

BEYOND COMPLIANCE:
EXPLORING EMERGING TECHNOLOGIES TO ENRICH THE VISUAL ARTS EXPERIENCE FOR
AUDIENCES OF ALL ABILITIES

Shirley Barkai

Major Paper submitted to the faculty of Goucher College in partial
fulfillment of the requirements for the degree of
Master of Arts in Arts Administration

2017

ABSTRACT

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FOR AUDIENCES OF ALL ABILITIES

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Degree and Year: Master of Arts in Arts Administration, 2017

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Goucher College

The Americans with Disabilities Act of 1990 (ADA) mandates enforceable guidelines to modify the built environment to make it accessible for individuals with disabilities. While critically important, the ADA does little to drive social and physical inclusion of individuals with disabilities. This is particularly recognizable in museums and similar public venues displaying visual art. The detailed, intimate, and often meticulously documented experience offered to patrons without physical or sensory limitations cannot possibly be the same for those with disabilities.

This paper contains descriptions of the principles of Universal Design (UD) and several emerging technologies, such as virtual reality (VR), augmented reality (AR), and

3D printing, and explores how these tools can be used by nonprofit visual arts organizations to provide broader, richer, and more inclusive experiences for audiences with a range of functional abilities.

The argument presented in this document maintains that the role of visual arts organizations is not to merely comply with regulations and provide the physical accessories and necessary mechanics to improve access to visual art experiences. They also serve to enable individuals to fully experience the art form through creating and presenting inclusive environments. By applying UD principles and leveraging emerging technologies, visual arts organizations should take an active and proactive role in promoting inclusion and thus contribute to a greater social understanding and improved perception of accessibility.

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FOREWORD

After beginning a career in the visual arts field, an unexpected and debilitating health condition disrupted my life as I knew it. With the sudden change to my sense of independence and community—not to mention my literal access to public places and employment—I became acutely aware of and intimately versed in issues related to disability and accessibility.

Coincidentally and perhaps serendipitously, the date of onset for these significant changes in ability shares an anniversary with the Americans with Disabilities Act. Though ramps, designated parking spaces, and similar accommodations were vital to my reentry into community life, I soon realized that the protections delivered by the Americans with Disabilities Act did not guarantee the same level of access to cultural experiences that I once had and took for granted. Eager to engage in visual arts experiences, the opportunities to participate no longer felt designed for me and my particular range of functional abilities. Inclusive thinking and design appeared to be the exception, not the norm. My observations and reflections on the meaning of inclusion pushed me to see the world from new perspectives and appreciate that my story is far from uncommon. This paper is inspired by these experiences.

This paper is dedicated to Team Barkai for always cheering “stronger than yesterday” and to John for standing by me—literally and figuratively—despite my preoccupation with the ableist undertones of your affectionate and motivational aphorisms.

ACKNOWLEDGEMENTS

My deepest thanks are reserved for Maryo Ewell, my dedicated advisor. Your thoughtful guidance, relentless curiosity, and infectious optimism have undoubtedly shaped this experience for the better. Thank you for regularly checking in on my sanity and for teaching me the value of “illuminating” an argument. To my meticulous committee of readers, Kim Dimond and Greg Lucas, thank you for your thoroughness. My father deserves honorary recognition as a reader for far exceeding his obligatory dad duties as sounding board. Thank you for steering me from the start and helping me through the very end.

Maryo, you imparted the sound advice to hang with people I love and find ways to laugh. Luckily I had the MAAOvericks for that. We are a motley crew and I am infinitely grateful that we did this together. I am humbled to call you peers and friends and look forward to all the ways you will inspire me in your personal and professional lives.

Thank you to the remarkable faculty of Goucher College’s Master of Arts Administration program for your support and commitment to cultivating my abilities as an arts leader and learner. You made me feel welcome in this community and created countless opportunities for me to grow, equipping me with the tools to tackle any challenge.

Another thank you to my family, friends, and colleagues for your encouragement and patience through this academic endeavor. You gave me the confidence to explore a subject very meaningful to me and the courage to give my voice to the research.

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Introduction

Visual art has the power to inspire the imagination, create spectacle, communicate a point of view, and reflect the human condition. The organizations that present visual art, specifically museums and galleries, captivate and educate the public, providing experiences for individuals to explore and expand their understanding of the world. For many nonprofit visual arts organizations, making culture and cultural experiences available and accessible to their communities and to broad audiences is fundamental to their core mission. Opportunities to engage and inform visitors grow each year as technological innovations gain traction and user adoption. Emerging technologies such as virtual and augmented reality can be powerful tools that bring audiences closer to the visual arts than ever before.

No matter the method, visual arts organizations achieve their basic responsibility concerning public access to art by providing engagement opportunities in the best way possible. If an arts organization only sees its role as a passive intermediary between the audience and the art, it is failing to live up to its promise and fulfill its potential. Instead, the visual arts community must demonstrate commitment to the public trust and champion engagement opportunities for every visitor—participatory, interactive, and enjoyable experiences. Encountering art in a comfortable environment makes the experience approachable and digestible, putting

audiences at ease and welcoming them to be wholly captivated by and connected to the work.

In reality, traditional participation in an institutional visual arts experience is built on many parameters and assumptions about the attendee. A visitor to a museum exhibition, for example, is expected to navigate various physical activities. She must be able to enter the facility and ambulate throughout its often-sprawling space. Artwork is generally displayed with the expectation that she is standing and positioned at a standard distance from the piece, as dictated—and often limited—by a wall or other mounted boundary designed to protect the work. Her museum visit is shaped by requisite conditions in order for her to fully experience visual arts programming. This generalization of the visual arts experience, though overly simplified, illustrates the degree to which physical presence and the physicality of arts attendance is attached to engagement with the art form.

With any limits to the movement through and perception of the physical norms associated with a traditional visual arts experience, an individual with disabilities faces barriers to her participation. “A museum can sparkle, kindle excitement, and be an uplifting experience, or it can be tawdry and depressing in spite of the glory of its collections. A museum environment is not neutral; its quality and atmosphere directly affect those who visit it” (“Museum Experience”). Whether positive or negative, the visual arts encounter is made up of both tangible and intangible elements. Though museums may strive to be inviting places by providing physical access, they can exclude and alienate audiences through subtle and

unintended cues. John Falk and Lynn Dierking's studies of museum visitor attitudes find that "all tangible reality contributes to [the physical context] of the experience. From easy access to clean toilets; from exciting exhibitions to freshly brewed coffee in the museum's café; from a well-stocked museum shop to clear signposting" ("Museum Experience"). Facing overlooked physical strictures, individuals with sensory or physical disabilities confront imposing challenges to encountering visual art in a public setting.

Technology exists that addresses the physical assumptions of the public visual arts environment and has long served as a tool both to facilitate deeper engagement for visitors and provide greater accessibility for individuals with disabilities. Adaptive technology "includes equipment made expressly for people with disabilities and has been made specifically for that community" ("Adaptive"). Examples of adaptive technologies commonly used in public visual arts environments are audio description, assistive listening devices, and closed captions that are made visible to those who wish to see them. These examples address the needs of two specific categories of disability, sensory and physical, which will be referred to in this paper. The sensory domain includes sight, hearing, speech, and touch. These abilities are tied to communication. The physical domain involves mobility, dexterity, strength, and stamina. Adaptive technology is a standard means to provide accommodations for patrons with sensory and physical disabilities and achieve legal compliance.

Discussion of public access to the arts for individuals with disabilities will benefit from a review of existing legislation. The Americans with Disabilities Act (ADA),

a civil rights law enacted in 1990, is an enforceable mandate of accessibility standards that are published by the Department of Justice in the Federal Register and that apply to places of public accommodations. Further analysis of the ADA and other key statutes will reveal the current climate of compliance standards that shape the social construct of access. As will be explored in this paper, because ADA regulations, in essence, define accessibility in terms of specific measurements and numbers, organizations easily lose sight of the intent of the law (Zimmermann).

In contrast to the compulsory ADA, Universal Design (UD) is a discipline used at the discretion of product creators, space planners, builders, architects, and industrial designers. UD outlines a progressive and evolving approach for developing inclusive environments that can be accessed, understood, and used to the greatest extent and highest utility possible. Its principles ensure that products and buildings can be used by virtually any user, regardless of her level of ability or disability (“Universal Design Principles and Guidelines”). While ADA guidelines focus on constructing or modifying the built environment to be accessible for people with disabilities, UD holds that the entire range of human capability must be at the heart of the design process.

Innovations in emerging technologies have made it easier and more efficient for designers to integrate principles of Universal Design into the creation of public environments. The term *emerging technologies* in this paper refers to new and developing technologies that could alter the business and social environment. Specifically, this paper uses virtual and augmented reality and 3D printing as prime examples applicable to the discussion.

Virtual reality (VR) is a computer visualization technology that uses projectors or headsets to generate a realistic environment in images, sounds, and other sensations. VR simulates the user's physical presence in this environment: a person using virtual reality is immersed in an artificial three-dimensional, 360-degree computer-generated world and is able to look around, move about, and interact with features or items in it.

Augmented Reality (AR) is a live view of a physical, real-world environment whose elements are overlaid by computer-generated information such as text, graphics, video, and other information. This dynamic information is displayed in real time and in semantic context with the real-world objects the user is viewing, thereby enhancing and enriching the user's perception and knowledge of physical reality.

Also referred to as additive manufacturing (AM), 3D printing is a process used to create a three-dimensional object by depositing successive layers of material using hardware that resembles an inkjet printer. Broadly speaking, 3D printing is an inexpensive way to print complex shapes using a variety of plastic materials directly from a computer-stored 3D design or a 3D-scanned image.

What if looking at a painting meant so much more than simply looking at a painting? An individual whose mobility prevents them from visiting a museum could wear a headset and observe van Gogh's "Le Café de Nuit", its radiating colors and textural style vibrating. If she moves her head she can experience an imagination of "what might have been there, just off the edges of the canvas" and notice the sky swirling like in "The Starry Night" (Meier). Meanwhile, a museumgoer with low vision can engage with the same vivid and texture-rich masterpiece through the tactile

experience of a 3D-printed replica of the painting's surface. Two patrons with very different needs and preferences can have very different—yet equally engaging and enriching—experiences with the same piece of visual art.

The nonprofit visual arts sector, using emerging technologies, has the potential to reshape society's perception of and framework for accessibility, exceeding current compliance guidelines to achieve a new standard beyond the boundaries of adaptive technology. More than many other artistic disciplines, visual art and the institutions that present and house visual art carry dimensional barriers. Integrating the mindset and approach of Universal Design and the transportive power of emerging technologies can lessen barriers and make a visual arts experience truly interactive, immersive, multisensory, and more inclusive for individuals with functional limitations that prevent them from entering a facility. Virtual audiences can participate through multimodal experiences that engage multiple senses and impact their way of knowing and being in the world, activating their visual, auditory, spatial, kinesthetic, and interpersonal senses and understandings. Experiencing visual arts in this manner is an exciting prospect for all audiences, increasing usability and flexibility, and creating an unparalleled elevated arts experience. With rapid change, maturation, and investment in these technological areas, this is the time for the visual arts sector to follow the example of other industries and advance existing assumptions about accessibility and disability.

Principles of Universal Design outline how accessible design is arguably good design—simple, intuitive, flexible, and equitable (Merritt 17). With the aid of technology

offering new possibilities for providing exceptionally accessible visual arts experiences, the visual arts community can commit to fostering an inclusive society that enables people with disabilities to live fully engaged and self-directed lives. Leveraging new technologies in the spirit of UD equips visual arts organizations to introduce a profound empathy in arts experiences, providing participants with an unprecedentedly deep form of engagement and education that, in turn, instills a value of inclusivity into society at large.

By complying with ADA regulations using standard adaptive technology, arts organizations can strive to provide fair opportunities and access to the arts. However, by investing in emerging technologies that transform the way the visual arts are consumed by all audiences, the sector can entirely disrupt the classification of disabilities as an inferiority or issue to pity, requiring specialized accommodations. Visual arts organizations can indeed offer an opportunity for all visitors to experience the visual arts in a new and unexpected way.

Universal Design is more than a design style; it is a benchmark based on several principles: “Disability is not a special condition of a few; It is ordinary and affects most of us for some part of our lives; If a design works well for people with disabilities, it works better for everyone; Usability and aesthetics are mutually compatible” (“Universal Design Principles and Guidelines”). Where ADA guidelines are prescriptive, UD provides a broader and holistic way of thinking about accessibility. “This type of philosophy is certainly congruent with the goals of ADA, because design that is easier for someone

with a disability might also be easier for everybody” (Zimmermann). “ADA compliant design is not universal but Universal Design is accessible and usable by all.” (Langlois).

Universal Design is socially and legally compelling. UD supports a human-centered approach, one that is user-friendly and convenient while simultaneously “respectful of user dignity, rights and privacy” (“Benefits”).

As other American civil rights movements have experienced, laws and government programs—while critically important—can only do so much.

Subversive cultural stereotypes of disability have undermined some of the most important milestones in disability rights...Lawsuits and court rulings don’t necessarily amount to bigotry, but on the whole they demonstrate an unwillingness to view Americans with disabilities as full citizens. (Baker et al.)

There is no attempt, in this paper, to argue that the nonprofit visual arts sector can solve these serious problems—with or without the aid of emerging technologies. However, there is much opportunity for the arts to raise the public’s social awareness and understanding of what inclusion and accessibility can mean and accomplish, and thus help erode stereotypes and build a more inclusive society. The arts provide a format to show the world through a different lens to help audiences make better sense of it. Structural and attitudinal change cannot happen overnight. Nevertheless, the visual arts community as a sector can take a leadership role in public education and insist on change. Mobilizing the nonprofit visual arts community as an ally for individuals with disabilities enables all audiences of the visual arts to experience art in new and deeper ways.

Chapter I A DEMAND FOR INCLUSION

“People expect things to be accessible” (qtd. in Zimmerman). This frank statement made by the president of Universal Design Consultants, John Salmen, captures the ever-evolving needs of audiences. Disability is a category of diversity that most individuals join as they age or, either temporarily or permanently, if they are affected by a trauma or health condition. People with disabilities constitute one of the largest minority groups in the United States. In 2010, 18.7% of 303.9 million people in the United States had some kind of disability (Brault). The “Please Be Seated” blog raises several issues with reductive definitions of disabilities:

In reality, we all fall somewhere on a curve, from Olympic athletes in perfect health with perfect vision and hearing to people commonly defined as severely disabled. On any given day, most museum visitors fall somewhere in the middle. Perhaps they’re tired that day, or pregnant, or forgot their reading glasses. But they are impaired—yet not perceived or treated as disabled. (Tokar)

With the vast range of reasons that may cause an individual to have a functional limitation, it is critical to establish an understanding of the needs and abilities of the American population, both within the context of a visual arts experience and outside of it. For many, creating public access for individuals with physical and sensory disabilities is more than a matter of convenience; their independence and livelihood depend on it.

Physical and Sensory Domains

Of the 51.5 million adults living with a disability in 2010, 41.5 million had disabilities in the physical domain (Brault). “Roughly 30.6 million individuals aged 15 years and older (12.6 percent) had limitations associated with ambulatory activities of the lower body including difficulty walking, climbing stairs, or using a wheelchair, cane, crutches, or walker” (Brault). About 15.7 million adults had disabilities in the sensory domain, alone or in combination with other domains. “Of the 241.7 million adults aged 15 and older, about 14.9 million or 6.2% of adults aged 15 and older experienced some level of difficulty with seeing, hearing, or having their speech understood” (Brault).

Aging Population

The elderly populace continues to grow rapidly and aging is frequently linked with disability. “The Baby Boom population is turning 65 at a rate of 10,000 per day, and by 2030, 20% of the U.S. population will be over 65, which will potentially increase the number of people with diminished eyesight, hearing, mobility, and cognition” (Bienvenu). “While they may not think of themselves as having disabilities, people in this age group often seek out businesses that accommodate those changes by offering better lighting, less ambient noise, and fewer stairs” (“Facts”). At 70.5%, people in the oldest age group, aged 80 and older, were about eight times as likely to have a disability as people in the youngest age group (Brault). Colleen Starkloff, cofounder of St. Louis-

based Starkloff Disability Institute, points out that there is danger in resisting vulnerability. “If our society doesn't become more reflective of how to include them, and enable them to age in place successfully and happily, we've got a big problem coming” (qtd. in Zaleski).

The State of Arts Participation

The 2012 Survey of “Public Participation in the Arts” (SSPA) shows that, compared to American adults in general, adults with disabilities are less likely to have visited an art museum or gallery in the last twelve months at the time of the study (“A Matter of Choice” 1). Adults with disabilities are underrepresented in arts audiences, comprising just under 7% of the general adult population visiting art museums or performing arts events. In 2012, about 6.9 million adults with disabilities, only about 25% of that population, attended a visual arts event by visiting a gallery, museum, craft festival, or touring “a park, monument, or neighborhood for its historic or design value” (“A Matter of Choice” 6). In contrast, around 84.8 million adults without disabilities attended a visual arts event.

Despite existing efforts to provide access, barriers prevent individuals with disabilities from participating in institutional visual arts experiences. Data from the “2012 General Social Survey” (GSS), which is conducted by the National Opinion Research Center at the University of Chicago, show that 43% of adults who wanted to go to an art exhibit, but did not, reported their difficulty getting there as a barrier (“A

Matter of Choice” 7). Exploring remote and alternative engagement strategies is a worthwhile prospect to combat deterring systemic barriers.

Consuming Art Through Media and Technology

American adults with disabilities are equally likely as the general adult population to “use radio, TV, or the Internet to listen to or watch programs about classical music, opera, theater, or dance” (“A Matter of Choice” 2). However, despite relative parity in their arts participation levels for certain activity types, adults with disabilities were less likely than adults in general to have viewed or listened to art via handheld or mobile devices. Given the flexibility, convenience, and variety of content and formats that such platforms afford—and the relatively high rates at which adults with disabilities experience art via other electronic media—better strategies to engage adults with disabilities through these newer options are warranted (“A Matter of Choice” 13).

Based on the tendency for adults with disabilities to view or experience the arts remotely using existing media channels, harnessing emerging technology is a logical means for visual arts organizations to reach broader audiences. Personal handheld devices like the iPhone contain functionalities that can serve as adaptive technology. One example is the VoiceOver feature that can make a personal device more intuitive for individuals with vision impairments. Specific gestures cue VoiceOver to read a selection or notifications out loud. VoiceOver can also activate sound effects, giving users audible feedback to gestures and touches. Hannah Goodwin, Manager of

Accessibility at the Museum of Fine Arts in Boston, spoke of the museum's approach to mobile multimedia upon the 2010 opening of its Art of the Americas wing, explaining that an individual with a vision or hearing disability visiting with a companion without a disability "use[s] the same devices, with access to the same content" (qtd. in Mohn). Visual arts organizations can use features available through mainstream personal devices to enrich engagement with diverse audiences.

Shifting the Disability Paradigm

Historically, two major conceptual models of disability have guided public perception and response. The medical model views disability as a feature of the individual, directly caused by disease, trauma, or other health condition and requiring medical care. In this view, disability is a deficiency necessitating treatment or intervention to correct the problem with the individual (*Towards* 8). Conversely, the social model does not interpret disability as an attribute of an individual, but rather as an idea that demands a political response because the problem is created by "an unaccommodating physical environment brought about by attitudes and other features of the social environment" (*Towards* 9).

As observed by Carol Gill at the Chicago Institute of Disability Research, scholars of disability studies believe that overemphasis on the medical model detracts from full citizenship for individuals with disabilities ("Reframing"). In Gill's view, the social model—sometimes called the civil rights model—explains both how individuals with

disabilities are seen by society and how the members of the disability community see themselves. Figure 1 compares the two models.

Medical Model of Disability	Social Model of Disability
Disability is a deficiency or abnormality	Disability is a difference
Being disabled is negative	Being disabled, in itself, is neutral
Disability resides in the individual	Disability derives from interaction between individual and society
The remedy for disability-related problems is cure or normalization of the individual	The remedy for disability-related problems is a change in the interaction between the individual and society
The agent of remedy is the professional who affects the arrangements between the individual and society	The agent of remedy can be the individual, an advocate, or anyone who affects the arrangements between the individual and society

Figure 1: Comparison of Medical and Social Models of Disability (“Reframing”)

Taken alone, neither model is sufficient. Though both approaches are valid to a degree, disability is a “complex phenomenon”, as characterized by the World Health Organization (WHO), “that is both a problem at the level of a person’s body, and a complex and primarily social phenomena” (Swain and French). Disability is the result of an interaction between the features of an individual and the features of the overall context in which they live. However, some aspects of disability are almost entirely

internal to the individual, while other aspects are almost entirely external. For this reason, both medical and social responses are appropriate to the problems associated with disability (Swain and French). Neither model should be wholly rejected (Swain and French).

An improved model of disability is a synthesis of both the social and medical, a framework that does not reduce the complex notion of disability to one of its aspects (Swain and French). The WHO's International Classification of Functioning, Disability, and Health system (ICF) is based on such an integration. By considering all aspects of human functions, ICF provides a model for an international standard to describe and measure health and disability across cultures and settings.

ICF breaks the rigid dichotomy of disability and no disability, an either/or binary, by establishing a coherent model to understand and gauge disability as a dynamic contextual variable. The system takes environmental factors into account based on the approach that an individual's functioning and disability occurs in a context (Swain and French). Identifying and measuring the effect of both the physical and social environment on the disadvantages experienced by individuals with disabilities, ICF considers disability "in all its dimensions - impairments at the body and body part level, person level activity limitations, and societal level restrictions of participation" (Swain and French).

To best serve all audiences, the visual arts community cannot make assumptions about its patrons. Disability is not a rare occurrence; every individual can experience a reduction in health and thereby experience disability. ICF provides a conceptual basis for

visual arts organizations to reevaluate understandings of their audiences and their needs and expectations. Applying this framework, visual arts organizations can effectively contribute to normalizing the experience of disability and help society recognize it as a universal human experience.

Shifting the focus from cause to impact, the visual arts community must work to assess their public environments “in terms of their level of facilitation or barrier-creation for different kinds and levels of disability” (Swain and French). Through this lens, accessibility is the effort “to combat the systematic oppression experienced by individuals with disabilities in everyday life” (Starr). Reconsidering and changing the environment can thereby change the attitudes, systems, and practices in society that create disabling situations. As will be addressed in Chapter III, emerging technologies provide a transformative mechanism to create enabling environments and offer new interpretations of the traditional visual arts experience.

In 2015, Nina Simon, Executive Director of the Santa Cruz Museum of Art and History, presented a speech, titled “Fighting for Inclusion,” at the MuseumNext conference, discussing the issues and challenges of inclusion:

Here’s my beef with inclusion: it’s too good. No one is “against” inclusion...but museums do exclude people. All the time. If everyone is “for” inclusion, does that mean it automatically happens? No. But if no one is against it, how do we make sure that we actually are doing it, that we aren’t just paying lip service to the idea? The answer, I think, is to acknowledge the activist, political roots of inclusion. Inclusion isn’t a given. Inclusion is something we fight for.

How is it that the existing framework of accessibility excludes people? What are the compliance standards that control the inclusivity of arts experiences? As will be discussed in greater depth, emerging technologies can elevate the visual arts community from lip service to true inclusion.

Chapter II DISABILITY RIGHTS IN THE COURTS AND IN THE PUBLIC

To better appreciate the role that emerging technologies can play in making inclusion the goal for visual arts organizations, one must first understand current practices and motivations for accessibility and the fight leading up to today's current compliance climate.

Oversimplifying Accessibility

The disability rights movement has approached disability through a social, or sometimes referred to as civil rights, model while the traditional perception of disability is based on the medical model. As a result, the disability rights movement has fought to both redefine the meaning of disability and challenge basic assumptions about the nature of disability (Fleischer and Zames).

The fight for accessibility for individuals with disabilities has a long history tied to legislation. The previously-mentioned Americans with Disabilities Act of 1990, among other inclusionary legislation, is comprised of complaint-driven statutes. Despite an overarching theme of inclusion, the statutes outline the requirements for compliance and assume adherence to such requirements unless a complaint is made (Starr). This means that, though advocates rely on and leverage statutes to support the need for

accessibility, legally imposed institutional change is ultimately prompted by complaints. Access efforts are rendered problematic from the start (Starr).

The ADA defines a disability as a physical or mental impairment that “substantially limits one or more major life activities” (“State”). This includes people with “a history or record of such an impairment, or a person who is perceived by others as having such an impairment” (“State”). Understandably, the law does not name all of the impairments that it covers. However, the oversimplification of the definition of disability has resulted in practitioners reductively categorizing audiences as “able-bodied” or “disabled”. As a result, institutions direct their efforts to address impairment, further reducing accessibility to a problematic challenge (Starr).

In the Courts

A statement of less than one hundred words, Section 504 of the Rehabilitation Act of 1973 was the first federal civil rights law for people with disabilities. Section 504 specifies how recipients of federal funding, including the National Endowment for the Arts (NEA), are prohibited from discriminating against individuals with disabilities. Such entities cannot use practices and policies that have a disproportionate, adverse impact on the classes of people protected by the federal laws. The NEA issued regulations in 1979 and began enforcing the law for funded museums (Cohen-Stratyner).

The significance of Section 504 should not be overlooked. Nevertheless, it is telling that terminology of accessibility does not appear even once. Instead, the legislation’s rhetoric stresses “discrimination” and “exclusion”. The National Council on

Disability's 2003 "Rehabilitating Section 504" report analyzed the federal enforcement of civil rights laws and found that Departments of Labor, Education, State, and Health and Human Services fell short in ensuring that recipients of their funding followed Section 504. "While it is beyond doubt that Section 504 matters, it is troubling that federal agencies have shown a lack of clear commitment to ensure that Section 504 can be vigorously integrated into federal agencies' newest mode of operations" ("Rehabilitating").

The 1990 Americans with Disabilities Act extended protection to the private sector and shapes the majority of current compliance guidelines (Fleischer and Zames). The ADA has undoubtedly led to the improved lives of individuals with disabilities in many ways. It "embodies—and makes enforceable—this nation's promise of full access to nonprofit organizations, businesses that serve the public, state and local governments, transportation, employment, and telecommunications" (Bowen). The 1990 legislation marked a monumental shift in American society's attention to accessibility and advocacy for populations with disabilities. Establishing legal recourse in the face of discrimination provided significant progress in giving people with disabilities social options and economic opportunities.

Believing the ADA to be a promise of full access, however, is not the same as a true guarantee of equal opportunity. The fight to achieve and preserve legal and social gains is an ongoing battle. "Because the Supreme Court focuses on the definition of disability rather than on the effects of discrimination (an approach used in no other civil rights law), the Court has ended up with a tortured definition of disability" (Fleischer

and Zames). In 2008, Congress passed the ADA Amendments Act (ADAA), which attempted to expand the statutory definition of disability. Columbia Law professor Elizabeth Emens summarizes the role of societal attitudes in the period between the ADA and the ADAA, analyzing the gap between societal attitudes and the law's demands:

The law was out ahead of common sense (the common sense of society, and thus of most legislators and judges), and so courts did what they often do in such moments: they narrowed the law to better fit their common sense.

What is that common sense about disability? That disability is unfortunate, even tragic, costly for employers and for society, to be avoided at most costs and accommodated only at a very limited cost. That disability cannot possibly have benefits (to the person with the disability or those around her), and likewise that accommodations only benefit the individual who requests them. Disability is, in this view, something we should keep hoping will eventually just go away if science gets good enough. In the meantime, this view might say, "we" (the nondisabled people, or sometimes just "people") should be good enough, moral enough, to do some things to help disabled people, but not too much, as of course we would not want to drag down society or the economy (207).

Emens underscores the tensions between perceptions and lawmaking. Like Section 504, the ADA fails to explicitly use accessibility or inclusion terminology and instead concentrates on the need to provide "equal opportunity for participation" (Starr). The construct of accessibility, as shaped by the ADA, therefore is defined by the standards

and stipulations of the legislation (Starr). The visual arts organization that limits its interpretation of accessibility to a burden and liability both excludes valuable patrons and also perpetuates an us-versus-them mentality.

Concern for budgetary hardship inflicted by the ADA commonly undermines the ADA's requirement for equal access. In actuality, incorporating accessibility features in new construction of public accommodation is less than 1% of construction costs ("Questions"). "This is a small price in relation to the economic benefits to be derived from full accessibility in the future, such as increased employment and consumer spending" ("Questions").

The Visual Arts Community Responds

To understand how museums handled the passing of the ADA, Barbara Cohen-Stratyner analyzed materials published or distributed by the American Alliance of Museums (AAM) and annual meeting presentations from 1990 to 2015. Cohen-Stratyner found that though the legislation was initially perceived as an imposition, it initiated a shift toward inclusiveness in museums and "ultimately paved the road for an openness to the even more inclusive principles of Universal Design" (64).

According to Cohen-Stratyner's findings, the museum field's concerns, and presumably the broader visual arts community's as well, centered on Title III of the ADA, which deals with public accommodations and services. Section 301(7) specifies that "a museum, library, gallery, or other place of public display or collection" all count as public accommodations (Cohen-Stratyner 64). Early AAM conference presentations

emphasized the ways that institutions should obey the mandate, and compliance with the law continued to be a concern through the 1990s (Cohen-Stratyner 65). Other resources distributed by the AAM and related organizations, such as the 1991 pamphlet titled “Preserving the Past and Making It Accessible to Everyone: How Easy a Task?”, perpetuated the trepidations regarding issues of mobility and “fears of conflicting interests between historically accurate architecture and potential visitors’ access” (Cohen-Stratyner 65). The community was still struggling to understand the consequences of ADA infraction.

The museum field began to think more broadly and shifted its activities toward greater priority for community, diversity, and inclusion in the 1990s and 2000s (Cohen-Stratyner 65). Greater societal issues, such as AIDS and diversity, were occurring on the national, regional, and state levels, and in finding a connection to debates stirring within the community, real progress accelerated (Cohen-Stratyner 65). The AAM’s publication of “Excellence & Equity: Education and the Public Dimension of Museums” marked a turning point in the field’s movement toward a unified acceptance and vision of serving the public (Cohen-Stratyner 65). The document pointed the way for members of the field to expand their role as educational institutions. The combination of the AAM’s institutional recommendations and increased widespread concern for inclusion activated museums to adopt inclusive practices.

Clare Brown, head of the Master of Arts in Exhibition Design program and Assistant Professor of Design at The George Washington University in Washington, D.C., was director of the Smithsonian’s accessibility programs in the mid-1990s and helped

harness the ideas of UD within the museum field. On the occasion of the ADA's twentieth anniversary, Brown ruminated on how the theory of UD, as an extension of ADA directives, is increasingly more pragmatic as a result of demographic changes (Brown and Majewski). "What we didn't realize then was that our guidelines were actually moving exhibition designers to think not only of minimum accessibility standards but of more inclusive design that worked better for museum audiences made up of diverse family groups, different age groups, and people of varied abilities" (Brown and Majewski). Brown's reflection on the museum world's implementation of the ADA's goals further illustrates the slow progression of translating principles into practice.

Today, countless resources available to the visual arts community provide guidance on how organizations can meet compliance standards, both on the policy and social level. One example, the Chicago Community Trust's "Renewing the Commitment: An ADA Compliance Guide for Nonprofits", includes tip sheets and templates. The guide offers specific actions and practices to help nonprofits ensure they adhere to Title III and other ADA regulations such as to "welcome people with disabilities and integrate them into their activities", "remove physical barriers to access to their facilities and if some barriers are too difficult or expensive to remove...take other steps to provide services to people with disabilities", and "integrate people with disabilities into 'regular' programs and provide 'special' programs only if equal opportunity would require a separate program; make online activities and information accessible" (Bowen). These recommendations underscore the significance of balancing legal requirements and civic responsibility to achieve true inclusion.

In addition, specialized funding and training support is progressively more available. The Massachusetts Cultural Council's UP Inclusive Design Initiative "seeks to inspire organizations to use design to anticipate and accommodate the full spectrum of human ability" ("Mass"). The UP initiative includes Innovation Fund grants for "innovative solutions for accessibility enhancements", such as "new technological resources in communication or information strategies" ("Application"). Charles Baldwin, UP's Program Officer, works directly with organizations to educate them on the importance of "going deeper than talking about the services [the organization] can provide" (Baldwin). Among the services provided by UP, Baldwin leads workshops and staff training related to attitude environments and for many organizations, "fear of litigation is still a motivator" to explore more comprehensive accessibility solutions (Baldwin). In his consultations, Baldwin addresses concerns with ADA regulation, but strives to initiate and foster a lasting cultural shift, connecting staff and leadership with the ethical value of committing to inclusion (Baldwin).

The Role of Technology

As previously described, visual art presents particular challenges for individuals with sensory and physical disabilities. Institutional or traditional visual arts experiences typically pose three levels of barriers: 1) They are housed in specific and restrictive spaces; 2) They are aesthetically restrained to two or three dimensions of space, and 3) They are obstructed by other environmental barriers due to concerns of cultural preservation, which define the spatial interaction between a viewer and the

artwork. These are the spatial determinants that dictate the visual arts experience for an individual. As a result, the visual arts sector works with limited boundaries to achieve legal compliance in the public realm.

Technology helps visual arts organizations meet current compliance standards. Auxiliary devices, services, and other methods, ranging from sign language and oral interpreters, to Braille and large-print materials, to note-takers and captioning, ensure effective communication with individuals with disabilities. More specifically, assistive technology involves any item, piece of equipment, or product system, such as a wheelchair, wheelchair ramp, hand splint, or computer-based equipment, used to increase, maintain, or improve the functional capabilities of individuals with disabilities. Another subgroup is adaptive technology, which is any product, device, or system that is specifically designed for the purpose of increasing, maintaining, or improving the functional capabilities of individuals with disabilities. Though all adaptive technology is also assistive technology, the more specific category of adaptive technology will be the primary area of focus going forward.

There are two categories of access made possible by technology: equivalent and alternative. These types of access pertain to the use of applications for learning as well as other forms of engagement. “Equivalent access provides the learner with the same learning activity but it is mediated in a different modality” (Nevile). Providing an individual with exhibition material in Braille or in digital format are examples of equivalent access.

“Alternative access provides the learner with a different learning activity but one that is designed to achieve the same learning objectives” (Nevile). The Walters Art Museum provides alternative access for blind and partially-sighted groups with docent-led touch tours of sculptures from various periods of the permanent collection. During touch tours, both the docent and the visitor wear gloves to examine pre-selected works from the Walters collection. This instance of alternative access provides the visitor with disabilities with a learning activity that differs from the activity used by the patron without disabilities. However, the alternative activity is designed to achieve the same learning objectives.

Alternative access options can become attractive to unintended communities of people. The Whitney Museum’s video tour blogs recorded by deaf hosts in American Sign Language are also captioned in English and are popular among people without hearing impairments (Mohn).

As important and useful as alternative access may be, it is discernibly not as intimate and impactful as equivalent access. What if alternative access grows so advanced that it reaches the level of equivalent access? Technology advancements allow designers in construction and manufacturing industries to better meet the challenges of both demographic changes and evolving legal strictures. “‘Better for everyone’ and ‘planning ahead for your family’s needs’ will begin to replace ‘handicapped’ and ‘elderly’ as marketing approaches” (Mace et al.). As comfort, safety, and flexibility become prominent messages in advertising, emerging technologies will continue to respond to the needs of people of all ages, abilities, and sizes

(Zimmermann). Designers will face a choice: reluctant compliance with minimum accessibility standards, or a “positive, sensitive offering of Universal Design services” (Mace et al). By making these choices now through investment in emerging technologies, the visual arts community can use its inclusive awareness to contribute to a more equitable and respectful society.

Chapter III

BREAKING BARRIERS WITH TECHNOLOGY

As the nonprofit visual arts community experiences greater demands to consider accessibility as a key concern for audiences, developments in technology offer solutions for increasing access and making greater opportunities for engagement. Emerging technology tools can make visual arts experiences more inclusive and, by implementing innovative approaches to inclusion, also position the nonprofit visual arts sector as a cultural leader for society.

Universal Design is Not the Same as Accessible Design

The Universal Design movement maintains that places and systems can be inherently accessible to a broad spectrum of people, regardless of age, condition, or ability (Merritt 16-29). As previously suggested, if disabilities are, in effect, created by the built environment, leveraging technology can provide new opportunities to reflect on the role that surroundings play in visual arts experiences. A Universal Design approach benefits diverse audiences by promoting accessible and usable products, services, and environments (“10 Things”). The use of effortless and user-friendly design can ensure a positive experience for users of any level of ability.

According to the Centre for Excellence in Universal Design in Ireland, the term Universal Design has been used incorrectly as a synonym for compliance with accessibility design standards. As detailed earlier, disability legislation prohibits discrimination on the basis of disability. Compliance with this legislation is promoted through existing accessible design standards that provide designers with the minimum requirements that must be met. In contrast, “Universal Design is not a list of specifications; it is an approach to design that considers the varied abilities of users” (“10 Things”).

Technology and Universal Design

By embracing the principles of UD, visual arts organizations can better create and repurpose more enabling environments. Originally and historically an architectural framework, UD includes seven principles with design and concept at the core, rather than the individual or a specific impairment (“Universal Design”). As communicated in Figure 2, the stated principles of UD promote simple, intuitive, flexible, and equitable design, all qualities that describe good design (Merritt 17).

Equitable use	The design is useful and marketable to any group of users
Flexibility in use	The design accommodates a wide range of individual preferences and abilities
Simple and intuitive use	Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level
Perceptible information	The design communicates necessary information effectively to the user, regardless of ambient conditions, or the user's sensory abilities
Tolerance for error	The design minimizes hazards and the adverse consequences of accidental or unintentional actions
Low physical effort	The design can be used efficiently and comfortably and with a minimum of fatigue
Size and space for approach and use	Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility

Figure 2: Principles of Universal Design (“The 7 Principles”)

As described earlier, technology has and continues to play an integral role in providing access for patrons with disabilities, with tools ranging from assistive listening devices and captioned multimedia to screen-reader-accessible websites and power-operated entry doors. In many ways, the benefits of embracing UD closely resemble those of integrating technology into public visual arts experiences.

Adopting technology as a means to better include patrons of all abilities also effectively serves as a resource management strategy. With the numbers of individuals requiring disability services climbing rapidly, the previously reliable tactic of merely accommodating audiences will become inadequate. Adapting UD principles proactively

supports the efficient and effective allocation of resources while also embedding an inclusive philosophy into all practices (“Universal Design”).

The marriage of technology and Universal Design follows a sustainable approach to managing diverse needs of audiences. Targeting the impairments of visitors and retrofitting the arts experience is a less viable model than modifying the environment or experience for all. Additionally, with disabilities that are increasingly varied, the expectation of a patron to self-identify as having a disability—and requiring alternative access to an arts experience—in part contradicts the commitment to create inclusive, welcoming, and engaging arts experiences (“Universal Design”). Emerging technology tools are an attractive means to satisfy the UD guidelines and eliminate a system of labeling functional limitations. In place of viewing accommodating audiences as the challenge, technology equips an organization to minimize the effort demanded of the individual to participate. Visual arts nonprofit practitioners can use technology to think of ways to reduce barriers to the experiences they provide.

New Levels of Inclusion via Emerging Technology

Emerging technology like AR and VR offers a level of immersive engagement greater than the somewhat distant experience offered by adaptive technology accommodations. As defined early in this document, virtual reality refers to “computer-generated environments that simulate the physical presence of people and objects and reality sensory experiences” (Freeman et al.). In basic applications of the technology, users interact with and manipulate 3D images through gesture-based and haptic devices

that provide tactile information and force feedback. Advances in graphics hardware, computer-aided design (CAD) software, and 3D displays are making VR more mainstream, particularly in the video game realm (Bianchini, “When Museums - 1”).

The museum field has a history of incorporating virtual reality into projects. In 1992, Apple Computer released “The Virtual Museum”, an educational CD-ROM, where 3D-modeled scientific exhibits were displayed in a pre-rendered environment that mimicked a typical museum building (Bianchini, “When Museums - 1”). Navigating from room to room, the user could find detailed information of the exhibits on view. Another instance is the Guggenheim Virtual Museum commissioned by the Guggenheim Foundation in 1999. The project intended to create a three-dimensional experience for patrons to explore in real time and in no way imitated the original architecture of the Guggenheim. The Virtual Museum introduced the potential for creating a digital hub for Guggenheim venues around the world. With the high cost of development, however, VR did not catch on as anticipated and museum interest in VR faded in the late 1990s (Bianchini, “When Museums - 1”).

A current wave of VR and AR technology innovation is permeating the mainstream market. Premium devices from Oculus, HTC, and Sony have recently garnered widespread attention. They are designed with a primary focus on gaming, video, and photo experiences. Tethered to a desktop or laptop, the headsets contain a pair of screens and lenses that generate a stereoscopic 3D image. Sensors monitor the user’s movements to adjust images accordingly.

Samsung Gear VR and Google Cardboard provide low-cost VR options for smartphone users. Both use the screens and sensors built into devices to deliver immersive, simulated worlds, enabling complete focus on content without distractions. A compelling method for storytelling, it allows users to feel the experience throughout their body (Freeman et al.).

Also intriguing, 3D printing technology can help individuals see in new ways. Tactile information received through fingertips creates a mental picture for the user of the object. In experiencing tactile feedback directly, an individual who is blind or low-vision is no longer dependent on someone else's interpretation. In a museum setting, to freely experience visual art provided by 3D printing technology promotes greater freedom and independence for patrons with sensory disabilities. The report "3D Printing: The Next Revolution in Industrial Manufacturing" finds that the additive manufacturing market, which includes 3D printing systems and services, has grown by 30% a year between 2012 and 2014 and by 2020 the 3D printing industry is expected to grow to \$21 billion (Boissonneault). The report also indicates that 10% of 3D-printed parts used in manufacturing processes are used as visual aids (Boissonneault). "3D printing presents compelling business opportunities. Companies that wait too long to explore the potential could be missing out" (qtd. in Boissonneault).

The total number of active virtual reality users is forecast to reach 171 million by 2018 ("Number"). In 2020, the augmented reality market is expected to generate 90 billion U.S. dollars in revenue ("Forecast"). The total number of paying virtual reality users is forecast to reach 28 million by 2018 ("Number").

Extensive discussion of the conceivable systems to monetize or disseminate emerging technology solutions is not included within the scope of this paper. However, the noted surge in VR and AR industry growth, both in number of users and in market activity, compounded with the new innovation that continues to fuel it, suggests potential models for paid or free subscription services. Such models would be feasible for patrons who own personal VR devices or would involve pay-per-view admission pricing for specific visual arts experiences.

With nonprofit visual arts organizations striving to reach and interact with the broadest possible audience, VR and AR and other emerging technologies open opportunities to experiment with novel methods of engagement. The following examples present ways that the visual arts community is investigating the leveraging of emerging technologies to reach, immerse, and educate audiences. The examples demonstrate how organizations “around the world are increasingly opening themselves up to virtual visits by anyone anywhere on the planet. At the same time, the brick-and-mortar versions are getting tricked out with the latest tech wizardry to enrich the viewing process” (May).

Guggenheim Expedition

Rebecca Mir is Associate Manager of Digital Media and Online Learning in the Guggenheim’s Education Department. In her contribution to “Checklist”, the museum’s blog presenting “stories on art, design, conservation, and more, shed[ding] light on the Guggenheim's past, present, and future”, Mir brings life to the museum visit:

Imagine you're in the middle of the Guggenheim Museum, and you're invited by an educator to sit on the floor in a circle with other visitors. The terrazzo floor beneath you is refreshingly cool; you notice the white spiral ramps winding up around you, and daylight filters in through the glass oculus that's over 90 feet above the group. You close your eyes for a moment and listen to the echoing sounds caused by other visitors moving throughout the space. The educator invites you to focus on being in this space and describe the experience. Words like "fluid," "bustling," "bright," "infinite," "open," "different," "noisy," and "overwhelming," might come to mind—these are some of the many adjectives that participants on our tours have actually shared.

Mir's animated description can be the description of the remote visitor's virtual reality experience. In partnership with the Google Cultural Institute, the Guggenheim has digitized the arts experience, allowing individuals around the world to move through the museum and position themselves in the space using their own devices or with Google Cardboard.

"A virtual experience of a museum will, necessarily, be fundamentally different from a visit to the physical building, and we trust that those differences can be strengths when in the hands of an engaged public and teachers," Mir goes on to explain. The Guggenheim hopes that by making the magic of the architecture available to anyone, the prospect of visiting in person becomes more attractive (Mir).

The educative possibilities for larger audiences are particularly exciting for the museum. "The challenge will be to help the public experiment with virtual reality as an

interpretive tool to explore artistic practice: to be creators as well as consumers” (Mir). The potential to encourage creative expression with emerging technologies reveals opportunities to engage with audiences in new ways.

Bruegel / Unseen Masterpieces

Bruegel / Unseen Masterpieces, a collaboration between the Google Cultural Institute and eight major museums from around the world, uses VR technology and super high-resolution imagery, called Gigapixel imagery, to provide immersive views and unique perspectives of the works of Flemish Renaissance master Pieter Bruegel. The project was initiated by the Royal Museums of Fine Arts of Belgium and incorporates VR, AR, and complementary resources such as YouTube videos that take viewers on a tour of artworks including *The Fall of the Rebel Angels* in an animated 3D space optimized for Google Cardboard. The virtual experience connects major museums’ collections with new technology, bringing the works’ hidden details and stories to life with both VR and AR elements.

Michel Draguet, Director General of the Royal Museums of Fine Arts of Belgium, speaks to the motivation and goals of the project through a series of videos available as embedded content on the *Bruegel / Unseen Masterpieces* webpage and published on the museum’s YouTube channel (“Why show”). Draguet explained the museum’s initial objective to present a traditional Bruegel exhibition that would tour to the world’s largest institutions. However, the expenses of transportation and insurance proved to be problematic, not to mention reckless due to the fragility of the work. “The museum

owes it to future generations not to damage these works that have survived history”, he says (“Why show”). Draguet touches on one of the key functions of a museum: to store and protect artifacts. Physical works of art must be handled carefully and held in secure, temperate environments. “The fundamental reason for this caution is that physical art is unique and cannot be replaced” (Fischer). Using virtual platforms bypasses these limitations. The technology offers the benefit of safeguarding and protecting valuable artwork in the spirit of cultural preservation.

While the initial stimulus to present Bruegel virtually was for preservation and cost saving, museum administrators quickly recognized other benefits, which may influence the way the museum will approach future exhibitions. “We will appeal to a larger audience that wouldn’t have visited the exhibit. Maybe they couldn’t have afforded it and now they will see Bruegel in detail in every imaginable way, freely, how, when, and where they want” (“Technological”).

Partnering with the Google Cultural Institute offered the Royal Museums of Fine Arts of Belgium the opportunity to use a variety of technologies on visitors’ phones and other tools. The AR technology solution superimposes relevant details cued by the viewer’s selections and interests, further personalizing and enriching their experience. Draguet elaborates on the project’s objective to create content that allows every visitor to extract new information from an image:

The goal is not simply to entertain. That is not the museum’s role. We don’t turn Bruegel’s paintings into cartoons. That would be meaningless. We do want to provide all the tools necessary to understand events, actions, and political or

religious contexts, which have lost their meaning over time. Technology offers a spiritual, almost physical, gate into the painting. (“Technological”)

Draguet dispels the misperception of and potential resistance to using new technology in museums because it can be distracting or gimmicky. By prioritizing the goal to provide meaningful, informative, immersive opportunities for learning from the outset, the Bruegel exhibit brings both enjoyment and learning to audiences.

Please Touch the Art

The Museo del Prado in Madrid designed the exhibit *Touching the Prado* to give blind patrons and visitors with low vision “an opportunity to create a mental image of a painting by feeling it” (Minder). Leveraging 3D printing technology, the exhibit contained six three-dimensional masterpieces. The Prado used a relief printing technique starting with a high-resolution photo of a painting. Employees selected the textures and features of the piece that would be compelling to enhance for a blind and low vision patron. A chemical process added volume to the reproduction while maintaining colors of the ink (Minder).

Fernando Pérez Suescun, curator of the exhibition, shared with the New York Times that even observing blind visitors discover the paintings was informative and allowed him to rediscover familiar masterworks (Minder). “There are really plenty of details to which I had never paid any attention” (Minder). For example, when a patron asked Pérez Suescun about the color of a portrait figure’s eyes, he needed to check.

Emphasizing different ways to view visual art does not diminish the integrity of experiencing the original work. Rather, it highlights new approaches to aesthetic inquiry.

ONCE, Spain's national organization for the blind community, collaborated with the Prado for the project, "offering advice on how to improve visits for the blind, notably by leaning the 3D canvases so that they would be easier to touch" (Minder). Audio guides were available to all visitors, as well as eye masks for visitors who chose to limit their vision "so they can relate better to what a blind person perceives" (Minder). *Touching the Prado* demonstrates how the application of 3D printing technology can make visual art accessible to those that use different senses to engage in arts experiences. Moreover, by combining adaptive and emerging technology, the exhibition not only exceeds the minimum requirements and conventional approach to providing accommodations, but also, as importantly, challenges the expectation that experiencing visual art requires specific sensory or physical abilities and enriches the engagement opportunities for any visitor.

A Sensory Point of View

"What if a painting could be perceived not only with eyes, but with all five senses? How would our experience of the artwork be changed? [Would it] be enhanced or, [on] the contrary, [will we] miss that 'ineffable essence' that makes a masterpiece?" (Bianchini, "London"). The revolutionary exhibition *Sensorium* at the Tate Britain, opened in 2015, tried to answer these questions with a real experience. Four paintings by Francis Bacon, David Bomberg, Richard Hamilton, and John Latham were the

cornerstones around which a complex multi-sensory experience developed (Bianchini, “London”).

Visitors could touch, smell, taste, hear, and see each painting by way of interaction solutions and technologies that aimed to “expand the experience and trigger engagement and imagination” (Bianchini, “London”). Touch was obtained through touchless haptic devices and ultrasound technology that allows people to sense touch without coming into contact with a touchscreen’s surface (Bianchini, “London”). Flower- and plant-based scents were released into the space, activated by visitors’ proximity. The exhibit included “specially conceived 3D-soundscapes” using a combination of directional audio and headphone-based audio systems (Bianchini, “London”). Visitors were also invited to wear biometric devices, which, by recording their vital parameters, estimated their emotional reaction to the experience (Bianchini, “London”). The multimodal setup of *Sensorium* presented a variety of strategies to experience the artwork. Providing different pathways to participate for various needs and preferences enhanced the experience for all visitors. Using emerging technology solutions in a museum exhibit context to highlight different senses challenges and expands conventional interpretations of visual arts aesthetics and experiences.

Recreating Magic: Yayoi Kusama’s *Infinity Mirrors*

The Smithsonian’s Hirshhorn Museum and Sculpture Garden in Washington, D.C. faced a serious problem when planning the installation of Yayoi Kusama’s *Infinity Mirrors* exhibit. Consisting of six rooms with mirrored walls and ceilings, moving through

the exhibition requires passing through thirty-inch doorways and onto platforms less than four feet wide.

According to the ADA, a public space must accommodate a wheelchair user making a 180-degree turn, effectively making *Infinity Mirrors* inaccessible to visitors using wheelchairs (Yoshitake). The Hirshhorn used the obstacle as an opportunity to think innovatively about accessibility. Drew Doucette, who oversees multimedia and technology initiatives at the museum, told the Washington Post, “Rather than it being something that you play with, there’s an actual use for [VR] if it’s around making things accessible to people as best as you can” (qtd. in Overly).

The museum has six Samsung virtual reality headsets available to visitors with disabilities. Users wearing the goggles can pivot their head side to side or move forward as they would in the actual room. Hirshhorn director Melissa Chiu described the sensation. “It forces you to simply be, to look, to experience something that’s immersive and to be fully immersed. That is a very unique experience today for people; there are very few moments where you can feel alone in the cosmos, and that’s how Kusama designed it” (Lesser).

Infinity Mirrors is the first exhibition in which the Smithsonian Institution has used VR explicitly to make an exhibit accessible to audiences with disabilities. Doucette speculates that VR’s presence in the museum world will continue to solidify:

I think that VR has a home in museums now, especially museums that are bringing in physical spaces and physical environments that you are supposed to walk into and experience, not just see something on the wall. When you are told

you have to go into the space to experience this and you're not able to do that, this is the perfect solution for it. (qtd. in Overly)

As more institutions strive to provide meaningful context with their content, VR can lure patrons into exhibition spaces, enchanting their sense of space, whether or not they are physically on site.

Honor Everywhere

Honor Everywhere brings immersive VR tours of World War II memorials in Washington, D.C. directly to veterans in their homes and assisted living centers. Short films create immersive experiences for veterans who are aging and who have disabilities using Stereoscopic 360, 3D video. Regardless of their physical location, veterans are able to experience the World War II Memorial, the Iwo Jima Memorial, the Vietnam Wall and Arlington National Cemetery from any location as if they were there in person. This project brings immersive, didactic VR experiences straight to the user outside the walls of the institution. The experience is not bound to a facility and yet can also transport a specific audience to another place that they are unable to visit.

Doubt, Distrust, and Dollars

What does a physical visit achieve that a virtual visit cannot? What does a virtual visit achieve that a physical visit does not? Perceived negative impacts of technology in

the arts come as no surprise and these questions speak to a general concern about life in the digital age.

Betty Siegel, Director of VSA and Accessibility at the Kennedy Center for the Performing Arts in Washington, D.C., shares that she worried that an overemphasis on remote access might change the fundamental experience at institutions like her own—even overtaking the perception of technology as a gimmick, mentioned earlier (Kelvey). If virtual access becomes such a great tool, could organizations then argue they no longer have to make traditional accommodations for individuals with disabilities? (Kelvey). “I wouldn’t want the venues to think, ‘Now I’ve solved this problem, I can just give somebody a robot and they visit virtually, then I don’t need to worry about providing access physically.’ To me, this technology is not a substitute for [first-hand] experience—it is a tool to be deployed when it is effective” (qtd. in Kelvey). Similarly, “adopting new technologies for accessibility doesn’t necessarily mean there must be a trade-off between the old and the new. ‘Did TVs replace radios? Or just make our lives richer by giving us more options?’” (Kelvey).

The rapid growth forecast for the emerging technologies market refutes concerns regarding expense and demand. The VR market is set to grow at a very fast rate in the coming years, with the revenue from virtual reality products forecast to reach 5.2 billion U.S. dollars in 2018 (“Number”). For 2017, the revenue of virtual reality products is projected to reach 4.6 billion U.S. dollars (“Number”). Within the first two months of 2016, \$1.1 billion was invested in VR technologies. The total in 2015 was

\$700 million. The technology advisor Digi-Capital estimates that by 2020, startups in augmented and virtual reality could make up a \$120 billion business (Takahashi).

With continually advancing technological developments, these tools are more sophisticated, affordable, and available. With less effort, institutions can purchase technological tools and customizable packages rather than the costlier alternative of building their own. Continued investment in emerging technologies will make the cost of adopting such tools into an organization's programs more feasible and potentially provide innovative revenue streams and audience growth.

Furthermore, efforts to develop new approaches to create and deliver AR content also means that virtual visits will become more convincing, experimental, and innovative, potentially surpassing the value of the physical visit for certain users. Skeptics of the credibility of a virtual visit may argue that imaginative interpretations of a visual arts experience undermine or devalue the "authentic 'aura' of the original" experience (May). "Yet, 'authenticity' is not an objective value" (May). Institutions will need to test ways to offer experiences that are more exciting, informative, and thought-provoking than the original experience, while still upholding their value proposition with audiences.

Chapter IV

TECHNOLOGY AS AN INSTRUMENT TO INCREASE SOCIAL AND ETHICAL AWARENESS

Though legislation protecting the civil rights of individuals with disabilities governs the behavior and practices of service providers, responsibility falls on the nonprofit visual arts community to hold itself accountable to achieve compliance. Further, members of the community must consider themselves as stakeholders in upholding the broadest standards of civil rights. In fulfilling their aesthetic missions, visual arts organizations can also provide arts experiences that are respectful of difference and the inherent dignity, autonomy, and independence of those they serve.

Establishing existing statutes as complaint-driven reveals how discrimination and oppression operates at different levels. Acknowledging that individual attitudes, societal values, and social structure all contribute to the inequity faced by people with disabilities can help the visual arts sector strategize how to promote equality in their service to diverse audiences. Understanding the underlying perceptions behind access efforts is essential to furthering inclusive practices. Glenn Lowry, Director of The Museum of Modern Art articulated the following philosophy in regards to access efforts:

I think that accessibility is also a state of mind. It isn't simply something that you do. It is something you have to think about, be committed to, it doesn't reside in one person or one department. It resides in a mindset of the institution and I

think once you commit yourself that way and everyone is thinking about: how can you make the experience of visiting the museum as accessible and engaging as possible to as broad and diverse an audience as possible, magic begins to happen. (qtd in Starr)

Providing equality of opportunity to arts experiences requires more than an understanding and commitment to pertinent compliance standards. An organization serving the best interest of its audience must maintain an institutional mentality that celebrates and encourages full participation and learning. Carrying out successful access efforts is part of a dedication to nurture and develop an informed and humane citizenry.

David Howard and Mary Ellen Young's studies of the role of leisure experiences in the lives of people with disabilities found that "diminished participation in leisure and recreation severely hampers a person's opportunity to acquire a positive self concept and important social and interpersonal skills" (Howard and Young). Participation in cultural life as a form of recreation plays an important part of a satisfying life.

As discussed previously, the World Health Organization's International Classification of Functioning, Disability, and Health model goes beyond labeling disability as simply a medical condition. ICF includes activity, participation, personal, and environmental factors as players in measuring health. What is more, recreation is identified as a component of the ICF under community, social, and civic life.

Equity through VR Immersion

Punchcut, “the human interface design and innovation company specializing in connected products and services for emerging platforms,” completed a user study on the future of VR by gathering impressions from both novice and experienced users (Punchcut, “Design”). The study “sought to uncover the strengths, challenges and opportunities for the future of VR as users engaged with different interaction paradigms while immersed” (Punchcut, “Design”). Among Punchcut’s insights into the design of VR user experience is that “as a user enters virtual space and the physical world falls away, immersive technology takes on a responsibility to build trust with the user while still providing a compelling experience” (Punchcut, “An Experience”). Designers and content creators are pushed to think more broadly about the communication between the user and the virtual environment and “provoke new models of interaction” (Punchcut, “An Experience”). This idea parallels the responsibility visual arts institutions have to maintain public trust. As VR becomes more mainstream, skepticism of its value and tentativeness from the user should not be ignored. Will Gee, Founder and CEO of BaltiVirtual, a Baltimore-based VR and AR studio, assures that there are always early adopters with cutting edge technological innovations. For others, across many fields, the idea of technology mediating an experience is simply ineffective, according to Gee.

Audiences must grow accustomed to the VR experience, both as a new system for arts engagement and as an immersive experience in itself. The more at ease a visitor feels in both intangible and tangible aspects of her experience, as established by Falk

and Dierking's studies of visitor behavior, the greater potential for her experience of a virtual space to be immersive and enjoyable. Her experience can be deeper and more purposeful than what is possible in the environment of the traditional visual arts encounter (Punchcut, "An Experience"). Gee predicts that institutions will adopt emerging technologies more as the tools become progressively "off the shelf" and flexible for customizing to the organization's content (Gee).

Creating an enhanced and compelling virtual experience can be an effective equalizer. "For some users, having a virtual body that is different than one's own can be liberating. It may allow a user to shed their inhibitions, instilling a sense of bravery and adventure that they otherwise would not have felt. It may allow them to disconnect from real-world limitations or maladies" (Punchcut, "An Experience"). The potential to make the user feel empowered by her environment and in control of her experience reveals the possibilities for the visual arts experience to be enabling beyond the minimum requirements of accommodation. In addition, the possibility to "experience capabilities that one may not have access to in the real world" translates to individuals of any functional ability (Punchcut, "An Experience").

These potentially unprecedented levels of immersion and empowerment enhance the transformative power already inherent in cultural and arts experiences. According to a poll conducted by Americans for the Arts, Americans believe that "the arts provide meaning to our lives" ("Public Opinion Poll"). Sixty-three percent of the respondents believe the arts "lift me up beyond everyday experiences", sixty-four percent feel the arts give them "pure pleasure to experience and participate in", and

seventy-three percent say the arts are a “positive experience in a troubled world” (“Public Opinion Poll”). The intense otherworldliness made possible through virtual reality can expand these responses even further, now making the visual arts experience riveting, enriching, and transformative for everyone. “Virtual experiences have the opportunity to be better than reality, and even feel magical; to experience capabilities that one may not have access to in the real world” (Punchcut, “Design”).

Finally, researchers have identified some unexpected benefits of VR, such as helping to foster empathy. While broadly fostering empathy is itself outside the mission of most visual arts organizations, its use by visual arts institutions may nonetheless help bring about greater equity in society. For instance, research suggests that virtual reality can help a user think outside herself and change her actions accordingly. In one example, participants who experienced a colorblindness simulation were more likely to help real colorblind people (Fieldninas). The Virtual Human Interaction Lab at Stanford University conducted experiments that demonstrated that VR users who experienced colorblindness in the immersive scenario spent twice the amount of time contributing to building a colorblind-accessible website as compared to participants who only imagined what colorblindness would be like (Fields). By including empathy as a component of educating the public, organizations can make a profound contribution towards a more pluralistic society.

Other Advantages

Promoting greater inclusion leads to broader access by broader audiences.

Expanding the possibilities for participation means that visual arts organizations can serve a greater and more diverse constituency. The economic byproduct of increasing audiences is not a minor one. “According to the U.S. Department of Labor, the market of people with disabilities has \$175 billion in discretionary spending, which is more than four times the spending power of tweens (8-14 year-olds), a demographic sought after by businesses” (“Facts”). Inclusive cultural experiences can increase potential customer and supporter bases and improve the long-term sustainability of visual arts organizations.

Draguet from the Royal Museums of Fine Arts of Belgium brings up another goal of the previously-referenced *Bruegel / Unseen Masterpieces* project:

We wish to offer a fresh look, which may appeal more to a younger generation, a newer audience. The traditional audience will not disappear, of course. Our goal is to actually attract young visitors who might be fascinated by what they find on the Internet. They should therefore be able to interact with the artwork at the museum. (“Technological”)

Experimentation with emerging technologies can cultivate the next generation of attendees and participants. Adoption of new technologies is comfortable for young audiences. Appealing to a younger constituency builds a future audience, an audience that is open to changing interpretations of cultural experiences.

Shifting Blame and Taking Responsibility

While it may be unreasonable to expect cultural institutions to fully anticipate the needs of all individuals with diverse needs, current efforts to provide adequate accessibility tend to be reactive. As a result, individuals who already experience discrimination in everyday life need to create their own opportunities for connecting in the museum space. For practitioners in the field, as a focus group articulated, one of the most essential aspects of access is awareness (Levent and Muyskens Pursley). Visual arts organizations' staff and leadership are likely to perceive legal compliance as accessible if they have not experienced barriers to engagement with cultural institutions firsthand.

During a focus group dialogue regarding access, participants discussed how visiting a museum was "hard work" (Levent and Muyskens Pursley). "If we're going get anything out of anything, we can't just say, 'Here we are.' We have to plan, we have to encourage, solicit assistance from people and from whatever to help us do what we need to do. I don't think people without disabilities often get that" (Levent and Muyskens Pursley). Under this framework, it is the responsibility of visitors with disabilities to advocate and educate for their needs. Proactively conferring with patrons with a range of abilities will help staff undo assumptions and better understand and appreciate the practicalities of making cultural settings accessible. "Personal relationships are a powerful source in lowering barriers between able-bodied and those with disabilities" (Tapia 196).

Conclusion

At the time of its codification, the Americans with Disabilities Act was a victory for disability rights, an aspirational declaration of a values system that has become integrated into the visual arts community. However, the reality of implementing and complying with the ADA has had its challenges. Some groups have embraced it, but others have merely adhered to the letter of the law.

While society has made progress in accommodating people with disabilities, and visual arts organizations continue to improve ADA compliance, individuals with disabilities still face numerous challenges that are not met, especially when the issue is beyond the scope of the literal definition of accessibility. Real engagement—a meaningful, interactive experience—requires going beyond the minimum requirements delineated by the ADA, such as through adaptive technology and architectural access.

Universal Design practices and the application of emerging technologies are extremely useful in surpassing ADA compliance, delivering enriching experiences to those who have otherwise very limited capability to experience visual art, and simultaneously expanding the visual arts experience for all audiences.

A more inclusive definition of accessibility recognizes that groups of potential patrons have restricted access to art not because of sensory or physical limitations, but more so because of environmental, social, and demographic conditions. Individuals

living in remote areas may lack the physical and financial means to visit an art institution. Others may fear they lack adequate education or social stature to properly consume art within the walls of a museum. Technology, again, provides remote access, auxiliary information, and an opportunity for communities that shy away from visual arts establishments to learn and make the first steps in the privacy and comfort of their homes. Furthermore, such technologies give museums and other art organizations a meaningful opportunity to reach out to marginalized populations and bring them closer to the art through remote access and education. This is, after all, one of the core values of many art institutions.

Ronald L. Mace, who coined the term Universal Design, was asked in a 1987 *Progressive Architecture* article, “what does the future hold?” He replied with a reminder and a challenge. “I’m very optimistic. I think we are ten, maybe twenty years away from where we will not have to talk about this as something special. It takes a long time to change attitudes and practice (qtd. in “Access”). Thirty years after Mace’s prediction, and nearly as many years since the introduction of the ADA, much progress has been made, but much is left to accomplish. Visual arts organizations can no longer be satisfied with the traditional tried-and-true methods of displaying and communicating static art and accommodating patrons of diverse abilities with alternative access. They must ask themselves, “More than a ramp, beyond architectural compliance, what does access look like?” (Baldwin). Using emerging technologies, visual arts organizations can improve inclusiveness, enhance education, expand audience numbers, and give all audiences an equally enriching cultural experience.

Leveraging emerging technologies to enrich the experience of visitors—whether locally or remotely—must be a deliberate and well-planned endeavor. Technology can be seductive, and staff must ensure that they use it intentionally. Applying a technology solution simply because it is exciting and attractive, or because it has expanded accessibility elsewhere, will likely fail to achieve the best possible aesthetic and inclusive results. Minimally, such an execution may be too expensive or complex to scale and reach a broad audience.

To appropriately evaluate, select, and implement technology, the arts administrator must follow a deliberate and structured methodology. She must weigh numerous considerations ranging from compliance and enrichment, to communication and outreach. For her “to know what will work and if it’s worth it, [she will] find out who is using [the technology] and what their experience is like” (Baldwin).

A proposed general framework for implementing emerging technology solutions in a visual arts experience requires that the arts administrator assess the current situation and consider the experience from the perspective of a patron with disabilities. She will then consult and collaborate with patrons and experts to consider the experience from multiple points of view. Establishing a visitor persona can help prepare the organization’s staff to understand how a range of functional disabilities changes or limits the experience. For instance, what is a visitor’s ability to view a piece from all sides; can the visitor touch the art; can the visitor experience the piece as part of a larger display context or does the existing accommodation limit the experience to a few

featured pieces; what additional information (visual, audible or haptic, textual or graphical) can enhance the experience?

The arts administrator will then document the assessment process and identify weaknesses and opportunities that can be improved using technology. Using UD principles to evaluate and propose a different experience scenario, she will describe how technologies can enhance and enrich the experience. Her staff must develop a business case and specify education goals to determine the feasibility and value of incorporating the new system into the organization's existing program mix. The final step is to evaluate and determine whether the chosen solution produces the desired outcome. Implementing emerging technologies with these tactics and approaches will help ensure successful development and adoption that can continually expand and enhance.

Edward Steinfeld, Director of the Center for Inclusive Design and Environmental Access at the State University of New York at Buffalo, and one of the original authors of the principles of Universal Design, advises that "Universal Design updates can be done incrementally—do it within your means. You don't need to do it all at once...It's a philosophy of practice, not a set of rules" (qtd. In Zimmermann). At the same time, in the eye of society, accessibility is becoming the expectation, not just the law (Zimmermann).

The well-orchestrated use of emerging technologies can serve as a powerful means to increase inclusion for individuals with disabilities and drive engagement for all audiences. No technology solution is one-size-fits-all. However, technology empowers

visual arts organizations to “do more than bestow equity. They must be equitable” (Baldwin). Applied correctly and strategically, technology can reframe existing perceptions of accessibility, promoting and embedding inclusion into an improved culture of the visual arts experience—one that exceeds compliance and builds a powerful unified front to improve quality of life and elevate the experience for all.

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