

Accessing Dioramas Through Touch For Visitors With Vision Loss

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December 2014

A thesis submitted to The University of the Arts in partial fulfillment of the requirements
for the degree of Museum Education, M.A.

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Abstract

Accessibility for visitors is a critical topic museums have begun to engage in as the field evolves. This thesis looks at accessibility for visitors who are visually impaired and how these visitors can engage with science topics. By creating accessible programming for visitors who are visually impaired that involves touch and dioramas provides an option for creating accessibility program that is not only hands on but interactive. If museums look at creative ways in which they could utilize dioramas, touch, or other senses to create an open and engaging accessibility program it allows them to open up their museum not only for visitors with accessible needs, but all visitors. While not all museums may teach science topics, this document can help engage all other types of museums in providing examples or ideas in how to create effective accessibility programming. This document also helps museums start to consider the most effective ways in which they can engage accessible audiences and how to address those audiences in the most professional manner. By addressing both the museum and the visitors prospective this document gives museums an insight in how to create accessibility programming.

Dedication

I would like to dedicate my thesis to my parents, Chris and Cheryl Brown. You all drive me insane (with love) but you have always supported me along the way. I know for a fact I would not be here today if it were not for your love and support. Thank you so much for everything.

Acknowledgements

I would like to thank my committee members for all of their help throughout this process, without you I would have been lost. I would also like to especially thank Helen Shannon and Trish Maunder, you both helped me out so much with my thesis and really helped me believe in myself and what I was doing. Thank you so much.

I would also like to thank the Academy of Natural Sciences of Drexel University for all of their help, kindness, and interest. Without your support none of this would have been possible.

Also, to Greg, I am sure you hate museums, the word thesis, and all other related things but thank you for your help and for believing in me.

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Nomenclature

Accessibility – Accessibility is the degree to which a product, device, service, exhibit, or environment is made available to as many people as possible. For this thesis, accessibility deals with the “ability to access” a museum and its exhibitions for all visitors.

Barriers – Barriers are anything that is present that prevents museums from being accessible, whether they are physical, mental, or otherwise.

Diorama – A model representing a scene with three-dimensional figures, either in miniature or as a large-scale museum exhibits.

Objects:

Educational Objects: objects used for teaching; in the case of natural history museums this includes skeletons, furs, scales, teeth, and any other related objects that are easy and affordable to access but teach the science of animals and natural history.

Primary Objects: original objects of general worth that are in good condition and are on display or in collections. Handling requirements for primary objects in the collection are restricted to professional staff.

Reproductions – Reproductions are objects that have been reproduced for one or more reasons an example would be imitation dinosaur bones, teeth,

or skulls. Reproductions are important for this project because they highlight what is important to learn and can be handled easily by visitors.

Secondary Objects: objects that are either duplicates or have general worth in modest to poor condition, and may be part of teaching collections. Handling requirements for these objects are much less restrictive.

Tertiary Objects: objects that are part of an exhibit or collection that can be handled without too great a risk of damage.

Touch Tour – For many people who are visually impaired, touch is the primary way to acquire information or access a work of art. For other museum visitors, tactile experiences help to complete their mental image of an object. In addition to touching original works of art, tactile experiences include: replicates, models, props, handling objects which convey one aspect of the work, and contemporary art made to be touched.

Universal Design – In terms of museum exhibitions, universal design is the idea that exhibitions can be made accessible by offering a multi-sensory learning experience that can be enjoyed by people of all abilities.

Verbal Tour/Description – verbal descriptions uses non-visual language to convey the visual world. It can navigate a visitor through a museum, orient a listener to a work of art, or provide access to the visual aspects of a performance/video.

Chapter I. Introduction

Interest in accessibility for museums started during my time in undergraduate years. Having had several friends with accessibility needs, I became increasingly aware of what was and was not being provided to people with disabilities. What was quite shocking to see was the drastic lack of accessibility at museums. On multiple occasions, friends who are blind were only given the opportunity to experience a museum if someone was there to read the labels. As a result, I became increasingly interested in museum accessibility as the focus of my educational research. This interest led to the development of specific questions that helped to guide this thesis.

Research Questions

There are two major research questions that are a part of this thesis. The first question considers the effectiveness of touch tours at natural history museums. Current research shows that art museums offer touch tours with objects and art, but the application of touch tours are not as present in the majority of other types of museums.¹ One specific type of museum that this thesis is interested in is the application of touch tours in natural history museums. Only a limited number of natural history museums offer and publicize touch tours, whether it is through their website or personal contact to local community groups with disabilities. These museums include the National

¹ Candlin, Fiona, "The Dubious Inheritance of Touch: Art History and Museum Access." *Journal of Visual Culture* 5, no. 2 (August 2006): 137-154. *Art Source*, EBSCOhost (accessed March 20, 2014).

Museum of National History in Washington D.C., the American Museum of Natural History in New York City, NY, and the Natural History Museum in London, England.

Yet, natural history museums offer replicas, reproductions, and actual objects that can be handled and used for educational purposes for visitors with all types of disabilities.² Such educational offerings include touchable objects in exhibits, workshops, or outreach programs. The objects, real or reproduction, found in these educational programming could vary but include animal pelts, bones, eggs, or other like objects. For this reason, the first question is a valid question because if natural history museums offer touchable objects to students and visitors through educational programming, why have touch tours not been developed for people who are low-vision or blind?

The second question asks why there is limited information about touch tours that are currently being offered at natural history museums. The data points out that, in general, most natural history museums offer objects for educational programming that are either reproductions or real, and also can be handled, such as animal furs and bones.³ Data also show that natural history museums offer educational programming and some sort of accessibility for visitors with disabilities.⁴ This data then makes this research question valid because it re-iterates the importance of accessibility. If the museum has available materials, programming and access can be made available to visitors with ease. This question is different than the first question because most natural history museums could create and offer minimal accessibility efforts for low-vision visitors, and some

² Sarna, Mike, "The Natural History Museum's inclusive interpretation approach," *Access By Design* no. 121 (Winter 2009 2009): 15. *Art Source*, EBSCOhost (accessed April 16, 2014).

³ *Ibid.*

⁴ *Ibid.*

museums already offer such programming. This research question will help to examine and address the limited spectrum of accessible touch tours offered in natural history museums.

Research Hypothesis

The interest expressed in accessibility in museums was then applied to the study accessibility programs that are currently developed for museums. One type of programming that piqued my interest was touch tours and their application in art museums based on the idea that touch tours could be used with different subject matter. The one type of museum that this thesis is based on is natural history museums. The reason for this interest in natural history museums is because of their dioramas, which are partially art, and because natural history museums have available reproductions and actual animal objects that can be handled. Dioramas, beyond the science placed in them, have a link to art because of the detail that went into the creation of each diorama. Each diorama had pictures, drawings, and models produced of the animals and environment down to a pain-staking detail. Illustrators who also studied science typically recorded exact colors, shapes, and many other details that helped to create dioramas in the greatest detail for visitors.

This idea of dioramas as an accessible program then developed, in unison with my interest in to touch tours, ultimately lead to my hypothesis. My research hypothesis is: if touch tours are utilized at dioramas in natural history museums, then visitors who are low-vision or blind will be able to better learn from them. This hypothesis transitions into

the purpose of this research, which is to identify if it is possible for touch tours to be applied to natural history museums.

Chapter II. Literature Review

There is a concept in the museum field that all visitors should be able to access museums and exhibitions and that these public places are inclusive and engaging. However, not every guest gets to experience museums, or an exhibition in the same way, and not everyone has the same abilities to learn from a museum. One group of people with a disability who lack access to learning in museums are visitors who are low-vision and blind. While museums are regulated by the federal government to be accessible, not all facilities can offer the same sort of programming and attention to accessibility as large museums like the National Museum of Natural History. My research will show that funding, building accessibility, and a lack of interest from museum staff are some of the reasons for this lack of accessible programming. Offering some things, like a few touchable interactives or accessible technologies does not always mean the museum is fully accessible for visitors who are disabled; Specifically in the case of visually impaired visitors who are not provided programming in natural history museums, limited offerings does not mean that a museum is made fully accessible for a visitor. Despite this lack of accessible programming, natural history museums are institutions that could offer touch-based tours because they have objects and collections that be handled.

Historically, touch-based tours are a practice used primarily for art-based museums and other art-related institutions. Touch tours are a program that allows visitors who are low-vision or blind to experience art and exhibitions, and learn about art despite

their disability.⁵ Currently though touch-based tours are offered chiefly to visitors who are low-vision and blind at art-based museums. Some exceptions to art museums exist, such as zoos and aquariums, but limited data exists beyond the general information provided to the public, such as when programs are offered.

The question that arises then is that if these practices of touch-based programs are so successful in art museums, why are touch tours not being used in other institutions? There could be a number of reasons as to why institutions may not offer touch-based tours and one such reason is that institution is not a museum that cannot provide touch-based programming; some reasons museum cannot provide touched-based programming may deal with the lack of a collection or objects to facilitate a touch tour. Though in terms of natural history museums, as addressed before, these museums do offer objects that can be handled. The research of this thesis will thus be based on natural history museums because of the objects that can be used for touch-based programming.

Laws and Regulation

All museums have to abide by federal law and regulations to make them accessible for guests with all ranges of disabilities. There are two reasons for this, one is that most of these public institutions are tax-exempt or receive some federal funding; as a result they are supported to some extent by the public. Title III of the Americans Disabilities Act (ADA) requires these places, such as museum, whether public or private

⁵ Candlin, Fiona, "The Dubious Inheritance of Touch: Art History and Museum Access." *Journal of Visual Culture* 5, no. 2 (August 2006): 137-154. *Art Source*, EBSCOhost (accessed March 20, 2014).

and of educational value, be as accessible as possible for all people, including those with disabilities.⁶ These laws, called the Americans with Disabilities Act (ADA), were enacted in 1990.⁷ The ADA laws focus on making fair and equal access to public entities, facilities, and jobs for people who are disabled.⁸ Museums fall under public accommodations as a public place for all people, and are considered a place of learning. Sub-chapter 3, section 1218, deals with public accommodations and services operated by private entities and defines what should be expected of museums and other public institutions, such as zoos and libraries.⁹ The law states “No individual shall be discriminated against on the basis of disability in the full and equal enjoyment of the goods, services, facilities, privileges, advantages, or accommodations of any place of public accommodation by any person who owns, leases (or leases to), or operates a place of public accommodation.”¹⁰ This means that the Americans with Disabilities Act provides comprehensive civil rights protections for “individuals with disabilities.”¹¹ This defines a person who has a disability as a person who has a physical or cognitive impairment that substantially limits one or more major life activity, or has a record of such impairment, or is regarded as having such impairment.¹²

Public places, such as museums, then must provide access to all of their educational resources and experiences.¹³ This means that educational sites must be

⁶ Americans With Disabilities Act of 1990. Public Law 101-336. 108th Congress, 2nd session (July 26, 1990.)

⁷ *Ibid.*

⁸ *Ibid.*

⁹ *Ibid.*

¹⁰ *Ibid.*

¹¹ *Ibid.*

¹² *Ibid.*

¹³ *Ibid.*

integrated learning sites that provide auxiliary aids, or like resources, and be ADA-compliant.¹⁴ But not all public places of learning are up to ADA compliance. This poses the question then as to why are not all public educational sites providing their visitors with accessible options? There are rules and regulations that all public educational sites must follow, the ADA Act, but changes can be made to the ADA Act if institutional changes could cause financial burdens.¹⁵ Any public site of educational value should be fully open and accessible, in some way, to all individuals and their needs; this means that visitors must be able to get through the door and have an opportunity to learn or experience what is being provided.¹⁶ Additionally, published or marketed materials, such as the institution's website should be integrated in such a way that accessible technologies can access the provide material there as well.¹⁷ However if an institution cannot provide that, the ADA Act says that like services can be provided.¹⁸

There are some exceptions to this rule through specific variations, but they fall under two different laws. The variations consider the uniqueness of each public site, i.e. if an institution can afford to make accommodations or if the building is historic and is

¹⁴ *Ibid.*

Auxiliary aids are services that are provided to visitors with disabilities so that visitors who are unable to communicate or engage with services are able to participate. These services can include: service devices, qualified interpreters, assistive listening headsets and the provision of readers, taped texts, brailled and large print materials for people who are blind or visually impaired, television captioning and decoding, and telecommunication devices and displays for visitors who are deaf or hard of hearing. Though auxiliary aids can be flexible and include reading of printed material as an option instead of Braille printed materials. Also, if costs are too extreme museums can provide alternative options to visitors that provide them like experiences.

¹⁵ *Ibid.*

¹⁶ *Ibid.*

¹⁷ *Ibid.*

¹⁸ *Ibid.*

historically preserved. One of the two variations of the ADA laws is that accessibility is done by a case-by-case study.¹⁹ This means that a public institution of education can hire a consultant to help decide what is most important in making the institution accessible. While it is not always possible, each museum should do what is necessary to provide visitors with an equal experience of education and learning.²⁰ The other variation falls under Sub-Chapter 4, Miscellaneous Provisions, Section 12204.²¹ This section states that if a building, or a museum, could potentially be threatened from destruction or is on the National Register for Historic Places, it does not have to provide the accessibility needed for visitors who are disabled.²² However, there are still standards that need to be met if such an historic site is to open to the public and is to be accessible. When the site cannot offer a fully accessible experience, these places have to offer similar or greater experiences for visitors who cannot experience the full historic house experiences.²³ This is important to mention because some public institutions can be, or are, in historic buildings, which means that unless the building is not a part of the mission the site must provide accessible options.²⁴

Changes to making a museum, historic house, or like public institution can and are done on a case-by-case study. While changes may not always be easy or affordable, because they are done on case-by-case study accessibility should not be a barrier any public education site should struggle with. The ADA laws focus on the importance of

¹⁹ *Ibid.*

²⁰ *Ibid.*

²¹ *Ibid.*

²² *Ibid.*

²³ Sartwell, Martha, *The Accessible Museum: Model Programs of Accessibility for Disabled and Older People*, (Washington DC: American Alliance of Museums, 1993), 101-103.

²⁴ *Ibid*, 101.

inclusion and making sure all visitors are able to receive the same experience. While the notion of a museum, or other public site, being accessible seems straightforward and easy to implement, that is not always the case for a variety of reasons such as funding or support. The ADA laws have been in place since 1990s, but not all institutions have fully implemented accessibility into their programming and exhibitions.

Additionally, an important thing to mention about the ADA laws is the rationale behind the laws. The laws were enacted to provide visitors who have accessibility needs with the forum to access all facets of life equally.²⁵ This access to a forum of support and entitlement allows visitors who have accessible needs to not only feel empowered but also it gives museums, and all like institutions, the power to do the right thing.²⁶ However, before the ADA laws, unlike other civil rights movements, there was no strong support system for individuals who have accessible needs. The ADA laws not only gave individuals the power to get access to all facets of life but it provided them a forum for support and growth within the world that also eradicated discrimination.²⁷ By also providing the ADA laws to help eradicate discrimination, it gave public institutions the power to support and provide access to visitors who have accessible needs.²⁸ This ability to support and provide to individuals who have accessibility needs is so critical because it provides a rationale and support for why the laws are necessary; it also proves how the laws help to effect museum programming. If museums are able to provide programs such as a touch tour it means that the rationale of the laws are effective because it helped to

²⁵ Americans With Disabilities Act of 1990. Public Law 101-336. 108th Congress, 2nd session (July 26, 1990.)

²⁶ *Ibid.*

²⁷ *Ibid.*

²⁸ *Ibid.*

remove discrimination, but also creates open access to individuals who have accessible needs that was not available before the laws.

Touch Tours

Touch tours are a form of programming that can be used as a source of alternative accessibility programming, it is best to define what a touch tour is and can provide to visitors who are low-vision or blind. Touch tours are defined for visitors who are blind or low-vision as:

the primary way to acquire information or access a work of art. For others, tactile experiences help to complete their mental image of an object. In addition to touching original works of art, tactile experiences include: replicas, models, props, handling objects which convey one aspect of the work, and contemporary art made to be touch.²⁹

Touch tours are in essence a hands-on, tactile tour where visitors who are visually impaired can experience and acquire new knowledge through the sensation of touch.³⁰

These tactile tours offer museum visitors who are visually impaired an opportunity that is rarely afforded to them, which is accessibility through touch. Touch tours also provide visually impaired visitors with equal opportunity to programming and access to the information museums can offer.

The existence of touch tours has been around since 1976 when the first major touch exhibition based around sculpture was held in the United Kingdom at the Tate

²⁹ Axel, Elisabeth Salzhauer, *Art Beyond Sight* (New York: American Foundation for the Blind, 2010), 216.

³⁰ *Ibid.*

Gallery.³¹ After the 1976 exhibition at the Tate Gallery many other national, and international, museums and organization, such as the Victoria and Albert Museum, began to implement accessibility for the visually impaired community.³² One of the reasons for this spike in interest in accessibility in the late 1970s came from laws such as the Rehabilitation Act and Education for All Handicapped Children Act; these laws put pressure on public institutions to become more accessible and offer educational opportunities to all visitors.³³ As a result of this emphasis in accessibility through law, many other museums and organizations began to work on producing programs and exhibitions that were accessible and educational, with touch often being the focus of programming for visitors who are visually impaired.³⁴ Touch often being chosen as the prime choice of accessibility for the visually impaired because it was a specific form of accessibility that lends itself to a very powerful form of learning.³⁵ As well, many of the museums in the late 1970s that were producing accessibility programs were art museums. Art museum's collections lend to objects being tactile because they have objects made of different mediums, while other museums collections are not comparable because they may not offer as many objects in different mediums. Though that does not mean that an experience cannot be tactile if original objects are not involved or are not made of different mediums. In fact, even reproductions of objects can help a visitor who is visually impaired learn about the topic being presented on a touch tour.

³¹ Pye, Elizabeth, *The Power of Touch: Handling Objects in Museum and Heritage Contexts*, (California: Leftcoast Press, 2007), 20.

³² *Ibid*, 20-21.

³³ *Ibid*, 20-21.

³⁴ *Ibid*, 21.

³⁵ *Ibid*, 22.

The application of touch, specifically touch that is educational, is important because it emphasizes the importance of allowing visitors to make their own meaning by exploring objects in their own way.³⁶ Touch can help visitors evoke specific memories or experiences that allow them to recall information or knowledge that was once previously used.³⁷ The emphasis of touch also provides visitors who are low-vision or blind a way to understand objects and create images and meanings of the objects they touch.³⁸ Thus touch is an invaluable education tool that when used properly for visitors who are visually impaired can provide a greater wealth of knowledge and an engaging opportunity for learning. By providing touch tours to visually impaired visitors at museums and like cultural institutions, museums are able to create and extend visually impaired visitors' education and personal experiences.

Verbal Tours

Verbal tours are another form of inclusive programming for visitors who are low-vision or blind. Verbal tours are defined as: "A tour that uses verbal descriptions and uses non-visual language to convey the visual world. It can navigate a visitor through a museum, orient a listener to a work of art, or provide access to the visual aspects of a performance."³⁹ Verbal tours can happen in conjunction with a touch tour, or other programming, but also function separately on their own as a device to experience

³⁶ *Ibid*, 19.

³⁷ *Ibid*, 20.

³⁸ *Ibid*, 20.

³⁹ *Ibid*.

museums.⁴⁰ While verbal tours are predominately used in most programming for visitors who are visually impaired, this thesis's literature review will focus on verbal tours and verbal descriptions used for touch tour or tactile related programming.

Verbal descriptions and their uses in touch tours have specific guidelines on how they work. Verbal descriptions in tours may be used before, after, or during a tour; during a tour verbal descriptions should engage museum visitors and create thought-provoking conversation on the art or subject at hand being presented.⁴¹ However verbal descriptions for tours can be adapted to the level of its learners.⁴² All of these features are important for a visitor who is visually impaired because it means that their experience being provided is at an optimal level. For museum professionals though it gives them an opportunity to be flexible and adaptable to accessibility programming.

Similar to all other histories for accessibility aids, verbal description was used academically in 1964 by Chet Avery, a U.S. Department of Education Employee who was blind.⁴³ While verbal descriptions had been around long before then, it was not until 1964 that verbal descriptions were used for educational purposes.⁴⁴ Avery helped to further verbal description by suggesting its use in films so that visually impaired audiences could consume films as well. Then in the 1970s and 1980s organizations began to form that produced verbal descriptions for all art-related purposes.⁴⁵ These organizations consulted museums, art galleries, theaters and other related cultural

⁴⁰ Axel, Elisabeth Salzhauer, *Art Beyond Sight* (New York: American Foundation for the Blind, 2010), 216.

⁴¹ *Ibid*, 220.

⁴² *Ibid*, 220.

⁴³ *Ibid*, 226.

⁴⁴ *Ibid*, 226.

⁴⁵ *Ibid*, 227.

institutions. Thus these successes of verbal descriptions and verbal tours have become a form of accessibility that most cultural institutions could use.

In the current realm of accessibility, verbal descriptions and verbal tours have also become digitized through websites and apps.⁴⁶ This digitization allows for a more personal touch tour or verbal experience of a museum and its collections.⁴⁷ The digitization of accessibility programs also means that it is easier to access for visitors who are visually impaired. The increase in digital verbal tours also means that many other institutions, such as science museums and observatories, can now participate in providing accessibility programs.⁴⁸ With increased practices and broader applicability verbal descriptions and tours are a way to open up and engage visitors who cannot always access a museum. That does not mean though that accessibility practices should be strictly used in a digital realm. If the application of verbal descriptions and verbal tours for science-based topics can be made into an application, this means that a real person at a museum can also offer this programming. Thus it is key to utilize verbal descriptions for touch tours that are themed on science-based programming. Not only will it open up ones tactile experiences but also facilitate a higher level of engagement from visitors who are visually impaired.

Universal Design

⁴⁶ Synder, Joel, *The Visual Made Verbal*, (Washington DC: Dog Ear Publishing, 2014), PG 5.

⁴⁷ *Ibid.*

⁴⁸ Verschaffel, Lieven, Brian Greer and Wim Van Dooren, *Words and Worlds: Modeling Verbal Descriptions of Situations (New Directions in Mathematics and Science Education)*, Pg 10.

Universal design is a concept that is defined as “a concept or philosophy for designing and delivering products and services that are usable by people with the widest possible range of functional capabilities, which include products and services that are made usable with assistive technologies.”⁴⁹ Universal design, in terms of education, has been used since the 1970s when Ronald Mace, an educator and an architect, coined the term.⁵⁰ This application of making things accessible for as many users as possible has been applied to many different forms and functions. For the purpose of this thesis though, universal design will be looked at through the lens of museum exhibition design and programs.

Universal design in terms of museum exhibition is the idea that exhibitions can be made accessible by offering a multi-sensory learning experience that can be enjoyed by all people of all abilities.⁵¹ Universal design is a form of exhibition design that is frequently used in science-based museums to make exhibitions, the museum, and programming inclusive for visitors of all abilities.⁵² Universal design is also a form of exhibition design that allows for many science museums to create exhibitions that are engaging, but not based on objects or a museum's collection.⁵³ The positive asset to universal design though is that not only are exhibits accessible for all visitors but it also

⁴⁹ Burgstahler, Sheryl E. and Rebecca C. Cory, *Universal Design in Higher Education: From Principles to Practice*, Massachusetts: Harvard Education Press, 2008, PG 6-7.

⁵⁰ *Ibid.*, PG 6.

⁵¹ Davidson, Betty, Candace Lee Heald, and George E. Hein, “Increased Exhibit Accessibility Through Multisensory Interaction,” *Curator* 34, 273-290.

⁵² *Ibid.*

⁵³ *Ibid.*

allows for all visitors to engage with the museum despite the institution not having a collection.⁵⁴

There are cases, such as the Natural History Museum of London, where universal design was implemented because of the inclusiveness of the exhibition design compared to other exhibition approaches for the physical space of the museum.⁵⁵ However universal design does not always work for all visitors when they interact with an exhibit, because visitors can have different modalities of learning and these different modalities can be a visitor's preferential way of learning.⁵⁶ Thus it is important for all museums, not just natural history, to be able to provide programming that is interactive and accessible for all types of learners. This is the benefit of offering a program such as touch tours; touch tours not only provide access to a museum and its collection but also engage all visitors who prefer to learn through touch.

The importance of implementing universal design in museums and cultural institutions is a major tool in making public institutions accessible for all visitors. It is also acknowledged that universal design is important for accessibility too. However, the focus of this thesis is the provision of accommodations and accessible programming for one particular audience: visitors who are low-vision or blind.

The research and literature for this thesis is therefore based on the application of touch-based tours to accommodate and provide a rich experience for visitors who are visually impaired. In this literature review it is important to focus on the needs of the community that is the receiver of these programs. Tactile learning is an important feature

⁵⁴ *Ibid.*

⁵⁵ *Ibid.*

⁵⁶ *Ibid.*

of learning in museums for visitors who are visually impaired.⁵⁷ Tactile learning occurs when low-vision and blind users are able to physically engage with an artifact or object.⁵⁸ During this experience, visitors with visual impairments can either access primary information or can complete their mental image of an art or object that cannot always be accessed without touch and verbal guidelines that help to educate visitors who are visually impaired.⁵⁹ The reason tactile learning is so engaging is because when it is done properly visitors who are visually impaired are able to receive a richer basis of knowledge of objects, artifacts, and information.⁶⁰ This learnt knowledge continues to stay with visitors who are visually impaired long past their programming because it provides visitors with a previous reference point and allows visitors to physically engage with objects.⁶¹ The reason why universal design, unlike touch tours, does not provide visitors with a richer level of learning and experience is because universal design was created in such a way that engages with all visitors and the most common forms of learning. However creating a program that focuses on a specific community and is inclusive to that community's learning styles and needs, such as a touch tour, would make a significant difference in attendance and learning. Plus touch tours can be applied to all types of museums.

Art-Based Touch Tours

⁵⁷ Axel, Elisabeth Salzhauer, *Art Beyond Sight* (New York: American Foundation for the Blind, 2010), 200-203.

⁵⁸ *Ibid*, 209.

⁵⁹ *Ibid*, 209.

⁶⁰ *Ibid*, 209.

⁶¹ *Ibid*, 209.

An area of research that is abundant in literature is that of art-based touch tours, which have been in place since the 1980s.⁶² This literature includes case studies that have been conducted to show the inclusiveness of art-based touch tours for visitors who are visually impaired, and how these visitors respond to art-based touch tours.⁶³ There is also documentation about ways to further expand and adapt art-based touch tours to meet affective, cognitive, and psychomotor domains of learning.⁶⁴ However, despite many guidelines, data, and research that have been written about art-based touch tours, there is limited information about how these programs can be adapted for other types of museums and cultural institutions.

There is ample data and research about touch tours involving art, because it is one of the oldest forms of inclusion in museums for visitors who are visually impaired.⁶⁵ While there are multiple variables such as the number of visitors, visitor interest, changing exhibits and topics, it helps to have museums and visitors define what they expect to happen during their museum visit in terms of accessibility.⁶⁶

Visually impaired visitors are also important participants, along with educators and other museum staff members, to offering a better understanding about what is of value about touch tours. Touch tours in art museums offer unique experiences for the

⁶² Axel, Elisabeth Salzhauer, *Art Beyond Sight* (New York: American Foundation for the Blind, 2010), 16-17.

⁶³ Candlin, Fiona, "Blindness, Art and Exclusion in Museums and Galleries," *International Journal of Art & Design Education* 22, no. 1 (February 2003): 100. *Art Source*, EBSCOhost (accessed March 19, 2014.)

⁶⁴ *Ibid.*

⁶⁵ *Ibid.*

⁶⁶ *Ibid.*

visually impaired on many different levels.⁶⁷ Touch tours not only include interactions with artifacts, but they also provide new relationships, partnerships, and educational opportunities for visitors who are low-vision and blind.⁶⁸ It is critical then to setup a focus group for this thesis so that these deeper connections can be experienced and represented in the collected data.⁶⁹

Defining objects that are used for touch tours is relevant to understanding the process of touch tours. Tertiary museum objects are objects that are touchable and can be handled significantly more than objects in a collection that are rare or invaluable and would be near impossible to replace.⁷⁰ Reproductions are objects that have been reproduced for educational purposes; such examples include dinosaur bones, teeth, skulls, and other related ephemera.⁷¹ Reproduction objects are important because they highlight what is significant in learning and can be handled with little precaution by visitors.⁷² Educational objects are objects used specifically for teaching students and visitors; examples of teaching objects are real skeletons, furs, pictures, and other objects that are not reproduced but can be handled and offer legitimacy and have a provenance.⁷³ Educational objects are also valuable because they are accessible, legitimate, and can provide access to knowledge that is can be learned in many ways.⁷⁴

⁶⁷ Axel, Elisabeth Salzhauer, *Art Beyond Sight* (New York: American Foundation for the Blind, 2010), 209-211.

⁶⁸ *Ibid*, 424.

⁶⁹ *Ibid*, 480.

⁷⁰ Boucier, Pauk and Ruby Rogers, *Nomenclature 3.0 for Museum Cataloging*, California: Altamira Press, 2010, 32-34.

⁷¹ *Ibid*, 32-34.

⁷² *Ibid*, 32-34.

⁷³ *Ibid*, 32-34.

⁷⁴ *Ibid*, 32-34.

Focus on art-based touch tours is not just about the artwork but the other aspects that are not always provided to the visually impaired community. Art-based touch tours can be used for more than just their educational purpose; these tours provide deeper relationships for all people involved.⁷⁵ Additionally these tours also utilize objects that are not used normally in tours, these objects can include: raised line drawings, artifacts, hands-on classes, and changing themes and topics, which benefit the visually impaired community.⁷⁶ While research and data focus on the application of art-based touch tours, the guidelines for art-based touch tours can be applied to all other types of museums and cultural institutions. Specifically, touch-based tours can be developed for natural history museums, dioramas, and other science-based museums on the principles of the guidelines of art-based touch tours. Natural history museums are a perfect example of a type of museum that can replicate art-based touch tours because they offer dioramas, educational objects and live animals.⁷⁷ Objects vary from tertiary objects to educational objects, which are already used for educational purposes. These available objects allow natural history museums an opportunity to adapt and create programs, such as a touch tour, for the visually impaired community.

Natural History Museums

⁷⁵ Axel, Elisabeth Salzhauer, *Art Beyond Sight* (New York: American Foundation for the Blind, 2010), 352.

⁷⁶ *Ibid*, 352.

⁷⁷ Pearson, Clifford A, "Breaking out of the display case, exhibits out and touch," *Architectural Record* 182, no. 9 (September 1994): 24.

One opportunity that exists against touch-based tours in natural history museums is the limited available data, literature, or research for these tours in natural history museums. Currently limited data and literature have been found, as such there is no literature that can be provided to prove the success of the application of touch tours in natural history museum despite touch tours existing in limited natural history museums. Despite the limited data made available, which could be a problem for the research of literature, this difficulty also provides a chance and opportunity for museums to create data, literature, and conversation about accessibility in museums.

The opportunities that could be provided from the limited literature and data could include a variety of results and opportunities for museums and emerging professionals. These results could include: the development of tours, other programming, literature, and collaborations between museums and the visually impaired community. These opportunities also allow for emerging professionals to create regulated and sharable criteria to be developed for all types of museums to use publically. Other opportunities that could occur include conversations and partnerships between professionals and communities on accessibility. By providing a forum to start these conversations, accessibility becomes more accessible for visitors, museum professionals, and cultural institutions. Engaging in a dialogue about accessibility gives museums the opportunity to continually improve their accessibility for the institution and visitors.

One important thing worth mentioning though is that there are a select handful of natural history museums that are already attempting to implement accessibility programming. However, all of these institutions are larger museums that have the resources to effectively produce and deliver accessibility programs. These museum

include the National Museum of Natural History in Washington D.C. and the American Museum of Natural History in New York City. While it is important that these museums are adding to the literature for accessibility, and making programs for all audiences, this does not mean that a small to medium sized museum cannot produce a similar program. Starting a dialogue about accessibility with the visually impaired community allows all institutions to start and create their own accessible programming. This thesis will engage other museums and professionals to consider producing accessible programs and content for all visitors. Whether the content is based on a large museum's model or is a program that is self-made, what is important is that accessibility starts to happen now and that all visitors receive access to a museum and its programming.

Chapter III. Research Methodology

Rationale

The rationale for conducting multiple forms of surveys and collection of different sets of data is that it allows the collected data to paint a bigger picture on the topic of accessibility in museums. This collected data should not only represent museum professionals, and visitors who are visually impaired, but reflect current efforts of the museum field on the topic of accessibility. The collected data will also span a variety of topics such as programming to accessible technologies. The reason for collecting a variety of data is that it will be able to better represent the participants involved with this thesis, and also help to create a better understanding in the applicability of the ADA laws. The rationale of collecting data from two different respondents is that it will illustrate how museum professionals' and visitors' are currently representing accessibility.

Conducting surveys with museum professionals is essential to the rationale of this thesis. Gathering museum professionals' data will explain in detail what programs are being created or used, relevant materials, previously collected data, and supplementary offerings to the visually impaired and emerging professionals' communities. Providing data from the professional field, while important, is only one part of the bigger picture on the topic of accessibility in museums. Without soliciting data from all potential participants in the field of museum accessibility, the data would not provide a wider discussion on museum accessibility.

The next form of surveyed data was with a focus group of members of the visually impaired community. The focus group's collected data featured a personal touch tour at a local natural history museum; the focus group featured questions related to the museum professionals' survey and the lived experiences of the participants. The set-up of this focus group started with an hour-long touch tour and then a recorded focus group session was held immediately after the tour. The rationale for conducting a focus group and producing a touch tour related to this thesis. Part of the purpose of having a focus group was that the participants must have a lived experience to discuss and compare to their other lived experiences. By providing the focus group with a comparable lived experience, this gives the focus group members a source of material to provide new lived experience data for this thesis. One of the main proponents in creating a touch tour, beyond the focus groups' lived experience, is because there are limited touch tours in natural history and science museums. Creating programming that is specific, and exists for the visually impaired community to experience, creates an additional layer to the data and the focus group's lived experience. It is of value to mention though that the participants of the focus group have all experienced accessibility programs at local museums or cultural institutions, though they are not science or diorama-based experiences. This all adds to the rationale of this thesis because it provides data based on the experience of the receivers of accessibility programming. Without the perspective of these participants of accessibility programming it means that all the data collected is biased to professionals only. Despite being a museum professional, one cannot surmise what a visually impaired person experiences when visiting a museum or attending a program.

Without the visitors experience, all attempted and created programming cannot fully benefit the intended audience because it lacks the visitors' perspective.

Research Team

The research team was a select group of individuals who helped with coding of the collected data. This team consisted of three individuals who have related backgrounds to the topic of this thesis. The research team also helped to code the data in appropriate categories so that the researcher's biases do not occur in the process of analyzing data. The selected individuals for the research team are necessary to the interpretation of the data also create a greater perspective on the collected data.

The selection of the individuals for the research team was done purposely based on the audiences that this thesis will be written for. These audiences include sighted museum professionals, individuals who work with dioramas or science, museum education departments, and museum professionals who work on the accessibility of museums. Carefully selecting a research team that represents the audience that this thesis will be written for ensures that the coded data will represent the future readers of this thesis.

The research team included three individuals who represent the potential audience of this thesis. The first member of the research team includes a male in his twenties who has his bachelor's degree in natural sciences. The second member of the research team is a female individual in her thirties who works in an education department at a local science museum; this participant has a bachelor's degree in natural sciences and this

individual has limited work experience working with visitors who have accessibility needs. The final participant is a female in her twenties who has worked at local museums that include the subjects of history and science; this individual is also a candidate to receive her master's degree in museum studies. The purposeful selection of the research team shows the diversity of the team but also represents the potential readers of this thesis.

Beyond talking about the qualifications of the research team who helped assist in the consensus coding of the collected data, it is important to talk about bracketing off the assumptions of the research team. Some of the assumptions the research team had included assumptions about the focus group's experiences, questions on how to deal with the visually impaired, as well as overall accessibility laws and language. However the research team had a very open and enthusiastic spirit about participating and learning more about the focus groups experiences through the collected data.

During the consensus coding sessions for the collected data from the focus group a reflexive journaling process was recorded. A reflexive journal is the process in which the research team will record their preconceived knowledge.⁷⁸ However during the process of the reflexive journaling, the journals should also highlight the changes each member of the research team had gone through when analyzing the data. Some of the original knowledge of the research team included limited understanding of visual impairments, limited experience on how the visually impaired learn, and limited experience on touch tours and accessibility programming. But through the gradual process of consensus coding the research team's knowledge did change. Some of the changes

⁷⁸ Fitzpatrick, Sanders, and Worthen, *Program Evaluation: Alternative Approaches and Practical Guidelines*, 215.

were better understanding of how touch tours work, better understanding of a visually impaired visitor's museum experience, and better understanding that all visitors are people who enjoy museums, too.

Finally for the protection of the collected data, the research team will not be participating in any other part of the data collection other than consensus coding. The research team will also not be involved in data analysis, measurements, or any other data collection that has been stated. The researcher will handle all other steps that deal with collected data. Thus any data analyzed or coded by the research team will be referenced in the text. This process of only allowing the research team limited access to collected data provides protection to all the participants of this thesis.⁷⁹

Participants

The participants are of equal importance to the methodology of this thesis as is the literature review. The participants will be individuals who are involved with the collection of data from the online survey and focus group. More specifically, the participants will include museum professionals and individuals who are visually impaired. However, both participants will partake in different measurements separately. Neither participant will overlap or partake in both measurements.

Museum professionals will be the first participants to be involved with this thesis's measurements. Museum professionals will be asked to participate in an online survey that was posted to professional listservs. These listservs included American

⁷⁹ *Ibid.*, 215.

Alliance of Museum professionals, Museum Ed.org, and the Association of Science and Technology Centers. The first measurement, the online survey, will ask museum professionals to consent to taking an online survey about museum accessibility programming. In the survey, museum professionals provided data that relates to accessibility programming and dioramas for visitors who are visually impaired. However, the surveys also asked for select museum professional participants; individuals from art museums and museums that do not utilize science or dioramas were excluded from participating in the survey.

The purpose for specifically collecting data relating to dioramas and science-based museums is that it will collect data relevant to this thesis. Contacting museums that utilize dioramas or science ensures that the online survey will not receive data that cannot be used in this thesis. Also part of the purpose for not selecting art museums to participate in the online survey is because accessibility programming has been practiced for at least three decades in art museums; and while the information could be relevant, collected data related to art would not be beneficial to dioramas or science topics. The data collected as well must be able to be reflected in the focus group questions. By collecting data that cannot be reflected to the focus group would mean that the collected data from the focus group would be irrelevant, which would affect this thesis.

The other group of participants that were involved with data collection from a measurement was the focus group. The focus group included visitors of museums who are visually impaired and vary on visual impairments that are self identified; the visitors chosen are also local community members who actively participate in cultural institutions accessibility programming that is offered. Another advantage to the selected focus group

members is that they have participated in a touch tour as well. Part of the rationale for selecting these particular participants is because of their lived experiences. The lived experiences of the focus group will provide data that is not only insightful to what they have experienced, but can also provide insight to museum professionals on accessibility.

Throughout the data collection of this thesis, protection will be provided to all participants. For the two types of participants protection is promised but will be offered in two different ways given how the measurements were administered.

For the online survey participants' protection came in multiple layers. The first form of protection came with allowing participants to consent to participating in the online survey. The next form of protection for the online survey participants included anonymity throughout the reporting of collected data. While a demographics section was a part of the online survey, this data will not be reported on in the data chapter of this thesis. Instead any reported data that relates to demographics will be done in a generalized way or a way that protects the museum professional and their institution. Such generalizations could include a description like: "the Tyrannosaurus museum, located in the mid-Atlantic region that exhibits science related topics", is how the museum will be reported on in the data section. The purpose for this generalization is that it will provide protection to the museum professional and the museum where they work. Additionally, if any negative or harmful data is collected that could effect the employee or museum negatively this anonymity protects the participant and their museum's image.

As for the participants of the focus group, while their protection will be similar to the museum professionals, it will also be different because of the way data was collected. The main form of protection for the focus group participants includes the consent of the

participants. Consent was collected before the recording of the focus group from each individual with a signature page that also had a witness signature. During the consent signature signing the participants were also informed of their rights to leave and not consent to the focus group at any time during this thesis. Thus if a participant chooses to not want to partake in this thesis, they have the right to leave. Additional forms of protection for the focus group will include the removal of name, age, location, or any other personal information that could locate a participant who helped provide data for this thesis. All of these steps to provide protection for a member of the focus groups are important because each member's safety is key. Also given the type of data that was collected for this thesis, anonymity gives the participants power to speak freely. If participants of this focus group do not feel like they can speak openly then that affects the collected data. Protection and safety is key so that the focus group members could openly speak about difficult subject matters or talk about difficult topics.

Individuals who were not included in this thesis are considered non-participants and there is reason for not including these non-participants in data collection. Selection of the types of participants who were to partake in measurements for this thesis was selected carefully. Museum professionals were selected because they offer data relating to the professional and internal perspective of museums. The individuals who are visually impaired were selected because they offer data based on a lived experience relating to museums. This leads to the non-participants and the reason why non-participants were not selected to participate in data collection relating to this thesis. Any non-participant who has vision, does not work in accessibility or at a museum, cannot participate because the data collected would not provide value or insight to this thesis. While these non-

participants may be readers of this thesis, the experiences of museum professionals and visitors who are visually impaired will be participants who provide the most compelling and relevant data.

Solicitation of data occurred through two different channels for each of the participants used for data collection. For the collection of data from museum professionals, solicitation occurred through professional listservs for museums. The listservs included American Alliance of Museum, Museum-Ed.Org, and the Association of Science and Technology Centers; through these listservs the online survey was posted to professionals to take online. The purpose of posting to a professional listserv is that the databases of the listserv reach large audiences of museum professionals across the nation. As a consequence of posting to such a large audience the online survey would receive a higher rate of response. The other advantage to posting in a listserv is that participants and non-participants of the survey could share the post of the survey to other professionals, which would create a snowball effect. The snowball effect would also help to create a higher rate of response for the survey. This form of solicitation was chosen purposefully because it is easy to produce, easy to share, and would also receive a high rate of response from participants. One stipulation to this form of solicitation and participants is that they will not be surveyed for the other form of data collection. This choice in not inviting museum professionals to be apart of the focus group is purposeful because it prevents cross-pollination or contamination of data collected from the focus group.

As for solicitation of the focus group members, they were chosen in a different way than the museum professionals. Solicitation of the focus group members were

chosen through a pool of individuals who are visually impaired and are active participants in local cultural institutions' accessibility programming; the other requirement was that these individuals have also experienced other touch tours at a museum other than an art museum. The purpose for selecting individuals who are visually impaired, who have been on a touch tour, and active at local museums is because of the data they can provide to the focus group session. These participants will provide data that is necessary for triangulation, but they will also be able to offer a lived experience. These select members of the visually impaired community also offer the experience of participating and creating programming for other visually impaired museum visitors. All of these lived experiences will help to create relevant data from the focus group that is necessary when reporting on someone's lived experience.

Measures

There were two instruments used overall for data collection. This first measurement was an online survey sent to museum professionals via listservs for museum professionals. The other instrument used for measurement purposes include a focus group that reflected the first instrument and other like touch tours. These measurements were chosen because they reflect the two audiences that were involved with data collection for this thesis.

The online survey included fourteen multiple-choice questions and three open ended questions; however, ten of the multiple choice questions offered participants to expand or provide other answers. The multiple choice questions included (also in appendix A): “ By choosing yes, you are consenting to participate in this survey.,” “What type of museum is your institution? Choose one below:,” “Does your museum offer any programming for visitors who are low vision/blind?,” “Does your museum offer any outreach programs for visitors who are low vision/blind?,” “Does your museum offer any accessible technology for visitors who are low vision/blind?,” “Does your museum have any dioramas on view?,” “Does your museum offer any accessibility programs based on dioramas?,” “Does your museum offer touch tours based on dioramas for visitors who are low vision/blind?,” “Does your museum have any attendance statistics on your visitors who are low vision/blind?,” “Have you conducted any evaluation or research on visitors who are low vision/blind?,” “Does your museum provide a personal contact to schedule programming for visitors who are low vision/blind?,” “May I contact your accessibility

coordinator for more information to conduct a case study?,” “What size is your institution's annual budget? Please choose from below.,” and “Where is your museum located within the state?.” And the open-ended questions include: “If there is anything else you offer for visitors who are low vision/blind? Please explain below.,” “What department(s) deals with your museum's accessibility needs? Provide below.,” and “In what city and state is your museum located? Please provide below.”

All the questions provided hope to illustrate the first instrument produced for museum professionals to take. This survey instrument also underwent a proto-typing phase as to make sure that questions were clear and concise for museum professionals before being sent out to the listservs. The proto-typing phase occurred over a week period and was sent out to fellow museum education classmates who are emerging professionals in the museum education field.

The other measurement used for data collection included a set of several open-ended questions used for the multiple focus group sessions. The questions produced for the focus group were created in response to data collected from museum professionals and the researcher's experience of going on touch tours. The focus group included several open ended questions that included: “Could you please self-identify your visual impairment?,” “Did you enjoy today's touch tour?,” “What were some pros/cons of the touch tour?,” “What were some pros/cons of the touch tour?,” “Is there anything you would change about the touch tour?,” “Did you have a favorite stop/object/etc during the tour and why?,” “Did you enjoy going on a touch tour at a natural history museum and would you do it again?,” “Would you like/be interested to go on a touch tour at any other science based museums?,” “As a visitor did you enjoy having a tour based on dioramas at

the museum or would you prefer an alternative subject matter instead of dioramas?,”

“When visiting a museum would you prefer to have a person or department within the museum you could contact to schedule a visit or access to objects?,” “Or would you rather be able to go online and access a museum’s information before visiting instead?,”

“Do you prefer a dedicated day for programming or would you prefer to be able to walk up, same day, and access a touch tour or accessibility program at that time?,” “If you had access to accessible technology for your museum visits would you use and what would you suggest as tools to use for accessible technology?,” “If you are opposed to technology would you rather instead, when you came to visit a museum, be able to get small box of objects and self guided tour to a do touch tour yourself?,” “If you could participate in other accessibility related programming at a science based museum would you?,” and “What sort of topics would interest you?.” However during the focus group other questions did come up because the focus group sessions were open to dialogue and discussion about touch tours, accessibility programming, and other related subjects.

The questions supplied should illustrate the focus group’s instrument that was used for collecting the visitors’ experience data. This measurement underwent a prototyping phase that included multiple revisions of sample questions so that the focus group had focused and concise questions. The process of recording the focus group and their provided data occurred differently then the museum professionals’ data; the data collected was recorded with a sound recording device and then transcribed. The focus group signed for their consent and had their rights read aloud to them. The purpose for reading the participants’ rights aloud was because the participants are all visually impaired and needed their rights read to them aloud. The data was verbally recorded and

transcribed so that the data would be recorded and able to be analyzed and used for this thesis.

Demographic Data Collection

Demographic data collection was included in both measurements used for data collection of this thesis. Demographics were collected from the participants who were involved with this thesis through the measurements created. The first set of demographics collected were from the museum professionals who responded to the online survey. The demographics collected from museum professionals dealt with the museum they work at instead of the individual who responded to the survey. The questions used to collect demographic data based on the museums included (see Appendix A): “What size is your institution's annual budget? Please choose from below.,” “In what city and state is your museum located? Please provide below.,” and “Where is your museum located within the state?.” This data was collected to provide a general description and understanding of the types of institutions that do or do not actively participant in accessibility at their institution. However, all of the collected demographic data will not be detailed in the data section; this means that each individual who responded to the survey, as an institution, will be safe to report openly. This anonymity of collected demographic data also means that it protects the institutions that openly participated in the survey.

Demographic data collected for the focus group differs from the online survey. Demographic data that was collected for the focus group included gender, age, and self-identification of each focus group member’s visual impairment. This data was collected

so that it could relate back to the individuals who participated in the focus group, but not all of the demographic data will be reported on in the data section, only the self-identified visual impairment that is relevant for the readers. This demographic data was important to collect though because it relates to the lived experience of each individual who took part in the focus group. Again, anonymity of each individual is of the utmost importance and other than the general descriptions, nothing specific or personal will be reported on in the data section of this thesis. This protection of the focus group allows each member of the focus group to be open and feel safe about any of the data they reported on during the focus group. Protection of each individual is important because it allows them too be open about difficult experiences or subject matters.

Procedure

The procedures for data collection were two different processes, one was an online survey and the other was a focus group that was conducted twice with different individuals. Both procedures were to correlate based on the data collected through these measurements. The online survey was sent out to museum professionals through online listservs that included: American Alliance of Museums, Museum-Ed.Org, and the Association of Science Technology Centers. The other procedure included was the focus group, which out of the two procedures was one of the most complicated procedures. The reason the focus group was so complicated was because it required a physical touch tour, a group of self-identified visually impaired visitors, and questions that reflected the

online survey measurement.⁸⁰ The purpose for structuring both measurements to correlate was purposeful so that the collected data can help to paint a bigger on the topic of accessibility.

Validity & Reliability

There are two factors that are key to keeping the data collected for this thesis valid and reliable; these two factors are external and internal threats to the collected data. Possible external threats to the data include the generalization of this thesis and if other institutions can apply this thesis to their institution. This means that if the measures and procedures produced for this thesis cannot be replicated at other museums this would be a threat to the validity and reliability of this thesis; it could also mean that museums and museum professionals find this thesis and its applicability not applicable to the field. Another threat to external validity would be that the focus group only concentrates on visitors who are visually impaired as visitors. This could be an external threat because it shows only one side to all visitors' experiences when there are other visitors who could benefit from accessibility programming. Though the reason that visually impaired participants were chosen is because of their lived experiences; these lived experiences are an essential part to the data collection this thesis. However, it is key that the data collected from the focus group is collected from individuals who are visually impaired but also aware of all visitors.

⁸⁰ Fitzpatrick, Jody L., Sanders, James R., and Worthen, Blaine R., *Program Evaluation: Alternative Approaches and Practical Guidelines* (Boston, MA: Pearson Education, 2004).

Internal threats that could occur to this thesis include the number of individuals who participated in the focus group; it is too small of a sample size. This means that because the focus group used such a small number of individuals from the local community, there is potential that there could be communication among the focus group participants; or that information regarding this thesis could be leaked out to other individuals. These internal threats could weaken the validity and reliability of this study because it could contaminate the data collected and analyzed.

Triangulation

Triangulation is the most important part to this thesis and the research methodology of this thesis. Triangulation is important because it gives this thesis research validity. The validity of this thesis's research occurs through the different types of participants involved with data collection for this thesis through museum professionals and the visually impaired focus group members who will provide data on the bigger picture of accessibility. Triangulation also occurs through the measurements used to survey and collect data for this thesis. Using an online survey and posting it to listservs allows for a randomization of participants who actively consented to taking the online survey. The other form of triangulation is demonstrated through the way in which both measurements were to reflect the data collected in each stage of data collection. The collected results of the data are important to triangulation because they will illustrate all the individuals who are important to museum accessibility. Triangulation also allows for a greater understanding of the topic of accessibility in museums.

Expected Results

The expected results of the collect data will vary, but in general it is assumed that most museums are not accessible to the visually impaired. There is potential for a variety of varying results and is expected to be collected in the online survey. It is expected that focus group will be interested in the programming offered to them for the focus group session. However, it also expected that the focus group will not fully understand the internal structures of museums, but will be open to helping these institutions become accessible. Additionally, the focus group is expected to be enthusiastic about science topics given that they can be harder to teach or conceptualize for the visually impaired. Through the collected data hopefully some of these expected results would be confirmed or denied based on the results.

Chapter IV. Data Analysis

As Told By the Museums

The first set of data was collected from museum professionals who handle accessibility or have connections to accessibility issues within their museum. The museum professional data were collected during a six-week period from August 8 to October 20, 2014 through an online survey. In total, 140 museum professionals started the survey, but only 52 participants finished the survey. The 52 completed surveys will be the data used for the data section of this thesis. This section looks at and analyzes the data collected from the museum professionals about museum accessibility and dioramas.

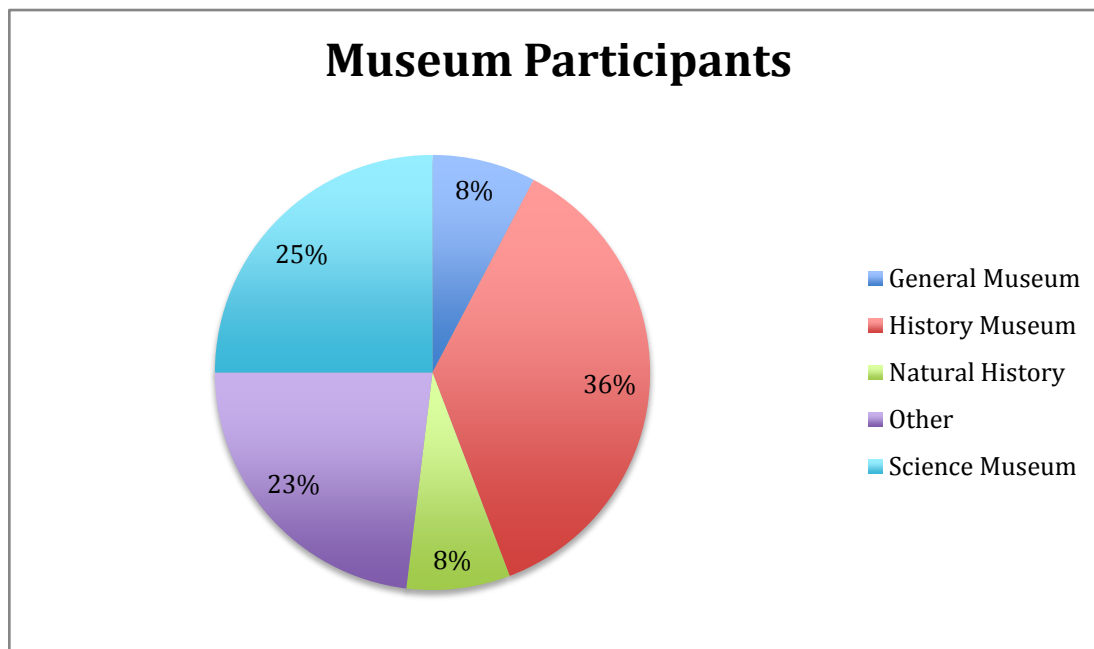


Figure 1: Data collected from Museum professionals on the type of museum where they work. (n=52)

In total, 52 participants completed the online survey, the types of museums that could participate in the survey included art museums, natural history museums, zoos, science museums, history museums, general museums, and others that included botanical gardens and air and space museums. Out of the 52 participants, 8% of the respondents were from general museums and natural history museums, 23% were from other museums that included: botanical gardens and archeology museums, 25% were from science museums, and 36% were from history museums. The survey also offered the option for art museums and zoos to respond. Unfortunately, no zoos responded to the survey. As for art museums, while they were an option, these participants were disqualified from the survey after their response. This disqualification was purposeful because the data collection was focused on dioramas and accessibility at non-art based museums. In general all of the other options provided on the survey were museums that could offer dioramas, which is why they were open to participate in the survey.

The rest of the data collected deals with how museum and museum professionals handle accessibility internally. This data ranges from accessibility of dioramas, accessibility of technology, if museums have dioramas, to what department handles accessibility. This collected data provides a better picture of how museums are currently addressing accessibility.

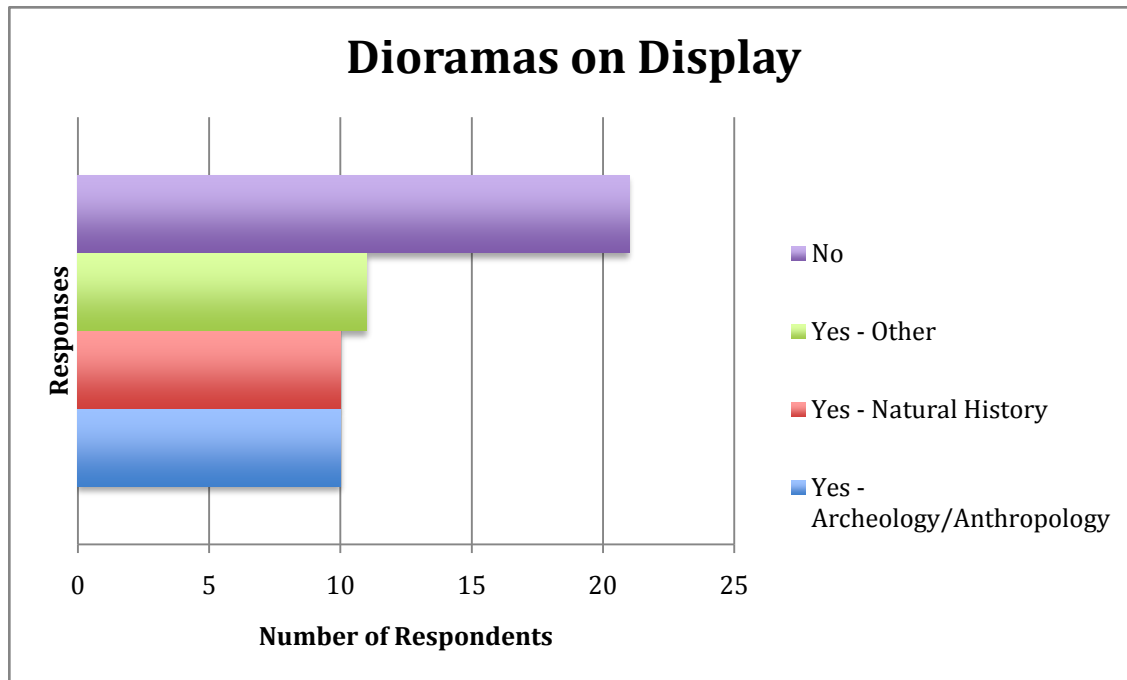


Figure 2: Data collected on museums that have dioramas on view based on selected diorama topics. (n=52)

Probably the most important data that was collected for this thesis dealt with dioramas. This question asked respondents if their museums had dioramas on display. Out of 52 respondents, 22 said that they did not have dioramas, while 10 said yes to natural history and anthropological dioramas, and 11 said yes to other dioramas, which included subjects of aviation, science, and horticulture. Out of the 52 respondents, 31 institutions, based on this survey, had dioramas on display. That means that there was a 60% response rate to museums having dioramas on display based on this survey. While this is a sample pool of museums, that is still a significant number of respondents to have dioramas. Dioramas are a potential entry point for accessibility programming for museums to offer visitors who are visually impaired. Even if museums are not actively offering access to dioramas or exhibitions for visitors who are visually impaired, they should be actively starting conversations about accessibility with visitors who have

accessible needs. When dioramas and exhibitions are left inaccessible within the museum, museums are not actively achieving their mission to all their possible constituents. Museums should be actively seeking to provide access to exhibitions and dioramas because it is apart of their mission to engage all visitor types and is required by law.

Additionally, out of the 52 completed respondents 20 of the 31 who haddioramas were institutions with natural history and anthropological dioramas. Depending on the institution, both natural history and anthropological dioramas could be on display at a museum that focuses on natural history. For museums that display these types of dioramas, this is an entry point for museums to consider accessibility or accessible programming for the museum.

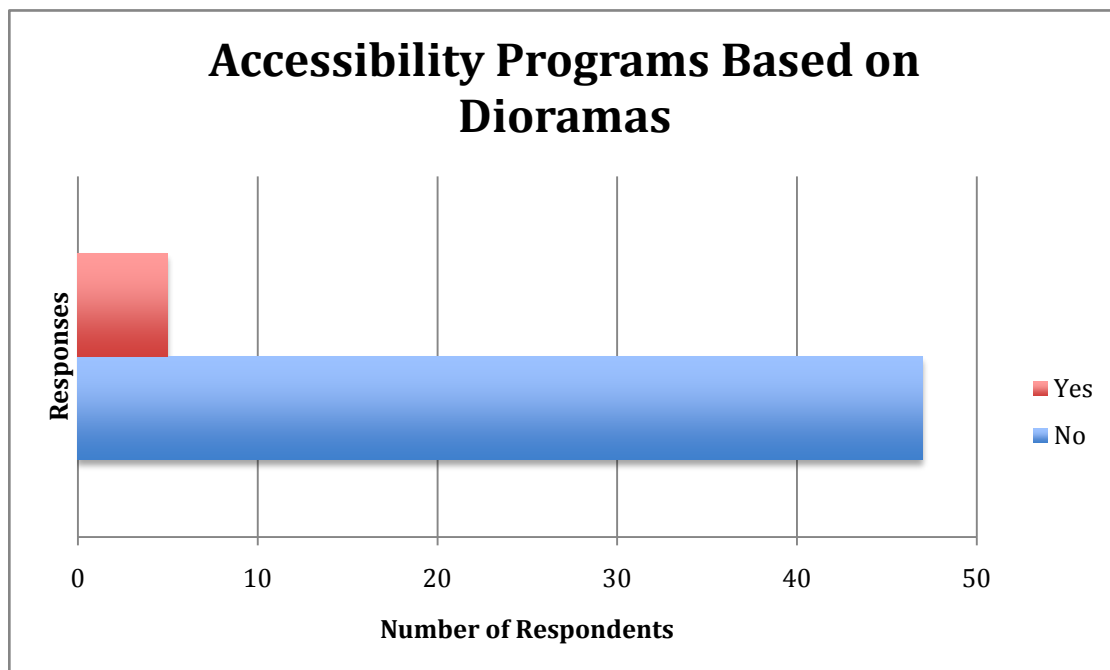


Figure 3: Data collected on Museum professionals response to offering programming based on dioramas. (n=52)

This question asked was whether museums offer programming based on dioramas. Out of 52 responses that completed the survey only 5 offer accessibility programming based on dioramas while 47 respondents said no. Given that 31 respondents from the previous data said they have dioramas on display, out of that 31 only 5 respondents said they offer programming that those visitors who are visually impaired can access. That is a 16% response rate from the data collected from the pool of museums that have dioramas. Considering that 84% of respondents with dioramas do not offer accessible programming, or some point of access to dioramas for visitors with accessible needs, this statistic is telling in that the pool of participants who completed the online survey may not see dioramas as accessible. This means that for visitors who are visually impaired, when they potentially access a museum with a diorama they are likely to not have the opportunity to experience the dioramas like the rest of the museum's visitors. However, museums with dioramas have an access point to engage visitors who are visually impaired; by utilizing them museums can achieve accessibility for visitors who have accessible needs.

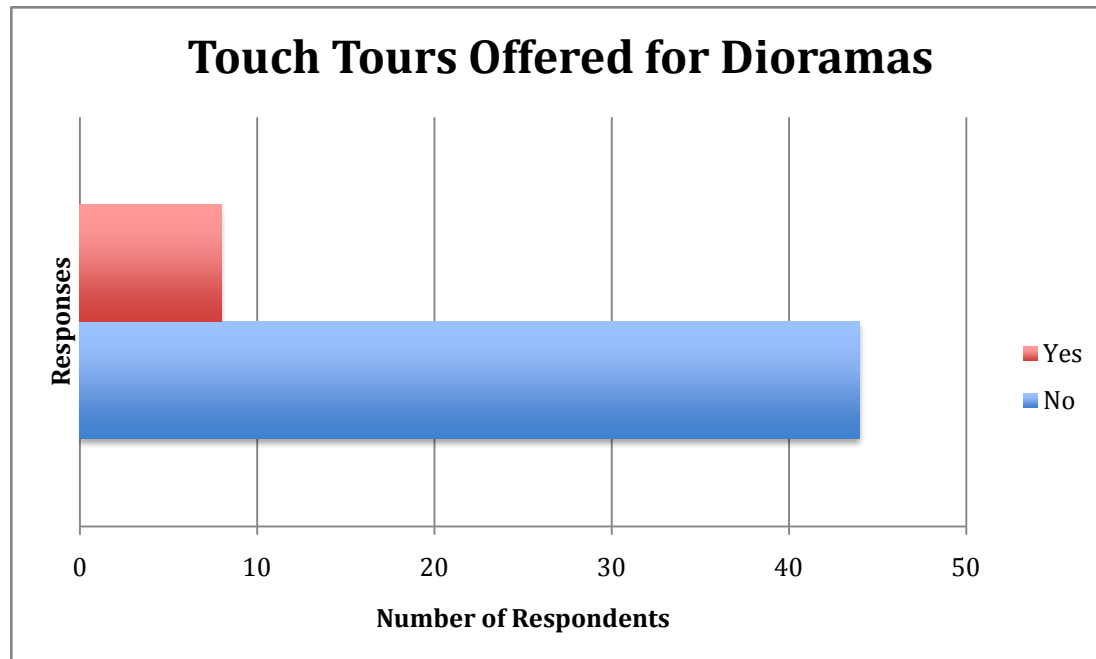


Figure 4: Data collected on Museum professionals' responses to whether their institution offers touch tours based on dioramas. (n=52)

Out of the 52 respondents that responded to offering touch tours based on dioramas, 8 said yes and 44 responded with no. While more institutions responded to yes in terms of offering access to dioramas through touch, the percentage - 16%, is still minimal compared to the 44 participants that responded with no to offering touch tours on dioramas. This data suggests that while some museums do offer dioramas, or opportunities for a tactile experience for dioramas, most of these museums that participated are not offering such programs. Though it is key to keep in mind that of these participants that do offer dioramas, only 8 offer touch tours based on their dioramas. This lack of access to dioramas offers an opportunity for institutions to create touch tours for dioramas. Even for institutions without dioramas though touch can be an opportunity for access and should still be considered when trying to create accessibility programming, especially for the visually impaired community.

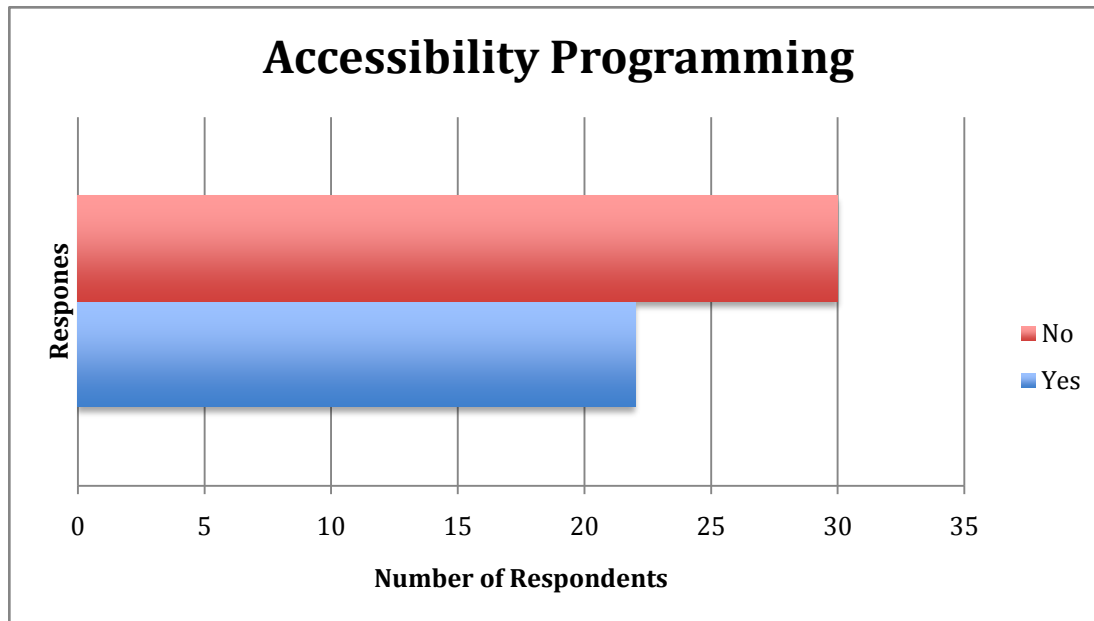


Figure 5: Data collected from Museum professionals' responses to offering programming for visitors who are low-vision/blind. (n=52)

Out of the 52 respondents who answered if their museum offers accessibility programming, 30 responded with no and 22 responded with yes. Out of the 22 who responded with yes, these professionals provided examples of what their institutions are currently offering; some of the offerings included special arranged visits where visitors interact with objects, monthly programming, and universal design. However of the 52 respondents, 30 museums said that they do not offer accessibility programming; given the current nature of accessibility given the ADA laws, that is shocking. Of the 32 respondents, which is 58% of participants of this survey, do not actively seek out to help visitors who have accessibility needs. This data shows that there is great opportunity for the field of museums and institutions to work on accessibility. If accessibility is not already considered, it should be something all museums start to consider and actively work towards. Museum visitors are going to change and museums need to be able to

provide for the diversity of visitors and what they expect during a visit. For some visitors that means accessibility programming.

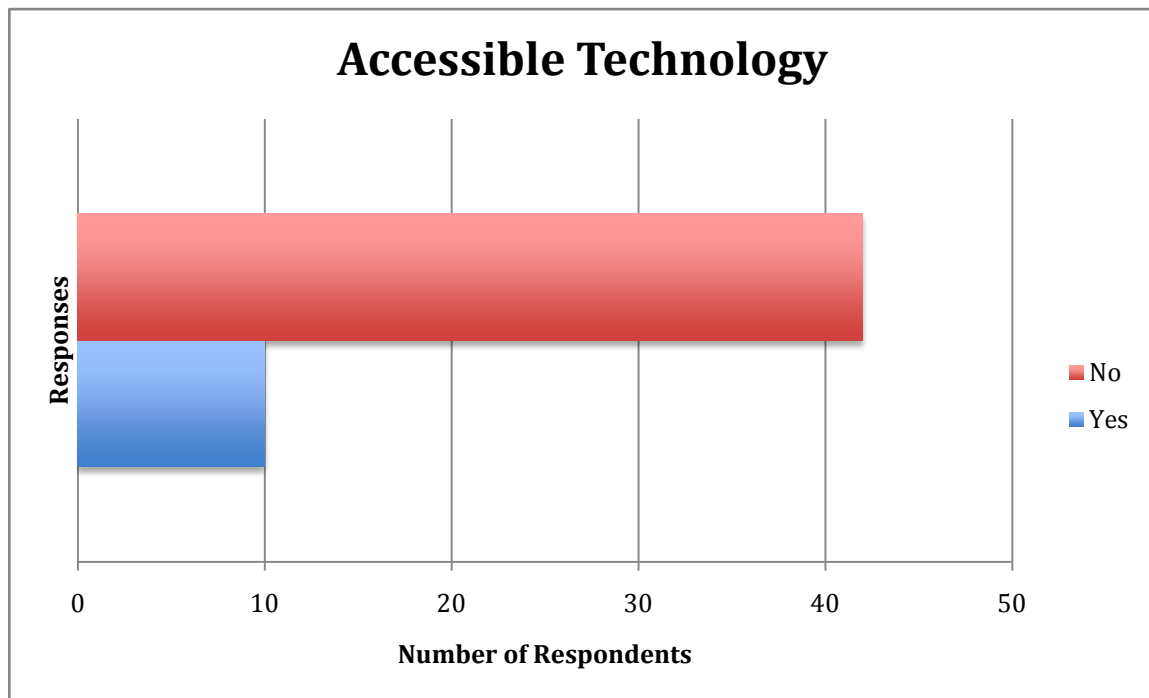


Figure 6: Data collected from Museum professionals' responses to offering accessible technology. (n=52)

Another question that was posed to museum professionals dealt with whether their institution currently uses accessibility technology. Of the 52 respondents, 42 said no and 10 said yes to using accessible technologies. Of the 10 that said yes, they provided examples of these technologies including 3D printing, audio recording, and digital applications. While 10 out of 52 respondents is only a 20% response rate for this survey, these institutions are currently using leading technologies that all other museums can consider. Digital application technologies and 3D printing are becoming more standard and are ways for visitors who are visually impaired to access the museum and its

collections without difficulties or damage to the collection. These technologies can also be utilized for dioramas to help visitors who are visually impaired to better experience and learn about what dioramas have to teach.

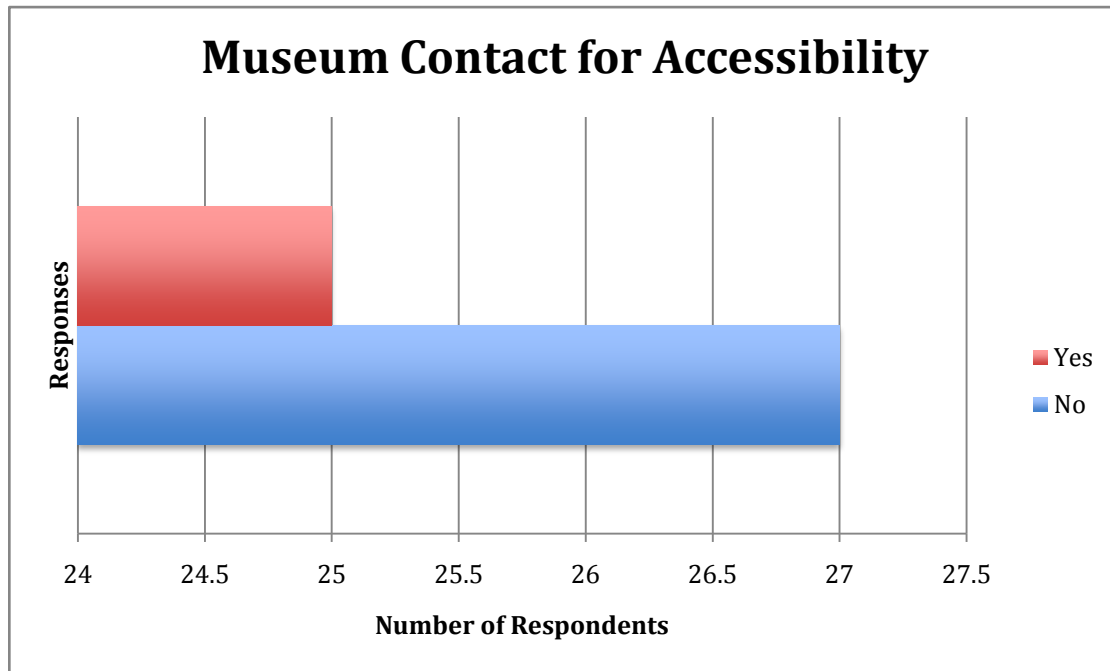


Figure 7: Data collected on Museum professional’s responses to offering visitors a contact for accessibility needs. (n=52)

Out of the 52 respondents, 27 responded with no and 25 responded with yes to providing a contact for accessibility needs. While this data is almost split evenly between online survey participants, it is still concerning that some museums do not offer a person, or department that a visitor can contact when they have questions about accessibility. While it may seem unnecessary to provide a contact person for accessibility questions, it is possible that not all visitors can access a website or feel comfortable with the basic information provided online. By offering a person or department that a visitor can call or talk to makes an individual with accessible needs comfortable. Not always are the needs of every accessibility covered, but having someone to contact makes handling

accessibility easier for both the visitor and the museum. Additionally, by having a person, or department that is accountable for accessibility means that museum can be forward-thinking in how to handle accessible needs for visitors. Despite half of the survey participants not offering a contact person or department for visitors who have accessibility needs, this data illustrates that there is an opportunity to create such departments. Again creating an accessibility department allows museums to better address the needs of their visitors, but also make those visitors feel comfortable and welcome in an institution.

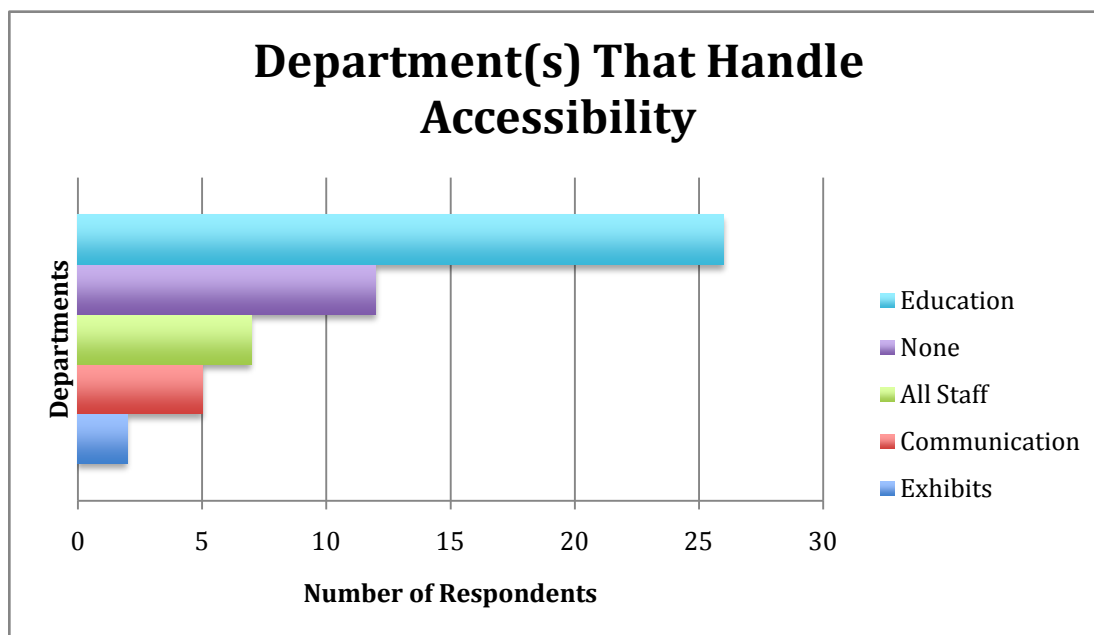


Figure 8: Data on collected on Museum professional's responses to what departments handle accessibility needs within a museum. (n=52)

The final set of data collected deals with which internal departments handle accessibility within museums. Out of the 52 respondents, 26 responded with Education, 12 said no department, 7 said all staff, 5 said Communications, and 2 said Exhibits. While this data is scattered, it shows that through the applicants who took the survey,

there is no uniform department that handles accessibility in a museum. However, one positive aspect of this data is that of the 52 respondents, 40 respondents said that their museum does have a dedicated staff/staff member who is responsible for working on accessibility projects. This data shows that while there is no dedicated staff for accessibility, departments like Education, Communications, and Exhibits are held responsible for making accessibility a part of a museum's mission. This data also shows that there is a great opportunity for museums to start to make accessibility an all-staff initiative.

Conclusions from the Museum Professionals Surveys

While not all institutions are accessible and not all institutions offer dioramas, accessibility is something all institutions can and should consider. Accessibility of dioramas though is something museums with dioramas should consider. Dioramas are an access point that museums with dioramas can utilize to engage visitors who have accessibility needs. For visitors who are visually impaired, dioramas also offer opportunities to engage all of their other senses to learn and complete their already acquired knowledge. And with changing technologies that are becoming readily affordable, these options are opportunities to open up dioramas, and museums, for all visitors.

However, accessibility is a field that not all museums currently are committed to or participate in despite relevant laws and regulations. An overwhelming majority of

responses from the data collected from the online survey show how little accessibility programs are offered by museums currently. What is even more somber is that many museums struggle to get participation from the highest level of staff. One participant stated that within their museum there was no higher-up staff that believed in accessibility.

Nobody, there is no institutional buy-in for accessibility since we aren't government-funded and therefore required to do it. As somebody who works with visitors, it is very disheartening to listen to our executive-level staff disparage people with disabilities and feel no shame saying that they don't belong here. - Botanical Garden, Illinois

Another example of how little accessibility is considered is that one participant stated that:

Unfortunately we have no department or person responsible for accessibility needs. – Natural History Museum, Maryland

These quotes are just examples, but it is easy to understand why accessibility can be a difficult barrier for institutions to overcome. This also means that accessibility is an area of opportunity for many institutions. With the ever-changing face of audiences for museums, by starting accessibility earlier rather than later, museums can engage with new audiences. Engaging with these new audiences means that it opens the door for museums to truly start engaging in best practices of accessibility. Accessibility should not be difficult to offer, but should become a part of a museum's everyday programming just like any other program.

For museums with dioramas though, dioramas are an opportunity to begin to achieve accessibility. Dioramas offer a treasure of opportunities because they provide a story that museum professionals can use to engage visitors who are visually impaired.

Simple things such as smells, sounds, time of day, science, or history are a part of dioramas. These connections to dioramas can be used to facilitate and create accessible programs in conjunction with what a museum currently has to offer. Despite data that suggests museums do not offer accessible programming on dioramas, it does not mean accessible programming on dioramas cannot be considered, especially for visitors who are visually impaired.

As Told By the Participants

The other most important set of data that was collected for this thesis was data from two different focus groups that participated in a touch tour based on dioramas. The data collected from the focus group was a recorded session of what these individuals said about their experiences in museums and their experience during their touch tour. This section will highlight quotes that iterate many of the themes that occurred in the online survey for museum professionals, but illustrate the museum experience of a visitor who is visually impaired.

The touch tour (see Appendix B) was developed specifically to highlight the dioramas that were chosen for the tour; the tour also had to be science-based because the dioramas are science based, so the theme of the tour was to be based on predators vs. prey and how animal adaptations benefit animals to either being a predator or prey. The three dioramas chosen were selected from the dioramas found in the North American Hall of Animals featured at a local natural history museum within the Pennsylvania state. Each diorama featured a predator vs. prey scene, or animals that could be considered a



Image 2 Diorama Skunk and Possum

predator and prey. Logistically, the tour was to last an hour so that visitors could participate in the focus group questions and explore the museum on their own.

The start of the tour included a verbal description of the floor where the focus group entered, then a brief history of the museum, as well as descriptions of the taxidermy process. The next part of the tour included an introduction to the tour's themes as well as a time for visitors to

put away coats and purses for their visit. The tour included verbal descriptions of the diorama that included the size of the diorama, the setting of the diorama, and the history of the diorama. The next part of the tour was verbal descriptions of the diorama as a scientific topic, which was predators vs. prey, and during this point, objects were handed to the focus group participants with the help of volunteers. Key scientific facts were brought up along with the



Image 1 Diorama Bobcat and Grouse

objects that were being handled. When talking about a bobcat's teeth the focus group would be handed the lower jaw of a bobcat. Throughout the tour, specific objects that related to scientific facts or knowledge about the diorama, or animal, would be handed to

the focus group. This was continued through out each of the three dioramas, so that the focus group could learn about the dioramas through touch.



Image3 Diorama Mountain Lion and Mule Deer

The three dioramas
chosen (see Appendix B)
were the Raccoon and
Opossum diorama, the
Bobcat and Grouse

diorama, and the Mountain Lion and Mule Deer diorama. All three of these dioramas depict a scene of predators vs. prey and were also created to replicate a scene of predators and prey in their natural habitat. Each diorama has a limited number of objects that were handled; each object was chosen so that it would represent adaptations that are beneficial to the survival of each animal. Additionally, a limited number of objects were chosen so that each member of the focus group was not overwhelmed by objects. The choice to keep the tour down to an hour as well as limit the number of objects was purposeful so that every participant of the focus group did not feel overwhelmed. The tour also built in time for



Image 4 Participant touching bobcat pelt

questions for the focus group participants, and places where other senses could be utilized for learning purposes. Such examples, while not written directly in the tour, include walking up and feeling the length and height of the diorama or placing objects, such as



Image 5 Participant handling deer antler

the antler's, to ones body to
better understand where an
antler would be on a deer.
All of which was created

into the tour so that the focus group participant could benefit the most from tour but also learn.

In general all of the participants enjoyed going on a touch tour based on dioramas that had a science theme. One participant stated that:

I love the amount of information and I love the feeling of describing of what was in the diorama and then being able to investigate what the structure of the animal may have been and its chief characteristic and the development of the diorama which is even more amazing then I used to think it was. So I am very delighted. – Participant One, self-described as low-vision

Participant Five stated about her experience:

I think the whole experience as a whole was so well done and fun and I'm not really sure if I have a specific diorama [that they like] because I think they are all interesting...I enjoy that there was a lots of touch available and a fair amount of science and it would have been okay to have more science. - Participant Five, self-identified as blind by birth

Participant Six also stated:

When you described it [the diorama] verbally it adds a lot more depth. - Participant six, self-identified social services aid for visitors who are visually impaired

These quotes exemplify what the purpose of a touch tour based on a natural history diorama is trying to serve. It shows that despite visual impairments, these participants of

the focus group were able to learn from and engage with dioramas in a way that even they did not expect. They were able to create new knowledge and explore a subject that has not always been offered to them.

Another participant was quoted as saying:

Context for instance,[for] a lot of people including myself, [are] coming not [with] a familiarity but a [sense of I have] heard of this or that and uh this would be the closest we ever get to them other than the zoo um so just giving it that that thematic content makes it richer as well as similarities like all the cats. – Participant Three, self-described as blind from birth

This quote shows how touch tours on dioramas can provide access to not just science subjects but other subjects and materials that visitors who are visually impaired have never had access to. Access is key in opening up a museum and making it accessible, and for visitors who are visually impaired providing access to science topics through dioramas is not



Image 6participant touching a deer skull

only key but can be offered to visitors successfully.

Participant Three of the focus group also brought up the importance of themes to dioramas in the quote above. While it was not considered, when designing the surveys, thematic content to the tours of the dioramas and accessibility help to engage visitors who are visually impaired. All of the other focus group participants agreed that the theme of

the tour and the potential for new themes is also a way to successfully create, engage, and sustain an accessible touch tour based on dioramas.

In terms of touch, being able to interact with objects was crucial to helping the focus group participants solidify their knowledge.

Um other than a few things like that I was really impressed with it I think has a lot of potential the uh you know feeling those different bones and the things and like those antlers and things were really cool um yeah there is just so much great stuff here. – Participant One, self-described as low-vision

Another participant stated that:

Being able to touch the skulls and the um pelts and everything um and to just get the information [was important] – Participant Five, self-identified as blind by birth

These quotes from the participants demonstrate that touch was key in helping further the focus group's knowledge. Concepts such as antlers, which could seem difficult to convey came across far more easily than they would have without touch or access to animal objects. During this portion of the tour (see Appendix B) the participants were handed deer antlers, described their scientific purposes, and then engaged with the antlers by placing the antlers on their head so as to better understand what an antler would be and where it was found. The objects, such as the antlers, also opened up the opportunity for engaging the focus group participants using their other senses. One stated that:

Holding the antler up which we did kinda by accident it was kinda something we did just for fun but holding that antler up I think was a really good exercise cause it showed the orientation which is another important thing to keep in mind is the orientation of items like as your giving them um and to do that to hold that antler up I thought was really a creative way to get the body involved – Participant Three, self-described as blind from birth

Participant Six stated:

I think there could be some more dimensions added like sounds of the animals. – Participant Six, self-identified social services aid for visitors who are visually impaired

Facilitating a program that utilizes touch with other senses further cemented the science concepts that were being taught through dioramas. Utilizing other senses was a crucial topic brought up by all of the other focus group members. Because each member has a different level of concept of science topics, utilizing the visitors other senses helped the focus group members recreate or learn new knowledge that was not known before. Using other senses also engaged the focus group to wholly experience a diorama in a new way that they appreciated. As mentioned above, Participant Three held a deer's antlers to his head. This not only engaged the visitor in using other senses but helped him to learn more about the deers found in the diorama.

Another topic that was covered with the focus group included the subjects of accessible technologies. On this topic, other than complete support for 3D printing, a majority of the focus group, while interested, were far less concerned with accessible technologies. None of the focus group participants gave significant quotes or had significant feelings that showed technology was make-or-break for a museum experience. However, it should be stated that the focus group members expect technology not to be accessible or non-existent, which could be a reason why the focus group participants were less interested in conversing about accessible technologies. However, 3D printing seemed like a new source of technology that could play a major role in accessibility. One participant was quoted as saying:

Yeah [use] 3D printing and perhaps a 3D printing of the animals like for example the mule deer and the puma so for us to be an example to see how

big they are relative to each other. – Participant five, self-identified as blind by birth

The technology of 3D printing should be an option all museums begin to consider as a way to become accessible; whether it is an addition to a touch tour, a collections experience, or for other educational purposes, 3D printing is a new and possible source for accessibility.

Museum contacts for programming and visitor services were topics that were also brought up by the focus group; again these topics were also questions posed to museum professionals. For the focus group having a contact is key, one participant stated that:

It depends on the resources available but flexibility is great... some have Internet access and are [technologically] savvy but being able to call is important because of flexibility. – Participant six, self-identified social services aid for visitors who are visually impaired

This quote illustrates that having a museum contact is key for museum visits, especially for drop-in visits like when a visitor is on vacation. Giving visitors the choice to access a museum whenever they want is essential too. The other connection to departments that handle accessibility was the discussion of how museums handle visitors who are visually impaired. Each member of the focus group greatly appreciated being treated equally, like all other visitors, during his or her visit. However, one focus group member was very appreciative of the fact that all the staff from security to higher-ups were kind and willing to go out of their way to help them.

The other thing I might add... how friendly the staff were when I came in and just they made sure and wanted to find out if there was anything or literature or anything in Braille for me. They took it upon themselves... and this was like the security lady I think this says a lot about the museum having such a friendly staff. – Participant Five, self-identified as blind by birth

This quote shows the importance of accessibility being an all-staff initiative. When visitors, especially those who have accessibility needs, are made to feel welcome they will want to return. Not only will those visitors want to return, they will tell other visitors, visually impaired or not, and it will create a positive image for that museum.

Accessibility, while it can be difficult, should start simply with treating all visitors equally, which for the focus group members, is key. Most people struggle with knowing how to treat a person with accessibility need, but the focus group showed that they too are people who want to be treated the same as all visitors.

The other major topic dealt with science programming that was accessible. Because the dioramas were science topics made accessible, it gave the focus group participants a chance to access science in way that has not always been provided to them.

One focus group member stated:

Things that are less available normally and that where a museum is something you would find out more information then you could normally find out about it...like for example something like astronomy because it is something that is not easy to envision. – Participant Five, self-identified as blind by birth

The same focus group member stated too:

I think that no matter what the subject matter is it would be interesting...and I think that in general all the science and natural history, technology, archeology, all of that stuff is interesting – Participant Five, self-identified as blind by birth

These quotes illustrate that even with limited access if the focus group members were able to achieve access to science, they would and want to. Science topics, even when taught through dioramas, were of interest to the focus group; the focus group also said that if they could learn about other science topics or visit other science-based museums

they would. However science topics and science-based museums are not something the focus group would consider immediately because they are not subjects they think to learn first through a museum visit. If museums that offer science-based topics start to take this opportunity to engage in accessibility for visitors who are visually impaired, the museum would benefit from new visitors and the opportunity to be engaging for all audiences. The focus group proves that while difficult, they want to learn about science topics like all other visitors and enjoy learning through touch and other accessible options.

Conclusions from the Focus Group

Overall the data collected from the touch tour again reiterates the idea that museums have the opportunity to create and engage in accessibility. The focus group participants were incredibly open, excited, and willing to help. While some of the quotes from the focus group convey the positive potential for touch tours based on dioramas and science topics, it is hard to truly illustrate the kindness and excitement the participants showed the researcher. The focus group illustrates that if museums can start to participate in partnerships and outreach, museums can open up the museum and become accessible. Many of the focus group's participants said they would offer their help and services to create programs for museums for free if they just received free admission to the museum! It may seem too simple a solution but simple solutions are sometimes key when trying to solve larger problems.

Dioramas, as well, should be noted as a source of opportunity for accessible programming. When asked of the focus group if they wanted to experience a touch tour on dioramas, there was a unanimous yes; no individual from either focus group was opposed to a touch tour on dioramas. In fact all of the participants wanted more to do with dioramas; different themes, seasons, animals, these were included as topics to consider when doing a touch tour on dioramas. The participants loved dioramas because it was a source of access for them as visitors and a source of access to science that is not always provided to these visitors. Accessibility is possible for all topics, even science, and dioramas should be considered when trying to make science museums accessible if a

museum has them. In general though, accessibility when done with effective partnerships and collaborations can be achieved for any museum; accessibility can be done through dioramas and touch tours for visitors who are visually impaired through partnerships. Museums offer a multitude of resources for creating new and engaging accessibility programming for all visitors and they should take those risks so that all visitors can engage with museums.

Chapter V. Conclusions and Applicability for the Museum Field

Conclusions

Overall, the data collected from both the museum professionals and the focus group helped to create an understanding of what can be created and applied to the field of accessibility in museums. Overwhelmingly, the data from the museum professionals were stark and did not prove that accessibility is something all museums think about. However, the enthusiasm, support, and willingness of the focus group to help museums is key in looking at how museums can take this thesis and apply the conclusions to the field and their institution. Accessibility, while it may seem difficult, is possible when every individual, such as the museum staff and the museum visitor, are involved. By looking at simple applications, museums can make accessibility for all visitors, not just those who are visually impaired, a part of their mission. Accessibility is a big part of providing best practices in the field and should and can be done when all are involved.

Applications for the Field

While the field of museum accessibility is constantly growing and changing it is important to consider how museums can facilitate accessibility programming for all visitors. This section will provide best practices for museum and museum professionals to use when creating accessibility programming for visitors who are visually impaired; museums can and should consider using these conclusions to create other accessible programming as well. Each application to the field was developed from the data collected through each measurement, the research of literature available on accessibility

in museums, and talking to the individuals who participated in the focus group. Though it is worth mentioning that all of these applications can be used for ALL types of museums and will work for all visitors. When accessibility is successful all visitors, with or without accessible needs, benefit from accessibility. Accessibility makes all parts of a museum and it's exhibitions engaging and exciting for all visitors. Additionally, even if museums are not actively offering access to dioramas or exhibitions for visitors who are visually impaired, they should be actively starting conversations about accessibility with visitors who have accessible needs, by starting this conversation it starts a movement to provide access of a museum, no matter what the subject matter, whether it is science or history.

1. Museums can use dioramas as a point of access for visitors who are visually impaired.

Through the data collected from the focus group, it was clear that the dioramas were a success in creating an accessible program. If an institution has dioramas, it should consider using those dioramas as a way to create accessible programming. Dioramas offer the opportunity to utilize similar educational objects to teach with, but to also utilize other senses for educational purposes for visitors who are visually impaired. Dioramas can be a simple but effective way to get communities into the door, but also to prove the worth of institutional commitment in accessibility as well. Dioramas provide a story that visitors who are visually impaired can access and learn through. Dioramas can also be the first step for an institution to take when considering accessibility. While dioramas seem like they would be something that is inaccessible, it is in fact the opposite because of the wealth of knowledge and content they provide to visitors.

2. When developing accessible programming, consider using all the senses.

For visitors who are visually impaired, being able to utilize all of their senses and muscle memory on a touch tour was important to help facilitate the knowledge they learned. The data collected from the focus groups also show that using other senses helped these individuals better experience their tour. During the focus group's touch tour they were able to hear sounds of animals that were collected in the field, which were captured to help study and recreate the dioramas. The animal sounds were an experience that was heavily talked about by the focus group, and also led to suggestions of smell. Utilizing the senses to help visitors who are visually impaired learn helps them to cement and better recall knowledge because it creates a larger understanding of the subject being taught through touch.

Some of the things to consider though when utilizing all of a visitor's senses with touch include: smells of animals and their bones, sounds of animals in the wild, and muscle movements of animals such as putting antlers to the head of a visitor or posing like an animal in a diorama. During the touch tour (see Appendix B) many of the objects chosen were objects that cannot necessarily be found or used on a daily basis. These objects were also chosen because they could elicit the focus group members to use other senses. Objects such as furs and pelts were chosen not only because of their authenticity but they also provided visitors with a pleasing tactile experience. Objects that were made of real animal remains, such as skulls, hoofs, and antlers were also chosen because they provide a different tactile experience than reproductions. Real objects provided different temperatures, they are not smooth, and smell differently than reproductions. However,

often during the touch tour, many of the focus group members had wished they had started with a model rather than the objects, even if not to actual size because it would have helped orient the visitor to what they were about to touch. Often times visitors on a touch tour will not all have the same level of vision or knowledge of what they are learning; orientation will be key in guiding all of the visitors to be properly oriented about objects and dioramas. During the touch tour, confusion based on an object came out of not being properly oriented to an object. Objects such as antlers and skulls needed orientation, or a physical movement, to help visitors comprehend how to handle the object and learn from them. Additionally, many times sound and smell were suggested to be played, or used, before handling the objects so that the visitor on a touch tour could have a fuller perception of the animal they were about to encounter. During the tour (see Appendix B) when sounds of animals were mentioned, without a comparison it was hard to imagine how that animal sounded. By placing sounds and smells of an animal, and orientation objects before the handling of an object such as a skull it would help guided the visitor to fully learning from an object. Without orientation or basic understanding of a concept it is hard for any visitor, even those with visual impairments, to learn from an object.

It is worth mentioning though that no reproductions or replicas were used during the touch tour, but it is possible that these types of objects could elicit a different experience for visitors who are visually impaired. It is best to test how visitors react to these types of objects before utilizing them for a touch tour because it could change the experience of touch.

3. Consider affordable options for creating engaging accessibility programming.

While accessibility programming can seem expensive, especially for a touch tour, have your institution consider all possible materials. Look at what your institution already uses for outreach or other educational programming. Sometimes the simplest objects can help relay a topic or idea through touch such as gift shop replicas, plush toys, or other related objects. Additionally, consider who your audience will be and what their visual impairment may be; if your tour group has been impaired from birth or just recently, each audience's will have different concepts of what your topic may be, such as a diorama. Utilizing simple objects to help visualize new or old concepts helps to build upon the knowledge visitors who are visually impaired have. However, your museum should try to utilize objects that have at least some form of authenticity. Authentic items not only enhance the visitors' tactile experience but also make the visitor feel powerful because they have been trusted enough to handle primary objects that not every visitor can interact with. Objects that can be related to comparable everyday objects or experiences are also key. During the focus group, the objects that stood out the most for the visitors were objects to which they could relate such as domestic cats when learning about larger cats. The reason objects that were relatable to the focus group worked so well is that it taught difficult concepts in a way that everyone could understand and learn from.

4. Museums should facilitate partnerships with local community organizations for visitors who are visually impaired.

Museums can bring in local communities of people who are visually impaired if they make an effort to connect and form partnerships with these groups. Through this research

and the collected data of the focus group, all individuals involved were excited to participate and help the local institution where the researcher was working and facilitating accessibility programming. The individuals of the focus group also were excited to try to further the program so that other members of their community could become involved because few institutions in the area offer or reach out to them. Making a purposeful connection not only invites local community groups to come in to your museum, but it also leaves the museum with a positive reputation for being open to all visitors. These local communities can also help museums hold focus groups so that museums can improve on what they currently offer for their visually impaired communities. Focus groups with these local communities are the best way to see what these visitors want and experience during a museum visit.

5. Accessibility training should be held institution-wide for all employees. Every employee is important in helping making a museum accessible.

Accessibility is an all-staff initiative plan, when all employees are involved with accessibility it is easier to facilitate accessibility from the beginning to the end of a museum visit. The data collected with the focus group showed that these visitors want to be helped and want to be treated like all other visitors. Because the staff at the local institution who were there for the touch tour were so helpful, the members were enthusiastic and affected by significantly their experience. During the focus group the efforts from security guards to retail associates to higher-level employees was an important talking point for each individual. The members not only appreciated the efforts but also suggested that because of the efforts they were more likely to come back to the

museum. The online survey also showed that there was a real confusion about which department or staff person should handle accessibility. While there should be a point-person or a department to handle accessibility, all staff should be involved with accessibility because all visitors enjoy having a good experience. Tasking everyone in the museum to be responsible for accessibility makes a precedent that accessibility is important to the institution, its visitors, and mission.

6. Museums should hire consultants to help with accessibility programming and training.

Accessibility can seem like a herculean task, especially given that the ADA laws can be difficult to understand or accomplish. However, there are consultants who can help facilitate even just the simplest efforts for a museum. By contacting a consultant, your museum will be better equipped to provide access to all visitors, but your museum will also have a point-person who can help train your staff. ADA laws, while difficult, can be addressed through simple changes that a consultant can help facilitate. A consultant can also help your museum gauge what are the most important and affordable steps your institution can take to become accessible. Through the data collected in the online survey, there are very few museums that offer accessibility programming or efforts, but the few institutions that do have done so through consultants. Consultants are a way for a museum to start an effort to sustainable accessibility.

7. Treat EVERY visitor equally when they walk through the front door of your museum.

Treating every visitor equally may seem like a simple idea but this does not always happen, especially for visitors who are visually impaired or have other accessible needs. But all people, especially those who are visually impaired, just want to be treated like a normal visitor. By having staff treat each visitor like they would typically treat any visitor is key to providing good customer service. Good customer service, especially for visitors who have accessible needs is of the utmost important because visitors who are visually impaired are people; all people want to be treated equally and have the same opportunities to experience and enjoy a museum. The data from the focus group helped to convey this application because of their lived experiences. All people who are humans want to enjoy what is being offered to them and others.

Chapter VI. Implications for Further Research

While the researcher did her best to accomplish all the tasks for this thesis, time and budget were considerations as to what could be accomplished for this report. While working on this thesis, the researcher did consider some of the things that could be further researched that could be of benefit to this and other theses and the museum field.

One of the first subjects that could be further studied is the role and use of technology for visitors who are visually impaired or have accessible needs. While technology was originally a significant part of this thesis, there was not enough time to tackle the technological ideas. Some things to consider when looking at technology include websites, accessibility laws for technology, what is currently being used by other museums, and how successful or wanted these technologies are by the visually impaired community. Technology is one of the ways accessibility is changing; it is critical that the field of museums understands how technology can help and hurt the field when creating and using technology for accessibility.

Another application that could be studied or created for further research are guidelines for other forms of accessibility programming for the visually impaired that are not art-based. . By looking at art-based touch tour guidelines, other museum's examples of touch tours, and other related materials one could create guidelines that history, anthropology, science, and other types of museums can use. Creating a universal guideline makes the field of accessibility more available to all institutions.

Another option is 3D printing that can be researched as an additional alternative to objects; 3D printing was something that the focus group talked about frequently

because of what it can potentially provide to a touch tour. Looking at how 3D printing can affect a touch tour and accessibility is key to understanding the future of accessibility. Looking at ways in which museums can create partnerships and effectively utilize 3D printing within the museum and touch tours, can provide an understanding of how effective other objects could be to the application of touch tours. It is also important though to further research and study how the materials of 3D printing will affect touch in a touch tour because of the lack of authenticity 3D printed items will create. However, 3D printing could potentially be a big step to accessibility and touch tours in the field of museums.

The final implication that could be researched or studied in this thesis would be partnerships for museums that are looking to create accessibility programming. During the process of this thesis and through the online measurement it was clear partnerships were key to creating accessibility programming. Throughout both the online survey with professionals and the focus group with visitors who are visually impaired, partnerships came up as a source of opportunity. Both participants were willing and open to working with each other; so looking at effective partnerships in case studies and looking at what institutions are currently using partnerships could be key to better creating and developing better accessible programs. Even if the programs are for niche groups such as visually impaired visitors, these partnerships that are created can be a source of learning and opportunity for all museums professionals to learn and grow from. Partnership also provide an opportunity to grow a museum's visitation, so looking at how partnerships affect a museum's visitor numbers will also prove to be necessary when studying

partnerships. Partnerships, just like 3D printing though, provide a start to opening up and making museums accessible.

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Appendix A. Online Survey for Museum Professionals

Research Instruments: Online Survey

Introduction: Hello and thank you for participating in my online survey. My name is Megan Brown and I am currently a graduate student in Museum Studies at University of the Arts. I am collecting data for my graduate thesis on accessibility in science museums. When taking this survey, please be as detailed as possible. Again, thank you for taking the time to take my survey. Your feedback is important.

1. By choosing yes, you are consenting to participate in this survey.
 - a. Yes
 - b. No
2. What type of museum is your institution? Choose one below:
 - a. Natural History Museum
 - b. Science Museum
 - c. Zoo
 - d. Art Museum
 - e. History Museum
 - f. General Museum
 - g. Other

- If museum is non-science and does not offer dioramas, end survey and offer a thank you here. -
3. Does your museum offer any programming for visitors who are low vision/blind?
 - a. No
 - b. Yes – Please list.
4. Does your museum offer any outreach programs for visitors who are low vision/blind?
 - a. No
 - b. Yes – Please list.
5. Does your museum offer any accessible technology for visitors who are low vision/blind?
 - a. No
 - b. Yes – Please list.
6. Does your museum have any dioramas on view?
 - a. Yes – of Natural History
 - b. Yes – of Archeology/ Anthropology
 - c. No
 - d. Yes – Other (Please specify.)
7. Does your museum offer any accessibility programs based on dioramas?

- a. No
 - b. Yes – Please list and describe briefly.
- 8. Does your museum offer touch tours based on dioramas for visitors who are low vision/blind?
 - a. No
 - b. Yes – Please describe.
- 9. Does your museum have any attendance statistics on your visitors who are low vision/blind?
 - a. No
 - b. Yes (Please summarize)
- 10. Have you conducted any evaluation or research on visitors who are low vision/blind?
 - a. Yes
 - b. No
 - c. Other (Please specify)
- 11. Does your museum provide a personal contact to schedule programming for visitors who are low vision/blind?
 - a. Yes
 - b. No
- 12. If there is anything else that you offer for visitors who are low vision/blind? Please explain below.
- 13. What department(s) deals with your museum's accessibility needs? Provide below.
- 14. May I contact your accessibility coordinator for more information to conduct a case study?
 - a. No
 - b. Yes (Please give their name and contact information.)

Demographics:

What size institutions are you based on your annual budget? Please choose from below.

- \$0 - \$50,000
- \$50,001 – \$250,00
- \$250, 001 to \$500, 000
- \$500,000 to \$1,000,000
- \$1,000,001 to \$10,000,000
- \$10,000,001 or over

In what city and state is your museum located? Please provide below.

Where is your museum located within the state?

- Urban
- Suburban
- Rural
- Other

Thank you so much for taking the time to take my survey. I greatly appreciate your response! If you would like to receive a summary of the results or send out the survey to others, please leave your email below.

AppendixB. Touch Tour

Introduction/Welcome/Thanks for coming

- a. Hello all and welcome to my touch tour and focus group for my thesis on accessibility. My name is Megan and I will be the one guiding today's tour.
- b. Description of main hall: The main hall we are entering on is the first floor and the Academy's accessible entrance, on 19th and Cherry St. On this floor is the museum's live animal center, where all the live animals are cared for, the ecology café, and the large lunchrooms for field trips. As well, on this floor is the Butterfly Elevator, which we will take and named as such because it leads up to the second floors butterflies exhibition, which features live butterflies. As we go into the elevator it will take us up to the second floor which features the butterflies exhibit, the changing exhibit spaces, and North American hall which features all dioramas of animals found in North America.
- c. Brief history of the Academy of Natural Sciences.
 - i. The Academy of Natural Sciences of Philadelphia was founded in 1812 "for the encouragement and cultivation of the sciences, and the advancement of useful learning."
 - ii. The Academy opened its doors to the public in 1828 on 302 Market St. During this period up until the 1870s the Academy's collection grew incredibly fast, so fast they needed more space thus the museum moved.
 - iii. In 1876, its present home was built at 19th Street and the Benjamin Franklin Parkway.
 - iv. During the 1920s and 1930s is when the academy collected and created most of their dioramas that are on display today.
 - v. Currently there are over 17 million specimens in the museum's collection
- d. Description of taxidermy
 - i. Taxidermy is the art of preparing, stuffing, and mounting the skins of animals for display or for other sources of study.
 - ii. The process of taxidermy includes:
 - 1. Taking exact measurements of the specimens (or animals).
 - 2. Bones, hide, and all other parts are removed from the animal. Any parts that can decay are thrown away during this process. Only objects that can be preserved are kept.
 - 3. The next step includes sculpting the animal out of clay from the measurements.
 - 4. Plaster is then put over the mold and is then removed once the mold has dried. The cast is then removed and paper maché.
 - 5. Once everything is dried the hide is fitted over the body of the animal – if everything is done right there should be no weird spots on the hide or animal. Everything should fit perfectly.
 - 6. Finally horns and hoofs are screwed into place. Fur is sewed down and paint and other last final touches are applied to the

animals before they are permanently placed down in their diorama.

- e. The theme of this tour is Predators and Prey, and during which this tour will talk about adaptations (a change by which an organism or species becomes better suited to its environment) that help predators, an animal that naturally preys on others, and prey, an animal that is hunted and killed by another for food, survive in their many habitats and the ever-changing seasons. And in relation to that, this is similar to humans in that as we can change and adapt to our surroundings such as seasonal changes for winter or summer.

Theme: Predators and Prey

Big Idea: Visitors will understand the difference between predators and preys in a variety of environments/habitats found in North America.

Audience: Low-vision and blind visitors

Sub-theme: There are adaptations that help North American animals survive in their habitats and help animals survive as predators/prey type animals.

Goals:

- Have visitors learn that there are multiple components to the animals, habitats, and their adaptations that help animals to be a predator or a prey. Have visitors learn the difference between predator and prey.

Objectives:

- Visitors will learn about and be able to explain about animal adaptations.
- Visitors will get to learn tactilely about adaptations through hands on experiences with adaptations.

Tour:

2. Diorama 1: Possum/Raccoons

- a. Description: The diorama we are first stopping at is the possum/skunk and raccoon. This diorama is 8 feet wide by 13 feet tall and 42 inches deep. Created in **1955, by taxidermist Louis Jonas**. This diorama features two families, one of which are raccoons and the other being Possums. This diorama displays a scene of a spring season. This season is indicated because of the diorama's foliage and the abundance of **baby possums, which are most often born during the spring season**. This diorama is chosen because it features two unique animals that could be considered predators and preys now that they are able to live in wood and urban environments.
Opossum:

- i. The opossum is from Pennsylvania and lives in woodlands and open countries but more recently have been found to live in cities. Opossum eats insects/earthworms/snails/amphibians, but are adaptable to their environment. The opossum has 50 teeth, which is more than any other North American mammal. The opossum is a marsupial, and plays dead for protection, which is one of their unique adaptation's to help against predators. As well opossum's have opposable thumbs on their hind feet, which allow opossums to grasp objects with relative ease. All of these adaptations allow opossums to live in a wooded, or in our case urban environments because they are good at adapting to their environment. Known predators to opossum's include: Humans, Cars, foxes, bobcats, hawks, and great horned owls. (Relate to objects.)

Raccoon (Skunks – talk about them in the diorama briefly)

- ii. The next animal in this diorama is the raccoon. Raccoons can be found all across the United States and can live in woodlands, open countries, and just like opossums found in urban settings too. Raccoons have a broad diet which allows them adapt to different living environments. Raccoons also can collapse their spines, which help them to fit into many tight and small spaces. As well, very similar to the opossum's opposable thumbs on their feet, raccoons have almost near opposable thumbs, which help them with grabbing objects, though in cities these mammals still struggle with opening up items like trash can lids. Again, these adaptations, opposable thumbs, adaptable diet, and collapsible spine help to let raccoons adapt to their environments and survive against prey. Known predators to raccoon's include: Humans, Cars, and large raptorial birds. (Relate to objects.)
- i. Objects: Raccoon/Possum fur, spine or skeleton of raccoon/possum,

3. Diorama 2: Bobcat/Ruffed Goose

- a. Description: The next diorama we will be talking about in detail is the Bobcat diorama. This diorama is 8 feet wide, 42 inches deeps, and 10 feet high. Created in 1964, by taxidermist Louis Jonas. This diorama features a predator, unlike our last diorama, and showcases a Bobcat in post attacking mode carrying its prey in it's mouth so that it can eat the ruffed goose later. This diorama displays a winter season because of the amount of snow, ice, and frozen pond that is replicated in the diorama. As well, the bobcat in the diorama would have a thicker set of **fur to show that it was in winter, which is a type of adaptation that helps the bobcat survive winters in the north.**
 - i. Bobcat: The bobcat is from Pennsylvania in the mountains. Bobcats eat rabbits/rodents/birds/occasionally deer. Bobcats are good at hunting. Bobcats are excellent climbers because they have long legs. Bobcats have razor sharp claws that can be retracted when not in use, like our domesticated house cat, which helps to protect the claws from dulling but also helps the bobcat to catch its prey. Bobcats also have

sharp pointed teeth, which are able to tear meat into small pieces so that it is able to consume its prey. Additionally, bobcats are generally quiet animals, with a few vocalizations like grunts and roars, but when they do scream it sounds like a woman screaming. While we just talked about preys, and a unique predator, the bobcat is specifically a predator. It's adaptations, sharp teeth, retractable claws, long legs, and ability to main a level of relative quietness helps to make these mammals a great predator so that it can catch it's prey relatively easy. Some of the animals bobcats and known predators to bobcats include: foxes, humans, mountain lions, and coyotes. (Relate to objects.)

- ii. **Objects:** Bird feathers, puma skull, puma teeth, bird beak

4. Diorama 3: Mountain Lion/Mull Deer

- i. **Description:** The final diorama we are going to be stopping at in North American Hall is the Mountain Lion/ Mull Deer diorama. This diorama is 13 feet wide, 15 feet deep, and 7 feet tall. It was created in **1932**, and Harold Green the curator of museum exhibits at the time carried out the construction of the diorama. This diorama features a fall scene of a predator about to attack its prey. The predator being the Mountain Lion and the prey being the Mull Deer. Some indicators that show that the season is fall includes the foliage on the ground, the lack of leaves on the trees in the diorama, and the fallen velvet on the ground near the mule deer in the diorama. During the Fall season mule deer's antlers, or velvet, fall off so that the deer can re-grow their antlers in the spring (This also tells the age of a deer.) In this diorama the predator is the Puma, and the prey is deer. There are a few indications of why each animal can be categorized as predator and prey. The indicator for the puma includes its pose, four feet on the ground, alert position, and attentively listening to the deer. (Ask the group to try to pose and imagine how they would stand if they were a predator about to attack their prey.) As for the deer, all of the deer are standing close together for protection, their ears are alert, and they are...
- ii. Some facts about Pumas and their adaptations include: Pumas live in Mountains/Coniferous Forests/Lowland Tropical Forests/Swamps/Greenlands. Pumas eat large animals such as deer every one to four weeks. On occasion pumas will eat small mammals like raccoons. Pumas can lunge 18 feet up into a tree. Pumas have excellent vision that allows them to hunt in complete darkness and help them to discern details in little to no light. Mountain lions have excellent hearing that can detect high frequency sounds that alert them to hidden prey. However, mountain lions have a weak sense of smell as a result of heightened hearing and eyesight. Mountains lions also have strong hind legs that allow them to maintain a good sense of balance and jump well. Finally, mountain lions have incredibly strong

jaws, which allow them to instantly break the neck of deers when they attack when they clamp down on the neck of its prey. All of which help this predator to survive and be a successful prey because it can hunt and attack with relative ease. (Relate back to objects.)

- iii. Mule Deer: Mule deer are found in... Mule deer have large ears that can move independently and in different directions to help them hear. Mule deer are fast, so fast they can reach up to speeds of 45 mph. Mule deer grow antlers every year, and on each antler are points, the points are the extension of the antlers. The points show the age and maturity of a deer, as the deer ages it grows more points, but once the deer is past it's peak age the antlers lose points in age. Mule deers have excellent vision, which allows them to see where a predator is coming from. Their eyes are placed on the sides of their heads so they can see in every direction except behind them. Mule deer in particular are good at jumping/leaping and can leap up to eight yards. As well, Mule deer can freeze if they hear or see a predator near by which can help decrease their chances of being attacked by a predator.
- iv. **Objects:** Deer antlers, deer skin, puma skin, large cat skull(?), raised line images

Pre-conclusion/Summary: In conclusion, North America is a vast territory with a large variety of animals. In each habitat of North America there are many animals that help play a large role to the habitat and other animals survival in their environment. Additionally, all animals have adaptations that help them to survive and play a role in their habitats.

Questions/Discussion/Thanks for following the tour

Appendix C. Focus Group Research Instrument

1. Ask focus group to give introductions - how do you self identify your visual impairment?
2. Did you enjoy today's touch tour?
3. What were some pros/cons of the touch tour?
4. Is there anything you would change about the touch tour?
5. Did you have a favorite stop/object/etc during the tour and why?
6. Did you enjoy going on a touch tour at a natural history museum and would you do it again?
7. Would you like/be interested to go on a touch tour at any other science-based museums?
8. As a visitor did you enjoy having a tour based on dioramas at the museum or would you prefer an alternative subject matter instead of dioramas?
9. When visiting a museum would you prefer to have a person or department within the museum you could contact to schedule a visit or access to objects?
10. Or would you rather be able to go online and access a museum's information before visiting instead?
11. Do you prefer a dedicated day for programming or would you prefer to be able to walk up, same day, and access a touch tour or accessibility program at that time?
12. If you had access to accessible technology for your museum visits would you use and what would you suggest as tools to use for accessible technology?

13. If you are opposed to technology would you rather instead, when you came to visit a museum, be able to get small box of objects and self guided tour to a do touch tour yourself?
14. If you could participate in other accessibility related programming at a science-based museum would you?
15. What sort of other science topics would you be interested in learning about?

Appendix D. Guidelines For Other Museums

A Guide To Providing Touch Tours For Museum Visitors Who Are Blind or Have Low Vision

Touch Tours

Museum educators, exhibit designers, and all other staff members can work together with an expert in accessible programming to identify art artifacts and objects that can be safely touched and handled in a natural history museum, or other types of museums.

Touch Tours can be created in the main galleries or an alternative space such as a classroom or special gallery in the museum. Trained educators and docents should lead the tours.

Preparing for a tour:

- Identify key objects, artifacts to be included in the tour.
- Create Focus Groups with members of the community and museum staff.
- Use tactile diagrams of objects/artifacts on the tour to help create or expand on knowledge.
- Use props, facsimiles, replicas and models that have authenticity and are to scale to help facilitate a tour.
- Use works that are either thematic, tell a story or are representative of the collection. Dioramas are a good example of what to use to create an accessible program.
- Use objects that work or offer a variety of experiences in scale, mediums, texture, manipulation, sound and even smell.

- Consider using objects the museum already uses for other programming to help facilitate accessible programming.
- Offer original artifacts/objects on the tour.
- Offer sound, smell and drama related experiences wherever possible to provide a deeper engagement of all the senses.
- Provide Braille and large print guides for visitors (18 font sans serif) to visitors when necessary.
- Send information materials ahead of the visit to the program participants.
- Create professional partnerships to help create successful accessibility programs.
- Treat every visitor equally and make sure that their experience is an experience to remember and share with others.