and their families. Equipped with this evaluative data, the museum will decide whether to continue the program past the pilot phase and will potentially examine other opportunities for programs and partnerships utilizing the technology.

This programming has the potential to continue beyond the pilot phase depending on the success of the pilot and the resources available over time. The technology may prove useful for distance learning opportunities for other populations. The technology could allow the museum to give behind the scenes tours and access to travelling exhibitions. The technology could be used for public programs or virtual artist residencies. Museum staff could use the technology to attend conferences and participate in professional development at a much lower cost to the institution. The technology could also assist museum

professionals in collaborating with more community partners and other institutions nationally and internationally.

Project Outcomes

The project will contribute to advancing accessible programming options for visitors with mobility disabilities or other physical limitations at the AIC. The project will allow museum professionals to explore the potential of the technology in facilitating educational programs and social interaction in an art museum setting. The project will serve as a model for other art museums looking to create innovative community arts programs for people in extended hospital stay and the broader disability community. The resulting collaboration will not just exist in a moment in time, but will live on in the digital realm as a part of AIC's interpretive content on and off-site. Ultimately, participants' creative voices will become present in the space beyond the virtual tour by sharing their artwork with the wider museum community.

Chapter 4: Project Plan

Remote Museum Tours at the Art Institute of Chicago

Resources:

Art Institute of Chicago:

Executive Director, Education (Manager of the Project Manager); Coordinator of Community Programs (Project Manager); Technology Integration Producer; Technology Specialist; Lead Museum Educator; Volunteer Docents; Access Advisory Council

Snow City Arts:

Program Manager; Teaching Artists

Key Stakeholders:

Participants - Long term patients at the John H. Stroger Jr. Hospital of Cook County

Suitable Technologies

Education Department

Technology Department

Museum Educators

Teaching Artists

Snow City Arts

John H. Stroger Jr. Hospital of Cook County

The Art Institute of Chicago

Action Plan:**Phase1: Project conception and initiation**

The Art Institute of Chicago (AIC) will consider how to best create a museum experience for people in extended hospital stay by meeting with stakeholders. It is assumed that the museum has already established a relationship with Snow City Arts and has collaborated with the organization on other projects. The museum will choose to work with Snow City Arts because the teaching artists on staff have a rapport with patients and hospital staff. Snow City Arts also has a system in place to facilitate arts programming on site at the hospital. AIC Education staff will work with Snow City Arts staff to learn more about the goals for their program participants. The museum will form an Access Advisory Committee, consisting of leaders in the disability community, who also have knowledge of telepresence technologies, to gain insight into the needs of the intended audience. With the support of the Community Advisory Committee, the museum will consult with Sutable Technologies regarding leasing the BeamPro, a telepresence robot. The Education department and Technology staff will meet to consult on project conception and how to best utilize the technology. The following are key milestones in the project conception and initiation phase:

1. Initial brainstorm session with Education Department, Snow City Arts and Technology Integration Producer.
2. Consultation with Sutable Technologies.
3. Meet with Access Advisory Council and receive feedback on initial ideas and technology.

4. Meet with Snow City Arts to determine needs of participants and logistics of organizing remote tours at the hospital.

Phase 2: Project definition and planning

The Art Institute of Chicago and Snow City Arts will create themed remote tours that focus on careful looking and conversations about artwork to give individuals and groups opportunities for social and creative experiences to relieve stress and pain. The remote tours during the pilot will be presented to both individuals in their hospital rooms and groups in the hospital's art room (operated by Snow City Arts). The Coordinator of Community Programs will organize planning meetings with the Lead Museum Educator and Snow City Arts Teaching Artists to determine the scope of the project, goals and objectives. The Coordinator of Community Programs will determine the budget and timeline for the project and manage the project from conception to completion. The following are the key milestones in the project definition and planning phase:

1. Tour planning meeting and project brainstorm, defining goals and objectives.
2. Formulate budget and timeline.
3. Acquire telepresence technology from Sutable Technologies.

Phase 3: Project Launch

The Coordinator of Community Programs will communicate goals and objectives to project stakeholders, staff and volunteers. He/she will make sure the timeline is distributed to staff and volunteers are notified of their schedules. The Lead Museum Educator will schedule dates and times for tours with Snow City Arts according to the museum calendar and program schedule. It will be the responsibility of Program Manager of Snow City Arts to manage all scheduling and planning logistics within the hospital. Under the supervision of the Coordinator of Community programs, the Lead Museum Educator and Teaching Artists will create the tour themes and related art projects based on objects in the museum collection and the interests of Snow City Arts participants. This team will plan tours and art projects for the first three pilots. After completion of the first three pilot sessions, the Lead Museum Educator and the Teaching Artists will report on the progress of the program to the Coordinator of Community Programs and the Snow City Arts Program Manager. Executive Director of Education and the Access Advisory Committee. The following are key milestones in the project launch phase:

1. Communicate goals and objectives to staff and volunteers involved in the pilot project.
2. Distribute timeline and clearly define specific responsibilities for each stakeholder over the scope of the project.
3. Testing telepresence technology and tour techniques with stakeholders and members of Community Advisory Council.

4. Tour development - written plans for tours and related art projects.
5. Establish evaluation and documentation methods for tours.
6. Schedule pilot sessions, coordinating with Snow City Arts and John H. Stroger Jr. Hospital of Cook County.

Phase 4: Project execution and control

The Lead Museum Educator and the Coordinator of Community Programs will develop training sessions for docents and staff that will be facilitating the remote tours on-site at the museum. The docents and staff will spend two afternoons in the museum galleries with the telepresence robot, working with the Lead Museum Educator to familiarize themselves with the technology and discuss touring techniques specific to the technology. Docents will lead the remote tours and will be overseen by the Lead Museum Educator. Snow City Arts teaching artists will assist patients with the technology and navigation off-site at the hospital. On the tours, participants, staff and docents will be able to communicate and interact live via telepresence technology. Museum staff, docents and SCA staff will debrief at the end of each pilot session to discuss ways to improve the experience for participants. The Lead Museum Educator will prepare a report on each pilot session and compile reports for the Executive Director of Education and the Access Advisory Committee. SCA Teaching Artists will work with patients after the tour and facilitate the planned art project. The Teaching Artists will document all artwork created in response to the tours and evaluate the process using an established rubric.

Teaching artists at SCA will document artwork created by participants and it will be featured as content on the AIC app that can be accessed, both on-site and off-site. The Coordinator of Community Programs and the Program Manager at SCA will select works for to be integrated into interactive digital content. The Technology Integration Producer will work with the Technology Specialist to create the new addition to the app based on the content developed in collaboration with the Coordinator of Community Programs and the Lead Museum Educator. The app and the new content will be tested on-site at the museum and off-site at the hospital and implemented as permanent digital content at the museum. The following are key milestones in the project execution phase:

1. Docent and staff training sessions - technology and tours.
2. Facilitate six pilot sessions utilizing telepresence technology.
3. Program evaluation by Museum staff and Snow City Arts staff.
4. Document ongoing art projects by participants.
5. Prepare program reports.
6. Present program reports to all stakeholders.
7. Select participant artwork.
8. Content development for app.
9. Launch content in app featuring work created by participants.

Project Timeline:

Remote Museum Tours at AIC - Community Art/Tech Program

ED, Education (EDE), ED, Technology Specialist (TS), Coordinator of Community Programs (CCP), Technology Integration Producer (TIP), Museum Educator Lead (ME), Docents (D), Community Advisory Council (CAC), Program Manager Snow City Arts (PMSCA) Teaching Artist Snow City Arts (TASCA)

Tasks	Start	End	Resources
Education and Tech brainstorm with SCA	1/9/17	1/9/17	EDE, TS, CCP, TIP, PMSCA
Consultation with Suitable Technologies	1/16/17	1/16/17	EDE, TS CCP, PMSCA
Meeting with Access Advisory Council	1/30/17	1/30/17	CCP, PMSCA, ME, TASCA
Planning meeting with SCA	1/31/17	1/31/17	CCP, PMSCA, ME, TASCA
Create budget and timeline	1/31/17	1/31/17	TASCA
Sign lease on telepresence technology	2/5/17	2/5/17	CCP
Lease BeamPro	3/1/17	2/28/18	EDE, CCP, TS
Test BeamPro in galleries - session 1	3/6/17	3/6/17	EDE, CCP, TS
Tour development meeting	3/13/17	3/13/17	CCP, TS, ME
Schedule six remote tours and book docents	3/13/17	3/27/17	CCP, PMSCA, ME, TASCA
Write tour plans 1-3 and develop art projects	3/13/17	3/27/17	TASCA, D
Test BeamPro in galleries - session 2	3/20/17	3/20/17	ME, TASCA
Develop docent and staff training plan	3/27/17	3/31/17	CCP, TS, ME
Docent and staff training #1	4/7/17	4/7/17	CCP, ME
Test BeamPro in galleries - session 3	4/17/17	4/17/17	CCP, ME, D, TS
Develop participant response rubric	4/18/17	4/21/17	CCP, TS, ME
Establish artwork documentation guidelines	4/24/17	4/24/17	ME, TASCA
Present tour plans and response rubric for edits	5/1/17	5/1/17	CCP, PMSCA
Edit tour plans and response rubric	5/1/17	5/8/17	CCP, ME
Docent and staff training #2	5/15/17	5/15/17	CCP, ME, D, PMSCA, TASCA
Pilot session #1	6/5/17	6/5/17	CCP, ME, D, PMSCA, TASCA
Debrief and evaluation	6/5/17	6/5/17	TASCA
Document participant artwork/response	6/5/17	6/30/17	TASCA
Pilot session #2	7/10/17	7/10/17	ME, D, TASCA
Debrief and evaluation	7/10/17	7/10/17	ME, D, TASCA
Document participant artwork/response	7/10/17	7/31/17	TASCA
Pilot session #3	8/7/17	8/7/17	ME, D, TASCA
Debrief and evaluation	8/7/17	8/7/17	ME, D, TASCA
Document participant artwork/response	8/7/17	8/31/17	TASCA
Prepare report on first 3 pilot sessions	9/1/17	9/8/17	ME
Present report to EDE	9/11/17	9/11/17	CCP, ME

Present report to CAC	9/11/17	9/11/17	CCP, ME
Edit tour plans	9/25/17	9/29/17	TASCA
Send tour plans to scheduled docents	10/2/17	10/2/17	ME
Pilot session #4	10/23/17	10/23/17	ME, D, TASCA
Debrief and evaluation	10/23/17	10/23/17	ME, D, TASCA
Document participant artwork/response	10/23/17	11/20/17	TASCA
Pilot session #5	12/4/17	12/4/17	ME, D, TASCA
Debrief and evaluation	12/4/17	12/4/17	ME, D, TASCA
Document participant artwork/response	12/4/17	12/22/17	TASCA
Meeting to Determine extension of BeamPro lease	1/5/18	1/5/18	EDE, CCP, TS, ME
Pilot session #6	1/8/18	1/8/18	ME, D, TASCA
Debrief and evaluation	1/8/18	1/8/18	ME, D, TASCA
Document participant artwork/response	1/8/18	1/31/18	TASCA
Prepare report on pilot sessions 4-6	1/22/18	1/31/18	ME
Present report to EDE	2/5/18	2/5/18	CCP, ME
Present report to CAC	2/5/18	2/5/18	CCP, ME
Digital content brainstorming meeting	2/19/18	2/19/18	CCP, ME, TS, TIP
Select documented artworks	2/19/18	2/19/18	CCP, ME, TS, TIP
Renew lease on BeamPro	3/1/18	3/1/18	EDE, CCP, TS
Content development	3/1/18	4/30/18	CCP, ME, TIP, TS
Content integration	5/1/18	5/7/18	TIP, TS
Content testing - app on-site	5/8/18	5/8/18	TIP, CCP, ME, TS
Test content off-site with SCA participants	5/18/18	5/18/18	CCP, ME, PMSCA, TASCA, TIP
Launch content on app	6/30/18	6/30/18	TIP, TS
Ongoing evaluation on app	6/30/18	12/31/18	TIP, TS

Proposed Budget:

Specific Funding - For this hypothetical project plan, it is assumed that the funding for this project is already in place at the time of conception through grant funding specifically allocated for community programs.

Funding - \$30,000

The Art Institute of Chicago will cover all costs of programming on-site at the museum, including operational costs, staffing, training, and technology. Snow City Arts will cover the cost of art supplies and staffing, as well as any other costs associated with their on-site programs.

BeamPro telepresence technology: \$4,995/year lease x 2 years - \$9,990

Suitable Technologies provides software and hardware updates through the lease agreement. The other costs associated with the technology may be the Internet connection required to operate the machines and the utility cost for charging. These costs are assumed to be integrated into the museum's operating budget.

App content development: \$5,000

Salary, additional hours for Lead Museum Educator: \$15,000

Chapter 5: Conclusion

Measuring Success

The Art Institute of Chicago and Snow City Arts will continually collect qualitative data throughout the pilot program using a rubric designed for participant feedback. As long as participants enjoy the program and benefit from the remote museum visit, the museum could conclude that the pilot program was successful. The museum and Snow City Arts would seek to determine whether the program offered individuals some relief from the stress of a hospital stay through their qualitative evaluation. Do they engage with docents and museum staff during the tour? Do they enjoy the social interaction of the tour? Do they seem interested in the tour theme? Do they discuss the tour after with friends and family? Do they want to come visit the museum after their hospital stay?

The Art Institute of Chicago and Snow City Arts would also measure success through participants' creative responses to the museum collections. Are participants inspired by the artwork and themes presented in the remote tours? Do they engage with the art project in a meaningful way? Do they feel connected to the museum space and excited to contribute to the museum's interpretive content? SCA teaching artists, as facilitators for the creative projects, will provide the most insight in evaluating the levels of enthusiasm and engagement from participants for the art-making portion of the pilot program.

The museum will keep a record of the number of program participants, but it should be noted that the number of individuals reached is not the measure for success. The measurement for success relies more on the quality of the experience for participants and the value they receive from participating in the program. For this reason, it is most important for the museum and Snow City Arts to collect qualitative data.

Additionally, the museum would evaluate the telepresence technology over the course of the pilot program. Can participants use the technology to comfortably navigate through the gallery space? Are they able to zoom in and see details in artworks? Does using remote technology feel similar to an actual museum visit? If the technology falls short, the museum may want to consider other options such as virtual reality.

Finally, the content for the app resulting from the community partnership will be evaluated in three phases. The first evaluation phase will take place on-site at the museum with user testing. The second evaluation phase will take place at John H. Stroger Hospital with Snow City Arts participants. The third phase will be ongoing evaluation after the official launch of the content on the app. Each evaluative phase, the museum will collect quantitative and qualitative data through analytics and user surveys. The Art Institute of Chicago will also continue collect user data and metrics after the pilot phase of the project. The app will be

successful if museum visitors engage with the content during their trip to the museum or their visit to the museum website.

Next Steps

My project proposal focuses on serving people with mobility disabilities, but this technology could be advantageous for many other individuals and groups on a broader scale. The museum could continue to work with volunteer docents to lead remote tours utilizing the technology for other community groups. Rural schools and communities that are too far away from the museum could use telepresence technology to visit the galleries and enhance their learning.

Individuals with autism could use the technology to introduce themselves to the museum environment, potentially diminishing some of the anxiety associated with visiting unknown places. Other organizations serving people with disabilities, such as assisted living facilities or day programs, could participate in remote tours of the museum. The museum could partner with local libraries to present remote tours for their patrons. People across the country could meet up with friends who are physically at the museum via telepresence. Museum staff could use the technology for work and professional development by telecommuting or attending conferences remotely. The technology would even be a great communications tool for collaborations between other national and international museums, artists, and scholars.

The museum could also continue integrating community responses into the app, utilizing content created by various participants within their community programs. Museum visitors using the app could experience the diverse perspectives of people within the community. The museum would be able to present collections in relationship to the community it serves, making them more relevant to a wider audience.

Digital Strategies: Towards Access and Inclusion

Museums can make their buildings, collections and exhibitions more accessible through the use of technology. Telepresence technology provides a unique avenue for museums to open up their buildings and collections to visitors with mobility disabilities. Telepresence allows visitors to actually be in the space, making decisions on where to go as they drive the machine, offering them choice and independence. It also enables them to engage with museum staff and patrons with the galleries. For these reasons, the technology provides the closest experience to an actual museum visit, where an individual can freely explore as well as interact with other museum visitors in a social setting. This experience is extremely valuable for individuals that may be isolated due to a physical disability. Henry Evans, a quadriplegic and advocate assistive robotics, spoke about the benefits of assistive and telepresence technology during his TEDx Talk in 2013. He said: “this technology allows me to remain engaged, mentally active, and feel like I am a part of the world” (TED, 2013).

Ultimately, not every museum will be able to acquire advanced robotic technology, but I believe that museums should strive to incorporate similar virtual experiences for these audiences that allow them to interact and connect with the collection and their community. Museums should also include accessible options within technology they already employ within their galleries and in the digital realm. Technology, in its broadest definition, includes the most basic tools that museums use to make their collections comprehensible, such as wall labels and hand held gallery maps. By simply integrating accessible features on-site in the galleries and into digital content on museum websites, museums automatically serve a broader public and make it easier for visitors with varying abilities and learning styles to explore art collections.

Individual abilities vary over time and at one point or another, we as human beings will all need assistive technologies to navigate our world. Museums should address the widest range of abilities within their digital and technological initiatives. Technology can be difficult territory for museums to navigate because of the costs associated with implementing new technology and the pace at which changes occur within the technological field. But if museums invest in technology and embrace individual abilities, integrating accessible features across all digital and technological initiatives, they will engage a diverse public, serve more visitors, and become more inclusive institutions.

Appendix A: Annotated Bibliography

Center for the Future of Museums (2016). *Trendswatch 2016*. American Alliance of Museums.

In *Trendswatch 2016*, I consider two chapters, “More than human: Extending the spectrum of ability” and “Me/we/here/there: Museums and the matrix of place-based augmented devices.” The first chapter outlines trends in augmented technology for humans. The author suggests that museums should address growing cognitive diversity and varying ability within their buildings and programs. Museums will also need to adapt to an even more diverse population if the current trends of wearable and implantable, ability-augmenting technology becomes more widely used among individuals with disabilities. This first chapter shows how integrated technology is in our lives and how it can create more opportunities for individuals with cognitive and physical differences. Museums will need to be prepared to welcome people of all abilities and the technology they use to enhance their experiences. The second chapter I consider, “Me/we/here/there...”, in which the author looks at virtual reality, augmented reality, and hologram technology, shows how museums can incorporate AR/VR experiences on site or in the digital world. The author quotes museum professionals that are wary of experiences that can be accessed off site because they believe it may discourage people from visiting the physical museum space. Other professionals believe that it will do the opposite and inspire people to come experience the museum environment in real life. I want to capitalize on the latter belief because I plan to argue that my proposed program will have the same effect of encouraging an ongoing relationship with the museum and the individual.

Finkelstein, J. (2007). Real time learning, outreach and collaboration. In Din, H. & Hecht, P. (Eds.) *The digital museum: A think guide*. Washington, DC: American Alliance of Museums.

Finkelstein argues that museums should incorporate live and interactive experiences for audiences that access their content on the web. He offers specific examples of online museum programming and why it's beneficial to communities. He encourages museums to move beyond recorded lectures and passive content and provide collaborative and social platforms for digital learning. I see this type of digital engagement as advantageous to individuals who are unable to physically visit the museum. Online platforms give them the opportunity to interact with the institution in deeper ways and provide social stimulation that may be lacking in their lives.

Fletcher, V. (2013). Museums around the world that enliven our souls: Inclusion through rich experience. *Curator: The Museum Journal*, 56(3), 297-305.

Fletcher describes institutions that have committed to universal design principles. The institutions described designed their museum environments with the idea of variable human ability in mind. Fletcher highlights a few important points that apply to my project relating to aging populations and people with disabilities. She also calls for institutions to move beyond just meeting the ADA requirements. I believe this article is a good starting point for extending these arguments and applying them to the museum's digital environment. Museums should aspire to creating welcoming environments in their physical spaces, but just as importantly, for their digital platforms.

Giannoulis, G., Coliou, M., Coliou, Y., Kamarinos, G., S., Roussou, M., Trahanias, P., Argyros, A., Tsakiris, D., Cremers, A., Schulz, D., Burgard, W., Haehnel, D., Savvaides, V., Friess, P., Konostantios, D. & Katselak, A. (2009). *Enhancing visitor access through robotic avatars connected to the web*. Museums and the Web. Retrieved from <http://www.museumsandtheweb.com/mw2001/papers/giannoulis/giannoulis.html>

This paper, presented at Museums and the Web in 2001, highlights the TOURBOT, a telepresence robot created for museum tours. TOURBOT allows online users to log on and control the robot remotely within museum galleries. The authors discuss potential benefits for communities and the museum field. The authors argue that digitization and online databases are time consuming and costly to maintain as collections change and travelling exhibitions rotate. A telepresence robot would allow institutions to easily provide access to changing content within the museum environment.

Karreman, D., Ludden, G., Evers, V., Tapus, A., Andre, E., Martin, J., Ferland, F. & Ammi, M. (2015). Visiting cultural heritage with a tour-guide robot: a user evaluation study in-the-wild.

The authors describe an evaluative study of visitor engagement during FROG (Fun Robotic Outdoor Guide) tours of the Royal Alcazar in Seville, Spain. The FROG robot is a social robot; it is programmed to recognize human faces and read social cues so that it can determine a visitor's interest level. Researchers collected data in the form of observation, video recordings, notes, and interviews. Researchers found that the robot could not interact with visitors because they stood too far away. The robot was only able to recite pre-recorded content. The robot also created an obstacle and barrier from the objects on view. In my opinion, this study

shows human guides are still needed to create the social experience of a museum tour.

- Katz, J. E., & Halpern, D. (2015). Can virtual Museums motivate students? Toward a constructivist learning approach. *Journal Of Science Education And Technology*, 24(6), 776-788.

Katz and Halpern conducted a study of 565 participants who interacted with two-dimensional and three-dimensional content on museum websites. The authors found that users that experienced the museum space in three dimensions were more engaged with the content and learned more about museum objects than users viewing two-dimensional images of the museum collection. The authors conclude that museums should invest in creating virtual programs to engage students and inspire them to visit the physical museum space. The results of this study give weight to the viability of virtual programs as powerful interactive learning experiences.

- Matchar, E. (2016, July 21). Instead of painkillers, some doctors are prescribing virtual reality. *Smithsonian*. Retrieved from <http://www.smithsonianmag.com/innovation/instead-painkillers-some-doctors-are-prescribing-virtual-reality-180959866/?no-ist>

Emily Matchar interviews Hunter Hoffman, director of the Virtual Reality Research Center at the University of Washington, and explores ways in which doctors and psychiatrists utilize VR to treat patients. Hoffman currently designs VR content for children with severe burns staying at Shriners Hospital in Galveston, Texas. His studies show children who immerse themselves in VR content during treatment reduce their level of pain by 50%. Psychiatrists use VR to treat phobias and PTSD. I am interested in how art museums can create immersive content using their collections for individuals who are in long-term treatment.

- McMillen, R. (2012). The inclusive art museum: Determining disability access. *International Journal of the Inclusive Museum*, 4(1), 101-115.

McMillen conducts an audit of the accessibility policies and procedures at an unnamed midwestern contemporary art museum. The museum is small with limited resources. She uses a resource from the American Alliance of Museums entitled *Everyone's Welcome: The Americans with Disabilities Act and Museums* to determine the strength and effectiveness of the museum's accessible initiatives. McMillen collected qualitative data through staff interviews. She determines that the museum needs to implement an accessibility statement, work with an advisory committee, market its accessible features and programs, and designate an ADA coordinator. The author makes suggestions for the museum based on its budget and resources. This case study provides an excellent example of

the steps all organizations should take to create a more welcoming and inclusive space. Special programs, like my proposed project, build upon these basic steps to further the social mission of museums.

Overgaard, I. & Sorensen, N., O. (2015). Can an art museum help in combating loneliness? *Journal of Applied Arts & Health*, 6(2), 187-203.

The authors created two museum art workshops for individuals suffering from loneliness at the Storm P. Museum in Copenhagen. This article outlines the programs, the intended results, and qualitative data from participants. Participants in the two programs created artwork in a collaborative environment, working with museum staff and other participants. The museum programs provided social experiences for participants and most felt less anxious and lonely during and after the program. The program also allowed participants to work closely with museum staff and inspired participants to volunteer at the museum after the program ended. The results of the authors' research provide positive examples of how a museum program can inspire participants to continue engaging with the museum after the program is over, suggesting that inclusive programs can have a lasting impact on individuals and their relationship with organizations.

Peacock, K. (2012). Museum education and art therapy: Exploring an innovative partnership. *Art Therapy: Journal of the American Art Therapy Association*, 29(3), 133-137.

Peacock describes multiple art museum exhibitions and programs, which incorporate art therapy as a theme or methodology. She also mentions the absence of therapeutic programs within most art museums, which emphasize the "historical value" of art and may disregard its "therapeutic aspects". She highlights museums that employ art therapists to serve isolated populations in their communities. She argues that when museums present exhibitions and/or programs with art therapy as a focus, they may help reduce social stigma surrounding mental health and illness.

Rigby, J., M. & Smith, S. (2013). Augmented reality challenges for cultural heritage. *AIR Working Paper Series*. Retrieved from https://www.researchgate.net/profile/Shamus_Smith/publication/259346765_AUGMENTED_REALITY_CHALLENGES_FOR_CULTURAL_HERITAGE/links/00b4952b26a66368ae000000.pdf

Rigby and Smith offer valuable insight into the current limitations of AR and VR technology. Although the technology is becoming increasingly more accurate and user friendly, museums and cultural sites may encounter challenges with tracking systems that must be in place to trigger location based content. The cost of the hardware, software and

content development may also deter museums from utilizing the technology. AR and VR systems can provide powerful, immersive museum experiences for visitors when used successfully, but there are many technological hurdles to overcome.

Sandell, R., & Dodd, J. (2010). Activist practice. *Re-presenting disability: Activism and agency in the museum*, 3-22.

Jocelyn Dodd is the Director of the Research Centre for Museums and Galleries and Richard Sandell is the Director and Head of the School of Museum Studies at the University of Leicester. In their article, they introduce how disability is viewed in our culture. They argue that disability history and art is mostly absent within cultural institutions and this only furthers the negative and demeaning cultural view of disability that pervades society. They are writing for museum professionals and calling for institutions to be inclusive in programming, content creation, and internal practices.

Silverman, L., H. (2010). *The social work of museums*. Oxon, New York: Routledge.

Silverman argues that museums are social institutions and should extend their services for true social good in their communities. She describes how museums can help individuals and groups by creating an interactive, social, and welcoming environment, either within the museum space, or remotely by bringing museum resources out into communities. She describes social work theory and applies it to work being done in museums that benefits individuals' relationships to themselves, their loved ones, and society as a whole. Silverman's book is a valuable resource and guide for museums considering serving audiences that are socially isolated or disenfranchised. This book will be integral in justifying a remote museum program and providing examples of the potential benefits for communities and individuals.

Treadon, C., B., Rosal, M. & Wylder, V., D., T. (2006). Opening the doors of art museums for therapeutic processes. *The Arts in Psychotherapy*, 33(2006), 288-301.

Treadon, Rosal and Wylder investigate case studies of museum programs that incorporate art therapy. The authors believe art museums and galleries are unique venues for therapy and institutions should enter into community partnerships to create therapeutic programs. The authors provide positive feedback from therapists and program participants to support their arguments. The authors find that museums and galleries are useful because individuals can participate in specific programming on site

but can also use these public spaces as a resource on their own. Art museums can be a place outside of participants' normal routine and experiences within that space have the power to positively affect their lives.

Wolfram, B., Armin B., C., Dieter, F., Gerhard, L., Dirk, S., Walter, S. & Sebastian, T. (1998). The interactive museum tour-guide robot.

The Interactive Museum Tour-guide Robot paper, presented at the Association for the Advancement of Artificial Intelligence conference in 1998, reflects on the software capabilities and the results of a field test of RHINO (an autonomous museum tour-guide robot). In the field test users were able to log onto a web interface where they could watch the robot in the museum space and send it to specific locations in the galleries. Even though it was equipped with sensors, the robot was unable to navigate through the crowded spaces and could not perceive some of the objects in the gallery. I found this article helpful for comparing older robotic technology to the advancements we have made today. It also illustrates some of the problems associated with the implementation of robotic technology within museum spaces, which may or may not be useful as I continue to search for the best technology to implement my proposed program.

Appendix B: Project Stakeholders

Community Participants

Patients at the John H. Stroger Jr. Hospital of Cook County: Patients at the John H. Stroger Hospital will participate in the pilot program and create artwork in response to the museum collection. Their artwork will be featured on the museum app.

Suitable Technologies

The company will provide support to the museum in the form of staff and participant training and software and hardware updates for the BeamPro.

Education Department at the Art Institute of Chicago

Coordinator of Community Programs: Project manager, develops tour plans, leads docent and staff training, presents reports to the department head, helps develop content for the app.

Lead Museum Educator: Oversees tours, develops tour plans, assists with docent training, helps develop content for the app.

Volunteer Docents: Participate in training sessions, lead tours for participants at John H. Stroger Hospital.

Technology Department at the Art Institute of Chicago

Technology Specialist: Managing all technology that supports the pilot program, including telepresence robot, Wi-Fi connection, and web app. Oversees integration of new digital content on web app.

Technology Integration Producer: Integrates digital content on web app.

Snow City Arts

Teaching Artists: Develop tours alongside AIC education staff, facilitate art projects with patients, help evaluate program.

Program Manager: Oversees teaching artists, collaborates with Coordinator of Community Programs, selects artwork for integration into web app, helps evaluate program, acts as liaison to administration and staff at John H. Stroger, Jr. Hospital.

John H. Stroger Jr. Hospital of Cook County

Nurses: May be present during tours for individuals staying in hospital rooms.

Doctors: May be present during tours for individuals staying in hospital rooms.

Appendix C: Glossary of Terms

AR - Augmented Reality - a system that enriches, or augments, the real world with computerized information and objects.

GPS – Global Positioning System – an electronic system that uses satellite data to determine the position of a vehicle, person, etc.

Telepresence - the use of virtual reality technology, especially for remote control of machinery or for apparent participation in distant events; a sensation of being elsewhere, created by the use of virtual reality technology.

VR - Virtual Reality - the computer-generated simulation of a three-dimensional image or environment that can be interacted with in a seemingly real or physical way by a person using special electronic equipment, such as a helmet with a screen inside or gloves fitted with sensors.

Appendix D: Illustrations



Figure 1 - A museum visitor utilizing the BeamPro at the de Young Museum. She is lead by a volunteer docent.



Figure 2 – The robot RHINO at the Deutsches Museum. Image: <http://www.museumsandtheweb.com/mw2001/papers/giannoulis/giannoulis.html>



Figure 3 – Beam Tours at the Air and Space Museum in Balboa Park. Image: <http://sandiegoairandspace.org/visit/beam-tour-program>



Figure 4 – Chesster and Kasparov, telepresence robots at the National Museum of Australia. Image: <http://www.nma.gov.au/engage-learn/schools/remote-visits/robot-tours>

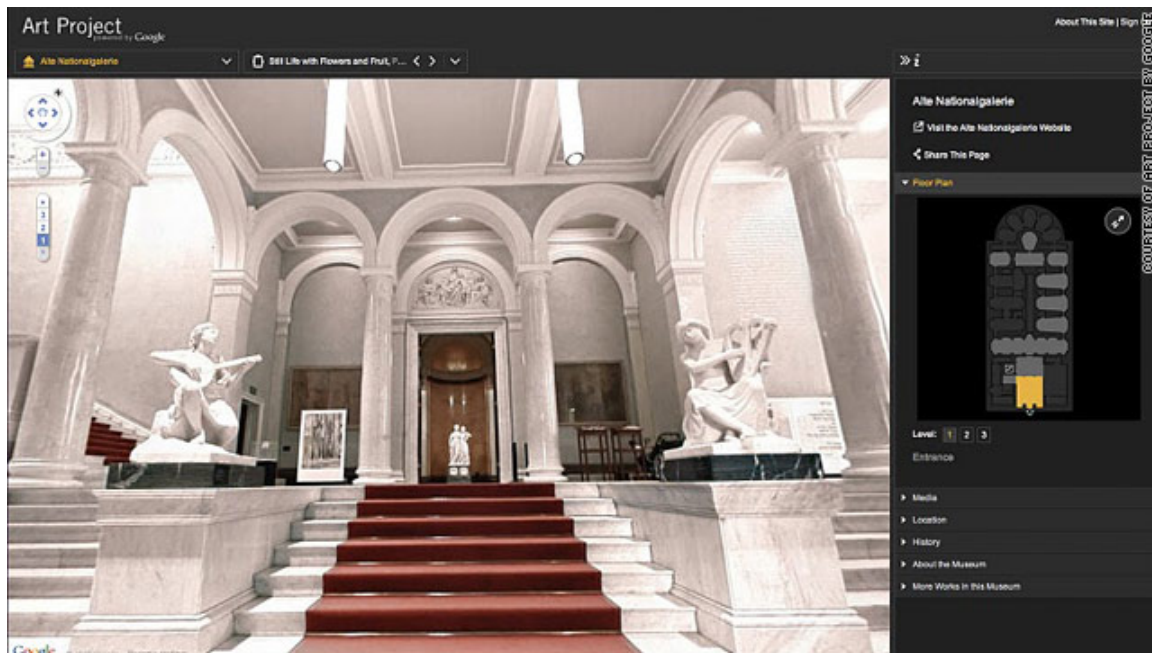


Figure 5 – Google Art Project virtual museum tour. Image:
<http://www.cnn.com/2011/TECH/innovation/02/02/google.streetview.art/>

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