NETWORKS OF EXPERIENCE: INTERACTIVE DIGITAL ART IN THE 21ST CENTURY

by

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DISSERTATION ABSTRACT

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Title: Networks of Experience: Interactive Digital Art in the 21st Century

Networks of Experience: Interactive Digital Art in the 21st Century considers interactivity in digital art practices. Emerging technologies advance so quickly that artworks using such technologies are not fully understood. Digital artworks are susceptible to unprecedented threats, including technology obsolescence, file incompatibility, and software updates that might considerably alter the artwork in a matter of months. However, immaterial characteristics such as interactivity are often overlooked in the panic of preserving physical technologies. Software and hardware do not always indicate how interactive a work should be, if it involves one or many participants at once, or how exhibition space should facilitate interaction. In this dissertation, I establish a framework to quantify and prioritize the many ways in which participants interact with artworks that make use of digital technologies. I propose a three-part typology – individual interactive experience, collective interactive experience, and distributed interactive experience – as illustrated with case studies including the VR artwork *The Chalkroom* (2017) by Laurie Anderson and Hsin-Chien Huang, the immersive digital exhibition *Continuity* (2021-2022) by the Japanese "ultratechnologist" collective teamLab, and the social media performance *Excellences & Perfections* (2013) by Amalia Ulman. The project offers clarity to the nature of interactivity, with an eye to long-term preservation when digital artworks are on display, on loan, or acquired in museum collections.

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This dissertation is dedicated to my trailblazer, Jayne Cole.

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PREFACE

In 2017, the Victoria & Albert Museum in London boldly announced the acquisition of a new object into its permanent collection: WeChat, China's largest social media platform. WeChat is central to life in China. In a single digital application, users can ride share, bank, order food, message friends, play games, post status updates, video chat, and pay for goods and services. WeChat is also a pioneer of social media design, integrating voice recording-based messaging and animated GIF "stickers" years before its Facebook and Instagram counterparts. V&A curators Brendan Cormier and Luisa Mengoni saw WeChat as the "Swiss Army Knife of apps," an emblem of multifunctional design in the media-saturated environment of the twenty-first century.[1] Acquiring such a digitally complex object for the V&A's collection was unprecedented. The process took two-and-a-half years, instigated in 2015 by a partnership between the V&A and China Merchants Shekou Holdings (CMSK) to build a cultural hub called Design Society (Sheji Hulian 设计互联) in the Sea World Culture and Arts Centre in Shenzhen.[2] The V&A Gallery at Design Society reached out to the WeChat team in Guangzhou to collaborate, with the goal of acquiring the app as an example of digital design intersecting with the city's urban landscape.

Preservation was the most pressing issue at hand. The V&A needed to ensure the long-term maintenance and survival of a code-based object tied to a constantly evolving server. As estimated by the app's developers, any technological change to the server would make the V&A's WeChat obsolete in less than ten years. The project therefore required a framing question

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[1] Brendan Cormier, "How We Collected WeChat," *V&A Blog* (blog), September 15, 2017, https://www.vam.ac.uk/blog/international-initiatives/how-we-collected-wechat.

[2] Luisa Elena Mengoni, "V&A Joins China Merchants Shekou Holdings (CMSK) in Launching Design Society," *V&A Blog* (blog), March 21, 2016, https://www.vam.ac.uk/blog/international-initiatives/va-joins-china-merchants-shekou-holdings-cmsk-in-launching-design-society.

posed by the curators: "When we talk about WeChat one hundred years from now, how will we be able to show people what it is?"[3] After months of experimentation, WeChat designers were able to create an offline, closed-software "demo" version of the app on an Android smartphone with pre-loaded content by a fictional user named Star.[4] Screen recordings were produced to visualize how users navigate the app and the V&A was provided with a physical smartphone to display, the Android Package (APK) file, and 152 GIFs from the "Bubble Pup" series.[5] The newly acquired WeChat was first exhibited in the 2017 Shenzhen Urbanism/Architecture Biennale – as a Samsung Galaxy A5 smartphone behind plexiglass playing the screen recording on loop (Fig. 1).

This solution presents a certain paradox. WeChat is an interactive digital application; user experience is tied to a haptic and audiovisual relationship with a smartphone. Why display documentation of the app's functions when it is tied to human interaction with a specific device? To Cormier and Mengoni, direct contact with the Samsung Galaxy A5 was not needed because visitors already experience the app on their personal devices: "It is our contention that only after the technology has evolved, and we've moved on to new devices and interfaces, will the display and ability to interact [with] our APK become valuable. We need to let our acquisition age."[6] Though this is undoubtedly true, how can the V&A ensure the interactive experience of 2017's WeChat is rekindled in one hundred years for visitors to fully understand this moment in digital design? How should that interactive experience look? Will the preservation of the Samsung

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[3] Cormier, "How We Collected WeChat."

[4] Cormier, "How We Collected WeChat."

[5] Luca Carini, ed. "Search: V&A Explore the Collections." Victoria and Albert Museum, 2017. https://collections.vam.ac.uk/search/?q=WeChat&page=11.

[6] Cormier, "How We Collected WeChat."

Galaxy A5 take precedent over the interactive experience, relegating WeChat to screen recorded documentation forever?

This dissertation tackles these questions. Today's objects of art and design are increasingly tied to the digital world. Museums, curators, and scholars alike require new language to understand such objects if they are to be preserved for future audiences to learn from and enjoy. The following chapters explore this challenge through the lens of interactivity – an immaterial characteristic that is often overlooked when considering the long-term implications of displaying, loaning, or collecting so-called "new media" in museums. Especially for complex interactive digital objects, it is crucial to balance attention between their material and immaterial characteristics to successfully ensure ongoing survival. An emphasis on the role interactivity plays in defining what these objects are and how they connect humans and machines may encourage museums to engage with artists and designers that critically examine twenty-first century technoculture and play a significant role in global contemporary art history.

INTRODUCTION
NETWORKS OF INTERACTIVE EXPERIENCE

Interactivity is a difficult characteristic to define and identify in contemporary art. Interaction between a human and an artwork is intangible; such a relationship may not be evident in the physical materials, but it may be crucial to understanding what the artwork is or does. As such, interactivity adds another layer to the challenge of displaying new media art in museums. Even major institutions with vast resources prioritize new media works that are static (such as single-channel videos) and are not predicated on interaction. According to Charlie Gere: "Work that is interactive and process-based, or that involves networks, systems, and feedback, tends to question the very notions of history, heritage, and time upon which museums and galleries are based."[1] When accessioning works into collections, museums commit to a regimen of care that might span generations of museum workers. "Stable" acquisitions such as painting and sculpture are backed by centuries of knowledge regarding long-term storage, display, and maintenance. New media is precarious – whether an example of digital app design or an artwork based in augmented reality, artificial intelligence, or social media. Today's artworks that make use of advanced digital technologies are susceptible to unprecedented threats: technology obsolescence, "URL rot," file incompatibility, and software updates might considerably alter artworks in a matter of months. As a result, immaterial characteristics such as interactivity are easily overlooked.[2]

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[1] Charlie Gere "New Media Art and the Gallery in the Digital Age" in *New Media in the White Cube and Beyond: Curatorial Models for Digital Art*, edited by Christiane Paul (Berkeley: University of California Press, 2008), 22-23.

[2] It is important to acknowledge that, in some cases, these factors are intentional. Especially for performance-based artworks and other ephemeral projects, the artwork is not meant to be preserved in any way. A nuanced understanding of what artworks are and what future the artist intended is crucial to effectively approach such artworks when they intersect with museums.

Ignoring the interactive layer of new media artworks could have significant consequences for their ongoing preservation. In her research on the prolific media artist Paik Nam June (1932-2006), Hanna Hölling found that, "over time, museums made changes that prevented [Paik's interactive works] from being activated… and transformed them into static objects of contemplation."[3] Paik's *Random Access* (1963), for example, gradually lost an essential element when on display over the years – the participant's actions (Fig. 2).[4] To Hölling, since many new media artworks can be switched "on" or "off," curators often choose "off" to protect the physical work from the effects of interaction. In doing so, museums turn the artworks into something different, more akin to relics than living works.[5] Paik's oeuvre is between sixty and twenty years old. When considering the V&A's goal of rekindling WeChat in one hundred years, this timeline may be the difference between an interactive experience with the artwork and a disconnected observation of its basic functions.

This study explores the interactive experience of new media artworks, specifically those made with digital technology since 2010. Though the danger of stagnation for earlier new media art like Paik's *Random Access* has been well documented, the rapid rate of technological development for interactive programming in the twenty-first century equally threatens recent artworks. Emerging technologies of virtual reality, augmented reality, digital installations, and social media advance so quickly that artworks using such technologies are not fully understood

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[3] Hanna Hölling, *Paik's Virtual Archive: Time, Change, and Materiality in Media Art* (Berkeley: University of California Press, 2017), 81. There remains an ongoing discussion in the field of global contemporary art on naming conventions for international artists and scholars. For the purpose of this dissertation, all names are listed according to the native custom (generally, for East Asia-born individuals, family name first and given name second; for North America and Western Europe-born individuals, given name first and family name second) except for bibliographic citations, which follow the Chicago Manual of Style.

[4] Hölling, *Paik's Virtual Archive*, 85.

[5] Hölling, *Paik's Virtual Archive*, 85.

by institutions that wish to engage with this branch of contemporary art. Art historical scholarship is also limited on how interactive experiences are constructed using these technologies. In response, I establish a framework to quantify and prioritize the many ways in which participants interact with artworks that make use of emerging digital technologies, with an eye to long-term preservation when acquired in museum collections. With renewed focus on interactivity, museums may feel more comfortable collecting artworks that critically examine technology's monumental impact on art and design in the last two decades.

Interactive (Digital) Art: History and Terminology

New media art, which is often defined as intersecting the fields of "art and technology" and "media art," constantly responds to the latest developments in technology.[6] "Old" media such as cathode-ray tube (CRT) televisions, slide projectors, and the Sony Portapak were once new and revolutionary. Today, digital technology facilitates new media art by providing themes of life in twenty-first century technoculture, mediums of screens and devices, and tools for the production process.[7] Digital art is one of many new media practices that rely on the technical process of computing to produce and distribute works. To art historian Beryl Graham, digital art is "made with, and for, digital media including the Internet, digital imaging, or computer-

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[6] This definition of new media art was put forth by Mark Tribe and Reena Jana, who consider new media art to be an intersection of two domains: art and technology and media art: "Art and Technology refers to practices, such as Electronic art, Robotic art and Genomic art, that involve technologies which are new but not necessarily media-related. Media art includes Video art, Transmission art and Experimental Film – art forms that incorporate media technologies which by the 1990s were no longer new." See Mark Tribe and Reena Jana, *New Media Art* (Hong Kong; Los Angeles: Taschen, 2009), 7.

[7] This terminology originates from art historian Christiane Paul, who argues for a new framework to approach digital art. Digital technologies could fulfill many roles: a tool in the creation process, a medium itself, or a theme in today's media landscape. See: Christiane Paul, *Digital Art,* (London; New York: Thames & Hudson, 2015).

controlled installations."[8] Interactive digital art, therefore, is a subset of new media practice that employs digital technologies and hinges on human participation. Such artworks might include digital installations, social media art, virtual and augmented reality, net.art, and any other practice that relies on human presence to activate the work via a digital interface.

Throughout this study, I refer to both "new media art" and "digital art," with the former term encompassing technology-based artworks in general (which may utilize analogue or digital technologies and encompasses a wider scope of contemporary art history) and the latter term specifying new media artworks based in digital technologies. Similarly, I use the term "interactive art" to describe both digital and analogue new media artworks that rely on human participation to activate.[9] "Interactive digital art" describes artworks that specifically employ digital technologies in this effort, acknowledging the monumental advancements in interactive programming since the "digital turn."[10] Following this logic, I prefer the terms "participant" and "user" to reference the human actor in interactive artworks. "Participant" encompasses both digital and analogue artworks, while "user" originates in computer science terminology and offers specificity to digital interactive experiences. I often use these terms interchangeably to emphasize the active role humans play in the construction of interactive artworks. This also

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[8] Beryl Graham, "Redefining Digital Art: Disrupting Borders" in *Theorizing Digital Cultural Heritage: A Critical Discourse,* edited by Fiona Cameron (Cambridge, MA: The MIT Press, 2007), 93.

[9] Though "interactive art" alone often refers to work created with digital computing, it could also encompass those made with analogue machines such as circuits, signal-based television, or devices that do not rely on binary data.

[10] Both terms fall under the umbrella of new media art, which spans the intersection of art and technology from analogue to digital and is not necessarily defined by interactive participation.

avoids the passive connotation of the term "viewer," which I find inconsistent with the premise of interactive art.[11]

Interactivity itself has a long history in contemporary art. In the 1950s and 1960s, practices that involved direct human participation surged. From Happenings to Fluxus scores and Op Art, individuals began taking an active role in both the creation and experience of artworks. The contemporaneous development of systems and cybernetic theories was crucial. Artists, philosophers, scientists, and engineers took up these ideas as conceptual guides for understanding the emergence of computing technologies in the wake of World War II. Systems theory originated in biology in the 1930s, embracing patterns of dynamic, continuous interaction between organisms within an environment.[12] With the introduction of mechanical feedback loops in Norbert Wiener's work on communication technology in the late 1940s, systems theory was integrated into a larger conception of cybernetics – a framework that would encompass both biological and mechanical systems. In the 1960s, second-order cybernetic theory narrowed to emphasize reflexivity, a shift in focus that N. Katherine Hayles describes as "bringing the observer *inside* the system, rather than assuming an external (and largely unnoticed) observer."[13] In contemporary art practices such as installation or performance art, this theory paralleled an integration of humans into the "system" of the artwork, transforming them from passive observers to active contributors.

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[11] In the instances when observation of interactivity occurs, I prefer the term "spectator," as it indicates an active relationship between humans and artworks. This follows Kate Mondloch's approach to spectatorship in *Screens: Viewing Media Installation Art*: "…*how* one sees is just an important as *what* one sees." See: Kate Mondloch, *Screens: Viewing Media Installation Art* (Minneapolis: University of Minnesota Press, 2010).

[12] See Edward A. Shanken, "Introduction: Systems Thinking/Systems Art" in *Systems*, Documents of Contemporary Art (Cambridge, MA: The MIT Press, 2015), 1-12.

[13] N. Katherine Hayles, "Cybernetics" in *Critical Terms for Media Studies* edited by Mark B.N. Hansen and W.J.T. Mitchell (Chicago: University of Chicago Press, 2010), 147.

Edward Ihnatowicz (1926-1988), Nicolas Schöffer (1912-1992), and James Seawright (1936-2022) were among the first artists to embrace technical feedback processes via light and sound sensors in the 1950s. However, these artists used terms such as "cybernetic," "responsive," and "reactive" instead of "interactive."[14] Computing technology was still largely conceptual, though artists were keenly aware of its potential to revolutionize art and society. Emerging principles of computer operations and software programming soon integrated into various artistic practices. Fluxus artists, for example, turned to rule-based "scores" that emphasized the creation and enactment of formal instructions to complete artworks – an impulse comparable to the numerical pattern of instructions required for digital computing.[15] However, with the exception of computer scientists/artists including Michael Noll, Frieder Nake, and George Nees, who experimented with plotters and punch-card technologies in the early 1960s, few artists were creating artworks with a computer.[16] It was Douglas Engelbart's 1964 development of the "X-Y position indicator for a display system," now known as a "mouse," that made real-time feedback processes between humans and machines more possible.[17] With this increased navigability, artists and participants alike could engage directly with computers as part of their experience with artworks.

In 1969, the term "interactive art" was first used in reference to *Glowflow,* an installation produced by artists and scientists at the University of Wisconsin-Madison. *Glowflow* was built in

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[14] Katja Kwastek, *Aesthetics of Interaction in Digital Art* (Cambridge, MA: The MIT Press, 2013), 7.

[15] A good example is LaMonte Young's (b. 1935) infamous *Composition 1960 #10 (to Bob Morris)* ("draw a straight line and follow it"), which was realized by Paik Nam June as *Zen for Head* in 1962.

[16] These artworks also cannot be labeled as "interactive," as they were meant for print-out and display as two-dimensional objects. For a history on early computer art, see: "The Pioneers (1950-1970)," A History of Computer Art (Victoria and Albert Museum, July 17, 2013), http://www.vam.ac.uk/content/articles/a/computer-art-history/. The V&A has one of the largest collections of early computer art in the world.

[17] Kwastek, *Aesthetics of Interaction in Digital Art*, 6.

a darkened room of transparent tubes filled with circulating phosphorescent particles. By walking on the sensitive, computer-controlled floor, participants could make the particles glow.[18] A flyer for the installation proclaimed: "*Glowflow* is not an exhibit in the traditional sense, but a continuous experiment in interactive art."[19] One of the contributors was Myron Krueger (b. 1942), a pioneer of artworks that react and respond to human presence.[20] Like earlier artists, however, Krueger rarely used the term "interactive" at the time. This hesitation to characterize works as interactive is also true for contemporaneous movements that emphasized in-person presence. In the 1960s and 1970s, Kinetic and Op art relied on humans to produce movement in machines and create optical illusions.[21] These are foundational movements for today's interactive art, even though they did not embrace the same terminology to describe the participant's role in activating the artworks.

"Interactive art" formally emerged as a new media practice when it was included in the 1990 edition of Ars Electronica. According to Katja Kwastek, "interactive art was thus frequently celebrated as *the* groundbreaking manifestation of [new] media art."[22] Works focused on social interactions in the 1960s, followed by computer-controlled environments in the 1970s, digital human-machine experiences in the 1980s, and the emergence of the internet in the 1990s, now left artists with fertile ground to explore interactive art as its own practice. This was supported by Ars Electronica. As debates surrounding the nature of interactivity flourished, the

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[18] Kwastek, *Aesthetics of Interaction in Digital Art*, 8.

[19] Exhibition flyer, Myron Krueger archives, cited in Kwastek, *Aesthetics of Interaction in Digital Art,* 8.

[20] For more on this project, see Myron W. Krueger, "Early Work: *Glowflow*, *Metaplay*, and *Psychic Space*" in *Artificial Reality II* (Boston: Addison-Wesley, 1991), 11-33.

[21] Christiane Paul, "From Archives to Collections: Digital Art In/Out of Institutions" in *Museum and Archive on the Move,* edited by Oliver Grau (Berlin: Walter De Gruyter, 2017), 187.

[22] Kwastek, *Aesthetics of Interaction in Digital Art,* 8.

festival expanded its definition of interactive art in 2004 to include "real-time interaction" and "passive interaction," breaking down what Kwastek calls "rigid boundaries between digitally and analogically mediated interaction, and between active participation in feedback processes and their 'passive' observation."[23] Some museums outside the new media art world embraced interactive art with this expanded definition in mind, installing exhibitions such as *Act/React: Interactive Installation Art* at the Milwaukee Art Museum (2008) and *Decode: Digital Design Solutions* at the V&A (2010).

<u>Characterizing Interactivity</u>

According to Beryl Graham, interactive literally means "acting upon each other."[24] Interaction is more than a reaction: in interactive art, a participant physically acts upon an artwork and the artwork responds by acting upon the participant in return. This is a step beyond pulling a lever or pushing a button and witnessing the artwork's response. Ben Neal, Edie Jo Murray, and Harmeet Chagger-Khan's *Mood Pinball* (2019)*,* for example, is a digital pinball machine that shoots pinballs in response to participants pulling levers and pushing buttons (Fig. 3). However, the artwork does not act upon the participant in return, like BREAKFAST's (est. 2009) *Flip Disk (Particles 45)* (2018)*,* which records participants' bodily movements and reflects them back in real-time using redeveloped flip-disc technology (Fig. 4). The duo 0100101110101101.org (est. 1994) describes this well, arguing that actions like clicking through a website only deliver default, pre-programmed results. To the artists: "Interaction is [only] when

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[23] Kwastek, *Aesthetics of Interaction in Digital Art,* 8.

[24] Beryl Graham, "What Kind of Participative System? Critical Vocabularies from New Media Art" in *The Do-It-Yourself Artwork: Participation from Fluxus to New Media,* edited by Anna Dezeuze (Manchester: Manchester University Press, 2010), 286.

one uses something in a way that was not foreseen by its creator."[25] New media artist Jeffrey

Shaw (b. 1944) agrees, seeing each participant of his work as "narrator and autobiographer of

one of [many] possible scenarios."[26] Interactive digital artworks therefore facilitate action

between humans and computers; they allow art and humans to "act upon each other."[27]

The term interactivity also helps distinguish among other forms of "participatory,"

"collaborative," or "do-it-yourself" practices. Participatory art, for example, emphasizes the

social dimension of art "as a way to bring art closer to everyday life."[28] Participatory art is often

tied to discussions of relational aesthetics, or Nicholas Bourriaud's notion of "an art taking as its

theoretical horizon the realm of human interactions and its social context, rather than the

assertion of an independent and *private* symbolic space (emphasis in original)."[29] Participatory

artworks might invite people to dance, drink beer, discuss philosophy or politics, run a travel

[25] Tilman Baumgärtel, "Interview with 0100101110101101.org, 09.10.1999," in *Net.Art.2.0: New Materials Towards Net Art* (Vienna: Verlag, 2005), 204.

[26] Jeffrey Shaw, "Modalitäten einer interaktiven Kunstausübung" in *Kunstforum International* 103 (1989): *Im Netz der Systeme,* 204. Translated in Kwastek, *Aesthetics of Interaction in Digital Art,* 36. Dominic McIver Lopes concurs in *A Philosophy of Computer Art*, considering interactivity as "prescribed user actions" that change the artwork's display through interaction. See: Dominic McIver Lopes, *A Philosophy of Computer Art* (New York: Routledge, 2010), 39 and Kathryn Brown, ed., *Interactive Contemporary Art: Participation in Practice* (London; New York: I.B. Tauris, 2016), 4.

[27] In the most technical sense, little digital art is fully interactive. As Graham points out, "computers can afford a very elaborate series of reactions, but no computer has yet passed the Turing Test for artificial intelligence, where a human judge must decide whether their typed dialogue is with a human or a computer." See Beryl Graham, "What Kind of Participative System," 287. As early as 1973, artists and programmers Stroud Cornock and Ernest Edmonds recognized: "An 'interactive' art system has within it an artefact so organized as to be able to sustain a conversation with the user approaching the kind of conversation we witness between people." See: Stroud Cornock and Ernest Edmonds, "The Creative Process Where the Artist is Amplified or Superseded by the Computer" in *Leonardo* 6, no. 11 (1973): 11-15. Graham emphasizes the importance of this choice in terminology, as even the most advanced technological systems can only "approach" full interaction. Nevertheless, I embrace the term interactivity in this project because it is the best term that indicates an active relationship between humans and machines in art.

[28] Claire Bishop, "Introduction: Viewers as Producers" in *Participation*, Documents of Contemporary Art (Cambridge, MA: The MIT Press, 2006), 10.

[29] Nicolas Bourriaud, "Relational Aesthetics," trans. Simon Pleasance and Fronza Woods (Dijon: Les presses du réel, 1998), 14. Notably, Bourriaud often employed language and terminology tied to new media art, but never explicitly connected his conception of relational aesthetics to technology-based artworks.

agency, or enjoy a Thai meal together.[30] Alternatively, collaborative art blurs the line between artist and spectator.[31] Such practices invite spectators to become co-producers, working in concert with artists to manifest an artwork. Art historian Anna Dezeuze unites these ideas under the umbrella term "do-it-yourself artworks," which "require an active and/or conceptual participation on the part of the spectator."[32] These practices embody twentieth-century impulses to dematerialize the artwork, deconstruct notions of authorship, and grant agency to spectators. However, they do not address humans' evolving relationship with technology across the monumental advancements of the same era.

"Interactive art" offers specificity to practices that place humans and machines in relation to one another. This relation may manifest in either human-to-machine or human-to-human interaction via analogue or digital technological interfaces. In his book entitled *Artificial Reality II,* Myron Krueger writes: "Human-computer interaction started with punched cards, progressed to text-based dialogues, and currently employs graphics and sound…. It is the definition of that relationship in which both art and science are interested."[33] Katja Kwastek adds that interactive art "can be measured either in terms of criteria for human-machine communication or in terms of the sociological concept of interaction – in other words, on the basis of the ideal of face-to-face

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[30] See works by Hélio Oiticica (1937-1980), Adrian Piper (b. 1948), Tom Marioni (b. 1937), Joseph Beuys (1921-1986), Martha Rosler (b. 1943), Allen Ruppersberg (b. 1944), Daniel Spoerri (b. 1930), Gordon Matta-Clark (1943-1978), Alighiero Boetti (1940-1994), Christo (1935-2020) and Jeanne-Claude (1935-2009), and Rirkrit Tiravanija (b. 1961).

[31] Anna Dezeuze, "An Introduction to the 'Do-It-Yourself' Artwork" in *The Do-It-Yourself Artwork: Participation from Fluxus to New Media,* (Manchester: Manchester University Press, 2010), 6. For more on collaborative art practices, see Grant Kester, *The One and the Many: Contemporary Collaborative Art in a Global Context* (Durham, NC: Duke University Press, 2011).

[32] Dezeuze, "An Introduction to the 'Do-It-Yourself' Artwork," 1.

[33] Krueger, "Early Work," 9.

communication."[34] In my conception of interactive art, this relationship between humans and machines is crucial. An interactive artwork might aim to facilitate human-to-machine communication; it might also encourage human-to-human interaction using a machine.

Because interactivity can encompass a broad range of artworks, interactive digital art is best understood when placed on a spectrum. Nicholas Shedroff and Beryl Graham both reference a "continuum" of interactivity in their scholarship on the topic.[35] To Shedroff, interactivity can be varied according to "the amount of control the audience has over the tools, pacing, or content; the amount of choice this control offers; and the audience's ability to use the tool or content to be productive or creative."[36] Virtual reality, for example, is highly immersive and embraces devices including movement-sensitive audiovisual headsets, haptic gloves, and multisensory masks. However, as Graham points out, "[virtual reality systems] show simple 'reactive' behavior (sic) to human input."[37] Participants have some control over their experience by moving the body or head – becoming Shaw's "narrator and autobiographer" of a pre-programmed experience. Immersive digital installations are more interactive. With complex algorithmic programming that spans multiple computer systems, the installation reacts and responds to the presence of the human body. In these experiences, participants have control over the pace and extent to which they engage with the installation – running, jumping, walking, sitting, or standing might affect

[34] Kwastek, *Aesthetics of Interaction in Digital Art,* 4.

[35] See Nathan Shedroff, "Information Interaction Design: A Unified Field Theory of Design," in *Information Design* (Cambridge, MA: The MIT Press, 2000), 267–92. Brenda Laurel conceived of this "continuum" of interactivity even earlier. See: Brenda Laurel, *Computers as Theatre,* (New Jersey: Addison-Wesley, 1991) for a similar approach.

[36] Shedroff, "Information Interaction Design," 283. Brenda Laurel agrees in her book, *Computers as Theater,* in which she discusses her theory that "interactivity exists on a continuum that could be characterized by three variables: frequency (how often one could interact), range (how many choices were available), and significance (how much the choices really affected matters)." See Brenda Laurel, *Computers as Theatre,* 2nd ed. (New Jersey: Addison-Wesley, 2014).

[37] Graham, "What Kind of Participative System," 287.

the work differently. Though this produces an illusion of total control, the advanced systems behind-the-scenes are still pre-programmed according to a set of instructions. The most interactive artworks connect people. As Graham insists, interactive art "cannot offer a full conversation between a machine and a person, but it can offer a platform for conversation between people, and act as a 'host' to facilitate this."[38] Such interaction might be achieved via social media art practices or installations that require engagement with user-generated content.

This spectrum is a useful method to describe the various ways in which interactivity manifests in new media artworks. Rather than understanding interactivity as a blanket characteristic, Graham and Shedroff's continuum offers structure to begin addressing questions central to this dissertation: how interactive are digital artworks? What kind of interactive experience do digital artworks offer? And how can museums ensure the interactive experience survives alongside the physical artwork when on display, on loan, or accessioned into a permanent collection? The following sections explore these questions in greater detail.

A Typology of Interactive Experience in Networks

Previous publications on interactive digital art develop an aesthetic of experience. This is a subjective endeavor, with focus on individual perception and interpretation of artworks. Katja Kwastek's *Aesthetics of Interaction in Digital Art,* for example, develops an "apparatus" to identify "the ontological status of interactive art."[39] Her book evaluates artworks from the perspective of artists, assistants, and participants through the framework of "self-observation,"

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[38] Graham, "What Kind of Participative System," 287.

[39] Kwastek, *Aesthetics of Interaction in Digital Art,* 51.

"recipient observation," and "recipient interviews."[40] With a focus on the aesthetics of various themes including play, performance, space, and liveness, Kwastek explores what an experience of interactive digital art is like. Other scholars including Anna Dezeuze propose studying the temporality of interactive works, tying experience to a discrete moment in time akin to performance art studies.[41] These approaches require in-depth interviews, surveys, and visitor feedback about what they saw, felt, smelled, and heard in the experience.

This study is not driven by an analysis of subjective experience. By contrast, I propose a framework for understanding how interactive experience is constructed in today's digital artworks. This is not the only possible framework; my proposal is one of many potential methods for investigating interactive experience in new media art.[42] I also do not attempt to categorically define interactivity. Instead, I offer a starting point for prioritizing interactive experience of digital artworks when on display, on loan, or entering a permanent collection. Software and hardware do not always indicate how interactive a work should be, if it involves one or many participants at once, or how exhibition space should facilitate interaction. Though I still put the participant at the center, I am more concerned with categorizing types of interaction than analyzing the participant's interpretation of the experience. This approach allows for a more

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[40] Kwastek, *Aesthetics of Interaction in Digital Art,* 64-67.

[41] Dezeuze, "An Introduction to the 'Do-It-Yourself' Artwork," 7.

[42] This approach is not unlike Claire Bishop's in her book *Installation Art,* which establishes a four-tier system of categorizing installation works of art by the kind of experience created, including: The Dream Scene, Heightened Perception, Mimetic Engulfment, and Activated Spectatorship. These categories shift focus from the work itself to the spectator, seeking a method to understand the various types of embodied experiences participants have when interacting with installation works of art. See: Claire Bishop, *Installation Art*, (London, UK: Tate, 2010). While Bishop's designations are not standard categorizations in the field, her general classification of installation art as defined by experience rather than materiality has become a standard technique for understanding the development of installation art as a medium.

nuanced perspective on the human-to-machine and human-to-human relationships that occur in interactive art as a whole.

I propose a three-part typology of experience that quantifies human and machine relationships in interactive digital art: individual interactive experience, collective interactive experience, and distributed interactive experience. First, individual interactive experience is produced by artworks that only engage one participant at a time and allow for an intimate, personal experience. Second, collective interactive experience stems from artworks that respond to the presence of multiple bodies simultaneously, emphasizing shared, in-person engagement. And third, distributed interactive experience is tied to artworks embedded in the structure of the internet, where users are physically distanced but interact on a shared virtual platform. This typology offers structure and language to understand the various modes of interactivity that can be achieved in digital art.

Network theory is a useful method to situate interactive experience within the technical environment of a digital artwork. Alexander Galloway defines networks as "systems of interconnectivity. More than simply an aggregation of parts, they must hold those parts in constant relation."[43] Galloway insists upon this relationality in networks: "a forest is not a network, but a forest's *ecosystem* is. A population is not in itself a network, but a population engaged in a market economy may well be (emphasis in original)."[44] Network diagrams can be used as tools, illustrating how individual points (nodes) are connected (via edges/links) in a given situation. Network theory can be applied widely; it is often used to interrogate the internet, transportation, social structures, economics, and almost any other active system. However, nodes

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[43] Alexander Galloway, "Networks," in *Critical Terms for Media Studies* (New York: Oxford University Press, 2010), 283.

[44] Galloway, "Networks," 283.

(whether computers, people, airports, or currency) must be enmeshed in a system to be considered a network.

In his 2004 book *Protocol* and extended in subsequent articles, Galloway outlines three types of networks in a computer system: centralized networks, decentralized networks, and distributed networks (Fig. 5).[45] Centralized, or "star" networks are characterized by "a singular hub" where all power converges.[46] In computer systems, centralized networks are often built around a single computer or server that controls all information related to the system. Decentralized networks have "*multiple* central [nodes]" with no single node in full control of the network (emphasis in original).[47] Decentralized computer networks are built around several computers or servers. However, individual nodes in decentralized networks can gain power over other nodes – a process that Albert-László Barabási calls "power law distribution."[48] When certain nodes gain more power and become "hubs," the network's behavior changes.[49] In contrast to the first two models, distributed networks are defined by "equity between nodes, bidirectional links, a high degree of redundancy, and a general lack of internal hierarchy."[50] Distributed networks are rhizomatic. As Galloway describes: "Like a rhizome, each node in a distributed network may establish direct communication with another node, without having to

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[45] Galloway drew from the work of Paul Baran, who first conceived of distributed networks in the 1960s. See: Paul Baran, *On Distributed Communications* (Santa Monica: RAND, 1964).

[46] Galloway, "Networks," 288.

[47] Galloway, "Networks," 288.

[48] Albert-László Barabási, "Introduction and Keynote to A Networked Self," in *A Networked Self: Identity, Community and Culture on Social Network Sites* (New York: Routledge, 2010), 1–14.

[49] Barabási, "Introduction and Keynote to A Networked Self," 4.

[50] Galloway, "Networks," 288.

appeal to a hierarchical intermediary."[51] Taken together, these three models allow for nuanced

interrogation into how various parts are interconnected in a living system.

The language of network systems helps define my typology of interactive experience in

digital art. In an article entitled "What Kind of Participative System: Critical Vocabularies from

New Media Art," Beryl Graham examines interactivity in terms of networks:

> If the audience or participants are considered as nodes, then it becomes easier to map exactly what kind of 'level of control' and hierarchical position they occupy. Whether or not a system itself can be changed is an important question for both new media and for politics – user-generated content is one kind of participation, the ability to change the taxonomy of the way in which information is displayed is a more sophisticated effect upon the system, but the control of a system (a 'sysadmin' in computer parlance) still demands particular access and skills.[52]

To Graham, Galloway's language surrounding networks naturally connects to Nicholas

Shedroff's "continuum" of interactivity.[53] Both invoke levels of control as defining factors,

which help define the amount of interactivity in a given artwork. This approach also supports the

turn in new media art to describe artworks in terms of behaviors, characteristics, or practices

instead of specific mediums.[54]

Mapping my typology of interactive experience onto network diagrams is a helpful

method for structuring a coherent framework that applies to a wide range of interactive artworks

(Fig. 6). However, I intentionally adopt the terminology of "individual," "collective," and

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[51] Alexander Galloway, "Protocol: How Control Exists after Decentralization," in *Networks*, Documents of Contemporary Art, edited Lars Bang Larsen, (Cambridge, MA: The MIT Press, 2014), 166.

[52] Graham, "What Kind of Participative System," 300.

[53] See Graham's application of Shedroff in Graham, "What Kind of Participative System," 286-287.

[54] For more on the turn to behaviors, characteristics, and practices, see: Sarah Cook, "Online Activity and Offline Community: Cultural Institutions and New Media Art" in *Theorizing Digital Cultural Heritage: A Critical Discourse,* edited by Fiona Cameron (Cambridge, MA: The MIT Press, 2007), 113-132; Beryl Graham, "Redefining Digital Art: Disrupting Borders" in *Theorizing Digital Cultural Heritage: A Critical Discourse,* Fiona Cameron, ed. (Cambridge, MA: The MIT Press, 2007), 93-112; and Christiane Paul, "Introduction" in *New Media in the White Cube and Beyond*, (Berkeley: University of California Press, 2008), 1-12.

"distributed" interactive experience instead of "centralized," "decentralized," and "distributed" interactive experience because the parallel to network diagrams is general and mutable. These terms also avoid the disconnect that might occur between the intended interactive experience and the realities of exhibition and display. As Graham acknowledges, meaningful interaction is difficult to achieve:

> Many art projects have built web sites for user-generated content and participation, only to find that nobody participated. Hosting participation is a delicate skill, and the participatory system must be clear, yet flexible, and the authorship must be at least partially 'decentralized.' Here again, the language of network systems is useful: an immaculately designed distributed system can quickly become a centralized system if nobody participates and one person ends up creating the content, and a conversation can become a monolog.[55]

Indeed, both decentralized and distributed networks have the potential to transform into a centralized network if interaction is limited to a single person. One person inside a digital installation intended for a collective experience has all the control over the artwork. One person commenting on a social media artwork has a one-sided conversation. These network models should thus be understood as changeable referents, depending on the real-life actions of people engaging with digital artworks.

To begin, individual interactive experience can be equated with a centralized network. All audiovisual information converges at the point of a single person. The experience creates a human-to-machine relationship through a single device (i.e., a headset or computer). One person has all the control in an individual interactive experience – their movements define the artwork as they become "narrator and autobiographer" of their own experience. A virtual reality artwork, for example, can isolate and plunge users into a new world, allowing them to navigate the space according to their own whims. Participants may have diverse experiences with the artwork by

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[55] Graham, "What Kind of Participative System," 293.

looking different directions or entering different virtual rooms at various times. From a technical standpoint, artworks that afford an individual interactive experience are often built around a single computer. If that computer crashes, the whole artwork is inaccessible. Such artworks can also be more mobile because they are not physically connected to other artworks or people. Virtual reality or net.art installed on a desktop are "closed" systems; even two people sitting next to each other would have a different experience of the artwork on their own terms. Theoretically, such artworks could be placed in any suitable location and maintain the same interactive experience.

Collective interactive experience is comparable to a decentralized network. Many people have control over the artwork at once as they share the same space. Participants enter into a human-to-machine relationship with the artwork, but due to their in-person engagement, a human-to-human relationship is also possible. Technologically, such artworks are built around several computers that all feed into a larger system; if one goes down, the entire artwork does not necessarily crash. Individual participants are also capable of increasing their power in the network. In a projection-based interactive digital installation, one participant might slowly place their hand on the wall and watch a digital stream of water divert around their hand. Another participant in the same space might suddenly press their entire body on the wall, provoking a much larger ripple effect and change to the environment. The artwork eventually reverts back to a pre-programmed standard condition in both cases, providing a base line for the next group of participants to manipulate the projection anew. In such experiences, people can be placed anywhere in the artwork's environment and effect change. Unlike artworks that offer individual interactive experiences, however, these artworks are limited by a certain physical space. Installations, for example, are carefully constructed in galleries and buildings to provide

boundary to the collective experience. The artwork is considerably less mobile. Collective interactive experience is therefore tied to physical presence in a discrete location.

Distributed interactive experience is most directly connected to network theory. Sharing a name with distributed networks, this type engages with a wide body of literature on the networked structure of the internet to connect people across wide geographies. In this model, participants are virtually connected to one another in a human-to-human relationship that is facilitated by machines. In a work of social media art, for example, users communicate over a shared application. They can comment, like, share, and message using the infrastructure of the online platform. Conversation can build on a single post and people can directly message the artist or each other. In this instance, participants do not need to share the same space at the same time. Interaction lives in individual smartphones and computers that could be located anywhere the world with an internet connection. Regardless of physical location or time zone, users can engage in the same interactive experience together.

As a whole, this typology is meant to establish structure and language to describe interactive experiences of digital art. This is crucial for understanding what such artworks are, what they do, and how relationships are built between humans and machines as a result. It also provides practical insight into artworks when they are on display, on loan, or accessioned into permanent collections. Uncertainty about the nature of these artworks is at the center of museums' hesitation to collect digital objects of art and design. Despite decades of engagement with digital technologies in the art world, very few museums have comprehensive collections or programs of display. The following section explores why, and presents methods for inserting this typology into strategies of conserving, preserving, and documenting similar artworks.

Interactivity and the Long-Term Survival of New Media Art

This study provides a framework for understanding interactive experience in documentation strategies for new media art. My typology offers insight into how interactive experience is constructed in artworks that rely on today's digital technologies; such language may be inserted into any existing strategy that museums utilize to ensure the long-term survival of new media art collections.[56] At its core, this study draws attention to the immaterial characteristics that are often overlooked in the panic of preserving physical technologies – but it does not ignore the fundamental role of hardware in this process. Material and immaterial components are equally crucial to understanding what a digital artwork does. As art historian Christiane Paul argues, "immateriality cannot be separated from the material components of the digital medium… The presentation and preservation of new media art therefore needs to consider tensions and connections between the material and the immaterial."[57] There is now a wide body of literature on the challenges of preserving artworks that are rapidly approaching technological obsoletion.[58] This study balances those concerns with the various modes of immaterial interactive experience such hardware offers.

Indeed, the last two decades have seen a surge in scholarship surrounding the long-term care of artworks that are termed "time-based," "variable" or "unstable."[59] It is now clear that the

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[56] Many documentation strategies for new media art have been proposed by museums since the early 2000s. This project does not propose a new strategy with tools of visitor surveys, reflections, or interviews to measure individual participants' subjective experience. However, it is important to note that these tools are still useful for artworks on a case-by-case basis and should not be discounted.

[57] Christiane Paul, "Digital Art Now: Histories of (Im)Materialities," *International Journal for Digital Art History* 5 (2020): 10.

[58] See scholarship by Annet Dekker, Jon Ippolito, Oliver Grau, Hanna Hölling, Pip Laurenson, Renée Van de Vall, and Vivian van Saaze.

[59] For more on this terminology, see: Joanna Phillips, "Time-Based Media," The Guggenheim Museums and Foundation. Accessed August 8, 2022. https://www.guggenheim.org/conservation/time-based-media; Kate Moomaw, "Preserving Variable Media at the DAM," Denver Art Museum, June 29, 2012.

"traditional" field of conservation does not adequately address the future of such artworks – this

model still leaves museums deeply hesitant to accession new media works into permanent

collections. Art historians and conservators such as Hanna Hölling insist that the "transitory,

processual, and conceptual/intangible aspects of art created since the 1960s has forced

conservation out of its object-oriented comfort zone," demanding "a new set of conceptual tools

in conservation."[60] Indeed, new media art presents challenges that were largely unforeseen in the

centuries of art restoration, conservation, and preservation that is intertwined with the history of

art.[61]

New media art presents dual challenges to long-term care: first, physical materials are

dangerously susceptible to technology obsolescence, requiring artists, conservators, and curators

to determine levels of "acceptable loss." Can screens be upgraded when the original hardware is

inaccessible? Should a broken speaker be replaced? Though excessive loss may permanently

alter the artwork, a suitable amount must be foreseen and managed. To Cat Hope and John Ryan:

"Areas of acceptable loss can include the physical deterioration of the work itself; the decline of

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https://www.denverartmuseum.org/en/blog/preserving-variable-media-dam; and Cat Hope and John Ryan, *Digital Arts: An Introduction to New Media* (New York: Bloomsbury Academic, 2014), 12-13.

[60] Hanna Hölling, "The Technique of Conservation: On Realms of Theory and Cultures of Practice" in *Journal of the Institute of Conservation* 40, no. 2 (2017): 92-93.

[61] It is important to consider the difference between restoration, conservation, and preservation. Until the early-nineteenth century, artworks were fully restored before going on display. Damaged sculptures were given replacement parts, often taken from other sculptures. Paintings were retouched, cut down, or enlarged to hide damage. To Hölling, conservation encompasses "all actions related to the manipulation of objects – their examination, documentation, and maintenance that, to varying degrees, is oriented towards securing these works' existence and survival." To safeguard artworks from restoration, preservation thus became an important practice to maintain artworks. Museums now aimed to provide what Computer History Museum Collections Manager Karen Kroslowitz calls "a stable storage or display environment in order to minimize further damage or deterioration." See Peter Walsh, "Rise and Fall of the Post-Photographic Museum: Technology and the Transformation of Art" in *Theorizing Digital Cultural Heritage: A Critical Discourse,* edited by Fiona Cameron (Cambridge, MA: The MIT Press, 2007); Hölling, Hanna. "The Technique of Conservation: On Realms of Theory and Cultures of Practice." *Journal of the Institute of Conservation* 40, no. 2 (2017): 87-96; and Karen Kroslowtiz, "Preservation, Conservation, Restoration: What's the Difference?" Computer History Museum, December 31, 2019. https://computerhistory.org/blog/preservation-conservation-restoration-whats-the-difference/.

the media used to record the work; the obsolescence of technologies originally employed to execute or access the artwork; or the loss of the concepts that underpinned the artist's intentions in making the work."[62] As Hölling asks, "how much modification can an artwork tolerate and still retain its own identity or authenticity, and at what point does the modification of an artwork obscure its identity or undermine its authenticity?"[63] With digital artworks, it is crucial to develop answers to such questions before works enter museum collections.

Second, and more pressing for this study, new media art often features immaterial characteristics that are central to the experience of the artwork. Works might be processual, conceptual, performance-based, or interactive in ways that are not evident in the physical technology. As Katja Kwastek outlines in *Aesthetics of Interaction in Digital Art,* "there is no necessarily causal relationship between the experiences and epistemic processes brought about by interactive art and the instrumental characteristics of interactivity. For example, a hyperlink system may present a non-linear narrative, but can just as easily involve the recipient in a question-and-answer game."[64] In other words, the use of any particular hardware or software does not guarantee a clear indication of how an artwork is to be experienced. For instance, Olia Lialina's (b. 1971) *Agatha Appears* (1997) and Susanne Berkenheger's (b. 1963) *Bubble Bath* (2005) are both examples of interactive net.art that rely on HTML coding – the former is a comic book-style click-through narrative, and the latter opens a series of browser pop-ups that ask individual users to complete game-style tasks such as catching a floating link.[65] Electronic

[62] Cat Hope and John Ryan, *Digital Arts,* 183. Also see Josephine Bosma, *Nettitudes: Let's Talk net Art* (Rotterdam and Amsterdam: Nai Publishers and Institute of Network Cultures, 2011), 171.

[63] Hölling, *Paik's Virtual Archive,* 4.

[64] Kwastek, *Aesthetics of Interaction in Digital Art,* 121.

[65] These two case studies are examined in depth in Kwastek, *Aesthetics of Interaction in Digital Art*, 177-193.

Disturbance Theater's (est. 1997) *Zapatista Tactical FloodNet* (1998) also uses HTML, but offers a distributed, rather than individual, interactive experience. Participants in this artwork were organized via email and asked to create "bad" URLs on Mexican and American governmental servers to create error messages that protest the deaths of indigenous Zapatista rebels in Chiapas, Mexico.[66] The difference in interaction between these artworks are difficult to identify in the basic hardware or software of the artworks.

In the early 2000s, museums and scholars alike began proposing various new strategies to describe and document new media artworks when they enter a collection. Today's most common strategies include the Variable Media Questionnaire (VMQ), Matters in Media Art (MMA), Capturing Unstable Media Conceptual Model (CMCM) and the Media Art Notation System (MANS).[67] These models encompass artworks that make use of technology, but are only a selection of strategies that address the documentation of contemporary artworks for which traditional conservation is inadequate. In addition, though they are undeniably useful, these strategies primarily address physical technologies without meaningfully engaging with immaterial characteristics. Clear terminology is needed to quantify and prioritize this critical component of new media artworks.[68] My typology of interactive experience can therefore

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[66] Electronic Disturbance Theater is a collective including Ricardo Dominguez (b. 1959), Carmin Karasic (b. 1954), Brett Stalbaum (b. 1966), and Stefan Wray. For a further discussion of this artwork, see Mark Tribe and Reena Jana, "Zapatista Tactical FloodNet" in *New Media Art* (Hong Kong; Los Angeles: Taschen, 2009), 40.

[67] The VMQ was developed by the Guggenheim Museum in 2003; MMA was proposed by the New Art Trust, the Museum of Modern Art, the San Francisco Museum of Modern Art, and the Tate in 2003; CMCM was advanced by the V2_Organisation in 2003; and MANS was offered by Richard Rinehart in 2005. See Jon Ippolito, "Accommodating the Unpredictable: The Variable Media Questionnaire" *Performing Arts Resources* 24 (2004): 94-101.; Gunnar Heydenreich, "Documentation of Change – Change of Documentation" in *Inside Installations: Theory and Practice in the Care of Complex Artworks,* ed. Tatja Scholte and Glenn Wharton, (Amsterdam: Amsterdam University Press, 2011), 155-172.; Fauconnier, Sandra, and Rens Frommé. "Capturing Unstable Media: Summary of Research." *V2_Organisation*, March 2003, 1-14.; and Richard Rinehart, "The Media Art Notation System: Documenting and Preserving Digital/Media Art" *LEONARDO* 40, no. 2 (2007): 181-187.

[68] Each strategy approaches from a different angle – the VMQ is an open-ended artist interview guide, MMA provides templates for technical specifications that integrate into museum databases, CMCM helps identify

contribute language and structure to strategies that already address many concerns associated

with the long-term documentation and preservation of new media art in museums. It inserts the

question of human-machine relationships into the ongoing quest to preserve precarious artworks

that rely on unstable technologies.

Methodological Approach

To adequately address both material and immaterial components of interactive digital art,

I draw from two divergent, yet complementary, methodologies: performance studies and media

archaeology. Increasingly, scholars consider new media art in terms of performance – looking to

the history of performance art documentation to better understand and preserve such artworks.

Re-installations of new media artworks at institutions including the Tate are termed

"activations," as these works are often re-created for every installation.[69] Performance art

documentation is a useful model, because it considers the role of spectators, environments, and

physical remnants of actions that could span multiple performances. For example, archives could

include costumes, props, and associated marketing materials in addition to photographic and

video records. Though such archives thoughtfully engage with the surviving documentation of

live events, performance theorists such as Peggy Phelan, Philip Auslander, and Jonah Westerman

have grappled with the relationship between a live event and its documentation since the early

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conceptual "levels" in interactive art, and MANS offers a musical score model to capture a work's "atmosphere." Some strategies are more practically helpful than others, and museums often combine approaches on a case-by-case basis. Though undeniably useful, The VMQ does account for interactivity in its list of "components," CMCM requires audiovisual documentation of people interacting with artworks, and MANS draws connections between physical hardware and the experience it should evoke. These models are further analyzed in Chapter 4.

[69] I first came across the term "activations" from Ana Ribeiro, Conservator of Time-Based Media at the Tate, in a presentation and subsequent conversation facilitated by the 2020 University of Sunderland Curating Art After New Media Professional Development Course.

1990s.[70] Performance studies thus rarely attends to the technologies and methods used to construct an experience in favor of a quest to locate the moment of a "live" performance.

Media archaeology, for its part, offers a methodological approach that circumvents the question of liveness. Following Michel Foucault's philosophical archaeologies, media archaeology was theorized and demonstrated by Friedrich Kittler, Jussi Parikka, Erkki Huhtamo, and the so-called German Media Theorists to direct attention to the technical. Media archaeology stems from Marshall McLuhan's claim that "the medium is the message" and Kittler's controversial extension that "media determine our situation."[71] Parikka characterizes this as a process of going "under the hood," excavating the physical machines, circuits, and networks that make up media technologies.[72] Media archaeology therefore considers the material aspects of artworks, sidestepping participant interpretation and subjective experience.

Taken together, performance studies and media archaeology offer a nuanced approach to the conservation, preservation, and documentation of interactive digital art. Media archaeology is often hostile to the role of humans, rejecting human presence in favor of deep, content-free investigation into technical conditions. By contrast, performance studies rely on human presence to understand embodied experience. When applied to new media art, performance studies

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[70] Peggy Phelan and Philip Aulsander have argued opposite poles of this discussion, the former placing primacy on the live event and the latter on its resulting documentation. These efforts attempt to locate the exact moment of performance – either existing in a "certain, un-repeatable time" (Phelan) or produced by the existence of documentation (Auslander). Both rely on speech act theories of performativity first put forth by British philosopher J.L. Austin in a series of Harvard lectures, which were posthumously published in 1962 as *How to Do Things with Words.* Such investigations often rely on subjective experience to locate the most "authentic" moment of performance. See: Peggy Phelan, "The Ontology of Performance: Representation Without Reproduction," in *The Politics of Performance* (New York: Routledge, 2003), 146–66; Philip Auslander, "The Performativity of Performance Documentation," *PAJ: A Journal of Performance and Art* 28, no. 3 (2006): 1–10; J.L. Austin, *How to Do Things with Words* (Oxford; New York: Oxford University Press, 1975).

[71] See Marshall McLuhan, "The Medium Is the Message," in *Understanding Media: The Extensions of Man* (New York: McGraw-Hill, 1964), 1–18; Friedrich Kittler, *Gramophone, Film, Typewriter*, Writing Science (Palo Alto: Stanford University Press, 1999).

[72] Jussi Parikka, *What Is Media Archaeology?* (Cambridge, UK; Malden MA: Polity Press, 2012), 83.

indicates an approach to living, rather than static, artworks. A combination of these methods allows for a consideration of interactive experience as constructed by technical hardware – without falling into an investigation of subjective experience or the "original," "authentic" moment of an artwork's activation. Throughout this study, I employ both methodologies in addition to network theory to encourage understanding of interactive digital art as both reliant on human presence and based on advanced technologies.

Chapter Summaries

In what follows, I amplify my typology through paradigmatic case studies of individual, collective, and distributed interactivity in digital art. The included case studies represent the transnational landscape and diverse approach to digital art production in the twenty-first century; each type is investigated via artworks that not only demonstrate interactive experience, but also harness it in a particularly striking manner.[73] Additionally, the case studies ground this investigation in concrete examples of interactive digital artworks that have been loaned, collected, or preserved by institutions committed to long-term display. Such artworks assist in the construction of a typology that extends beyond the specific examples at hand and could apply to similar artworks entering institutional collections. As such, the case studies not only provide insight into how interactive digital artworks may be better incorporated into museums, but also expand the understanding of today's new media art practices in contemporary art scholarship.

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[73] This follows in the footsteps of Kwastek's framing of case studies: "The aim of the case studies is not to provide a representative overview of interactive media art. Instead, each of the selected works portrays specific aspects of an aesthetics of interaction in a particularly striking manner." See: Kwastek, *Aesthetics of Interaction in Digital Art,* 177. Like Kwastek, I do not attempt to categorically define interactive digital art or suggest that this typology is only applicable to the specific practices of virtual reality art, immersive installation art, or social media art.

Chapter 1, "Individual Interactive Experience: Immersion by Headset," examines the relationship between individual interactive experience and the sense of vision via an example of virtual reality (VR) art. In VR experiences, participants can only interact with the artwork wearing a headset. They often experience the work alone, despite in-person engagement in a public exhibition space. This centralized network of experience places the participant in the center of the artwork with control over the construction of their own personal narrative. Though such artworks are more reactive than interactive, each participant's embodied gaze creates a unique experience of the artwork each time they enter a headset. Laurie Anderson and Hsin-Chien Huang's *The Chalkroom* (2017) is my central case study in this chapter. *The Chalkroom* reflects Anderson's fascination with language and text, exploring new modes of immersive, self-driven storytelling. The work is displayed in a highly constructed space at the Massachusetts Museum of Contemporary Art (MASS MoCA), with the walls, ceiling, and floor covered in the same blacklight text and drawings featured in the beginning of the VR experience. This attention to environment amplifies the participant's isolated experience when immersed alone in the virtual program. *The Chalkroom* is a paradigmatic case study for this dissertation, as it relies on first-person point-of-view and utilizes vision as a multimodal sense to reinforce an individual, human-to-machine experience with the digital artwork.

Chapter 2, "Collective Interactive Experience: Sharing Space in Digital Ecosystems," traces notions of collectivity and collective interactive experience through Japanese new media art history and the "ultratechnologist" group teamLab. Collective interactive experience brings participants together in an immersive environment that reacts and responds to each body's physical presence. Many people have control over the environment at once, and their actions have the potential to affect the experience of others in the shared space. This decentralized

network of experience is bound to a carefully constructed physical location, but participants can interact anywhere in that environment. In fact, participants depend on the movements of others to experience the artwork collectively. This chapter focuses on teamLab's exhibition *Continuity* (2021-2022) at the Asian Art Museum of San Francisco, which created a digital ecosystem in which participants could effect change on the projected flowers, creatures, and calligraphic text in shared space. In contrast to an individual interactive experience, this immersive environment is contingent on interactions between humans, machines, and other humans in a single location. *Continuity* is the ideal case study for this project because it simultaneously presents two notions of collectivity: the team-based model of teamLab's working process and the conceptual design of space that encourages collective interactive experience within an immersive installation.

Chapter 3, "Distributed Interactive Experience: Performance Art in the Age of Instagram," presents a history of distributed interactive experience from correspondence and mail art in the mid-twentieth century to social media art in the 2010s. Social media users engage directly with artworks via online platforms, but their virtual interaction is distributed across the structures of the internet. Amalia Ulman's *Excellences & Perfections* (2014) is a strong example of this type; the digital platform facilitates interaction between people via the application interface. *Excellences & Perfections* was a performance staged by the artist on Instagram, examining and critiquing the ways in which young, Euro-American women present themselves online. The performance is a paradigmatic example of distributed interactive experience with social media art, as it includes both Ulman's posts and all user reactions, comments, and conversations surrounding the work. Instagram connected the artist with other human followers around the world in real time, using the digital platform to both disseminate the performance and engage the widest range of participants. *Excellences & Perfections* is an exemplary case study

for this dissertation, as its encouragement of social media habits and user engagement allowed Ulman to harness distributed interactive experience in service of her larger thematic goals.

Chapter 4, "New Media in the Museum: Reconceptualizing Documentation for Small and Mid-Sized Institutions," is an applied chapter of this research to new media art collections more broadly. With targeted attention to the challenges small and mid-sized museums face when displaying, loaning, or accessioning new media art, this chapter advocates accessible, affordable, and efficient tools that might encourage such museums to increase their engagement with new media art and artists. The chapter reconsiders documentation as an ongoing process that captures multiple moments in time, rather than a singular endeavor upon accession or loan. It also reveals the potential of utilizing emerging technologies including virtual reality, photogrammetry, and 3D scanning as documentation tools for capturing immaterial characteristics such as interactivity. The collections management platform CatalogIt is offered as a case study for this chapter as a promising model and resource for comparatively underfunded institutions to rethink their approach to new media art documentation. The chapter is also accompanied by an appendix of resources for small and mid-sized museums that wish to increase their new media art programming and collection.

The conclusion, "The Preservation of Interactive Digital Art" brings my theorizations of interactive experience together with the long-term, practical implications of this research. This chapter discusses and analyzes documentation efforts already underway for each case study, pointing towards the application of my three-part typology in these and future endeavors to preserve interactive digital art.

Records of the Present

New media artists critically engage with the monumental impact of technology on society, exploring themes from surveillance, hacktivism, and online identities to the nature of reality, climate change, and technoculture at large. Such explorations are important contributions to contemporary art history, which too often focuses on the "stable" mediums such as painting or sculpture that address similar themes. Fear of investing in unstable objects – coupled with inconsistent resources for preservation and a tenuous relationship between new media and contemporary art history – has led to woefully underrepresented collections of new media art and design in museums worldwide. Museums should be more comfortable with the uncertainty of collecting such work; this would allow museums to thoughtfully engage artists who are utilizing emerging technologies in their practices. In today's media-saturated, deeply technological world coming out of the wake of COVID-19, nuanced investigation into the role of technology in art is more important than ever.

The impact of further hesitation could be devastating. As early as 2001, artist and scholar Lev Manovich worried that "future theorists and historians of computer media will be left with not much more than the equivalents of the newspaper reports and film programs from cinema's first decades."[74] In many ways, Manovich's prediction has proven true. As Oliver Grau contends: "It is no exaggeration to state that we are facing the 'total loss of an art form' created in the early times of our post-industrial digital societies… Only when we develop systematic and concerted strategies of collection, preservation and research will we be able to fulfill the task which digital

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[74] Lev Manovich, *The Language of New Media* (Cambridge, MA: The MIT Press, 2001), 7.

culture demands in the twenty-first (sic) century."[75] Indeed, the rapid rate of technological

development rarely allows space and time to understand each step that led to today's practices.

In his seminal book *The Language of New Media,* Manovich worked to provide "a record

and theory of the present."[76] My study follows in these footsteps twenty years later, providing a

record and theory of interactive digital art in the 2010s and 2020s – both to document the current

state of new media art production and to promote models that will ensure the "present" has a

record. Only with such foundations can scholarship build around this moment in the history of

art.

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[75] Oliver Grau, "Digital Art's Complex Expression and Its Impact on Archives and Humanities for a Concerted Museum-Network of Expertise and Preservation" in *Museum and Archive on the Move,* edited by Oliver Grau (Berlin: Walter De Gruyter, 2017), 100, 115.

[76] Manovich, *The Language of New Media*, 7.

I: INDIVIDUAL INTERACTIVE EXPERIENCE
IMMERSION BY HEADSET

"You're in the Chalkroom. Hey, where did everybody go? Have a seat. Here's some things for you to read." A low, steady voice rises above the ethereal, percussive, electronic sound emerging from the headphones. You have just strapped a 2017 HTC Vive Virtual Reality headset around your eyes (Fig. 7).[1] As you look around, you find that you are in a strange but familiar place. The virtual room is the same as the one you physically entered – the floors, walls, pillars, and ceiling are black, covered with scrawled drawings and phrases in chalky white brushstrokes: "I dreamed I had to take a test in a Dairy Queen on another planet;" "Funny how hatred can also be a beautiful thing… when it's as sharp as a knife, as hard as a diamond" (Fig. 8). The same purple-blue glow from the physical room's blacklights emanates from its virtual counterpart and the same eerie music is now amplified in the headphones (Fig. 9). Once you get your bearings, the voice reemerges: *"Now I'll take you to the center of the Chalkroom. Remember there are things to see behind you. All around you."* The familiar room expands and abstracts into an otherworldly geometric realm with scattered rectangular structures and stormy skies. A spotlight follows your gaze as you fly through and catch glimpses of drawings and phrases that blanket the dark landscape. Your journey ends in a large, open area with an altar-like cube in the center: *"You've arrived at the heart of the Chalkroom. Now you can go anywhere, just pick a place. Use the controller to strike the picture of the place you want to go. If you're feeling adventurous, try standing up and flying around. There's no map, so, good luck. And remember, you can always just float around somewhere for a while. After about fifteen minutes, your trip will be over."* You are free to explore. For your fifteen minutes, you navigate virtual

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[1] This was the original launch of the HTC Vive Virtual Reality System, simply called HTC Vive. The consumer launch for this system was in April 2016.

rooms of whispered stories, wildly free fly, make digital sound sculptures, and "shoot" text onto *The Chalkroom's* walls using the trigger on the handheld controller. When you finally remove the headset, you are still in an uncanny place – not quite virtual, not quite "real" either.

The Chalkroom is a virtual reality (VR) artwork and installation by Laurie Anderson (b. 1947) and Hsin-Chien Huang (b. 1966).[2] Developed at the Massachusetts Museum of Contemporary Art (MASS MoCA) in 2017, *The Chalkroom* is the third interactive artwork produced by the two artists in collaboration.[3] Huang initially proposed a virtual reality project in 2015, when the current state of VR technology was still emerging. According to Anderson: "When I realized we could make a dark, abstract and mysterious world that was still oddly hand-made – and that I could finally fly like I do in my dreams – I said, 'I'm in.'"[4] With Huang's technical expertise and Anderson's conceptual approach, *The Chalkroom* came to fruition for the inaugural exhibition of Anderson's fifteen-year studio engagement at MASS MoCA to produce new work and house her expanding archive. Virtual reality is one small facet of this initiative: Anderson's widespread multimedia practice spans "self-playing" cyborg violins, opera and pop compositions, projection-based sculptures, video performances, interactive CD-ROMS, and

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[2] Anderson began classical violin at age five, performed with the Chicago Youth Symphony, and received degrees from Barnard College (BA, 1969) and Columbia University (MFA, 1972). In 2002, Anderson was the first artist-in-residence for NASA. Her groundbreaking works have been exhibited internationally, and she continues to live and work in New York City. In 2022, she was honored a "Visionary Pioneer of Media Art" at Ars Electronica. Huang studied at the National Taiwan University (BS, 1984), ArtCenter College of Design (BS, 1992), and the Institute of Design, Illinois Institute of Technology (MS, 1993). The new media artist, designer, and engineer is now a professor at the Design Department of National Taiwan Normal University.

[3] The first was *The Puppet Motel,* an interactive CD-ROM piece from 1995. The second was *Aloft,* 2017, which was a more scripted experience based on Anderson's experience surviving a plane crash in the 1970s. *The Chalkroom* has been installed in other places in addition to MASS MoCA, including: the Louisiana Museum Literature Festival (Humlebaek, Denmark, August 2017), 74th Venice International Film Festival (Venice, Italy, September 2017), Taipei Museum of Fine Arts (Taipei, Taiwan, 2017), Guild Hall (East Hampton, New York, 2018) and the Smithsonian's Hirshhorn Museum (Washington, D.C., 2022). For more on the two artists' collaborations, see: Bonnie Marranca and Laurie Anderson, "Laurie Anderson: Telling Stories in Virtual Reality," *PAJ: A Journal of Performance and Art* 120 (2018): 37–44.

[4] Laurie Anderson, *All the Things I Lost in the Flood: Essays on Pictures, Language and Code* (New York: Rizzoli Electa, 2018), 83.

more. However, though she is a pioneer of new media art and often turns to emerging

technologies in her work, Anderson's focus is on stories. Language and text are the core of her

practice; virtual reality is a medium for personal, immersive, self-driven storytelling that

envelops users in Anderson's world.

 The Chalkroom is a paradigmatic example of individual interactive experience in digital

art.[5] Participants experience the work alone, despite their physical presence in a shared

exhibition space. Each participant has control over their virtual actions in the isolated

environment; they construct a new personal narrative every time they wear a headset. Virtual

reality is an effective medium for this type of experience. As designer and researcher Brenda

Laurel observes, in virtual reality "all imagery is displayed from the point of view of an

individual participant…. VR is an utterly first-person point-of-view medium."[6] However, as a

type, individual interactive experience is not tied to virtual reality technology. Artworks on a

personal computer such as Thomson & Craighead's (est. 1993) arcade-style game *Trigger Happy*

(1998), which asks users to destroy rolling hypertext in an info-war, may also insist upon a single

participant with control over their own experience with the artwork.[7] Marie-Laure Ryan

acknowledges: "any so-called first-person video game on a regular computer screen offers a

display that can be navigated with a mouse and that constantly updates to reflect the position of

the cursor (a substitute for the player's body)."[8] In other words, individual interactive experience

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[5] The introduction includes a full outline of this type of experience and others explored in this dissertation.

[6] Brenda Laurel, *Computers as Theatre*. 2nd ed. (New Jersey: Addison-Wesley, 2014), 184.

[7] For more on this artwork, see: Jon Thomson and Alison Craighead, "Trigger Happy," Thomson & Craighead. Accessed June 6, 2022. http://www.thomson-craighead.net/thap.html. Play it via emulation at http://www.triggerhappy.org/.

[8] Marie-Laure Ryan, *Narrative as Virtual Reality 2: Revisiting Immersion and Interactivity in Literature and Electronic Media* (Baltimore: Johns Hopkins University Press, 2015), 40-41. In fact, Brenda Laurel and Rachel Strickland's *Placeholder* (1992) is designed for two people to enter a virtual world together. VR could therefore

relies on first-person point-of-view regardless of the technologies used to achieve that perspective.

First-person point-of-view also indicates an emphasis on users' eyes to communicate their body's relationship to virtual spaces. As such, individual interactive experience is intricately tied to the sense of vision. VR's insistence on strapping a headset around participant's eyes to create an immersive environment is one such example. As Philippe Fuchs underlines, "it is the *observer,* and not the technology, who provides the cues involved in three-dimensional spatial perception (emphasis in original)."[9] Individual interactive experience thus requires an embodied observer who uses visual information to recognize their control over their personal experience with an interactive digital artwork. With a focus on virtual reality and *The Chalkroom* as a case study, this chapter investigates the relationship between individual interactive experience and vision. It begins with a discussion of how vision makes an experience seem more personal before turning to VR as an illustrative medium for this type. The chapter then returns to *The Chalkroom* as an artwork that particularly harnesses the capabilities of individual interactive experience and concludes with a reflection on this type as a form of solo performance.

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offer a distributed or collective interactive experience, not just an individual one. Lisa May Thomas and David R. Glowacki also write: "The user is typically alone in the physical space, and wearing a headset or HMD through which they are inhabiting a virtual space alone. If they are 'with' others, then it tends to be either with simulated avatars, or else users who are physically remote to themselves and present via telematic interactions (e.g. online platforms for video gaming)." See: Lisa May Thomas and David R. Glowacki, "Seeing and Feeling in VR: Bodily Perception in the Gaps Between Layered Realities," in *International Journal of Performance Arts and Digital Media* 14, no. 2 (2018): 156.

[9] Philippe Fuchs, Judith Guez, Olivier Hugues, and Jean-François Jégo, *Virtual Reality Headsets: A Theoretical and Pragmatic Approach* (London; New York, NY: CRC Press, 2017), 44.

Individual Interactive Experience and Vision

Vision is often considered the dominant sense in Western conceptions of the body.[10] Though touch, smell, hearing, and taste are also recognized as basic human senses, vision frequently emerges as the most important for gathering information about our surroundings. Neuroscientist Semir Zeki understands the function of seeing as "*the acquisition of knowledge about the world* (emphasis in original)."[11] To Zeki, though there are other senses that provide knowledge, "vision happens to be the most efficient way of obtaining it, and there are some kinds of knowledge, such as the color of a surface or the expression on a face, that can only be obtained through vision."[12] Vittorio Gallese agrees, but emphasizes that vision is a complex, synesthetic process: "The expression 'laying the eyes' indeed betrays the haptic quality of vision: our eyes are not just optical instruments, but also a 'hand' touching and exploring the visible, turning it into something *seen by someone* (emphasis in original)."[13] Despite the history of prioritizing vision, Gallese's perspective demonstrates that contemporary neuroscience does not understand the senses as hierarchical or separate. Instead, today's neuroscientists emphasize the intricate connections between senses that provide humans with the embodied experience of life, a point that will be further explored throughout this chapter.[14]

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[10] See Thomas and Glowacki, "Seeing and Feeling in VR," 152. Also see Mel Slater, Bernhard Spanlang, Maria V. Sanchez-Vives, and Olaf Blanke, "First Person Experience of Body Transfer in Virtual Reality" in *PLoS ONE* 5, no. 5 (2010): 1-9.

[11] Semir Zeki, "Art and the Brain," in *Daedalus* 127, no. 2 (Spring 1998): 73.

[12] Zeki, "Art and the Brain," 73.

[13] Vittorio Gallese, "Visions of the Body: Embodied Simulation and Aesthetic Experience" in *Aisthesis* 1, no. 1 (2017): 48-49.

[14] This is also explored in the humanities as the mind-body problem in philosophy. For more on the history of this philosophical debate, see: Jonathan Westphal, *The Mind-Body Problem* (Cambridge, MA: The MIT Press, 2016).

As this scientific tension illustrates, understandings of vision have changed over the centuries. In his seminal book *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century,* Jonathan Crary traces a "separation of the senses" and a "radical abstraction and reconstruction of optical experience" from 1810 to 1840. To Crary, nineteenth-century thought marked "the unloosening of the eye" from the network of other senses "for the rebuilding of an observer fitted for the tasks of 'spectacular' consumption."[15] He argues that "knowledge was accumulated about the constitutive role of the body in the apprehension of a visible world, and it rapidly became obvious that efficiency and rationalization in many areas of human activity depended on information about the capacities of the human eye."[16] Crary's analysis is tied to nineteenth-century "objects of vision" including phenakistiscopes, binoculars, and stereoscopes that revolutionized and emphasized people's experience of sight.[17] This attention to vision set the stage for later technologies such as the Cinérama, Stereopticon, Photograma, Sensorama, 3D glasses for IMAX cinema, and virtual reality headsets – devices that similarly mediate an individual's experience through the eyes.

These sight-based technologies demonstrate that vision is often harnessed to create uniquely individual experiences. One of the most effective tactics for this effort is cutting off

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[15] Jonathan Crary, *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century* (Cambridge, MA: The MIT Press, 1992), 9, 19. Also see Friedrich Kittler, *Optical Media: Berlin Lectures 1999,* Translated by Anthony Enns (Cambridge, UK; Malden MA: Polity Press, 2010), 11.

[16] Crary, *Techniques of the Observer,* 16.

[17] Crary also connects these technologies to the late 1500s with the invention of the camera obscura, which he sees as indicating "the appearance of a new model of subjectivity, the hegemony of a new subject-effect. First of all the camera obscura performs an operation of individuation; that is, it necessarily defines an observer as isolated, enclosed, and autonomous within its dark confines. It impels a kind of *askesis,* or withdrawal from the world, in order to regulate and purify one's relation to the manifold contents of the now 'exterior' world. Thus the camera obscura is inseparable from a certain metaphysic of interiority: it is a figure for both the observer who is nominally a free sovereign individual and privatized subject confined in a quasi-domestic space, cut off from a public exterior world…. At the same time, another related and equally decisive function of the camera was to sunder the act of seeing from the physical body of the observer, to decorporealize vision." See Crary, *Techniques of the Observer,* 38-40.

peripheral vision. When an individual's gaze is guided forward, they feel secluded from their surrounding environment even if they are sharing space with other individuals or objects. Stereoscopic technologies facilitate this well. The nineteenth-century invention presents two slightly offset images that, when held closely to the eyes with a handheld viewing device, produces an illusion of three-dimensional depth. As Brooke Belisle argues: "The stereoscope disciplined the body of its user to produce depth effects that could not actually be stepped into."[18] Indeed, stereoscopes, 3D glasses, and even VR headsets require users to move their entire head to keep their experience intact and often block peripheral vision with eye masks. A particular gaze is prioritized. Oliver Grau agrees in his book, *Virtual Art: From Illusion to Immersion,* where he emphasizes experiences that "almost wholly visually seal off the observer hermetically from external visual impressions."[19] As Grau maintains, virtual realities throughout art history – from floor-to-ceiling wall paintings to panoramas – rely on filling an observer's entire field of (directed) vision. This ultimately creates a sense of immersion despite the lack of smell, taste, touch, or sound that would contribute to a more embodied immersive experience.

The frame is another useful tactic for facilitating an individual interactive experience. Jacques Derrida considers the frame a "parergon," which is "neither work (*ergon*) nor outside the work, neither inside or outside, neither above nor below…"[20] To Derrida, when we look at a painting, we see the frame as part of the wall; when we look at a wall, we see the frame as part of

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[18] Brooke Belisle, "The Dimensional Image: Overlaps in Stereoscopic, Cinematic, and Digital Depth" in *Film Criticism* 37/38, no. 3/1 (2013): 132.

[19] Oliver Grau, *Virtual Art: From Illusion to Immersion* (Cambridge, MA: The MIT Press, 2003), 13.

[20] Jacques Derrida, *The Truth in Painting*, translated by Geoffrey Bennington and Ian McLeod (Chicago: University of Chicago Press, 1987), 9.

the painting.[21] Though it goes unnoticed, the frame is a tool that defines both space and the

conceptual limits of an artwork. From a neuroscientific perspective, Gallese insists that "once we

let the artwork capture our attention, the frame surrounding it almost disappears, as we are fully

absorbed by the image."[22] Even though it ideally melts away, the frame creates a boundary

around an observer's focus and points their gaze in a particular direction. Computer screens

enable this experience; users become engrossed in the illuminated screen of pixels and data, a

phenomenon interpreted in the *Matrix* franchise as an ability to read raining green digital code as

images and graphics with the proper focus. In these situations, the surrounding environment is

deemphasized in favor of the person's gaze into the frame. The individual nature of this

experience is captivating. In fact, Laurel and other game designers argue that first-person

experiences increase engagement with interactive media as users are pulled into the screen and

take on a "willing suspension of disbelief" of their true relationship with their surroundings.[23] A

frame can therefore help target interactive experience for individual users and delineate space for

their focus.

As these two tactics illustrate, vision is prioritized as the sense through which an

individual interactive experience is constructed. Regardless of contemporary understandings of

the relationship between bodily senses – and despite attempts to incorporate haptic, auditory, and

olfactory senses into experiences with new media artworks – vision remains a marked priority.

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[21] See further expansion and analysis of Derrida's concept in Robin Marriner "Derrida and the Parergon" in *A Companion to Art Theory,* edited by Paul Smith and Carolyn Wilde (Hoboken: Blackwell Publishers, 2002), 349-359.

[22] Gallese, "Visions of the Body," 47.

[23] "Willing suspension of disbelief" is a 19th century concept originating from poet and critic Samuel Taylor Coleridge. Its origins lie in theater, as audiences know that what they are watching is "pretend" but they are still able to enjoy it. See Gay Wilson Allen and Harry Hayden Clark, *Literary Criticism: Pope to Croce* (Detroit: Wayne State University Press, 1962), 221-239. Also see Brenda Laurel, *Computers as Theater*, 139-142 and Janet Murray, *Hamlet on the Holodeck: The Future of Narrative in Cyberspace,* 2nd edition (New York: The Free Press, 2016) 107.

The following sections explore how this sense manifests in virtual reality, a technology and medium for artistic expression that insists on both immersion and interaction in an individualized, highly visual setting. The chapter also reveals that vision is tied to other senses that are often overlooked, from the weight and feel of a headset precariously resting around users' faces to the understanding of tactility inside a VR environment and the increasingly prevalent sound design that accompanies such experiences. These discussions are then applied to Anderson and Huang's *The Chalkroom* as exemplary of individual interactive experience with VR technologies.

Virtual Reality = Immersion + Interaction

The term "virtual reality" has many different interpretations. "Virtual" could reference an illusion or imaginary space, a computer-mediated technology, or a sense of potential.[24] As Kris Paulsen outlines, "'virtual' was initially used to describe the particular, even physical, qualities – or virtues – of a person or thing."[25] However, over time, "virtual" shifted to encompass: "essence, potentiality, or effect, although not in form or actuality; supposed, imagined."[26] Virtual reality could therefore encompass a broad range of experiences that seemingly transport a person into a different world – from the absorbing experience of reading fiction to walking into a floor-to-ceiling narrative painted room or putting on a VR headset. As Janet Murray writes in *Hamlet on the Holodeck: The Future of Narrative in Cyberspace:* "A stirring narrative in any medium

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[24] For a further outline of these three senses of the word "virtual," see Marie-Laure Ryan, *Narrative as Virtual Reality 2,* 8.

[25] Kris Paulsen, *Here/There: Telepresence, Touch, and Art at the Interface* (Cambridge, MA; London: The MIT Press, 2017), 41.

[26] Oxford English Dictionary Online, s.v. "Virtual, adj. and n.," http://www.oed.com/view/Entry/223829, accessed August 15, 2022.

can be experienced as a virtual reality because our brains are programmed to tune into stories

with an intensity that can obliterate the world around us."[27] As a concept, virtual reality is an

important aspect of literature, art history, and philosophy that should not be overlooked in

today's application of the term that is centered on advanced technologies.

However, according to Marie-Laure Ryan, today's VR technology makes use of all

definitions of the "virtual:"

> … the technological because VR is made of digital data generated by a computer; the optical because the immersive dimension of the VR experience depends on the reading of the virtual world as autonomous reality, a reading facilitated by the illusionist quality of the display; and the [potential] because, as interactive system, VR offers to the user a matrix of actualizable possibilities.[28]

Virtual reality (VR) technologies, meaning those that make use of a head-mounted display

(HMD) and handheld controllers or instruments that are linked to a centralized computer system,

is now the most recognizable use of the term. [29] Though the technology itself has co-opted the

definition, all aspects of "virtual reality" are important to understand the medium as an

immersive, interactive space.

The development of VR technologies is closely related to advancements in film and

computer science. In 1960, cinematographer Morton Heilig patented a "Stereoscopic Television

Apparatus for Individual Use," which extended his earlier work developing the Sensorama in the

1950s. Howard Rheingold initially described the apparatus as a "head-mounted display that a

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[27] Murray, *Hamlet on the Holodeck*, 98.

[28] Ryan, *Narrative as Virtual Reality 2,* 8.

[29] Because the term virtual reality has become so interconnected with the technological definition, I do not capitalize the entire phrase. I do, however, prefer to use the abbreviation VR when distinguishing the technologies from other virtual realities throughout art history, literature, or philosophy.

person could wear like a pair of exceptionally bulky sunglasses."[30] In 1968, Ivan Sutherland developed the first HMD to use a mechanical head tracker, which allowed participants to look around a graphic room by turning their head.[31] These projects were largely military in origin: the United States' Advanced Research Projects Agency (ARPA), Office of Naval Research, and Bell Labs funded this type of research to boost flight simulation technologies in response to the Soviet Union's launch of Sputnik in 1957.[32]

VR technology first reached the public in the late 1980s.[33] Alongside the rise in personal computers and other digital technologies, VR was touted as "a magical window onto other worlds;" an emblem of how "reality is disappearing behind a screen."[34] By the 1990s, accessories such as data gloves and spatialized sound headphones made this technology feel even more revolutionary. Virtual reality became the hottest trend in high-tech, with the buzz word saturating the field of interactive entertainment. As Brenda Laurel illustrates, VR soon approached "the elbow in its pop-culture curve," with California-based technologists making

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[30] Howard Rheingold, *Virtual Reality: Exploring the Brave New Technologies of Artificial Experience and Interactive Worlds - from Cyberspace to Teledildonics* (Secker & Warburg, 1991), 58.

[31] Ken Hillis, "A Critical History of Virtual Reality," in *Digital Sensations: Space, Identity, and Embodiment in Virtual Reality* (Minneapolis; London: University of Minnesota Press, 1999), 9.

[32] It is important to understand the history of new media art as intertwined with military defense and social control. Alan Turing's (1912-1954) machine, widely understood as a foundation for modern computing, was developed to break the German Enigma code in the 1940s. The US Department of Defense's Advanced Research Projects Agency (ARPA) was founded in 1957 to explore Cold War (1947-1991) technologies, ultimately demonstrating the computer's potential as a visual medium. The Semi-Automatic Ground Environment (SAGE) was intended to support an air defense system and produced today's Graphical User Interfaces (GUIs) in cooperation with companies including IBM. The development and application of these new media technologies and art are therefore tied to this complicated history. For more on this, see Kat Hope and John Ryan, "Key Concepts, Artistic Influences and Technological Origins of the Digital Arts" in *Digital Arts: An Introduction to New Media* (New York: Bloomsbury Academic, 2014), 25-55 and John Beck and Ryan Bishop, *Technocrats of the Imagination: Art, Technology, and the Military-Industrial Avant-Garde* (Durham, NC and London: Duke University Press), 2020.

[33] See Ryan, *Narrative as Virtual Reality* and Yunju Kim and Heejun Lee, "Falling in Love with Virtual Reality Art: A New Perspective on 3D Immersive Virtual Reality for Future Sustaining Art Consumption" in *International Journal of Human–Computer Interaction* 38, no. 4 (2022): 372.

[34] Rheingold, *Virtual Reality*, 19.

dark jokes about "face-sucking goggles" and scholars turning to words such as "telepresence" or "immersion technology" to avoid the over-hyped "virtual reality."[35] The technology itself remained in the hands of researchers and tech companies with the capability to support its bulky equipment and advanced computing requirements.

The rise of "Web 2.0" in the early 2000s quickly shifted interest away from VR and towards emerging forms of networked interaction such as social media.[36] However, as Brooke Belisle outlines, the emphasis on mobile media helped advance VR technologies in the twenty-first century: "One reason VR never became popular was that it required expensive, heavy helmets and data gloves strung with tangles of wires. Today, immersive gaming platforms… can take advantage of the smaller, lighter, cheaper, and more stable components that were developed for hand-held devices."[37] The dream of VR was reignited. In 2012, 21-year-old Palmer Luckey developed the VR headset Oculus Rift with a $2.5 million crowdfund that was later purchased by Facebook for $2 billion.[38] Luckey claims that he was inspired by the unrealized dream of VR in the 1990s. Critics were optimistic; according to Belisle, the release of Oculus Rift was "heralded as finally achieving the immersive potentials that were promised by early VR but never achieved."[39] VR technologies and headsets have since exploded on the consumer market, with founding companies including Oculus VR (2012), StarVR (2013), Google Cardboard (2014),

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[35] Laurel, *Computers as Theater*, 184.

[36] Brooke Belisle, "Immersion" in *Debugging Game History: A Critical Lexicon* (Cambridge, MA: The MIT Press, 2016), 249.

[37] Belisle, "Immersion," 249.

[38] Belisle, "Immersion," 247.

[39] Belisle, "Immersion," 247.

Samsung Gear VR (2014), Playstation VR (2016), HTC Vive (2016), and FOVE (2016) leading the charge.

Beyond the technological components that enable today's virtual reality, VR experiences are underpinned by a long history of art historical precedents. VR relies on two intertwined concepts: immersion and interaction. First, the metaphor of immersion implies a plunge into an all-encompassing environment. Belisle calls this "a state of engagement in which viewers or users feel transported into and absorbed by the world of a representation."[40] In art, immersive experiences have a long history. Oliver Grau traces this phenomenon across centuries of art history in his article, "Into the Belly of the Image: Historical Aspects of Virtual Reality," from the *Casa dei Misteri's (Villa of Mysteries)* second-order Pompeiian style wall painting to Baldassare Peruzzi's (1481-1536) Italian Renaissance *Sala delle Prospettive* and Anton von Werner's (1843-1915) nineteenth-century *Panorama of the Battle of Sedan*.[41] To Grau, these artworks surround observers "in an illusory setting where time and space are one."[42] The sense of transportation into these images was powerful – Peruzzi's use of perspective was so successful that Titian (ca. 1488-1576), a recognized Renaissance master, was unwilling to believe the *Sala* was a painting and visitors to the Werner panorama instinctually kept their distance from the canvas in fear of colliding with the depicted horses.[43] These aesthetic experiences predate

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[40] Belisle, "Immersion," 247.

[41] For full analysis, see Oliver Grau, "Into the Belly of the Image: Historical Aspects of Virtual Reality" in *Leonardo* 32, no. 5 (1999): 365-371 and how these ideas are furthered in Oliver Grau, *Virtual Art: From Illusion to Immersion* (Cambridge, MA: The MIT Press, 2003).

[42] Grau, "Into the Belly of the Image," 365.

[43] Grau points out, and it is important to emphasize, that "today our eyes are used to following increasingly accelerated movement; thus we can hardly appreciate the effect that a still panorama picture had at that time." The same is true for earlier immersive experiences with paintings that contemporary viewers might find static. See Grau, "Into the Belly of the Image," 367. For Titian's reaction and Grau's citation of *Neue Preußische Zeitung,* see Georgio Vasari, *Le Vite* (Florence: Studio per le edizioni scelte, 1976 [1568]), 318.

today's immersive capabilities of virtual reality, which presents users with an all-encompassing, 360-degree view of a virtual environment via a secured head-mounted display over the eyes.[44] However, the phenomenon of immersion that these early virtual realities cultivated are integral to the history of developing VR experiences that take immersion to its next (digital) state.

The second concept crucial for today's VR is interaction. As outlined in the introduction to this dissertation, interactivity involves humans and computers "acting upon each other" and is an important, though immaterial, aspect of contemporary digital art production.[45] According to Lisa May Thomas and David R. Glowacki, with regards to VR, "strapping a screen to your head does not necessarily qualify as '[VR]' unless you also have the ability to reach out and touch that world."[46] 360-degree videos or film displayed via VR headsets may be highly immersive but create a passive observer. As VR technologies advance, media scholars and designers agree that interactivity is crucial for creating effective VR experiences. Artist and computer scientist Jaron Lanier (b. 1960), a key figure in the development of today's VR technologies, argues: "If you can't reach out and touch the virtual world and do something to it, you are a second-class citizen within it... a subordinate ghost that cannot even haunt."[47] Other scholars such as Mel Slater agree, understanding the interactive element of VR in terms of "presence." To Slater, immersion stands "simply for what the technology delivers from an objective point of view" while presence

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[44] These examples often offer a collective experience of immersion rather than the uniquely individual emphasis of VR discussed in this chapter. Collective experience is discussed in Chapter 2 of this dissertation.

[45] Beryl Graham, "What Kind of Participative System? Critical Vocabularies from New Media Art" in *The Do-It-Yourself Artwork: Participation from Fluxus to New Media,* edited by Anna Dezeuze (Manchester: Manchester University Press, 2010), 286. See an expansion of this definition in the introduction to this dissertation.

[46] Thomas and Glowacki, "Seeing and Feeling in VR," 147.

[47] Jaron Lanier, *Dawn of the New Everything* (London: The Bodley Head, 2017), 128.

is "a human reaction to immersion."[48] It is this combination of immersion and interactivity (or presence) that defines both the technology and the understanding of experiencing VR today.

Virtual Reality and Vision

The immersive-interactive experience of VR is tied to the sense of vision. As previously discussed, the development of sight-based technologies since the nineteenth century point to an emphasis on the eyes as crucial for mediating experiences of simulated depth. The importance of stereoscopy in this effort cannot be overstated. As Ken Hillis argues: "without stereoscopy, each eye would see the same flat, painting-like scene instead of one replicating the more 'curved' sense of vision made available to perception via the slightly different position from which each eye receives information and views the surrounding world."[49] VR headsets make ample use of this technology while simultaneously cutting off peripheral vision and directing users' gaze forward. These vision-based tactics make VR an individual interactive experience that feels personal and isolating. Indeed, as Philippe Fuchs states: "[VR] is the anthropocentric vision for the application user."[50] Any experience of VR is driven by the direction of each users' gaze; participants construct their own narrative in the virtual space via visual information and stimuli.[51]

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[48] Mel Slater, "A Note on Presence Terminology" in *Presence Connect* 3, no. 3 (2003): 1-5. See also Eryn Parker and Michael Saker, "Art Museums and the Incorporation of Virtual Reality: Examining the Impact of VR on Spatial and Social Norms" in *Convergence* 26, no. 5–6 (2020): 1160. Brenda Laurel agrees, arguing that "agency is a key component of first-person experience" such as virtual reality. See Laurel, *Computers as Theater,* 141.

[49] Hillis, "A Critical History of Virtual Reality," 9.

[50] Fuchs, et.al., *Virtual Reality Headsets,* 13.

[51] The idea of control as it pertains to interactivity is further explored in the introduction to this dissertation, namely, as a qualification for measuring the level of interactivity in a particular artwork. See Nathan Shedroff, "Information Interaction Design: A Unified Field Theory of Design," in *Information Design* (Cambridge, MA: The MIT Press, 2000), 267–92 and Brenda Laurel, *Computers as Theatre,* 29.

Because vision is prioritized in VR, virtual reality is simultaneously an embodied and disembodied experience. Users rely on their bodily senses and modes of perception – particularly vision – to activate their experience. At the same time, physical bodies do not travel with users into the virtual world; there is a sense of being two places at once. Thomas and Glowacki see this in terms of "layering," which involves two cognitive processes: "Firstly, perceptual mechanisms which inform bodily reactions to the visually perceived environment or virtual body… override the cognitive understanding or knowledge that the virtual world is not real. Secondly, within the perceptual system itself, vision overrides other sensory input into the body."[52] Vision therefore plays such an active role in creating an individual, immersive, interactive experience that it supersedes all other conscious perceptions. When users are fully engaged, their visual sense allows for the "suspension of disbelief" that they are in a virtual environment. It is only when the system glitches or distractions such as a loud noise, strong smell, or unexpected touch startle the user that other senses come to the forefront of cognition.[53] Virtual reality technologies exploit this cognitive process by prioritizing vision via HMDs and facilitating an immersive-interactive experience through each user's ability to visually process their individual sense of embodiment.[54]

However, for visual information to make sense to VR users, there must be a recognition of how the rest of the body orients the gaze and mediates the experience. This engages neuroscientific understandings of vision as a multimodal sense. According to Vittorio Gallese,

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[52] Thomas and Glowacki, "Seeing and Feeling in VR," 151.

[53] See Slater, "A Note on Presence Terminology," 1-5; Mel Slater, Bernhard Spanlang, Maria V. Sanchez-Vives, and Olaf Blanke, "First Person Experience of Body Transfer in Virtual Reality," 1-9; and Thomas and Glowacki, "Seeing and Feeling in VR," 152.

[54] Brooke Belisle synthesizes this point: "embodied processes that are always already underway, and largely involuntary, become the framework through which the models' virtual dimensions are constructed as sensible." See: Brooke Belisle, "Whole World Within Reach: Google Earth VR" in *Journal of Visual Culture* 19, no. 1 (April 2020): 118.

vision activates motor neurons, which "not only cause movements and actions but they also respond to body-related visual, tactile and auditory stimuli, mapping the space around us, the objects at hand in that very same space, and the actions of others."[55] In other words, vision cannot be separated from the rest of the body in the perception of both physical and virtual spaces. Erkki Huhtamo discusses this in terms of "haptic visuality," which "implies the transposition of the qualities of touch to the realm of vision and visuality."[56] Indeed, many VR designers argue that users must be able to see virtual versions of their hands to feel properly immersed in the environment, a phenomenon that requires activating the sense of touch via visual imagery.[57] It is this relationship between users' physical and virtual perception that produces the immersive-interactive experience of VR.

This expanded sense of vision is not only understood in VR systems, but also built into their design. Even in early versions of virtual reality, critics such as Mark Dery observed that, in VR, "the television swallows the viewer, *headfirst* (emphasis added)."[58] The eyes are a conduit for receiving impressions of immersion and interaction, but it is the expanded orientation of the body, head, and eyes that facilitate experiences in virtual spaces.[59] Spatialized sound assists in this effort, as auditory clues help direct attention and bodily movement to certain areas of the VR

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[55] Gallese, "Visions of the Body," 45.

[56] Erkki Huhtamo, "Twin-Touch-Test-Redux: Media Archaeological Approach to Art, Interactivity, and Tactility." In *Media Art Histories* (Cambridge, MA: The MIT Press, 2007), 73. For this reason, Huhtamo argues that "Quite clearly, any segregation of the senses from each other is out of the question."

[57] See a further analysis and technical argument for this point in Fuchs, et.al., *Virtual Reality Headsets,* 19-21.

[58] Mark Dery, *Culture Jamming: Hacking, Slashing, and Sniping in the Empire of Signs* (Westfield, NJ: Open Media, 1993), 6.

[59] As of 2022, there are a few emerging VR headsets that include eye tracking technology, such as Tobii, HTC Vive Pro Eye, Pico Neo 2 Eye and Microsoft HoloLens 2. These are still very expensive and not on the consumer market as widely as other forms of VR headsets.

space. Visual awareness of the body in VR is also crucial. Techniques such as "cone drag" help ensure that perceptions of height and other spatial relationships are maintained. As Belisle describes:

> [When users move in VR,] that movement is directed by their gaze; but anchoring movement at eye level can result in users feeling they are virtually crashing their faces into things rather than 'landing on their feet,' so to speak. Cone drag ensures that the implicit distance between a user's head and feet adjusts relative virtual shifts in scale so that users feel their virtual movements result in the point of view they had expected.[60]

These strategies directly engage other senses and often require movement of the head and upper body, which heightens users' awareness of their own physical body when equipment shifts. Despite its perceived priority, vision should therefore be understood in relation to the other senses in VR and seen as a conduit through which simulated embodiment occurs.

As the previous sections illustrate, expanded understandings of vision are not only intricately tied to virtual reality as a medium, but also play a crucial role in constructing an individual interactive experience using digital technologies. Laurie Anderson and Hsin-Chien Huang's *The Chalkroom* is evocative of this type and takes advantage of its capabilities. The artwork begins as an installation with timed entry, significantly reducing the amount of people sharing the same space. Participants are then fitted with a VR headset and completely isolated from both their physical location and their fellow users to experience the digital artwork alone. *The Chalkroom's* VR technologies rely on vision to create an individual interactive experience, but the artwork also reinforces isolation inside the experience with embodied tactics such as Anderson's voice and grammatical structure, reflections of users' bodily movements, and

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[60] Belisle, "Whole World Within Reach: Google Earth VR," 123-124. Belisle discusses cone drag in terms of Google Earth VR development, but similar tactics are used in other VR experiences to ensure the relative scale of user's bodies to the environment.

spatialized sound. The following section thus returns to this artwork in more detail, revealing how *The Chalkroom* harnesses individual interactive experience in digital art.

<u>*The Chalkroom* and Individual Interactive Experience</u>

As both a VR experience and installation artwork, *The Chalkroom* blurs the boundary between physical and virtual space. Participants enter the installation through a thick curtain at MASS MoCA in half-hour intervals, when they are transported from the familiar white cube museum galleries to Anderson's darkened blacklight world. Four seats are in the center of the room with their own headset dangling from the ceiling and corresponding controllers hanging on the armrests (Figs. 10, 11). The floors, ceiling, walls, and pillars are covered in Anderson's iconic phrases and doodles, a style originating from the artist's contribution to the inaugural Hugo Boss Prize exhibition at the Guggenheim Museum in 1996 and influenced by Allan Kaprow's infamous *Words* installation at the Smolin Gallery in 1962.[61] The physical installation is an intermediate space. Participants begin and end the VR experience in a different reality – neither the otherworldly virtual realm nor the recognizable "real" world. Anderson uses this liminal space to enhance the immersive experience of *The Chalkroom* as a whole. As Gabriella Giannachi argues in *Virtual Theatres:* "The virtual… always contains something that is already familiar – something that has already been experienced. This is why, upon entering a [VR] environment, the [user] usually *knows* what to do, even if they have never been in the

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[61] Denise Markonish, "Language of the Future" in *The Chalkroom Gallery Guide* (North Adams: Massachusetts Museum of Contemporary Art, 2017). For more on the Hugo Boss Prize exhibition, see: "Timeline of the Hugo Boss Prize," The Guggenheim Museums and Foundation. Accessed June 6, 2022. https://www.guggenheim.org/hugo-boss-prize/time-line. For Kaprow's installation, see Rose Moose and C. Robert McElroy, *Allan Kaprow's Words: About Allan Kaprow* (New York: Smolin Gallery, 1962).

environment before (emphasis in original)."[62] In the case of *The Chalkroom,* participants experience a version of the virtual world even before putting on a headset.[63] An uncanny feeling of familiarity emerges when users are sealed off from the physical installation and enter the virtual version of the same space.

When experiencing *The Chalkroom,* participants are immersed in words. Written quotes and vignettes are physically and digitally scrawled on the wall: "They say our empire is passing… as all empires do…;" "The show's about to begin, unfortunately the soloist is still hiding inside the grand piano;" "Instead of a period at the end of each sentence… there should be a tiny clock that shows you how long it took you to write that sentence (Figs. 12, 13)." In the virtual version of *The Chalkroom,* these words and phrases often explode into clouds of letters that scatter and fly throughout the space. The spoken word emerges after donning the VR headset, with Anderson's hyperenunciated voice cutting through the drone of the electronic music:

> *I had this dream. And in it my mother is sitting there cutting out pictures of hamsters from magazines. In some of the pictures, the hamsters are pets. In some of them, hamsters are just somewhere in the background. And she's got a whole pile of these cedar chips – you know the kind – and she's gluing them together into frames for the pictures. She glues them together and frames the pictures. And then, hangs them up over the fireplace. That's more or less her method. And suddenly I realize, that this is just her way of telling me that I should become a Structuralist filmmaker. Which I had, you know, planned to do anyway.[64]*

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[62] Gabriella Giannachi, *Virtual Theatres: An Introduction* (London: Routledge, Taylor & Francis Group, 2004), 130.

[63] A similar VR artwork, *Lab'Surd: the LABoratory of SURvirtuality,* was created in 2015 by Judith Guez, Guillaume Bertinet, and Kevin Wagrez. In this artwork, "the spectator is immersed in a virtual room that is a copy of the actual room where he is sat down. While the spectator wears the VR headset, he gets immersed into another world he is free to explore. This virtual world is at the beginning of the experience a realistic copy of the actual room where the installation takes place. Then, the place will progressively be transformed and deconstructed until becoming more abstract with paradoxical architecture. The spatial sound aims to guide the spectator and make him look around him. The sound is revealed to be an important element to use to guide the eyes and the narration." See Fuchs, et.al., *Virtual Reality Headsets,* 178.

[64] This story is told in the Dance room of the VR experience.

VR technology itself is also made of words: HTML coding and VRML (Virtual Reality

Modelling Language) serve as the backbone of the virtual environment.[65] This complex layering

of text is the heart of Anderson's practice. According to the artist: "There are many ways that

words can be part of visual art… There is looking at words, seeing words, reading them,

understanding them and relating them to thoughts and things. There are words made of light, of

memories and – when they're spoken out loud – of sounds and air."[66] *The Chalkroom* utilizes all

of Anderson's approaches to words in visual art. In fact, the artist's own description of the

artwork refers to participants as "readers": "*[The Chalkroom]* is a virtual reality work in which

the reader flies through an enormous structure made of words, drawings, and stories."[67] As

readers, therefore, participants are immersed in both the highly visual virtual environment and in

the imaginative stories told inside that environment.

The Chalkroom is also interactive; users maintain a level of control over their own

experience and can actively effect change within the environment. Though participants are

guided by Anderson's omniscient presence, they are given the freedom to "*Use the controller to*

strike the picture of the place you want to go," including: Cloud, Dog, Sound, Free Fly Slow,

Free Fly Fast, Writing, Anagram, Water, Dance, and Tree. In the Cloud room, the artist's voice

gives the instruction: "*Just press and hold the trigger to pull the chalk dust out of the wall*" and

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[65] See this point expanded in Giannachi, *Virtual Theatres*, 123.

[66] Anderson, *All the Things I Lost in the Flood,* 115. According to Anderson: "Most of the stories I tell are in first person. My own voice is essentially a combination of my parents' voices. My father learned inflexion and diction from wise guys – actors like Jimmy Cagney and Bob Hope – and combined their swagger with a deadpan Midwestern delivery. My mother's voice was more authoritarian, a Church of England voice. And I've mixed those up and found my own voice. Of course, like most people I have at least twenty voices – intimate, conversational, formal, academic, goofy, gossipy and so on. In performances I use a mixture of these everyday voices. I've also used other people's voices, combining them in large orchestral works or installations." See Anderson, *All the Things I Lost in the Flood,* 175.

[67] Anderson, *All the Things I Lost in the Flood,* 57.

whispers: "*What are days for? To wake us up, to put between the endless nights*" as the dust

swirls around. In the Sound room, users can hold down the controller's trigger and speak or sing,

an action that creates sound sculptures in the space that can be played by striking them with a

virtual mallet. The Writing room asks participants to freely "shoot" Anderson's phrases onto a

blank room in any design. Holding down the controller's trigger launches an ongoing stream of:

"When my father died we put him in the ground. It was like a whole library had burned down.

World without end." These interactive elements – which ask users to physically reach their arms

out and activate the controller, engage their vocal cords, listen carefully to the whispered stories,

and read appearing text – make *The Chalkroom* a successful immersive-interactive experience

that engages multiple senses in virtual reality.

The Chalkroom is also a useful case study to understand individual interactive experience

in digital art. The artwork and installation gradually seal off participants from their surroundings

– first by transitioning from the public exhibition space to a semi-private installation and second

by isolating each user in a VR headset. This experience slowly narrows participants' experience

from collective (as a general museum visitor) to individual (as a participant in the artwork). Once

users don a headset, they are visually closed off from their previous surroundings and their

senses become engaged in the digital environment. The HTC Vive headset prevents peripheral

vision into the physical installation, the gaze is directed forward through the stereoscopic lenses,

and users "suspend disbelief" that they are still seated in an exhibition space with other museum

visitors. The spatialized sound and Anderson's voice in the headphones reinforces the isolation;

the first words uttered in the VR are: *"You're in the Chalkroom. Hey, where did everybody go?"*

This initial guidance by the artist establishes a personal relationship between users and the

artwork, a relationship that is maintained throughout the experience via Anderson's instructions

using a second-person singular grammar structure. For the duration of their visit to *The Chalkroom,* users are alone with the words and sounds in the vast expanse of the virtual world.[68] They never encounter another digital avatar in the space, and, ideally, they never become aware of their actual surroundings over the drone of the music or the frame of the headset's stereoscopic lenses.

The VR experience reinforces individual interactive experience through a design that recognizes each user's movements in the space. When participants are steered through *The Chalkroom* on the way to its center, a spotlight follows the direction of the user's gaze to highlight the drawings and phrases that spatter the walls. A virtual version of the VR controllers stands in for the user's hands when they are asked to select a place to visit. In the Free Fly rooms, the perspective and scale of the environment shifts according to the participant's bodily movements in "flight," which may be achieved by holding the two controllers together and/or physically standing up and walking around the installation. The Anagram room is another example. In this space, two large bald heads hover on the walls and mirror individual movements back to the user. Any nodding, shaking, or moving of the user's head is reflected by their chalk-drawn counterparts while Anderson tells a story: *"I'm on a talk show. 'Love your new book' says the host. I haven't written a book but I try to go along with this anyway. I think it has the words 'dog drool' in the title."* In this room, users become an actor in Anderson's story as they take on the role of the "talking heads" depicted on the wall. These spaces heighten the individualized

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[68] Janet Murray writes, "For the purposes of experiencing multisensory immersion, one of the simplest ways to structure participation is to adopt the format of a visit. The visit metaphor is particularly appropriate for establishing a border between the virtual world and ordinary life because a visit involves explicit limits on both time and space." *The Chalkroom* is framed exactly like a visit, making it a particularly successful work of VR. See Murray, *Hamlet on the Holodeck*, 105.

immersive-interactive experience of the VR by allowing the participant to visually see how their body relates to the virtual environment.

These tactics underline how vision, as a multimodal sense, facilitates an individual interactive experience of *The Chalkroom* as an installation and virtual reality artwork. The sense of immersion is primarily communicated through vision, an experience that is heightened and reinforced by the installation space that duplicates the same physical and virtual environment. Once users strap the VR headset around their eyes, they are almost wholly sealed off from the external world and their entire field of vision is filled by the stereoscopic views of *The Chalkroom.* The percussive, electronic sound and Anderson's voice that emerge from the headphones further isolates the user as both their auditory and visual senses become flooded and engaged in Anderson's world. Participants layer their cognition of the virtual world over the physical world via these stimuli, allowing their experience of the space to rely on visual perceptions of their embodied relationship to the virtual environment.

When their visit is over, participants are gradually re-introduced to the "real" world by emerging into *The Chalkroom's* all-encompassing physical version before exiting back into the museum's public galleries. This process can feel disorienting. Heather Kapplow, for example, reflects on how the artwork satisfied her penchant for being psychologically thrown off balance: "I like to watch myself trying to right myself and am fascinated by all of the tiny micro adjustments involved in making the world make sense again when it hasn't for a moment."[69] This readjustment is a brief internal recalibration of a participant's mind and body to the physical world. Such moments of self-awareness remain after the individual interactive experience with the artwork has concluded.

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[69] Heather Kapplow, "Tripping Across the Lines Between Physical and Virtual Reality with Laurie Anderson," Hyperallergic, June 5, 2018, https://hyperallergic.com/440728/laurie-anderson-massmoca/.

As such, the individual nature of *The Chalkroom* prompts self-reflection. In navigating

the artwork for fifteen minutes, users get a glimpse into Anderson's psyche – the memories,

stories, and phrases that contribute to the artist's identity. At the same time, participants can

reflect upon how their own stories and memories might manifest in *The Chalkroom*. As Sunanda

K. Sanyal describes:

> 'Floating' through [*The Chalkroom*] makes you feel a nagging unease, as if you are
> navigating through the nooks and crannies of someone's mind, where each turn around a
> dark corner offers stories that you are not supposed to know… It would not be unusual to
> come away from *The Chalkroom* with a heightened awareness of the complexities of
> one's own mind, where the conscious and the rational easily slide into the subconscious,
> and memories, both fond and intimidating, are all but disjointed pieces of some unsolved
> puzzle.[70]

Indeed, the artwork inspires a conceptual plunge into personal experiences, childhood memories,

and autobiographical text that generates in the artwork and remains even after participants

remove the headset. As Anderson proclaims: "[*The Chalkroom*] is a library of stories, and no one

will ever find them all."[71]

Individual Interactive Experience as Solo Performance

Experiencing *The Chalkroom* or any other virtual reality artwork is often likened to a

performance. This parallel stems from a long history of interdisciplinary scholarship between

new media and performance studies, instigated by Brenda Laurel's groundbreaking book,

Computers as Theatre, in 1991.[72] When Peggy Phelan published *Unmarked: The Politics of*

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[70] Sunanda K. Sanyal, "Laurie Anderson," CAA Reviews (College Art Association, August 2, 2019), http://www.caareviews.org/reviews/3586#.YwPVyuzMKrc.

[71] "Laurie Anderson: A Virtual Reality of Stories," Louisiana Channel, March 27, 2019, https://channel.louisiana.dk/video/laurie-anderson-virtual-reality-stories.

[72] See Brenda Laurel, *Computers as Theatre* (New Jersey: Addison-Wesley, 1991). Other authors expanded this approach, see: Gabriella Giannachi in *Virtual Theatres: An Introduction;* Jon McKenzie, "Virtual Reality: Performance, Immersion, and the Thaw," *The Drama Review* 38, no. 4 (1994): 83–106; and Martina Leeker,

Performance two years later, her proclamation that "live performance plunges into visibility – in

a maniacally charged present – and disappears into memory" greatly impacted early

understandings of how people engage with interactive digital art.[73] Though the underlying

infrastructure of a digital artwork remains constant, individuals' navigation of the virtual space is

unanticipated and unique to each activation of the artwork. This is tied to the goals of

performance art as a practice. To Scott deLahunta:

> Everything about these technologies of virtual reality emphasize audience interaction,
> immersion, or participation over watching from a single vantage point. Thus, they align
> themselves with the formative cultural movements of the 1950s when interdisciplinary
> experimentation challenged the borders of conventional arts disciplines and their
> presentation and sought to break down barriers between performer and audience, maker
> and viewer.[74]

Indeed, performance studies has much to offer in understanding the interactive experience of

digital artworks, particularly those facilitated by VR technology. Participants are given a certain

amount of control over their own experience, and the traditional lines between artwork,

participant, and audience are quickly blurred.

Participants (or performers) are required for a virtual reality artwork to activate. They are

not external viewers or audience members, but instigators who realize the artwork's existence.

As Panayiota Demitriou argues, "immersive experience cannot exist without immersants,

without bodies… who are responsible for generating and/or processing the different content in

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Imanuel Schipper, and Timon Beyes, eds., *Performing the Digital: Performativity and Performance Studies in Digital Cultures* (Bielefeld: Transcript Verlag, 2017).

[73] Peggy Phelan, *Unmarked: The Politics of Performance* (New York: Routledge, 1993), 148. As Gabriella Giannachi describes: "virtual theatre consists of a performative component, which is unique in time, and a remediated component, which is more or less permanent. This means that virtual theatre takes place through the viewer's 'performance' of the work and its disappearance into memory (of both the viewer and, on occasion, the work itself)." See Giannachi, *Virtual Theatres* 6.

[74] Scott deLahunta, "Virtual Reality and Performance," *PAJ: A Journal of Performance and Art* 24, no. 1 (2002): 106.

real-time, where each manifestation of this is unique, a performance never-to-be repeated in the same manner."[75] Individuals who don a VR headset for an artwork such as *The Chalkroom* create their own iteration of the artwork by choosing which rooms to visit, at which point in the experience, and for how long they linger in certain stories or tasks. The artwork is driven by users, with their own interests and impulses guiding their decisions in the virtual space. As artist Jeffrey Shaw describes, participants become the "narrator and autobiographer" of their own experience with the artwork.[76] In the case of *The Chalkroom,* the experience is not documented or recorded in any way; each performance exists as an ephemeral moment that "disappears into memory" at its conclusion. These factors help realize the experience of the artwork as a moment of performance.

The metaphor of performance also implies the existence of an audience. Though *The Chalkroom* does not take advantage of it, VR programming allows for a mirror display of an individual participant's view to be projected on a public screen. In addition, for many VR art experiences, headsets are installed directly into public galleries, which encourages spectators to gather and observe users' actions while waiting to experience the artwork themselves. On one hand, this allows participants to feel freedom in the virtual environment as the only person able to see the digital world. On the other hand, the spectators' gaze can provoke anxiety in users who become self-conscious and careful with their actions for fear of judgement. As Eryn Parker and Michael Saker found in a study of VR audiences: "In the context of VR… the practice of people watching not only took on a more active and contemplative hue, but also prophetically provoked

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[75] Panayiota Demetriou, "'Imagineering' Mixed Reality (MR) Immersive Experiences in the Postdigital Revolution: Innovation, Collectivity, Participation and Ethics in Staging Experiments as Performances" in *International Journal of Performance Arts and Digital Media* 14, no. 2 (2018): 176.

[76] Jeffrey Shaw, "Modalitäten einer interaktiven Kunstausübung" in *Kunstforum International* 103 (1989): *Im Netz der Systeme,* 204. Translated in Kwastek, *Aesthetics of Interaction in Digital Art,* 36.

anxiety in some participants about the prospect of reckoning with this seemingly normless experience."[77] *The Chalkroom* mitigates these anxieties particularly well. The low light, timed entry, and limit to four participants at a time make the experience more personal, without obvious pressure of spectators' gaze. Though other VR artworks still facilitate an individual interactive experience between participant and machine, *The Chalkroom* offers a more intimate version of the artwork's performance.

However, other people are still present in *The Chalkroom's* installation space. Four users perform the artwork simultaneously, with the distinct awareness of other bodies sharing a similar experience. One user may decide to "fly" by physically standing up and walking around the room, while another may suddenly sing out to make a sound sculpture. These actions draw attention to individual participants, which might bring others out of their "suspension of disbelief" and make them aware of the simultaneous performance. In addition, all participants are under the watchful eye of the gallery facilitator (Fig. 14). Though the facilitator plays a role more akin to a stagehand than an audience member in the performance analogy, their gaze is still present and could influence individual's perception of their performance of the artwork. In fact, when watching users in preparation for writing an article about *The Chalkroom*, Heather Kapplow reflected: "Though at capacity, the room is silent except for the shuffling of people's feet and shifting in their seats. It's eerie – like watching an audience watching a movie where you can't see the screen and they can't see you."[78] Like John Cage's *4'33"* (1952), the sense of performance is heightened by the often-overlooked behaviors of both those performing and those

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[77] Eryn Parker and Michael Saker, "Art Museums and the Incorporation of Virtual Reality: Examining the Impact of VR on Spatial and Social Norms" in *Convergence* 26, no. 5–6 (2020): 1165.

[78] Kapplow, "Tripping Across the Lines."

witnessing the performance.[79] Participants might experience the virtual artwork in different ways, but their physical presence in the installation space will indicate their lively participation in activating the artwork.

As a type, individual interactive experience can therefore be understood as a form of solo performance. Artworks of this type are intimate, personal, and driven by a single individual with a perception of control over their own actions. Though many people might witness the experience – as a group hovering over a single computer screen or a small crowd spectating a VR experience – there remains one person at the center of each iteration of the artwork at a time. Users engage with such artworks alone; they are in a first-person, one-on-one relationship with the machine. This is distinct from the other types of interactive experience discussed throughout this project. Though collective and distributed interactive experience may also invoke parallels to performance studies and theory, individual interactive experience's relationship to the solo performance specifically helps to underline its focus on the singular participant. To be sure, with the emphasis on individual users in today's development of digital technologies, it is vital to understand how such interactivity manifests in digital art. The following chapters offer more specificity to this distinction, with attention to interactive experiences that involve more than one participant to different ends.

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[79] For more on this artwork, see Kyle Gann, *No Such Thing As Silence: John Cage's 4'33''* (New Haven: Yale University Press, 2010).

II: COLLECTIVE INTERACTIVE EXPERIENCE
SHARING SPACE IN DIGITAL ECOSYSTEMS

As you approach the newest special exhibition space at the Asian Art Museum of San Francisco, you are confronted with a gaping dark chasm (Fig. 15).[1] Anticipating the vivid and mesmerizing space you have seen on social media, you walk through the doorframe and allow darkness to envelop your body. Your senses are immediately bombarded. You enter the world hidden beyond the entrance hall and simultaneously process an overwhelmingly sweet smell, a serene celestial soundscape, and a vibrant digital ecosystem of blooming cosmos flowers and orange spider mums, shimmering swarms of butterflies, and darting white crows (Fig. 16).

You shake off your disorientation and join the awestruck and gleeful people sharing this experience. The walls and floor are covered in varieties of flowers and leaves that grow, scatter, and wilt at your touch. Butterflies cheerfully navigate the environment until accidentally trampled or hit by an unsuspecting passerby (Fig. 17). Crows that are caught or crash headlong into an obstacle suddenly burst and turn into a chrysanthemum (Figs. 18, 19). You continue to weave around fellow visitors as you explore this digital realm. With strategically placed mirrors and shiny floor tiles, some rooms appear to recede into infinity. One area births a kaleidoscope of butterflies while another generates a murder of crows. A school of fish rushes from one side of the exhibition space to another, shaping a path according to the human bodies obstructing the floor (Fig. 20). As the potential for interaction within the environment becomes clear, you begin to join others growing flowers, catching crows, and taking photographs of the digital ecosystem in which you now play a part.

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[1] This was the inaugural exhibition for the Akiko Yamazaki & Jerry Yang Pavilion, which expanded the museum by seventeen percent and provided unprecedented space for twentieth and twenty-first century art. For this chapter, I consider the *Continuity* exhibition as a single borderless installation except for the southwestern room, *Born From the Darkness a Loving, and Beautiful World* (2018/2021)*,* which featured calligraphic *kanji* (the Japanese writing system using Chinese characters) turning into elements of water, fire, and rainbows when touched.

Time passes and the seasons change. The chrysanthemums of autumn give way to the deep blue pansies and violas of winter, followed by the geraniums and pink cherry blossoms of spring and the golden sunflowers of summer (Figs. 21, 22, 23, 24). Still, every visitor's action in the space has a consequence; standing still will grow a bed of flowers, grazing a hand along the wall may kill butterflies or crows; fish divert around the sea of people grouped in the room. The environment reacts and responds to the presence of both digital and human presence unique to each moment and relies on active engagement with the space. Even when you are ready to exit the exhibition, your impact on the environment remains for the next wave of awestruck visitors while you rejoin the more "traditional" gallery spaces of the museum.

This immersive exhibition, titled *teamLab: Continuity,* was on display July 23, 2021, until February 28, 2022, attracting over 125,000 visitors.[2] According to teamLab, the Japanese artist collective responsible for the exhibition, *Continuity* was so-titled because "everything exists in a long, fragile yet miraculous borderless continuity of life."[3] People are meant to co-exist within the digital ecosystem, dissolving boundaries between one another, the artworks, and ideas of the natural environment. For this reason, the exhibition is a fruitful example of collective interactive experience in digital art. In this type of experience, humans share space with other humans in an environment that relies on physical presence and communal action; the existence of others inherently shapes the experience of the artworks and the themes they address.[4] Notions of collectivity and co-creation are also central to teamLab's working process, which is deeply

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[2] This statistic was shared by Robert Mintz, Deputy Director of Art & Programs at the Asian Art Museum of San Francisco. *Continuity* featured many of the same artworks as those at teamLab: Borderless in Tokyo but was 1/10th of the size.

[3] "Exhibitions: teamLab: Continuity," Asian Art Museum of San Francisco, March 1, 2022, https://exhibitions.asianart.org/exhibitions/teamlab-continuity/.

[4] The particularities of this type are further explored in the introduction to this dissertation.

connected to the history of art-technology groups in Japan and informs the state of new media art

production today. Indeed, the *Continuity* exhibition manifests teamLab's approach to both

collective artmaking and collective experience in a particularly striking manner.

This chapter examines collective interactive experience through a case study of teamLab

and the *Continuity* exhibition. This example serves as a model for the group's approach to

collectivity – both as a team-based artist group and as designers of shared exhibition spaces. The

chapter therefore begins by contextualizing teamLab's practice in the new media art history of

Japan, with an emphasis on collective artmaking with emerging technologies in contemporary

Japanese art. It then turns to situate teamLab's practice in the typology of collective interactive

experience by examining *Continuity* as a digital ecosystem.

teamLab: The Ultratechnologist Group

teamLab was co-founded in 2001 with five members – Inoko Toshiyuki (b. 1977), Sakai

Daisuke (b. 1978), Tamura Tetsuya (b. 1977), Yoshimura Joe (b. 1977), and Aoki Shunsuke (b.

1978) – each bringing specialized training in software engineering, robotics, and information

technology.[5] The collective calls itself the "Ultratechnologist Group" (Urutoratekunorojisuto

Shūdan ウルトラテクノロジスト集団), working to "navigate the confluence of art, science,

technology, design and the natural world."[6] Founded as both an information technology start-up

and an art collective, teamLab established a commercial production wing to fund the group's

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[5] Laura Lee, *Worlds Unbound: The Art of teamLab* (Bristol: Intellect, 2022), 9. There remains an ongoing discussion in the field of global contemporary art on naming conventions for international artists and scholars. Throughout this dissertation (and especially in this chapter), all names are listed according to the native custom (generally, for East Asia-born individuals, family name first and given name second; for North America and Western Europe-born individuals, given name first and family name second) except for bibliographic citations, which follow the Chicago Manual of Style. In this chapter, macrons are used for long vowels and key words are translated in both Japanese and English.

[6] teamLab, "Biography," teamLab, accessed August 24, 2022, https://www.teamlab.art/about/.

artistic projects. While one side of the company develops search engines, digital products, and

office space design, the other creates video and projection-mapped artworks that push advanced

technologies to their fullest aesthetic capability.[7]

Today, teamLab is home to over 750 "ultratechnologists," bringing together artists,

programmers, engineers, CG animators, mathematicians, architects, and designers.[8] All members

of the collective work in-person and on-site in Tokyo, where the group continues to maintain a

headquarters for their international projects. The interdisciplinary marriage of engineering,

scientific research, entertainment industries, and art that teamLab represents is indicative of a

shift in today's contemporary art landscape. teamLab's model – an artist-run company with

integrated studios, Do-It-Yourself approaches, well-equipped collective workspaces, dedicated

display space, and funding through ticketed experiences – lead the Research & Development

Platform at Serpentine Galleries to label it as a "future art ecosystem" of new media art

production in 2020.[9] Indeed, the group's international presence plays a key role in the trend

toward spectacular, Instagram-oriented, immersive exhibitions.

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[7] teamLab, "Biography." teamLab's first major international presence was at the *Kansei – Japan Design Exhibition* held at the Musée des Arts Décoratifs in 2008. It was through this exhibition that the collective came to the attention of Murakami Takashi (b. 1962), who invited the collective to organize a solo exhibition at the Kaikai Kiki Gallery in Taipei. In 2013, teamLab participated in the Singapore Biennale. The following year, the group signed with Pace Gallery and opened their first exhibition at Miraikan in Tokyo. In 2015, the collective represented Japan at the World Expo in Milan, which was closely followed by the opening of DMM.PLANETS Art by teamLab in 2016, their first large-scale immersive exhibition space. teamLab's success in the 2010s culminated in the opening of the MORI Building DIGITAL ART MUSUEUM: EPSON teamLab Borderless in 2018, touted as the first-ever digital museum with 107,000 square feet of exhibition space in Tokyo. The collective's artworks are now in permanent collections of museums worldwide, including the Museum of Contemporary Art in Los Angeles, the Asian Art Museum of San Francisco, the National Gallery of Victoria in Melbourne, and Amos Rex in Helsinki. For more history on teamLab, see Laura Lee, "Introduction," in *Worlds Unbound: The Art of teamLab* (Bristol: Intellect, 2022), 1-31.

[8] Y-Jean Mun-Delsalle, "Japanese Digital Art Collective teamLab Imagines a World Without Any Boundaries, Part 2," *Forbes*, August 19, 2018, https://www.forbes.com/sites/yjeanmundelsalle/2018/08/19/japanese-digital-art-collective-teamlab-imagines-a-world-without-any-boundaries-part-2/.

[9] See Serpentine R&D Platform, *Future Art Ecosystems Issue 1: Art x Advanced Technologies*, edited by Robin Mackay (London: Serpentine Galleries, 2020), 97-98.

However, teamLab's work is also deeply rooted in the history of art and technology in Japan, a history that helped establish the field's mode of production. With a long record of art associations, loosely organized or strict membership groups, and other collaborative practices, new media artists in Japan were poised to pioneer the model of team-based art production that is prevalent today. Morris Low agrees, arguing:

> The media-technological context of digital art in Japan originates in the context of collaborative practices between the digital media industry, research laboratories, programming specialists and research and education centers (sic) bridging the gap between art, design, and science. Technological developments undertaken by large companies such as Sanyo, Sony, or Matsushita, are being linked to Japanese craftsmanship, and in relation to nature and aesthetics.[10]

Artistic endeavors in Japan are entwined with various interdisciplinary specialties and rely on collaboration between these entities. In fact, Japanese new media artists were some of the first to join forces with corporate giants such as Canon and NTT (the Nippon Telegraph and Telephone Corporation), a trend that Serpentine Galleries identifies as an important strategy for an "art-industrial revolution" in the 2020s.[11] This infrastructure continues to be the model for new media art production and innovation worldwide, and is born from a longer history of collectivity and approach to art-technology projects in Japanese art history that deserve a closer examination.

Collectivity and New Media Art History in Japan

To best understand collective interactive experience in teamLab's practice, it is important to address notions of collectivity and the development of new media art in Japan since the Meiji

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[10] See Morris Low, "Technological Culture" in *The Cambridge Companion to Modern Japanese Culture,* edited by Yoshio Sugimoto (Cambridge, UK: Cambridge University Press, 2009) and Emilia Sosnowska, "Touch, Look and Listen: The Multisensory Experience in Digital Art of Japan," *CITAR Journal* 7, no. 1 (2015): 64.

[11] See Serpentine R&D Platform, "Strategies for an Art-Industrial Revolution" in *Future Art Ecosystems Issue 1: Art x Advanced Technologies*, ed. Robin Mackay (London: Serpentine Galleries, 2020), 82-128.

Restoration of 1868, which often marks the beginning of "modern art" in the country. At this time, the 268-year Tokugawa Shogunate fell, Emperor Meiji was reinstated as the direct ruler, Japan opened its borders to trade and relations with the West, and a new wave of industrialization was sparked. Though the Meiji Restoration was not a breaking point from total isolation, the very idea of "modern art" and its institutions is marked by this new interaction with the West. [12] The entire artistic infrastructure, including art schools for practical training, museums, exhibitions, and other public venues for art appreciation were now modeled from French, British, Dutch, and other Western systems. The word for "art" or "fine art," *bijutsu* (美術), was first introduced when Japan participated in the Vienna Expo of 1873, blending existing understandings of beauty in both regions.[13] It was now important to define Japanese artistic practice in Western terms, with notions of "art," "painting," "sculpture," "craft," and "architecture" developing as categorizations for aesthetic endeavors for the first time.

In the wake of these changes and new understandings of art itself, practicing artists turned to "art associations" (*bijutsu dantai* 美術 団体) and "exhibition societies" to help adjust to the modern systems.[14] Throughout the Meiji Period (1868-1912), organizations for Western-

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[12] It would be a misunderstanding to think of the Meiji Restoration as a breaking point from total isolation. Trade with East Asian and Dutch merchants was ongoing throughout the Tokugawa Shogunate's rule, and many Western influences had already taken root by 1868. Tessa Morris-Suzuki argues that the Shogunate fostered a specific approach to technological development, fueled by trade with Dutch, Chinese, and Korean merchants who brough materials (especially books) into Japan. In the late 18th century, new, Western technologies began to be introduced through Dutch ports such as Dejima. These included oil paint, and the techniques of copperplate engraving and etching. See: Tessa Morris-Suzuki, *The Technological Transformation of Japan: From the Seventeenth to the Twenty-First Century* (Cambridge, UK: Cambridge University Press, 1994).

[13] See Shioya Jun et al., "The Genesis of the Word *Bijutsu* (Fine Art)" in *The 20th Century: Art in Japan* (Tokyo: Tokyo Art Club, 2019), 14-15.

[14] See Reiko Tomii, "After the 'Descent to the Everyday': Japanese Collectivism from Hi Red Center to The Play, 1964-1973," in *Collectivism after Modernism: The Art of Social Imagination after 1945* (Minneapolis: University of Minnesota Press, 2007), 52. It is important to note that earlier notions of artist "schools" and lineages contributed to this approach to collective structure, which are especially prevalent in premodern painting and woodblock print culture in the Edo Period (1603-1868).

style oil painting (*yōga* 洋画) and traditional Japanese-style painting (*nihonga* 日本画) came together under names such as the Meiji Art Society (Meiji Bijutsu-kai 明治美術会, est. 1889) or the Japan Art Association (Nihon Bijutsu Kyōkai 日本美術協会, est. 1879) to host exhibitions and participate in the Bunten (Monbushō Bijutsu Tenran-kai 文部省美術展覧会), a state-sponsored annual juried salon founded in 1907.[15] With these organizations, artists could submit and exhibit work with support from umbrella structures that were defining the new academic system of artmaking. Art associations continued into the Taishō Period (1912-1926), with reorganizations and splinter groups such as the Second Section Society (Nika-kai 二科会, est. 1914) and the Futurist Art Association (Mirai-ha Bijutsu Kyōkai 未来派美術協会, est. 1920) forming in response to disagreements over what constitutes "*bijutsu*" and to provide new avenues for exhibitions. Even during the Fifteen Year War (1937-1952), wartime associations such as the Japan National Service Art Society (Nippon Bijutsu Hōkokukai 日本美術報国会, est. 1943) were formed to reconcile artists' need to serve the war effort with their desire to continue painting.[16] The development of modern art systems in Japan is thus closely linked to the formation of these art associations and their model of exhibition-based collectivism.

In this same period, Japan was grappling with the relationship between art and modern technology. In the 1870s, the country began hosting National Industrial Exhibitions (Nihon Naikoku Kangyō Hakuran-kai 日本内国勧業博覧会), which would display domestic examples of industrial production (printing presses, bookbinding machines, steam engines, and ice cream

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[15] This exhibition was renamed Teiten in 1911 and Nitten in 1947.

[16] Reiko Tomii, "Introduction: Collectivism in Twentieth-Century Japanese Art with a Focus on Operational Aspects of Dantai," *Positions* 21, no. 2 (2013): 232-233. See also: Maki Kaneko, "New Art Collectives in the Service of the War: The Formation of Art Organizations during the Asia-Pacific War" in *Positions* 21, no. 2 (2013): 309–50.

makers) alongside objects labeled "*bijutsu*" (including postage stamps, postcards, and currencies).[17] The underlying goal was to adapt Western technology to preserve the Japanese spirit, a concept simplified as "Japanese spirit, Western learning" (*wakon yōsai* 和魂洋才).[18] The definition of *bijutsu* was thus entangled in this effort to define and understand Western approaches to both art and technology; it was used to adapt the concepts in service of the modern industrialization project.

In the first half of the twentieth century, the embrace of technological advancement slowly morphed into techno-nationalism, which fueled the colonialist and imperialist sentiments of the Fifteen Year War.[19] After the atomic bombings of Hiroshima and Nagasaki in 1945, approaches to technology therefore changed. The US-led General Headquarters Occupation was focused on demilitarization and restructuring of Japan's technological output. As Kusahara Machiko writes: "When the war ended in 1945 and the occupation forces arrived with overwhelming material presence, it became clear that the wartime spiritualism could not resist the power of [American] science and technology. The belief that Japan had to remodel itself as an industrial nation was widely shared."[20] This led to significant economic shifts. Japan began importing technology with an eye toward its export potential. The country would not innovate its own technologies, rather, it would develop existing technologies for re-export.[21] To Morris Low,

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[17] National Industrial Exhibitions were held five times from 1877 to 1903.

[18] Morris Low, Shigeru Nakayama, and Hitoshi Yoshioka, *Science, Technology and Society in Contemporary Japan* (New York: Cambridge University Press, 1999), 187.

[19] For more on the effects of Japanese colonialism and imperialism during the war, see: Asato Ikeda, Aya Louisa McDonald, and Ming Tiampo, eds. *Art and War in Japan and Its Empire, 1931-1960* (Leiden: Brill, 2013).

[20] Machiko Kusahara, "Proto-Media Art: Revisiting Japanese Postwar Avant-Garde Art," in *A Companion to Digital Art* (Malden, MA: Wiley-Blackwell, 2016), 113.

[21] For more on this, see Merton Peck and Shuji Tamura, "Technology" in *Asia's New Giant: How the Japanese Economy Works* (Washington, D.C.: Brookings Institution, 1976), 527. The authors identify three features of postwar Japanese technological development: high returns on importing technology in terms of exports and

Nakayama Shigeru, and Yoshioka Hitoshi, this led to an emphasis on domestic research and development – an approach that returned to earlier efforts to adapt, advance, and commercialize imported technologies to industrialize and modernize the country.[22] Art's relationship to this reconsideration of technology was complicated. The relatively new concept of *bijutsu,* combined with the trauma of war and the deadly capabilities of the technologies involved, left artists reeling in the aftermath.

In the immediate postwar landscape, it was also difficult for artists to become re-established. Rapid reorganization of art associations made it clear that most pre-war structures could no longer be maintained. According to Tomii Reiko, after this turmoil, the very nature of collectivism changed. To Tomii: "Although the exhibition remained a key concern, vanguard collectives to a greater extent worked as collaborative units to execute extraexhibition projects. In this sense collectivism after modernism in Japan is closely identified with collaboration."[23] Many artists chose to work together and produce artwork in new ways. Still, the general structure of a "group" of artists, even loosely defined and organized, continued to be an important vehicle for artistic production.[24] Artists found solidarity and familiarity within groups that shared goals

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productivity; extensive government controls over imported technology; and clever management, investment, and domestic research and development that capitalizes on imported technology.

[22] See Morris Low, Shigeru Nakayama, and Hitoshi Yoshioka, "Basic versus Applied Research" in *Science, Technology and Society in Contemporary Japan* (New York: Cambridge University Press, 1999), 13.

[23] Tomii, "After the 'Descent to the Everyday,'" 53-54.

[24] Indeed, as Tomii illustrates: "Japan is a land of collectivism because it has produced literally hundreds of artists' groups since the late nineteenth century, which as a whole constitute a main engine to propel the evolution of its art practices and institutions in the past century. If twentieth-century Japan was a land of collectivism, twenty-first-century Japan is a veritable living museum of collectivism, in which assorted modern modes of collectivism that historically arose can still be found in active operation." See: Tomii, "Introduction," 228.

and values in the emerging avant-garde movements and sought to create work both individually and together.[25]

Postwar artists did not shy away from incorporating technology or addressing its impact in their new collective practice. In fact, several avant-garde (*zen'ei bijutsu* 前衛美術) and, later, contemporary art (*kindai bijutsu* 近代美術) groups embraced emerging technologies in their collective artmaking and set the stage for Japan to become a leader in new media art production worldwide. The first such group was Jikken Kōbō, or "Experimental Workshop" (Jikken Kōbō 実験工房, active 1951-1957), which was founded by surrealist critic Takiguchi Shūzō (1903-1979). The group was unorganized in the sense that artists were not official members, nor were they tied to exclusive affiliation. The artists sought a "total art" that would transcend genre, including visual arts, music, dance, and literature.[26] Jikken Kōbō embraced new industrial materials, creating "auto-slide" works combining tape recorders and slide projectors to produce still images, music, and spoken narrative performances. Like research and development scientists at the time, these artists used existing technologies to push back against techno-nationalism.[27] The group even preferred the word "recital" or "presentation" over "exhibition" to encompass their shared multimedia activities.[28] To Jikken Kōbō and many other emerging avant-garde

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[25] Tomii identifies many different forms of collectivism that are prevalent both in global art history and in Japanese art history. In the Japanese postwar context, she defines collectivism as "strategic alliances (primarily) of artists motivated to seek and create alternatives to the existing options, be they artistic/expressive or social/operational or both." See Tomii, "Introduction," 232.

[26] See Shioya Jun et al., "The 1950s: The Perseverance of Tradition and New Creativity" in *The 20th Century: Art in Japan* (Tokyo: Tokyo Art Club, 2019), 166.

[27] For more on this, see Miwako Tezuka, "Jikken Kōbō and Takiguchi Shūzō: The New Deal Collectivism of 1950s Japan," *Positions* 21, no. 2 (Spring 2013): 351–81.

[28] See Shioya Jun et al., "The Jikken Kōbō" in *The 20th Century: Art in Japan* (Tokyo: Tokyo Art Club, 2019), 168-169. See also Miwako Tezuka, "Experimentation and Tradition: The Avant-Garde Play: Pierrot Lunaire by Jikken Kōbō and Takechi Tetsuji," *Art Journal* 70, no. 3 (2011): 64–85.

groups, Western influence after the Meiji Restoration dictated *bijutsu* to be categories of "painting," "sculpture," and "crafts." Breaking down those genres might open new opportunities for expression in the postwar world.

The Gutai ("Concrete") Art Association (Gutai Bijutsu Kyōkai 具体美術協会, active 1954-1972) was another collective that sought a freedom of expression that was not possible in the pre-war art structures. Founded by Yoshihara Jirō (1905-1972), Gutai placed their emphasis on physical engagement with materials; the artists were interested in exploring a connection between matter and action, and between the artist and the artwork.[29] Contrary to Jikken Kōbō, however, Gutai had a closed membership process and more formalized exhibition structure. To Yoshihara, part of a successful businessman lineage, there was validity to maintaining an artistic infrastructure – how the participating artists used that platform, however, was extremely open.[30] Yoshihara called for creating works that had "never existed before," and artists embraced the true avant-garde spirit of experimentation.[31] Artists engaged in "action painting" and works that heighten viewer experience in an environment, emphasizing interaction over passive observation. As a result, Gutai artists are widely seen as precursors to Allan Kaprow's (1927-2006) Happenings and anti-art practices that focus on the process of creation rather than the product itself, an impulse that made a monumental impact on later new media art.

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[29] For more on Gutai's aesthetic approach, see Alexandra Munroe "All the Landscapes: Gutai's World" in *Gutai: Splendid Playground* (New York: Guggenheim Museum, 2013), 21-43.

[30] For more on Yoshihara's background, see Ming Tiampo, "Originality and Transnational Modernism in the Taishō Era: Yoshihara's Formative Years" in *Gutai: Decentering Modernism* (Chicago: University of Chicago Press, 2011), 14-21.

[31] Shioya Jun et al., "New Groups from Kansai" in *The 20th Century: Art in Japan* (Tokyo: Tokyo Art Club, 2019), 169. See also Jiro Yoshihara, "The Gutai Manifesto," in *Theories and Documents of Contemporary Art: A Sourcebook of Artists' Writings* (Berkeley: University of California Press, 1996), 695–97. Gutai was also the first internationally recognized postwar group. Yoshihara began publishing bilingual (French and Japanese) *Gutai* newsletters in 1955. As part of the "Informel Whirlwind" that was encompassing avant-garde groups around the world, Gutai gained international recognition from artists and critics in France and the United States.

Gutai also made a variety of works using sound, light, and motion to investigate interactions between physical materials and the human body. To Ming Tiampo and Alexandra Munroe, this engagement was "a call to pacify technology and invoke the cosmic in the rapidly advancing space age."[32] The work of Tanaka Atsuko (1932-2005) is especially relevant to this point. Tanaka's most famous work, *Electric Dress* (1956), used industrial textiles and lightbulbs to create a fluorescent gown. As a member of Gutai, Tanaka was interested in the relationship between her body and the material – in this case, electricity that would lightly shock her extremities as she moved slowly through the space.[33] These engagements brought technology back to the human experience, rather than the ideals of technological progress on a universal scale.

The international Fluxus movement is another group that engaged with emerging technologies and theories in innovative ways. Active from 1962 to 1978, Fluxus artists produced video, performance, and other rule-based "score" artworks that engaged with emerging global communication systems and the information age.[34] In the 1960s, Korean-born Fluxus artist Paik Nam June (1932-2006) began working with televisions as an artistic medium. His 1965 *Magnet TV* aesthetically plays with the technology itself, creating an electrical reaction on the television screen with a magnet. Paik was trained in Japan and became known as one of the first video artists, making a major impact on the development of new media and global contemporary art. Though Fluxus was largely based in New York, Japan soon became a hub of Fluxus activity. Artists including Ay-O (b. 1931), Shiomi Mieko (b. 1938), and Yamaguchi Katsuhiro (1928-

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[32] Munroe, "All the Landscapes," 32. Also see a discussion of the 1967 exhibition *Gutai Art for the Space Age* in Tiampo, *Gutai: Decentering Modernism,* 156-159.

[33] For more on this artwork, see Namiko Kunimoto, "Tanaka Atsuko's Electric Dress and the Circuits of Subjectivity," *Art Bulletin* 95, no. 3 (2013): 465–83.

[34] Fluxus is further explored in Chapter 3 of this dissertation.

2018) joined the group after an influential visit by John Cage (1912-1992) and Ono Yoko (b. 1933) to the experimental Sogetsu Art Center in 1962.[35] Fluxus activities continued into the 1970s, with active members throughout the United States, West Germany, and Japan.

Fluxus operations influenced the founding of Hi-Red Center (HiReddo Sentā ハイレッド・センター, active 1963-1964), which was formed by Takamatsu Jirō (1936-1998), Akasegawa Genpei (1937-2014), and Nakanishi Natsuyuki (1935-2016) in 1963.[36] Hi-Red Center approached the community itself as a work of art, performing "actions of agitation" (*kakuhan kōdō* 撹拌行動). The group sought to trigger moments that would "shake up public awareness," and were concerned about the potential of nuclear resurgence.[37] In 1964, the group staged *Shelter Plan,* a work that embodied their anxieties over space age technologies and the increased monitoring of life on earth. The artists set up a temporary office in a hotel, where visitors were examined and provided with personalized box-type shelters that would protect against nuclear attack. Visitors were also provided with *Mystery Cans,* to be opened in the event of nuclear disaster. This and other work by the collective take the political landscape of the Cold War as its theme, with particular attention to the 1960s approach to technology.[38]

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[35] Doryun Chong understands John Cage's visit as "monumental:" "The impact of their visit on the Japanese scene was so powerful that it was dubbed 'Kēji shoku,' or 'Cage shock.'" See: Doryun Chong, *Tokyo 1955-1970: A New Avant-Garde* (New York: The Museum of Modern Art, 2012), 71. For more on Japanese artists' impact on the international Fluxus movement, see: Luciana Galliano, *Japan Fluxus* (London: Lexington Books, 2019).

[36] Hi-Red Center is so named because it combines the first character of each member's family name: *taka* (high, 高), *aka* (red, 赤), and *naka* (center, 中).

[37] Shioya Jun et al., "Hi-Red Center – From Artworks to Direct Action" in *The 20th Century: Art in Japan,* (Tokyo: Tokyo Art Club, 2019), 211.

[38] For more on this project, see Michio Hayashi, "Tracing the Graphic in Postwar Japanese Art" in *Tokyo 1955-1970: A New Avant-Garde,* edited by Doryun Chong (New York: The Museum of Modern Art, 2012), 102. This is also tied to anxieties related to the Daigo Fukuryū Maru incident, a fishing boat that was contaminated by radiation from an American nuclear test on March 1, 1954, and contemporaneous protests regarding the renewal of the US-Japan Security Treaty (Anpo protests), which maintained US military presence in Okinawa.

GUN (Niigata Gendai Bijutsu Shūdan GUN 新潟現代美術集団 GUN, 1967-1980) was another conceptual and performance-based group interested in the art-technology sphere. Like Fluxus, GUN artists became interested in the postal system as a medium and mail art as a practice. In 1969, co-founder Horikawa Michio (b. 1946) began *Shinano River Plan*, a mail art project inspired by the Apollo space missions and landing of American astronauts on the moon. The artist and teacher asked his students to do an assignment – "[pick] a stone on the earth weighing 300 grams" – the same amount that Neil Armstrong and Buzz Aldrin collected on the moon.[39] Horikawa then mailed the stones both to his artistic collaborators and to global politicians in protest of the Vietnam War and other events that made a worrisome impact on the Earth. Like *Shelter Plan,* such a project engages with the themes of the space age through performance-based and other conceptual practices that were becoming prevalent in global contemporary art and greatly informed the development of new media art in the latter half of the twentieth century.

In the late 1960s, Marshall McLuhan's influential writings on media theory were introduced to Japan.[40] Like other contemporary art movements in the United States and Europe, this inspired new directions of artmaking that interrogated technologies as extensions of human perception.[41] In 1966, a group of thirty-eight interdisciplinary artists came together to form the Environment Society (Enbairamento no Kai エンバイラメントの会, active 1966) and produce

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[39] For more on this project, see Reiko Tomii, *Radicalism in the Wilderness: International Contemporaneity and 1960s Art in Japan* (Cambridge, MA: The MIT Press, 2018), 117-119.

[40] Kazuhiko Gotō, "Erekutoronikusu jidai no kankyō: Māsharu makkurūhan no komyunikēshon ron" [Environment in the Age of Electronics: The Communication Theory of Marshall McLuhan], *Bijutsu Techō* 275, special issue, "Kūkan kara kankyō e" (November 1966): 106-7 (As cited in Midori Yoshimoto, "From Space to Environment: The Origins of Kankyō and the Emergence of Intermedia Art in Japan," *Art Journal* 67, no. 3 (2008): 26).

[41] For more on McLuhan's theories, see: Marshall McLuhan, *Understanding Media* (Corte Madera, CA: Ginko Press, 2003).

the two-part exhibition *From Space to Environment* that connected ideas of perception,

cybernetics, and communication to the human experience of the environment. Yoshimoto Midori

argues that the group's understanding of "environment" (*kankyō* 環境), "originally represented

an interactive site to realize a 'dynamic relationship between a human and his or her

surroundings.'" [42] To the Environment Society, interaction could include many forms and

mediums, including performances, mobile sculptures, electronic sound, and kinetic-optical art

that would heighten people's awareness to their place in the external world – an impulse

harnessed by teamLab and other collectives in the twenty-first century interested in immersive,

interactive experiences. The group's seminal exhibition is often considered a benchmark of

postwar Japanese art, especially its turn to consider concepts that would later be known as

"intermedia" and "technological art." In fact, many Environment Society artists were later

involved in the 1970 Japan World Exposition in Osaka (Expo '70), which became an emblem of

technological spectacle and led some to declare the "death of the avant-garde."[43]

Practices now understood as "new media" began to spread widely on an international

scale with a major technological advancement: the personal computer. As Japanese artists started

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[42] Yoshimoto, "From Space to Environment," 45. She continues, "It is important to recover this open-ended meaning of *kankyō*, because if *kankyō geijutsu* has since become almost conflated with intermedia art, both terms have been reduced in the Japanese context to mean technological art. By reexamining this grounding terminology, it becomes possible for art historians to reinvestigate the transnational and transgenre exchanges in 1960s art and understand how they have shaped today's Japanese art."

[43] Trends toward "environmental art," "intermedia" and sensory experience culminated in Expo '70, which was intended to showcase cutting-edge technology on an international stage with the theme "Progress and Harmony for Mankind." Many artists from avant-garde groups were involved in the Expo, though the spectacular event caused a major rift between those inspired by advanced technologies and those concerned with the Expo's techno-nationalist potential. The influential artist Okamoto Tarō's endorsement of the Expo by accepting an offer to coordinate the thematic exhibition for the government-sponsored spectacle went against everything avant-garde artists believed, and the majority had no idea how to respond to this development. To Okamoto, however, this was an opportunity to enact his theory of "Polar Opposites," (*taikyoku shugi*) that "new art forms would be born only from emphasizing contradictions or conflicts rather than synthesizing them." For more on this, see Midori Yoshimoto, "Expo '70 and Japanese Art: Dissonant Voices an Introduction and Commentary," *Review of Japanese Culture and Society* (December 2011): 1–12.

engaging with computer technologies, the term "media art" (*media aato* メディア・アート) emerged. The adoption of *media aato* – rather than *bijutsu* – indicates a shift in understanding materials in a global setting. According to artist Yoshioka Hiroshi: "Media art has always been called '*media aato*' in Japanese, perhaps because it is one of the latest developments of art, and it sounds more natural to keep its phonetic correspondence to its original English words."[44] Computer technologies were widespread. They also further eroded established mediums, as they provided a multimedia space to combine photography, design, performance, picture, and sound in one technology. One of the first collectives to make use of this technology was Dumb Type (Damu Taipu ダムタイプ, est. 1984), a group of 15 artists established in 1984. The artists adopted the English term "dumb," meaning "mute" or "stupid" to evoke a dark, cynical view of technology in response to the superficial consumer and emerging bubble economy of the 1980s.[45] New media practices and materials were therefore increasingly situated in an international context and technology-based art could take on new global themes.

New media institutions grew in Japan when the internet was commercialized in 1994. Artists increasingly turned to digital technologies in their work, a trend that culminated in the establishment of the Japan Media Arts Festival in 1997. The festival was intended to unite art and technology by bringing together digital art, manga, anime, video games, and other forms of entertainment. In the early 2000s, this influenced the government to enact the "Basic Law for the Promotion of Culture and Arts," which coined the term *media geijutsu* (メディア芸術) as

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[44] Hiroshi Yoshioka, "Art Is About the Future; Otherwise, Nothing: Art and Media in the Context of the Post-War Japan and Beyond," in *Coded Cultures: New Creative Practices out of Diversity* (New York: Springer, 2011), 111.

[45] For more on Dumb Type and their works, see: Woodrow Hood and Cynthia Gendrich, "Memories of the Future: Technology and the Body in Dumb Type's Memorandum," *PAJ: A Journal of Performance and Art* 25, no. 1 (2003): 7–20.

another translation of "media arts" that encompasses film, comics, animation, and digital

artworks in a broader context of popular culture – a designation that introduced an even more

expanded view of "art" than previously embraced.[46] With this approach to art-technology

endeavors via blurry relationships between *bijutsu, media aato* and *media geijutsu*, Japan became

known as an unparalleled leader in technology-based innovation, artistic output, and research on

a global stage.[47] Japan's presence at international events and founding of domestic institutions

soon pointed to an expansive understanding of how art, technology, engineering, and

entertainment industries intersect.

This history provides vital context to the state of new media art production in Japan

today. The relatively recent import of discreet categories such as "painting" and "sculpture" after

the Meiji Restoration, combined with avant-garde efforts to deconstruct genre entirely and the

recent conflation of art, technology, and entertainment in notions of *media geijutsu*, provided

ample ground for new media art to grow in Japan. To Yvonne Spielmann: "From the Japanese

standpoint, the term 'new media' is redundant, as the absence of any terminology offered by the

history of media or even by art history means that [all] media must count as new."[48] In contrast

to Western counterparts, "the conception of devices, computer applications, programming

functions, and the aesthetic construction of auditory, visual, graphic, and multimodal

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[46] However, Yoshioka acknowledges that theory is still needed to address the relationship between fine art, new media art, and popular arts – one that considers the similarities and differences between terms such as *media aato* and *media geijutsu.* See Yoshioka, "Art Is About the Future; Otherwise, Nothing," 111.

[47] Japan had a major presence at events including Ars Electronica (est. 1970), SIG-GRAPH Conference (est. 1974), and the International Symposium on Electronic Art (est. 1990) in the late 1990s and early 2000s. Yvonne Spielmann cites this as the impetus for writing her book: "My point of departure came from noting how it was the aesthetic and technical exemplars from Japan, above all, that stood out in international exhibitions and festivals in the 1990s." See Yvonne Spielmann, *Hybrid Culture: Japanese Media Arts in Dialogue with the West*, trans. Anja Welle and Stan Jones (Cambridge, MA: The MIT Press, 2013), 1.

[48] Spielmann, *Hybrid Culture*, 4.

representations are very tightly woven" in Japan.[49] Indeed, while artists in the United States and

Europe struggled to carve out legitimacy for art and technology collaborations, Japanese artists

and engineers were not impeded by conceptions of the two fields as separate and incompatible.[50]

This allowed for widespread innovation, experimentation, and collaboration with technological

mediums and themes for decades.

teamLab emerged out of this rich history of Japanese collectivity and art-technology

endeavors in 2001. Though the collective's approach is related to similar international

collaborative studios such as Random International (est. 2005), Studio Drift (est. 2007), and

Forensic Architecture (est. 2010) that engage emerging technologies for their artistic output,

teamLab should not be separated from its genesis in modern and contemporary Japanese art

history. For one, the collective uses the word *shūdan* as the translation for "group" when

identifying as the "Ultratechnologist Group" rather than the English import "group" (*gurūpu* グ

ループ). This word choice links teamLab to the avant-garde associations of the 1960s and 1970s

such as GUN, who used *shūdan* as their collective identifier.[51] Second, teamLab takes on the

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[49] Spielmann, *Hybrid Culture*, 7.

[50] This was especially evident in Experiments in Art and Technology's *9 Evenings: Theatre and Engineering* project, which received criticism for technological malfunctions and misunderstandings about how technology could be art. As Christiane Paul argues: "Art audiences and museum visitors have looked at paintings for centuries, and for many the medium of paint is neither a surprise nor an obstacle. But the cultural heritage that has 'trained' us in approaching certain art forms, such as painting, has not necessarily provided us with a vocabulary to understand others, like new media. See Christiane Paul, "Challenges for a Ubiquitous Museum: From the White Cube to the Black Box and Beyond" in *New Media in the White Cube and Beyond: Curatorial Models for Digital Art* (Berkeley: University of California Press, 2008), 67.

[51] Tomii discusses the distinction between these words in "After the 'Descent to the Everyday,'" 49-50. "The art organizations are *dantai*, connoting their formal and structured nature. The organizational names commonly ended with the suffix -*kai* (society) or with the word *kyōkai* (association)… [some] contemporaries preferred the archaic but native-sounding suffix -*ha* (school), which derived from the premodern painting schools such as Kano-ha and Rinpa. The import word "group" (pronounced *gurūpu*) was commonly used to discuss contemporary collectives, and it was sometimes incorporated in the names. In the 1960s and 1970s, the collectives were often called *shūdan*, another Japanese word that also means "group," less formal in its assembly than *dantai*. The theme of the 1973 Kyoto Biennale, "art by *shūdan*," capitalized on its somewhat subversive nuance. For the past decade, another import word, 'unit' (*yunitto*), became quite popular: Bikyōtō's Hori Kōsai calls his current group of three

ethos of domestic technological research and development in Japan that was pioneered by groups

such as Jikken Kōbō. Rather than innovating new digital technologies in their projects, teamLab

pushes existing and well-established technologies of projection mapping, digital design, and

algorithm engineering to their fullest capability. Third, teamLab's embrace of artists, engineers,

animators, mathematicians, and architects in their exponentially growing collective is tied to an

understanding of art and technology as interdisciplinary.[52] And fourth, teamLab's embrace of

corporate sponsorship – particularly the partnerships with EPSON for their permanent exhibition

space, teamLab: Borderless – is linked to a long history of Japanese technology and engineering

firms sponsoring digital projects in the wake of Expo '70.[53] These elements of teamLab's

practice should not be overlooked when discussing the pioneering collective in a global context.

    However, teamLab's approach to collectivity is different than many avant-garde groups

such as Gutai or Hi-Red Center. As Tomii writes:

> It is tempting to see a source of post-1945 collectivism in the persistent Japanese social
> mores of 'group orientation'… However, the often short-lived existences of such small
> vanguard collectives as Neo Dada and HRC points to a freespirited 'collectivity without
> conformity.'…In a sense, their collectivism constituted an individualism in the guise of
> groups.[54]

In contrast to the avant-garde structure of individual artists working to further their own practice

within a group structure, teamLab works as a single entity – perhaps closer to the ideal of "group

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'Unit 00." I might also note that this could be expanded to include designations such as *facutori,* as in Murakami
Takashi's Hiropon Facutori.

   [52] As Karin Oen discussed in an interview with me on August 29, 2021, 750 people isn't an unusual
number for employees in a design agency, though it seems striking for an artist collective.

   [53] This is also tied to a much longer history of Japanese companies supporting the arts. Department stores
Mitsukoshi and Takashimaya, for example, began exhibiting and popularizing art in commercial spaces in the early
twentieth century. For more on this history, see Younjung Oh, "Shopping for Art: The New Middle Class' Art
Consumption in Modern Japanese Department Stores," *Journal of Design History* 27, no. 4 (2014): 351–69.

   [54] Tomii "After the 'Descent to the Everyday,'" 69.

orientation" than any postwar artist group achieved. Though the 750 members of the collective have distinct roles, artworks are developed collaboratively and under the unifying name of teamLab. The group even prefers to conduct interviews about their artworks as teamLab regardless of the individual spokesperson who conducted the interview.[55] In addition, apart from traveling installation crews, teamLab's activity is conducted on-site and in-person at their Tokyo headquarters. This allows the artists to create works that are both conceptually and practically steeped in a collective mindset. According to Laura Lee in *Worlds Unbound: The Art of teamLab:*

> … each individual's embodied contributions are transformed into imaginative acts that develop the image as it unfurls, such that the creative agency of viewers' communal behaviors plays an authorial role in the work. Thus, teamLab's emphasis on collectivity and collaboration in its working process – its dismantling of the single-artist model – extends conceptually also to the exhibition context, where individual and communal participation in creative activities represent what teamLab calls "co-creation."[56]

It is this mindset of collaboration and co-creation that informs teamLab's application of collective interactive experience in their digital art installations. In teamLab's case, it is the entanglement of their conceptual approach with their working process that generates this type of experience in their exhibition spaces – a point that is particularly salient in the *Continuity* exhibition. The next section thus provides more definition to collective interactive experience as a particular mode of interactivity in digital art before applying it to *Continuity* as an illustrative case study.

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[55] This approach to teamLab's collectivism was embraced and understood in Laura Lee, *Worlds Unbound: The Art of teamLab.* However, it was challenged in the *teamLab: Continuity* exhibition catalogue, which made sure to attribute quotes to specific members of the team and highlight individual members of the collective. See Karin Oen, Clare Jacobson, and Yuki Morishima, *teamLab: Continuity* (San Francisco: Asian Art Museum, 2020).

[56] Lee, *Worlds Unbound,* 258.

Collective Interactive Experience in Digital Art

As outlined my introduction, collective interactive experience is related to digital artworks that respond to multiple bodies simultaneously in shared exhibition space. The type often references installation art that offers an embodied, immersive experience; however, collective interactive experience is not exclusive to a particular medium of artistic production. The public artwork *Impulse* (2015-2016) by Lateral Office (est. 2003), for example, asked visitors to Montreal's arts district to play on see-saws that responded with light and sound according to the participants' movements and the expanded urban environment.[57] On the other hand, Brian Knep's *Healing Pool* (2008) utilizes projection mapping and dynamic algorithms to allow people walking over an image to witness its scarring and healing process in a more formal gallery space.[58] Though these artworks are different in site, material, and conceptual approach, they share the type of collective interactive experience in how participants are meant to engage with the artwork together.

Indeed, the shared environment in collective interactive experience creates a sense of immersion in the artwork. According to Panayiota Demetriou, "the state of immersion increases if one experiences it with others and with relevance and immediacy."[59] Whether or not people are physically surrounded by a digital environment, their engagement with the artwork and with others allows them to feel immersed in their experience. The social dimension of this sensation cannot be overstated, as the ongoing interaction between individuals allows them to "suspend

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[57] See an expanded discussion of this artwork in David Torrents, *New Media Installation: Technology in Public Art* (Berkeley: Gingko Press, 2018), 116-121.

[58] See an expanded discussion of this artwork in Phaedra Shanbaum, "You Are the Controller: Ubiquitous Interfaces and Interactive Digital Media Art Installations," *Artnodes* 24 (2019): 64–71.

[59] Panayiota A. Demetriou, "'Imagineering' Mixed Reality (MR) Immersive Experiences in the Postdigital Revolution: Innovation, Collectivity, Participation and Ethics in Staging Experiments as Performances," *International Journal of Performance Arts and Digital Media* 14, no. 2 (2018): 178.

disbelief" that they are in a constructed environment.[60] Demetriou understands this in terms of

the "disappearance of signs:" "where to be truly immersed in a situation one must almost forget

about the technological infrastructure used, as a type of 'unawareness' to the system in complete

captivation."[61] The focus thus shifts from the technology itself to the experience of sharing an

artwork with other people engaged in the same activity.

The co-present nature of collective interactive experience allows artworks categorized in

this type to emphasize co-creation. According to Ben Walmsley, "co-creation represents a

broadening perspective of creative production from the individual to the collective and a socially

led reconceptualization of creative consumption."[62] Co-creation relies on the active presence of

multiple participants that play a crucial role in realizing the artwork itself. This is an important

feature of collective interactive experience, as the type insists on engagement between an

artwork and many people sharing a co-present situation. Co-creation can also manifest in the

working process of an artist collective creating artworks in an interdisciplinary, team-based

setting. In an example such as teamLab, the artist group co-creates the environment as a

template, which will be realized as an ecosystem through the collective actions of participants

co-creating their experience with the artwork.

Co-creation also recognizes the potential for uncontrolled, unplanned, and improvised

action in shared space. According to Kenny K.N. Chow, "interaction between humans and digital

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[60] The idea of "suspension of disbelief" is important to histories of immersive technologies and is further explored in Chapter 1. See Brenda Laurel, *Computers as Theatre,* 2nd ed. (New Jersey: Addison-Wesley, 2014), 139-142 and Janet Murray, *Hamlet on the Holodeck: The Future of Narrative in Cyberspace,* 2nd edition (New York: The Free Press, 2016) 107.

[61] Demetriou, "Imagineering," 177. This idea is also related to the idea of Ubicomp, referring to "the seamless integration of technology into every object, place and body." For more on this and how it relates to digital installation art, see Shanbaum, "You Are the Controller," 65-67.

[62] Ben Walmsley, "Co-creating Art, Meaning, and Value" in *Audience Engagement in the Performing Arts: A Critical Analysis*, New Directions in Cultural Policy Research (London: Palgrave Macmillan, 2019), 174.

environments should be continuous and simultaneous…a digital environment has to accept user

bodily motion as input and present perceivable constant changes."[63] In collective interactive

experience, these changes occur both by individual participants' actions and the actions of others

that share the same space. The environment responds in kind to any motion; when multiple

people are engaged simultaneously, the actions of one will fundamentally affect the experience

of another. A design that allows for the perception of immediate reaction to bodily movement

thus heightens the sense of unplanned co-creation in the space. In fact, Chow argues that

participants sharing multimedia space become "co-performers" in a "live" interactive show. He

argues:

> The multimedia artifact contributes to different versions of the performance, because the
> generative processes support pseudorandom variation, and interactivity facilitates human
> intervention. Hence, each presentation is like an improvised co-creation between the
> participants and the artifact. This kind of co-creation is more improvised than prepared
> because the designer can never exactly know how or when the participants would take
> action to interfere with the outcome.[64]

Participants' actions bring such artworks to life. Artworks must therefore be able to react and

respond to a wide variety of simultaneous actions that could be random and impulsive. For this

reason, experiences may be entirely different each time a participant enters into new collective

situations within the artwork – a phenomenon that is especially relevant to the *Continuity*

exhibition as a dynamic ecosystem.

Co-creation is also tied to a sense of play. Especially when participants are joined by

close friends and family members, they become comfortable and enjoy the opportunity to

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[63] Kenny K.N. Chow, *Animation, Embodiment, and Digital Media* (New York: Palgrave Macmillan, 2013), 81.

[64] Chow, *Animation, Embodiment, and Digital Media*, 111. For more on the idea of performance in a media environment, see: Philip Auslander, *Liveness: Performance in a Mediatized Culture* (London; New York: Routledge, 2008).

explore the limits of the interactive space. Chow contends that, in a lively digital environment, people "build habits to interact with the medium transparently, feel at home in the environment, develop a sense of intimacy and pleasantness with it, make sense out of it, and are encouraged to imagine."[65] Miriam Bratu Hansen takes this a step further, discussing how collective play in technological environments could inspire modes of collective action by establishing new relationships between bodies and images.[66] Indeed, in a collective interactive environment, participants have the opportunity to re-imagine their relationships with spaces, other humans, and digital technologies. This concept is a core of teamLab's practice. According to the group: "People think with their bodies as they move through the world, and much of human society has developed through creative achievements born from collaboration and collective play."[67] To teamLab, playful actions heighten participants' awareness of the world they inhabit and can inspire a reconsideration of their own impact upon shared ecosystems. It is for this reason that the collective rarely publishes instructions or descriptions of how their artworks function, instead encouraging visitors to explore the limits and capabilities of the installations on their own.[68] The next section explores these concepts further, with a focus on the construction of digital ecosystems in *teamLab: Continuity* as exemplary of collective interactive experience.

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[65] Chow, *Animation, Embodiment, and Digital Media*, 101.

[66] See Hansen, Miriam Bratu. "Room-for-Play: Benjamin's Gamble with Cinema." *October* 109, (2004): 3-45 and further interpretation of this article in Laura Lee, *Worlds Unbound,* 307.

[67] teamLab, *teamLab 2001-2016* (Tokyo: teamLab, Koumeisha Inc., 2016), 275.

[68] This was told to me in an interview with Alexa Canova-Parker, at the time a contemporary art intern at the Asian Art Museum of San Francisco, on August 10, 2021.

Continuity featured sixteen artworks designed by the teamLab collective, ten of which were iterations of their interactive digital installations. Using projection mapping and dynamic algorithms, the digital artworks were overlayed onto the Asian Art Museum's existing floor and temporary walls using fifty projectors and six high-definition screens, and were powered by an air-conditioned room full of computer equipment.[69] Despite the necessity for bulky technical components, the meticulously designed and detailed projections allow the ceiling-mounted equipment to fade into the background.[70] The brilliant artworks capture full attention. They do not have distinct borders; one area blends into the next and digital creatures such as butterflies or crows are free to roam widely. *Flutter of Butterflies Beyond Borders* (2015/2021) and *The Way of the Sea, Flying Beyond Borders – Colors of Life* (2018/2021), for example, overlay into *Forest of Flowers and People: Lost, Immersed and Reborn* (2017/2021) with no clear distinction between where one artwork begins and another ends. The seasons also gradually change – one year passes in the span of one hour – with a gradual evolution of flowers and scents according to this lifecycle. The exhibition creates a digital ecosystem, with flowers, butterflies, crows, fish, and calligraphy interacting with both human participants and other digital objects in a constantly evolving space.

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[69] Installation and infrastructure information was told to me in an interview with Robert Mintz, Deputy Director of Art & Programs at the Asian Art Museum of San Francisco on August 19, 2021. According to Lee: "Projection mapping is a technique that produces mixed reality by utilizing spatial mapping – the virtual 3D reconstruction of an environment – to convert an object into a projection surface, thereby enabling rich media content to overlay actual objects and environments." See Lee, *Worlds Unbound,* 95-96.

[70] teamLab doesn't particularly try to hide their equipment – people just have to look up. But because the space feels so all-encompassing, the average visitor will likely never notice the tangle of projectors and wires on the ceiling. This is also true of Borderless. When Emily Stokes-Rees visited, she wrote: "As digital art exists outside of the constraints of materiality, in *teamLab Borderless* the building may be a significant physical structure, but somehow its presence – its walls and corridors and ceilings – melt into the background." See Emily Stokes-Rees, "Exhibition without Boundaries: teamLab Borderless and the Digital Evolution of Gallery Space," *Museum Worlds: Advances in Research* 7 (2019): 245.

Despite the ecosystem's liveliness, teamLab's interactive installations rely on collective actions to realize the artworks. At the beginning of the day, the walls and floor are largely blank, and the room is steeped in scented floral perfume.[71] It is the participants' movements – from actively pressing their body against the wall to standing still for a few moments or roaming the galleries – that slowly begins to grow seasonal flowers and diffuse scent throughout the space. Butterflies are birthed in *The Void* (2016/2021), a set of blank monitors that explode with life as soon as a person enters the alcove (Fig. 25). Crows emerge from *Crows are Chased and the Chasing Crows are Destined to be Chased as well, Transcending Space* (2014/2021), a projected video loop that is triggered by the presence of visitors in its gallery (Fig. 26). According to Laura Lee, "it is viewer interactivity that brings the formal configuration of the piece[s] into reality, with the work[s] changing uniquely in relation to the individual, the collective, and the specific moment."[72] It is therefore the shared actions of people interacting with the space throughout each day that brings the ecosystem to life.

Indeed, the presence of other people is a positive factor in the overall experience of the exhibition. Fellow participants are part of the ecosystem and are seen as co-creators and co-actors in the execution of the artworks. According to teamLab:

> Viewers become part of the work. This changes the relationship between an artwork and an individual into a relationship between an artwork and a group of individuals. Factors such as whether there were any viewers that saw the work five minutes before you did, or what the viewer next to you is currently doing, suddenly become important. At a minimum, our interactive installations call more attention to the actions of the viewers around you than would a traditional painting. Unlike a viewer who stands in front of a conventional painting, a viewer immersed in an interactive artwork becomes more aware of other people's presence. The result is that the art gains the ability to influence the

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[71] teamLab partnered with the perfumer L'Occin in 2016, but *Continuity* used a private Japanese perfumer who designed original scents. Diffusers throughout the space represent the four seasons, and the scents were replenished every two months. This information was gathered in an interview with Alexa Canova-Parker, at the time a contemporary art intern at the Asian Art Museum of San Francisco, on August 10, 2021.

[72] Lee, *Worlds Unbound,* 225.

relationships between the viewers standing in front of it. And if the effect of another person's presence on the art is beautiful, it is possible that that person's presence itself will be seen as beautiful.[73]

In contrast to other museums and galleries that emphasize solo experiences with individual artworks in minimalist, "white-cube" settings, teamLab's installations rely on the presence of others to activate a vibrant environment for all.[74] Communal action is valued. However, with its melodic soundscape and gradual seasonal changes, the shared space encourages contemplativeness and awe. Rather than facilitating a fast or high-energy visit, participants are encouraged to slow down (Fig. 27).[75] Flowers grow on a delay; it takes a few moments for people to notice their impact on the environment and the exhibition demands patience to experience the yearlong cycle (Fig. 28). Because visitors are not competing for space or time, they are able to exist among the evolving ecosystem as members of a shared experience.[76]

The co-presence of humans, flora, and fauna in the digital ecosystem also reveals teamLab's understanding of the relationship between humans and the natural environment. As mentioned at this chapter's outset, human impacts on the space have lasting consequences – even

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[73] Lee, *Worlds Unbound,* 333. See this sentiment expressed elsewhere, particularly in Emily Stokes-Rees, "Exhibition without Boundaries," 245-246. See also Shuhei Senda, "Borderless and Brilliant: teamLab's Dreamlike Digital Art Museum is Now Open." designboom, 15 July 2018. www.designboom.com/art/teamlab-mori-building-digital-art-museum-open -interview-07-15-2018.

[74] According to Lee: "the crowds at teamLab Borderless locations do not detract from the positive energy in the space. On the contrary, other people must necessarily share the spaces for the artworks to properly operate, and the works are designed to encourage communality. Thus, the picture-taking practices follow suit…teamLab's art is astonishing and visitors want to preserve the feeling this provokes in them; based on the dozens of teamLab exhibitions I have visited, however, I have never observed this taking place at the expense of others." See Lee, *Worlds Unbound,* 17.

[75] This point was reinforced in an interview with Karin Oen, curator of *teamLab: Continuity,* on August 29, 2021.

[76] This also makes *teamLab: Continuity* a highly accessible exhibition. If one visitor is not able to experience one or more senses (blind, for example) they can experience others (smell, sound). teamLab Borderless in Tokyo is different because the design of the space asks for a high level of mobility. By contrast, the Asian Art Museum of San Francisco is governed by USA accessibility laws. Timed entry to the exhibition additionally helped to limit the amount of people in the space at one time, an adjustment particularly tied to COVID-19 physical distancing measures.

oblivious actions may result in the deaths of butterflies or crows and fish must alter their paths in response to human presence. A more pessimistic view suggests that digital environments such as this may one day be the only interactive depictions of healthy ecosystems left on the planet. However, teamLab's philosophy points to a more balanced approach to humans and nature. According to the collective:

> Rather than nature and humans being in conflict, a healthy ecosystem is one that includes people. In the past, people understood that they could not grasp nature in its entirety, and that it is not possible to control nature. People lived more closely aligned to the rules of nature that created a comfortable natural environment…we hope to explore a form of human intervention based on the premise that nature cannot be controlled.[77]

Instead of presenting a utopic ideal of the natural world or allowing human destruction to create a dystopic future, teamLab demands a dynamic relationship between humans and nature. Human presence is necessary for the artworks to function, and yet, participants fundamentally alter the space with their actions. The ecosystem thus allows for a more nuanced approach to the repercussions of sharing space with both other humans and various living things, even though teamLab's design is highly constructed and controlled by the collective's approach.

teamLab's goal is to change relationships between oneself, each other, and the world through art.[78] By heightening our perceptions of the interrelated experiences we share, *Continuity's* digital ecosystem is intended to provide a microcosm of relationships in the external world. Furthermore, Lee argues that the group's use of digital tools (which could be seen as disembodying artifacts of a technology-driven age) instead "reinsert embodiment and

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[77] See teamLab, "Forest of Flowers and People: Lost, Immersed and Reborn," teamLab, accessed August 24, 2022, https://www.teamlab.art/w/flowerforest/. This is also tied to traditional Japanese values in Shinto. For more on how these traditions impact digital media, see Chow, *Animation, Embodiment, and Digital Media*, 55-56.

[78] teamLab's mission statement indicates that he collective works to "navigate the confluence of art, science, technology, design and the natural world…[aiming] to explore a new relationship between humans and nature, and between oneself and the world through art." See teamLab, "Biography."

harmonious collectivity within people's lives."[79] In this collective interactive experience, the

environment's embodying elements of immersive imagery, evocative soundscapes, and alluring

scents transport participants into a world in which they can imagine new relationships that might

transfer to the physical world. teamLab agrees, writing:

> With immersion of the body into the artwork, the boundary between the self and the artwork becomes ambiguous. And, through that experience, the boundary between the self and the world begins to disappear. Because our presence and the presence of others can cause change in the shared world of the artwork, it is possible that we will feel ourselves and others meld with the world and become one body.[80]

It is in this setting that people might become more aware of how they intersect with their

surroundings and begin to value the shared impact we make upon both each other and the

environment. With today's anxieties surrounding climate change, the fractured political

landscape, and adaptations to a post-COVID-19 world, this is an important exercise to emphasize

commonalities in the relationships we share in our external lives.

As this chapter demonstrates, *teamLab: Continuity* is a useful illustration of collective

interactive experience for two reasons: First, the exhibition is designed in the collaborative

mindset of the teamLab collective itself, with an approach to artmaking that stems from modern

and contemporary Japanese art history. Second, and more strictly related to collective interactive

experience as a type, the exhibition relies on shared space and communal action that

fundamentally affects all participants' experience. It is therefore the extension of teamLab's

working philosophies into the exhibition space that facilitates co-creation and collective play in

Continuity. As the group asserts, "Our hope is that through enjoying this co-creative experience

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[79] Lee, *Worlds Unbound,* 225.

[80] teamLab, *teamLab 2001-2016*, 174.

people may become more creative in their everyday lives."[81] Indeed, teamLab's artworks are meant to extend beyond the gallery walls, inspiring a collective mindset in both the group itself and in the participants that experience their installation spaces.

Collective Interactive Experience Post-COVID-19

Especially in the wake of COVID-19 lockdowns, collective interactive experiences in digital art take on a new tone. *teamLab: Continuity* itself was delayed due to the pandemic, as the exhibition was intended to launch in the spring of 2020. With the return to in-person museum visits, especially exhibitions that involve interaction with the space and fellow visitors, collective interactive experience feels both heightened and valued in a new way. As museums, galleries, and experimental art centers such as Superblue, Meow Wolf, and Artech House continue to engage with this type of experience, it is more important than ever to interrogate how collectivity and collective experience manifests in digital art practices. It is through such experiences that we are reminded how connected we are, and how much we rely on the ecosystems in which we play a vital part.

By extension, the COVID-19 pandemic also revealed our reliance on digital tools to communicate and collaborate in physically distant but shared settings. The next chapter thus turns distributed interactive experience as a type that emphasizes engagement over virtual platforms, connecting people via distributed communication systems such as the internet. Though collective and distributed interactive experience both allow people to relate to one another, further articulation of their differences will allow for more nuanced understanding of how immaterial experiences with digital art change according to their type of interaction.

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[81] teamLab, *teamLab 2001-2016*, 275.

III: DISTRIBUTED INTERACTIVE EXPERIENCE
PERFORMANCE ART IN THE AGE OF INSTAGRAM

On April 19, 2014, LA-based Argentinian artist Amalia Ulman (b. 1989) posted an image of the words "PART I" with the cryptic caption "Excellences & Perfections" on Instagram (Fig. 29).[1] For two months, her account was filled with pastel colors, bright daylight, and objects of *kawaii* culture (the Japanese aesthetic of "cuteness"), with ribbons, flowers, baby animals, stickers, and strawberries surrounding the blonde Ulman wearing baby doll dresses (Fig. 30). On June 20, Ulman announced a breakup (Fig. 31). Her posts slowly took on a darker tone, with yellowed filters, emphases on black and gold, and the artist in sexually suggestive positions (Fig. 32). Over time, it became clear that Ulman was working as an escort and pole dancer: she was pictured with cash, lavish gifts, and drugs before announcing a breast augmentation surgery on July 10 (Fig. 33). The artist soon suffered an emotional breakdown, when the newly brunette Ulman was pictured with a handgun and posted two videos of herself crying in the dark (Fig. 34). On August 14, she wrote an apology for her recent behavior: "I was acting weird and committed many mistakes because I wasn't at a good place in my life tbh… I'm really sorry if I have offended you. Everything came out from a soul full of pain, anger and darkness" (Fig. 35).[2] The subsequent images were marked by inspirational phrases, cozy sweaters, and avocado toast, as the artist recovered her health and entered a new relationship (Fig. 36). On September 14, Ulman posted a concluding image: a black-and-white image of a rose and a blue heart emoji (Fig. 37).

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[1] Ulman was based in Los Angeles for the duration of this project. She now considers herself an "airport artist with an office in New York City." See Amalia Ulman, "Amalia's Website," Amalia's Website (2012-2021), accessed August 29, 2022, https://www.amaliaulman.eu/.

[2] Amalia Ulman, "Dear Everyone," *Instagram.* August 14, 2014. https://webenact.rhizome.org/excellences-and-perfections/20141014171636/http://instagram.com/p/rrUG3QlV78/?modal=true.

Excellences & Perfections was a performance staged on Instagram that examined and critiqued the ways in which young, Euro-American women present themselves online. Over the course of five months, Ulman crafted a three-part narrative shifting her online identity from "cute girl" to "sugar baby" to "life goddess" – female roles she identified as the most popular on social media at the time.[3] The artist amassed a loyal following (for 2014), with 89,244 followers by the conclusion of the series.[4] When it was revealed to be a performance, some followers were devastated by Ulman's "inauthentic" representation of her life. However, it was precisely the artist's ability to build "authentic" relationships and connections with participants via Instagram that allowed her to create a feminist critique and social commentary on the manipulation of online environments.

Excellences & Perfections demands a particular type of interaction with its participants. Instagram users engage beyond the passive action of scrolling; selecting, commenting, "loving," or sharing an image with other users marks active engagement with the performance and with the artist. For social media performances in particular, users activate the artwork through their continuous interaction over an extended period of time. The online platform also connects users across a wide geographic spread using the infrastructure of the internet, allowing humans to interact with other humans via this networked system.[5] For this reason, *Excellences & Perfections* is a useful example of distributed interactive experience in digital art. Further, the performance takes advantage of this type of interactivity; the project's encouragement of social

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[3] Catherine Wood, *Performance in Contemporary Art* (London: Tate, 2018), 103.

[4] "Amalia Ulman: Excellences & Perfections Archive." Rhizome.org, September 2014. https://webenact.rhizome.org/excellences-and-perfections/.

[5] As outlined in the introduction to this dissertation, interactivity is best understood on a spectrum. I see distributed interactive experience (humans interacting with other humans via machines) as the most interactive on that spectrum.

media habits and user engagement enabled Ulman to explore themes of identity construction in the social media environment of the 2010s.

This chapter dives deeper into distributed interactive experience as a particular type of interactivity in digital art. It begins with a definition of this type, offering three features of distributed networks that inform my conception of distributed interactive experience with artworks. The second section traces a history of distributed interactive experience in contemporary art more broadly. From correspondence art in the 1950s to net.art in the 1990s and social media art in the 2010s, this section reveals that distributed interactivity is rooted in practices that do not necessarily rely on digital technologies. Renewed attention to this history offers clarity to distributed interactive experience as a type and *Excellences & Perfections* as an illustrative case study. The third section returns to Ulman's project, examining how the artist was able to harness this type of interactivity to engage Instagram users in her performance. The chapter concludes with a glimpse into the future of distributed interactive experience in contemporary art as artists continue to engage with the implications of global digital communication technologies.

Distributed Interactive Experience

As outlined in the introduction to this dissertation, my conception of distributed interactive experience is tied to distributed network models. Distributed networks are rhizomatic in form and connect nodes in equal, bidirectional links.[6] Modern distributed networks can be traced to the industrial revolution of the nineteenth century, when railroad tracks, electricity networks, and telephone lines extended across continents and transformed the world's

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[6] For more on distributed networks, see: Alexander Galloway, "Networks," in *Critical Terms for Media Studies* (New York: Oxford University Press, 2010), 288.

communication systems. When fiber-optic cables stretched between data centers to create what would soon be known as the internet in the late 1960s, the new infrastructure was considered a "network of networks."[7] However, as Tung-Hui Hu reveals in his book *A Prehistory of the Cloud,* the internet is a graft; it layers on top of earlier infrastructures including railways, sewer systems, and interstate highways.[8] The internet, originating in the Cold War military context as ARPANET, was intended to be a distributed networked system. To avoid total shutdown from targeted attacks on one centralized node, a system of "packet switching" was proposed to fortify the network by rerouting data through other interconnected nodes.[9] Messages might be broken up into smaller "packets," sent along various routes through the network, and reassembled at their destination. In his 1964 essay for the RAND Corporation, Paul Baran proposed this system of "distributed communications," where nodes "must all play an active part in working with one another to construct the message that is being sent."[10] Though this system was never realized (and the internet is far from a perfect distributed network), this emphasis on technical horizontality became a defining logic of the new communication infrastructure.[11] Distributed

[7] According to Hu, "The Internet was so named because it moved data between satellite, packet radio, and telephone networks (inter-networks)." See Tung-Hui Hu, *A Prehistory of the Cloud* (Cambridge, MA: The MIT Press, 2015). This language can also be found in Clement Apprich, *Technotopia: A Media Genealogy of Net Cultures* (Lanham, MD: Rowman & Littlefield, 2017), 103.

[8] See: Tung-Hui Hu, "The Shape of the Network" in *A Prehistory of the Cloud* (Cambridge, MA: The MIT Press, 2015), 6-7. "…virtually all traffic on the US Internet runs across the same routs established in the nineteenth century, a point that is readily visible when looking at network diagrams… It is worth remembering that the fiber-optic cables that run from Salt Lake City to the San Francisco Bay Area are in the same position they have always been, since the telegraph: In the immediate vicinity of railroad tracks."

[9] Apprich, *Technotopia,* 103-104. Also see Janet Abbate, "White Heat and Cold War: The Origins and Meanings of Packet Switching," in *Inventing the Internet* (Cambridge, MA: The MIT Press, 1999), 7-41.

[10] Baran as interpreted by Phillip H. Gochenour, "Distributed Communications and Nodal Subjects," in *New Media & Society* 8, no. 1 (2006): 36. For Baran's original publication, see: Paul Baran, *On Distributed Communications* (Santa Monica: RAND, 1964).

[11] This infrastructure, which was later tied to ideals of democratic openness, led to the belief that the internet is a distributed system devoid of power relations. However, many scholars have noted that the internet is highly controlled via technical protocols. See: Alexander Galloway, "Protocol: How Control Exists after

networks were soon understood in terms of this rhizomatic system that, if only in theory, connect

information and people via extensive global communication infrastructures without a

hierarchical means of transferring data.

Distributed networks are also defined by their wide geographic spread. In his conception

of "distributed communities," Philip H. Gochenour proposes "a shift away from thinking about

'online community' that happens in a specific place, to thinking about 'distributed community'

as something that utilizes the internet as an infrastructure to compose itself."[12] To Gochenour:

"A distributed community is one that uses an extended communications infrastructure to allow

interaction and coordination of behavior among its members, each of which functions as a node

within the overall system."[13] At its most basic level, the horizontal infrastructure of the internet

allows for interconnected communication between individuals spread across continents. Lee

Rainie and Barry Wellman consider this in terms of "networked individualism," which is

"*personal* – the individual is at the autonomous center just as she is reaching out from her

computer, *multiuser* – people are interacting with numerous diverse others, *multitasking* – people

are doing several things, and *multithreaded* – they are doing them more or less simultaneously

(emphasis in original)."[14] With networked individuals as nodes in this distributed network of

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Decentralization," in *Networks*, Documents of Contemporary Art, edited Lars Bang Larsen, (Cambridge, MA: The MIT Press, 2014); Apprich, *Technotopia,* 104-105; Albert-László Barabási, "Introduction and Keynote to a Networked Self" in *A Networked Self: Identity, Community and Culture on Social Network Sites* (New York: Routledge, 2010), 4. When discussing the internet in terms of distributed networks, it is crucial to recognize these power relations at play. At the same time, research by sociologist Duncan Watts on Twitter determined that, in the internet's distributed system, messages are still able to reach their destinations even without the emergent superconnectors that make the internet lean towards centralized or decentralized systems. See: Duncan Watts, *Everything is Obvious* (New York: Crown Business, 2011).

[12] Gochenour, "Distributed Communities and Nodal Subjects," 35.

[13] Gochenour, "Distributed Communities and Nodal Subjects," 46.

[14] Lee Rainie and Barry Wellman, "The New Social Operating System of Networked Individualism," in *Networked: The New Social Operating System* (Cambridge, MA: The MIT Press), 7.

technological infrastructure, interaction can occur between other networked individuals in any

geographic location around the world.

A third feature of distributed networks is what Wendy Hui Kyong Chun calls "network

time." In her book *Updating to Remain the Same: Habitual New Media,* Chun considers network

time as a noncontinuous flow.[15] Chun argues that "networks do not imagine a collective entity

traveling together through time, but instead a series of individuals that (cor)respond in their own

time to singular, yet connected, events."[16] Network time is also stretched across long time

frames, a phenomenon that Chun discusses in terms of "habits" that are "potentially or frequently

repeated."[17] To Chun, habits are central to the formation of network time: "Through habits,

networks are scaled, for individual tics become indications of collective inclinations. Through

the analytic of habits, individual actions coalesce bodies into a monstrously connected

chimera."[18] This feature of distributed networks is important to place in dialogue with the

geographic spread of networked individuals as they habitually multitask, on multithreads, with

other networked individuals, on their own time.

In my conception of distributed interactive experience, these three features of distributed

networks – distributed communication infrastructure, distributed community, and network time –

are crucial. Not only are networked individuals spread across continents, but they are also

scattered across time zones and able to interact with the same artwork at various intervals, either

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[15] It is important to note that Chun is referring to "networks" more generally, but I am modifying her terminology (in the same sentiment) to "distributed networks." See: Wendy Hui Kyong Chun, *Updating to Remain the Same: Habitual New Media* (Cambridge, MA: The MIT Press, 2016), 3.

[16] Chun, *Updating to Remain the Same,* 27.

[17] Chun, *Updating to Remain the Same,* 3.

[18] Chun, *Updating to Remain the Same,* 3. Further: "Imagined connections and edges – things that remain – are traces of habits. In terms of social networking sites, the strength of a friendship – its weight – is gauged by the frequency of certain actions. More strongly: information is habit." Chun, *Updating to Remain the Same*, 53.

synchronously or asynchronously.[19] Interactive digital artworks in this type make use of the

distributed technological infrastructure of the internet to connect humans with other humans.

Users do not need to share the same physical space at the same time to interact with the artwork,

the artist, or other users. Instead, online platforms facilitate interaction across the distributed

network system. In the example of Ulman's *Excellences & Perfections,* Instagram utilized the

internet to asynchronously connect the artist with almost 90,000 individuals spread around the

world. This type of interactivity was central to the success of the project, and deserves a closer

examination as a strategy in contemporary art history more generally.

A History of Distributed Interactive Experience in Contemporary Art

Distributed interactive experience is not defined by the existence of digital technologies.

Though distributed interactive experience in today's digital artworks make use of the internet's

infrastructure, there is a longer history of contemporary art practices that produce this type of

interaction.[20] These practices, beginning with correspondence and mail art in the late 1950s and

1960s, create distributed communities across network time using earlier communication

networks. Once the internet grafts onto this infrastructure, distributed interactive experience

emerges again as net.art in the 1990s and social media art in the 2010s. This history is also

marked by major shifts: the reconceptualization of information in the 1950s and 1960s, the fall of

the Soviet Bloc in the 1980s, the proliferation of the internet and World Wide Web (WWW) in

the 1990s, and the platformization of the internet in the 2000s. Though defined by different uses

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[19] In my conception of "distributed interactive experience," works could be interacted with synchronously via live-stream or other simultaneous engagement with participants. It could also be asynchronous, with people interacting with an artwork in their own time. Both fall under Chun's conception of "network time."

[20] As outlined in the introduction to this dissertation, I use the term "interactive art" to describe both digital and analogue artworks that rely on human participation to activate.

and conceptualizations of communication infrastructures, each phase emphasizes interaction between humans across geographic space and time. Reviewing this history reveals a wider lens through which to view distributed interactivity in today's digital art, which contextualizes Ulman's artistic strategy in producing the *Excellences & Perfections* performance in 2014.

In the wake of World War II, information itself was reconceptualized. Communication theory by postwar engineers and theorists including Claude Shannon and Norbert Weiner emphasized the technical process of sending messages over the content of those messages, investigating how "noise" affects information as it travels between sending and receiving instruments.[21] With developments in computing in the postwar landscape, existing information networks could be understood in an entirely new way. The so-called "Information Age" was emerging; transistors, mechanical computers, and vacuum tube technology were revolutionizing intercontinental and transcontinental communications. However, as Alfred Chandler and James Cortada recognize: "Americans [had] been preparing for the Information Age for more than 300 years" with systems including "the U.S. postal system and roads for the mail to travel on… copyright laws… newspapers, books, pamphlets, and broadsides… telegraph, telephone, phonograph, and motion pictures."[22] The reconceptualization of information was pivotal in this history. As Roger Rothman argues, the late 1950s and 1960s are distinctive "not [because of] the emergence of information systems, for they had existed for centuries, but rather the development of an information system that operates, for the first time, free of any necessary connection to the

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[21] For more on the political implications of this communication theory and a media genealogical approach to information theory, see: Colin Koopman, "Information Before Information Theory: The Politics of Data Beyond the Perspective of Communication" in *New Media & Society* 21, no. 6 (2019): 1-18.

[22] Alfred Chandler and James Cortada, eds, *A Nation Transformed by Information: How Information Has Shaped the United States from Colonial Times to the Present* (Oxford: Oxford University Press, 2000), v.

content it is presumed to transmit."[23] Scholars, scientists, engineers, and artists alike thus began

to understand communication infrastructure as a medium.

Correspondence art (which later came to be known as mail art) emerged alongside this

reconceptualization in the late 1950s. Relying on postal service infrastructure, this practice

represents an early form of distributed interactive experience in contemporary art history. In his

essay, "The Unimaginable Globality of Networks," Lars Bang Larson argues:

> It was mail art of the late 1950s and early 1960s that most radically developed a model
> for distributed authorship based on informal exchanges that played out between many
> participants. These were artists and non-artists alike, but all of them authors doubling as
> senders and receivers, in a gift economy that established a present of strange,
> communicational events.[24]

The communication infrastructure itself allowed participants to connect asynchronously across a

wide geographic spread. Interaction occurred habitually, in what art historian Ina Blom calls "a

present of communicational events, of uncontrollable exchanges, of things arriving and departing

at unforeseen times and places, thanks to the medium of the postal system."[25] Indeed,

correspondence art used a networked infrastructure to connect a widespread community across

time.

Though artists had been communicating for centuries through existing methods of

journals, magazines, and personal correspondence, it was Ray Johnson (1927-1995) and the New

York Correspondence School (active 1950s-1970s) that first realized correspondence art as a

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[23] Roger Rothman, "Fluxus, Or the Work of Art in the Age of Information" in *Symplokē* 23, no. 1-2 (2015): 318.

[24] Lars Bang Larsen, "The Unimaginable Globality of Networks" in *Networks,* Documents of Contemporary Art, edited by Lars Bang Larsen, (Cambridge, MA: The MIT Press, 2014), 14.

[25] Ina Blom, "Ray Johnson: The Present of Mail Art," The Ray Johnson Videos, 2008. http://www.rayjohnson.org/ray-johnson-the-present-of-mail-art/.

practice and the mail system as a medium.[26] Johnson began mailing proto-Pop collages to his

circle of friends and colleagues with certain principles, including "ongoing exchange, frequent

forwarding, unmotivated generosity, and democratic participation."[27] Members of the NYCS

fluctuated from seventy-five to over three hundred people over the years. Letters would travel to

members via other members in the system and a robust culture of unsolicited gift-giving

emerged. Mailings often required interaction, such as Johnson's *How to Draw* guides or *Please

Add & Return* instructions, such as: "(color face if you wish) (or add a mustache) (or write a

letter on the face) (or add a Chinese fortune cookie fortune) (or a fact)."[28] According to

participating artist Ken Friedman (b. 1949), "at its height [NYCS] existed around [Johnson] as

many intersecting relationships independent of his direct involvements."[29] The mail network

itself became the core of the artists' practice. It allowed them to question official communication

systems and circumvent the established art institution, a goal shared by many other contemporary

art movements at the time.[30]

In the 1960s, the international group Fluxus took correspondence art a step further.

Active from 1962 to 1978, Fluxus artists connected the United States, West Germany, and Japan

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[26] Ken Friedman recognizes the Nouveau Realistes as a precursor to this, saying: "If the Nouveaux Realistes created paradigms of correspondence and mailed art as works, it was the New York Correspondence School that took the notion from paradigm to practice." See: Ken Friedman, "The Early Days of Mail Art" in *Eternal Network: A Mail Art Anthology,* edited by Chuck Welch (Calgary: University of Calgary Press, 1995), 4.

[27] Colby Chamberlain, "International Indeterminacy: George Maciunas and the Mail" in *ARTMargins* 7, no. 3 (2018): 75.

[28] For more examples of Johnson's work, see: Sofia Kofodimos. "The Open Curriculum of the New York Correspondence School: Ray Johnson's Pedagogical Mail Art," Sofia Kofodimos, April 5, 2016. https://sofiakofodimos.wordpress.com/2015/06/14/the-open-curriculum-of-the-new-york-correspondence-school-ray-johnsons-pedagogical-mail-art/.

[29] Friedman, "The Early Days of Mail Art," 4.

[30] This includes Pop Art's embrace of advertising and mass media as art and Minimalism's rejection of traditional materials and the "genius author," which challenge the primacy of "painting," "sculpture," and other established systems in contemporary art institutions.

through the international travels of avant-garde artist and composer John Cage (1912-1992).[31]

The group began producing a diverse range of performative "scores," publications, and mailed

projects that spanned continents. Friedman calls this the "second phase" of correspondence art,

termed mail art, when the practice moved beyond an idea of personal correspondence and

towards a larger, more public setting.[32] Artists often mailed performance scores to one another to

be enacted at a public Fluxus event. LaMonte Young's (b. 1935) infamous *Composition 1960*

#10 (to Bob Morris) ("draw a straight line and follow it"), for example, was realized by Paik

Nam June (1932-2006) as *Zen for Head* in 1962. Other projects were published in Fluxus "house

magazine" *V TRE, Fluxboxes*, *Fluxkits,* and *Fluxus Editions.* In his article "International

Indeterminacy: George Maciunas and the Mail," Colby Chamberlain argues: "Whereas once mail

could be conceived as discrete letters transmitted from one individual to another, now it was a

circuit processing an undifferentiated volume of printed matter."[33] New York Fluxus leader

George Maciunas (1931-1978) took this practice to an extreme, proposing a "sabotage and

disruption" of New York City's communication networks in 1963, which would flood the city

with Fluxus newsletters, bulk mailings, and advertisements on public transit.[34] With projects in

this setting, mail art broke free of its association with personal correspondence and took on a

new, public approach.

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[31] John Cage was using distributed networks himself to build the Fluxus community, traveling on planes, trains, steamers, etc. in addition to utilizing the postal system to develop the robust artist communication network.

[32] Blom, "Ray Johnson: The Present of Mail Art." As Blom describes, mail art was also seen as a parallel to other emerging "communication arts," such as video art, which could similarly "distribute 'signals' across the boundaries of time and space." These ideas culminated in the pivotal exhibition *Information* at the Museum of Modern Art in 1970.

[33] Chamberlain, "International Indeterminacy," 76.

[34] See a discussion of how Fluxus used the postal system from the theoretical perspective of German Media Theory in Chamberlain, "International Indeterminacy," 73.

Fluxus operations are another example of distributed interactive experience with artworks. Members and participants created distributed communities across network time. For Fluxus, the postal system was the infrastructural core of the network.[35] As Friedman argues: "Fluxus was the first group of artists to understand the potential of the postal system as a world-spanning, cost-effective distribution system. It was open. It went everywhere. The direct operating cost to the artist was low."[36] This reliance on communication infrastructure became a defining feature of the network's practices. As Chamberlain notes, "through postal correspondence, the 'little groups' that had formed around the world in the wake of Cage's travels were bound together, as much by stamp adhesive as by the word 'Fluxus.'"[37] Many projects grew out of this bound network.[38] Shiomi Mieko's (b. 1938) *Spatial Poems* series (1965-1975), for example, both utilize and illustrate the networked structure of Fluxus. Shiomi reached out to her international friends through the mail, asking them to perform intimate or public actions, document their experience, and report back for inclusion in the event's publication.

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[35] As a nebulous international collective, Fluxus was one of the first groups to be understood in terms of a "network." This language emerged from within Fluxus itself: George Brecht called the group "a network of active points all equidistant from the center" and Robert Fillou theorized "The Eternal Network" as a network of linked, poetic gestures that could exist outside commodity structures in a "global village." However, this network was far from a perfect ideal. Peter Frank notes that Maciunas intended for Fluxus to be a "hierarchically driven collective" by himself and the travels of John Cage. Interestingly, Frank notes that the vast majority of participating artists "organized themselves as a relatively open and informal network." Even with imbalances in participation and control of the group's resources, Fluxus artists retained some of Ray Johnson's ideals of widespread democratic engagement and ongoing exchange. See Chamberlain, "International Indeterminacy," 57-85; Rothman, "Fluxus, Or the Work of Art in the Age of Information," 309-325; Peter Frank, "Ken Friedman: A Life in Fluxus" in *Artistic Bedfellows: Histories, Theories and Conversations in Collaborative Art Practices* edited by Holly Crawford (Lanham: University Press of America, 2008), 145-186.

[36] Friedman, "The Early Days of Mail Art," 8.

[37] Chamberlain, "International Indeterminacy," 64.

[38] Another example from Japan is the Psychophysiology Research Institute (Sisehin Serigaku Kenkyujo), which imagined "an invisible museum, in which local institutes participate through actions or nonactions that take place simultaneously at a specified time and space in their own locales" in six mailings from 1964 to 1970. See Reiko Tomii, "After the 'Descent to the Everyday': Japanese Collectivism from Hi Red Center to The Play, 1964-1973," in *Collectivism after Modernism: The Art of Social Imagination after 1945* (Minneapolis: University of Minnesota Press, 2007) 63-64.

Instructions ranged from "write a word or words on the enclosed card and place it somewhere" to "around the time listed – simultaneous – listen to the sounds around you" and "open something which is closed." Interpretations were mailed back to Shiomi with documentation, which were then placed on a global map and published in *Fluxkits* and *Fluxboxes*. These physical boxes serve as archives for both the performances and for the network, documenting various years of Fluxus activity around the world. The maps were also mailed via Fluxus's publication house in New York, sharing the project with its international participants.

From the 1960s to the 1980s, these artists' idea of a "network" was largely rooted in ideals of cultural solidarity, democratic access, and political activism. Fluxus operations inspired groups like the Beau Geste Press (active 1970-1976), which connected artists in the United Kingdom, Eastern Europe, and Latin America. This group sought to encourage interaction between "as many possible sources of small groups of creators" with "something unnameable in common."[39] As Klara Kemp-Welch and Christina Freire illustrate: "Precarious periodicals, artists' books, postcards, stamps, and other low-tech reproductions circulated through the ever-expanding networks developed via a constant exchange of address lists, along with photographs, records of actions, visual poetry, and other experimental documents and proposals."[40] These activities had an explicitly political goal: subverting state control over information and communication. While living under oppressive dictatorship in late-1970s Uruguay, mail artist Clemente Padín (b. 1939) traced an expansion in mail art practice "as a means to denounce and document the situation." According to Padín: "Official mail was protected by international

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[39] See *Schmuck* (South Cullompton: Beau Geste Press, 1972), where I. Felipe Ehrenberg (using the pseudonym Kyosan Bajin) quotes George Brecht: "Individuals with something unnameable in common have simply naturally coalesced to publish and perform their work."

[40] Klara Kemp-Welch and Cristina Freire, "Artists' Network in Eastern Europe and Latin America" in *ARTMargins* 2, no. 2-3 (2012): 6.

treaties that had to be respected by both democracies and dictatorships, and thus became one of the only possible means of communication between artists living under distinct political and economical conditions."[41] Artists found solidarity through this medium, amplifying the mail system itself as a means of subversive activism against the state.

In 1989, the fall of the Soviet Bloc re-opened borders in Eastern Europe and ushered in a new age of communication access between artist groups. In the years leading up to this shift, correspondence and mail art became more internalized by remaining active contributors, with projects including Michael Crane and Mary Stofflet's *Correspondence Art: Source Book for the Network of International Postal Art Activity* (1984) and the Decentralized Worldwide Mail Art Congress (1986).[42] At the same time, new developments in technology threatened to change the established communication infrastructure: namely, the fax machine, the internet, and the World Wide Web (WWW).[43] In an article entitled "New Directions: Into the Nineties," artist John Held (b. 1947) proclaimed: "There is obviously a place for fax in the mail art network – at the very least, as a way to meet last minute show deadlines; at the very best, to utilize a medium that has a far faster pace than the postal system. Mail art will use fax technology, as it does any communication technology."[44] This strain and competition between communication systems ushered in a new era of distributed interactive experience with artists and artworks.

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[41] Clemente Padín, "Mail Art: A Bridge to Freedom" in *ARTMargins* 1, no. 2-3 (2012): 37.

[42] Held calls this a time of "self-reflection in mail art." See: John Held, "New Directions: Into the Nineties" in *Eternal Network: A Mail Art Anthology,* edited by Chuck Welch (Calgary: University of Calgary Press, 1995), 110.

[43] It is important to note that the internet and World Wide Web are two different entities: the internet is the technological, infrastructural system that connects computers to one another. The World Wide Web is the network of web pages that users see when online.

[44] Held, "New Directions," 109.

As the internet became more established in the late 1980s and early 1990s, artists embraced the potential of the new networked infrastructure. Mailing lists and listservs, characterized by Charlotte Frost as "email-based discussion groups managed by software applications that automate the forwarding of content to subscribers," became the primary communication channel among artists transitioning to the internet.[45] Early adopters of this medium called their work "net.art," a term formatted after the protocol for naming computer files.[46] Artists and collectives including Natalie Bookchin (b. 1962), Heath Bunting (b. 1966), Vuk Ćosić (b. 1966), Olia Lialina (b. 1971), Alexi Shulgun (b. 1963), etoy (est. 1994), and JODI (est. 1999) took advantage of the new infrastructure to further existing artistic practices: writing, sound, radio, kinetic, video, conceptual, and performance art were reimagined and transferred online. As Josephine Bosma argues: "The novelty of [net.art] lies in the amplification and realization of earlier art concepts in a new, personalized media field."[47] In other words, the technical advancement of the internet and WWW inspired net.artists to situate artistic practice within the infrastructure of this emerging new technology.

Net.art also engaged with a new, much closer, sense of distributed community and network time. With nearly instantaneous response times, people could connect with one another in a way that felt very different from mail art communication. As Held projected:

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[45] These discussion groups include Nettime (founded in 1995), The Syndicate (founded in 1996), Rhizome (founded in 1996), and 7-11 (founded in 1997).

[46] According to Charlotte Frost, "The origin of the term has been credited to Pit Schultz, although net.art mythology has it that Vuk Ćosić received it in an accidentally encrypted email." Net.art also technically refers to the earliest adopters, or "beta" phase of the practice. Later work drops the dot. See: Charlotte Frost, "Internet Art History 2.0" in *Revisualizing Visual Culture* (London: Routledge, 2010), 127.

[47] See Josephine Bosma, "Net Art: Building Something out of Nothing Self Education, Collaboration and Networking," Josephine Bosma, 2005. http://www.josephinebosma.com/web/node/9. In his 1999 essay for the *net.condition* exhibition, Peter Weibel also identifies "dislocation," "nonlocality," and "interactivity" as defining features of net.art. To Weibel, these features set the practice of net.art apart from earlier media art. See a discussion of this text in Ceci Moss, *Expanded Internet Art: Twenty-First-Century Artistic Practice and the Informational Milieu* (New York: Bloomsbury Academic, 2019), 13.

The electronic network constitutes a new space, but this space is unique in that it is spanned by nodes and connections, and that it facilitates instant global interaction. The concept of the global village arrived quite naturally: a village is the place where people are in shouting distance of one another, where people speak the same language, where gossip thrives, where people are held together by common fate. The networks have arrived just in time, it seems, to make the changes in global thinking manifest in the arts. If everything goes right, electronic networks (sic) may become the plaza on which the street-theatre of the global village will take place.[48]

This idea of a "global village" was shared by many artists and scholars at the time, who viewed the internet as a new utopia of global collaboration and democracy. Though this has been widely criticized for its naiveté of the deeply political, capitalist power dynamics at play, Held's embrace of the internet's potential illustrates a new sense of distributed community.[49] Artists, scholars, and participants could interact across a world that felt somehow smaller. Indeed, the emerging idea of a "cyberspace," coined by science fiction writer William Gibson in 1984, understood the internet's communications potential as "a consensual hallucination experienced daily by billions of legitimate operators."[50] Though the mail system was still more expansive and reliable, it was the internet and WWW that were compressing the sense of geographic space and response time. People could engage with artworks in real time, from anywhere around the world, in what felt like "shouting distance" from one another. They could also directly interact with other humans, sharing that experience in network time. With the introduction of net.art, therefore, earlier forms of distributed interactive experience were significantly condensed.

After the dot-com bubble gave way to Web 2.0 in the early 2000s, the internet itself was rebranded to recapture its focus on participative interactivity and shore up investments in the new

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[48] Held, "New Directions," 116.

[49] For a critique of the "global village" concept, see: Jodi Dean, "Why the Net is Not a Public Sphere" in *Constellations* 10, no 1 (2003): 95-112.

[50] William Gibson, *Neuromancer* (Munich: Wilhelm Heyne 1990), 51.

infrastructure. As Croteau, Hoynes, and Milan illustrate: "Web 2.0 highlighted and developed capabilities of the Internet that had existed since its inception. The basic technology wasn't new, but the uses to which it was put had evolved."[51] The impact of marketing hype and encouragement from internet enthusiasts "enabled the rise of blogging, social-networking sites, content platforms such as YouTube, collaborative wikis such as Wikipedia, virtual game worlds such as World of Warcraft, and virtual worlds such as Second Life."[52] Though net.artists were already embracing the ways in which the internet could foster interactivity and participation across wide geographies and time zones, the general public was now encouraged to take on this new potential of the internet. Like the transition from correspondence to mail art in the 1960s, Web 2.0 thus allowed art practices on the internet to enter a more public sphere.

Web 2.0 also ushered in an age of platforms. Nick Srnieck understands platforms as "digital infrastructures that enable two or more groups to interact. They… position themselves as intermediaries that bring together different users: customers, advertisers, service providers, producers, suppliers, and even physical objects."[53] In the first decade of the twenty-first century, new platforms exploded: Wikipedia (2001), Friendster (2002), Blogger (2003), Myspace (2003), Second Life (2003), Facebook (2004), Flickr (2004), Reddit (2005), YouTube (2005), Twitter (2007), Tumblr (2007), Grindr (2009), and Instagram (2010) revolutionized social networking on the internet.[54] However, even though these platforms offer a distributed interactive experience

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[51] David Croteau et.al., *Media/Society: Technology, Industries, Content, and Users* (Thousand Oaks, CA: SAGE, 2018), 297. Also see also see a discussion about the first use of the phrase "Web 2.0" in Trebor Scholz, "Market Ideology and the Myths of Web 2.0" in *First Monday* 13, no. 3 (2010). https://firstmonday.org/article/view/2138/1945.

[52] Croteau et.al., *Media/Society*., 297.

[53] Nick Srnicek, "Platform Capitalism" in *Platform Capitalism* (Cambridge, UK: Polity Press, 2016), 43.

[54] This list comes from a compilation in Lauren Cornell and Ed Halter, eds, *Mass Effect: Art and the Internet in the Twenty-First Century* (Cambridge, MA: The MIT Press, 2015), xx.

for users, platforms are guided by protocols, conditions, and legalities set by the platform owner.[55] For this reason, algorithms, content sorting, curation, and filtering shape user engagement with content. David Nieborg and Thomas Poell call this "the platformization of cultural production," which is defined as "the penetration of *economic, governmental,* and *infrastructural extensions* of digital platforms into the web and app ecosystems, fundamentally affecting the operations of the cultural industries (emphasis in original)."[56] The development of platforms therefore shifted the ways in which artists and artworks could produce distributed interactive experience.

Social media art emerges in this new landscape of cultural production on platforms. In his article entitled "Hacia una teoría del social media art (Towards a Theory of Social Media Art)," Juan Martin Prada defines social media art as "a set of artistic practices that the emerging participatory platforms of Web 2.0 take as a specific field of action."[57] Especially after 2004, Prada argues, new forms of socialization based on logics of "user generated content" and the slogan "broadcast yourself" became the backbone of this new contemporary art practice.[58] In the early 2000s, artists began performing on YouTube, exchanging links, posting born-digital interactive projects, and publishing blogs and texts on social media. Ed Fornieles (b. 1983), for example, created the project *Dorm Daze* (2011), a "multi-person, scripted soap opera that unfolded through the Facebook accounts of fictional personae."[59] Other artists wanted to critique

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[55] See Apprich, *Technotopia,* 107 and Srnicek, *Platform Capitalism,* 36-92.

[56] David Nieborg and Thomas Poell, "The Platformization of Cultural Production: Theorizing the Contingent Cultural Commodity" in *New Media & Society* 20, no. 11 (2018): 4276.

[57] This is my own translation of Juan Martin Prada, "Hacia una teoría del social media art (Towards a Theory of Social Media Art)" in *Revista de occidente,* no 465 (2020): 5.

[58] This is my own translation of Prada "Hacia una teoría del social media art," 5-6.

[59] Cornell and Halter, eds, *Mass Effect,* xxii.

the platformization of the internet. Constant Dullaart's (b. 1979) *High Retention, Slow Delivery* (2014) was an Instagram performance where the artist purchased 2.5 million fake followers and distributed them to various members of the contemporary art world to boost their appearance of popularity and influence.[60] These projects take on the emerging space of social media as a new phase of distributed interactive experience online.

Social media art is a challenging practice to define. Interaction with artworks and humans on today's internet is more complex than the utopic "cyberspace" of the 1990s. Artists and artworks now intermingle with sponsored content and neoliberal capitalist corporations, fighting for algorithm attention alongside every other content producer online.[61] Social media art is therefore situated in a broader digital media environment than earlier movements such as Fluxus or net.art. It is more difficult than ever to disentangle artistic projects from those by influencers, organizations, and everyday social media users. Platform protocols also limit artists' control over associated content and directed advertisements might affect the perception of an artwork online.[62] Often, artists embrace this muddled media environment and use it as a point of departure in their work. However, this shift in how the internet is used instigated a change in online artistic practices. To best situate social media art in the history of distributed interactive experience, it is important to recognize the basic principle that platforms connect networked

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[60] For documentation of this project, see Voornaam Achternaam, "High Retention, Slow Delivery," Vimeo, July 16, 2022. https://vimeo.com/107035478. Other artists resist platformization entirely. Rafael Rozendaal's (b. 1980) single server sites *brokenself.com* (2007) or *likethisforever.com* (2011) sidestep the controlling protocol of social media platforms.

[61] Jesse Darling captures this well: "Social media is to the read/write web what sprawl is to the metropolis of modernity: a homogenous, cancerous, rhizomatic junkspace that expands exponentially outward on a sludgy wave of strip malls and sponsored links, greed and induced demand." See Jesse Darling, "Arcades, Mall Rats, and Tumblr Thugs" in *Mass Effect: Art and the Internet in the Twenty-First Century* (Cambridge, MA: The MIT Press, 2015), 326.

[62] In addition, artists use social media to different ends; some consider platforms as a medium for artistic intervention while others use social media as tools to promote work and engage with collectors, museums, and galleries. A nuanced understanding of how artists are employing this technology is crucial.

individuals across a wide geographic spread. Users still interact in the nebulous realm of network

time via platforms' communications infrastructure.

Excellences & Perfections: Distributed Interactive Experience on Instagram

Amalia Ulman's *Excellences & Perfections* emerges out of this extended history of

distributed interactive experience and early moments of social media art. The project began with

Ulman's deadpan humor poking fun at the social environment on platforms such as Instagram.

Using her own personal account, Ulman's initial followers were friends and colleagues from

Central Saint Martins School of Art and Design in London, where the artist received her

bachelor's degree in 2011. Playing into stereotypical female online personae with both visual

aesthetics and online protocols such as hashtags produced thousands of followers unaware of

Ulman's background as an artist. Over time, even initial followers fell into the pattern of

construction and deconstruction of online identities. On a post during the "sugar baby" phase of

the project, follower weldingninja commented: "I used to take you seriously as an artist until I

found out via Instagram that you have the mentality of a 15 year old hood rat" to which

yanzeecandle responded: "Hood rat is a good style" (Fig. 38).[63] Followers interacted with the

project for five months, engaging with the new, platformed environment of social media without

knowledge of Ulman's plan for the series. The next section dives into this project in more detail,

with particular attention to how Ulman utilized distributed interactive experience in service of

the performance.

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[63] Amalia Ulman, "I Used to Take You Seriously," *Instagram.* June 27, 2014.
https://webenact.rhizome.org/excellences-and-perfections/20141014162333/http://instagram.com/p/pxVqkHlV8P/?modal=true.

Excellences & Perfections offers a case study of distributed interactive experience via today's social media platforms. Conducted entirely on Instagram, the performance took advantage of the platform's ability to connect distributed communities around the world in network time. Instagram played a crucial role in this project, allowing Ulman to engage users in a way that both ties the project to the history of photograph-based contemporary performance art and reflects upon the particularities of social media interaction in the 2010s. For this reason, *Excellences & Perfections* is not only an example of distributed interactive experience with participants, but also an exploitation of this type of interactivity. By harnessing the features of distributed interactive experience, Ulman constructs a performance that critically engages with social media identities and user engagement online.

Founded in 2010, Instagram was one of the first platforms to be designed and conceived exclusively for mobile devices.[64] According to Mariane Cara: "For this reason, we are best able to understand its working through the figure of the smartphone – a technical gadget that is easy to handle and has become a dominant medium of choice for instant interaction."[65] Users could now connect at any time or place, without physical ties to an at-home internet connection. Instagram connected humans with other humans in a new way. People could interact on-the-go – commenting, "loving," and tagging during those idle moments of commutes, lines, and other free minutes throughout the day. Larissa Hjorth and Sarah Pink see these activities in terms of "digital wayfaring." To the authors: "In-between places like trains, busses, or the walk between one building to another are no longer contexts for just 'killing time.' These wayfarer spaces…

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[64] Mariane Cara, "The Semiotic Layers of Instagram: Visual Tropes and Brand Meaning" in *American Journal of Semiotics* 34, no. 3-4 (2018): 349. It is also important to recognize that Instagram was founded as a platform before concepts of influencer culture and sponsored content. These uses of Instagram became more prominent after 2015.

[65] Cara, "The Semiotic Layers of Instagram," 349.

have now become key moments where new forms of visuality and sociality are generated, through camera phone photography and the digital copresence associated with locative media."[66] As a born-mobile platform, Instagram was designed for this type of wayfaring interaction.

Instagram also re-introduced an enthusiasm for amateur photography. In her article "The Semiotic Layers of Instagram," Cara calls Instagram's early years "reminiscent of the 'Kodak Culture' universe" which established "a concrete and 'retro' aesthetic, providing a particular salience to the nostalgic references of filters that hark back to the 1970s."[67] Ulman's project took on these tropes directly. Her use of filters, posed portraits (selfies), and staged compositions reflect what Lev Manovich refers to as "Instagrammism," a style defined by the unique intersection of photography, design, and cinematography on Instagram.[68] As Cara argues: "With the launch of Instagram, the technical, social and democratic aspects of amateur photography have been renewed."[69] *Excellences & Perfections* took on these aspects, presenting images of (seemingly) everyday life on a public platform to be shared with a wide network of friends. In reality, these everyday activities were highly directed. In a 2021 interview with the Museum of Modern Art, Ulman said: "A lot of people thought everything was staged. But there was more

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[66] Larissa Hjorth and Sarah Pink, "New Visualities and the Digital Wayfarer: Reconceptualizing Camera Phone Photography and Locative Media," in *Mobile Media & Communication* 2, no. 1 (2014): 42.

[67] Cara calls this the first phase of Instagram (2010-2015), while the second phase (2016 onwards) "disconnects Instagram from strictly nostalgic representations, incorporating the flexibility of signs and a broader capacity for the meaning-making process, creating a semiotic atmosphere that is elastic and open to new perspectives." See Cara, "The Semiotic Layers of Instagram," 349. I focus only on the first phase for the purposes of this chapter, since that is where Ulman's project clearly lands.

[68] See Lev Manovich, "Notes on Instagrammism and Mechanisms of Contemporary Cultural Identity (And also Photography, Design, Kinfolk, K-Pop, Hashtags, Mise-En-Scène, and Состояние" in *Instagram and Contemporary Image* (Manovich.net, 2017). https://bit.ly/2ULBjrQ. To Manovich, formal dimensions of "saturated or faded color, use of empty areas and textured areas, etc." combined with content that "create particular 'sensibility,' 'attitude,' or 'tonality'" makes up the concept of "Instagrammism."

[69] Cara, "The Semiotic Layers of Instagram," 333. In line with Susan Sontag and Pierre Bourdieu, Cara sees photography as "an imprint of a nanosecond" for "freezing fragments of the day, situating the activity between the intellectual and the ordinary, in the creation of a visual poetry and a series of common popular meanings."

acting involved during a long period of time, and then the photos would happen in the middle of all of this, which made them more natural looking."[70] In fact, Ulman began living her life as each persona as the performance became more sophisticated. During the "sugar baby" phase, for example, Ulman took lessons in pole dancing.[71] She would often book hotel rooms for the weekend and take a wide range of images at once for the coming weeks' content.

Because Instagram is a highly visual social networking platform, Ulman's decision to use the platform situates *Excellences & Perfections* within a longer history of image-based performance art. As Catherine Wood outlines: "In the context of the USA and Europe during the 1970s, a number of artists began to make work in which they imagined performance taking place within a new reality: inside the space of the image itself."[72] Artists such as Cindy Sherman (b. 1954), Urs Luthi (b. 1947), and Natalia LL (b. 1937) inserted themselves into performative photographic images, taking on roles originating from mass media or art history.[73] Sherman's *Untitled Film Stills* (1977-1980), for example, present "snapshots" of an imaginary blonde actress played by the artist. Emphasizing stereotypical tropes of women in mass media, Sherman's critique relied on the camera to capture her performance as if the images were movie stills or publicity shots.[74] However, as Wood points out, this project was conceptualized and

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[70] See "El Planeta Q&A with Amalia Ulman." YouTube. Museum of Modern Art Film at Lincoln Center, April 28, 2021. https://www.youtube.com/watch?v=zNq0hIttYho. Other details about this performance were discussed in a Q&A following a screening of Ulman's film *El Planeta* at the Museum of Modern Art on December 11, 2021.

[71] Michael Connor, "First Look: Amalia Ulman-Excellences & Perfections" (Rhizome, October 20, 2014), https://rhizome.org/editorial/2014/oct/20/first-look-amalia-ulmanexcellences-perfections/.

[72] Catherine Wood, "Pics or It Didn't Happen" in *Histories of Performance Documentation* (New York: Routledge, 2018), 72.

[73] Wood, "Pics or It Didn't Happen," 72.

[74] For more on this project, see: Anna Kérchy, "The Woman 69 Times: Cindy Sherman's 'Untitled Film Stills" in *Hungarian Journal of English and American Studies* 9, no. 1 (2003): 181-189.

designed for display in a gallery context. Later performance artists such as Suzanne Lacy (b. 1945) and Cosey Fanni Tutti (b. 1951) "initiated and directed the performance of not only images – whether from a basis of staging choreographed actions, or engaging in forms of self-performance – but also intervened in image distribution circuits."[75] Projects such as Lacey's *In Mourning and in Rage* (1977) or Tutti's pornographic *Magazine Actions* (c. 1973-1977) were meant to coexist with other mainstream media content, with images distributed in magazines, newspapers, or on television.[76] In a similar way, Ulman's *Excellences & Perfections* posts are entangled with other media content on Instagram. She simultaneously performs each identity in the project (akin to Sherman's performance approach) and situates the performance alongside targeted advertisements, content recommendations, and other profiles on Instagram's platform (akin to Lacy's or Tutti's distribution approach).

Instagram allowed Ulman to insist upon a distributed interactive experience with participants. Using the infrastructure of the internet, Instagram connects networked individuals in distributed communities across network time. The social media platform also encourages interaction with users – the crucial element needed to activate the performance. Without this form of interactivity, the performance would be static. Artist and theorist Brad Troemel ruminates on this point in his essay, "Athletic Aesthetics." To Troemel:

> Posting work to the Internet without a network of viewers in place raises the same questions as the proverbial tree falling in an empty forest. If a Tumblr post has no notes, is it art? Does it exist? For your artists using social media, the answer is no. If an audience for their work isn't maintained, it loses the context necessary for regarding it as art.[77]

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[75] Wood, "Pics or It Didn't Happen," 73.

[76] For more on these projects, see: Suzanne Lacy, "The Crystal Quilt (1985-1987)," Suzanne Lacy, n.d., Accessed December 7, 2021. https://www.suzannelacy.com/the-crystal-quilt/ and Alison M. Gingeras, "Cosey Fanni Tutti" in *Aperture,* no. 225 (2016): 48-53.

[77] Brad Troemel, "Athletic Aesthetics," in *The New Inquiry*, May 10, 2013. https://thenewinquiry.com/athletic-aesthetics/.

Instagram's format is naturally conducive to storytelling, providing space for Ulman to reach a broad audience in a branded, networked format.[78] But the construction of a brand is not effective without engagement from users. Especially on social media, users are encouraged to interact beyond scrolling. The act of sharing, commenting, or "loving" an image is the mark of consumption. In other words, users activate the *Excellences & Perfections* images on Instagram through continuous interaction. The performance relies on this interaction to maintain a sense of distributed interactive experience.

The slow insertion of Ulman's profile into followers' feeds also allowed users time to establish Chun's "habits" of engaging with the performance and each other. As the five-month-long performance unfolded, users commented, "loved" images, and tagged friends. The performance spread across thousands of followers in the form of a daily post (and sometimes two or three). Some make a dramatic announcement – breast augmentation surgery, an emotional breakdown, or a new boyfriend – that produce a moment of crisis in the narrative.[79] Most fall into a rhythm of everyday life. The narrative slowly builds over time, held together by users' interactions with the artist's profile. As Ulman's followers expanded, they developed habits of engaging with her life. Troemel sees this in terms of pattern formation, as users begin to

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[78] As Zizi Papacharissi and others have argued, Instagram encourages the construction of daily life experiences through images. Today, individuals cultivate a brand as often as corporations. See: Zizi Papacharissi, ed, *A Networked Self: Identity, Community and Culture on Social Network Sites* (New York: Routledge, 2010), 334. However, it is important to note that this project was initiated before widespread ideas of "sponsored content" or "influencer culture." No sponsor would have contacted Ulman at this time to partner with her like a brand, though she was actively working to broadcast herself in a way that would be sponsored in today's social media environment.

[79] Chun argues that crises punctuate network time. The more "dramatic," crisis-like moments of the series disrupt the habits users were creating and allow for the establishment of new habits with the new identity. See: Chun, *Updating to Remain the Same*, 69-70. "Unfolding in real time, habitual repetition grounds ties; crises break and create new ones."

recognize patterns in the flow of information on their social media feeds.[80] The more users

engaged with Ulman's posts, the more frequently the artist's posts appeared in their feed. The

more frequently posts appear, the more followers recognize and trace the patterns in Ulman's

performative identities.[81] Ulman took advantage of these habits to slowly build her "cute girl,"

"sugar baby," and "life goddess" identities and provoke further interaction with followers.

Interactivity in *Excellences & Perfections* emerges most clearly in the comment section

of the 2014 performance posts. At the time of the original posting, comments often feature

messages of support or criticism. On July 10, 2014, for example, Ulman posted a mirror selfie

wearing a hospital gown (Fig. 5). The caption reads "nervous and excited!! Getting 450cc high

profile anatomical silicon gel… Massive butterflies n anxiety. Im sure i'll be fine. And THANK

YOU for the warm wishes!! I appreciate ALL the support!!" to which user babylon_kingkong

responded "omg lol baaaaabe good luck! You are gonna look so faboosh!"[82] Though many of

Ulman's followers shared this sense of support, others responded with cynicism. On August 17,

2014, Ulman posted a handwritten quote: "A Sunday well spent brings a week of content" with

the caption "What are you going to do today? #sunday #blessings."[83] Two users, bondage.hipster

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[80] "Even if you don't go on winding quests for content and allow information to passively wash over you through your feed, you ultimately arrive at the same place: recognizing patterns and flow rather than shutting the floodgates." See: Troemel, "Athletic Aesthetics."

[81] Troemel references Marshall McLuhan's *The Medium is the Massage* in the development of this idea: "Our electrically-configured world has forced us to move from the habit of data classification to the mode of pattern recognition. We can no longer build serially, block-by-block, step-by-step, because instant communication ensures that all factors of the environment and of experience coexist in a state of active interplay." See Marshall McLuhan, *The Medium is the Massage* (New York: Random House, 1967).

[82] Amalia Ulman, "Nervous and Excited," *Instagram.* July 10, 2014. https://webenact.rhizome.org/excellences-and-perfections/20141014220030/http://instagram.com/p/qRq9oylV-Y/?modal=true.

[83] Amalia Ulman, "A Sunday Well Spent," *Instagram.* August 17, 2014. https://webenact.rhizome.org/excellences-and-perfections/20141014171636/http://instagram.com/p/ry6-bMlV_v/?modal=true.

and item_idem responded with "Whatever Bich u boring now" and "Get a life please!" (Fig. 39).[84] These comments are contemporaneous reactions to the images in the users' feeds – each associating Ulman with a specific identity built over an extended period of time. The July commenter knows Ulman as "cute girl," and the August commentators know her as "cute girl" turned "sugar baby" turned "life goddess." babylon_kingkong, bondage.hipster and item_idem react to and engage with Ulman's posts as a response to her online persona. None are aware that the entire profile is a performance. They continue to encounter a daily flow of posts, interacting by commenting, "loving," or sharing Ulman's posts with other users.

When *Excellences & Perfections* was revealed to be a performance, as opposed to an "authentic" representation of Ulman's life, some followers were outraged and accused the artist of fraud.[85] Interaction with the performance posts after the announcement are therefore different. Even if it is their first time experiencing the images, these commenters (generally) know Ulman by her identity as performance artist through press articles, past commenters, and Ulman's own post thanking the organization Rhizome for its support of the project (Fig. 40). After the posts were revealed as a performance, comments generally fall into two categories: those praising Ulman's creativity or those criticizing the gullibility of previous commenters. A year and a half after Ulman's August 19, 2014, post, awstein commented: "This is a brilliant project, thank you Amalia. Comments such as the above actually keep adding to it. The inability to see parody for what it is, eh :p" (Fig. 41).[86] This contrasts with an even more recent comment by

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[84] Ulman, "A Sunday Well Spent."

[85] For more on perceptions of narcissism in selfie culture and a feminist critique of the practice, see: Derek Conrad Murray, "Notes to Self: The Visual Culture of Selfies in the Age of Social Media" in *Consumption Markets & Culture* 18, no. 6 (2015): 490-516.

[86] Amalia Ulman, "Simplicity is the Ultimate Sophistication," *Instagram.* August 19, 2014. https://webenact.rhizome.org/excellences-and-perfections/20141014171636/http://instagram.com/p/r5EX9_lVwm/?modal=true.

xxmrsjesshoffmanxx, who posted "Its fake guys [eyeroll emoji]" three years after the conclusion

of the project (Fig. 42).[87] This desire to appear "in the know" on Instagram is similar to an

audience phenomenon in performance art more broadly. Performance artist Andrea Fraser (b.

1965) often endured audiences that would chortle, smirk, or display other indications of

"knowing" her *Museum Highlights* tours (1989) were a performance.[88] This impulse is amplified

in the age of social media, as "trolls" attempt to provoke quarrels by appearing more

knowledgeable than any other user. Ulman's profile offered fertile ground for this type of

response, as her embrace of social media stereotypes were particularly (and intentionally)

vulnerable to trolls and other forms of online criticism.

Regardless of response, Ulman herself sees the importance of interactivity to the life of

the project. In an interview with Catherine Wood entitled "Pics or It Didn't Happen," Ulman

insists:

> The performative aspect comes from the interaction with the audience and the audience
> can interact with it any time. You know, it depends on their lives. And then background
> knowledge: people that already know it's an art piece, I feel, have a different reaction.
> And then people that don't know and have that genuine experience of the piece, that can
> happen anytime basically. Because even though *Excellences & Perfections* has had a lot
> of press, there are people that will find it and go through it and still maybe feel something
> outside of it being an archived piece of work.[89]

Interestingly, comments post-performance continued this interaction in a new way; they became

less attached to the posted content and engaged more with the project in totality. An increase in

"tags" occurs between 2015 and 2019, a feature Ulman's followers utilized to introduce the

series to other users (Fig. 43). These "tags" seem to be random – individual posts take on a sense

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[87] Amalia Ulman, "Safe and Happy," *Instagram.* July 11, 2014. https://webenact.rhizome.org/excellences-and-perfections/20141014171636/http://instagram.com/p/qUjbT6lV_K/?modal=true.

[88] Shannon Jackson, "Staged Management: Theatricality and Institutional Critique" in *Social Works: Performing Art, Supporting Publics* (Abingdon, Oxon: Routledge, 2011), 124.

[89] Ulman quoted in Wood, "Pics or It Didn't Happen," 77.

of autonomy, and any image from the series became emblematic of the performance. As the

performance gained recognition in the art community, comments engaged with a broader

discourse on contemporary performance art. Some users even attempted to locate the moment of

Ulman's performance. In October 2019, one follower wrote: "Interesting. If I'm leaving a new

comment here in 2019, does the performance continue through my interaction?... My comment

renews and keeps the performance alive and powerful here…I will keep thinking about it. Just a

public notation" (Fig. 44).[90] Comments of this type were frequent in the latter portion of the

series – clustering in the last week of the *Excellences & Perfections* posts – presumably because

they were most recently available on users' feeds. The comments can also be traced throughout

the project as followers return to the more "dramatic" moments, confirming their role in pivoting

the performance's narrative.[91] Regardless, reactions kept appearing on the posts. Users continued

to activate the series by interacting with the images nearly six years after the original posting –

an unusually long period of time for online content – before Ulman removed the series from her

account in 2021.[92]

Ulman's project took advantage of social media's capacity to facilitate distributed

interactive experience with participants. Instagram's ability to connect networked individuals in

distributed communities across network time allowed the artist to construct a performance that

directly engaged with contemporaneous cultural themes of performative online identities and

user engagement on the internet. The fact that her constructed identities provoked a range of

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[90] Amalia Ulman, "The End," *Instagram.* September 14, 2014. https://webenact.rhizome.org/excellences-and-perfections/20141014171636/http://instagram.com/p/s67XD2FV5l/?modal=true.

[91] The continued engagement with Ulman's post could also be attributed to the inclusion of this series in a canon of 21st century art, as students were encouraged to study the series for its feminist critique of online cultures through textbooks such as Wood, *Performance in Contemporary Art*.

[92] The removal of the performance from Instagram is further discussed in the conclusion to this dissertation.

reactions – from outrage, dismay, and judgement to respect and admiration – indicates that her

interventions into the social media sphere relied on distributed user interaction to activate the

artwork. Manifesting in habitual comments, "loves," and "tags," these reactions kept the

performance in the "present." For this reason, *Excellences & Perfections* is not just an example

of distributed interactive experience, but an effective utilization of this type of interactivity for

performance art online. Ulman engaged users around the world with Instagram's aesthetics,

associated stereotypes, and particular mode of social media interaction. Her savvy manipulation

of Instagram to produce a compelling performance art narrative and gain thousands of followers

is ultimately what allowed the artist to offer a feminist critique of social media in the 2010s.

Distributed Interactive Experience in the Metaverse

As artists continue to engage emerging technologies in interactive digital art, it is vital to

understand how these artworks facilitate interactivity at the time of their inception – whether that

manifests as individual, collective, or distributed interactive experience. With new systems and

platforms emerging from the tech industry, distributed interactive experience will continue to be

a useful concept for framing the type of interactivity that utilizes communication technologies

and infrastructures to connect humans with other humans. The transformation of Facebook to

Meta in 2021, for example, indicates a turn to the "metaverse."[93] To Facebook founder and CEO

Mark Zuckerberg, virtual reality, augmented reality, smart glasses, and other technologies are

"the next evolution of social connection" that will allow users to "socialize, learn, collaborate

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[93] For more on artists' role in the Metaverse, see: Dean Kissick, "What Will Art Look Like in the Metaverse?" The New York Times. The New York Times, December 1, 2021. https://www.nytimes.com/2021/12/01/magazine/mark-zuckerberg-meta-art.html.

and play in ways that go beyond what we can imagine."[94] As different hardware and software are employed to encourage interaction between distributed communities in network time, an understanding of distributed interactive experience as a typology offers crucial context to the nature of interactivity. Especially in the wake of COVID-19 lockdowns, a nuanced understanding of the relationship between humans, other humans, and the communication technologies that bind them together is necessary. Artists will continue to investigate these themes, utilizing distributed interactive experience to critique, engage, and otherwise scrutinize how communication technology impacts life in the twenty-first century.

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[94] "Welcome to Meta: Meta." Welcome to Meta | Meta, 2021. https://about.facebook.com/meta/.

IV: NEW MEDIA IN THE MUSEUM
RECONCEPTUALIZING DOCUMENTATION FOR SMALL AND MID-SIZED INSTITUTIONS

Museums and cultural institutions are tasked with the preservation of the past for future audiences to learn from and enjoy. When museums accession objects into their collections, they commit to storage, display, and conservation that might span generations of museum workers. For this reason, cultural theorist Fiona Cameron argues, "[museums and heritage organizations] hold a significant part of the 'intellectual capital' of our information society."[1] Contemporary art – especially its conceptual, ephemeral, and participatory practices – significantly challenges this directive. Museums today are confronted with materials such as plastic and food, installations with multiple components, and performance-based works that only leave archival traces. These artworks present complications to long-term care unlike "stable" objects such as traditional painting or sculpture.

As outlined in the introduction to this dissertation, rapid advancements in technology are perhaps the largest difficulty for preserving collections of contemporary art. So-called "new media" presents two complications to long-term care.[2] First, physical materials are dangerously susceptible to technology obsolescence; VHS tapes, floppy disks, and CRT televisions are not widely available, produced, or used by today's new media artists. As a result, museums struggle to implement effective strategies for ongoing preservation of artworks that make use of these technologies. At the same time, museums must anticipate the needs of future new media artworks that rely on today's web pages, software, and technological hardware. Second, artworks

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[1] Fiona Cameron, "Introduction" in *Theorizing Digital Cultural Heritage: A Critical Discourse* (Cambridge, MA: The MIT Press, 2007), 1.

[2] For a definition of "new media art," see Mark Tribe and Reena Jana, *New Media Art* (Hong Kong; Los Angeles: Taschen, 2009), 7, which is further analyzed in the introduction to this dissertation.

often feature immaterial characteristics that are central to the experience of the artwork. Interactive, conceptual, or performance-based experiences with a new media artwork are not evident in the physical technologies used to create the work. Curators and conservators must grapple with both aspects to ensure the survival of new media artworks when incorporated into museums.

This chapter expands the scope of my project from interactive digital art to new media art generally – spanning both analogue and digital artworks – and shifts in focus to address the practical challenges of incorporating new media art into museum collections. This expanded scope encompasses a larger portion of new media art as it exists in today's museum collections. In this chapter, I direct attention to the particular needs of small and mid-sized museums that often lack resources to engage with new media art. Though models exist for documenting and preserving new media objects, this process is often understood as a singular endeavor at the moment of an artwork's entrance into a museum. I reconceptualize documentation as a living, ongoing process that captures multiple moments of an artwork's lifetime. Such consideration of documentation sidesteps major concerns for small and mid-sized museums, namely, the hesitancy to document new media collections with similarly unstable documentation tools and archives. With accessible, affordable, and efficient strategies to properly care for new media artworks, smaller museums may be encouraged to expand their programs of display, loan, and collection of artworks that play a significant role in the history of contemporary art.

The first half of this chapter discusses existing strategies for documenting new media artworks that were proposed between 2003 and 2005. It then turns to reimagine documentation as a living, ongoing process, with the goal of encouraging museums to expand their engagement with new media art. The second half of the chapter focuses on the unique challenges small and

mid-sized museums face in this field, offering best practices for comparatively underfunded institutions through a brief case study of the collections management platform and app CatalogIt. It concludes with an outlook of documentation in the wake of COVID-19 and is accompanied by an appendix of affordable resources for small and mid-sized museums.

A History of Documenting of New Media Art

Conservators, collections managers, and curators must acknowledge the inevitability of change when new media artworks enter museum collections. Over time, technological components may be replaced, analogue video formats may be digitized, and software may be re-written or emulated on upgraded playback machines. However, as conservation theorist Renée Van de Vall insists: "We need to distinguish between changes which have an impact on the work as an *artwork,* and thereby on the range of appropriate interpretations, and changes which only affect the work as an *object,* leaving its possible interpretations unchanged (emphasis in original)."[3] Meticulous documentation is key. According to Annet Dekker, "documentation is the process of gathering and organizing information about a work, including its condition, its content, its context, and the actions taken to preserve it."[4] Conservators may utilize various tools to achieve this aim, such as photography, video, and technical or conceptual specifications. Targeted strategies for employing these tools are now a crucial component to the production, display, and accessioning of new media artworks in museums. Without proper documentation, future conservators and curators will face difficult questions when decisions must be made. They

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[3] Renée Van de Vall, "The Devil and the Details: The Ontology of Contemporary Art in Conservation Theory and Practice." *British Journal of Aesthetics* 55, no. 3 (2015): 15.

[4] Annet Dekker, "Enjoying the Gap: Comparing Contemporary Documentation Strategies" in *Preserving and Exhibiting Media Art: Challenges and Perspectives,* ed. Julia Noordegraaf et.al, (Amsterdam: Amsterdam University Press, 2013), 149.

may considerably alter an artwork's identity or allow it to fall into total obsolescence in the name of long-term conservation.[5]

In 1997, the Foundation for the Conservation of Modern Art and the Netherlands Institute for Cultural Heritage organized a symposium entitled "Modern Art, Who Cares?" to address these concerns. In the years following, a wide variety of proposals for documenting and preserving unstable artworks emerged.[6] However, no single proposed strategy has become standard practice for museums. The current International Council of Museums code of ethics states: "Museum collections should be documented according to accepted professional standards. Such documentation should include a full identification and description of each item, its associations, provenance, condition, treatment and present location."[7] Proposals since the early 2000s are rarely centrally published or critically examined; they therefore cannot be labeled as "accepted professional standards." Regardless, many museums have adopted methods proposed by researchers, scholars, or institutes focused on the care of unstable artworks to encourage standardization over time.[8]

The Guggenheim Museum was the first institution to confront this challenge. In 2003, it established a task force of conservators, curators, and artists to develop the Variable Media

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[5] Hanna Hölling, an art historian and conservator of contemporary art, has noted that, "as part of a technical science, conservation comprises, among other things, all actions related to the manipulation of objects – their examination, documentation, and maintenance that, to varying degrees, is oriented towards securing these works' existence and survival." See Hanna Hölling, "The Technique of Conservation: On Realms of Theory and Cultures of Practice," in *Journal of the Institute of Conservation* 40, no. 2 (2017): 87-96.

[6] The focus of this symposium was not new media art specifically. It also included "unstable" contemporary artworks that rely on plastics, food, or other ephemeral materials that are in severe danger of degradation.

[7] "International Council of Museums Code of Ethics" (International Council of Museums, 2017).

[8] These models relate to "unstable" artworks in the broadest sense – artworks that may or may not have a "media" or "advanced technology" component. Though they can be considered with regards to unstable new media artworks, few are specifically directed to the conservation of new media art.

Questionnaire, or the VMQ. The VMQ is a guide for artist interviews, working to define what the Guggenheim team refers to as "medium-independent behaviors."[9] Rather than focusing solely on the artwork's materials, the VMQ addresses the artist's conceptual intent. Jon Ippolito, one of the VMQ's leading developers, describes the system as "an instrument for determining how artists would like their work to be re-created in the future, if at all. In contrast to one-size-fits-all technical fixes, this instrument is meant to be applied case-by-case, one artwork at a time."[10] To best consider the artist's original intention, the VMQ provides an open-ended interview guide to prompt the kind of questions a museum will need to answer to properly care for the work in the future. Ippolito admits, however: "No matter how open the questionnaire may be to different options and perspectives, it's impossible to predict every decision necessary to preserve a work, especially regarding its translation into mediums that don't even exist yet."[11] Regardless, the VMQ functions as an "ethical will," which attempts to guide future curators and conservators who may be tasked with re-creating the work without support from a living artist.

The VMQ is perhaps the most flexible and versatile documentation model. It is also maintained by its developers and updated when new research and language emerges. The current (third generation) version uses what new media art historian Christiane Paul calls "a component-based structure," where "interviewers can pick from a list of components, choose the ones applicable to the artwork, and associate them with it."[12] Summarized by Paul, these components include:

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[9] Jon Ippolito, "Accommodating the Unpredictable: The Variable Media Questionnaire" *Performing Arts Resources* 24 (2004): 95.

[10] Ippolito, "Accommodating the Unpredictable," 94.

[11] Ippolito, "Accommodating the Unpredictable," 100.

[12] Christiane Paul, "From Archives to Collections: Digital Art In/Out of Institutions" in *Museum and Archive on the Move,* edited by Oliver Grau (Berlin: Walter De Gruyter, 2017), 190.

- Material (such as Media Display, Computer Hardware, Live Material, Interchangeable Inert Natural or Manufactured Material, Locative Sensors, Robot, Mechanism, Reproducible Inert Manufactured Material)
- Source (Interchangeable or Reproducible Video Source, Generic Software, Custom Software, Reproduceable Video Source, Key Concept)
- Environment (External Physical or Virtual Reference, Gallery)
- Interaction (Participant, Performer, Viewer)[13]

A component-based strategy is helpful in structuring a museum's approach to the interview process. However, these are broad guidelines that must be supplemented with language and terminology that encompass a wide range of new media art practices.

The New Art Trust, which includes the Museum of Modern Art, the San Francisco Museum of Modern Art, and the Tate, proposed another model in 2003, entitled Matters in Media Art (MMA). MMA provides templates for assessing three stages of the acquisition process – pre-acquisition, accessioning, and post-acquisition – with a primary focus on "time-based media" artworks.[14] This method is meant to fit within the standardized systems used by registrars and collections managers, which makes it heavily text-based. MMA emphasizes condition reports, facility reports, installation specifications, cost assessment, purchase and loan agreements, copyright agreements, digital video assessments, technical analyses, and file characteristic analyses.[15] In this way, MMA aims to document new media artworks in tandem with other objects in a collection. This attempt at standardization, though rooted in previously established practices, may be too text-reliant to be effective for a wide range of artworks entering

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[13] Paul, "From Archives to Collections," 190. See an interactive version of the VMQ at https://variablemediaquestionnaire.net/.

[14] Dekker, "Enjoying the Gap," 161.

[15] Gunnar Heydenreich, "Documentation of Change – Change of Documentation" in *Inside Installations: Theory and Practice in the Care of Complex Artworks,* ed. Tatja Scholte and Glenn Wharton, (Amsterdam: Amsterdam University Press, 2011), 164.

museum collections.[16] Supplementary tools such as video and photography, or incorporation of the viewer's experience may be necessary additions to the MMA model with regards to new media artworks.

Also in 2003, the V2_Organisation proposed the Capturing Unstable Media Conceptual Model (CMCM) to address the unique challenges of preserving interactive new media artworks. Developers Sandra Fauconnier and Rens Frommé refer to the CMCM model as "between archiving and preservation" because it utilizes documentation strategies to create a "broad inventory of related, relevant archiving and preservation initiatives."[17] The CMCM attempts to define an artwork's "original state" in historical context to outline how that state will change over time.[18] For new media artworks, this involves clear documentation of every step in the design process, which is especially useful for team-based projects with multiple authors.[19] An abstract model creates "levels" of concepts embedded within an new media work of art, and asks artists to consider how each of those levels should be archived or preserved. Fauconnier and Frommé insist: "Artists can choose between having their work documented ('linking') or preserved ('cloning')."[20] In other words, artists can either allow their work to evolve alongside the advancement of technology or exist only in its original state. The CMCM encourages institutions to decide the extent to which they will document each level, and according to Fauconnier and Frommé, this "may include genres of directive nature, such as installation

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[16] Heydenreich, "Documentation of Change," 164.

[17] Sandra Fauconnier and Rens Frommé, "Capturing Unstable Media: Summary of Research," *V2_Organisation*, March 2003, 1.

[18] Fauconnier and Frommé, "Capturing Unstable Media." 5.

[19] Fauconnier and Frommé, "Capturing Unstable Media." 8.

[20] Fauconnier and Frommé, "Capturing Unstable Media." 2.

instructions, technical riders, schemes and plans and documentation on ambient sound or lighting conditions."[21] In this way, the CMCM provides a more collaborative relationship between artists and institutions to determine the best strategy for an interactive artwork's future.[22]

Individual practitioners in the field have also worked to establish documentation strategies. In 2005, curator and theorist Richard Rinehart developed the Media Art Notation System (MANS). Like MMA, MANS strives to standardize terminology for ease of processing through typical collections management databases. However, its categories are not quite as broad and are predicated on three main components: the "conceptual model," the "expression format," and the "score."[23] The "conceptual model" describes the relationship between materials and concept to define what elements of the artwork are most important to preserve. The "expression format" establishes a vocabulary to be used when discussing individual works of art in their own context. Documentation tools to achieve this include artist interviews, photography, video, technical specifications, audience interviews, and descriptions of similar works by the same artist. These two components are not unlike those proposed in the VMQ or MMA.

On the other hand, the "score" acts as tool to document both an artwork's components and the environment it establishes with the spectator. The concept is based on the musical score, which allows an orchestral and/or choral conductor to see what each performer should be playing

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[21] Fauconnier and Frommé, "Capturing Unstable Media." 9-10.

[22] Interestingly, the CMCM model includes the participant's experience in the overall documentation strategy. In addition to photo, video, and digital descriptions of every step in the design process, the CMCM provides a process for documenting the work's surrounding context. This refers both to audiovisual evidence of people interacting with the piece and to the environment in which it was installed, which is especially useful for artworks that exist outside the doors of a museum or gallery. Establishing the contextual relationship of a work of art with its audience assists future curators and conservators in recreating the experience of interacting with these types of artworks. CMCM offers a complement to other approaches, but allows for a greater incorporation of media into the documentation process.

[23] Heydenreich, "Documentation of Change," 162.

and what the overall ensemble should sound like. Rinehart argues: "The reason that musical

scores provide a useful model for media art notation is that they provide the clearest example of

description that compiles formalized (systematic) discreet elements into documents that aid in

the re-performance or re-creation of works of art."[24] In short, the score serves as an instruction

manual for the installation process. The artist Sol LeWitt, for example, thought of his *Wall*

Drawings specifications "like a musical score that can be redone by any or some people."[25] On

the other hand, the score concept allows for a nuanced description of a spectator's experience

with a work of art's "atmosphere."[26] By employing methods of musical interpretation to create a

description of an experience, a museum is better prepared to recreate artworks to the artist's

specifications.

Though none of these strategies are accepted as standardized best practice, many are

embraced by large, comparatively well-funded institutions working to preserve their new media

art collections. In fact, a combination of these strategies is often adopted on a case-by-case basis

and the lack of official standardization may allow for more flexibility as technology develops. As

conservators, curators, and artists continue to work through the complex challenges new media

artworks pose, more scholarship and practical application is needed to solidify and encourage

best practices over time.

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[24] Richard Rinehart, "The Media Art Notation System: Documenting and Preserving Digital/Media Art" *LEONARDO* 40, no. 2 (2007): 182.

[25] Sol LeWitt quoted in Van De Vall, "The Devil and the Details," 8-9.

[26] Frederika Huys, "The Artist is Involved! Documenting Complex Artworks of Art in Cooperation with the Artist" in *Inside Installations: Theory and Practice in the Care of Complex Artworks,* ed. Tatja Scholte and Glenn Wharton, (Amsterdam: Amsterdam University Press, 2011), 108.

Reconceptualizing Documentation: More is More!

Despite advancements in the last two decades, most museums still approach

documentation from the rigid frameworks of traditional conservation – relying on material-

specific categorizations and ignoring the processual, interactive, and technological nature of new

media artworks. As Renée Van de Vall outlines, today's conservation ethics demand that

"treatment should be as restricted as possible and should not intervene any more than absolutely

necessary with the original material."[27] Museums now aim to provide what Karen Kroslowitz

calls "a stable storage or display environment in order to minimize further damage or

deterioration."[28] In other words, museums emphasize a preventative, rather than curative,

approach to the long-term care of artworks. However, even if a new media artwork sits in a

clean, stable storage facility for decades, it will still succumb to obsolescence when its hardware

and/or software becomes inaccessible. The video artist Bill Viola (b. 1951), for example, once

lamented that museum staff condition-reporting his work "assiduously note every fingerprint on

his video decks but fail to notice when a functional component like a speaker or transformer is

missing or obsolete."[29] Fiona Cameron and Helena Robinson agree, noting that "while many

curators are aware of the polysemic contexts of objects… this approach has been slow to be

applied to documentation."[30] To avoid such misunderstandings, a reconceptualization of

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[27] Van de Vall, "The Devil and the Details," 286.

[28] Karen Kroslowitz, "Preservation, Conservation, Restoration: What's the Difference?" Computer History Museum, December 31, 2019. https://computerhistory.org/blog/preservation-conservation-restoration-whats-the-difference/.

[29] Jon Ippolito, "Death by Wall Label" in *New Media in the White Cube and Beyond: Curatorial Models for Digital Art,* edited by Christiane Paul (Berkeley: University of California Press, 2008), 107.

[30] Fiona Cameron and Helena Robinson, "Digital Knowledgescapes: Cultural, Theoretical, Practical, and Usage Issues Facing Museum Collection Databases in a Digital Epoch" in *Theorizing Digital Cultural Heritage: A Critical Discourse,* edited by Fiona Cameron (Cambridge, MA: The MIT Press, 2007), 180.

documentation is necessary.[31] Even museums with strategies in place must rethink how their

process supports the ongoing survival of artworks, not simply a one-time effort in a traditional

conservation mindset.

Documenting a new media artwork when it first intersects with a museum is crucial but

insufficient when considering a long-term projected lifetime. Instead, documentation should be

approached as a living, ongoing process that meaningfully adapts to artworks' needs at multiple

moments in time. Conservator Vivian van Saaze agrees, arguing that "continuous intervention"

should be the primary approach to new media art.[32] To van Saaze, inevitable changes should be

understood as productivity and potentiality, rather than loss and damage.[33] Amanda Wallace also

acknowledges this need in collections management as a field, which "must be understood as a

means to an end – not the end in itself."[34] Museums take time to condition-report and document

artworks when they are first housed, whether at the beginning of a loan, a new exhibition, or a

recent acquisition to the permanent collection. Minor updates are added over time, but like the

case of Viola's video decks, these updates easily fall into the realm of superficial changes. New

media artworks must be plugged in, inserted into a working playback machine, or otherwise

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[31] Curator Richard Rinehart frames this well, arguing that documentation "may need to function in new ways with regard to new media art. New media art is, in relation to traditional art forms, more media-independent but more context-dependent, making documentation necessary not only for an historic understanding of the work, but for its continued existence." See: Richard Rinehart, "One of Us!: On the Coupling of New Media Art and Art Institutions" in *A Companion to Digital Art,* edited by Christiane Paul (Malden, MA: Wiley-Blackwell, 2016), 490.

[32] Vivian Van Saaze, "Doing Artworks: An Ethnographic Account of the Acquisition and Conservation of *No Ghost Just a Shell*," *Krisis: Journal for Contemporary Philosophy* 1 (2009), 21.

[33] Van Saaze, "Doing Artworks," 21. Van Saaze proposes an approach inspired by Bruno Latour's actor-network theory, involving a diverse range of "actants" upon the artwork – from the museum building and administration to technicians, curators, conservators, and the artist.

[34] Amanda Wallace, "Collections Management and Inclusion" in *Including Museums: Perspectives on Museums, Galleries, and Social Inclusion,* edited by J. Dodd and R. Sandell (Leicester: University of Leicester Department of Museum Studies, 2001), 83.

activated for proper evaluation. Systems should be in place to ensure these artworks are wholly revisited with some frequency, even without the impetus of a new exhibition or loan request.

Documentation tools are crucial to this ongoing process. Conservators and curators rely on photography, video, technical specification software, and other digital tools to capture an artwork – both as illustrations of its ideal display and as records of its condition. However, these records can be similarly unstable. Digital files and storage mediums degrade over time, leaving museums with the frantic directive of saving unstable artworks with unstable tools. The overwhelming expectation of preserving both the artwork and all its associated documentation becomes paralyzing. Museums thus limit documentation iterations, which increases the value of existing records. As time progresses, the documentation requires its own preservation strategy, straining institutions' bandwidth for the archival process.

This phenomenon indicates a full circle around Walter Benjamin's notion of the "aura" that surrounds an "original" object; documentation almost takes on the same aura as the artwork due to its scarcity.[35] In fact, as art historian and conservator Hanna Hölling reveals: "…the archive, far from being a static and distant entity, merges with the work, becomes part of it – so much so that, in certain works, the archive itself becomes an artwork."[36] However, as Peter Walsh argues," it was the incorporation of photographic technologies (including x-ray, infrared, and ultraviolet) in museums that gave rise to notions of an "original" object in the first place. To Walsh:

> Benjamin has the aura of art exactly the wrong way around. It is the mechanical
> reproduction – the photograph – that created the aura of the original, much as it was the

[35] See: Walter Benjamin, "The Work of Art in the Age of Mechanical Reproduction (1935)," in *Illuminations*, trans. Harry Zohn (New York: Schocken Books, 1969), 1–26.

[36] Hanna Hölling, *Paik's Virtual Archive: Time, Change, and Materiality in Media Art* (Berkeley: University of California Press, 2017), 154.

machine that created the 'handmade,' the negative that created the 'positive,' and the digital that gave retroactive birth to its latent opposite, the 'analog.'[37]

The inevitability of change in new media art requires resistance to Benjamin's notion of a hierarchical, "authentic," original. Documentation should similarly be understood as generative and iterative; it must be allowed to evolve alongside the artwork.[38]

Still, maintaining some of Benjamin's separation between artwork and documentation may help museums practically approach their collections and archives in a way that supports living artworks over time. Museums must become comfortable producing frequent, wide-ranging documentation about an artwork with the goal of preserving the artwork rather than every associated record. Releasing the pressure of preserving archival documentation for generations of future museum staff may help the artwork itself endure for as long as possible.[39] This is not to say that past documentation is unimportant or irrelevant. Instead, documentation can become what Annet Dekker calls "an alliance of process, presentation, and preservation" that is "a critical space in its own right, a space in which the issues and concerns of the work are addressed

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[37] Peter Walsh, "Rise and Fall of the Post-Photographic Museum: Technology and the Transformation of Art" in *Theorizing Digital Cultural Heritage: A Critical Discourse,* edited by Fiona Cameron (Cambridge, MA: The MIT Press, 2007), 29.

[38] Benjamin and Jean Baudrillard's theories of mechanical reproduction and simulation induce the idea that "real" works of art are severely threatened by digitality. Fiona Cameron points out that these ideas have "a persuasive effect on the way museum collections and digital objects have been viewed, used, and assigned meaning." As a result, many scholars of new media attempt to re-contextualize these theories in a way that validates digital objects. Cameron maintains that decisions surrounding digitization involve "an active process of value and meaning-making equivalent to that of the physical object." See Fiona Cameron, "Introduction" in *Theorizing Digital Cultural Heritage: A Critical Discourse* (Cambridge, MA: The MIT Press, 2007) and Fiona Cameron, "Beyond the Cult of the Replicant – Museums and Historical Digital Objects: Traditional Concerns, New Discourses" in *Theorizing Digital Cultural Heritage: A Critical Discourse* (Cambridge, MA: The MIT Press, 2007), 51.

[39] This relationship between documentation and artwork might change if the artwork ceases to exist entirely. For a discussion of the relation between documentation and artwork in ephemeral art like performances, see: Philip Auslander, "The Performativity of Performance Documentation," *PAJ: A Journal of Performance and Art* 28, no. 3 (2006): 1–10. This is not to say that museums shouldn't try to preserve records for as long as possible. I am simply advocating for accepting the inevitability of older records declining over time.

through appropriate forms without necessarily becoming reproductions."[40] These documents and their associated archive must continue to develop; Dekker argues this adds new layers to the artwork and opens "potential for elaborating on the original version, thereby allowing it to survive FOREVER."[41] If documentation and artwork are allowed separate, though intertwined roles, museums may become more comfortable implementing long-term preservation plans and taking more risk when it comes to engaging with new media art in their spaces and collections.

Furthermore, if museums understand documentation technologies as tools in a living process that do not require the same preservation strategy as the artwork, emerging digital technologies may prove invaluable to the documentation process. Virtual reality, augmented reality, and 3D scanning technologies are now widely available.[42] Though these technologies are similarly precarious, their role in an ongoing process of documentation and preservation may prove to be invaluable. Museums should be more willing to provide records of the current moment, whether or not those records are projected to survive generations. Without documentation of multiple moments in time, obsolescence may advance much quicker. Indeed, digital tools offer potential to capture the experience of new media artworks from various angles and viewpoints, a strategy that would especially benefit immersive and interactive artworks such as installations. Many new media artists intend to push beyond the limits of two-dimensionality; documentation that reflects this intention may lead to a better understanding of the artwork

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[40] See Annet Dekker, "Enabling the Future, or How to Survive FOREVER" in *A Companion to Digital Art,* edited by Christiane Paul (Malden, MA: Wiley-Blackwell, 2016), 568.

[41] Dekker, "Enabling the Future," 568.

[42] Recent research and efforts are being made to better preserve this data. See: Jennifer Moore, Adam Rountrey, and Hannah Scates Kettler, eds., *3D Data Creation to Curation: Community Standards for 3D Data Preservation* (Chicago: Association of College and Research Libraries, 2022).

across time.[43] As emerging digital technologies advance, therefore, the possibilities of documenting complex artworks using those technologies can follow suit.

As early as 2007, Cameron and Robinson considered how tools such as audio, video, and 3D simulations could be integrated into the acquisition process: "For example, [documentation] could include the digital recording of significance through comments by makers, users, and donors, the documentation and recording of the pre-museum contexts of objects, and the digital rendering of objects in 3D and object movies."[44] Virtual reality, augmented reality, photogrammetry, and scientific analyses bring new perspectives to artworks and expand the range of possible records. Cameron and Robinson continue: "The potential to technologically liberate documentation from the empirical model of standardized, linear narrative description to incorporate diverse media and create 3D objects, visualizations, and simulations…. might revise documentation, taking account of these technological potentialities."[45] Such an approach would allow documentation to adapt both to twenty-first century modes of knowledge production and to future changes in technology without compromising the artwork or its associated archive.

A continuous and generative documentation process also requires expanding our notions of whose voices can contribute to the archive. The production of records involves what Hölling refers to as "tacit knowledge," or "the (nonembodied, virtually present) skills, attitudes, and social relations of persons involved in creating the archive."[46] Records are generated by artists,

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[43] According to art historian Claire Bishop: "Visualization of a work of art as a three-dimensional space is difficult via a two-dimensional image, and the need to be physically *inside* an installation renders photographic documentation even less satisfactory than when it was used to reproduce painting and sculpture (emphasis in original)." Claire Bishop, *Installation Art: A Critical History* (London: Tate, 2010), 10-11.

[44] Cameron and Robinson, "Digital Knowledgescapes," 183.

[45] Cameron and Robinson, "Digital Knowledgescapes," 168-169.

[46] Hölling, *Paik's Virtual Archive*, 151.

conservators, curators, cultural specialists, collections managers, registrars, IT specialists, photographers, interns, volunteers, and many more individuals with specific skill sets, viewpoints, and stake in the archival process. It is important to recognize that archives originate from humans with diverse backgrounds and approaches to objects.[47] Encouraging museums to produce a larger quantity of wide-ranging records allows more voices to participate in the process. New media art relies on a collaborative model for production; transferring that collaborative mindset to the documentation and preservation of such artworks is crucial.[48] Ultimately, more perspectives, expertise, and first-hand accounts in the archive will assist future curators and conservators in continuously reactivating artworks and addressing specific needs that arise over time.

Reconceptualizing documentation as a living process ultimately supports museums in efforts to engage with new media art in their spaces. Most artists use digital technology at some point in their practice – either as a tool to create a more "traditional" art form (3D printed sculpture), a means to store or deliver an artwork (a digitized painting), a new artistic medium entirely (virtual reality), or as a theme related to life in today's media-saturated technoculture.[49] Today's digital reliance is profound, and new media artists will continue to engage with these themes. Museums invested in contemporary art must find ways to incorporate these artworks in their spaces as representative of twenty-first century artistic production. Only targeted, thoughtful, and intentional engagement with these artworks will provide insight into today's art

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[47] Cameron and Robinson, "Digital Knowledgescapes," 168-169.

[48] Christiane Paul agrees, writing: "The nature of new media projects and the collaborative processes employed in their creation, curating, and presentation make it evident that writing a history of new media and preserving the art itself will require new models and criteria for documenting and preserving process and instability." See: Christiane Paul, *New Media in the White Cube and Beyond: Curatorial Models for Digital Art* (Berkeley: University of California Press, 2008), 6-7.

[49] For more on this, see Christiane Paul, *Digital Art* (London; New York: Thames & Hudson, 2015).

world while simultaneously ensuring artworks' survival for future audiences and scholarship. An approach to documentation that accepts artworks as living objects encourages museums of all size to expand their new media art programs. This approach is not only beneficial to large museums with new media documentation strategies in place, but also to small and mid-sized museums hesitant to begin. The next section shifts focus to the latter institutions, which face particular challenges in this area and require additional resources to successfully implement documentation systems in the first place.

Challenges for Small and Mid-Sized Museums

It is increasingly important to address the challenges new media art presents in the context of small and mid-sized museums. Models at institutions such as the Tate, the Guggenheim, the Museum of Modern Art, or the Victoria & Albert Museum can feel unreachable for curators and registrars working with limited collections. Large institutions have more bandwidth to propose long-term research projects in this area, which are often supported by a stronger network of wealthy benefactors. The New Art Trust, for example, hinged on support from the Kramlich Collection to develop the Matters in Media Art model and encourage new media art acquisition at major museums.[50] In most cases, this type of financial support is directed towards established institutions with more power in the cultural industry.

Comparatively underfunded institutions that are interested in displaying, loaning, and collecting new media art often lack resources to do so. Many academic museums and galleries, for example, are invested in engaging with art and artists that address themes that are relevant to university students' lives and worldviews. Smaller museums of contemporary art are

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[50] "About," Kramlich Collection, https://www.kramlichcollection.org/about, n.d. Accessed March 14, 2022.

increasingly aware of the monumental role emerging technologies play in art production today and want to engage with these artists more frequently. Even community museums and cultural centers often cannot avoid programs that involve technological components such as screens or projectors. The uneven distribution of new media art towards larger institutions ultimately excludes a wide range of artists producing new media art without a venue for display or critical attention in their communities. By extension, new media art becomes increasingly tied to elite institutions, collectors, and festivals, despite the prevalence and accessibility of new media tools for artists to employ in their practices.[51]

All museums face specific challenges associated with the display of new media art. However, small and mid-sized museums still face many of the basic, practical challenges that are better addressed in larger institutions. Staffing is one of the most pressing issues. Data and IT specialists are needed to help troubleshoot equipment and assist in maintaining collection databases. Attendants are often required to help explain to visitors how to engage with the artwork and keep an eye on expensive technological components to ensure they are not misused or damaged. Smaller institutions also rely heavily on volunteer labor; these individuals rarely have access to databases and other equipment that require specialized skills or individual login credentials to access secure museum servers. Another challenge is related to physical infrastructure; spaces must have ample access to electricity and plugs to avoid accessibility issues associated with cords spread across gallery floors. Museums must also maintain a strong internet connection, which often requires signal boosting equipment. In addition, many new

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[51] In addition, art historian Beryl Graham insists: "If contemporary art is not documented, then it is very difficult to build a critical history of any media, unless the critics were at the very place an event happened, or present at the moment before the Web site ceased to function." Beryl Graham, "Redefining Digital Art: Disrupting Borders" in *Theorizing Digital Cultural Heritage: A Critical Discourse,* edited by Fiona Cameron (Cambridge, MA: The MIT Press, 2007), 105. Indeed, cultural institutions hold significant power in the legitimization and validation of art practices, and the absence of new media in these spaces ignores a wide range of artistic interventions into today's globalized and technological world.

media artworks require a darkened room for proper display, which necessitates a separate gallery space dedicated solely to screen or projector-based projects. Small and mid-sized museums are often overwhelmed by these challenges. More intentional, targeted resources are needed to support these institutions in their work with new media.

Case Study: CatalogIt

Accessible, affordable, and efficient documentation tools are crucial to encourage comparatively underfunded institutions to engage with new media artists and artworks. The collections management platform and app CatalogIt is a promising resource and case study for this type of support.[52] CatalogIt was founded by Dan Rael and Howard Burrows when Rael was struggling to find a flexible tool for cataloguing and documenting his personal collection of ethnographic art. Museum content management systems such as PastPerfect and Mimsy are available, but these platforms are not user friendly or designed to accommodate eclectic collections. In 2015, Burrows lent his expertise in software engineering to develop an app for documenting Rael's collection. Two years later, the app was made available to other private collectors with similar needs. CatalogIt was soon introduced to museum registrar and consultant Joy Tahan Ruddell, who saw the app's potential to support museums and archives more

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[52] See: "Powerful, Intuitive Museum & Private Collections Management," CatalogIt, Accessed March 14, 2022. https://www.catalogit.app/.

broadly.[53] As of 2022, more than 1,000 museums and 3,000 private collectors in the world utilize CatalogIt as their primary content management system.[54]

CatalogIt is unlike any documentation tool available. First, the system is entirely cloud-based. Most museum content management programs (PastPerfect, Mimsy, etc.) are downloaded onto individual computers; this largely restricts volunteers or staff members working outside the museum's walls.[55] CatalogIt lives in the company's HUB, an online publishing platform that can be accessed on any device. The mobile-friendly design allows users to view, edit, and add records offsite or in crowded collections storage facilities. In addition, it allows volunteers to contribute time and energy to documentation efforts that would otherwise be impossible due to inaccessible computers and login credentials.[56] Second, CatalogIt is highly visual and interactive in design. The developers were inspired by Instagram, determining that "creating an entry should be as easy as making an Instagram post."[57] Users can quickly snap an image from their phone or add an existing image, choose an object classification from CatalogIt's ontologies, and add metadata and other specific information as needed.[58] Once an entry is complete, the app instantly

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[53] Gina Gotsill, "Virtual Art for the Museum-Starved: Oakland-Based App CatalogIt Lets Museums Share Collections," Local News Matters, March 4, 2021, Accessed March 14, 2022. https://localnewsmatters.org/2021/03/04/virtual-art-for-the-museum-starved-oakland-based-app-catalogit-lets-museums-share-collections/?utm_source=LNM_weekly_newsletter&utm_medium=email&utm_campaign=all_content&utm_source=A%26E%2FCulture+LocalNewsMatters.o.

[54] Gotsill, "Virtual Art for the Museum-Starved."

[55] CatalogIt offers a migration service from these collections management software programs to its platform with tech support by the developers.

[56] CatalogIt also includes different levels of access, including owner, admin, read-write, editor, or read-only depending on a staff member's or volunteer's needs for access.

[57] This quote was given in an interview with the developers on February 17, 2022.

[58] The CatalogIt ontologies are authoritative for ease of searching and standardization across institutions that use the platform. Customization is expensive, makes the software more complex, and requires constant upgrades. The platform's ontologies (which are often revisited, added to, and discussed) keeps the application and platform simple and accessible.

creates a QR code for the object record that can be used in gallery spaces or marketing materials for the institution.

CatalogIt is especially useful for small and mid-sized museums with limited access to technological or financial resources. The HUB, for example, is housed and maintained by the company, which removes pressure for smaller museums to hire staff with IT expertise. CatalogIt also offers integration to other web publishing platforms while maintaining museums' individual branding. Institutions can integrate CatalogIt directly to their websites through a WordPress plugin, iframe integration component, or API that makes the collection discoverable and searchable online. At the same time, museums can control what data is made public and prevent unauthorized use of copyrighted material through image watermarks. Basic plans are affordable, yet still allow a significant number of entries, storage space, and users – a service for which the majority of museums could easily budget.[59]

Because the CatalogIt HUB houses information from multiple institutions, it simultaneously serves as a meta-archive and research hub that breaks down boundaries between individual collections. Online visitors can easily navigate and search for objects located across the country, while museum staff can compare data with institutions that hold similar objects. This methodology tackles some of the failures of earlier collections digitization efforts. As Hölling acknowledges: "Computerized and digitized records, although they held great promise, failed to make the archive accessible to outsiders; only rarely is an external researcher allowed to browse the databank of a museum."[60] A renewed sense of connection between scholars,

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[59] As of 2022, plans start at $450 per year, allowing 25,000 entries, 100 gigabytes of storage, and eight users. CatalogIt also offers specific plans for personal collections, non-museum cultural organizations, and conservators. In addition, it offers technical support for migrating from one system to theirs.

[60] Hölling, *Paik's Virtual Archive*, 207, footnote 23.

museums, and objects may help support institutions as they tackle similar challenges related to the documentation, maintenance, and preservation of all objects – especially new media artworks that require a more collaborative approach to ongoing survival.

As discussed previously, new media art presents challenges to the documentation process that are unlike those of other "stable" objects. CatalogIt is not yet fully supportive of technology-based artworks. However, its accessible, affordable, and efficient approach is a promising step in the right direction. Adding features such as timed maintenance alerts, increasing support for multiple file types (including audio, video, or 3D scans), and expanding the list of ontologies to address technological components would greatly benefit new media objects in CatalogIt.[61] Crowdsourcing also holds vast potential for expanding the archive to include the widest range of possible voices. As Jon Ippolito argues, "preservation vigilantes" might hold a key to the ongoing survival of new media: "the future of new media lurks… anywhere that so-called amateurs thrive, because it is only by their paradigm of proliferative preservation that we will keep the rich technological culture of the present alive."[62] Opening access to collections data and developing a crowdsourcing feature to share expertise or anecdotal information about experiencing artworks may prove invaluable for future curators or conservators tasked with reactivating an artwork decades after its creation.

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[61] CatalogIt developers and staff are keenly interested in these directions. As of 2022, the developers are working on creating better ontologies for installation art and mixed media, with plans to address born-digital art in the coming months and years. They are also actively exploring the prospect of adding crowdsourcing capabilities to the platform.

[62] Jon Ippolito, "Trusting Amateurs with Our Future" in *A Companion to Digital Art,* edited by Christiane Paul (Malden, MA: Wiley-Blackwell, 2016), 539.

Documentation in the Wake of COVID-19

When the COVID-19 virus spread to pandemic levels in early 2020, museums and cultural institutions were among the first to shutter their doors for the health and safety of staff and visitors. The public health emergency revealed the crucial role digital collections and documentation play in fulfilling museums' missions. Museums were forced to reevaluate their online presence – were collections digitized and available? Could the community connect with the museum virtually? What public programs had potential to both inform the public and alleviate the stress and anxiety of the current moment? Museums of all size were determining how to digitally deliver content and provide virtual access to their collections for staff, researchers, and the public who could no longer access the physical buildings.

Documentation was at the heart of these concerns. For many museums, the goal shifted to provide as many records as possible online. In 2021, for example, the Louvre released 482,000 digitized works and the Art Institute of Chicago announced the museum's first open-data API, a web tool featuring "metadata on over 100,000 artworks from the museum's collection, including works' relationships to resources like artist biographies, keywords, and exhibitions."[63] Small and mid-sized museums faced more challenges, as many had not yet begun digitization efforts. In fact, the American Alliance of Museums (AAM) estimated in November 2020 that one third of institutions in the United States would never physically reopen.[64] Time will tell the accuracy of

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[63] Nikhil Trivedi, "Public Access to Our Public Presence: Sharing our API," The Art Institute of Chicago, January 26, 2021. Accessed April 16, 2021. https://www.artic.edu/articles/902/public-access-to-our-public-presence-sharing-our-api#content-h1; Valentina di Liscia, "The Louvre Digitizes 482,000 Artworks from the Depths of Its Collection," Hyperallergic, April 8, 2021. Accessed March 14, 2022. https://hyperallergic.com/636318/the-louvre-digitizes-nearly-half-a-million-artworks/?utm_campaign=week-in-review&utm_content=20210416&utm_medium=email&utm_source=newsletter.

[64] American Alliance of Museums, "National Snapshot of COVID-19 Impact on United States Museums," American Alliance of Museums, October 2020. Accessed March 14, 2022. https://www.aam-us.org/2020/11/17/national-snapshot-of-covid-19/.

such predictions; in the meantime, museums must adapt and take advantage of all available resources to deliver their collections virtually. Though restrictions are largely lifted in 2022, the impacts of closures are wide-ranging and will continue to underscore museums' approach to digital initiatives.

Documentation tools are also evolving. Recent developments in blockchain technology, for example, have the potential to revolutionize documentation for born-digital artworks. The proliferation of non-fungible tokens (NFTs), which Alfred Weidinger defines as "the artist's digital signature," indicates a new type of documentation tool. To Weidinger, NFTs bind the artist's work "to a secure trading platform and stands for [their] copyright as well as the right of ownership of the collector."[65] Using well-established blockchain technology from the financial sector, NFTs allow digital artists to attach their intellectual property to a more tangible source. By extension, collectors – whether individuals, galleries, or museums – are able to trace the provenance of digital objects and increase the range of records that can be included in an artwork's archive. On the other hand, NFTs present serious challenges related to the extraction of resources and climate change, digital ownership of public domain artworks, and the encouragement of neoliberal capitalist art markets.[66] The incorporation of this technology into the contemporary art world will continue to be monitored closely as it evolves.

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[65] Von Alfred Weidinger, "Forward," in *Proof of Art: A Short History of NFTs, From the Beginning of Digital Art to the Metaverse* (Berlin: Distanz, 2021), 7.

[66] For example, the NFT collective Global Art Museum made NFTs of public domain artworks in March 2021 as a "social experiment," drawing wide criticism from the international museum community. See: Sarah Cascone, "A Collective Made NFTs of Masterpieces Without Telling the Museums That Owned the Originals. Was It a Digital Art Heist or Fair Game?" Artnet News, March 22, 2021. Accessed March 14, 2022. https://news.artnet.com/art-world/global-art-museum-nfts-1953404. For more on NFTs' impact on the environment, see: Hiroko Tabuchi, "NFTs Are Shaking up the Art World. They May Be Warming the Planet, Too," The New York Times, April 13, 2021. Accessed March 14, 2022. https://www.nytimes.com/2021/04/13/climate/nft-climate-change.html.

In this landscape, it is more important than ever to support small and mid-sized museums in their efforts not only to digitize physical collections but also to engage with new media artists that are interrogating this unique moment in time. Targeted support for the specific challenges comparatively underfunded institutions face is crucial. This chapter is thus accompanied by an appendix of open-source, free, or low-cost programs and initiatives available as of 2022 that offer a place to begin. The resources range in scope, from tools that assist in the documentation process to data-sharing networks and virtual exhibition platforms. With this consolidated and annotated list, it is my hope that small and mid-sized museums might feel more comfortable diving into the possibilities. As emerging technologies become ever more present in museums' administration, programs, exhibitions, collections, and archives, such access to efficient and affordable resources will prove invaluable.

CONCLUSION
THE PRESERVATION OF INTERACTIVE DIGITAL ART

Interactivity presents serious complications to the long-term survival of digital artworks. This characteristic is immaterial; it cannot be discerned from an evaluation of an artwork's software or hardware alone. In addition, interactivity can be integral to understanding what a digital artwork is, what it does, and how participants are intended to engage. In the introduction to this dissertation, I proposed a three-part typology of interactive experience (individual, collective, and distributed) to provide a framework for understanding digital artworks that actively connect humans and machines. Subsequent chapters present case studies that not only exemplify each type, but also take advantage of the types' capabilities to advance a project's themes and goals. This is an important contribution to new media art history broadly, as interactivity is often woefully overlooked in scholarship on artworks that feature this element.

However, an overarching goal of this endeavor is to provide language and structure that might aid in the long-term preservation of twenty-first century artworks that are rapidly approaching obsoletion. With greater understanding of how interactivity manifests in various digital artworks, museums, galleries, and other institutions may be encouraged to incorporate these complex artworks into their programs of display, loan, and permanent acquisition. By way of conclusion, I therefore return to each case study discussed here and highlight ongoing efforts to ensure their documentation and survival. These case studies provide a wide range of models – from institutional collaboration to independent crowdsourcing – that open the door for new and creative approaches to engage with artworks that will continue to play a vital role in the history of art.

Case Study I: *The Chalkroom*

Laurie Anderson and Hsin-Chien Huang's VR artwork *The Chalkroom* (2017) was a leap

into the world of virtual reality technologies in the early stages of VR's 2010s resurgence. Rapid

changes in interactive technologies made Anderson wary to work with the HTC Vive system.

According to the artist:

> I didn't want to work with [VR] because the things that we had done in the world of CD-ROMs had disappeared and weren't playable on any system 15 years later. It's something you work on for a long time and it's like your book being shredded, all traces of the pictures, the stories, the sounds, the music, the interactivity, were gone, reduced to a bunch of lines pointing in different directions with no instructions on how they related. It was very hard for me to work on something that had no future whatsoever.[1]

Anderson is keenly aware of the temporary lifespan of her VR projects. However, like many

other avant-garde artists working to disconnect their art from the deeply capitalist dynamics of

the art market, Anderson also recognizes a value in VR's ephemerality. In an interview with

Ashleigh Kane, Anderson said, "You're working in an art form which is transitory… it's less

able to be collected, less able to be displayed."[2] For some artists, the impermanent aspect of

emerging technologies is an advantage; it allows them to explore themes and practices in a more

experimental setting while pushing back against the hegemonic power of the art world system.[3]

Anderson sits somewhere in the middle of this debate, with both a healthy trepidation of losing

record of her work and a desire to take advantage of the technology's capability to realize her

artistic vision.

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[1] See Ashleigh Kane, "Laurie Anderson Wants to Break Your Heart with Her Latest VR Artwork," Dazed, April 24, 2019. https://www.dazeddigital.com/art-photography/article/44165/1/laurie-anderson-hsin-chien-huang-virtual-reality-vr-to-the-moon-vive-artwork.

[2] Kane, "Laurie Anderson Wants to Break Your Heart."

[3] This is true of many new media artists who value the fact that digital objects do not have a singular "original," a characteristic that is challenged by the recent development of NFTs. It also connects to the goals of avant-garde movements such as Dada and Fluxus that engage with performance art, ephemeral materials, or site-specific installations for a similar reason.

Encouragingly, targeted efforts to preserve virtual reality artworks have accompanied the

reemergence of VR technology. In 2019, Myrto Aristidou and Theopisti Stylianou-Lambert

convened the MuseumArtTech project to investigate how virtual and augmented reality artworks

are being preserved in collecting institutions.[4] The scholars found that ongoing maintenance with

a clear plan of action was key – from the artist's active involvement in updating and migrating

software to the development of a questionnaire with guidelines for future preservation. Tamiko

Thiel (b. 1957) and Zara Houshmand's (b. 1953) VR artwork *Beyond Manzanar* (2000), for

example, became one of the first VR objects to be collected in a museum when it entered the San

José Museum of Art's new media collection in 2002.[5] Twenty years later, the artists continue to

work with the museum in ensuring that the interactive capabilities of the artwork are maintained

for future display. Thiel additionally collaborated with the Whitney Museum of American Art to

accession her AR artwork *Unexpected Growth* (2018) in a yearlong process to develop a "digital

art questionnaire" about the artwork and its future survival when she can no longer play a part in

its maintenance.[6] These efforts are underpinned by recent research on standards for the

preservation of 3D data, realized in the 2022 edited volume *3D Data Creation to Curation:*

Community Standards for 3D Data Preservation.[7] Indeed, reinvigorated conversations around

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[4] This information was presented in a panel entitled "From the Artist's Perspective: On the Longevity of VR/AR Artworks" at the Art, Museums & Digital Cultures International Conference on April 22, 2021.

[5] For more information on this artwork, see: San José Museum of Art, "Beyond Manzanar," Browse the Collection (San José Museum of Art), accessed September 6, 2022, https://sjmusart.org/embark/objects-1/info/1400.

[6] For more information on this artwork, see: Whitney Museum of American Art, "Tamiko Thiel: Unexpected Growth," Collection (Whitney Museum of American Art), accessed September 6, 2022, https://whitney.org/collection/works/60645.

[7] See: Jennifer Moore, Adam Rountrey, and Hannah Scates Kettler, eds., *3D Data Creation to Curation: Community Standards for 3D Data Preservation* (Chicago: Association of College and Research Libraries, 2022).

the preservation of VR and its data may prove to extend the projected lifespan of VR artworks entering museum collections today.

The Chalkroom navigates these practical challenges for VR artworks and offers a model between temporary display and full acquisition. The artwork is on long-term loan at the Massachusetts Museum of Contemporary Art as part of Anderson's broader studio engagement and residency at the museum. This fifteen-year partnership offers space for Anderson to experiment and display new works while also housing her extensive archive.[8] *The Chalkroom* can therefore be on view for an extended period, which provides more opportunities for both documentation of the artwork and scholarship on its contents. These elements could prove invaluable in a future preservation project (if initiated). Though the artwork will likely be phased out of semi-permanent display in the coming years, MASS MoCA's model illustrates the benefits of a long-term loan system for interactive digital artworks. Long-term loans release pressure on the museum for preserving the artwork forever; and yet, there is time and opportunity to produce a complete record of the artwork, its themes, and its interactive capabilities. This is one of many potential actions that could encourage museums to expand their work with new media artists overall.

Case Study II: *teamLab: Continuity*

teamLab: Continuity and other immersive installations by the ultratechnologist group present a complex challenge to long-term preservation. teamLab's mixed reality environments are often designed to be site-specific and exhibitions outside of the group's permanent space in Tokyo are temporary. In addition, the algorithm, graphic, and software design is co-produced in

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[8] This archive is in desperate need of attention and digitization, a project that came to my attention through Denise Markonish, Senior Curator and Managing Director of Exhibitions at MASS MoCA.

numerous layers that span teamLab's massive collaborative structure. Despite these challenges, the collective is interested in the longevity of their work. *Continuity* and other international exhibitions feature iterations or new versions of existing artworks, which allows teamLab opportunity to revisit installations and ensure their stability. The artists are also working to preserve their own data. In an interview for the *Continuity* exhibition catalogue, co-founder INOKO Toshiyuki said that "preserving and maintaining the previous versions are important for us. We have been working to create a system to archive the work. I hope that in a hundred years, two hundred years, people will still be able to see our works."[9] In fact, one of teamLab's five-channel digital artworks, *100 Years Sea* (2009), was produced with the intent that it will run for 100 years to digitally animate and compare ocean levels in real time.[10] Long-term preservation is thus a persistent question that the collective must address internally.

However, teamLab's spectacular spaces are also heavily documented by participants. The collective sits squarely in the trend that Laura Lee terms "hashtag art," or "contemporary exhibitions that are designed to be visually spectacular and thus lend themselves to picture taking and social media posting (Fig. 45)."[11] According to Lee: "The vast sea of selfies that have emerged from these venues index the collective's soaring global popularity."[12] Indeed, social media plays a large role in marketing and advertising the teamLab experience. More importantly for preservation, social media archives participants' experience of the installations; multi-perspective, crowdsourced imagery captures the artworks in a way that could not be achieved in

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[9] Karin Oen, Clare Jacobson, and Yuki Morishima, *teamLab: Continuity* (San Francisco: Asian Art Museum, 2020), 21.

[10] For more on this artwork, see Laura Lee, *Worlds Unbound: The Art of teamLab* (Bristol: Intellect, 2022), 136.

[11] Lee, *Worlds Unbound*, 17.

[12] Lee, *Worlds Unbound*, 2.

singular photoshoots. The compilation of these images and videos via geolocation tags provide a continuous archival record of teamLab's international projects. This is an intrinsic feature of platforms like Instagram. A 2016 study by Pavica Sheldon and Katherine Bryant specifically includes the category of "documentation" as a motivation for use that is unique to this platform. To Sheldon and Bryant, Instagram is set apart from other social media forums because of its focus on images. When people are motivated to document moments in their lives, they are more likely to post a picture on Instagram accompanied with a caption, a practice that allows Instagram to act "as a kind of virtual photo album for many people."[13] teamLab's preservation process can take advantage of this expansive commentary and audiovisual record of their installations that is readily available on the internet.[14]

A cursory search of the Asian Art Museum of San Francisco's "tagged" posts reveal a range of perspectives, with hundreds of posts documenting the various seasons, rooms, and motifs of *teamLab: Continuity*. Posts are accompanied by captions that review the exhibition and encourage followers to attend, reflect on the experience with poetry, or even announce an engagement (Figs. 46, 47, 48). Not only do these posts record the installations and how they were experienced, but they also provide valuable insight into participants' interpretation of their collective experience. This is a valuable documentation strategy for both teamLab and the few institutions who have attempted to fully accession their interactive artworks into permanent

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[13] Pavica Sheldon and Katherine Bryant, "Instagram: Motives for Its Use and Relationship to Narcissism and Contextual Age" in *Computers in Human Behavior* 58 (2016): 94.

[14] Other scholars advocate for the incorporation of social media as a documentation tool for artworks. See: Joanna Bucknall and Kristy Sedgman, "Documenting Audience Experience: Social Media as Lively Stratification" in *Documenting Performance: The Context and Processes of Digital Curation and Archiving,* edited by Toni Sant (London; New York: Bloomsbury Methuen Drama, 2017), 113–130 and Patrizia Toscano, "Instagram-City: New Media, and the Social Perception of Public Spaces," in *Visual Anthropology* 30 (2017): 275–86.

collections.[15] A model based on crowdsourcing documentation via social media thus offers

another option for expanding engagement with interactive digital art that includes a plan for

developing future records.

Case Study III: *Excellences & Perfections*

Amalia Ulman's *Excellences & Perfections* is similarly tied to the archival functions of

social media. As a performance conducted on Instagram, the platform automatically collected

and organized each post in Ulman's profile by date and time, which documented the project in a

clear chronology for those returning to the performance after its conclusion. Instagram acts as a

platform by which the artwork can archive itself, a process Wolfgang Ernst understands as a

"microarchive" in which "data processing takes place in real time in the minutest space, so ultra-

short-term fast memory comes into play."[16] Beyond maintaining her public profile on Instagram,

Ulman was not required to take specific action to ensure that the performance remained available

on her account. Her profile itself was capable of simultaneously serving as the performance, its

documentation, and its archive.

Nevertheless, *Excellences & Perfections* was also linked to an institutional archival

process. Rhizome, a site for born-digital art exhibitions, preservation, and software development

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[15] The only museum that has accessioned one of teamLab's interactive digital installations is the National Gallery of Victoria in Melbourne. See: National Gallery of Victoria, "Moving Creates Vortices and Vortices Create Movement," Works (NGV), accessed September 7, 2022, https://www.ngv.vic.gov.au/explore/collection/work/131626/. The Art Gallery of New South Wales has accessioned a more limited interactive program, see: Art Gallery of New South Wales, "Flowers and People - Gold, 2015 by teamLab," Collection (Art Gallery of NSW), accessed September 8, 2022, https://www.artgallery.nsw.gov.au/collection/works/406.2015/. Other institutions including The Asian Art Museum of San Francisco, the Asia Society Museum in New York, and the Borusan Contemporary Art Collection in Istanbul have accessioned digital animations and artworks that operate on a continuous loop rather than fully interactive installations.

[16] Wolfgang Ernst, *Digital Memory and the Archive*, Electronic Mediations, Volume 39 (Minneapolis; London: University of Minnesota Press, 2013), 87.

associated with the New Museum, archived the performance on their own website in October 2014.[17] This was the pioneering project for Colloq, Rhizome's in-house social media archiving tool.[18] Colloq was revolutionary in 2014; it was intended to "help artists preserve social media projects not only by archiving them, but by replicating the exact look and layout of the sites used, and the interactions with users."[19] Until Colloq, web-based preservation relied on static, "screenshot" images due to threats of "URL rot," file incompatibility, and software updates that drastically alter the site's appearance over time.[20] With Colloq, Rhizome was not only able to capture Ulman's links, posts, and comments, but also the interactivity of the site. Visitors to the archive can navigate Ulman's profile as it existed on October 10, 2014 (Fig. 49). This experience is fundamentally different than scrolling through Ulman's profile in 2022 (Fig. 50), as updates to software, design, and layout leave Instagram in a constant state of flux.

In early 2021, Ulman decided to remove *Excellences & Perfections* from her Instagram account. The performance was relegated to the artist's "stories highlights" in the form of a link that could be accessed by "swiping up." The link takes users to Rhizome's website and the Colloq documentation. Though the performance can still be accessed, users can only click through comments, tags, and hashtags as they existed in 2014. The continuous interaction that occurred between 2014 and 2021, following the conclusion of the performance, is lost. For this reason, social media is a particularly unstable medium for the ongoing longevity of performance

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[17] Rhizome, "About" (Rhizome), accessed September 8, 2022, https://rhizome.org/about/.

[18] Michael Connor, "First Look: Amalia Ulman-Excellences & Perfections" (Rhizome, October 20, 2014), https://rhizome.org/editorial/2014/oct/20/first-look-amalia-ulmanexcellences-perfections/. Colloq was folded into the larger Webrecorder Software Project in 2015, which was re-developed and renamed as Conifer in 2020. For more on Conifer, see Appendix B in this dissertation.

[19] Aisling Quigley, "Colloq at Rhizome: Preserving Social Media" (HASTAC, October 23, 2014), https://www.hastac.org/blogs/aoq1/2014/10/23/colloq-rhizome-preserving-social-media.

[20] Quigley, "Colloq at Rhizome."

art online. Changes in software, user trends, and methods of interacting with the platform fundamentally impact the ways in which the performance appears on Instagram. *Excellences & Perfections,* therefore, is no longer an active artwork. Users can only peruse documentation of the performance (albeit with interactive elements included). In some ways, it resembles how Wendy Hui Kyong Chun describes the Internet Wayback Machine: "not quite dead, but not quite alive either."[21] Regardless, the performance's lifespan continues to be a paradigmatic example of interaction with digital art online.

The *Excellences & Perfections* case study offers a third model for the long-term preservation of interactive digital artworks. Institutional partnerships and collaborations with organizations with the capacity and expertise to address the future of such artworks could prove to be invaluable. As Christiane Paul asserts:

> While collecting institutions need to make more of an investment into digital art as an important artistic practice, they also may not be the ideal places for creating the highly technically-involved infrastructures for all types of digital preservation. Additional archives and resources maintained by educational institutions and non- or for-profit organizations are a necessary supplement to museum collections, and the preservation and archiving efforts by Rhizome or the Archive of Digital Art are crucial in enabling digital art and its history to survive.[22]

Any method for increasing representation of new media art in the cultural sector is vital for the survival of these important artworks. A broader collaboration between institutions interested in displaying and loaning interactive digital art and those best poised to ensure long-term survival is paramount.

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[21] Wendy Hui Kyong Chun, "The Enduring Ephemeral, or the Future Is a Memory" in *Critical Inquiry* 35, no. 1 (2008):169.

[22] Christiane Paul, "From Archives to Collections: Digital Art In/Out of Institutions" in *Museum and Archive on the Move,* edited by Oliver Grau (Berlin: Walter De Gruyter, 2017), 196.

<u>Records of the Present (Reprise)</u>

This dissertation follows in the footsteps of Lev Manovich, who worked to provide "a record and theory of the present" in his 2001 book *The Language of New Media.*[23] The rapid advancement of digital technologies since the turn of the century has left scholarship reeling; artworks that made significant contributions to the state of today's new media art are often lost in the shuffle. With a wide range of practices available today – including virtual and augmented reality, artificial intelligence and machine learning, interactive programming, blockchain technology, digital design, social media, video, and more – artists will continue to explore important themes that document this moment in time. As such, my attention to specific case studies in this dissertation attempts to ensure their longevity in the growing canon of new media art. Though the artworks may not be available in their current form forever, I hope that expanded discussion of their interactive capabilities will serve as a record and theory of this present.

This project also reveals that immaterial characteristics such as interactivity are easily overlooked in the panic of preserving physical components of new media artworks. The brief case study of WeChat discussed in the preface demonstrates the need for new language to understand interactive experience with digital objects if they are to be preserved for future audiences to learn from and enjoy. As V&A curators Brendan Cormier and Luisa Mengoni asked: "When we talk about WeChat one hundred years from now, how will we be able to show people what it is?"[24] The same is true for any interactive digital artwork in a museum today. One hundred years from now, will we be able to experience today's artworks as they were intended? Will scholastic or audiovisual documentation survive?

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[23] Lev Manovich, *The Language of New Media* (Cambridge, MA: The MIT Press, 2001), 7.

[24] Cormier, "How We Collected WeChat."

As Chun argues, memory – particularly computer memory – is an active process of commemoration that must be maintained to ensure it does not fade.[25] Research, documentation, archiving, and scholarship must therefore continue in a living process that ensures the survival of interactive digital art in the twenty-first century. Chun recognizes: "What is surprising is not that digital media fades but rather that it stays at all and that we stay transfixed by our screens as its ephemerality endures."[26] The present will continue to unfold; it is the combined efforts of artists, museums, archivists, and scholars that will ensure that these precarious artworks endure in collective memory of new media art history.

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[25] Chun, "The Enduring Ephemeral," 164-165.

[26] Chun, "The Enduring Ephemeral," 171.

Figure 1: V&A Display of *WeChat*, 2017, Gallery 76 Shenzhen
Photograph: ©Victoria and Albert Museum
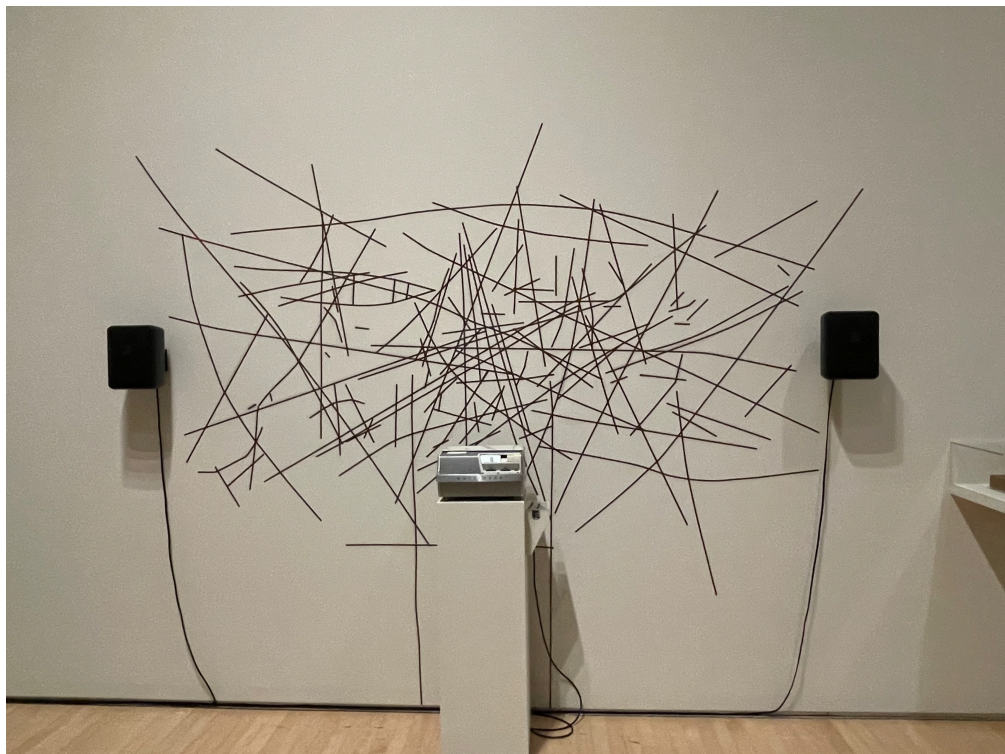
Figure 2: Paik Nam June, *Random Access,* 1963, reconstructed 2000 by the Solomon R. Guggenheim Museum and San Francisco Museum of Modern Art; Photograph: Emily Lawhead, 2021

Figure 3: Ben Neal, Edie Jo Murray, and Harmeet Chagger-Khan, *Mood Pinball,* 2019*,* Open Data Institute, London; Photograph: Emily Lawhead, 2020

Figure 4: BREAKFAST, *Flip Disc (Particles 45),* 2018*,* WNDR Museum, Chicago Photograph: Emily Lawhead, 2021
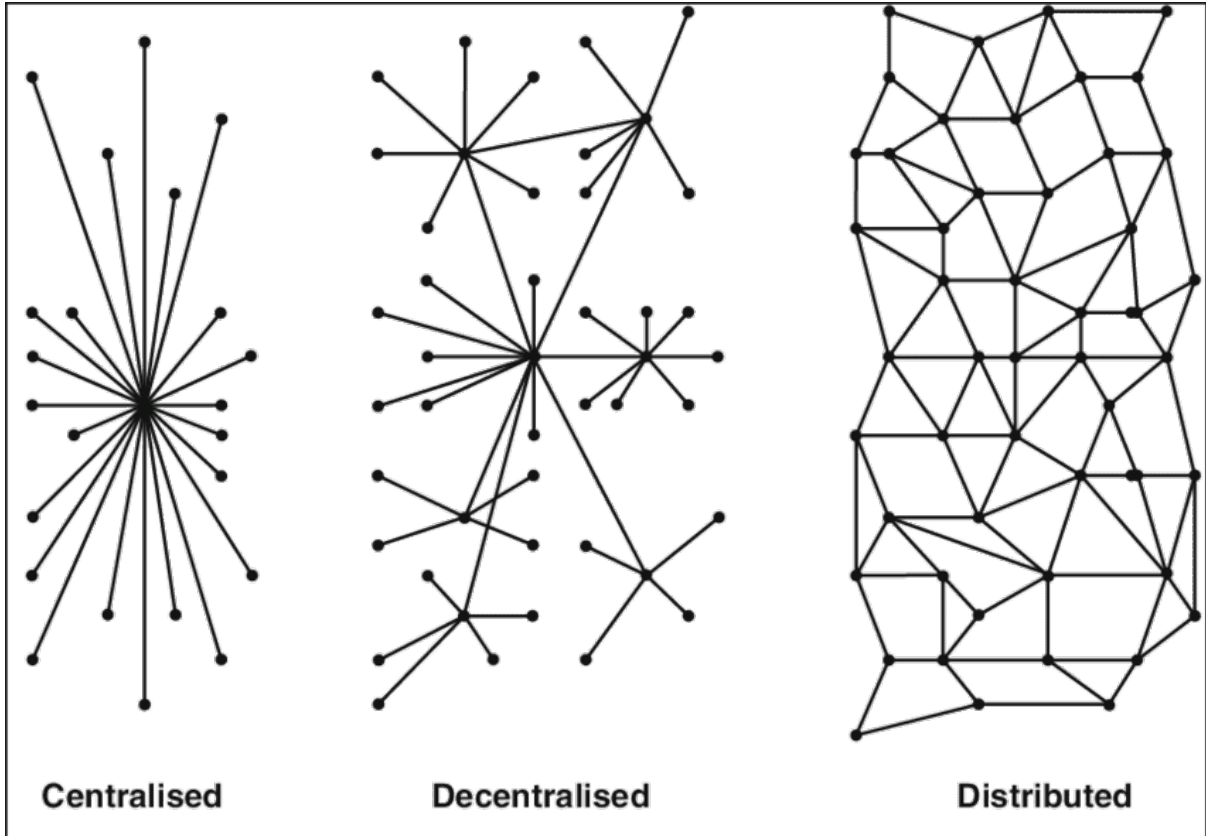
Figure 5: Baran's Network Diagrams in Paul Baran, *On Distributed Communications* (Santa Monica: RAND, 1964), 2.
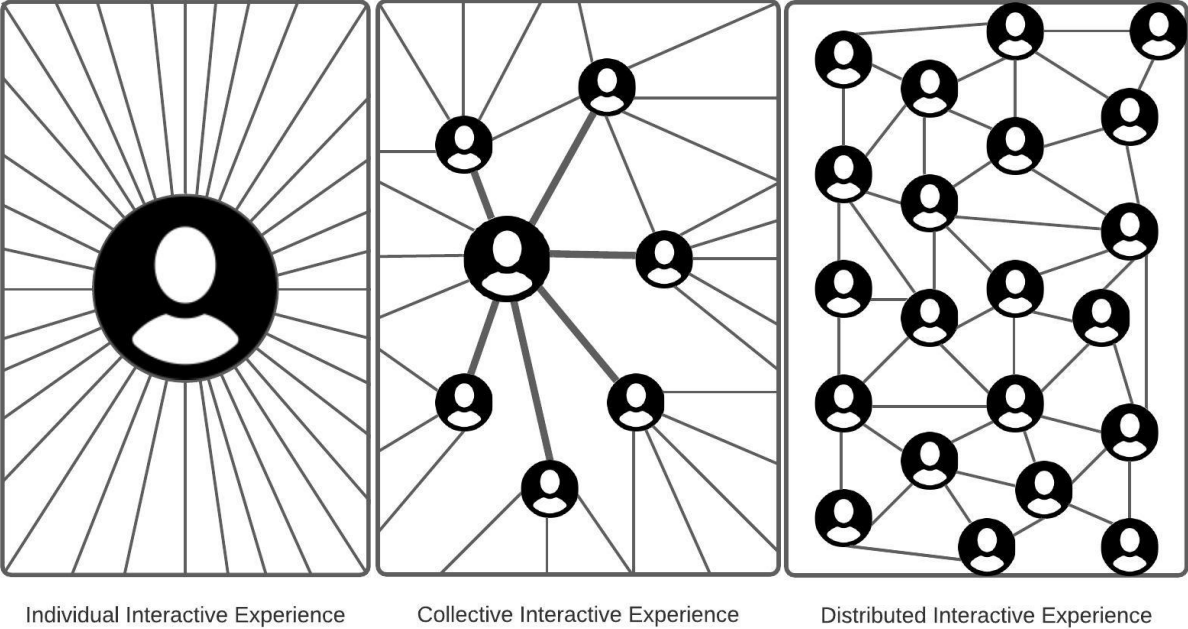
Figure 6: Interactive Experience Network Diagrams, Emily Lawhead 2021

Figure 7: Laurie Anderson and Hsin-Chien Huang, *The Chalkroom* (headset), 2017, Massachusetts Museum of Contemporary Art; Photograph: Emily Lawhead, 2022
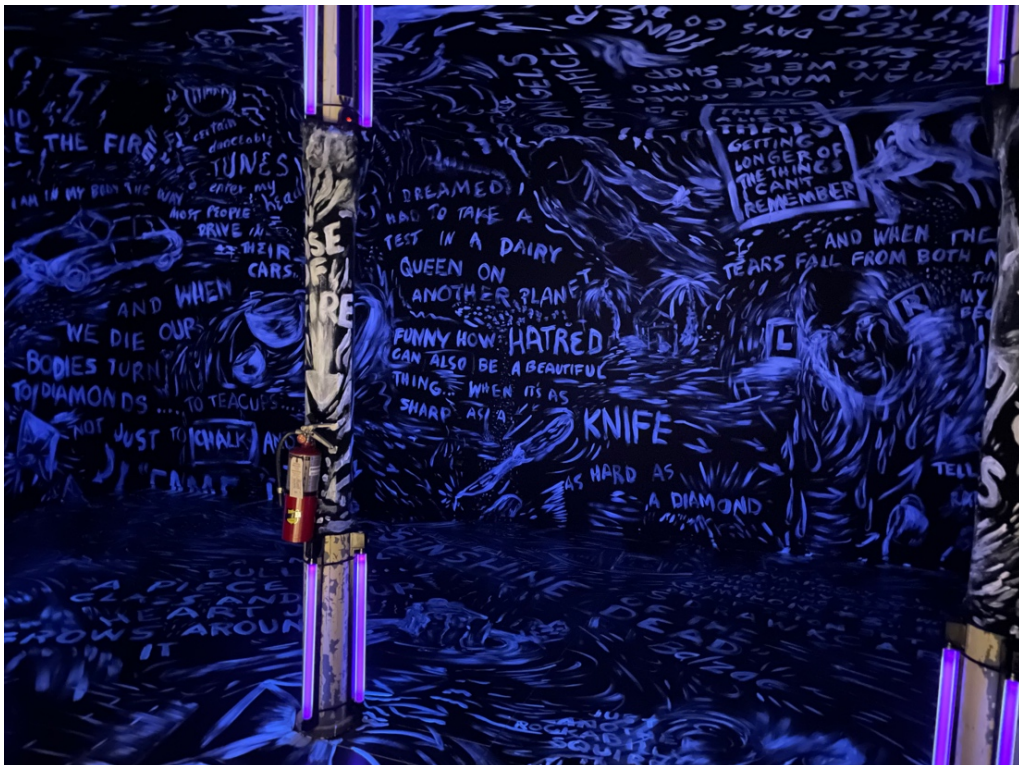
Figure 8: Laurie Anderson, *The Chalkroom* (installation detail), 2017, Massachusetts Museum of Contemporary Art; Photograph: Emily Lawhead, 2022
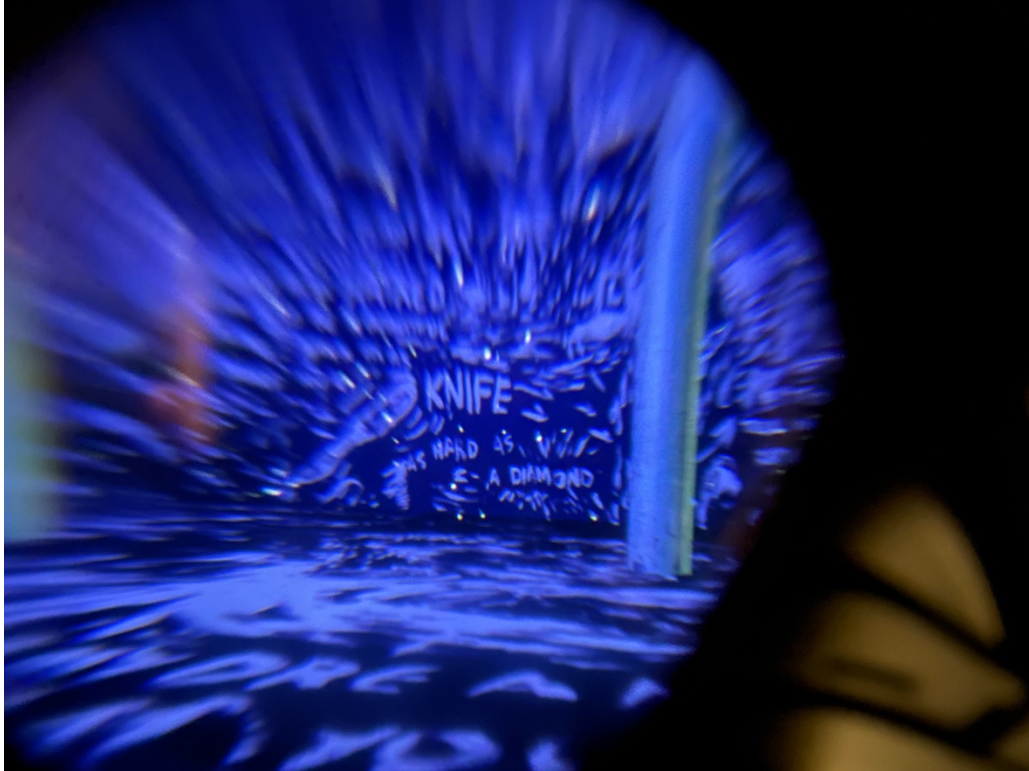
Figure 9: Laurie Anderson and Hsin-Chien Huang, *The Chalkroom* (VR view), 2017, Massachusetts Museum of Contemporary Art; Photograph: Emily Lawhead, 2022

Figure 10: Laurie Anderson and Hsin-Chien Huang, *The Chalkroom* (installation space), 2017, Massachusetts Museum of Contemporary Art; Photograph: Emily Lawhead, 2022

Figure 11: Laurie Anderson and Hsin-Chien Huang, *The Chalkroom* (seat), 2017, Massachusetts
Museum of Contemporary Art; Photograph: Emily Lawhead, 2022
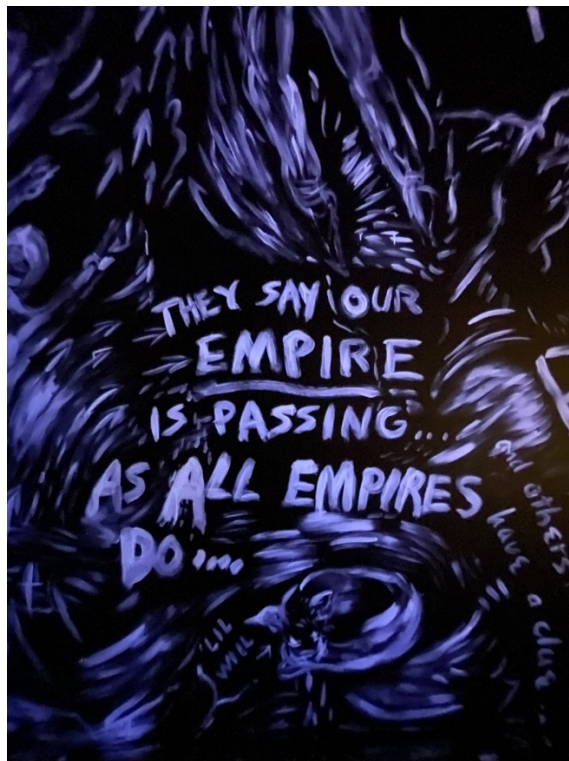
Figure 12: Laurie Anderson, *The Chalkroom* ("empire is passing"), 2017, Massachusetts
Museum of Contemporary Art; Photograph: Emily Lawhead, 2022
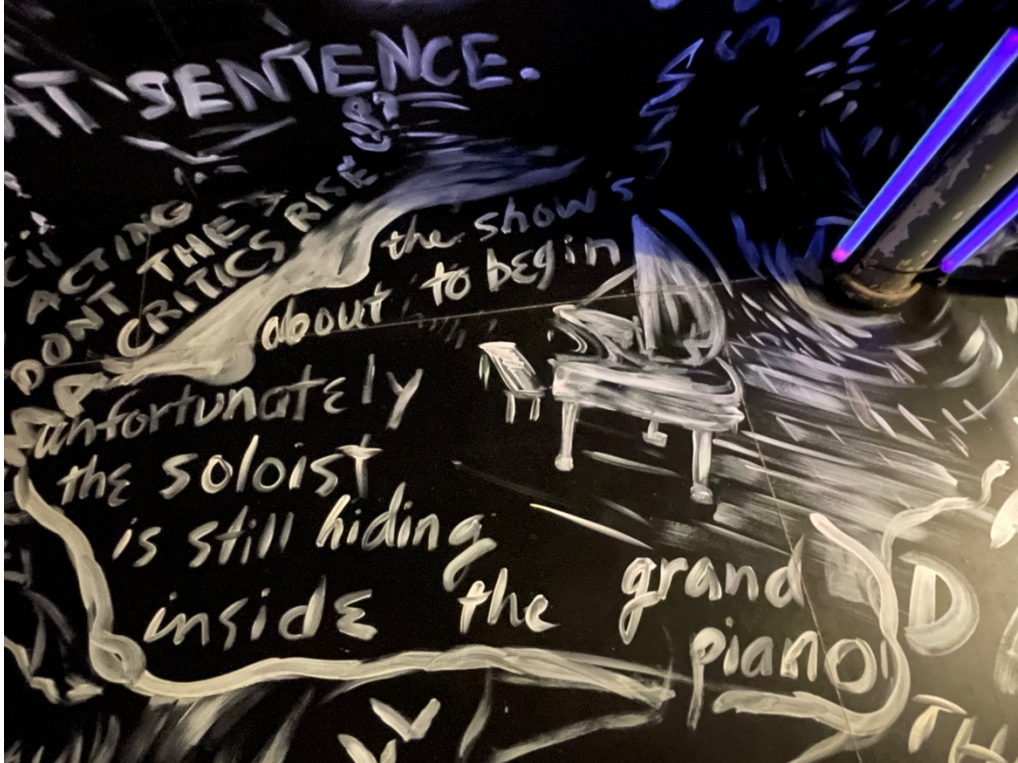
Figure 13: Laurie Anderson, *The Chalkroom* ("soloist in the grand piano") 2017, Massachusetts Museum of Contemporary Art; Photograph: Emily Lawhead, 2022

Figure 14: Participants experiencing Laurie Anderson and Hsin-Chien Huang, *The Chalkroom*, 2017, Massachusetts Museum of Contemporary Art; Photograph: Canal Street Communications/Laurie Anderson Studio

Figure 15: *teamLab: Continuity* entrance, 2021-2022, Asian Art Museum of San Francisco;
Photograph: Emily Lawhead, 2022
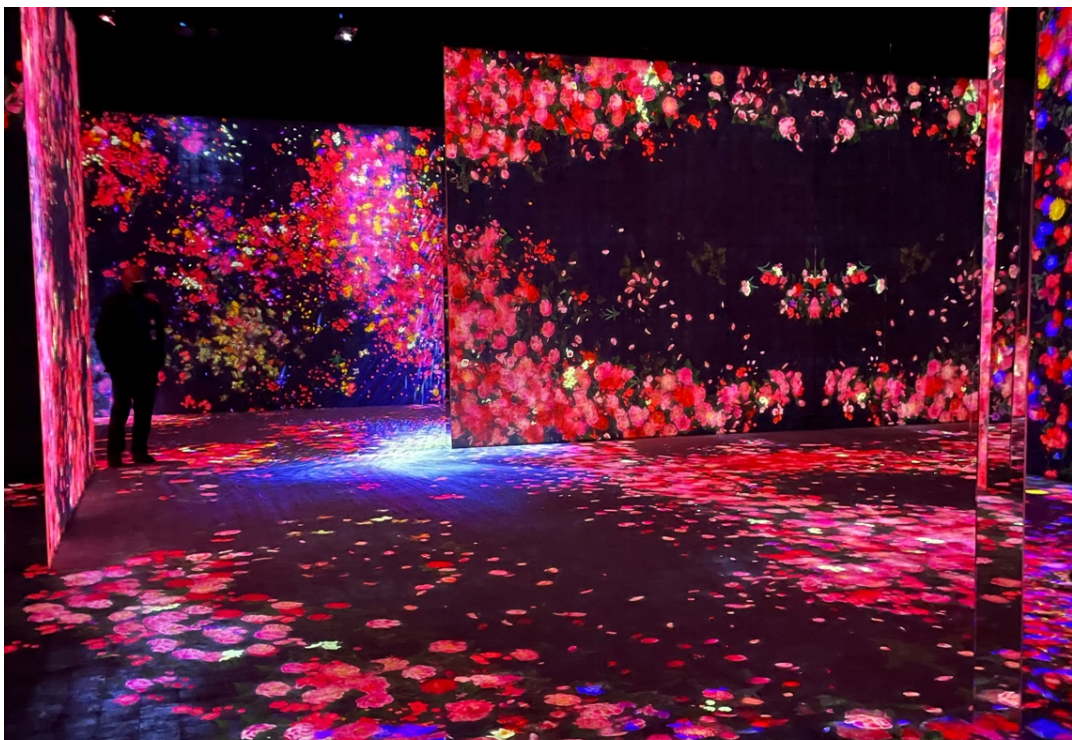
Figure 16: teamLab, *Forest of Flowers and People: Lost, Immersed and Reborn*, 2017/2021,
Asian Art Museum of San Francisco; Photograph: Emily Lawhead, 2022

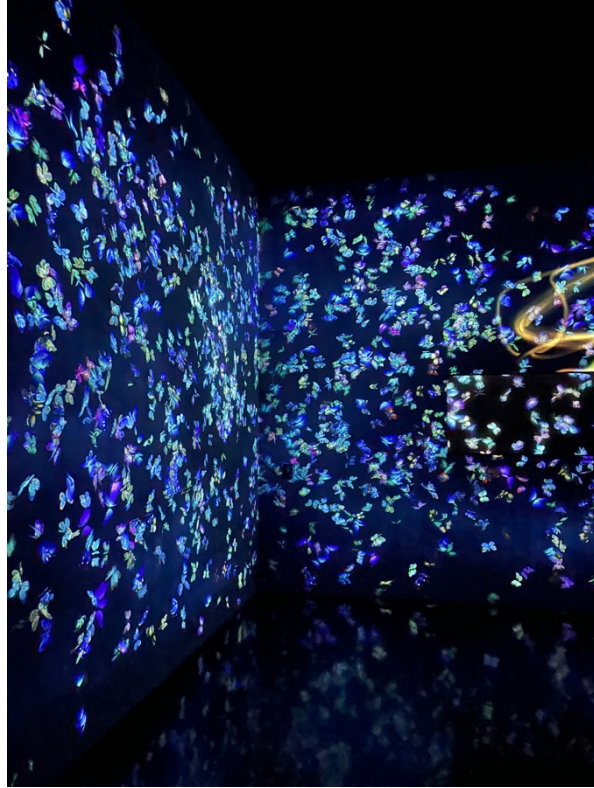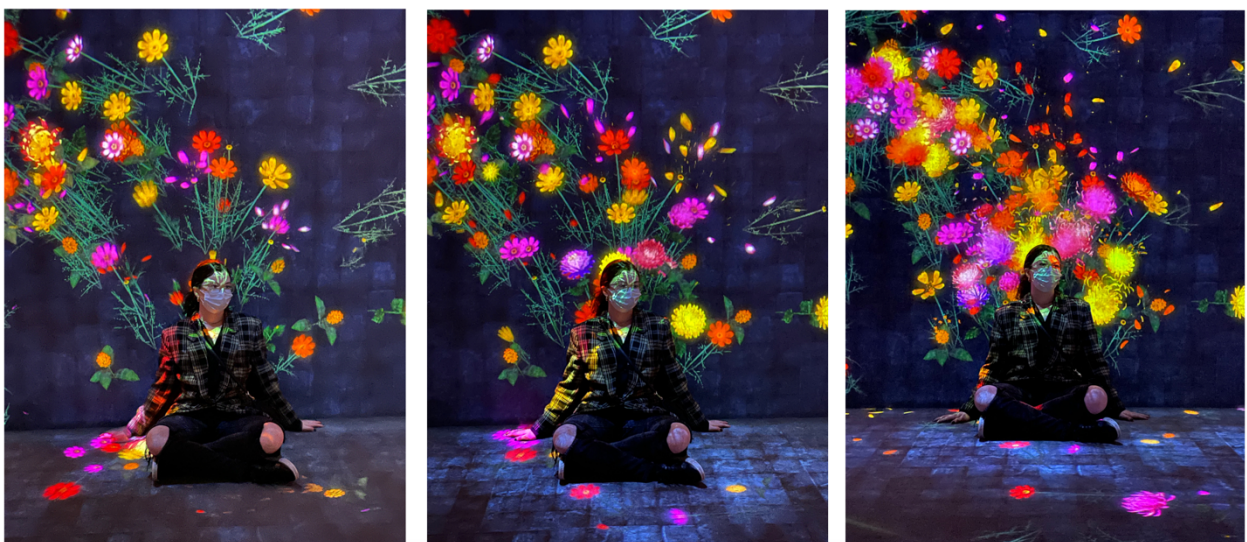Figure 17: teamLab, *Forest of Flowers and People: Lost, Immersed and Reborn,* 2017/2021 and *Flutter of Butterflies Beyond Borders, Transcending Space,* 2019/2021, Asian Art Museum of San Francisco; Photograph: Emily Lawhead, 2022
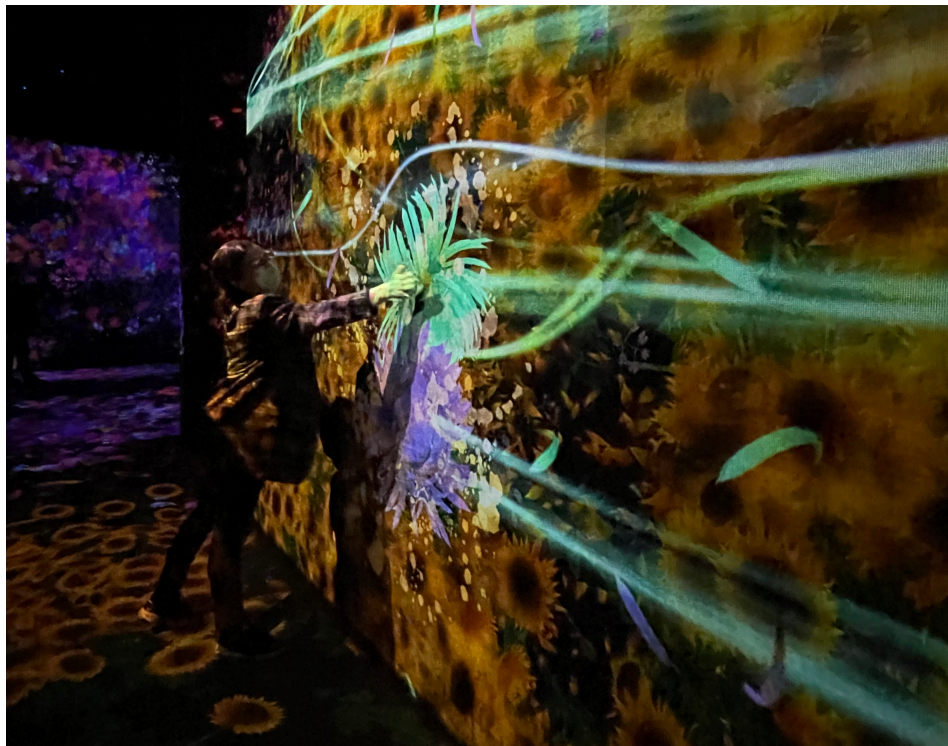
Figure 18: teamLab, *Forest of Flowers and People: Lost, Immersed and Reborn,* 2017/2021 and *Crows are Chased and the Chasing Crows are Destined to be Chased as well, Flying Beyond Borders,* 2018/2021, Asian Art Museum of San Francisco; Photograph: Emily Lawhead, 2022
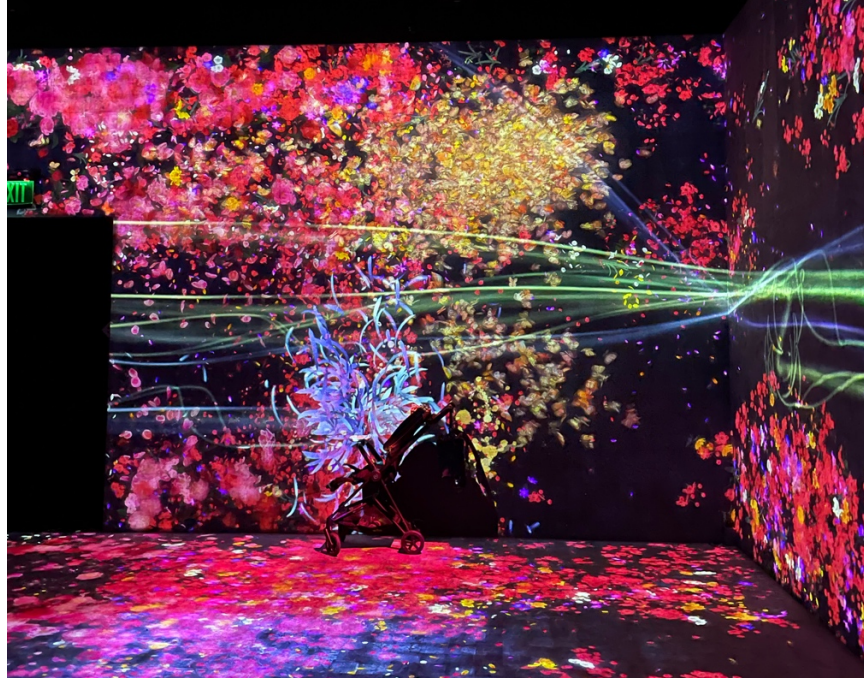
Figure 19: teamLab, *Forest of Flowers and People: Lost, Immersed and Reborn*, 2017/2021, *Flutter of Butterflies Beyond Borders, Transcending Space,* 2019/2021, and *Crows are Chased and the Chasing Crows are Destined to be Chased as well, Flying Beyond Borders,* 2018/2021, Asian Art Museum of San Francisco; Photograph: Emily Lawhead, 2022

Figure 20: teamLab, *Forest of Flowers and People: Lost, Immersed and Reborn*, 2017/2021 and *The Way of the Sea, Flying Beyond Borders–Colors of Life,* 2018/2021, Asian Art Museum of San Francisco; Photograph: Emily Lawhead, 2022

Figure 21: teamLab, *Forest of Flowers and People: Lost, Immersed and Reborn* (Autumn), 2017/2021, Asian Art Museum of San Francisco; Photograph: Emily Lawhead, 2022

Figure 22: teamLab, *Forest of Flowers and People: Lost, Immersed and Reborn* (Winter), 2017/2021, Asian Art Museum of San Francisco; Photograph: Emily Lawhead, 2022
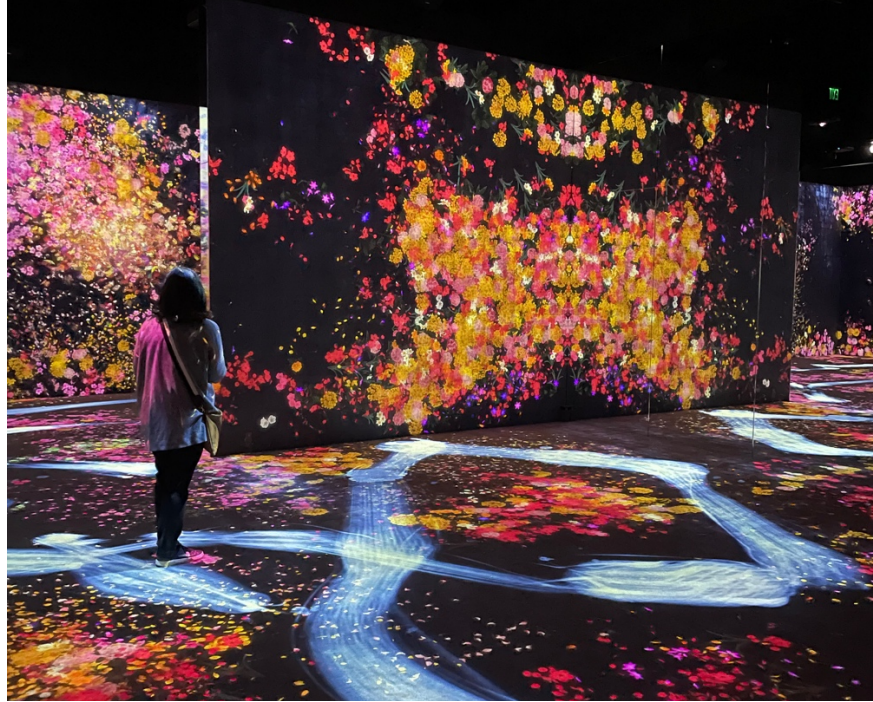
Figure 23: teamLab, *Forest of Flowers and People: Lost, Immersed and Reborn* (Spring), 2017/2021, Asian Art Museum of San Francisco; Photograph: Emily Lawhead, 2022
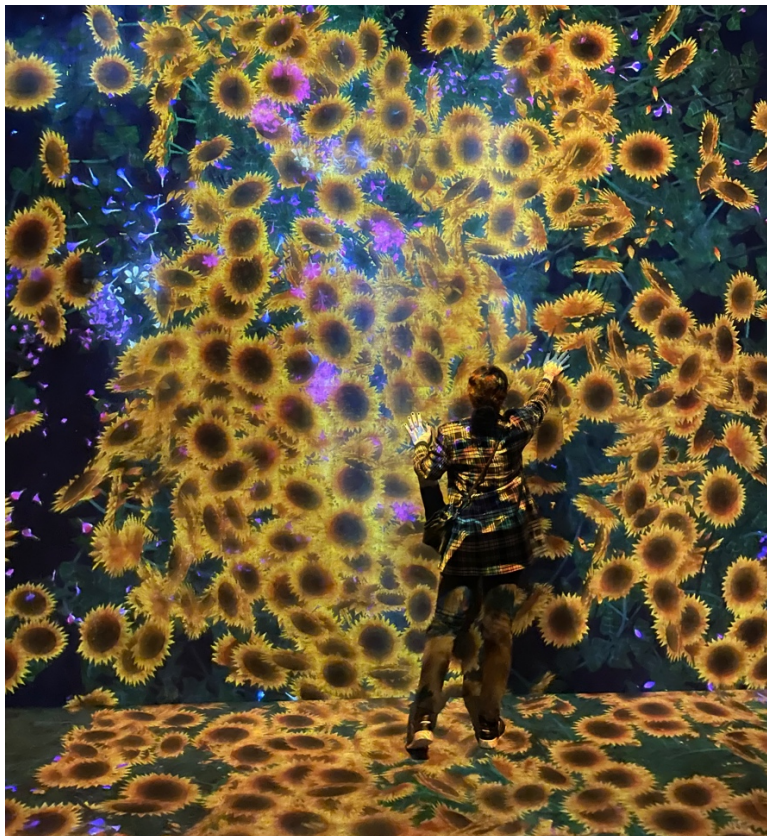
Figure 24: teamLab, *Forest of Flowers and People: Lost, Immersed and Reborn* (Summer), 2017/2021, Asian Art Museum of San Francisco; Photograph: Emily Lawhead, 2022

Figure 25: teamLab, *Flutter of Butterflies Beyond Borders, Ephemeral Life,* 2015/202 in *The Void*, 2016/2021, Asian Art Museum of San Francisco; Photograph: Emily Lawhead, 2022

Figure 26: teamLab, *Crows are Chased and the Chasing Crows are Destined to be Chased as well, Flying Beyond Borders,* 2018/2021emerging from *Crows are Chased and the Chasing Crows are Destined to be Chased as well, Transcending Space,* 2017/2021 into *Forest of Flowers and People: Lost, Immersed and Reborn*, 2017/2021, Asian Art Museum of San Francisco; Photograph: Emily Lawhead, 2022

Figure 27: teamLab, *Forest of Flowers and People: Lost, Immersed and Reborn* (slow down), 2017/2021, Asian Art Museum of San Francisco; Photograph: Emily Lawhead, 2022

Figure 28: teamLab, *Forest of Flowers and People: Lost, Immersed and Reborn* (slow growing), 2017/2021, Asian Art Museum of San Francisco; Photograph: Emily Lawhead, 2022
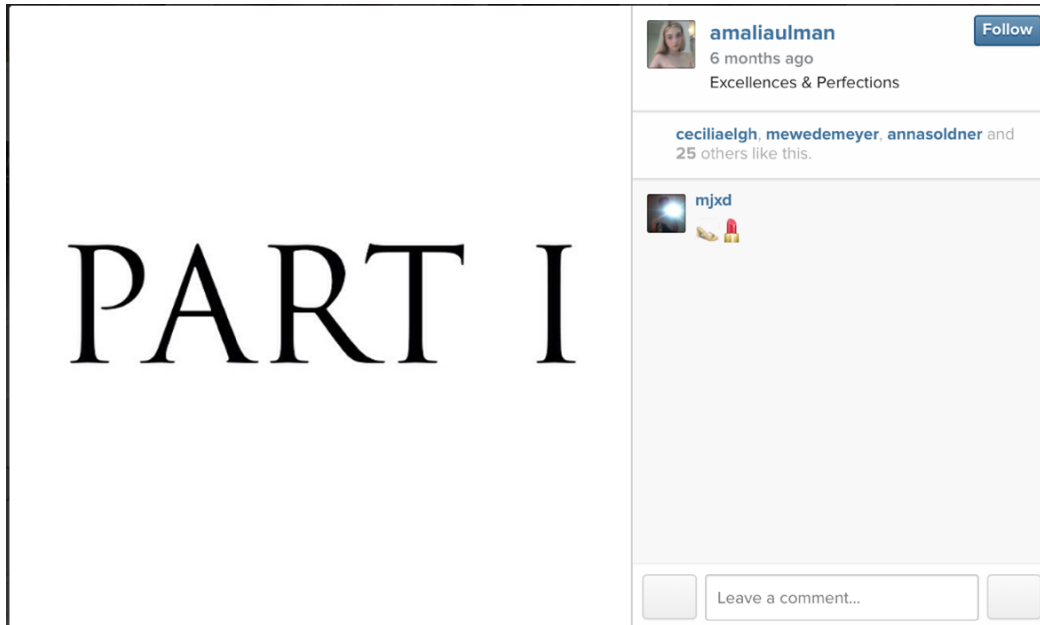
Figure 29: Amalia Ulman, *Excellences & Perfections* ("Part I"), April 19, 2014; Rhizome Archive; Screenshot: Emily Lawhead, 2019
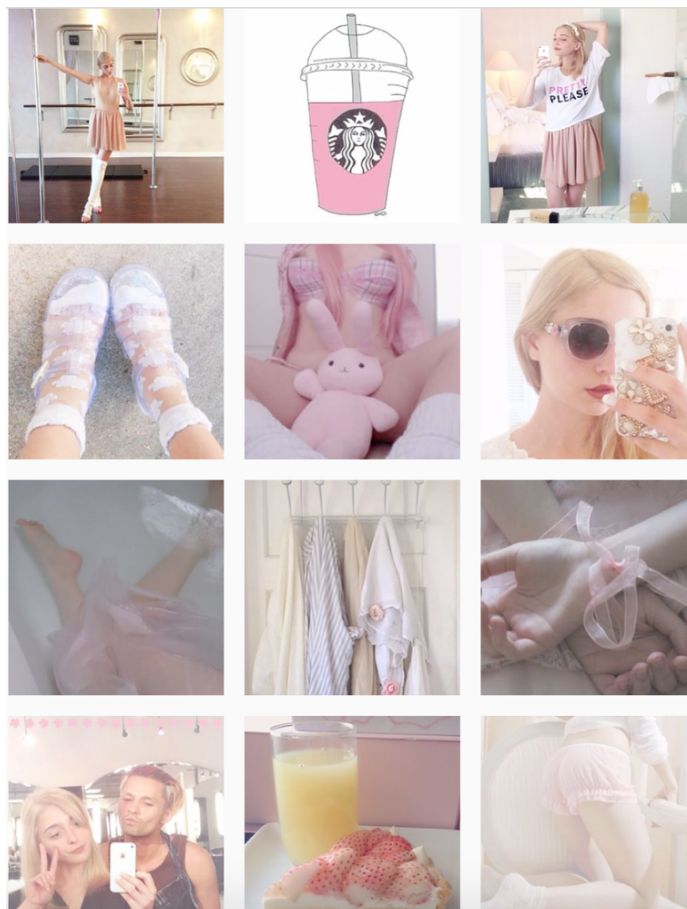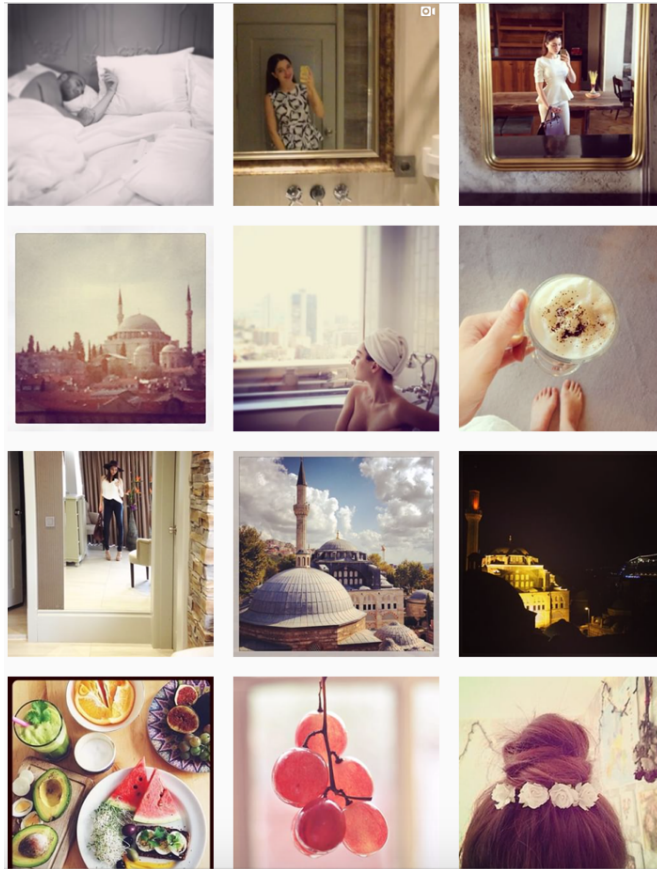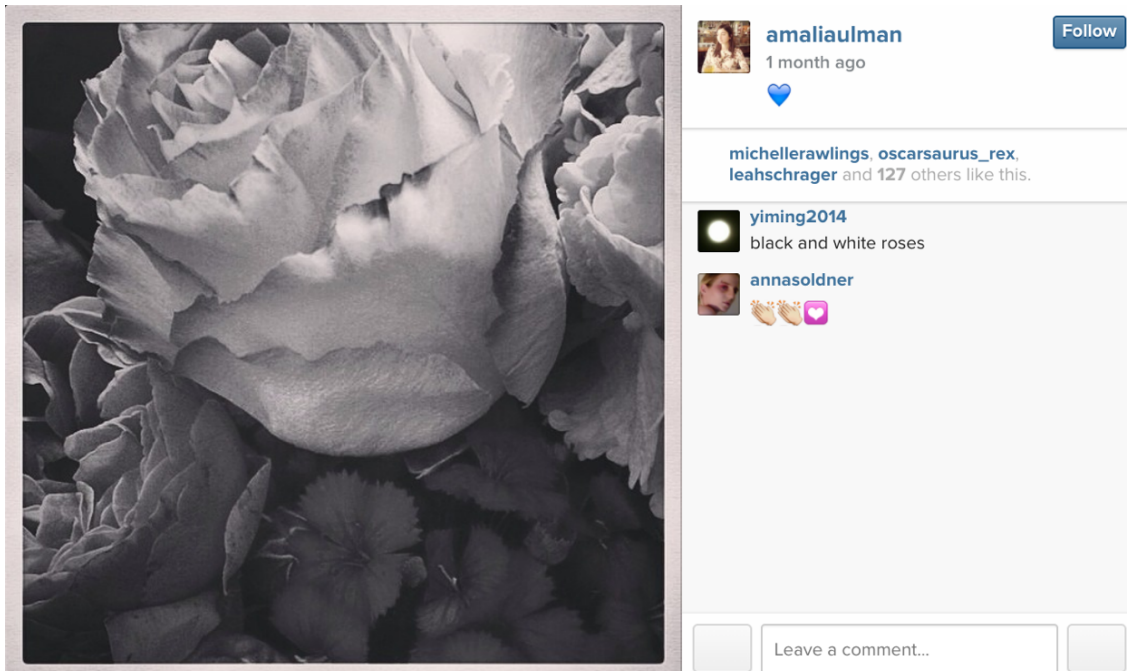

Figure 30: Amalia Ulman, *Excellences & Perfections* ("Cute Girl" phase detail), May 22 – June 2, 2014; Screenshot: Emily Lawhead, 2019
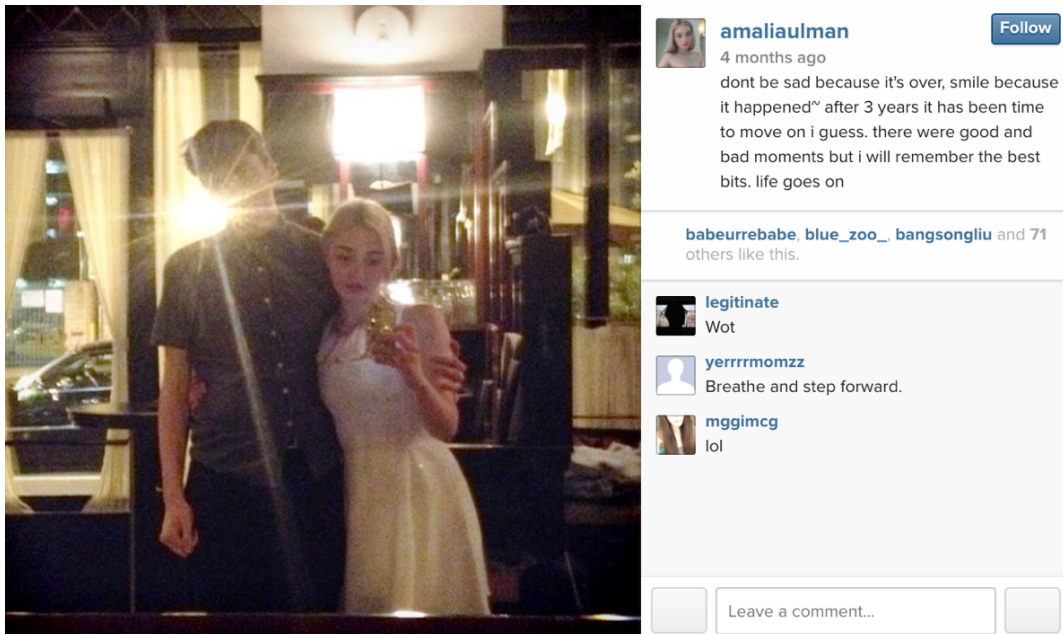
Figure 31: Amalia Ulman, *Excellences & Perfections* (breakup announcement), June 20, 2014; Rhizome Archive; Screenshot: Emily Lawhead, 2019
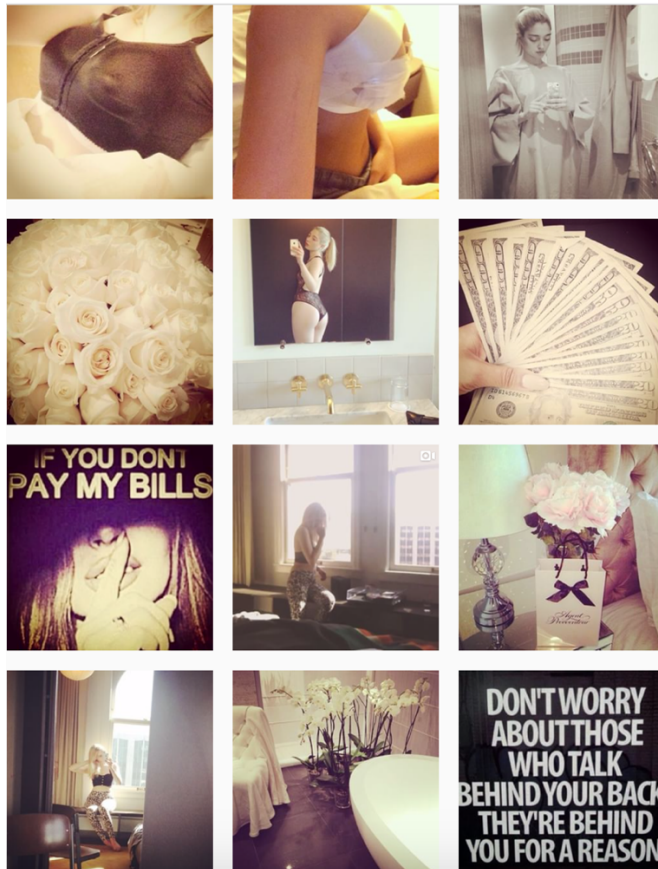
Figure 32: Amalia Ulman, *Excellences & Perfections* ("Sugar Baby" phase detail), July 4 – July 12, 2014; Screenshot: Emily Lawhead, 2019

Figure 33: Amalia Ulman, *Excellences & Perfections* (breast augmentation surgery announcement), July 10, 2014; Rhizome Archive; Screenshot: Emily Lawhead, 2019
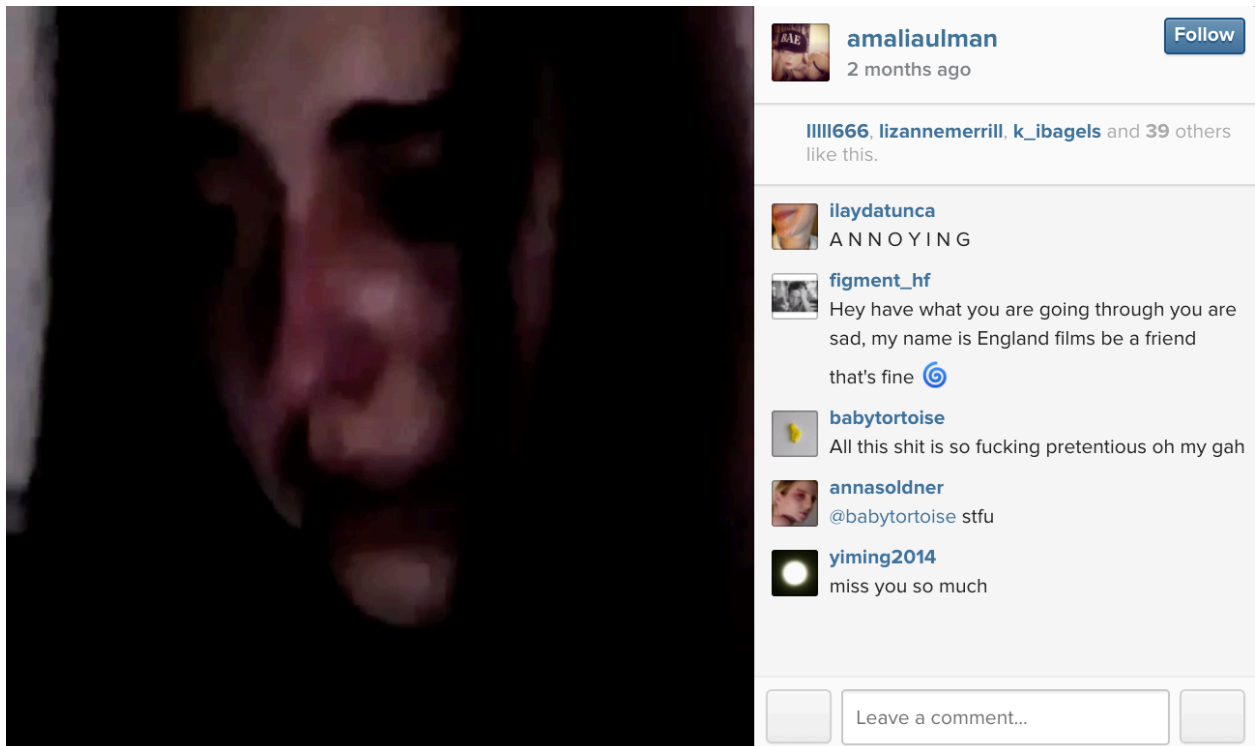
Figure 34: Amalia Ulman, *Excellences & Perfections* (breakdown video still)*, August 8, 2014; Rhizome Archive; Screenshot: Emily Lawhead, 2019

Figure 35: Amalia Ulman, *Excellences & Perfections* (apology), August 14, 2014; Rhizome Archive; Screenshot: Emily Lawhead, 2019
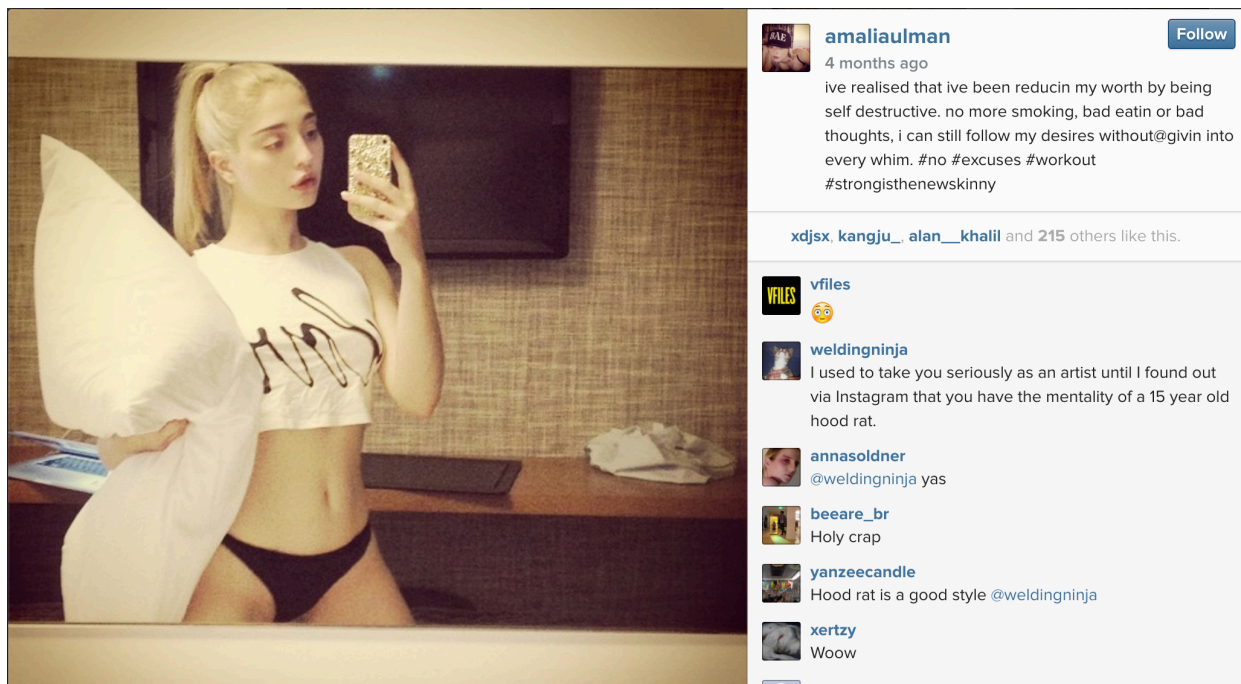

Figure 36: Amalia Ulman, *Excellences & Perfections* ("Life Goddess" phase detail), September 6 – September 14, 2014; Screenshot: Emily Lawhead, 2019

Figure 37: Amalia Ulman, *Excellences & Perfections* (the end), September 14, 2014; Rhizome Archive; Screenshot: Emily Lawhead, 2019

Figure 38: Amalia Ulman, *Excellences & Perfections* ("I used to take you seriously"), June 27, 2014; Screenshot: Emily Lawhead, 2019
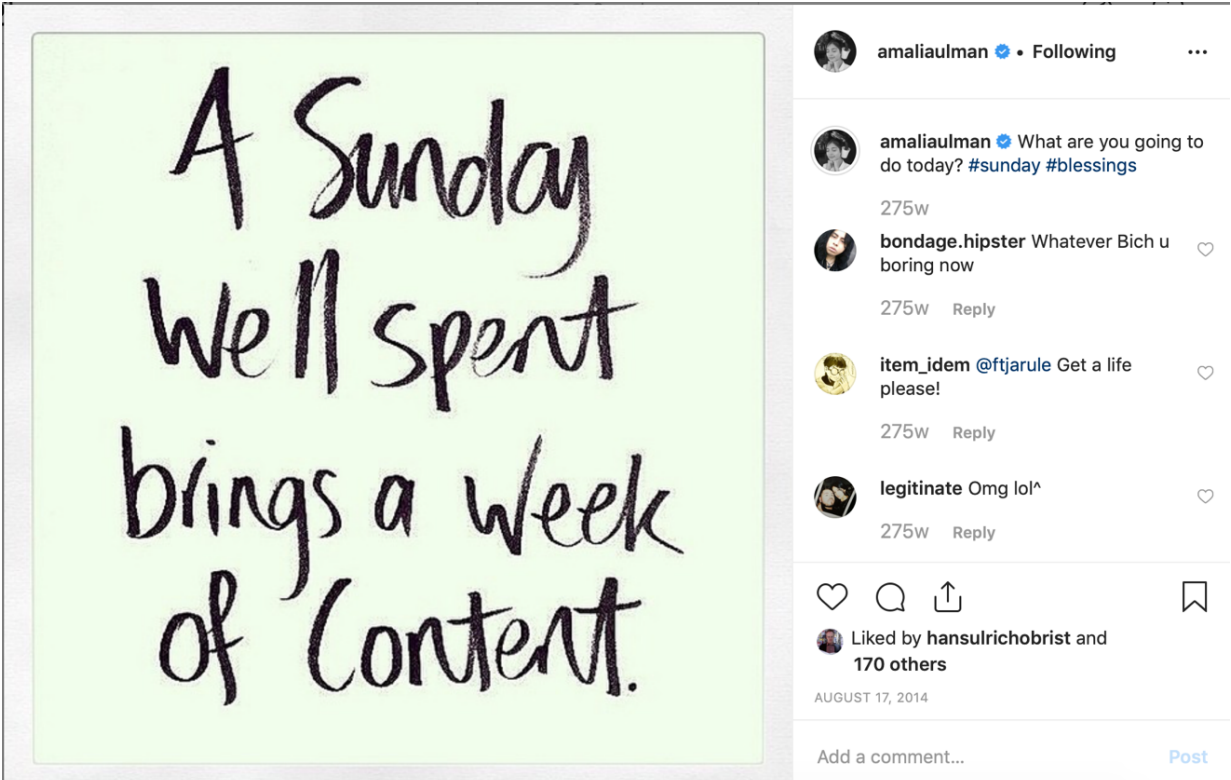
Figure 39: Amalia Ulman, *Excellences & Perfections* ("A Sunday well spent"), August 17, 2014; Screenshot: Emily Lawhead, 2019
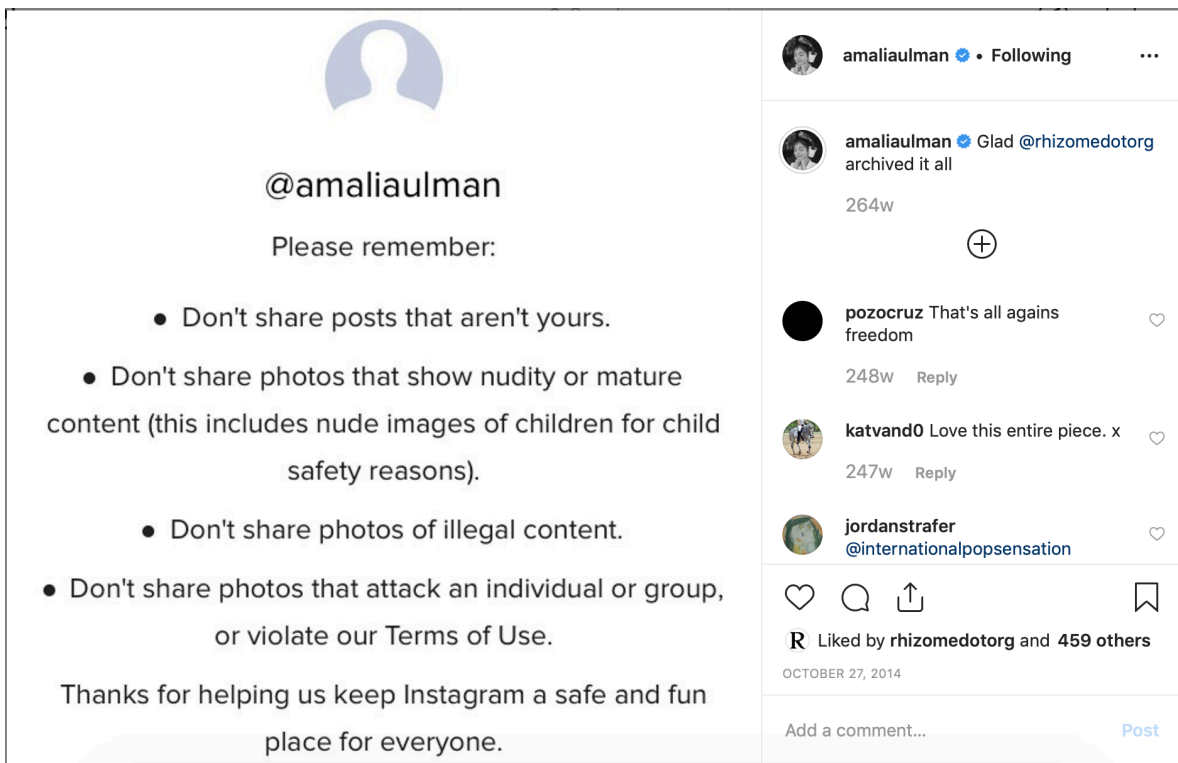

Figure 40: Amalia Ulman, "Glad Rhizome archived it all," October 27, 2014; Screenshot: Emily Lawhead, 2019

Figure 41: Amalia Ulman, *Excellences & Perfections* ("a brilliant project"), August 19, 2014;
Screenshot: Emily Lawhead, 2019

Figure 42: Amalia Ulman, *Excellences & Perfections* ("It's fake guys"), July 11, 2014;
Screenshot: Emily Lawhead, 2019

Figure 43: Amalia Ulman, *Excellences & Perfections* (tags), July 31, 2014; Screenshot: Emily Lawhead, 2019

Figure 44: Amalia Ulman, *Excellences & Perfections* ("a public notation"), September 14, 2014; Screenshot: Emily Lawhead, 2019

Figure 45: teamLab, *Forest of Flowers and People: Lost, Immersed and Reborn* ("hashtag art"), 2017/2021, Asian Art Museum of San Francisco; Photograph: Emily Lawhead, 2021
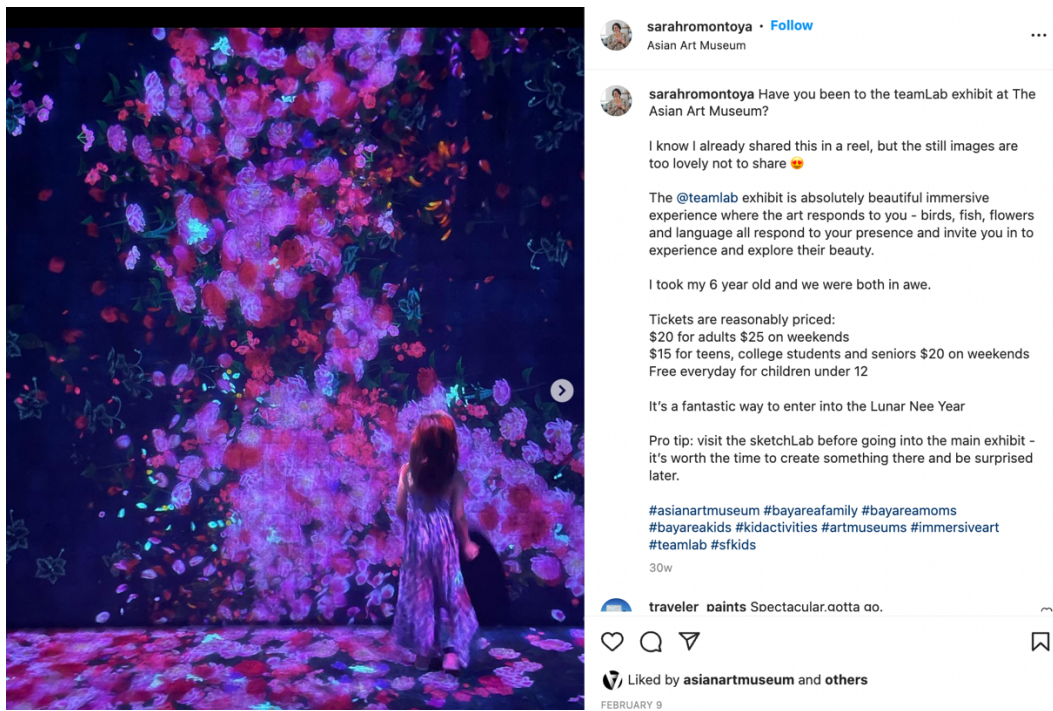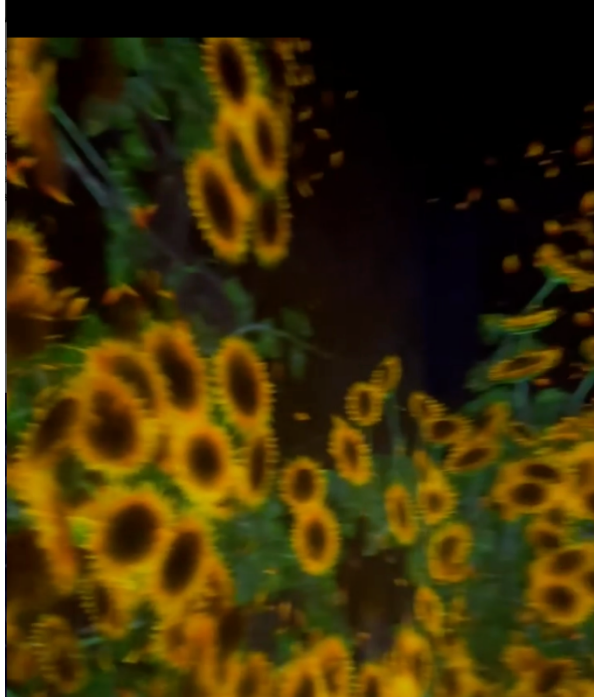

Figure 46: sarahromontoya, Asian Art Museum of San Francisco (influencer tag), February 9, 2022; Screenshot: Emily Lawhead, 2022

Figure 47: stefanieyu, Asian Art Museum of San Francisco (poetry/video still), ca. March 2, 2022; Screenshot: Emily Lawhead, 2022

Figure 48: cutebrainpants, Asian Art Museum of San Francisco (engagement), September 7, 2021; Screenshot: Emily Lawhead, 2022
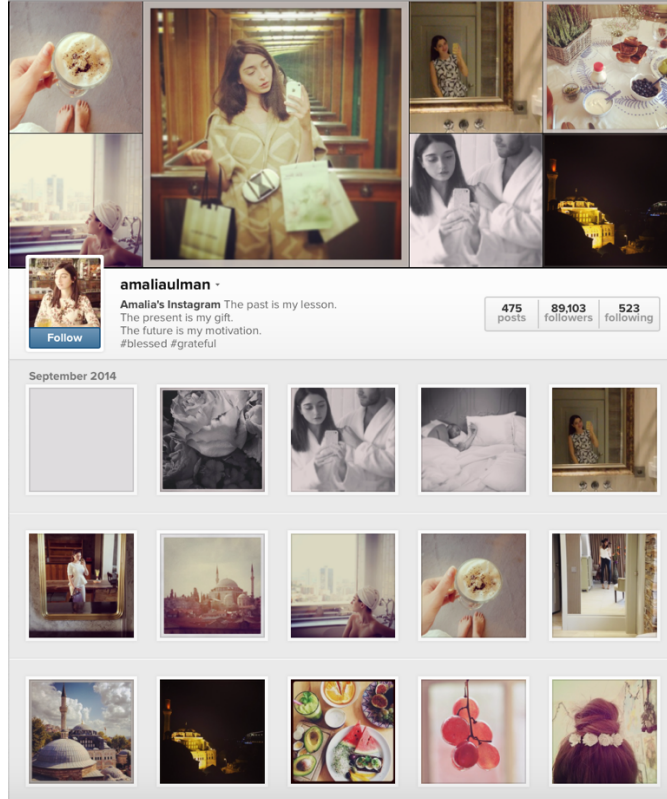
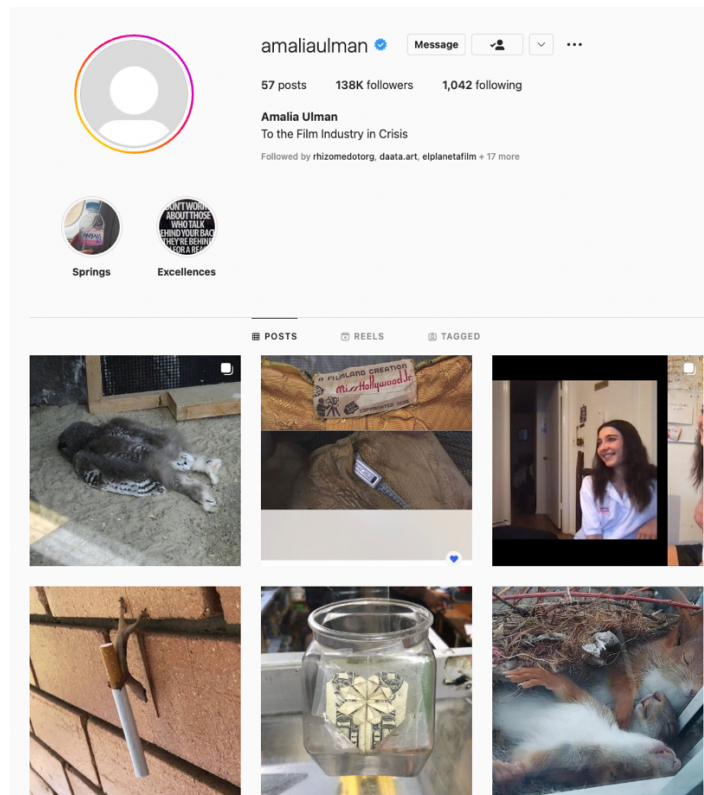Figure 49: Amalia Ulman's 2014 Instagram profile; Screenshot: Emily Lawhead, 2022

Figure 50: Amalia Ulman's 2022 Instagram profile; Screenshot: Emily Lawhead, 2022

Arches (archesproject.org)

Arches is an open-source, geospatially enabled software developed by the Getty

Conservation Institute and the World Monuments Fund. Targeted to support cultural heritage

sites, the platform supports data management, discovery, visualization, and project management.

Arches can assist organizations in creating digital inventories of both physical and intangible

objects (describing types, locations, cultural period, materials, conditions) and share conservation

projects and data. In addition, organizations can use the geospatial software to risk map and

monitor conditions around heritage and archaeological sites that are impacted by sea level rise,

erosion, and other impacts of climate change.

Artsteps (artsteps.com)

Artsteps is a user-friendly website that supports the development of VR exhibitions.

Users can upload their own images, video, audio, text, and other digital files, placing them in

virtual spaces that are premade but partially customizable. Complete exhibitions can then be

embedded in any website or blog to share content on sites familiar to an organization's audience.

The basic version is free with an account; services including private websites and domain names,

expert curation, fully custom designs, and hosting virtual events in the VR space are available for

a quoted project-by-project fee.

Capturing Unstable Media Conceptual Model (v2.nl/archive/works/capturing-unstable-media-conceptual-model-cmcm)

As discussed in Chapter 4, the Capturing Unstable Media Conceptual Model (CMCM) was developed by the V2_Organisation in 2004 to document interactive media artworks. The archived website still includes CMCM's multi-hierarchical and object-oriented ontologies, which are stored in the open-source ontology editor Protégé and available for free download via Stanford University.

Conifer by Rhizome (conifer.rhizome.org/)

Conifer (previously the Webrecorder Software Project) is a tool developed by the organization Rhizome to create interactive copies of any web page. The software allows users to save all elements of a website, including playing audio and video, clicking buttons, and scrolling. Conifer helps to counteract "URL rot" and other phenomena associated with broken links, redesigns, and upgrades that greatly affect websites that might hold important cultural heritage data. Its complex design also allows for the capture of more intricate websites with user-specific content and interactions, embedded media, or complicated Javascript. As of 2022, free accounts include 5 gigabytes of storage, with more available by supporting the initiative with monthly ($20/month) or annual ($200/year) subscriptions.

FromThePage (fromthepage.com)

FromThePage is a crowdsourcing manuscript transcription service. The platform supports plain-text transcription, bilingual editions, and annotations, with support in a wide range of file types. From the Page is used by a range of libraries and archives to digitize papers, government

documents, logs, diaries, and other correspondence that play a significant role in special collections but often take hours of staff time to transcribe. Transcribers volunteer their time and are always free, but institutions pay to host projects on the organization's website. As of 2022, plans are available for researchers ($80/month), small organizations ($300/month), and large institutions ($500/month) for the duration of the project.

Getty Vocabularies OpenRefine Reconciliation

(getty.edu/research/tools/vocabularies/obtain/openrefine.html)

The Getty Vocabularies OpenRefine Reconciliation is an open-source tool for data managers at museums and cultural institutions to conform their collections data with the Getty's vocabularies. In this way, information housed in comparatively smaller organizations can be better streamlined and relevant to the broader field that takes cues from larger institutions such as the Getty. Artist names, for example, are mapped onto the standardized Union List of Artist Names (ULAN). The tool is available for free and includes detailed instructions for first-time users.

Grants and Opportunities

Several grants are available for small or mid-sized museums to revitalize their preservation efforts. In October 2022, the National Endowment for the Humanities opened a series of Preservation Assistance Grants for Smaller Institutions that encompasses both physical and digital collections. Other organizations including the National Endowment for the Arts, the Institute of Museum and Library Services, and the International Council of Museums regularly post and offer grant opportunities for similar projects.

International Image Interoperability Framework (iiif.io)

  The International Image Interoperability Framework (IIIF) is a system for standardizing image and video files across the web, enabling deep zoom, comparison, page orders, annotations, captions, and translations in high resolution. Visitors to the site can see any uploaded image from any participating institution and the software is available as an open API.

Matters in Media Art (mattersinmediaart.org)

  The Matters in Media Art (MMA) model discussed in Chapter 4 was developed by the New Art Trust in 2005 to address the future of "time-based media" art. The model's website includes a helpful step-by-step guide to pre-acquisition, acquisition, and post-acquisition of new media artworks. The MMA website also includes downloadable templates for copyright agreements, deeds of gift, purchase agreements, and condition reports for video, audio, film, slide, and computer-based artworks in addition to their associated playback equipment.

Mukurtu (mukurtu.org)

  Mukurtu (pronounced MOOK-oo-too) is an open-source collections management software built by and for indigenous communities in North America. Maintained by the Center for Digital Scholarship and Curation at Washington State University, the platform encourages the exchange of digital heritage while maintaining an ethical approach to culturally specific materials. Mukurtu supports Traditional Knowledge (TK) Labels, which allow indigenous communities to add information about access, use, and distribution. It also creates space for community records in object files to ensure multiple stories can enrich the archive. Most importantly, Mukurtu includes a wide range of cultural protocols that define and manage access

to specific objects or collections that may be restricted to certain members of the community. The CMS (collections management software) is available for free and can run through an institution's web hosting provider.

New Art City (newart.city)

New Art City is a virtual art space for born-digital art. The platform is not limited to so-called "white cube" or "black box" virtual exhibitions, instead encouraging designs that take full advantage of the digital medium. Exhibitions are supported by real-time multiplayer systems, allowing users to attend exhibitions together, chat, and watch each other move around the space without needing to register with or download a third-party software. New Art City also includes an exhibition toolkit for digital art, with how-to guides for launching a show. As of 2022, the platform is still in private beta. However, it is actively collaborating with university MFA programs and smaller museums, galleries, and festivals with an interest in exhibiting digital art. Interested organizations can submit a proposal to the developers about projects that especially align with New Art City's mission and values.

Reciprocal Research Network (rrncommunity.org)

The Reciprocal Research Network is a consortium of twenty-nine cultural institutions that share data on the RRN interface. It was co-developed by Musqueam Indian Band, the Stó:lō Nation/Tribal Council, the U'mista Cultural Society and the Museum of Anthropology at the University of British Columbia and is especially targeted towards objects and collections originating from the Northwest Coast of British Columbia. There is a low threshold of data needed to start participating, which encourages institutions with a small number of objects to

share materials with the consortium. Institutions can join for free and receive a custom kiosk and mobile app for their space that connects visitors to the larger digital collection during their visit.

Scripto (scripto.org)

Scripto is a free, open-source Omeka plugin that allows communities and members of the public to transcribe, translate, or add descriptions to files in an institution's Omeka site. The software is geared towards digital humanities projects in universities, libraries, archives, and museums and is available for download in either Omeka Classic or Omeka S.

Variable Media Questionnaire (variablemediaquestionnaire.net)

The Variable Media Questionnaire (VMQ) is perhaps the most versatile documentation tool for new media artworks. Developed by the Guggenheim Museum in 2003, the questionnaire helps guide artist interviewers when an artwork enters a museum collection. A demo version of the third-generation beta is available on the website to experiment with the interface. If institutions are interested in adding more information to a permanent version, they can contact the VMQ developers directly.

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