

NETWORKED ALTERNATIVES: DIGITAL CURATION AND ARTISTIC PRODUCTION  
ON ARTIST-RUN PLATFORMS

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## **ABSTRACT**

Colin Post: Networked Alternatives: Digital Curation and Artistic Production on Artist-run Platforms

(Under the direction of Christopher A. Lee)

This dissertation explores how artists creatively engaged with digital and networked technologies care for their artworks and related studio or personal archival materials. As digital and new media artworks frequently face preservation concerns and require regular maintenance shortly after the point of creation, artists often become the first stewards of their own work. Central to these artistic engagements, artists leverage digital and networked technologies to circulate artworks in exhibition and display contexts outside of museums and commercial galleries, including online platforms and hybrid gallery spaces that I refer to as ‘networked alternatives.’ I position these networked alternatives in longer histories of artists’ experiments with digital and networked technologies as well as artists’ efforts to effect their own exhibition contexts alternative to arts institutions and markets. Along with the artists, the curators of these spaces play crucial roles in the digital curation of these artworks and archival materials. The curators not only work with artists to mitigate technical issues in the process of staging networked exhibitions but also undertake largely volunteer labor to ensure the long-term viability of artworks featured in these exhibitions.

As artists and curators care for these artworks and archives throughout the lifecycle of these materials, they seek out information and learn new skills contributing to situated knowledges needed to perform digital curation labor. From the creation of new artworks to the

ongoing care of older works, these artists develop digital curation repertoires that become fundamental to their broader artistic efforts. Processes and practices for managing data across complex information systems are integral to activities involved in creating, exhibiting, and experiencing digital and new media artworks. I analyze these digital curation information needs and practices through the theoretical framework of information worlds, examining the various other individuals, organizations, technologies, communities, and sociopolitical factors that impact these information needs and practices. These artists and curators in turn shape the art worlds and various other social worlds constituting their information worlds; the digital curation repertoires of these individuals both drive and reflect broader changes in how art is created, disseminated, and experienced across these social worlds.

To Annot

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## TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION .....	1
1.1) The First Stewards of Digital and New Media Art.....	2
1.2) Paper-Thin and Networked Alternatives .....	6
1.3) Statement of Purpose and Research Questions.....	13
1.4) Overview of Research Design and Methods .....	19
1.5) Overview of Main Findings.....	23
1.6) Summary.....	27
CHAPTER 2: LITERATURE REVIEW .....	28
2.1) Foundational Concepts .....	28
2.1.1) Digital and New Media Art .....	29
2.1.2) Information Needs, Behaviors, and Practices.....	33
2.1.3) Digital Curation .....	37
2.2) Conceptual and Theoretical Framework.....	41
2.2.1) Information Worlds .....	41
2.2.2) Sociology of Art and Art Worlds .....	45
2.3) Relevant Approaches to Cultural Heritage Preservation.....	49
2.3.1) Digital Preservation .....	49

2.3.2) Art Conservation.....	62
2.3.3) Post-Custodialism and Community Archives.....	72
2.3.4) Personal Information Management and Personal Digital Archiving.....	80
2.4) Artists' Information Needs and Behaviors .....	85
2.5) Art and Networked Technologies.....	96
2.6) Summary.....	111
CHAPTER 3: METHODS AND STUDY DESIGN .....	112
3.1 Overview of Methods .....	113
3.1.1) Constructivist Grounded Theory .....	113
3.1.2) Situational Analysis.....	115
3.1.3) Art Historical Methods .....	119
3.2) Reflection on Research Methodology .....	121
3.2.1) Relationship between Method and Theory.....	121
3.2.2) Self-reflective Statement on Positionality as Researcher .....	123
3.3) Study Design.....	130
3.3.1) Case Study and Sample Selection .....	131
3.3.2) Data Collection.....	136
3.3.3) Data Analysis.....	140
3.3.4) Evaluating the Study.....	146
3.4) Summary.....	148

CHAPTER 4: DIGITAL CURATION INFORMATION NEEDS AND PRACTICES .....	150
4.1) Artists' Information Needs and Practices .....	150
4.1.1) Digital Curation Challenges .....	155
4.1.2) Personal Archiving Practices .....	169
4.1.3) Practices of Care .....	187
4.1.4) Organizations and Communities .....	207
4.1.5) People .....	217
4.1.6) Technologies .....	223
4.1.7) Information Sources .....	232
4.2) Information Needs and Practices of Paper-Thin Curators .....	237
4.2.1) Overview of Paper-Thin .....	239
4.2.2) Sociotechnical Factors .....	258
4.2.3) Paper-Thin as Archives .....	270
4.3) Summary .....	279
CHAPTER 5: ARTISTS' INFORMATION WORLDS .....	281
5.1) Overview of Social Worlds and Arenas .....	283
5.2) Permeable Art Worlds .....	293
5.2.1) Local and Networked Arts Communities .....	294
5.2.2) Intersections and Tensions with Information Technology Industries .....	299
5.2.3) The Shape of Digital Art History .....	305

5.3) Changing Conditions for Exhibiting, Selling, and Experiencing Art.....	309
5.3.1) Relationships between Artists and Curators.....	310
5.3.2) Relationships with Collecting Institutions and Private Collectors.....	314
5.3.3) Relationships with Audiences.....	321
5.4) Gaining Skills to Create and Care for Artworks.....	325
5.5) Summary.....	332
CHAPTER 6: CONCLUSION.....	333
6.1) Implications for Cultural Heritage Institutions.....	334
6.2) Implications for Arts Education and Pedagogy.....	340
6.3) Limitations of the Study.....	343
6.4) Directions for Future Research.....	347
6.5) Summary.....	349
REFERENCES.....	351

## LIST OF TABLES

Table 1 Overview of Study Participants .....	136
Table 2 Overview of Digital Curation Challenges and Related Practices .....	153
Table 3 Overview of Information Needs and Sources .....	155
Table 4 Overview of Paper-Thin Volumes .....	239

## LIST OF FIGURES

Fig. 1 Temporary splash page for NewHive.....	160
Fig. 2 Brenna Murphy, <i>SentientTransistor~ToolMatrix</i> .....	162
Fig. 3 Workflow for D'Alessio's creative projects.....	173
Fig. 4 Documentation photographs on <i>VVORK</i> .....	180
Fig. 5 Zachary Dean Norman, image still of Ragged Point Barbados from <i>Endangered Data</i> ..	184
Fig. 6 Sterling Crispin, <i>N.A.N.O. B.I.O. I.N.F.O. C.O.G.N.O.</i> .....	192
Fig. 7 Sarah Rothberg, <i>Memory/Place: My House</i> .....	195
Fig. 8 Raul De Lara, <i>Invasive Species (Burning Man)</i> .....	204
Fig. 9 Andy Lomas, from <i>Mutant Vase Forms</i> .....	226
Fig. 10 Phillip Stearns, <i>GyrFalcon (Open Vault)</i> .....	229
Fig. 11 Screenshot of Paper-Thin's landing page.....	240
Fig. 12 Andy Lomas, <i>Cellular Forms</i> .....	241
Fig. 13 Hunter Jonakin, <i>Collector's Digital Art Piece</i> .....	246
Fig. 14 Daniel Baird and Haseeb Ahmed, <i>HWBMx8</i> .....	248
Fig. 15 Zachary Dean Norman, <i>transform dot rotate</i> .....	250
Fig. 16 Martina Menegon, <i>I'll Keep You Warm and Safe In My People Zoo</i> .....	251
Fig. 17 Installation shot of Paper-Thin v3.....	253
Fig. 18 Installation shot of Paper-Thin v3.....	254
Fig. 19 Installation shot of Paper-Thin v3.....	254
Fig. 20 Social worlds/arenas map.....	287
Fig. 21 Sarah Rothberg, installation shot of <i>Touching a Cactus</i> .....	318

## CHAPTER 1: INTRODUCTION

Cultural heritage institutions have steadily developed novel techniques, approaches, and tools for the ongoing care of digital and new media art, but these works often face preservation concerns long before entering institutional collections, and far more works will never enter into institutional collections at all. Significantly, artists themselves along with the curators of smaller galleries and art platforms, which I describe with the term ‘networked alternatives,’ have taken on primary responsibilities in the digital curation of artworks and related archival materials. Created and exhibited with rapidly changing digital and networked technologies, these artworks are sustained only through the application of both routine and exceptional digital curation efforts, including refreshing storage media, format migration, and altogether recreating older artworks with current technologies. Overall, this dissertation investigates the changing patterns of cooperative activity among the many individuals and organizations involved in the creation, exhibition, appreciation, and ongoing care of digital and new media art, focusing on the crucial role that artists and curators play in in the digital curation of these works early on.

This digital curation work is deeply interwoven into artistic practices of creating artworks and staging exhibitions for in-person, online, and otherwise networked venues, and extends into the ongoing maintenance of artworks in the custody of artists or smaller galleries. In the dissertation, I describe the challenges encountered by artists and curators involved in this work as well as the repertoires of practices they perform—both individually and collectively—to address these challenges as they care for digital and new media artworks. I analyze these practices through the theoretical framework of information worlds, highlighting how these

individuals engage with a robust array of information sources and develop varied information practices across the disparate and intersecting social worlds they inhabit. Specifically, I focus on how these practices develop within art worlds; the ongoing development and performance of these practices reflect, and in some cases drive, substantial changes in these art worlds. This research endeavors to understand the challenges that these individuals face, and how information professionals might support artists and curators in this work, as a critical step toward keeping digital and new media artworks in living circulation.

In the following sections of the introduction, I detail the situation of artists and curators engaged in digital curation work, provide background on the case study at the center of my research, and enumerate my research questions, before briefly describing my study design and principal findings.

### **1.1) The First Stewards of Digital and New Media Art**

Art has always existed in networks—webs constituted through cooperative activity among individuals occupying a wide spectrum of roles, as they apply technologies, perform techniques, and exchange information needed to create, experience, and care for artworks. For Becker (1982), these patterns of cooperative activity define art worlds. Artists are one among many groups, along with curators, art handlers, critics, gallery goers, and conservators, who are involved in these patterns of cooperative activity. In particular, the cooperative work involved in the ongoing care and stewardship of artworks forms a foundation for countless other art world activities. Museum visitors encounter contemporary pieces alongside ancient artifacts. Art criticism and art historical research thrives on a material record of artworks and related archival materials. Artists reference and respond to earlier artistic activity, drawing on information culled from books as well as direct experiences of historical works.



As Becker describes, cooperative interactions between diverse art world participants are sites of negotiation (26), for instance as a curator discusses with a conservator how to restore an older piece about to go back on display, and conventions develop over time that guide and regulate these negotiations (30). Well-established conventions informing conservation approaches and techniques in cultural heritage institutions break down as these institutions collect digital and new media artworks. Becker specifies the uptake of new technologies involved in the creation of art as a major driver of change, as art world participants form new patterns of cooperative activity in order to mobilize resources along with people possessing the skills and knowledge required to address unique or novel challenges. For example, Saaze, Wharton, and Reisman (2018) discuss how staff at the Museum of Modern Art (MoMA) have been promoting the adaptations needed to collect, exhibit, and care for digital and new media artworks. This has involved adding new staff roles to bring on individuals with technical expertise, exploring new conservation practices attuned to the unique characteristics of digital media, and building out information storage and collection management systems to accommodate artworks comprising complex digital objects.

However, many significant artworks engaged with digital technologies exist outside of these traditional collecting contexts: online, in the artist's personal archives, or through some other alternative means of dissemination. In fact, many artists engaged with digital technologies intentionally work outside of traditional arts contexts. In many cases, artworks are created and shared on networked technologies, such that the works resist reification into singular and discrete objects and collection into institutions. Artists throughout the 20<sup>th</sup> century have variously explored practices that do not solely result in the production of static objects, but the introduction of digital and networked technologies raises distinct issues bearing on the relationship between

the circulation of information and the circulation of artworks. Seth Price's *Dispersion* (2002 - ongoing) is an essayistic meditation on the history of distribution systems for art that he has shared online as a PDF<sup>1</sup> and has also installed in gallery spaces; like dye tracing in a scientific experiment, the ongoing circulation of the piece in all its material forms illustrates the shape of networks through which artworks move. In other cases, artists may take up digital and networked technologies as a mode of institutional critique. As Stallabrass (2003, 114-137) describes, many Internet artists of the 1990s engaged with digital and networked technologies precisely to operate outside of institutions, critiquing the exclusivity and elitism of museums and galleries, and exploring the possibilities of art made on popular communication media. An artwork may also remain in an artist's custody simply because no institution has expressed interest in collecting the work. For artworks dependent on digital technologies, these pieces will likely run into preservation threats long before they enter into institutional collections—if ever.

Many of the strategies and approaches advanced in the existing literature are not well suited to the distinct issues involved in the preservation of digital artworks, especially those that exist outside of traditional institutional collections. Although the literature has long attended to the unique challenges involved in the preservation of digital artworks, including interactive and interrelational features of these works (Besser 2001), Serexhe (2013) suggests that the radical shift in the dissemination of visual art introduced by digital technologies calls for a paradigmatic shift in conservation, curation, and museological practice in general (23). I suggest that this involves the consideration of new approaches to digital and new media artworks beyond traditional custodial models of collection and care—as well as a recognition and appreciation of the emergent patterns of cooperative activity that artists, curators, and others are already

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<sup>1</sup> <http://www.distributedhistory.com/Dispersion2016.pdf>

developing and practicing in the creation, exhibition, and care of art in smaller galleries and other alternative arts spaces.

Artists are the first stewards of digital and new media artworks, and they are forging new patterns of cooperative activity with the curators, gallerists, and others who run the exhibition spaces and platforms that reside outside of traditional collecting institutions and art markets. Even for digital and new media artworks that are eventually collected by arts institutions or acquired by private collectors, artists have likely undertaken crucial labor to keep artworks functional, and in many cases, artists continue to have a responsibility in performing ongoing maintenance of works in private and institutional collections as well. Throughout the dissertation, I describe this cooperative activity as ‘digital curation’ in a polysemous sense that melds library and information science (LIS) and museological curatorial lineages and practices. For artists and curators working with digital and networked technologies, activities involved in the management of data and digital objects across complex information systems are immanent to activities involved in the creation, selection, presentation, and contextualization of artworks. Artists back up project files on hard drives, and curators and gallerists troubleshoot technical difficulties as they stage networked exhibitions. This digital curation work fundamental to the creation and initial exhibition of digital and new media artworks seeds and extends into how these artworks are cared for by artists, curators, and gallerists over time.

Even though artists, gallerists, and curators take on the primary responsibilities in stewarding these artworks, these cooperative digital curation activities include others and link directly into the work of other art world communities, organizations, and institutions. In this research, I seek to position these digital curation activities in the broader information worlds occupied by the artists and curators (Jaeger and Burnett 2010). As artists and curators learn new

skills, techniques, and tools to undertake the digital curation of artworks and related archival materials, they seek out a range of information sources, engage with wide and varied communities, and directly collaborate with other artists as well as programmers and scientists. In developing and performing digital curation practices, artists and curators participate in art worlds along with many other intersecting and adjacent social worlds. All these kinds of information and interactions shape how artists, curators, and gallerists approach the ongoing care of digital and new media art.

## **1.2) Paper-Thin and Networked Alternatives**

The dissertation research centers on a case study of Paper-Thin.<sup>2</sup> An art platform curated by two artists, Daniel Smith and Cameron Buckley,<sup>3</sup> Paper-Thin catalyzes the exploration of new modes of artistic production using digital and networked technologies. As I suggest in the preceding section, curators and gallerists associated with alternative and experimental arts spaces are critical cooperative actors in the digital curation of art outside of traditional institutional and art market contexts. Throughout the history of digital and new media art, artists and curators have seized on the potential of these technologies to not only achieve novel aesthetic experiences within discrete artworks but to also form communities of artistic exchange and to widely disseminate artworks using computer networks. In technologically- and historically-specific ways that I detail in the next chapter, the artistic production of particular artworks emerges from and interweaves with the communicative exchange among artists over networks, this itself constituting a form of artistic production. Digital curation, then, is integral to myriad modalities

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<sup>2</sup> <https://paper-thin.org/>

<sup>3</sup> I will refer to all artists, curators, and others who participated in the study by their full names when I first mention them in the body of the text and then by their last names only in subsequent references. An overview of all study participants can be found in Table 1, included in section 3.3.1.

of artistic production, encompassing both the care of particular artworks as well as the work required to initiate and sustain the arts communities, galleries, and platforms through which these artworks are created, experienced, and circulated.

Paper-Thin's curators expressly resist dominant models for exhibiting and presenting art generally, and digital and new media art in particular. "This is not a gallery / This is not a museum / This is not an institute / This is not a game," reads a list of negations on the 'About' section of Paper-Thin's site. Viewers might infer that Paper-Thin does not sell or collect works of art, does not represent particular artists, does not offer formalized programming, but is decidedly an artistic effort. The one positive statement enumerated—that Paper-Thin is "the space between virtual and material"—suggests a trajectory of inquiry but also eludes any concrete characterization. In its indeterminacy, the statement risks perpetuating the common myths of digital information as intrinsically ephemeral, fungible, and fluid (Kirschenbaum 2008, 51-57). By occupying this "space between," in fact, the curators foreground the materiality of digital and networked technologies; throughout, I highlight the implications of this materiality for how both curators and artists create, present, and care for artworks on Paper-Thin.

While enigmatic, this series of statements aptly describes the dynamic nature of Paper-Thin. Across three distinct 'volumes,'<sup>4</sup> Buckley and Smith have embraced a range of technologies and pursued varying curatorial approaches, these disparate instantiations unified by a commitment to facilitating artists' experimentation with new modes for creating and disseminating art with and within networked systems. For the first two volumes, Smith and Buckley recruited artists to contribute to immersive virtual reality (VR) environments, accessible

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<sup>4</sup> The curators label each distinct Paper-Thin project as a volume, of which there have been three so far. I provide detailed descriptions of each volume in chapter four. In the text, I refer to these volumes as either Paper-Thin v1 or Paper-Thin v3, or just v1, v2, and v3.

to viewers within a web browser or downloadable to their local machines. Although sharing similarities as online VR art projects, v1 and v2 also exhibit significant differences in terms of how VR and web technologies were deployed and how the curators and artists collaborated to produce the VR environments. Paper-Thin v3 was a site-specific installation at the 2018 HubWeek Festival in Boston.<sup>5</sup> For this installation, Smith and Buckley devised a networked drawing application that enabled artists to compose digital sketches at a distance that were then executed on paper by a computer numerical control (CNC) drawing machine set up in the exhibition space. The curators coordinated seven pairs of artists to perform these live, collaborative drawing sessions throughout the duration of the festival. Though generating analog and digital artifacts in the form of drawings and datasets of sketching coordinates, the real-time interactions between artists and machines over a network constituted the core of v3.

Paper-Thin has always been a mercurial project, changing across iterations as the curators learn from past experiences both challenging and fruitful. Buckley and Smith discuss Paper-Thin in express terms as a project sparked and furthered by learning: for themselves, the process of learning new technologies inspires ideas for how future volumes of Paper-Thin might be configured; for artists, each volume presents a unique framework within which to experiment, prompting artists to think about a set of technologies coupled with some means of computer-supported collaborative work as a mode of artistic production. I elaborate on these learning processes as the development of situated knowledges in chapter five. As the focus of this study, I am interested in how the digital curation work carried out by the curators running Paper-Thin and the participating artists (both as part of Paper-Thin and in their individual artistic practices)

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<sup>5</sup> <https://2018.hubweek.org/>

integrate into the broader project of creating, disseminating, and caring for art in networked exhibition contexts.

The digital curation practices performed by the artists and curators include varying sets of techniques, which can be grouped as digital curation styles or repertoires, as I discuss in chapter four, developed and applied depending on different potential aims for how digital artworks might be created, selected, presented, and cared for over networked systems. In particular, the digital curation practices of the individual artists vary depending on details of the artist's career and studio practice, although there are also broad similarities and shared challenges across the artists in the study. For their interactions with Paper-Thin and its curators, these various digital curation repertoires differ in key ways from the curation and conservation practices in commercial galleries, museums, and other arts institutions. Throughout the dissertation, I develop the notion of 'network alternatives' to describe Paper-Thin and other current alternative or artist-run arts spaces that foreground communicative exchange and creative play with digital and networked technologies as a means to explore new modes of artistic production. Paramount to initiating, contributing to, exhibiting with, and sustaining networked alternatives, artists and curators contribute to emergent patterns of cooperative activity for creating, staging, and caring for digital and new media art that bring in individuals and communities from outside the art world and employ novel techniques and practices not common in arts institutions.

I use the term networked alternatives to position the arts platforms, smaller galleries, and arts spaces that I discuss in this dissertation within a longer history of artists creating and disseminating work using networked technologies, and as a nod to an even broader history of artists effecting spaces and systems to share artworks outside art museums and markets. As Apple (1981) describes, New York artists in the 1960s and '70s established alternative exhibition

spaces, converting their studios into temporary galleries or transforming otherwise abandoned properties into performance venues, seeking to extend the boundaries and definitions of art and to alter established art world structures (5). Diverse groups of artists came together in spaces like The Kitchen, Franklin Furnace, and PS1<sup>6</sup> to carry out ephemeral performances, precariously transitory sculptures, and collaborative projects that did not easily fit into major museums or commercial galleries. As with Paper-Thin, staking out these alternative spaces that were directed by the participating artists enabled and empowered experimentation with new modes of artistic production—and also involved artists in new kinds of caretaking activities to maintain the social, technical, and physical infrastructures undergirding these spaces.

Beyond this specific time period in New York, artists in many eras and areas have striven to create or take control over their own exhibition and dissemination contexts, intentionally working outside of established arts institutions and markets. These motivations have likewise driven artists' various engagements with digital and networked technologies, especially the Internet and the World Wide Web (the Web), which have presented artists with the means to establish communities generative of artistic exchange, circulating among more or less self-contained groups of artists or open to broader publics. Encompassing a broad range of creative practices and artforms that have emerged from these artistic engagements with networked technologies, Connor (2019) defines net art, or net-based art, as “artful participation in network culture” (9). Participation, for Connor, is essential to net art: as no single artwork can step outside the ever-engrossing sociotechnical ensembles of computer networks, artists represent aspects and fragments of the social, political, and economic dimensions of these networks

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<sup>6</sup> Apple notes that many of these alternative spaces have since become art world institutions in their own right, as exemplified by the spaces listed here.



through works that necessitate participation—both their own and audiences—in the continual unfolding of networked technologies and cultural practices.

Net-based art can intersect with arts institutions and organizations but more often effects emergent exhibition spaces and contexts wholly outside established institutions. Williams (1977) advises that the sociology of culture needs to attend to cultural production beyond institutions, to articulate particular formations with no direct institutional manifestations or relations (138). Many artist-run efforts to create and exhibit art outside of established institutions fits within this broad remit, but for Williams, it is also essential to draw out the particularities and contingencies of these formations—the technologies used, the practices performed, the socioeconomic factors at play. I aim to describe Paper-Thin as an example of one such formation: the networked alternative. By highlighting the social and technological issues that impact how the Paper-Thin curators and the participating artists create, stage, and care for networked exhibitions, and by illuminating comparisons to the artists' individual studio practices and experiences with similar alternative galleries and arts spaces, my goal is to illustrate how Paper-Thin functions as a distinct kind of formation central to artistic cultural production in the present moment, emphasizing digital curation as immanent to these processes of production.

While networked alternative is the term that I develop throughout the dissertation, Buckley and Smith have come to think of Paper-Thin as an artist-run platform. Especially with the rise of social media, the term 'platform' has been widely used but often with competing meanings to describe many different kinds of information systems and technologies possessing divergent characteristics. These varying uses of the term make it important to stress that Paper-Thin is not a platform in the sense of Facebook or Twitter. These are platforms in that anyone can make an account and use a suite of readymade functionalities to create content and interact

with other users. In contrast, Paper-Thin functions more like a gallery, as the curators invite artists to participate in each volume and engage in a curatorial dialogue about the artists' participation in the project. In this, Paper-Thin and other examples of networked alternatives I will discuss are also unlike earlier artist's online communities, for which membership and social relations among participants were both more fluid and enduring. Artists who have contributed to Paper-Thin do not constitute a community as such, as most of these artists do not know each other outside of their shared participation in a particular Paper-Thin volume and as relationships of interaction and exchange are largely not sustained after the conclusion of that volume.

For Smith and Buckley, Paper-Thin operates as a platform in the ways that they foster artistic experimentation with digital technologies: not in the form of a particular software system or service that artists interact with to create and share artworks but by setting up parameters for artists to explore and test out potential means of artistic production, collaboration, and dissemination. The curators achieve this by configuring a variable media ecology consisting of a core set of technologies, though open to other tools and systems introduced by the artists, and by putting in place baseline protocols for interacting with the technologies, other participants, and the curators—all of which artists can adhere to or generatively push up against. Paper-Thin is a platform in the sense of a foundation to build upon, depart from, or to serve as a hub for many intersecting connections.

This sense of the term informs Bogost and Montfort's (2009) notion of platform, which they and others have advanced through scholarship in the area of platform studies. For Bogost and Montfort, platforms are computing systems that support creative work and allow developers to work creatively on the platforms themselves, homing in on re-programmability as a key

characteristic. The Platform Studies book series, published by MIT Press and edited by Bogost,<sup>7</sup> provides examples of platforms that fit this definition: video game consoles like the Atari Video Computer System (VCS) or the Nintendo Wii, personal computers like the Commodore Amiga, as well as software tools like Adobe Flash. Platform studies elevates computing systems as sites of creativity and cultural production, but the focus ultimately remains on a given system.

Goriunova (2012) offers a more expansive definition of art platforms as assemblages of human and machinic agents organized over and through networked systems in ways that are plugged into processes of subjectification and creativity (6). Art platforms tap into and showcase a broad diversity of creative practices engaged with digital and networked technologies, occupying a grey zone between practices recognized as art and emergent aesthetic practices not yet wholly defined (7). This resonates with how Buckley and Smith envision Paper-Thin as a platform: not tied to a particular computing system or set of hardware and software but as a driver of artistic experimentation with the aim of actively seeking out new art forms and means of disseminating art. Rather than referring to a specific computing system, art platforms in this sense are organizational enterprises, coalescing and amplifying creative energies and artifacts generated through the complex interaction of many individuals and technologies “to the point of brilliance” (41). Networked alternatives like Paper-Thin, and the digital curation labor involved in sustaining these as living platforms, describe one approach to how these individual, social, and technological actors might be organized toward artistic production.

### **1.3) Statement of Purpose and Research Questions**

Within the broader research area sketched out above, the dissertation focuses on the information needs that artists and curators experience as they create, exhibit, and care for digital

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<sup>7</sup> [http://bogost.com/projects/platform\\_studies/](http://bogost.com/projects/platform_studies/)

and new media artworks, as well as the information sources that they draw on and the information practices that they develop to perform this digital curation work integral to their artistic activities. Despite a substantial and growing body of literature on artists' information needs and behaviors, only a few scholars have addressed how artists use digital and networked technologies as part of their general information practices (Koopmans 2009; Mason and Robinson 2011; Robinson 2014), and little attention has been paid to the information needs and practices associated specifically with the curation of digital and new media artworks and related archival materials (Molloy 2014). While artists regardless of their chosen medium share many similar experiences in their professional and creative work, such as applying for grants or managing information about pieces sold or featured in exhibitions, artists also experience challenges and seek out information highly specific to a given technology, technique, medium, or way of working. Artists working creatively with digital and networked technologies may need to document their source code or troubleshoot a technical issue with some open-source software they are adapting to experimental ends—all involving quite different information sources and practices than those for issues faced by artists working primarily with analog materials.

For essentially all artists today, technologies like digital cameras, image editing software, and networked information systems and services constitute core components of their regular creative and professional work. Even those artists not creating digital and new media art specifically and not exhibiting in networked alternative spaces are still likely performing digital curation work as they grapple with unwieldy personal information collections of emails, install shots, and social media posts. However, there are scant information resources, educational materials, or tools designed specifically to assist artists in the ongoing care of their digital artworks, personal archives, or other data related to their artistic careers. Of the wealth of

scholarship, tools, and resources on digital curation and digital preservation, these are largely tailored to working with collections in organizational or institutional settings, and otherwise fail to match up with how artists are creating, disseminating, and caring for art. Bentkowska-Kafel (2010) opines that “it is difficult to imagine an artist consulting textbooks on digital preservation and following recommended ISO [International Organization for Standardization] standards while embarking on an act of creation, or adhering strictly to such guidance once the work is released on the Web” (154). Whether or not Bentkowska-Kafel is correct in her assumption, she points out a blind spot of utmost importance to the longevity of digital and new media art: the information sources that these artists are drawing on and the information practices they are enacting remain unstudied and unknown.

Many scholars, conservators, and information professionals in the domain of digital and new media art have proposed conservation and preservation approaches that break with traditional custodial models of care (Rinehart and Ippolito 2014; Boutard 2015; Ensom 2015). I agree that the preservation of digital visual arts heritage requires the ongoing development of post-custodial or otherwise distributed approaches. However, these new and emergent approaches need to be built upon a deep understanding of artists’ information needs and practices pertaining to digital curation. Conservation approaches that involve collaboration with artists or archiving tools and services directed at artists should not be developed wholly from the perspective of cultural heritage institutions. As part of engaging with artists as active collaborators in the preservation of digital visual arts heritage, information professionals need to be attuned to artists’ own attitudes toward preservation, address prominent information needs that artists experience, integrate with artists’ existing digital curation and personal archiving practices, and also understand how these existing practices differ or depart from institutional

‘best practices.’ Artists are developing rich understandings of digital curation—what the ongoing care of complex digital objects entails and the deep interrelationships between these stewardship activities, artistic production, and how present and future audiences encounter this art—but the information practices of these artists diverge in significant ways from those in cultural heritage institutions. With this research, I aim to advance the availability of information resources, tools, and services for artists and curators involved in the digital curation of artworks and archives outside commercial or institutional contexts, but I believe that these efforts need to proceed based on a firm empirical foundation of how artists and curators are already going about this work and how various information sources and practices enter into this work.

The present research has built upon an exploratory study (Post 2017a), in which I conducted studio visits and semi-structured interviews with seven artists engaged with digital and networked technologies about the challenges and strategies involved in maintaining artworks in their custody. This exploratory study resulted in a number of interesting findings, all suggesting the fruitfulness of further research in this area. One finding was that artists’ conceptions and experiences of caring for digital artworks can differ markedly from institutional perspectives on digital art conservation. Several of the artists were not concerned with maintaining their artworks as persisting, preservable objects, placing value instead on the process of creating new works or substantially revising past works. For those who were concerned with preserving specific artworks, challenges in storing, exhibiting, and selling works were more pressing than the preservation challenges typically stressed in the research literature, such as format and media obsolescence. To address the challenges typically identified in the literature, artists pursued several creative preservation strategies, including proliferating copies of artworks online, attempting to build communities of practice around specific new media art forms, and

reproducing digital works in analog media like wood and paper. While these strategies are consonant with the ‘variable media paradigm’ (Rinehart and Ippolito 2014) that I discuss in chapter two, these would certainly not accord with traditional art conservation approaches.

Another major finding was that artworks and archival materials were not easily distinguishable in artists’ preservation practices. Components of artworks (such as source files, process materials, and documentation) were stored and maintained as part of artists’ broader studio and personal archives. By and large, artists were more concerned with preserving their overall archival collections than the maintenance of any discrete, individual artwork. Even for those artists who were not concerned with the preservation of specific artworks, they also maintained studio archives, and placed great value on the preservation of these materials for at least the length of their artistic careers. Although cultural heritage institutions also make considerable efforts to collect and preserve artists’ personal and studio archival materials, these are often seen as distinct from artworks, which are treated as discrete entities.

While this earlier research prompted these interesting findings, the study was limited in several significant ways. Primarily, my sample was homogeneous across many key dimensions: none of the artists were people of color; all of the artists were relatively early on in their careers; none of the artists were represented in the collections of major museums or galleries; and many of the artists were based in North Carolina, with only one artist based outside of the United States. Additionally, the extent of my research was relatively limited, as I only conducted one studio visit with each artist, and did not interview other individuals who might be involved in the process of caring for artworks, such as curators, conservators, collaborators, or collectors. Of these limitations, I intentionally selected artists working outside of major museums or collecting institutions, as I was interested in how artists manage artworks still in their custody. However,

the generally limited knowledge on artists' information needs and behaviors related to digital curation, along with the results of this earlier study, demonstrate the need for further research into this area.

The present study addresses some of the limitations of the earlier research while building a foundation for an ongoing research agenda. In terms of research design, which I touch on below, the present study both expands the scope by including more artists along with individuals in those artists' social worlds but also focuses on a particular arts space in Paper-Thin. To date, nearly 30 artists have participated in the three Paper-Thin volumes, representing a broad diversity in terms of geographic location, nature of artistic practice, stage in artistic career, gender, race, and country of origin. Across these volumes, the curators and the participating artists have experimented with new approaches to creating, disseminating, and caring for artworks using digital and networked technologies that are representative of the vibrant activity of artists engaged with new media at large. For these reasons, Paper-Thin has been an ideal case study to explore how artists are currently grappling with the care of their artworks and archival materials. I further elaborate the rationale and process for selecting Paper-Thin in chapter three.

As a networked alternative arts space that has brought together a wide range of artists, Paper-Thin has been a useful focal point. I have been able to branch out into the distinct information worlds and social worlds that each of the participating artists inhabits, while returning back to Paper-Thin as a shared point of contact. As discussed above, Paper-Thin does not constitute an ongoing community of artists, and I have not approached the research with that assumption, but the study participants' shared experiences of creating and exhibiting work as part of this artist-run platform have provided a common thread running throughout the study data and analysis. In contrast to the snowball sampling procedure used in the exploratory study, where



there were multiple branching connections among the study participants, this central focus has made it easier to position the artists' and curators' digital curation practices within an art historical context, specifically earlier examples of artistic efforts to establish alternative exhibition and dissemination contexts leveraging digital and networked technologies. While the participating artists all have markedly different artistic practices that reference and resonate with a full spectrum of ideas and works from throughout the history of art, the three Paper-Thin volumes and the role of Paper-Thin as an artist-run platform delimit the scope of this art historical analysis to a manageable degree.

In my study of Paper-Thin and the participating artists, my research questions can be stated as follows:

- 1) How do artists engaged with digital technologies as an integral part of their creative practices navigate the process of the long-term care of their artworks and studio archives?
  - a. What information needs do they experience at various stages throughout this process?
  - b. What factors influence these information needs and this process?
  - c. What information sources do they draw upon in this process?
- 2) What role does Paper-Thin play in this process, as an artist-driven platform for curating, disseminating, and caring for digital and new media artworks?
  - a. How has this platform impacted the information worlds of the participating artists?
  - b. What sociotechnical factors impact the development and sustainability of Paper-Thin?
  - c. How does the role of Paper-Thin compare with other kinds of arts institutions like museums and galleries in addressing needs related to the care of digital artworks?

#### **1.4) Overview of Research Design and Methods**

As noted above, the present research is a case study of the artist-run platform, Paper-Thin, including the curators of the project as well as the artists who have contributed work to the platform across the three volumes. I have used a situational analysis methodology (Clarke, Friese, and Washburn 2018) to design the study and define the units of analysis. The authors describe situations as “enduring arrangement of relations” of many entities, inclusive of the

human, technological, organizational, social, and any other factors or elements that may constitute this arrangement (17). While there are no clear rules for bounding the situation, as with more traditional approaches to case study research (Yin 2014), the researcher needs to make determinations about how to define the situation and what streams of evidence will be relevant to addressing the research questions. For the present research, I investigate the situation of artists engaged in the digital curation of their artworks and related archival materials with a focus on the information sources, other individuals, organizations, and technologies involved in developing and performing digital curation practices.

As artists leverage digital and networked technologies to not only create artworks but to also exhibit and disseminate artworks, I determined that it was essential to explore this situation for artists' individual creative practices as well as for artists and curators involved with alternative art spaces and platforms. To this end, there are two units of analysis: Paper-Thin as an artist-run platform, focusing on the digital curation practices of Smith and Buckley, the artist-curators running the project; and the artists who have contributed to the platform, focusing on the digital curation practices in their individual artistic careers though paying particular attention to how participating in Paper-Thin has entered into the development and performance of these digital curation practices. I detail the sampling procedure in chapter three, but I note here that I was able to recruit 14 of the 27 total artists who have contributed work to Paper-Thin.

I conducted semi-structured interviews with these 14 artists as well as with the two Paper-Thin curators, covering digital curation and personal archiving practices, wide ranging factors that shape the development and performance of these practices, and the kinds of information that the artists and curators seek out, generate, collect, and use as they develop and perform these practices. To provide concrete examples of the many kinds of information sources

discussed in the semi-structured interviews, I asked the artists to send me citations, links to, or copies of particular information objects that they had used to learn about or employ digital curation practices at any point in their creative process, from creation to ongoing care after a work had been exhibited. As I seek to understand digital curation as a cooperative activity carried out in—and helping to constitute—art worlds, I asked the artists to put me in touch with another individual with whom they had discussed digital curation or personal archiving matters, either in specific terms to address some issue or in more general terms. This resulted in an additional 11 study participants, including artistic collaborators, curators, and collectors. I conducted semi-structured interviews with these individuals in order to develop a richer sense of the many individuals and organizations fulfilling other roles in the digital curation of artworks and archives. I applied constructivist grounded theory approaches to coding the interviews (Charmaz 2014) along with situational analysis mapping techniques to analyze this data, all of which I lay out in chapter three.

I have employed these social science research methods as a means to think about digital curation as an inherently social phenomenon involving the interaction of many individuals in particular contexts, with aesthetic issues and art history conditioning these contexts in important ways. I used art historical theories and ideas from the history of art to analyze artworks created by the artists as part of their individual artistic practices, works produced as part of the three Paper-Thin volumes, and Paper-Thin overall as an artist-run platform for creating, exhibiting, and caring for digital and new media art. In particular, I have drawn on theories about the interrelationships between technology and art from the cultural Marxist tradition. Thinkers in this tradition, such as Walter Benjamin and Raymond Williams, have emphasized the shared material basis of artistic production and economic modes of production more broadly, all of which

contribute to the ongoing, transformative reproduction of social structures and cultural forms. For Benjamin ([1934] 1999), artists as producers who critically engage with technologies uncover political tendencies shaping production processes (769) while also suggesting alternative tendencies that viewers can follow and take up as they themselves become producers (777). While the ideas of these earlier scholars remain prescient, I have also drawn on more recent scholarship offering radical materialist perspectives on art and technology, namely the work of Matthew Fuller and particularly his concept of media ecologies (2005). These theories and ideas are especially appropriate for the present study, as many artists throughout the history of digital and new media art, as well as those involved with Paper-Thin, engage with digital and networked technologies precisely to respond to the political and economic factors shaping these technologies, and to envision and enact other modes of artistic production and cultural production more broadly.

These art historical approaches have integrated well with situational analysis. Rather than two distinct analytical processes, ideas from art history have informed my coding and mapping techniques and, likewise, these social science methods have guided and prompted my art historical analyses and comparisons. With both the art historical and social scientific methods, I have endeavored to assess how artists' and curators' digital curation practices are carried out in social worlds populated by multifarious individuals, technologies, and organizations and are shaped by many cultural, social, technical, economic, and political factors. Situational analysis provides means to visualize and analyze these dense ecologies and the cultural Marxist tradition provides ideas and approaches to think through how artistic and cultural efforts sit at the crux of these ecologies, both responding to these many factors and simultaneously motivating forces of change that in turn transform these ecologies. I further describe this integration as a particular

theory/methods package as a part of a full elaboration of the methods, study design, and analytical techniques in chapter three.

### **1.5) Overview of Main Findings**

In chapters four and five, I describe the artists' and curators' digital curation practices as they create, exhibit, and care for digital and new media artworks and related archival materials; and I position these practices within broader information worlds that encompass many intersecting and adjacent social worlds and are shaped by social, political, and economic factors at play in the broader lifeworld. Across the participants, I found significant similarities and important trends in information needs and practices. Overall, artists' and curators' information worlds are rich and varied, as they seek out information from a huge variety of sources and have developed diverse information practices to generate, interpret, collect, and use this information.

Some of these information sources and practices are centered in art worlds, especially for artists who have had works acquired by arts institutions or are represented by commercial galleries, but artists and curators of networked alternatives seek out, generate, and use information in many other social worlds both adjacent to and distant from art worlds. As artists and curators learn how to use technologies to both create and care for digital and new media artworks, they participate in communities of users and developers for both open-source and proprietary technologies, by posting to user forums, reading official and user-generated technical documentation, and watching video tutorials, especially on YouTube. In many cases, artists are both seekers and contributors of information resources in these communities, for instance, downloading open-source libraries to run 3D modeling software and then sharing assets created with that software. Artists also participate in art worlds as they work through digital curation information needs, mostly through informal conversations and more formal collaborations with

other artists, as they discuss issues and challenges held in common, share resources and strategies, or work through technical difficulties together on a collaborative project. Especially for artists who primarily work with digital and networked technologies in their creative practices, these interactions develop both through local arts scenes and online arts communities, often with overlap between participants in offline and online social worlds. These social worlds further intersect with the software communities described above, as artists can meet each other and discover shared interests in the creative applications of some technology.

The galleries, platforms, and arts spaces I describe as networked alternatives constitute another crucial meeting point for artists and others in art worlds with shared interests in digital and networked technologies. Paper-Thin is the focus of this dissertation, but I encountered other examples through the research, in particular the IRL Gallery<sup>8</sup> run by Caroline Turner and Ian Anderson and the And/Or Gallery<sup>9</sup> run by Paul Slocum. The curators, artists, and gallerists running these networked alternatives work through countless issues with artists to help them both create and then stage digital and new media art. Technical difficulties are enmeshed with aesthetic and conceptual issues as artists and curators experiment with technologies, often pushing them to unanticipated uses to explore new modes of artistic production and dissemination. After the conclusion of these exhibitions, the curators and gallerists then take on a primary role in caring for the artworks: maintaining an archives of the works exhibited by (at a minimum) storing the data but also performing more labor- and resource-intensive services like continuing to provide access to past works and undertaking preservation activities like migration, emulation, or recreation.

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<sup>8</sup> <http://irl.gallery/>

<sup>9</sup> <http://www.andorgallery.com/>

Artists and curators engage with wide and varied information sources and practices, as noted above, mainly motivated by the creation and exhibition of artworks. However, these information practices that are developed in the course of creating and exhibiting works seed practices for the ongoing care of artworks and archives. This learning takes place in artists' individual creative practices, as well as through their participation in networked alternatives like Paper-Thin. Through the cooperative work of staging networked exhibitions, the interactions between artist and curator are generative to many ends: producing artworks but also contributing to the artists' and curators' situated knowledges that they will continue to enact as they create new artworks and care for existing works. For artists, directly working with digital and networked technologies in the creative process is perhaps the most fundamental source of information for developing and performing digital curation practices.

Networked alternatives are at the core of the emergent patterns of cooperative activity involved in caring for digital and new media art outside of cultural heritage institutions. Not only do these galleries, spaces, and platforms provide means for artists to exhibit works outside these institutional settings and experiment with new modes of artistic production, but artists also develop digital curation practices through their participation with networked alternatives, and the curators take on a primary responsibility in caring for work exhibited through these spaces. Taken together, the artists and curators act as the first stewards of digital and new media art, maintaining both materials constituting these works—the data, software, hardware, and other analog components—as well as the dynamic sociocultural contexts in which these works were initially created, exhibited, and continue to persist.

The emergent patterns of cooperative activity that center around networked alternatives illustrate larger changes within and across art worlds, and pose implications for museums,

academic art programs, and cultural heritage institutions more broadly. While artists and curators of networked alternatives perform critically important work as they care for digital and new media art, this labor is incredibly precarious, often volunteered by the artists and curators on the basis of strong personal and professional motivations but largely without the support of external financial or material resources. I suggest that museums have a potential role in these emergent patterns of cooperative activity, for instance by providing distributed digital storage infrastructure or contributing to the development of open-source digital art curation tools, but that any work to these ends must proceed with careful consideration of the community's needs and desires and the social, political, and economic dimensions of any such institutional intervention. Undergraduate and graduate academic art programs also stand to transform how they support artists' digital curation practices. Although many artists in the study matriculated in or graduated from these programs, few received formal digital curation education through their coursework. As digital curation skills are increasingly essential for artists to carry out both creative and professional activities throughout their artistic careers, academic art programs cannot exclude this from their curricula.

Cultural heritage institutions more generally are contending with changes in how individuals, communities, and organizations produce material records of their activities and interact with digital information systems. In many ways, digital and new media art sits at the frontier of these changes, as artists create complex digital objects that test the limits of digital curation and digital preservation techniques and approaches. While the scope of the present study is relatively limited, the findings pertaining to how artists and curators care for digital and new media art outside institutions, along with the attendant implications for how these materials are



cared for within institutions, speak to current questions about how libraries, archives, and museums collect, appraise, describe, provide access to, and preserve digital cultural heritage.

## **1.6) Summary**

In this introduction, I have laid the groundwork for the chapters to follow. I have described the research area of digital and new media art curation, pointing to significant tensions and departures between how these materials are cared for within and outside cultural heritage institutions. As artists and curators of smaller galleries, arts spaces, and platforms are the first individuals involved in the creation, exhibition, and ongoing care of digital and new media art, the digital curation practices that they develop and perform now impact the long-term material and sociocultural record of today's digital visual arts heritage. I have outlined the research questions and the design of the present research with the intention of addressing some of the most important issues in this area, namely the information needs that these individuals encounter as they create and care for digital and new media art, and the information practices they develop and perform to seek out, generate, collect, interpret, and use that information to undertake digital curation labor. There is a need for information resources, tools, and services designed specifically for artists engaged in the digital curation of their artworks and archives, but these must be developed with a firm empirical understanding of the challenges artists are actually facing and the practices they have already cultivated to address these issues.

## **CHAPTER 2: LITERATURE REVIEW**

In this chapter, I provide a detailed description of the scholarly and intellectual background that my study has drawn upon and to which my research contributes. I first define the foundational concepts that undergird my study, explaining why these concepts are particularly important for my research. I then develop the broader theoretical and conceptual framework of information worlds and art worlds, discussing how they have been applied in the study. I next review the main areas of research that have informed the present study, including various approaches to cultural heritage preservation, artists' information needs and behaviors, and artists' engagements with networked technologies. Throughout, I explicate how my study contributes to these areas of research.

### **2.1) Foundational Concepts**

In this section, I define three foundational concepts that inform my research questions, study design, and methods, as well as my overall understanding of the research area. I detail the difficulties of circumscribing digital and new media art but provide my rationale for using this category. I discuss my use of the information needs and information seeking behaviors concepts and some related theories from the LIS scholarship, as well as how I adapt these for thinking about artists' digital curation practices. Finally, I describe the relationship between digital curation and digital preservation in LIS, while expanding this sense of digital curation to include ideas about curation from art history and museum studies.

### 2.1.1) Digital and New Media Art

The overarching goal of the proposed study is to advance research in the area of digital and new media art curation, and I have already frequently used these terms throughout the introduction. However, the categories of ‘digital art,’ ‘new media art,’ and other related terms are complicated, contested, and permeable. The category of ‘digital art’ implies a distinction from traditional art forms like painting, sculpture, and mixed media, but contemporary painters, sculptors, and mixed media artists also maintain websites and advertise work on Instagram. Many artists producing nominally ‘analog’ art objects make use of digital technologies and software as part of their creative practices. While I use the terms ‘digital’ and ‘analog’ to differentiate those objects that are performed within computing environments from those that exist in a material form apart from such environments, this distinction breaks down when thinking about artworks as dynamic objects with many forms and instantiations. For example, Oliver Laric, Aleksandra Domanović, Christoph Priglinger, and Georg Schnizter developed *VVORK* (2006-2012),<sup>10</sup> a website for sharing analog artworks by artists exhibiting in venues underrepresented in dominant art criticism discourses and publications (Domanović, Laric, and Jones 2015, 108). Though itself a contested term, McHugh (2011) advances the notion of ‘Post-Internet’ to describe art created at this juncture of online and offline worlds, discussing many artists who work in ‘traditional’ media but are influenced by or respond to the conditions of a networked society.

Despite these complexities, digital and new media art function as categories with currency across art worlds. Art history texts describe digital and new media art as distinct genres of art, with distinguishing features and canonical works (Greene 2004; Paul 2015). Curators

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<sup>10</sup> <https://web.archive.org/web/20190301205623/http://www.vvork.com/>

organize exhibitions around the theme of digital technology, such as the recent *Thinking Machines* show at the Museum of Modern Art,<sup>11</sup> which explored not only artworks created with computers but also computers as artfully-designed objects. Categories of digital and new media art inform collecting practices, as many museums continue to develop collections under these headings,<sup>12</sup> with prominent issues pertaining to collecting and exhibiting new media artworks reflected in lively and ongoing discourses (Graham 2014). Additionally, many organizations and institutions are dedicated specifically to the collection, exhibition, and preservation of digital and new media art, such as Rhizome,<sup>13</sup> Ars Electronica,<sup>14</sup> and Zentrum für Kunst und Medientechnologie (ZKM).<sup>15</sup>

The ready and widespread use of these categories—‘digital art,’ ‘net art,’ ‘media art,’ and so on—belies a more complicated and vexed relationship between artistic practices engaged with digital technologies and arts institutions than these labels suggest. Digital artistic practices and artworks have long been ghettoized or outright excluded from art history texts and art museums. Stallabrass (2009) notes several key difficulties that net-based art, specifically, poses for the art world. Net-based art raises the question of what constitutes an ‘art object,’ challenging not only institutional collection and exhibition practices but also the conventions of the art market. Bosma (2011) also warns against the tendency of labels like ‘Internet art’ or ‘media art’ to reinforce notions of medium-specificity, as if the Internet (or any other digital technology) is a medium like oil paint with certain inherent material properties that all artworks using that technology

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<sup>11</sup> <https://www.moma.org/calendar/exhibitions/3863>

<sup>12</sup> <https://www.sfmoma.org/artists-artworks/media-arts/>

<sup>13</sup> <http://rhizome.org/>

<sup>14</sup> <https://www.aec.at/news/>

<sup>15</sup> <https://zkm.de/en>

necessarily adhere to or work against. Bosma acknowledges that artists do indeed work with and against the materiality of digital technologies but emphasizes that net-based art (and digital art more broadly) is characterized by a radical diversity of practices and creative approaches that engage with any number of technical, social, and material layers comprising digital technologies.

Although the labels of ‘digital’ or ‘new media’ do not adequately speak to the diversity of creative practices and approaches engaged with digital and networked technologies, and can obscure the multiple and varied historical lineages of artists making use of these technologies, the categories do have cultural significance and practical utility. In terms of digital curation, these categories serve pragmatic purposes, as artworks dependent upon digital technology face unique preservation and conservation threats and require quite different preservation and conservation treatments from those employed for analog media. However, conservation treatments affect the history and the aesthetic experience of artworks; so digital and new media art curation must consider artworks in all their complexity, even as unsubtle categories like ‘digital art’ do serve a number of broader purposes.

For purposes of this study, I use the term ‘digital and new media art’ by adapting the inclusive and expansive sense of ‘new media’ put forth by Rinehart and Ippolito (2014). ‘New media art’ is a widely used vernacular term that Rinehart and Ippolito employ to refer to “not the latest gizmos available now but to expressive technologies of any period that outpace their culture’s ability to control them” (235). Artists enter into this space opened up by new technologies to both explore novel creative applications and to critically reflect on unanticipated complications and implications for society. Although I will focus on artists who engage with digital technologies specifically, I follow Rinehart and Ippolito in connecting these artists and artworks to broader lineages of artists who critically engaged with technologies like video, radio,

or television when these were also ‘new media.’ Rinehart and Ippolito use this expansive sense of new media to make historical connections between current artistic practices and historic artists like Nam June Paik, who manipulated analog television sets to create strange and variable sculptures, and art tendencies like conceptual and performance art of the 1960s, which also challenged traditional notions of the ‘art object’ and other arts institutional conventions. While I use the phrase ‘digital and new media art’ to encompass this diverse array of artistic practices, I also frequently use the term ‘digital and networked technologies’ to refer to the broad range of technologies artists engage with in the creation of digital and new media art.

This expansive sense of digital and new media art has been crucial for my study. First, many of the artists included in my study work across digital and analog media, and so focusing exclusively on a strictly delimited ‘digital art’ would have hampered my ability to take full account of these artists’ creative practices. For example, John Harlan Norris creates acrylic and oil portraits but fashions models for his paintings by photographing assemblages composed of objects associated with his portrait subject and then intricately Photoshopping these images into surreal visages. Second, I hope for the results of my research to apply broadly to art conservation issues relevant to historic as well as current artworks. Conceptual, performance, and installation art from past decades also face conservation issues comparable to current digital and new media art, and my research aims to contribute to broader discourses in contemporary art conservation. As I detail in my research design below, my study includes artists representing a diversity of approaches to creatively working with digital technology in order to reflect this expansive notion of digital and new media, with the intention that the results of my research will be broadly applicable.

### 2.1.2) Information Needs, Behaviors, and Practices

In the LIS discipline, ‘information’ is one of the most oft-defined and yet most ambiguous concepts. Saracevic (1999) likens information to other basic concepts like justice or life, which remain difficult to precisely define even as researchers in jurisprudence and biology continue to make advances to better understand the manifestations, behaviors, and effects of these essential ideas (1054). For the purposes of this study, I depart from Buckland’s (1991b) notion of information as thing. Buckland discusses how information is also discussed as a process (for instance, looking for information on a topic using an online search engine) and as knowledge (or information that an individual has internalized). However, these other senses of information depend upon pieces of information that have material existence in the world: books, newspapers, speech, or websites, for instance. I refer to Buckland’s notion of information as thing in my study to encompass a wide range of possible sources of information that artists draw on as they go about caring for their artworks and managing their personal archives, including not only books, manuals, websites, and consultations with information professionals but also experiments with materials or examinations of earlier artworks. The artists in this study engage in a variety of information-seeking processes, such as combing through software user forums and watching YouTube videos in order to gain knowledge required to create and care for artworks—but all of this necessarily proceeds from the information artifacts used by the artists.

In my study design and research questions, I also apply the foundational concept of information needs to ascertain how artists respond to challenges in the care of their artworks and archives, and the kinds of information sources they use to address these issues. Belkin (1980) describes information needs as ‘anomalous states of knowledge,’ representing some gap in an individual’s knowledge about a topic. These needs are often difficult for individuals to fully

specify or articulate, as they may lack the requisite terminology or the complete knowledge that would enable them to address the information need in the first place. In a similar vein, Taylor (1968) outlines four stages in the development of information needs: first beginning at a visceral, unconscious level; next progressing to an acknowledged, conscious need; then formalized and articulated by the individual; and finally compromised as the individual deals with the realities of the information systems to which she poses her information need.

Responding to these information needs, information behaviors are the practices that individuals, groups, and organizations engage in to find, organize, preserve, use, and otherwise interact with information. LIS scholars have proposed many models and theories of information behavior, which have suffused my understanding of artists' digital curation practices. This reflects how artists integrate a wide range of information sources into their creative and digital curation practices. While the artists in the study do experience discrete information needs and perform various information behaviors to find information sources that meet these needs, these concepts as they have traditionally been defined and applied do not neatly match up with artists' creative and digital curation practices. Cowan (2004) makes the point that artists use and apply information in quite diverse ways, often as part of creative processes, driven by curiosity, as part of cyclical or iterative investigations, or responding to issues of perception and expression, none of which can easily be characterized in terms of discrete information needs or behaviors. Artists in this study do experience information needs—such as, how do the Unity<sup>16</sup> and Unreal<sup>17</sup> game engines differ—and do seek out particular information sources like technical documentation

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<sup>16</sup> <https://unity.com/>

<sup>17</sup> <https://www.unrealengine.com/en-US/>



shared on community message boards, but these needs and behaviors are situated within artistic practices and processes that do not follow a straightforward, linear resolution.

For instance, Smith and Buckley experimented with both Unity and Unreal as they built the first volume of Paper-Thin, weighing many factors as they decided which engine to use, substantially recreating vast sections of the first Paper-Thin environment in the process. These considerations included the visual capabilities of the engines, which engine was more widely used by the digital arts community, and the ability to embed the resulting virtual environment in a web browser for audiences to easily access. Smith and Buckley arrived at and worked through these considerations dynamically and over time through the process of experimenting with the technologies and in discussion with one another, leading to a decision to use Unity that continues to impact how they care for the artworks featured on the platform. Describing this decision as a discrete information need resolved by a particular information source found as a result of a particular information behavior would dramatically flatten the reality of how Smith and Buckley interact with information as a critical component of their artistic and curatorial processes.

I apply the terminology of information needs, information seeking, and information behaviors, but, throughout the dissertation, I integrate these terms into a vocabulary of information practices. By ‘information practices,’ I mean the embodied and enacted activities of individuals as they engage with, interpret, and use information in its socially-, technologically-, and materially-contingent forms. Savolainen (2008) talks about information practices as “tools for the furtherance of everyday projects” (50). Embedded in daily activities and attending to how individuals ply information to targeted ends, this sense of information practice as tool recalls De Certeau’s (1984) analysis of the practice of everyday life. De Certeau argues that practices of consumption that permeate day-to-day existence in capitalist society are acts of “secondary

production,” which change the commodity in the process of making use of it, potentially to subversive or unexpected ends that stand to transform the dominant cultural economy (xiii-xiv). The concept of information practices characterizes a similar transformative process, as individuals fashion tools, approaches, or techniques out of available information—including information they have generated themselves—to achieve some end, such as creating, exhibiting, or caring for an artwork. These information practices often take up information from many sources, crucibles that produce something altogether different or new.

I have also found the vocabulary of information practices useful for the present research project, as this conforms with how artists and curators describe their own activities. Artists talk in terms of their creative practices or studio practices, and likewise curators discuss curatorial practices, in both cases to denote both specific modes of engagement with technologies and artistic mediums as well as to frame broader conceptual approaches to artistic production and dissemination that inform these specific modes of embodied engagement. The vocabulary of information practices echoes these descriptions of artistic and curatorial practices but focuses in on the role of information seeking, creation, and use in these material, social, or technological processes. While the language of ‘behaviors,’ which evokes behavioral psychology, locates the need for and use of information within the individual, ‘practices’ places emphasis on how the individual works with and against information in its material forms and carries out these activities in sociocultural contexts, often in direct participation with particular people or broader communities. In the case of this research, artists’ information practices related to digital curation involve grappling with the limits and possibilities contingent to pieces of hardware and software and working with artistic collaborators, curators, and others to negotiate how artworks are exhibited, collected, and cared for at the juncture of these disparate parties.

Still, I draw on the concepts, theories, and models of information needs and behaviors to analyze and think about the experiences relayed by the artists in the study, and I use these terms especially when referring to concepts taken up from the LIS scholarship. In particular, I have used theories of information seeking behaviors within the broader framework of information worlds described below. This theoretical framework has helped me to understand discrete information needs as part of dynamic and complicated processes and to identify the social, political, and aesthetic factors and the diverse range of actors shaping artists' information practices undertaken in response to these needs.

### 2.1.3) Digital Curation

In the introductory chapter, I refer to the long-term care of digital and new media artworks and related archival materials in terms of both digital curation and digital preservation. By 'digital curation,' I mean a holistic approach to the stewardship of digital materials that involves actively working with and adding value to these digital materials across the life cycle and directly engaging with various stakeholders for these materials at different life cycle stages—as carried out by creators, users, and stewards both in and outside of institutional contexts. These stakeholders may include the creators of digital materials, collaborators or other individuals using digital materials shortly after the point of creation, cultural heritage professionals interested in the long-term preservation of these materials, and secondary users in domains both related to and distinct from that of the original context. For instance, Wallis et al. (2008) describe a digital curation effort with ecologists that aimed to integrate an archival orientation towards ecological sensing data into research activities like experimental design, data capture, and metadata description in order to facilitate the long-term use and preservation of these data sets within the scientific community.

As Beagrie (2006) details, digital curation emerged and developed during the 2000s out of the recognized need to build common vocabularies between scientific and digital library and archives communities, as well as new approaches that proactively integrated data stewardship at stages of data creation, use, sharing, and long-term preservation and access. Bringing to bear the expertise and goals of these various communities, digital curation activities aim to add value to digital materials for both current and future users. According to this sense of the term, digital curation is a superset of digital preservation, including all the activities that make up digital preservation, as well as additional activities like working with content creators earlier in the life cycle of digital materials. Lee and Tibbo (2011) emphasize that the skills and competencies required for digital curation work are highly consonant with the skills and competencies required for the archival profession. Indeed, many LIS degree programs now offer specializations and certificates in digital curation, and all manner of information institutions post jobs for ‘digital curator,’ specifying that applicants possess skills and knowledge similar to those job descriptions for ‘digital archivist’ or ‘digital records manager.’

While the notion of digital curation defined in the scholarly literature and informing LIS curricula focuses on professionalized activities carried out in cultural heritage institutions, Dallas (2016) argues for an expanded sense of digital curation, inclusive of the wide range of ways that individuals organize, use, save, and share digital materials outside of these institutional, custodial contexts. Even though digital curation has traditionally foregrounded practices and methods for information professionals to work with content creators early on in the life cycle of digital materials, Dallas critiques a power dynamic that pervades these approaches: information professionals, equipped with best practices and sophisticated tools, on the one side; and creators and users of digital information occupying a ‘wild frontier’ on the other. For Dallas, this ‘wild

frontier' mindset establishes an entrenched division between professional and vernacular practices that risks effacing the meaning and value of digital materials that can only be grasped in particular contexts of use.

While professionalized digital curation instrumentalizes digital materials as assets to be evaluated for preservation and future use (428), individuals in other contexts create, use, save, and share digital materials in ways that differ dramatically. As Dallas points out, this is especially evident with information practices on the Web, “which produces patterns of digital resource production, management, and use that blur the boundaries of what is (to be) curated, where it resides, at what point it may or may not be curated, by whom, and what curation consists of in that context” (424). Along with the many divergent ways that ‘digital curation’ can currently be seen in practice, Dallas acknowledges the intellectual and etymological lineage of curation in museology that reaches much further back than the LIS definition of digital curation and encompasses varied and dynamic approaches to the care of cultural heritage objects. Curation in this specific context of visual art continues to change and develop, as curators not only embrace new ways for presenting and contextualizing artworks—methods that, in turn, alter how audiences, critics, and art historians think about art—but also pursue curation as a creative, artistic project in its own right (O’Neill 2012).

Throughout the dissertation, I develop a polysemous sense of digital curation that characterizes how artists and curators in the study manage data and digital objects across complex information systems as activities integral to the selection and dissemination of artworks in networked, artist-run platforms like Paper-Thin. Digital curation as the holistic care of digital objects across their life cycles is immanent to and inseparable from the curation of artworks on networked alternatives—and truly the curation of digital and new media artworks more

generally. However, as I develop the nuances of digital curation as it is practiced by the artists and curators in this study, the artists running Paper-Thin and other related galleries and online platforms expressly question curation as it is practiced in museums and commercial galleries, seeking new models that enable artists to experiment with digital and networked technologies and forge communities around digital and new media art that function outside typical arts institution and market constraints. This curation of the digital requires artists and curators to grapple with the technical difficulties of migrating works across formats and software environments, organizing massive amounts of information, and adapting complex artworks to the specifications of particular pieces of hardware; but these digital curation activities are part of artistic production, processes intrinsic to the creative labor of staging and caring for artwork on digital networks.

These artists have established practices that leverage digital technologies to care for their artworks, but the meanings of these practices would be distorted if viewed solely through lens of professionalized digital curation. In this dissertation, I seek to understand how these practices function as digital curation embedded in this particular context. As networked technologies continue to reshape how individuals and cultural heritage institutions alike interact with digital information—stored using cloud services, retrieved via mobile devices, and shared over social media platforms—Dallas (2016) calls for a “fundamental re-examination of the nature, scope, and actors of digital curation” (437). I draw on the robust scholarly discourse around digital curation from cultural heritage and scientific data communities, and I also aim to contribute to this discourse by analyzing the practices, technologies, and motivations involved in the care of artworks in online, artist-run platforms.

## **2.2) Conceptual and Theoretical Framework**

I draw on two related concepts to form the theoretical framework for my study: information worlds and art worlds. I first discuss Jaeger and Burnett's (2010) notion of information worlds as a general concept for thinking through how the diverse range of factors and elements constituting situations might influence information needs and practices. I then describe art worlds as a particular example of information worlds, a connection that I advance and explore in chapters four and five. Throughout, I point out how both information worlds and art worlds integrate with the methods of situational analysis. Information worlds and art worlds can be readily characterized and analyzed using social worlds/arena mapping techniques, which I more fully detail in the following chapter.

### 2.2.1) Information Worlds

Jaeger and Burnett (2010) describe the theory of information worlds as an effort to enhance the understanding of the role of information in society by analyzing “the myriad interactions between information, information behavior, and the many social contexts in which they exist” (7). The authors propose that the ways in which individuals find, use, and make meaning out of information are influenced simultaneously by local contexts as well as broader social contexts, pointing to the impact of public institutions, the media, and political discourse among other factors. To address how these local contexts and broader contexts intersect, interrelate, and mutually influence one another, Jaeger and Burnett join Chatman's (1999) theory of life in the round with Habermas' ([1981] 1987) conception of the public sphere and the related notion of ‘lifeworlds.’

From Chatman, Jaeger and Burnett (2010) derive four basic concepts for understanding information worlds: social norms, social types, information behaviors, and worldview; this final

term they revise slightly as information value. According to Chatman's (1999) theory of 'life in the round,' each of these four concepts helps to characterize how individuals handle uncertainty and ambiguity. Social norms refer to the propriety of different behaviors in a given social context, governing what constitutes acceptable or unacceptable interactions in a particular small world. Social types refer to the roles that different individuals play in the small world, such as gatekeeper or arbiter. As used by Chatman and Jaeger and Burnett, information behaviors follow closely how I define the term in the previous section, encompassing the wide range of practices individuals engage in to find, share, and use information. Information value is how individuals in a small world appraise and make sense of information. Taken together, all of these serve to structure a horizon of meaning, or a life in the round. While Chatman researched social contexts marked by information poverty like prisons or retirement homes, Jaeger and Burnett expand the concept of small worlds to include all manner of social contexts.

Information worlds describe not only the small, localized social contexts of individuals' interaction with information but also how those small worlds intersect and are embedded within broader assemblages of social factors and actors. To understand these larger social contexts, Jaeger and Burnett (2010) turn to Habermas' related theories of the public sphere and lifeworld. For Habermas ([1962] 1991), the public sphere is both an historical and idealized space of collective information exchange across all members of a society. Historically, there have been various sets of technologies and practices that have enabled public sharing of information, from ancient Roman public squares through to the Internet. Although all ostensibly public, many factors have constrained access and the ability to contribute to these public spheres, notably, for Habermas, class-based economic structures, with some groups gaining privileged control over



communication infrastructure. Enveloping the public sphere, Habermas' notion of the lifeworld consists of the entirety of the collective information in a social environment (26).

While the theoretical conceptions of both the small world and the lifeworld are rich in their own rights, the authors demonstrate how each complements the other: the particularity and situated concreteness of the small world adds specificity to Habermas' often abstract notions of the public sphere, while the idea of the lifeworld enables a broader perspective on how various small worlds interrelate and build up to exert influence on or otherwise take part in larger social contexts. Taken together, Jaeger and Burnett assert that the theory of information worlds provides a much-needed analytical framework for examining how micro, intermediate, and macro social contexts interrelate in a networked information ecosystem. For instance, artists navigate many intersecting contexts—including immediate social groups of friends and peers, various galleries and collecting institutions, and funding agencies like the National Endowment of the Arts—as they find and implement information relevant to their artistic practice.

Although Jaeger and Burnett discuss the social as broken into micro, meso, and macro contexts, I adapt their theory following the post-structural and postmodern perspectives offered by Clarke, Friese, and Washburn (2018) in situational analysis. As described below, situational analysis approaches the social in terms of complex ecologies of human and nonhuman actors, discourses, economic and political processes, and sociotechnical factors. Analyzing social phenomena as 'situations' explicitly proceeds from a belief that these assemblages cannot be broken into easily stratified layers of distinct contexts: "there is no such thing as context in [situational analysis], only the contextual whole, the situation as a whole that is to be described and analyzed through mapping" (Clarke, Friese, and Washburn 2018, 49). With the theory of information worlds, a similar concern motivates Jaeger and Burnett (2010), and this is the

justification behind joining Chatman's account of small worlds with Habermas' notions of the public sphere and lifeworlds: information is social, and thus shaped by social factors both local and broad. I take the foundational premise of the theory but depart from their preservation of distinct micro, meso, and macro levels of social context.

To understand information needs and information behaviors in a particular situation, such as artists carrying out the digital curation of their artworks and archives, I agree with Jaeger and Burnett that scholars need to think about how small worlds are interpenetrated and interpolated into meso and macro social contexts, although I contend that these are all already ecologically related—not small world *and* macro social context, but small world *as part of* a complex, contextual whole. Small worlds are not separable from these broader contexts, nor are they isolated from each other. Individuals occupy many different small worlds, and information passes across small worlds, even as this transfer can involve the transfiguration or radical reevaluation of that information. Art worlds are among these small worlds that the artists in my study traverse, although as I discuss next, these are also multifarious and dynamic components of this broader contextual whole—neither a singular 'art world' that all artists encounter in the same way nor a statically defined set of social norms, types, practices and values.

While I make use of many key ideas from Jaeger and Burnett (2010), the present study is not expressly an effort to analyze the study participants' shared information world. In future work, I plan to model the information world of artists and curators involved in networked alternative arts platforms and further develop the social norms, social types, and systems of information value impacting how these individuals create, exhibit, and care for art using digital technologies. In the present study, however, I am principally concerned with understanding the shifting patterns of cooperative activity constituting art worlds, elucidating the new kinds of

individuals, communities, technologies, and practices integral to the digital curation of art on networked alternative arts platforms. I have put the theory of information worlds into conversation with the theory of art worlds—both being theoretical approaches to social worlds—to emphasize the role of information and information practices in the artists’ and curators’ digital curation activities. Next, I turn to this theory of art worlds in more detail.

### 2.2.2) Sociology of Art and Art Worlds

Broadly speaking, the sociology of art examines how art fits within larger social processes like economics or politics, how these larger social processes impact art, and how art itself functions as a social world. In my research, I examine how artists find and use information pertaining to digital curation; these practices are necessarily embedded in broader social dynamics and processes involved in the creation, dissemination, and interpretation of art. The theory of information worlds gets at the relation between information use and these social processes, and I supplement this more general theory with the concept of art worlds, as derived from the sociology of art.

Danto (1964) advances the concept of an ‘artworld’ as part of a philosophical definition of art. Reviewing theories for distinguishing art from non-art, Danto argues that these earlier efforts do not provide necessary and sufficient conditions that account for all artworks. Danto asks what distinguishes Robert Rauschenberg’s *Bed* (1955)<sup>18</sup> from a bed, or Andy Warhol’s *Brillo Box* (1964)<sup>19</sup> from a Brillo box. He proposes that to see these as art “requires something the eye cannot decry—an atmosphere of artistic theory, a knowledge of the history of art: an artworld” (580). Much in the way that Bourdieu, Darbel, and Schnapper ([1969] 1990) contest

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18 <https://www.moma.org/collection/works/78712>

19 <https://www.moma.org/collection/works/81384>

that the ‘natural’ appreciation of art actually necessitates a deeply ingrained cultural education about what art is and how to experience it, Danto posits that the defining feature of art is a socially-constituted, historically-situated institution of an artworld. The nature and character of this institution change over time and across cultures, but all art becomes art through some interaction with the artworld. Without acculturation to this institution, Rauschenberg’s *Bed* will appear to be a messy, strangely positioned bed with paint spilled all over it.

Dickie (1974) extends Danto’s definition of the artworld to propose a more complete institutional analysis of aesthetics and a more particular articulation of what constitutes an artwork under this institutional rubric. Dickie defines art as “1) an artifact [and] 2) a set of the aspects which has had conferred upon it the status of candidate for appreciation by some person or persons acting on behalf of a certain social institution (the artworld)” (34). In short, an artwork is any artifact that has been deemed an artwork by someone in the artworld. As Dickie clarifies, the institution of the artworld is only loosely organized, an “established practice,” but contingent and malleable (31); and anyone who sees herself as a member of the institution is “thereby a member” (36). Under this definition, anyone acting on behalf of this institution (even the artist herself) can confer candidacy of the status of art on some artifact. As the word ‘candidacy’ suggests, the artwork does not have to be lauded or affirmed as significant but merely possess the *potential* to be appreciated. Dickie acknowledges that this is an expansive and circular definition (something is an artwork when it is recognized as an artwork, and the artworld is the institution that confers the status of artworks), but he affirms that the circle is nonetheless “large and informative” (43). As with Danto, Dickie’s definition draws attention to the essential importance of the institutional context of art, not only in the contemporary moment, but also across the history of art.

Building on this institutional definition of art, Becker (1982) describes ‘art worlds’ (now styled as two words) with a greater degree of sociological detail. With his discussion of art worlds, Becker is not so much interested in distinguishing art from non-art—or in making aesthetic evaluations about good art and bad art—but instead seeks to understand how art is created, shared, and received via social processes. In the vein of Strauss’ (1978) social worlds/arenas approach, Becker describes art worlds as particular kinds of social worlds, with their own commitments, practices, techniques, places, and discourses. In describing art worlds as social worlds, Becker advances his main thesis that artworks are necessarily the result of cooperative activity: artists, yes, but also manufacturers and distributors of artistic media, gallerists, curators, conservators, art handlers, dealers, and, importantly, audiences. As these complexes of cooperative activity become routine, they form more or less enduring social patterns, and these form the foundations of art worlds.

These patterns are by no means consistent nor stable, as there are many different art worlds and as all art worlds are in continuous processes of change. Conventions emerge in response to this dynamism, representing “the continuing adjustment of cooperating parties to the changing conditions in which they practice” (59). As conventions shift, as individuals introduce innovations or respond to constraints, art worlds can splinter off, forming subgroups or new art worlds entirely. In either case, fostering new art worlds or sustaining existing ones requires mobilizing resources: not only an artist’s ability to acquire materials for a new work but also a manufacturer’s capacity to produce and distribute these materials, a museum or gallery’s capability to exhibit the work, and an audience’s knowledge of how to experience the work. All these activities require resources, including money, as well as skills, infrastructure, and techniques.

In this study, I describe the digital curation of artworks and related archival materials as a cooperative activity involving many stakeholders performing a number of different roles. As discussed in the following section, conventions over how to best approach the preservation of these materials are developing but nonetheless nascent. Even as practices for preserving digital and new media artworks solidify in cultural heritage institutions, less sure are practices in other contexts like the artist's studio or a small gallery space. Artists who creatively and critically engage with digital technology also participate in new (and in some cases still emergent) art worlds, forming conventions that depart from traditional custodial models in which museums, commercial galleries, or collectors are primarily responsible for conservation and long-term care. In many cases, these artists and artworks explicitly challenge many such conventions. In chapter five, I detail these new regimes of cooperative activity involving diverse stakeholders both similar and divergent from art worlds described by Becker and other sociologists of art. Specifically, I attend to the role of information in these processes: the kinds of information artists are seeking, where they are finding this information, how they make sense of this information, who they are discussing these issues with, and how they are putting this information to use.

Although the concepts of information worlds and art worlds have shaped my research from its initial conception through to analysis and writing, I have taken care to reflect on the influence exerted by these extant concepts. As discussed in the following chapter, sensitizing concepts and received theories are important for initiating and positioning research, but these should not overdetermine the interpretation of the data. The creation, sharing, and care of digital and new media art represent a situation quite different from the art worlds discussed by Becker or the information worlds described by Jaeger and Burnett, and so in my research I have added

to, adapted, and broken from this initial conceptual and theoretical framework, all of which are born out in the following chapters.

### **2.3) Relevant Approaches to Cultural Heritage Preservation**

In this section, I review the literature of several areas of cultural heritage preservation scholarship and practice, including digital preservation, art conservation, post-custodial and community-driven approaches to archives, and personal information management (PIM) and personal digital archiving (PDA). I discuss the relevance of each of these areas particularly as it pertains to the digital curation of artworks and related archival materials.

#### 2.3.1) Digital Preservation

From the perspective of materials and technology, many digital and new media artworks resemble other kinds of digital objects more than analog artworks, and so the preservation of digital artworks necessarily draws upon strategies and approaches of digital preservation. As Chiantore and Rava (2012) discuss of contemporary art in general, artists throughout the 20<sup>th</sup> and 21<sup>st</sup> centuries have used non-traditional analog and digital materials, requiring the field of art conservation to turn to other areas of expertise to inform conservation and preservation treatments. I delve into art conservation in the next section, but here I cover the development of digital preservation, focusing on the implications for and applications to the care of digital artworks and related archival materials.

While this section largely covers digital preservation from the perspective of cultural heritage institutions and professionals, all of this provides necessary background for understanding digital preservation issues that artists face in their creative and professional practices. Artists in the study encounter discourses on digital preservation research, for instance in interactions with museum professionals when artworks enter into museum collections. For

instance, the Victoria & Albert Museum (V & A) recently collected works by one of the Paper-Thin artists, Andy Lomas, and the acquisition process involved detailed discussions on file formats and future migration pathways, among other issues pertaining to the ongoing care of his works. Additionally, any resources or services implemented in cultural heritage institutions to help artists better undertake digital curation efforts earlier in the life of artworks will also be grounded in this research area. Literature on personal perspectives on archiving and information management is also important background, and I cover this in a later subsection.

Concerns over long-term access to digital information have run corollary to the development of digital technology itself, although earlier efforts were diffused across many areas of professional practice and did not begin to coalesce around a shared terminology and discourse of ‘digital preservation’ as such until the 1990s. Social scientists have collected digital information since the 1930s, initially on machine-readable punch cards. These data sets continued to grow through 1950s and 60s and have been stewarded in social science data archives intended to support the long-term use by future social scientists (Rokkan 1966). Computer scientists and engineers have called attention to the longevity of electronic storage media (Bertram and Cuddihy 1982). Archivists, who have long been tasked with preserving analog and paper-based media, have discussed the role of computer automation in archives (Hickerson, Winters, and Beale 1976), as well as the archival care of digital information. For instance, Mallinson (1986) argues that transferring machine-readable records to microfilm represents “the simplest and most effective means of permanent retention of the information in these records” (147). While I cannot describe the full scope of early efforts to preserve digital information, it is important to recognize that many such practices existed and developed as part and parcel of the use of digital technology itself. In a similar fashion, the artists in the study



confront the longevity of various digital information (and challenges to it) as a core part of their creative practice. Although none are conservators or archivists, pushing digital technologies to new and unanticipated uses necessarily engages artists in actively thinking about how to sustain materially-precarious artworks.

By the mid-90s, cultural heritage professionals and information scientists signaled the need to develop more concerted and systematic efforts to ensure the longevity of digital materials, laying the groundwork for the field of digital preservation as such. As noted above, digital information had been around for decades, but many areas of society saw dramatic growth in the regular use of digital information, and information professionals were becoming increasingly aware of the real and potential threats to the long-term viability of digital materials in the collections of libraries, archives, and museums. Hedstrom (1998) declares this situation a “time bomb” for these cultural heritage institutions: although technologies for mass storage of digital information had advanced remarkably to this point, cultural heritage professionals still lacked any proven standards, protocols, and methods for the long-term preservation of these expanding digital collections.

Conversations about the impending “digital dark age” attended this growing awareness of the vulnerabilities of digital information (Kuny 1997; Brand 1999), and some continue to peddle this fear of this total information loss, for instance Internet pioneer and current Google guru Vint Cerf.<sup>20</sup> While this millenarian rhetoric misrepresents the current situation and obscures the decades of work that has already been undertaken to build up infrastructure to guard against this cultural loss, the general public interest in digital preservation is highly notable. Digital technologies have been around long enough, and have been used for a broad enough range of

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<sup>20</sup> <http://www.bbc.com/news/science-environment-31450389>

purposes, that many individuals have experienced loss, corruption, or simple misplacement of digital materials in some fashion: hard drives crash, important files cannot be found, and web-based services change their terms of use or go out of business altogether. These kinds of discussions are important junctures between academic and institutional research and the broader public. In the domain of the visual arts, there has likewise been increasing public attention about challenges and strategies of digital preservation, for instance a recent partnership between Google Arts & Culture and Rhizome—featuring the aforementioned Cerf.<sup>21</sup> Through these public-facing initiatives, artists are already thinking about digital preservation, often gaining awareness of the issues and developing an interest in learning further skills and competencies to take care of their own materials.

The two major digital preservation approaches for keeping older digital information accessible on current software and hardware environments are format migration and emulation of obsolete systems. For both of these approaches, the regular refreshing of storage media, or copying digital information to new storage media, is also necessary as older media degrade. Advancing on the findings of the Task Force on Archiving of Digital Information (1996), a large-scale research effort to identify and address key issues in preserving digital materials, Hedstrom (1998) discusses the serious limitations of format migration as a strategy. Migration may succeed in preserving the content of digital objects but may also fail to capture structural characteristics, aspects of the display, or functionalities of the digital object in its original format—a limitation all the more pressing for dynamic digital objects, such as interactive hypermedia, or other emerging formats on the Web. Rothenberg (1999) is especially sensitive to the limitations of migration articulated by Hedstrom and highlights the importance of

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<sup>21</sup> <https://blog.google/topics/google-europe/preserving-digital-art/>

maintaining aspects of the look, feel, and functionality of a digital object as it existed in its original hardware and software environment. A digital object is more than just the information it contains: digital objects are made meaningful through interpretation and use, which encompasses the user's experience of the look, feel, and functionality of the digital object. Rothenberg posits emulation as a more extensible, flexible, and scalable preservation strategy that also more faithfully preserves the look, feel, and functionality of digital objects in virtual recreations of their original runtime environments.

As Rothenberg emphasizes, emulation is not without its limitations, and he outlines several challenges that need to be addressed for emulation to be advanced as a preservation strategy for digital cultural heritage. As emulation requires hardware and operating system specifications, which can be proprietary for many systems, institutions need to deal with issues of intellectual property to emulate these systems. The long-term success of emulation also depends upon thorough, human-readable annotations, or metadata, for digital objects, articulating key aspects of the context of particular digital objects as well as more general technical requirements. The crux of emulation as a preservation strategy is the ability to specify emulators now that will continue to function on future, unknown systems, and to achieve this Rothenberg asserts the need for standardized and formalized descriptive taxonomies that can capture the full range of behaviors for digital objects and software programs and all relevant attributes of hardware platforms.

As part of the Creative Archiving at Michigan and Leeds Emulating the Old on the New (CAMiLEON) project, a joint effort at the University of Michigan and the University of Leeds to study emulation and migration as preservation strategies, Granger (2000) provides an overview of the debates surrounding emulation. Granger agrees with Rothenberg that emulation can

address shortcomings of migration but critiques Rothenberg's position as absolutist, attempting to stake out emulation as a once-and-for-all solution when the actual landscape of digital preservation is far more complex and demands a more nuanced tact. Institutions potentially carrying out emulation are each situated in their own unique political and financial situations, and as such not all institutions will be able to implement emulation in the universal and uniform way that Rothenberg envisions. Granger also suggests that the reality of the current "digital jungle" of highly varied hardware platforms, pieces of software, and operating systems is exceedingly complex for such a uniform and universal solution. However, Granger also critiques the other extreme position that emulation should play no part in digital preservation efforts. Instead, Granger endorses a third, middle way with emulation as a strategically deployed digital preservation solution for particular cases, especially when look, feel, and functionality are of central relevance to the significance of a given digital object.

As Rosenthal (2015) observes in his detailed overview of the state of emulation, in the intervening years, format migration has become the predominant digital preservation strategy. Despite the advocacy of Rothenberg and others, technical, economic, and legal barriers have made emulation unfeasible as a digital preservation strategy for all but a minority of special cases. However, developments in emulation have reduced some of those barriers for cultural heritage institutions, namely new emulation frameworks that transparently deliver access to emulators integrated into webpages via cloud services, namely the Emulation-as-a-Service (EaaS) framework developed at the University of Freiburg.<sup>22</sup> While developments in emulator frameworks have made the implementation of emulators in cultural heritage institutions more feasible, Rosenthal also outlines a number of further barriers that require more attention. Perhaps

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<sup>22</sup> <http://eaas.uni-freiburg.de/>

the most pressing issue is that the legal basis for emulation as a preservation strategy for cultural heritage materials remains unclear and often quite restrictive. There are also minimal systems of long-term technical support for emulators—a serious barrier for institutions with limited in-house technical resources.

In the face of these existing challenges, a variety of institutions have successfully advanced efforts in implementing emulation, particularly for the preservation of digital artworks. For instance, Rhizome has used the EaaS framework to preserve and provide access to a number of CD-ROMs by artist Theresa Duncan.<sup>23</sup> Suchodoletz, Rechert, and Valizada (2013) describe the benefits afforded by delivering access to emulators via a cloud-based web client: the EaaS framework centralizes the specialty software needed to run emulators, and then provides distributed, remote access to these specialized configurations as a cloud-based service. In other implementations, EaaS can be run on a local machine as a Docker container or hosted as a service at an institution. For a more scalable and widespread integration of the EaaS framework as part of a broader digital preservation strategy, cultural heritage institutions need to develop sustainable funding models, along with the other obstacles discussed above. Developing emulation as a scalable and affordable preservation strategy is the focus of the Emulation-as-a-Service Infrastructure (EaaSI) project at Yale University.<sup>24</sup>

The look, feel, and functionality of digital systems are often critically important to the meaning of digital artworks, and so emulation should be pursued as a preservation strategy for this class of cultural heritage materials. However, there are notable limitations for emulation as a strategy to preserve digital art that must be acknowledged as well. While Rothenberg (1999)

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<sup>23</sup> <http://archive.rhizome.org/theresa-duncan-cdroms/>

<sup>24</sup> <http://www.softwarepreservationnetwork.org/eaasi/>

argues that emulation helps to capture the original context of a given digital object, Lee (2011) has discussed in detail that ‘context’ is itself a complex concept, the intricacies of which are often not fully unpacked in digital preservation discourse and practice. For Lee, context can mean the “set of symbolic expressions or representations” that encompass a given entity, the characteristics of the situation in which an entity occurs, or “aspects of the mental or physical state, disposition, intentions, identity, or recent experiences” of the individual interacting with a given entity (97). Information relating to any and all of these senses of ‘context’ may be important to capture in order to preserve not only the physical makeup of a given digital object, like an artwork, but also the more elusive social and cultural significance of that object. This may include contextual information from when the work was first created or from over the course of the object’s life as it dynamically persists over time.

Scholars and information professionals working in the area of digital preservation should also interrogate the extent to which emulation faithfully captures the look, feel, and functionality of a given digital object. First, emulation may recreate aspects of the look and feel of a historical software environment while still failing to convey how one would have originally created or used an object in that environment. This contextual information regarding the conditions of use and structures of meaning particular to the time of an object’s creation is critical to the form of expression but is not well captured by emulation. Sköld (2018) describes this as the ‘expanded notion’ of an archival object, including social and cultural contexts in addition to the digital object itself. Sköld discusses this expanded notion in terms of video games as digital objects enriched by the social and cultural aspects of play, but this concept can be readily applied to digital and new media art objects as well. Far from providing individuals accurate insight into

archival objects, emulation of historical systems may breed misinterpretation of how information objects were created or used in earlier time periods.

Additionally, even though an emulator may approximate the look and feel of the original interface, the experience of interacting with an emulated version of a digital object can differ in key ways from the original hardware and software environment (Hedstrom et al. 2006). As discussed by Rieger et al. (2015), several factors can come into play: the improved processing power of a newer machine may cause the work to behave differently as aspects of the work load more quickly than before; users interact with the keyboard, mouse, and other peripherals of newer machines, which may be quite different in terms of physical characteristics like size, texture, layout, or responsiveness. These differences result in distinctive experiences that may have a bearing on the viewer's perception or interpretation of an artwork, a tension that the Guggenheim Museum explored in the 2004 exhibition "Seeing Double," which featured digital and new media artworks with original and emulated versions paired side-by-side.<sup>25</sup>

Just as with migration, emulation too shapes the resultant preserved digital object and influences a user's experience of that object. Hedstrom et al. (2006) investigated this aspect of emulation, conducting a study comparing users' "perceptions and responses to digital objects in their original format to those same objects preserved using emulation and migration" (160). This study explored both users' preferences in interacting with digital objects as well as their perceptions of which versions were most authentic. In both cases and across the different kinds of digital objects used in the study (which included a video game and speech outlines), the authors found that it was not easy to rate emulated, migrated, or original versions as 'better' or 'worse' than the other versions. Users preferred versions for different reasons; for instance, many

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<sup>25</sup> <https://web.archive.org/web/20140911121017/http://www.guggenheim.org/new-york/press-room/releases/press-release-archive/2004/643-march-3-seeing-double-emulation-in-theory-and-practice>

users preferred the emulated version of the video game because it was easier to play than the original. Users also brought a complex of reasons to bear in determining the ‘authenticity’ or ‘originality’ of a given object, including appearance and layout, but also associated metadata such as the date the file was ‘last modified.’ Emulation does not so much maintain the original context as it creates a new context for the digital object: a preservation environment designed to approximate the look, feel, and functionality of a digital object but an environment that is still necessarily constructed for a set of purposes likely quite distinct from that of the original runtime environment.

Another major issue is that existing digital preservation strategies have been developed largely to preserve relatively simple digital objects: single files that can be migrated to new formats, moved to new storage media, or run in an emulator. However, these strategies begin to break down for more complex digital objects. This is especially pertinent for digital and new media artworks, as these are rarely a single, self-contained file. Artworks may be analog and digital hybrids, such as installation works including both digital components and analog sculptural elements. Even fully digital works may encompass many interrelated digital files. In some cases, some of these digital components may be interactive or dynamic, such as live data streams or input from viewers. All these complexities are not easily addressed by emulation—or other digital preservation strategies for that matter.

To begin to confront these challenges, the Jisc-funded initiative Preservation of Complex Objects (POCOS) held a series of symposia that brought together researchers working to preserve three different kinds of complex digital objects: digital artworks, video games, and data visualizations (Delve and Anderson 2014). Among the challenges raised for the preservation of digital artworks, Abbott (2014) discusses the interactive nature of much digital art, which only



functions through direct involvement of the viewer. Paper-Thin v1 and v2 are prime examples of this: both are VR environments comprising many interrelated artworks connected by an individual's experiential movement through the space. As Abbott describes, such works are not single objects, but rather are constituted through ongoing, iterative processes, or “system[s] of communication” (298).

With cases of interactive and dynamic works, it becomes difficult to identify what constitutes the actual ‘object’ to be preserved. This issue was addressed by the InterPARES project, a major international research effort that has examined how the essential archival concept of the ‘record’—characterized as an authentic, evidentiary document, the provenance of which can be carefully traced—must be adapted for electronic materials (Duranti 2007). In the second phase, the team expanded their scope to study interactive and dynamic digital objects, including digital artworks, inquiring how these kinds of digital materials further challenge the requirements of authentic and evidentiary digital records set out in the first phase (Duranti and Thibodeau 2006). While the requirements that a record's content, form, and integrity need to be maintained over time are often difficult if not impossible to uphold for digital artworks, Duranti and Thibodeau suggest that dynamic electronic documents can still be constituted as ‘records’ as long as the variability is intended as part of the prescribed behavior of that object. For digital artworks, even this notion of ‘prescribed variability’ may not be a sufficient addendum to the requirement, as many artworks explore uncertainty and foster unpredictable results. To capture this prescribed variability, Duranti and Thibodeau suggest that artists need to become key players in defining the ‘essence’ of dynamic digital artworks, providing instructions for how the artwork is intended to behave and outlining the key components of the work, for instance through artist interviews (Abraham and Beerkens 2012).

Heslop, Davis, and Wilson (2002) also describe the need for archivists to delineate the ‘essence’ of digital objects. The authors characterize digital objects as ‘performances,’ rendered at the juncture of many variable components: the object source file, the hardware and software needed to render the file, and the researcher, situated in her own particular context. As the variable conditions of this performance can result in quite different instantiations of presumably the same digital object, archivists cannot hope to achieve fixity and integrity of digital records in the same way as analog records. Instead of maintaining unchanged, stable objects, the authors propose describing the essential characteristics of a digital object and striving to maintain these essential aspects across performances. Archivists can then direct resources toward maintaining these essential aspects, instead of attempting (likely in vain) to preserve an ideal, wholly unchanged, ‘original’ digital object. Indeed, according to this approach, the conditions constituting a digital object are always performative and contingent, meaning that there is no single original version of a given digital object.

Hedstrom and Lee (2002) define those aspects of a digital object that “affect their quality, usability, rendering, and behavior,” as “significant properties” (218). As with Heslop, Davis, and Wilson (2002), Hedstrom and Lee suggest that archivists need to be able to target those properties that are most significant to the meaning, interpretation, and ongoing use of a given digital object and use these considerations to drive digital preservation decisions. While acknowledging the importance of the concept of significant properties for digital preservation, Yeo (2010) calls attention to several difficulties and limitations of significant properties. Primarily, Yeo discusses the complexity and variability of significance, as there can be no single, exhaustive, or stable definition of the significance of any given object. The properties identified as significant will depend on the individual or community using the object, and significance is

also likely to change over time, both within and across communities of use. For instance, an artist's understanding of her own work may differ from how audiences experience it, and both of these interpretations may be equally important to document (Jones and Muller 2008). Despite this variability and complexity, Yeo observes that much of the work on significant properties has been carried out by archivists, librarians, and curators, representing only a slim proportion of the diverse populations who engage with digital objects.

Attending to the inherently dynamic nature of much digital and new media art, Depocas, Ippolito, and Jones (2003) describe a set of strategies in what they term the 'variable media approach.' Aided by tools like the Variable Media Questionnaire,<sup>26</sup> a freely available piece of software developed by Still Water in conjunction with a number of institutions including the Guggenheim and Whitney museums, artists collaborate with institutions when works enter into collections to articulate the essential aspects of interactive and dynamic artworks and specify the extent to which these aspects can change over time. If a particular material is no longer available or piece of hardware no longer functions, museums can recreate these obsolete aspects and still achieve the same intended interactive and dynamic experience for new viewers of the work. Tools like the Variable Media Questionnaire can be seen as part of a larger strategy of documentation, using artist and audience interviews, photography and videography, or detailed description to create a more stable record of interactive digital artworks that persist even after the work itself may no longer function. Abbot (2014) observes that documentation has been used to create records of works of performance art, as well as other performing arts like dance and music, and lists a number of documentation models that have been developed specifically for digital and new media art, such as the Documentation and Conservation of the Media Arts

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<sup>26</sup> <http://variablemediaquestionnaire.net/>

Heritage (DOCAM) model,<sup>27</sup> which tracks events at all different stages of a work's lifecycle, from creation to collection to conservation. Innocenti (2014) suggests that these kind of comprehensive documentation models can help maintain the provenance of digital artworks, all of which must stay in a constant "state of evolution," revived by one digital preservation strategy or another, in order to remain in existence (82).

Echoed by Yeo (2010), Depocas, Ippolito, and Jones (2003), and others, the preservation of digital objects calls for the involvement and intervention of other stakeholders beyond cultural heritage professionals. As I have discussed, digital preservation involves far more than technical decisions about what file format to use or what storage media to invest in, hinging also upon how cultural materials are interpreted and made sense of in a variety of contexts. For digital and new media artworks—cultural objects that are especially sensitive to interpretation—artists can and should play a role in determining how these materials are preserved, among other stakeholders like audiences, critics, historians, and conservators. However, artists' attitudes towards preservation, artists' involvement in institutional preservation practices, and artists' own preservation and archiving practices remain understudied in systematic, empirical research.

### 2.3.2) Art Conservation

Many digital and new media artworks challenge traditional, custodial models of collection, exhibition, and care in arts institutions. One of the primary motivations for conducting research on the information needs and practices of artists is precisely because many such artworks remain in the custody of artists, resist persistent and static reification as durable objects, or otherwise necessitate alternative, post-custodial approaches to conservation and preservation. However, these artworks are also collected and cared for by institutions, and even alternative,

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<sup>27</sup> <http://www.docam.ca/en/documentation-model.html>

artist-driven approaches to the long-term care of these artworks exist in dialogue with a broader context and history of art conservation. Across diverse contexts of care, many enduring questions of art conservation continue to bear on digital and new media artworks. How do we define the ‘essence’ of an artwork? To what extent should an artist be involved in the conservation of her own works? What is the role of the conservator, and how much liberty can she take in altering a given work? In this section, I briefly trace these questions through the history of art conservation, specifically addressing how these questions continue to apply to digital and new media artworks. I also outline some new and emergent approaches to art conservation and consider the implications of these for digital and new media artworks.

Objects do not gain value as cultural heritage in a vacuum but rather are constituted as such by complex sociotechnical processes; for art objects specifically, this cultural value is constructed and maintained in part through art world institutions, such as museums, galleries, and art historical scholarship. Pearce (1993) describes the underlying social, historical, and philosophical trends that have undergirded how museums make meaning out of the “lumps of the physical world to which cultural value has been ascribed” (4). This includes the infrastructure of museums, like documentation systems and storage spaces; policies and procedures informing professional practice in areas such as curation, exhibition, conservation, and education; and intellectual frameworks for interpreting objects, such as functionalism, semiotics, and various modes of historiography. Conservation is one strand of this broader complex of sociotechnical processes by which objects gain meaning through museological collection and care, and this has developed historically as a body of professional practice alongside the evolution of museums as public-facing cultural heritage institutions.

Conti (2007) tracks the historical development of restoration and conservation practices and approaches from the 15<sup>th</sup> century to the turn of the 20<sup>th</sup> century.<sup>28</sup> Conti describes social, political, cultural, and economic factors that have influenced the development of conservation and restoration, articulating the historical contingencies of conservation to two ends: not only have practices of maintaining and preserving artistic cultural heritage developed in response to historically-situated factors, but the variable and dynamic development of conservation has also in turn shaped the historic artworks that conservators continue to care for today. The artworks in museum and gallery collections have passed through the care of earlier conservators, each of whom may have brought different aesthetic philosophies and attendant practices to bear on the same work. For any given artwork, this accumulation of conservation and restoration activities all contribute to the overall history of the piece.

Through manuals, publications, and other outlets, many central issues of art conservation such as the intentions of artists, the role of conservators, and the relationship between works in original and conserved states began to be actively discussed during the 19<sup>th</sup> century. Following the loss of a great many artworks during the Napoleonic wars, Rome and other Italian provinces fortified state support for the conservation of artistic heritage, developing state-funded programs for systematically managing conservation and restoration efforts for public artworks (Conti 2007, 271). By the end of the 19<sup>th</sup> century, a rich discourse had developed around issues and challenges of conservation and restoration, laying the foundation for the later professionalization of the field of art conservation. With some writers arguing for the need to preserve the authenticity and historical value of artworks and others prioritizing the maintenance of cogent aesthetic

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<sup>28</sup> Although restoration and conservation are terms often used interchangeably to refer to the general practice of preserving objects of cultural heritage, I will use restoration to refer to more active efforts to return a work to a previous state and refer to conservation as more passive efforts to prevent or slow down effects of deterioration.

experiences of preserved artworks, these debates not only served to inform processes of professionalization for the fields of conservation and cultural heritage at the turn of the 20<sup>th</sup> century; these discourses also continue to have relevance for the preservation of digital and new media art. Despite novel technological challenges, the preservation of digital and new media artworks still confronts questions that have dogged conservators for centuries.

One such issue is restoration, and the extent to which a conservator should actively alter or intervene into an artwork in order to maintain the material integrity of the work. This was a question of heated debate and controversy in the 19<sup>th</sup> century around the restoration of architecture in particular. One of the main proponents of active restoration was Eugène Viollet-Le-Duc, an architect responsible for restoring many significant Gothic churches throughout Europe. Viollet-Le-Duc ([1854] 1996) argues that “an edifice ought to be restored in a manner suitable to its own integrity” (316) but recognizes that the restorer comes up against a number of practical issues that inhibit him or her from maintaining an absolutely pure ‘original’ state of a building. Attending to both the aesthetic experience and history of the building while also responding to present needs, the restorer as understood by Viollet-Le-Duc is engaged in an essentially creative act. As Viollet-Le-Duc states, “to restore an edifice means neither to maintain it, nor to repair it, or to rebuild it; it means to reestablish it in a finished state, which may in fact never have actually existed at any given time” (314). This kind of creative intervention was met with staunch opposition by figures like John Ruskin and William Morris. Ruskin ([1880] 1996) asserts that restoration “is a Lie from beginning to end,” destroying the authentic, historical traces that a building bears in a forged attempt to return the edifice to some prior state (322). In the “Manifesto of the Society for the Protection of Ancient Buildings,” Morris ([1877] 1996) agrees with Viollet-Le-Duc that historic buildings do not exist in a pristine

original state and have aged or been modified over time, but he argues that restoration obscures this rich and varied history precisely by trying to resuscitate the earlier style of the building in total—efforts destined to fall short as a shallow imitation.

Against the backdrop of these 19<sup>th</sup>-century debates, the field of art conservation and cultural heritage began to develop into a professional practice, balancing the need to respect the historicity of cultural heritage materials while also responding to practical exigencies required for these materials to persist into the future. Clavir (1998) asserts that the two constitutive values in the field of conservation as it professionalized over the course of the 20<sup>th</sup> century were a belief in the integrity of the cultural heritage object and the application of scientific methods in the care of these objects. Clavir emphasizes that integrity does not have a single, concrete definition in conservation but generally intends that the intrinsic nature of the object is not altered, a ‘nature’ that includes physical, aesthetic, conceptual, as well as historical attributes. Related to the integrity of the object, Clavir (1998) describes how the application of scientific methods developed as a core value within the professional field of conservation. In addition to the general value accorded to science in the wake of the Enlightenment, Clavir highlights the years following World War I as the period in which conservation crystallized as a profession. The war accelerated the pace of scientific and technological development but also caused great destruction to cultural heritage. Responding to this, the British Museum turned not to traditional restorers but rather to scientists, founding the Department for Scientific Research, a hugely influential body in the broader development of the conservation field.

Muñoz Viñas (2005) observes that contemporary conservation theories, approaches, and practices have begun to diverge from these underlying principles of the integrity of the object and the privileging of scientific methods. In contrast to classical conservation, Muñoz Viñas



describes contemporary theories of conservation as a negotiative process, through which conservators engage in dialogue with all stakeholders invested in the meaning and cultural value of an object. This approach to conservation recognizes that there is no singular ‘True’ state of an object but rather that meanings and values are socially and subjectively constructed and that the conservator has an active role in constructing the meaning of cultural heritage objects. Instead of acting as the expert and sole authority, the conservator needs to share this responsibility to ethically care for cultural heritage objects belonging to many different cultures. I suggest that this can be linked to broader postmodern intellectual trends that have manifested in archival discourse as well. Cook (2012) characterizes the current archival paradigm in terms of similar community-driven approaches, according to which archivists recognize the subjective influence they exert in shaping the historical record and strive to distribute archival authority by working with a diverse range of stakeholders in the care of archival materials.

Building on early research into digital preservation challenges facing libraries, archives, and museums (Task Force on Archiving of Digital Information 1996; MacLean and Davis 1998), Besser (2001) was among the first to extend these discussions to preservation problems particular to digital and new media artworks, suggesting that these kinds of works necessitate the very shift in art conservation practice described by Muñoz Viñas. In addition to hardware, software, format, and storage media obsolescence, Besser identifies two additional issues that are of special importance to the conservation of digital and new media artworks. First is the ‘inter-relational’ problem, or the inherently interconnected nature of much digital art, and especially net-based art, which does not consist of a single object but rather of many interlinked pages or data streams. Second is the translational problem, or how changes to hardware and software

affect the look, feel, and functionality of an artwork across different versions, discussed above in terms of emulation and migration.

As Besser points out, one of the key aspects of digital art is the difficulty of separating the ‘work’ from its display device or substrate. These issues underly a fundamental question for conservators: what constitutes the boundary of the ‘work’ to be preserved? Responding to and furthering critical consideration about the nature of the ‘art object’ initiated by conceptual and performance artists of the 1950s, 60s, and 70s, artists working with digital and networked technologies raise this question in the new terms and particularities of digital media. These kinds of works cannot be conserved with the same set of practices as paintings or sculptures, and in response, conservators have developed new practices like artist interviews and generating technical documentation. Besser urges that art conservation will need to undergo such a shift in approaches and practices to care for digital and new media artworks as well, taking cues from approaches to preserving conceptual, performance, and installation art, while paying attention to the particular technological requirements of digital works. The major shift that Besser advocates is for conservators and curators to actively work with artists to define the boundaries of the ‘work’ and to articulate what specifically should be preserved. This approach does not necessarily privilege the artist’s intent as the sole grounds for interpretation but does recognize the importance of the artist’s intent as part of the essential curatorial and museological context surrounding the work and as an important perspective for future conservators as well as researchers and audiences.

This expansive and participatory paradigm for art conservation has been further developed by Rinehart and Ippolito (2014), who have advanced the variable media approach mentioned above (Depocas, Ippolito, and Jones 2003). According to this approach, Rinehart and

Ippolito argue that the material substrate of new media artworks be treated as variable and that these artworks should not be defined as a unique object or set of objects but rather as an intellectual or conceptual entity that can be instantiated in any number of ways. There may not be a definitive, ‘authentic’ form for a work; instead, new media works may be characterized as a provenance of variable instances that have taken different forms in varying material configurations over time. With the variable media approach, Rinehart and Ippolito reconsider not only the shape and form of the ‘artwork’ but also rethink the role of the artist, the curator, and the audience, all of whom may take on active roles in shaping future instances of an artwork. In an understanding of conservation as inherently creative that echoes the position of Viollet-Le-Duc, the artwork is not an artifact to be affixed once and for all but a living entity to be sustained and (when necessary) reinvented.

Along with new theoretical approaches, conservators also need to adopt new techniques and skill sets quite distinct from those required in the care of analog materials. Engel and Wharton (2014) observe that the care of software-based artworks often necessitates the involvement of interdisciplinary teams with a range of expertise, including computer science and LIS, in addition to traditional art conservation knowledge and skills. In particular, Engel and Wharton discuss the role of software documentation and source code analysis as crucial new skill sets for conservators and information professionals engaged in the care of software-based art. Though the cultural heritage aims of museums differ markedly from the primary objectives of software engineering, museums can employ practices of software maintenance to ensure the long-term preservation of software-based art, such as acquiring the software libraries used by the artist in programming the artwork and working with the artist to provide further documentation needed to make sense of the software, like annotations or comments on the source code. As

discussed below, artists also frequently need to learn these kinds of skills in the creation and care of digital artworks—often drawing on information sources from open-source software and other technological development communities to meet these needs—although the existing literature on artists’ information needs and practices has not thoroughly explored this area.

The ongoing development of these new theoretical approaches and techniques takes place within the broader, shifting landscapes of art worlds. As Lurk, Espenschied, and Enge (2012) describe, digital cultural heritage generally, and digital artworks in particular, often frustrate traditional institutional approaches. While institutions like museums, libraries, and archives focus on the collection and custody of discrete objects deemed to have historical or cultural value, digital cultural objects exist in aggregate in the context of various sociotechnical systems. Paper-Thin v1 and v2 both consist of discrete digital objects contributed by individual artists, but these all come together within the context of the Unity environment embedded in a web browser. Although it is conceivable that any of these individual pieces—or even an entire volume of Paper-Thin—could be acquired into an institutional collection, this removal from the networked context would significantly alter the work.

Even digital and new media artworks represented in institutional collections may have distinct and ongoing lives in public, networked spaces. Lurk, Espenschied, and Enge highlight community-driven preservation projects, like the torrent of Geocities homepages salvaged by the Archive Team,<sup>29</sup> characterizing these as efforts to preserve not just discrete objects but rather the entire social, cultural, and technical context in which these corpora of cultural heritage materials have been constituted. The authors argue that community and institutional approaches can be reconciled, suggesting that institutions treat whole platforms as entities or ‘objects’ to be

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<sup>29</sup> <http://blog.geocities.institute/about>

preserved. As discussed above, emulation can play a significant role as a preservation strategy to maintain the data of digital objects along with the context surrounding the data; however, as Lurk, Espenschied, and Enge demonstrate, emulation in this sense is far more than a merely technical solution, needing to create a virtualization of not only hardware and software but also social, cultural, and experiential aspects. Digital cultural production often encompasses a corpus of interdependent objects created by and exchanged within a community of users—not a single blog post but a blog roll; not a single Geocities page but a neighborhood.

Serexhe (2013) urges that the unique issues and challenges posed by digital and new media art necessitates that the field of conservation rethink many of its core tenets and practices. For Serexhe, this paradigm shift in artistic production calls for a paradigm shift in how artworks are collected, exhibited, and conserved. In line with Serexhe, Ensom (2015) suggests an alternative model for collecting and conserving digital art, moving away from a custodial model where unique works are held and cared for by institutions, and towards a model of open, online distribution. Examples such as Rhizome's ArtBase<sup>30</sup> or the Archive of Digital Art<sup>31</sup> demonstrate that media arts organizations have been moving in this direction, by maintaining repositories of digital art available for free online—although these still largely follow the institutional model, with each artwork separated from its original context (although catalog entries may include links to where the work was originally presented, if the site or service is still available) and re-presented as a discrete work. As many of the above authors make clear, digital and new media art signals the need for changes in how institutions care for cultural heritage materials. However, the precise changes to be implemented are still up for debate, and conservators, information

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<sup>30</sup> <http://rhizome.org/art/>

<sup>31</sup> <https://www.digitalartarchive.at/database/database-info/archive.html>

science researchers, and other cultural heritage professionals continue to prototype, test out, and assess viable and sustainable models for caring for digital and new media artworks.

### 2.3.3) Post-Custodialism and Community Archives

As noted in the previous subsection, the contemporary conservation paradigm detailed by Muñoz Viñas is consonant with related approaches in the archival field, namely post-custodialism and community archives. The bodies of literature on these archival approaches can usefully inform alternative and non-custodial methods for preserving digital and new media artworks, complementing potential models for collaborative conservation between artists and conservators, as well as other digital curation tools or services offered to artists earlier in the life of artworks. In this subsection, I provide an overview of the history, theory, and issues involved in post-custodial and community archives and discuss some examples of synergy between the archives and art conservation fields in implementing related post-custodial and community-driven approaches.

Ham (1981) introduces the notion of a ‘post-custodial era’ for archives. Observing dramatic changes in the technologies for creating, sharing, and storing recorded information, Ham argues that the traditional custodial practices of archives—in which archivists act as custodians of a relatively small collection of documents, caring for these within the physical place of the archival institution—can no longer meet the complexities and challenges attendant to an emerging computerized society. Not only are individuals and organizations producing more information on a wider variety of media, but due to the speed of technological change and other threats outlined above, much of this is already at risk of being lost to the historical record before it has a chance to pass over the custodial archival threshold. The kernel of the post-custodial approach is a new kind of relationship that Ham envisions between established archival

institutions and proliferated archival programs, including local historical societies and archives departments in public libraries, as well as records in organizations and businesses. Archival institutions can act as centers of leadership in this broader archival system, providing outreach and training to proliferated archival programs, developing collaborative services such as conservation cooperatives and steering planning between archives and across the profession.

Bearman (1991) radically extends this initial articulation of post-custodial archives, responding to an even greater uptake of the use of personal computers and the generation of electronic records. Bearman urges a wholesale revamping of the archivist's role in organizations and society at large. Bearman baldly states that archivists need not serve as custodians of records—except as a last resort—and instead must become regulators and auditors of information systems. In this arrangement, record creators maintain custody over their materials and act as the primary parties responsible for the ongoing care of these materials, while archivists facilitate this by establishing policies, implementing systems, and regulating behavior so as to ensure that the archival requirements of preservation, access, and arrangement of these materials be met. In short, Bearman urges that archives become virtual hubs to records that continue to reside with their original creator.

The introduction of post-custodial ideas into archival discourses has sparked many heated debates. Among the most vocal critics, Duranti (1996) makes a case for the symbolic as well as practical importance for archivists to maintain their role as custodians of records and other documentary materials, tying this into deep cultural histories of the archives as a physical place. Without an established archival threshold, Duranti argues that archives will fail in their duty to perform this crucial societal role, necessary to preserve cultural and communal memory as well as to hold organizations and individuals in power accountable. O'Shea and Roberts (1996)

usefully contextualize these debates in the history of electronic records, which had long been either outright neglected by or posed serious challenges for professional archivists. As the authors stress, post-custodial approaches are *not* non-custodial but represent attempts to move beyond the limitations of custodial strategies when it comes to electronic materials. Still, the authors hold that the overall archival mission ought to remain the same for both analog and digital materials: the guardianship and defense of documents as authentic and accessible records, preserved over the long-term. In a later review of these issues, Wallace (2002) concurs that archivists need to adopt new strategies in order to meet the challenges of electronic materials but adds that archivists also need to abandon any preconceptions that there is a single solution to address these challenges. Moving past partisan divides, Wallace encourages archivists to embrace flexibility and improvisation, trying out many different strategies and configurations of custodial and post-custodial approaches.

While the challenges of electronic records catalyzed the uptake of post-custodial strategies, the roots of post-custodialism can be traced back to the development of the Australian series system first articulated by Ian Maclean and Peter Scott in the 1950s and '60s (Scott 1966), and in turn the continuum model of records developed by several archival theorists and practitioners in the 1980s and '90s. Departing from the 'life cycle' model, according to which records pass through discrete life phases, and only enter into archives after they have passed through previous phases of creation and active use, continuum thinking conceives of the record as a complex entity in a dynamic state of becoming that cuts across four dimensions: creation of the record, as a trace of some activity; capture, as records are brought into various individual, corporate, or institutional systems; organization, as records are marshaled into shared structures of understanding and access; and pluralization, as records push beyond discrete systems into the



broader communal memory (Upward 2000). Framing post-custodialism in terms of continuum theory, Upward (1996) asserts with O'Shea and Roberts (1996) that archivists need to think beyond a strict duality between custody and non-custody to see how the archival mission necessarily permeates across society and to consider the care of records in any dimension or stage of activity. In practice, continuum thinking manifests in particular archival strategies, notably in the recognition that archivists need to attend to digital materials earlier on, for instance by supporting records creators in the ongoing care of materials or designing systems that address preservation issues before records are even created.

Building on the continuum model advanced by Upward (1996), McKemmish (2001), and others, Ketelaar (2005) develops the idea of a memory continuum in order to describe the intricate relationships between memory and archives. The memory continuum ranges from individual or personal memory to familial memory to societal memory. Ketelaar first establishes that all memory, even individual memory, is constituted through a network of interactions: between human actors but also with other non-human agents, namely memory texts, which include all manner of artifacts, such as documents, monuments, and art objects. At the societal level, groups of people form what Ketelaar refers to as 'communities of records.' Communities of records sustain their communal identity through shared memory texts; this body of texts form a communal heritage, which gives "continuity, cohesion and coherence to a community" (54). In recognition of the power for all manner of archives, records, and recorded information to help constitute the memory of individuals, families, and indeed entire communities, Ketelaar emphasizes that sharing collective memories and sharing authority over communities of records with the communities of origin is an ethical imperative for archivists and records professionals. To adhere to this imperative, archivists may need to consider post-custodial approaches to caring

for records, affording community stakeholders authority over and access to records outside of and apart from archival institutions (Bastian 2002).

Flinn, Stevens, and Shepherd (2009) discuss community archives as another means by which communities assert greater control over their own cultural heritage materials. The authors acknowledge that ‘community’ and ‘archive’ are variable terms, encompassing a wide range of practices, but they use this as a frame to study a variety of community-driven efforts to collect and preserve archival materials on their own terms. As the authors describe in relation to their case studies of London-based community archiving groups, such as rukus!,<sup>32</sup> a group dedicated to the documentation of the black Lesbian Gay Bisexual Transgender and Queer (LGBTQ) community, these archives amalgamate a diversity of materials such as oral histories, newspapers, ephemera, books, and photographs and make these accessible to the ‘community of record.’ Community archives are often driven by clear political goals: as a kind of activism against forces of oppression and marginalization leveraged by the dominant culture, as a foundation for community education and identity formation, and as a resource for writing otherwise subjugated histories. As the authors observe, however, community archives balance autonomy against sustainability and often establish partnerships or hybrid relationships with institutional archives, which can involve sharing custody over materials or drawing on institutional support for resources and training. These relationships pose challenges arising from the differing perspectives and goals of community and institutional archives, but professional archivists have looked to post-custodial theories and approaches to redefine their roles and obligations towards community archival materials.

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<sup>32</sup> <http://rukus.org.uk/archives/>

Similar to community archives, De Kosnik (2016) discusses ‘rogue archives,’ a term she uses primarily to refer to online communities that maintain repertoires of archival practices to document themselves and carry out functions important to their communities. These rogue archives stand in contrast to traditional archives in a number of ways: archival labor is carried out by members of the community on a volunteer basis; archiving is open to everyone in the community and special training or professional certification is not required; rogue archives are not so much oriented toward the preservation of discrete objects or particular archival collections but rather toward the sustainability of the community and the maintenance of a repertoire of archival skills and practices (15-21). Drawing on Taylor’s (2003) distinction between the archive and the repertoire, these repertoires are not preserved in persistent digital objects but rather through the ongoing showing and doing of members of the community.

The main example that De Kosnik develops is that of fan fiction communities, but the concept of rogue archives can also be applied to artist-driven platforms like Paper-Thin, and indeed, many of the archival practices and attitudes described by De Kosnik are exhibited by the artists and arts platforms in my study. As with fan fiction archives, Paper-Thin has been created through cooperative work of the curators and participating artists; the curators, Smith and Buckley, continue to care for these cooperatively-constructed environments online with their own resources and labor. Although Smith and Buckley maintain past volumes of Paper-Thin, their creative energies are directed toward producing new volumes of Paper-Thin, generative of a repertoire of artistic practices engaged with networked technologies. De Kosnik cites examples of artist-driven archival projects, such as the Public Netbase,<sup>33</sup> founded in 1995 by Konrad Becker and Francisco de Sousa Webber, and winner of the Prix Ars Electronica. As I develop in

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<sup>33</sup> <http://www.t0.or.at/aboutnb.htm>

a later section, these forerunners provide important art historical context, although Paper-Thin and current web technologies differ in important ways.

For cultural heritage preservation and art conservation, the model of participatory conservation, in which institutions engage diverse stakeholders and draw on bodies of knowledge from the cultures where objects originated (Sloggett 2009), is reminiscent of post-custodialism in archives. Wharton (2008) presents a case study of participatory conservation of an art object important to the communal memory of several different groups: a 19<sup>th</sup>-century public sculpture depicting the Hawaiian chief Kamehameha I in North Kohala, Hawaii. A committee made up of local community members opted for a cross-cultural solution, blessing the sculpture with a traditional chant and then arriving at a treatment decision with a community vote. The conservation process itself sparked a new dialogue about the meaning of the sculpture in the community; through participatory efforts, both conservator and community members integrated new information about the sculpture, altering previous understandings and shaping new meanings for the work. At the conclusion of the project, the sculpture had taken on a new identity as a “conservation object” constituted by the whole community (8).

For digital and new media art, the variable media approach discussed in the preceding subsection (Depocas, Ippolito, and Jones 2003; Rinehart and Ippolito 2014) similarly approaches the preservation and conservation of new media art objects as a negotiative, interpretive, and inherently creative process, involving the participation of many stakeholders, including artists, curators, and audiences, in addition to conservators. However, many digital and new media artworks exist online or in artists’ personal archives, outside the custody of institutions in the traditional sense, and thus resembling the situation of electronic records and archives at the center of many debates about post-custodialism. In addition to the logistical and technical

concerns about the custody of electronic records—such as whether to transfer materials from the creator’s computing environment to that of the institution—new media artworks also bring aesthetic issues to bear. Biggs (2014) argues that the traditional custodial model of museums runs counter to the aesthetics of much new media art, which often consciously challenge processes of reification and commodification. Many of these artworks are intentionally temporary, as artists shift away from the creation of static, discrete objects and toward the initiation of iterative processes that interrogate technological systems. Biggs suggests that the intent of much new media artwork is to offer artists and audiences alike grounds for investigating and experimenting with the digital technologies that increasingly structure and shape our social, cultural, political, and economic contexts. With this in mind, conservation may mean holding open the potential for individuals to tinker with and hack into the environments established by the artist, which involves not only maintaining particular hardware and software systems, but also the requisite literacy to use and understand the technologies framed by the artist (29).

This shift in how digital and new media artworks are conceptualized—from discrete objects to grounds for experimentation and inquiry—does not obviate the need for cultural heritage institutions. But this does pose serious questions for how institutions like archives and museums approach the care of digital and new media artworks, such as the role of the artist in conservation decisions, who maintains custody of the files, hardware, software, and any analog components that make up the artworks, and how the ‘work’ itself is even conceptualized. As arts institutions navigate these issues, post-custodial and community approaches to archives can be informative frameworks for thinking through models for digital curation that do not necessarily involve the transfer of custody of artworks into institutional collections. These alternative models might include offering resources and services to help artists care for their own artworks and

archives, or actively fostering communities of practice among artists working with similar technologies and facing shared challenges. This dissertation seeks to build toward these alternative models by providing a foundation of empirical understanding of how artists are currently caring for their artworks and archival materials, both in their individual studio practices and through their participation in networked alternatives.

#### 2.3.4) Personal Information Management and Personal Digital Archiving

Echoing voices in the post-custodial and digital curation literature, John et al. (2010) urge that a great deal of significant cultural heritage remains in personal collections and archives, uncollected by traditional memory institutions. Jones (2012) defines ‘personal information’ in broad terms as any and all information that relates to an individual, including information created by her but also any information about her, owned by her, or experienced by her (22-3). The extent of this all is an individual’s unique ‘personal space of information’ (PSI). As individuals grapple with this exceedingly large “sea of information,” PIM activities extend control over this unwieldy and dynamic PSI (25). Out of this broader PSI, individuals form personal information collections that they manage for both short- and long-term purposes. Personal archiving practices, and PDA specifically, can be seen as a particular subset of PIM, driven more by long-term goals oriented toward memory-making.

John et al. (2010) suggest that supporting PIM and PDA fall under the purview of cultural heritage institutions, overlapping with institutional approaches to preservation. Copeland and Barreau (2011) emphasize this critical role of cultural heritage organizations as well, pointing to public libraries as institutions well positioned to help individuals manage their digital information. Advancing PIM and PDA services and resources for artists is among the primary anticipated applications for the findings of this dissertation. As Gunn (2018) observes, however,

PIM and PDA pose important questions for information professionals, entering into debates about the merit and nature of professional intervention into the care of materials earlier on in the life cycle. Gunn recommends that information professionals and institutions do have a role in PIM and PDA but that the focus should be on outreach and dialogue with communities, striving to meet the particular needs of different individuals and communities, and not just blindly imposing blanket ‘best practices’ (xix). Echoing Dallas (2016), professional best practices may conflict with the aims and intentions of creators and other users of digital materials. As I have emphasized throughout, digital curation broadly, including post-custodial and community approaches in addition to PIM and PDA, all suggest a new role for information professionals as collaborators with many other stakeholders invested in the care of a given object or collection.

Lee and Capra (2011) note that PIM and PDA can both contribute to the complex and inherently interdisciplinary issues pertaining to the curation of personal digital collections (30), for both individuals and from the perspective of professional archives and records management (ARM). Although archival institutions and records management departments are typically interested in collective, organizational, and corporate memory, the boundaries between individual and organizational information practices are increasingly ambiguous (65), and in both PIM and ARM, information is distributed across heterogeneous systems (49). Additionally, personal papers or manuscripts collections in archival institutions increasingly include individuals’ digital materials. As Lee and Capra assert, both PIM and ARM stand to benefit from the “identification, crafting, and advocacy of appropriate incentives for good personal digital curation” (61). Personal digital materials that have been well curated while in the custody of individuals will be primed for archival description, preservation, and access if they enter into the holdings of archival institutions. This is true of analog materials as well, but the larger size,

greater degree of heterogeneity, and quicker rate of obsolescence for digital collections all make holistic support for personal digital curation paramount.

I agree that facilitating good personal digital curation is beneficial for cultural heritage more generally, including museums and other arts institutions. Despite the synergy between these two areas, Lee and Capra also point out many key differences between PIM and ARM perspectives, including quite different time scales informing the management of materials, the disparate nature of primary versus secondary use of materials, and distinct criteria for appraisal and retention of materials. This is also true of the arts, as artists engaged in the personal management of their artworks and related archival materials have different needs and requirements than museums concerned with the long-term care of extensive and diverse collections. Artists may use documentation photographs to apply for residencies or grants and may significantly rework earlier pieces for upcoming exhibitions. These differences—stemming from artists using and re-using archives as part of ongoing creative careers—have implications for the emerging negotiative and collaborative approaches to conservation discussed above.

Many scholars have studied the personal information practices of individuals engaged in creative activities and hobbies. As defined by Stebbins (2007), ‘serious leisure’ is a systematic pursuit of some core activity, which people find so substantial or interesting that they initiate a ‘leisure career,’ gaining skills, knowledge, and experience to develop acuity in that activity (5). Distinct from casual or project-based leisure, serious leisure is a sustained pursuit that involves significant personal effort, promises many durable benefits, and contributes to an individual’s identity (12). Although individuals pursuing creative or professional careers as artists do not exactly fall under Stebbins’ definition of an individual engaged in serious leisure, it is critical to make a distinction between general PIM and PDA practices and those PIM and PDA practices



undertaken as part of a core, directed activity in which the individual has an impassioned investment. In this sense, both an artist and an intensely committed bass fisher might have a key similarity, both motivated to pay special attention to how they manage information integral to some greater pursuit.

An example of this research more closely related to art than bass fishing, Spurgin (2011) describes the collection management norms, practices, and challenges of digital photography hobbyists. In contrast to much PIM literature, which finds that individuals reluctantly manage their personal collections, serious photographers are proactive and quite meticulous in administering their digital materials, by maintaining file and folder organization schemes, routinely backing up data on external media, and implementing complex workflows to deal with images saved across various versions and file formats. However, Spurgin also identifies some key challenges. Principally, the largely proprietary nature of digital photography file formats, creative editing software suites, and asset management programs present enduring obstacles to the long-term preservation of and access to these collections. As photographers move to new systems and hardware, they need to overhaul their collections—and viable practices for these migration pathways are by no means straightforward or widely known.

Many other widespread challenges identified in the PIM and PDA literature also apply to visual artists working with digital technologies. Marshall (2008a) posits that the increasingly distributed and complex nature of personal digital collections—with materials spread across devices, in the cloud and on web- or mobile-based applications—continue to present myriad challenges, making it difficult to organize, appraise or delete, and ultimately refind older materials. Whittaker (2010) affirms that refinding older materials is a persistent difficulty, reporting on a study of personal photography collections in which individuals were unsuccessful

in locating older photographs almost 40% of the time. Jones (2012) reiterates the challenges outlined by Marshall, observing that most individuals devote little time or energy to managing personal collections, even as PSIs become increasingly large and diffuse (31).

Related to refinding and searching across large collections, scholars have studied appraisal and valuation, investigating why individuals keep some digital and analog materials while discarding others (Hendon 2000; Kirk and Sellen 2010). Odom et al. (2012) consider how individuals' processes of long-term valuation differ for digital materials versus analog materials. While many families engage in various practices for selecting particular analog objects as significant and handing these down as heirlooms, they do not typically engage in similar practices for handing down 'digital heirlooms.' The authors describe how existing cloud and web-based services are used for sharing digital materials, but participants interviewed in the study were largely uncertain as to how these storage platforms might function for long-term, cross-generational safekeeping. Artists similarly grapple with the uncertain longevity of networked storage systems, aiming to manage materials for both short- and mid-term purposes like sharing images of work on social media or applying for upcoming exhibitions, as well as long-term ends like building a corpus of works that speak to an artistic career or legacy.

Unique issues associated with managing digital and new media artworks call for empirical research on artists as a specific population and the development of services and tools that meet artists' particular needs. For instance, PIM and PDA training could be better integrated into undergraduate and graduate fine arts curricula, with academic librarians or archivists providing instruction and resources. The artists in the study describe a range of hypothetical tools that could improve PDA tasks, like database software designed specifically for keeping track of dynamic digital artworks. Across many contexts, information professionals support the

information needs and practices of digital artists, including support for creative activities as well as the short- and long-term preservation of digital artworks. In order to provide this support, further research is needed to investigate how the information practices of digital artists as a specific population both match and differ from the models articulated in the existing literature.

#### **2.4) Artists' Information Needs and Behaviors**

Theories, approaches, and practices from digital preservation, art conservation, post-custodial and community archiving, and PIM and PDA all inform the long-term care of digital and new media artworks both in institutional collections and in artists' personal archives. Across these areas, a common theme is that the preservation of cultural heritage materials in general—and digital materials, specifically—stands to benefit from engaging the diverse stakeholders invested in the long-term care of these materials, importantly including the creators of the records themselves. Approaches to the preservation of digital and new media artworks call for the involvement of the artist, both to advise in preservation and conservation of works in institutional collections and to better understand how artists are caring for digital artworks and archives outside of custodial contexts.

As a result, the development of digital art curation services, tools, and resources need to be grounded in empirical research of artists' information needs and behaviors. In a call for research frequently quoted in the literature of artists' information behaviors, Cobblestick (1996) observes that there are more practicing artists in the United States than lawyers, and yet in comparison, relatively little research has been conducted to investigate the information needs of artists. In the most recent and comprehensive literature review on the subject, Hemmig (2008) provides a history of research into artist information behaviors, noting several limitations of existing literature up to that point. Very little research has actually studied practicing artists, with

much of the literature based on librarians' personal or anecdotal experiences serving artists. Nearly all the literature that did study artists directly drew on populations of art students and faculty artists. Hemmig concludes that we have an incomplete picture of artists' information behavior, with little assurance as to how the findings of the previous literature describe the information needs of other kinds of communities of artists, such as those without academic affiliations or those who hold other occupations in addition to pursuing art professionally.

In this section, I review the literature on artists' information needs, behaviors, and practices, including studies covered by Hemmig and those that have been published since. In addition to describing existing knowledge on artists' information behaviors, I identify further gaps in the literature that the present research addresses. One area that I pay particular attention to is the role of digital and networked technologies in artists' creative processes and information behaviors. While several authors have shed light on artists' use of the Web to search for information (Koopmans 2009; Mason and Robinson 2011; Robinson 2014), the information behavior literature has paid little attention to the role of digital technologies in creative practice. As I note above, scholars in this area have generally taken a limited view on what constitutes 'information behaviors,' with discrete needs addressed by particular information sources—a view that is difficult to apply to the complex and iterative processes involved in the creation, exhibition, and ongoing care of digital artworks. The existing literature provides a rich foundation for understanding the kinds of information that artists seek and the purposes to which this information is used; in the following chapters, I build on this by describing how artists working with digital and networked technologies similarly seek and use a huge variety of information and articulate how these practices are embedded within variable information worlds and shaped by complexes of actors and sociotechnical factors.

The creation of artworks is the central activity for artists and the driver of many information needs and practices. Scholars have described finding inspiration as a primary information need for artists, with many of the sources identified being intangible or otherwise difficult to pin down as ‘information objects.’ Cobbledick (1996) finds that artists often draw on personal experiences, observations from the natural world, memories, and their own imagination as sources for inspiration. In a case study centered around a single artist’s creative process, Cowan (2004) observes that this artist draws on observations of the natural environment, interpersonal relationships, rigorous self-inquiry, and sensory feedback and meditation upon the color, texture, patterns, and other aspects of material of the artwork-in-process as sources of inspiration. While this artist uses more standard information sources like books and periodicals outside of the creative process, Cowan suggests that artists often depend upon non-bibliographic sources, especially for the creative process. Artists’ information behaviors cut across many contexts, although Cowan notes that many previous studies have focused largely or exclusively on artists’ use of libraries and traditional bibliographic sources. In a survey of 78 emerging artists, Mason and Robinson (2011) echo that artists draw on an enormous range of sources for inspiration, extending well beyond the ken of bibliographic materials.

In addition to these less tangible sources, artists draw on information objects in the purview of cultural heritage institutions. Among these materials, other contemporary and historical artworks are a major source of inspiration, including reproductions in print and online, as well as those in museum collections (Cobbledick 1996). Artists also reflect back on their own body of artworks as a source of inspiration for future works (Cobbledick 1996; Cowan 2004). Even though much of the existing research has perhaps overly focused on artists’ use of libraries and bibliographic information sources, artists do place great value on libraries. Across studies,

artists report using a variety of libraries, including public libraries (Cobbledick 1996; Ferguson 1986; Mason and Robinson 2011), art and museum libraries (Oddos 1998), and academic libraries (Cobbledick 1996; Mason and Robinson 2011; Reed and Tanner 2001). For artworks not immediately accessible in nearby museum collections, books can be an important resource for reproductions, but many authors emphasize that artists draw inspiration from an eclectic range of books well beyond the subject area of art history (Cobbledick 1996; Mason and Robinson 2011).

Whether specifically for inspiration, another information need, or just part of a general information search, Stam (1995) stresses that images are perhaps artists' most sought-after kind of information, ranging from specific subjects, such as places or people, to images reflecting general moods or containing particular color schemes. Layne (1994) also notes the wide-ranging utility of visual information for a variety of artists' information needs, such as guides for technical processes as well as sources of inspiration. In terms of where artists find visual information, Cobbledick (1996) cites print sources like books and periodicals as especially important. Even with the explosion of the Web and other digital resources for discovering images, Mason and Robinson (2011) find that print materials remain important sources for visual information. Patelos (2013) emphasizes that artists continue to value finely-produced print monographs as sources for visual information as these volumes often feature image reproductions of much higher quality than those available online.

Beyond inspiration, artists have information needs related to the technical aspects of the creative process, including information about materials or artistic techniques (Cobbledick 1996), as well as health and safety concerns (Dane 1987). Cobbledick (1996) reports that artists often turn to technical manuals to learn about materials, tools, or specific technical processes, and

Frank (1999) adds that artists value both explanatory text as well as illustrative diagrams and images. Artists also gain understanding of the properties of materials or the capacities of a given technique through direct experimentation with media and processes (Cobbedick 1996; Hemmig 2009). In advance of their own experimentation or as a supplement, artists rely on interpersonal sources, asking other colleagues about their techniques and use of materials (Cobbedick 1996). Hemmig (2009) emphasizes the particular importance artists place on peer artists as sources for technical information, as well as more formal interpersonal sources like classes and demonstrations on a given technique. These sources are not limited to in-person contacts, as artists search on the Web for technical, materials, and process-related information, such as tutorials or how-to videos (Koopmans 2009).

As discussed above, artists' creative practices cannot be easily described in terms of discrete information needs; many authors implicitly echo this, emphasizing instead general browsing as the primary mode of information seeking for artists (Ferguson 1986; Frank 1999; Hemmig 2009; Pacey 1982). In a panel discussion on artists' reading habits and library usage, artists highlight the importance of open stacks and browsing to find unexpected information sources (Ferguson 1986). As artists draw on eclectic interests far beyond art and art history, browsing through materials can be a useful means to discover materials from a variety of subject areas. Hemmig (2009) also finds that browsing is a key mode of information behavior for artists, who draw on a wide array of information sources, even if these do not have immediate applicability to the search at hand. Hemmig describes artists as consummate information gatherers, who are always searching for information that may eventually make its way into the creative process.

Artists expend a lot of energy and effort in the creation of artworks, but selling works, placing works in exhibitions, and generally keeping up with the art world are all professional activities with attendant information needs and practices. Cobbledick (1996) finds that participation in arts scenes is a primary means by which artists stay tuned into various art worlds—both local and international—and find out about professional opportunities. Through this participation, artists draw on a network of interpersonal sources, including artists but also curators, gallerists, and other arts professionals to learn about upcoming exhibitions and potential buyers for artworks (Cobbledick 1996; Hemmig 2009). In order to sell work, artists often rely on connections with commercial galleries, although some artists mention making connections with buyers directly (Cobbledick 1996). Information needs related to professional activities also include copyright and legal issues: artists need to know how to protect their intellectual property, which includes reproduction rights, keeping track of sales, leases and commissions, and managing their estates over time (Dane 1987). Aufderheide, Milosevic, and Bello (2016) stress that copyright concerns and legal issues are only becoming more prominent in the professional lives of artists with the growing capacities for the reproduction and exchange of intellectual property on the Web. Although the artists in the present study share similar practices for connecting with a range of art world individuals, the landscape for selling digital art is radically different from what Cobbledick and others describe.

Digital and networked technologies play increasingly important roles in artists' information practices, although these roles have certainly evolved over the several decades during which artists' information needs have been studied. Many of these studies either predate the Web or coincide with the early history of the Web, before digital technologies had been widely adopted as everyday tools for accessing information. Greer (2016) asks how artists'



information behaviors have developed in the wake of broad changes in the access to and use of computer technologies. Although much of the existing literature characterizes artists as frequent library visitors and heavy users of print materials, has this picture changed with greater access to the Internet? Greer conducted a citation analysis of 425 bibliographies from undergraduate studio art capstone theses from three different universities over the period of 2011 to 2014, amounting to over 8,000 citations analyzed. Greer notes that the students use websites far more than noted in previous studies, with websites making up almost 25% of the information sources in student theses. Monographs remain the most heavily used type of information source, constituting about 40% of the sources cited; however, the author speculates that many of these may be e-books and not print sources.

The Web has become essential in how artists connect with other artists and find out about professional opportunities like grants, exhibitions, and shows (Koopmans 2009). Artists maintain personal websites, as well as social media and e-commerce accounts, in order to promote their work and connect with other artists and audiences. Through these social networks, artists form interpersonal connections with other artists, who then become vital sources of information as noted above. Both Koopmans (2009) and Mason and Robinson (2011) observe, though, that even as artists draw more heavily on the Web, this does not supplant but rather supplements other information sources. Mason and Robinson emphasize in particular that print sources remain a key part of artists' information intake. Hemmig (2009) finds that electronic sources were more important than in earlier studies but that artists still relied heavily on interpersonal sources and print materials. The introduction of the Web and other computer technologies has not made information searching universally easier, however. Aufderheide, Milosevic, and Bello (2016) warn that confusion over legal issues and concerns over the copyright status of materials affect

how artists search for and select materials, especially during the creative process. The authors describe how confusion around copyright and a lack of understanding of fair use inhibit artists from creatively drawing on, re-producing, or adapting copyrighted materials, a situation made only more complicated in the digital environment where material can be found and copied easily even if the copyright status is not always clear.

Graveline (1998) emphasizes the significance of cultural background and its effect on information behavior, discussing how social and cultural forces impact the information worlds of black artists, likely making the information needs and behaviors of these artists different from those of white artists. Robinson (2014) similarly remarks that much of the literature on artists' information behaviors pertains to Western artists and asks how the information behaviors of non-Western artists might compare to these existing models, examining the information needs of Egyptian artists specifically. Robinson finds that the information behavior of Egyptian artists in many ways matches the models of information behavior for Western artists, although Egyptian artists have additional burdens in access to information: the Egyptian education system offers students very few opportunities to learn about the arts and receive arts training; public libraries do not have much current material and are often difficult to access. Despite these challenges, the artists found information by participating in small but thriving networks of contemporary arts groups and galleries. These artists were also avid users of the Internet, using Google as well as social media platforms and other online communities to address nearly all art information needs. However, much arts information online is in English with very few Arabic sources. In a similar move to investigate a specific population, Schiff (2010) discusses Dervin's (1998) sense-making theory in relation to the work of artist Judith Scott, who is deaf and has Downs Syndrome. Schiff

demonstrates that art making functions as a sense-making behavior for Scott and that the resulting artworks illustrate aspects of the deaf experience to a broader public.

Artists have unique—as well as diverse—information needs, and many authors have considered ways to tailor information services to better meet the needs of this patron population. As noted above, much of this research has been carried out by information professionals and practitioners aiming to improve services for artists, so the literature offers many rich and promising suggestions for ways in which to better meet artists' information needs. As a baseline to support artists' information seeking, several authors suggest that libraries maintain diverse collections of materials, well beyond just art and art history resources (Cobbledick 1996). Dane (1987) notes that artists are a diverse population, not only in terms of demographics but also in terms of the artistic media they use, the genre of works they create, and their skill level for various artistic practices. Dane observes that this diversity and eclecticism of collections is often a strength of public libraries, making this kind of library especially appealing to artists.

In addition to facilitating use of library materials, libraries can take other measures to fashion the library as a community space. Patelos (2013) emphasizes the importance of libraries as places, providing artists space for both solitary study as well as gateways for interaction, discourse, and collaboration. Libraries can foster this creative activity by designing study spaces for both individual and group study. Public libraries in particular can support local arts scenes by holding exhibitions and purchasing works, such as prints or artist's books, for their holdings (Dane 1987; Patelos 2013). In these ways, libraries can become integral parts of local arts communities, both fostering the growth of local arts and forging connections between librarians and artists. Oddos (1998) points out that libraries have different purposes than art centers,

museums, or galleries but also recognizes that libraries can play an active role in the creative process.

By building these relationships, librarians can learn more about the needs of their patrons, and artists can increasingly see the public library as a vital resource. Along these lines, Cobbledick (1996) considers how librarians might serve as interpersonal sources for artists, perhaps staying abreast of the local arts scene, acting as an intermediary for artists, and putting artists in touch with new information and resources. Dane (1987) and Stam (1995) both suggest that libraries support not only artists' creative activities but also other kinds of information needs, such as those pertaining to the business of art, professional needs like finding studio spaces, and copyright and legal issues. Conducting focus groups for studio art and architecture students, Bennett (2006) reports that many student artists lacked business and professional skills, such as how to find and apply for grants or how to market and sell their work to galleries. Leousis (2013) describes efforts to forge connections between graduate art students and the art library in order to promote library resources and encourage a research culture, making personal connections by visiting the students' studios, serving on several students' thesis committees, and generally becoming acquainted with their creative practices as well as potential information needs. This kind of relationship-building can be of immense importance for underrepresented populations as well. Graveline (1998) suggests that librarians forge relationships with local arts communities, as artists may not be aware of resources available at the library to support their information needs.

While not thoroughly discussed in the literature, Cobbledick (1996) asserts that libraries can be access points to technologies, tools, and other kinds of resources—not just books and periodicals. Stam (1995) suggests that libraries can provide access to image reproduction

technologies like photocopies and scanners, which can help artists to make greater use of images discovered in the library. As these two rather dated examples demonstrate, though, more recent studies have not approached other kinds of technologies that libraries might provide for artists. As the wealth of creative digital technologies and software only continues to expand, this is a fruitful area for further research. For instance, Copeland (2015) suggests that public libraries can serve as hubs for community digital archives, providing access to digital storage and related digital curation tools and resources, a possibility that I explore as an implication of the present research.

Although studies almost universally acknowledge the diversity of artists as a group, few studies strive to target particular communities or other more finely determined sub-groups—aside from the default population of student and faculty artists. Along these lines, existing studies have not systematically examined the information behaviors of different kinds of artists creatively working with digital and networked technologies. Creating, exhibiting, caring for, or selling a painting constitutes quite a different set of activities than for a digital or new media artwork. While a painter may need information on a particular kind of oil medium, an artist working with digital technologies may need to troubleshoot a particular software program or fix a bug in a program she is coding. Comparing these two cases, the information needs of a digital artist may be closer to an IT professional than to an oil painter. The present research addresses this by focusing in on artists creatively and critically engaged with digital and networked technologies, seeking to understand the particular information practices developed and employed by these artists and sounding out similarities and differences from the existing literature on artists' information needs and practices more generally.

## **2.5) Art and Networked Technologies**

As noted in the previous section, relatively little research has focused on artists' information needs and practices related to digital and networked technologies, either with regard to how artists use these technologies in their information practices or to how artists have creatively engaged with these technologies. Despite the limited research in this area of information science, artists have long experimented with digital and networked technologies for creating and disseminating art, and art historians and critics have developed a rich body of literature studying these works. As artists and curators create, exhibit, and care for artworks within this broader historical context, expressly taking up or adapting ideas from the history of art and situating their current work in relation to earlier artistic efforts, artists' information needs and practices cannot be divorced from artists' particular contexts nor from their relationships to diverse histories of artistic engagements with digital and networked technologies. In this section, I review some significant artworks and critical writing about these works, particularly with the goal of contextualizing and historicizing Paper-Thin as an online artist-run platform. To this end, I focus especially on art created, shared, and experienced in and through networked systems rather than attempting to provide an overview of the entire range of digital and new media art. Throughout the dissertation, I call back to ideas and examples laid out here as points of comparison to the findings of my research.

Artists, including visual artists as well as writers and musicians, have experimented with digital technologies and algorithmic techniques throughout the history of computers, with these early artistic engagements often blurring traditional generic distinctions. Funkhouser (2007) describes poetry text generators created in the 1950s and '60s as imbued with a Dadaist collage aesthetics and indebted to Oulipo procedural approaches to literature (33). For instance, John

Cage and Jackson MacLow undertook experiments with algorithmic composition processes, generating poems that referenced Kurt Schwitters and could also be read as sonic scores (66-71). Taylor (2014) posits that the Howard Wise Gallery put on the first exhibition of digital art in 1965, featuring work by A. Michael Noll and Bela Julesz, colleagues and engineers at Bell Labs (31). While clearly demarcated as art objects in this gallery setting, these artworks raised bigger questions about the relative roles of humans and machines in the artistic process. These debates only superficially resolved when Noll was able to successfully copyright his computer-generated drawing *Gaussian-Quadratic* (1963) in 1965 (33). As Taylor develops throughout his book, many questions raised by this early work have continued to be posed and debated in new terms as technologies have developed and new artistic movements and tendencies have emerged.

Contemporaneous to and overlapping with these early computational experiments, conceptual artists were also questioning received assumptions about the art object, critically considering what it consists of, how it gets presented to audiences, and who is involved in processes of artistic production. Lippard (1973) famously characterizes the work of conceptual artists as contributing to the dematerialization of the art object. Rather than a discrete painting or sculpture, 1960s and '70s conceptual artworks often took linguistic, textual, or otherwise informational forms. As an example, Joseph Kosuth's *One and Three Chairs* (1965) juxtaposes a definition for 'chair,' a physical chair, and an image of that object, drawing attention to differences between a concept and its material and mediated manifestations. While many conceptual artworks have since been assimilated into arts institutions and art markets as objects bought, collected, and sold (including Kosuth's piece),<sup>34</sup> in other instances, conceptual artworks were intentionally made to be readily reproduced. Seth Siegelaub and John Wendler curated an

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<sup>34</sup> <https://www.moma.org/collection/works/81435>

untitled book, now referred to as the “Xerox Book” (1968), comprising works on paper created with Xerox machines, with contributions from now canonical artists like Kosuth and Lawrence Weiner. The book, doubling as exhibition venue and catalogue, has been circulated widely, even now as it lives on as a PDF document.<sup>35</sup>

Along with conceptual art, artists associated with minimalism, land art, and other movements and tendencies in the 1960s and ‘70s similarly created works that expanded or unsettled prevailing notions of the art object. Assessing these emergent bodies of work, such as Donald Judd’s rhythmically repetitive metal sculptures that were fabricated with industrial techniques or Robert Morris’ large-scale earth sculptures, Burnham (1968) argues that these kinds of artistic practices demand the elaboration of a new aesthetic paradigm attuned to more than just the formal qualities or content intrinsic to the art object. Burnham takes steps toward this with his discussion of a ‘system esthetics’ that foregrounds the networks of communication involved in the creation of these artworks. As Burnham describes a piece underway by Morris, it “involves precise information from surveyors, landscape gardeners, civil engineering contractors, and geologists” (32). Artists working in this mode expand the sense and scope of activities involved in artistic production, taking on problems and employing approaches “more natural to architects, urban planners, civil engineers, electronic technicians, and cultural anthropologists” (34). Rather than a specific artistic medium, the communication networks in which artists contract collaborators and garner information to approach technical issues becomes the principal domain of creative practice and artistic production.

While the communication networks in which these artists participated were predominantly analog—telephones and fax machines—many aspects of these artistic production

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<sup>35</sup> <http://www.primaryinformation.org/product/siegelaub-carl-andre-robert-barry-douglas-huebler-joseph-kosuth-sol-lewitt-robert-morris-lawrence-weiner/>



processes resembled those of artists experimenting with computational technologies: bridging disciplinary boundaries across art, science, and engineering; and enlisting professional expertise and diverse sources of information to address issues at the intersection of technical and aesthetic dimensions of works. With the 1970 *Software* exhibition at the Jewish Museum, Burnham further explored the relationship between communication systems and artmaking while pioneering the curation of artworks created with a range of information technologies, both digital and analog. As Burnham (1970) identifies in the introductory essay to the exhibition catalog “information processing systems and their devices” are “the fastest growing area in this culture,” (10) and the exhibition represents one of the first attempts to highlight artists grappling with the implications of this change for art and society more broadly. Burnham first voiced the need for a ‘system esthetics’ in response to artists like Judd and Morris but revealed the profound application for such an aesthetic paradigm in confronting art engaged with digital and networked technologies.

Through the 1970s and ‘80s, artists experimented with global telecommunication technologies like satellites and networked computers, interrogating both the potential and limits of these systems to make possible new modes of connection and interaction. In one of the first such efforts, Liza Bear and Keith Sonnier established a bidirectional satellite system connecting artists in New York and San Francisco via a shared video feed. The performative interactions between these groups of artists were documented in two video pieces, together comprising the work titled *Send/Receive Satellite Network* (1977).<sup>36</sup> As Paulsen (2017) observes, these videos are cacophonous, visually busy with text relaying error messages, suggestive of the creative possibilities of near-instantaneous bicoastal communication but emphasizing the difficulties and

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<sup>36</sup> <http://www.keithsonnier.net/sendreceive.html>

noisiness inherent to the channel (107). As Bosma (2019) argues, these early experiments with telecommunications systems encompassed a range of artistic media and practices from video to drawing but centered on the communicative exchange between participants as the primary artistic activity, with artists responding as much to the resistances and blockages of communication as to its facilitation.

For *Electronic Café* (1984),<sup>37</sup> the art collective Mobile Image (Kit Galloway and Sherrie Rabinowitz) built a more extensive telecommunication network that was importantly also open to the public. As part of the Olympic Arts Festival leading up to the 1984 Olympic Games in Los Angeles, Mobile Image set up suites of emergent technologies like slow-scan television cameras and digital writing and drawing tablets in five locations across LA, networking these disparate sites so participants could communicate with each other and share their creations. Levine and Glahn (2016) articulate the political intent behind the work, pushing back against the unquestioning celebration of ‘innovative’ technologies produced and distributed by major corporations to instead prompt a “different technological order, in which technologies are shaped by the shared concerns and potentials of common users, instead of by controlling forces of capital and power.” Mobile Image not only sought to put cutting-edge technologies in the hands of individuals for them to learn on their own terms but situated these technologies as necessarily social tools, “as ways to produce new publics, new sets of political relations.”

Although investigating the longer-term implications of these technologies for artistic production and social relations, these early telecommunications projects were inevitably temporary performances or installations. As the Internet steadily grew from its origins in the US military and a handful of research universities, artists began to populate slightly more permanent

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<sup>37</sup> <http://www.ecafe.com/museum/history/ksoverview2.html>

digital spaces like Usenet groups and Bulletin Board Systems (BBS) (Malloy 2016). In addition to sharing discrete artworks in these spaces, artists and writers used technologies like multi-user dungeons (MUDs) and MUD Object-Oriented (MOOs) as new means for collaborative artistic production and also leveraged computer networks to establish dedicated virtual communities for artists like the Art Com Electronic Network (Loeffler 1988). Prominent among these, *THE THING* (1991 - ongoing) began as a BBS and has expanded its functions as an Internet Service Provider (ISP), web hosting service, mailing list, and more.<sup>38</sup> Through these developments, expansions, and iterations, *THE THING* has been a locus of artistic activity engaged with digital and networked technologies, as artists have shared projects, discussed ideas pertaining to art and critical theory, and sparked artistic collaborations and experiments.

Daniels (2010) outlines three phases of an artistic “network avant-garde,” with early telecommunication experiments like *Send/Receive* comprising the first and more permanent networked arts communities like *THE THING* characterizing the second (22-3). As with earlier telecommunications projects, *THE THING* and other arts virtual communities focused more on communication and fostering community as core artistic activities than the creation of enduring art objects. Daniels describes these arts communities as ‘frameworks,’ acting as “self-organized infrastructures” constituted through the particular networked technologies as well as a “unique techno-social dynamic” as the virtual communities wove into artists’ everyday lives and intersected with local arts scenes (24-5). With the rapid and widespread popularity of the Web in the mid-90s, artists increasingly launched standalone webpages, and communities like *THE THING* also established web presences, initiating the third phase of Daniels’ artistic network avant-garde.

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<sup>38</sup> <https://thing.net/>

While Daniels sees the third phase as emerging out of these frameworks—with many of the same artists who were central to these earlier virtual arts communities also key figures involved in making art for and on the Web—he notes significant departures. The underlying Internet infrastructure and the Web both became increasingly commercialized, making it impossible for arts communities to stake out even semi-autonomous space online. Artists worked with and against this creeping commercial influence as a key feature of the Web, with some like the collective etoy (established 1994)<sup>39</sup> explicitly framing themselves as net-based corporations. In the case of this group, their existence as a corporation eventually led to a legal conflict with the toy company eToys, this conflict itself playing out as the artwork *Toywar* (1999-2000) (Wishart and Bochsler 2002). Daniels (2010) also notes that artistic projects on the Web were often explicitly framed as artworks—delimited by titles, dates of creation, and named artists—rather than existing in and through communities of artistic exchange (38). Related to this, these discrete artworks often focused on formal and visual aspects of the Web, such as the art duo Jodi's (Joan Heemskerk and Dirk Paesmans) works that deconstruct the underlying hypertext markup language (HTML) code constituting webpages,<sup>40</sup> treating these technologies as artistic media to experiment with more so than as a basis for communicative exchange between artists and other participants.

Even as artists framed net-based projects more explicitly as artworks, many works still questioned assumptions about the artist as author and explored the inherently social nature of the Web. Alexei Shulgin initiated many such collaborative projects, such as *Homework* (1997),<sup>41</sup> a

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<sup>39</sup> <http://www.etoys.com/>

<sup>40</sup> <http://joid.org/archive/>

<sup>41</sup> <http://www.easylife.org/homework/>

provocation sent to art students in a course taught by Natalie Bookchin to create net artworks, which were then subsequently graded on an A to F scale. While nominally a discrete project, the artwork comprises contributions by many participants and is materially constituted through many branching and interlinking webpages spanning both individual and institutional domain spaces. This work was created for and on the Web but demonstrates the heterogeneity of this network: the Web intersects with and conjoins to the formally circumscribed social space of the classroom, as the student artists negotiate new relations to each other, the instructor, and external parties through the familiar lens of a homework assignment.

Overall, artists working on the Web in the mid-90s were still meditating on the limits and possibilities of networked technologies for art and artistic communities—but in a context in which the Internet and the Web were increasingly integral to social, cultural, economic, and political phenomena. While this era of net-based art tends to be labeled as ‘net.art’ and historicized as a unified movement, Bosma (2011) argues that this framing misconstrues how these artists thought about their own work and how they related to each other (127-9). Rather than an artistic movement, Bosma describes net artists of this time as a group of friends with strong social connections but who pursued a wide range of styles, practices, and approaches. Although a select group of artists are typically associated with net.art, including Shulgin and Jodi, these artists were part of a large and diverse community of artists, curators, critics, and others involved in sharing and discussing work in mailing lists like Nettime and in-person at events like Next 5 Minutes (141), a festival that ran sporadically from 1993 to 2003 and brought together artists and media activists.<sup>42</sup> Bosma urges that we see net.art as historically-situated but

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<sup>42</sup> <http://www.tacticalmediafiles.net/n5m4/about.jsp.html>

part of an ongoing, living artistic engagement with networks as a mass medium and global communications infrastructure.

Although I agree with Bosma regarding the importance of positioning net.art in a broader historical frame, participants in net-based art communities and later scholars have recognized the end of the 1990s as a key point of transition for digital and new media art. Galloway (1999) details significant changes in artists' creative practices, the socioeconomic and cultural context of networked technologies, and the attitudes of established arts institutions to net-based art. While much 1990s net art focused on the formal-visual, social, or technological aspects of the Web and websites, Galloway observes a trend of artists developing code- and software-based artworks, such as Maciej Wisniewski's *netomat* (1999),<sup>43</sup> an alternative web browser that pulled together streams of images, text, and audio in response to user queries. *netomat* still relied on the technological infrastructure of the Internet and asked viewers to consider the browser as an interface to networked information, but the piece functioned as standalone software and engaged viewers in the constituent code, as they could write in a custom eXtensible Markup Language (XML) dialect to direct the browser.

Galloway (1999) also surmises that "1999 is the year net.art became rarefied," as net-based artworks featured prominently in the Documenta 10 festival, and as ZKM staged *Net\_condition* (Weibel and Druckery 2001), the first major survey of art engaged with networked technologies. London (2010) recounts that several leading arts institutions, including MoMA and the Whitney, were also exploring new methods for the collection and exhibition of digital and new media art at this time. As '90s net-based art had always existed outside the established art world, with many artists intentionally working outside of institutional contexts, this new

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<sup>43</sup> <https://www.digitalartarchive.at/database/general/work/netomat.html>

attention engendered tensions between artists and institutions. Stallabrass (2003) enumerates many ways that this push toward institutional inclusion changed net-based artworks and net art in general: displaying net-based artworks in galleries cut them off from the broader sociotechnical context of the Internet, rendering them as sterile and discrete artworks rather than cultural products situated in a web of links (121); this institutional framing simultaneously altered how both artworks and the artists participated across art worlds, with artworks swept up in the market for contemporary art and their creators grappling with new identities as professionalized artists (132-4).

Many artists exploited these tensions and transformations in their work. In the performative intervention *Documenta Done* (1997),<sup>44</sup> Vuk Ćosić cloned and mirrored the website for Documenta 10 on his own server, pirating the net-based artworks featured in the festival out of this institutional custody and recirculating the works in their native online environment. Olia Lialina ([2000] 2017) established *The First Real Net Art Gallery* (1998) in an effort to develop infrastructure, mechanisms, and practices for selling net-based artworks that did not depend on traditional art market institutions—although this site has yet to realize commercial ambitions and “has turned into a gallery-yet-to-be... a repository of discussions that take place before things finally settle and buying and selling net art turns into a boring, routine thing.”<sup>45</sup> The acquisition, collection, and exhibition of digital and new media art has yet to become boring or routine, and artists engaged with digital and networked technologies have remained in uneasy relationships to arts institutions, art markets, and art histories.

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<sup>44</sup> <https://anthology.rhizome.org/documenta-done>

<sup>45</sup> The domain space initially established by Lialina for this gallery has now essentially become an artist’s site collecting Lialina’s projects and links to related articles and pages: <http://art.teleportacia.org/>

In part, these initial tensions never fully resolved because arts institutions' early support for digital and new media art burst along with the dot-com bubble. As Kuni (2010) observes, many of these institutional efforts were not only buoyed by late '90s net hype but were also directly financed by e-commerce investments (191). Many of these initiatives were headed by junior curators or staff in temporary positions who were let go when these funds dried up. Additionally, these institutions lacked the foresight to fully understand the ongoing financial and technical resources involved in the long-term curation of digital objects—a sticking point that continues to plague all kinds of cultural heritage institutions as they dump money into building digital collections that also need to be maintained into the future. As Rosenthal et al. (2012) make clear, just digital storage (let alone resources required for ongoing curation activities) represents a significant and recurring cost.

In the early 2000s, artists and critics began talking about 'software art' as a particular mode of artistic practice. This trend follows from Galloway's (1999) observation that artists increasingly developed functional pieces of standalone software as artworks. Perhaps motivated by the growing prominence of software across culture and society more broadly for everyday activities like composing documents or playing games, artists approached software as a distinct type of cultural object ripe for intervention and interrogation. Broeckmann (2007) clarifies that the term 'software art' does not intend a particular artistic movement, as diverse artists have taken disparate approaches to code-based artworks, but Broeckmann does hold that the status of software as art needs to be firmly articulated:

The notion of art needs to be distinguished sharply from practices like design and engineering, in the sense that art plays out in a completely different register than on the level of functionality or beautification. Art is about the transgression of boundaries, about the 'making strange' of familiar experiences, about dramatising what pretends to be innocent, about the articulation of differences and the friction between them, and about



exploring the virtualities, the potentialities of technologies and human relationships (166).

While software has been used for creative applications in many domains, artists create works that question how software is typically experienced, both deconstructing and envisioning anew the economic or cultural values and the political relationships effected by software. Broeckmann notes the importance of the Internet to software art, both as a means to broadly circulate works and as infrastructure supporting distributed cultural production, but software art is not limited to networked environments.

Software art describes artistic practices that engage directly with digital and networked technologies as core to both the material makeup and conceptual operations of artworks. Importantly, software art consists of code in some shape or form. In contrast, artists and critics in the late 2000s and early '10s began to develop a notion of 'Post-Internet' art to refer to work that did not necessarily use digital and networked technologies but was nonetheless created and experienced in an irreversibly networked culture. Though McHugh (2011) popularized the term in a series of blog posts, he reflects that the term and related ideas were trafficking among artists like Marisa Olson to encapsulate the sense that the Internet was no longer a privileged space full of potential for autonomous artistic communities or alternatives to dominant economic or political systems but, rather, was already immanent to society as such. "It became the place where business was conducted, and bills were paid. It became the place where people tracked you down" (5). Artists no longer need define themselves as 'net artists' because the Internet enters into all artists' creative practices by imbuing and impacting many aspects of social and cultural life.

The centrality of the Internet to how all kinds of artworks are seen and experienced has implications for artists working in any medium. For instance, artists maintain web presences and

social media profiles to reach audiences or search for images to fuel creative processes. Although these impacts are felt broadly, artists and artworks that have come to be associated with ‘Post-Internet’ in art criticism explicitly address how the ubiquity of the Internet affects the creation and experience of art. Artie Vierkant has developed these ideas in his critical writing as well as his piece *Image Objects* (2011 - ongoing),<sup>46</sup> exploring how this ready and rapid transmission of artworks (and images of artworks) online undermines the auratic integrity of the discrete art object. As Vierkant (2010) asserts, “the work of art lies equally in the version of the object one would encounter at a gallery or museum, the images and other representations disseminated through the Internet and print publications, bootleg images of the object or its representations, and variations on any of these as edited and recontextualized by any other author.”

Droitcour (2014) criticizes Post-Internet art on precisely this position, though, arguing that this attitude leads to artworks that “look good in a browser just as laundry detergent looks good in a commercial.” For Droitcour, these artworks are created with the screen in mind but fall flat in the gallery space. Though Vierkant’s ideas suggest that the proliferation of copies of artworks subverts the gallery system—or any other apparatus for controlling the experience or valuation of artworks—Droitcour observes that gallerists and dealers have glommed onto the Post-Internet label as a recognizable brand for showcasing and selling art. Droitcour’s positions reflect some of the criticisms leveled at ‘Post-Internet,’ and the term remains contested if used at all in current art critical discourses. As an art historical term, ‘Post-Internet’ may experience the same fate as ‘net.art,’ shorthand for a group of artists sharing significant affinities though belying the lack of any such unified art movement and obscuring their participation in broader and more diverse communities.

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<sup>46</sup> <https://anthology.rhizome.org/image-objects>

Along with the transmission of artworks from physical gallery spaces to digital images on screens, artists have also responded to the unparalleled circulation of digital cultural materials native to the Internet, propelled by earlier web platforms like Flickr and Photobucket and now by YouTube and Instagram. Coupled first with digital cameras and now smartphones, these services have enabled individuals to create and share images and videos with minimal technical expertise. In the mid-2000s, artists began to assemble ‘surfing clubs,’ collaboratively authored blogs that aggregated especially strange or compelling user-generated media discovered while surfing the Internet (Romocki 2008). As Olson ([2010] 2015) reflects on her participation in one such club, *Nasty Nets* (2006-2012),<sup>47</sup> the artist as ‘pro surfer’ collects and organizes exemplars of digital culture, forming ‘meta-commentaries’ about the nature of online cultural production and gesturing toward a ‘web sublime’ suggestive of immersing oneself fully into the net (161-2). As a curator of digital culture, the pro surfer artist performs digital curation in the expanded sense articulated by Dallas (2016).

In some ways, these surfing clubs recall 1990s net-based art. Like *THE THING* and other early ‘90s communities, surfing clubs joined artists together over networked information systems to share works and discuss and enact ideas about the impact of digital technologies on artistic practices. As with these earlier communities, artists shared discrete projects and pieces but this overall dynamic of exchange among participants constituted the artwork. Driven by the participation of a relatively small group of artists, surfing clubs were more self-contained than *THE THING*, functioning more as loose collectives than communities. While *THE THING* operated—at least initially—as a semi-autonomous community, connecting artists to each other but not necessarily to the broader society, surfing clubs insatiably dove into popular culture

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<sup>47</sup> <https://anthology.rhizome.org/nasty-nets>

generated on and through the Internet. Lonergan ([2009] 2015) explains that surfing clubs collected user-generated materials that were especially marked by the defaults built into commercial software and systems, highlighting idiosyncratic and endearing applications of filters, gradients, and other preset functions for manipulating content (171). As Lialina (2005) recounts, artists in the mid-90s also embraced a do-it-yourself aesthetics inspired by individuals creating their own websites, but the widespread availability and marked higher quality of commercially-available tools have drastically changed the nature of how people create and share web content—transformations continuing through to today.

In their varied artistic practices and artworks, the study participants reflect, draw upon, and expressly reference many of these ideas from the history of digital and new media art. This art historical context illuminates the digital curation challenges encountered by the participants and the repertoires of digital curation practices that they develop and perform as they care for their materials. As hinted at points in this section, digital curation practices have always been immanent to creative practices engaged with digital technologies, as artists and others involved in artistic production wrangle data across complex information systems, troubleshoot technical issues, and coordinate cooperative action. Just as artists adopt and adapt ideas from earlier digital and new media art to distinctly different social and technological contexts, so too the nature of digital curation transforms in response to changes in the capabilities of technologies and how they are used in society. This digital curation dimension of digital and new media art has not often been discussed in the art historical and art critical literature, although these activities are essential to not only create and share digital art but also to steward these works into the future.

## **2.6) Summary**

In this chapter, I have elaborated the background and context out of which my dissertation research developed. I have defined the foundational concepts and the theoretical framework that inform my research questions, study design, and data analysis. I have described the existing research in several areas of cultural heritage preservation, all of which contribute to the preservation of digital visual arts heritage and, in particular, to strategies for the curation of digital and new media artworks and related studio archival materials. In addition, I have reviewed the literature on previous research into artists' information needs and behaviors and provided a historical overview of artists' engagements with digital and networked technologies. My research is situated within this broader domain, and my dissertation contributes to the scholarly discourse in all these areas. In the next chapter, I describe the methods used in my study.

### **CHAPTER 3: METHODS AND STUDY DESIGN**

In this chapter, I elaborate the details of the study carried out to answer the research questions enumerated in the first chapter. As elaborated in the previous chapter, scholars across many disciplines have contributed to a robust literature on the long-term care of a digital visual arts heritage, with perspectives from digital preservation, art conservation, post-custodialism and community archives, PIM and PDA, information-seeking behaviors, and art history all addressing how digital and new media artworks and related archival materials are cared for both in and outside of cultural heritage institutional collections. However, a review of this literature demonstrates that little empirical research has investigated the cooperative patterns of activity emerging to care for those artworks in artists' personal archives or circulating on artist-run platforms or smaller galleries. The present study seeks to characterize these patterns of cooperative activity, focusing on the information practices that artists and curators develop and perform to carry out this cooperative work. I pose two overarching research questions: how do artists engaged with digital technologies as an integral part of their creative practices navigate the long-term care of their artworks and studio archives? What role does Paper-Thin play in this process, as an artist-driven platform for curating, disseminating, and caring for digital and new media artworks?

I first provide an overview of the methods used throughout the study, from delimiting the case study through to data analysis and writing. These methods include situational analysis, constructivist grounded theory, and a range of art historical theories and ideas addressing the relationships between art and technology. Next, I expand upon how the conceptual and

theoretical framework described in the preceding chapter integrates into my methodological approach to form a coherent theory/methods package. I also reflect on my own positionality as a researcher and how this has influenced the choice and application of methods and theory. Finally, I describe my study design in detail, including the process of selecting a case study and delimiting the bounds of that case study, methods for data collection, the data analysis techniques used, and the means for evaluating the study.

### **3.1 Overview of Methods**

Before outlining the details of my study design and the particular applications of analytical techniques, I provide an overview on the methods used to shape and carry out the research: situational analysis, constructivist grounded theory, and a range of art historical theories and ideas addressing the relationships between art and technology. Situational analysis and constructivist grounded theory provide the social science research methods used in the study to understand artists' information needs and practices, while the art historical methods and theories complement this analysis by informing the interpretation, contextualization, and historicization of the artists' particular artworks. I offer background on the methods and describe the rationale for how these methods are suited to answer my research questions.

#### **3.1.1) Constructivist Grounded Theory**

Overall, I have used a grounded theory approach to design and carry out the study. Grounded theory was first articulated as a coherent strategy for qualitative research by Glaser and Strauss (1967) and has since become a widely used approach to conducting research across many social science disciplines. As Glaser and Strauss explain, grounded theory begins from a fundamental shift in the conception of the relationship between theory and data; the authors do not see theory as derived separately or abstracted from data but instead argue for the need to

discover theory *from* data, exploring how theory emerges out of empirical situations rather than testing preexisting theories and concepts. A key feature of grounded theory is that the processes of data collection, coding and analysis, hypothesis testing, and theory building are all interrelated and mutually constitutive throughout the research process.

In particular, I am using a constructivist variation of grounded theory advanced by Charmaz (2014), which recognizes that researchers do not begin from a *tabula rasa* but necessarily bring with them some preexisting ideas about their research. Charmaz positions constructivist grounded theory as part of a longer and dynamic development of this approach to social science research. Emerging out of broader methodological debates in the social sciences, Glaser and Strauss' (1967) initial proposal of grounded theory sought to justify the value of qualitative data in an academic climate that privileged quantitative data and statistical methods (7). As Clarke, Friese, and Washburn (2018) recount, Glaser and Strauss split, each pursuing relatively disparate strands of grounded theory through the 1970s and 1980s, Glaser adhering to a positivist epistemology and Strauss attempting to marry grounded theory with symbolic interactionism (7). Despite these differences, both Glaser's (1978) and Strauss' (1987) later articulations of grounded theory have been influential on qualitative research methodology, and as Charmaz (2014) summarizes, these different strands of grounded theory are a constellation of methods, all with shared strategies and approaches (15).

Situational analysis and constructivist grounded theory are both situated in this lineage of grounded theory methods, but depart from Glaser and Strauss' (1967) initial formulation—as well as both Glaser's (1978) and Strauss' (1987) later formulations—in key ways. Both constructivist grounded theory and situational analysis respond to postmodern and post-structuralist critiques of grounded theory in particular and social science research in general. The



critical insight in Charmaz's (2014) articulation of grounded theory is that the act of research is itself constructed and that the biases and perspectives of the researcher need to be recognized as bearing on the knowledge produced from the research process (13). For Charmaz, grounded theory is *constructed* rather than 'discovered,' as Glaser and Strauss put it (17). The researcher does not uncover some fixed, enduring truth about social processes but rather actively constructs knowledge about the world in collaboration with research participants, involving the worldviews and previous experiences of both the researcher and participants.

### 3.1.2) Situational Analysis

Clarke, Friese, and Washburn (2018) position situational analysis within the grounded theory tradition described above. Along with Charmaz's (2014) constructivist grounded theory, situational analysis is part of the 'second generation' of grounded theory methods (Morse et al. 2009), sharing the same basic approach to qualitative research as first developed by Glaser and Strauss (1967) but introducing significant changes. Situational analysis shares with constructivist grounded theory the recognition that all knowledge is situated, influenced by the perspectives and biases of the researcher and research participants. Clarke, Friese, and Washburn (2018) observe that Straussian grounded theory, with intellectual foundations in pragmatism and symbolic interactionism, has always taken seriously the socially-constructed nature of knowledge, welcomed the interpretive capacity of the researcher, and striven to account for the plurality of perspectives across researchers and research participants.

Both constructivist grounded theory and situational analysis foreground and explicitly articulate the inherently interpretive and situated nature of Straussian grounded theory in terms of the critical theoretical framework of postmodernism. Situational analysis differs from constructivist grounded theory, though, in the analytical emphasis. While constructivist grounded

theory analyzes social processes as experienced and described by research participants, situational analysis seeks to understand the broader set of ecological relationships impacting a given social phenomenon, including humans, but also organizations and collective entities, nonhuman actors, technologies and infrastructures, and visual and textual discourses. This attention to ecological relationships also has roots in Straussian grounded theory: the Chicago School of sociology pioneered the use of maps to represent the “human ecologies” constituting research sites (65); and Strauss (1978) developed a ‘social worlds/arena’ perspective to better describe the social conditions impacting the social processes studied in grounded theory.

To extend Straussian grounded theory, situational analysis braids three new theoretical grounds into the existing foundation of pragmatism and symbolic interactionism. The primary new ground is the work of Michel Foucault, who describes the inherently relational nature of social processes with concepts like discourse and the dispositive, sometimes translated as ‘apparatus,’ or an arrangement of concepts, discourses, and technologies at work in a particular historical moment (Bussolini 2010, 91-2). Sexuality is one example of a dispositive that Foucault returned to throughout his career (Foucault 1988). The second ground consists of many theories that describe the role of nonhuman actors, such as Haraway’s (1991) notion of the cyborg, Latour’s (1987) account of technological actors in processes of knowledge production, or Foucault’s concept of a discourse. Finally, situational analysis incorporates the concepts of the rhizome and assemblage from the philosophy of Deleuze and Guattari ([1980] 1987). Deleuze and Guattari invoke the rhizome to suggest non-hierarchical (or ‘non-arboreal’ in their terms) modes of thought, signification, and organization, metaphorically contrasting the horizontal, nodal growth of rhizomatic roots to the vertical, regular growth of trees. Another way of apprehending complex instances of organization, the assemblage describes temporary

arrangements of heterogeneous elements and entities comprising some gestalt greater than the sum of its parts (DeLanda 2006, 4).

These new theoretical grounds manifest in the method of situational analysis, through the analytic focus on situations and the technique of mapping these situations in different ways. Instead of identifying social processes, situational analysis describes the overall situation in which these processes are embedded and play out. The precise nature of a ‘situation’ remains necessarily ambiguous, as this will differ across research projects, but Clarke, Friese, and Washburn (2018) compare the ‘situation’ to ‘the field’ or ‘field site’ in anthropology, or a “somewhat enduring arrangement of relations, [including] a number of events over at least a short period of time” (117). Similar to the dispositive and the assemblage, situations are complex, bringing together heterogeneous elements, including individuals, discourses, organizations, nonhuman actors, political entities or issues, technologies, spaces, and sociocultural and symbolic elements. Straussian grounded theory attends to the conditions and many contextual factors that impact social processes, for instance with conditional matrices that outline micro, meso, and macro social contexts surrounding the action or process under research (Corbin and Strauss 2015, 163). However, Clarke, Friese, and Washburn (2018) contend that conditions and contexts cannot be separated from actions and processes and that elements of a situation cannot be isolated into distinct levels of analysis: “the fundamental new poststructural assumption here is that everything in the situation both affects and co-constitutes most everything else in the situation in some way(s)” (46). The analytic focus of the situation, then, foregrounds the ecological interrelations between heterogeneous elements involved in social processes and opens the researcher up to complexities of the social phenomena under research.

Integral to understanding the nature and boundaries of a situation is the analytical practice of situational mapping. As with coding of other kinds of research data in grounded theory studies, which proceed iteratively in concert with data collection, researchers map the situation throughout the research process, revising and adapting maps as new data are collected and analyzed and as the researcher gains a deeper understanding of the situation. Situational analysis involves three kinds maps: situational maps, which specify all the major elements in the situation, including human and nonhuman actors, discourses, organizations, and other dynamic processes (127); social world/arena maps visualize the commitments, conventions, sites of action, and collective entities at work in a situation (151); positional maps outline the predominant positions, both articulated and unarticulated, on controversial issues contested within the situation (165). Although these maps can be used to illustrate research findings, the authors stress that the primary purpose of the maps is analytic: similar to coding, situational mapping immerses the researcher in the data, providing the researcher with tools and techniques for arriving at insights, identifying patterns and themes, and grappling with complexity and contradictions (105). I detail how I have employed these mapping techniques for my study in the section on data analysis below.

As Clarke, Friese, and Washburn note, constructivist grounded theory and situational analysis have different analytical focuses (social processes and situations, respectively) but are highly compatible (9, 108). The authors resolve that grounded theory can be used to study both processes and situations (55), and attending to both of these has been critical for my particular research. I have sought to understand how artists carry out digital curation by finding information and learning new skills needed to create and care for their artworks; but these processes take place within situations involving other individuals like collaborators,

organizations like galleries, and the particular technologies used, among many other factors.

Methods from situational analysis and constructivist grounded theory have complemented each other, as I have used these in concert to analyze how artists' curation practices are shaped by the information worlds in which these processes take place.

### 3.1.3) Art Historical Methods

I have also analyzed various artworks by the participating artists, as well as Paper-Thin as a whole, using art historical methods attuned to the interrelationships between art, technology, and society. Although I have applied a range of ideas and theories from the history of art, which I cite in my discussions of these artworks throughout the dissertation, my overall approach to the readings of these works has been based in the tradition of Marxist cultural materialism. Much of this intellectual tradition stems from the prescient work of Walter Benjamin, who theorized about the ability of artists to surface deep sociopolitical 'tendencies' through artistic experimentation with technological means of production, for instance in the lecture "The Author as Producer" (Benjamin [1934] 1999), and about the impact of mechanical reproduction on the originality or 'aura' of artworks, in the perennially influential essay "The Work of Art in the Age of Mechanical Reproduction" (Benjamin [1939] 2003). Though writing in the 1930s and 1940s in response to technologies like photography and film, Benjamin's work remains relevant to artworks engaged with digital technologies like Paper-Thin, as Benjamin crucially links analysis of artistic activity with a Marxist attention to the social and political dimensions of material processes. Later thinkers, including Raymond Williams, have expanded upon Benjamin's work to elaborate a more thoroughgoing program for Marxist cultural materialism as an analysis of 'culture' as a complex interrelationship of dynamic social material processes (Williams 1977). As noted in the introductory chapter, Williams specifically calls for the need to analyze artistic

‘formations’ or emergent artistic trends and activities as active processes existing in generative tension with formalized and established cultural institutions—for instance, networked alternatives like Paper-Thin.

Williams ([1974] 2003) points to the social and material particularity of technologies, distinguishing television broadcast networks from the analog film and photography discussed by Benjamin. Likewise, while drawing on the theories and methods of earlier thinkers, I also describe the particular social and material contexts in which Paper-Thin functions. For this, I have drawn on various theoretical accounts of digital and networked technologies, which are in many ways related to the Marxist cultural materialist thinkers. Primarily, I have taken up Fuller’s (2005) notion of media ecologies, which he uses to describe the dense interrelationship between diverse material forces that shape use and experience of digital and networked technologies. Artists engaged with digital technologies negotiate these ecologies as they create work, at times as a conscious critical intervention and at other times just to get something to function.

Both Jaeger and Burnett’s (2010) notion of information worlds and the concept of art worlds (Becker 1982) describe information practices and artistic activities, respectively, as situated within complex social worlds, influenced by many actors, factors, technologies, and socioeconomic forces. The art historical and media studies approaches contribute to the analysis of the complex social worlds that Paper-Thin and the participating artists inhabit, highlighting the political and economic dimensions of the artists’ and curators’ digital curation practices. As these artists and curators explore alternative approaches to creating, exhibiting, and caring for artworks, the art historical theories outlined above provide critical vocabularies for describing the effects of these digital curation practices in terms of cultural production and consumption and the shifting role of art in a networked society—all with implications for who participates in

culture and how. I develop these strands in chapters four and five, but as I discuss in those chapters, the present study surfaces many larger questions about the dynamic relationships between art and technology that warrant further consideration and treatment beyond the bounds of this dissertation.

### **3.2) Reflection on Research Methodology**

In this section, I reflect on the methods that I have used to design and carry out my study, both in relation to the theoretical framework undergirding my research as well as to my personal positionality. I first discuss how the particular methods outlined above integrate with the theories of information worlds and art worlds and are thus especially well-suited to address the research questions driving this study. I then reflect on my own positionality as a researcher, coming at this project from a certain personal, sociocultural, and scholarly perspective. Across the reflective statements, I discuss how these specific methods and my own position as a researcher have shaped the research, foregrounding some aspects of the research area and research questions while obscuring or potentially distorting others. While the choice of certain methods and a researcher's positionality will always shape the research in some way, I acknowledge several factors especially pertinent to the study design, data collection, analysis, and presentation of findings; I consider the implications of the influence of these factors and steps taken to address this potential influence.

#### **3.2.1) Relationship between Method and Theory**

In the preceding section, I outlined the methods used to carry out the study; in the previous chapter, I detailed the theoretical and conceptual framework undergirding the study design and analysis. Clarke, Friese, and Washburn (2018) describe situational analysis itself as an assemblage, braiding together various intellectual traditions into the existing foundation of

grounded theory (95) and suggest that researchers think of situational analysis as a ‘theory/methods package’ (61). My own theory/methods package is likewise an assemblage, bringing together grounded theory, art historical and media studies theories, information worlds, and art worlds. Across the diverse theories and methods, this assemblage incites points of consonance and points of dissonance—both of which have been generative of analysis and inquiry—and has provided me with a strong set of tools, techniques, and approaches to address the research questions driving my study.

Constructivist grounded theory and situational analysis cohere around a shared epistemological orientation that recognizes the situated nature of knowledge. Both methods are based on epistemological grounds that all individuals construct their realities through an interaction of personal experiences and shared social perspectives. The theories of information worlds and art worlds derive from these broader epistemological grounds. Both information worlds and art worlds describe the many, complex interrelated factors that shape social organization and interactions. These social worlds are historically contingent and situated, emergent from the many interactions between and among individuals, as well as nonhuman actors, technologies, discourses, and political, economic, and symbolic elements.

Although the art historical theories are not directly related to these social science research methods, the underlying assumptions that artworks function within historical contexts and that the meaning of these works derive in part from the specific materials and technologies used accords with the constructivist epistemology sketched above. However, more than simply emphasizing the importance of seeing art within its cultural and historical context, Benjamin, Williams, and others in the cultural Marxist tradition stress how artworks respond to and resist the dominant political and economic conditions. As mentioned above, I have used these theories



to pursue analytical trajectories pertaining to the political and economic dimensions of digital art curation, such as the valorization of digital art objects, alternatives to predominant institutional models for collecting and displaying artworks, and critiques of corporate control over technologies. These are all questions that I encountered as I employed situational analysis and constructivist grounded theory methods to conduct my research, but I needed theories attuned to the relationships between art and technology to begin to formulate answers.

Situational analysis and constructivist grounded theory provide methods for collecting and analyzing data, but these methods require theories to drive interpretive inquiry. Theories of information worlds and art worlds have enabled me to analyze digital curation as an inextricably social phenomena carried out across diverse social worlds, and art historical and media studies approaches have afforded me critical tools for thinking through the impact of these digital curation practices on the production, circulation, and reception of digital and new media art in particular sociocultural contexts. Each component of the theory/methods package that I have assembled has served distinct but interrelated requirements to address the inherently interdisciplinary research questions at the heart of this dissertation.

### 3.2.2) Self-reflective Statement on Positionality as Researcher

Overall, grounded theory seeks to foreground the perspectives of research participants, using the participants' own language and actions to drive interpretation of the data. However, Charmaz (2014) and Clarke, Friese, and Washburn (2018) also stress the role of researchers in constructing particular representations of social reality, necessarily bringing their own biases and previous experiences to bear throughout the research process. The influence of the researcher is not something to excise—the researcher contributes valuable skills, background, and insights to make sense of complex social phenomena—but the researcher does need to exercise regular self-

reflection to remain cognizant of the particular ways he is actively influencing the research process. Charmaz (2014) advises that the researcher should critically reflect on his positions and perspectives throughout the research process, focusing especially on key terms, or ‘sensitizing concepts,’ that serve as part of the conceptual scaffolding the researcher uses to make sense of the objects of study (30). This critical self-reflection needs to be sustained throughout the research process, as important when coding interview transcripts as at the beginning of the study. In this subsection, I document the foundation for the critical self-reflection that I have sustained throughout my research.

Central to my research are the related concepts of art, the artist, and the artwork—the definitions for all of these have been contentiously debated across time and have taken on quite different meanings in various social and historical contexts. These questions are far from settled today, fueling ongoing discussions both inside and outside of academic discourses. Although my research does not aim to directly take up any of these questions, I have encountered differing senses of these concepts from research participants, and the findings of my research speak to how variable—and at times conflicting—notions of art are negotiated for digital and new media artworks in particular. Indeed, artworks engaged with digital and networked technologies often expressly challenge notions of the artwork as a fixed object, as well as broader questions about art, its place in institutions like museums, and its social function. All of this makes it crucial for me to foreground my own perspectives on art and to highlight how my previous experiences have influenced the research process. Here I want to discuss three principal aspects of my own experience that have shaped my understanding of art and may influence my perspective as a researcher working in this area.

First, my training as a researcher in the LIS discipline with a focus in archives has not only influenced my overall perspective on art, artists, and artworks but has also directly shaped my planned research, including how I have framed the research, the particular research questions posed, and my methods for data collection and analysis. I have drawn on an existing body of literature largely from the field of LIS to provide the scholarly context for my own research, and I have used a number of key ideas from LIS in my research questions, namely ‘information needs,’ ‘information practices,’ and ‘information objects.’ All of this has already conditioned how I approach the phenomena of artists taking care of their artworks and studio archives. This has manifested in obvious ways, like the questions that I asked in interviews pertaining to the information sources that artists draw on.

This has also manifested in more diffuse ways across the research process. One potential influence of the archival perspective that I have been especially cognizant of is a propensity to think in terms of artifacts. This tendency pervades the existing literature on digital art preservation, as much of this has been written from the perspective of collecting institutions, which tend to treat artworks principally as objects in their collections. As a function of art registration and cataloging, artworks in collecting institutions require accession numbers and metadata on creators and media, even if the work itself troubles such cut and dried distinctions. However, I have sought to elicit artists’ perspectives on their own artwork, considering this in the context of an artist-run platform, Paper-Thin, which has quite a different approach to the treatment of artworks than traditional arts institutions. At times, these artists’ perspectives have broken with these institutional reifications of the ‘artwork,’ and I have made efforts to highlight rather than overwrite these differences, from how I framed questions in interviews to how I coded, analyzed, and interpreted the data from the artists’ interviews.

A related potential influence from the archival perspective is a tendency to be concerned with preserving ‘the stuff.’ However, in this research, I have been more interested in the people—considering primarily how artists are grappling with taking care of their artworks and archives and not necessarily if the materials in question are ultimately preserved according to professional ‘best practices.’ From a traditional archival perspective, the individual creator often does not play a prominent role once materials enter into an archival repository, at which point the archivist becomes the custodian. This notion of the role of the archivist is changing across the profession, and these shifting attitudes are represented in the community and post-custodial archival literature discussed in the previous chapter. Much of this literature discusses the role of records’ creators and other stakeholders in the long-term care of materials, acknowledging other ways of remembering that diverge from the preservation of documents in a repository (McKemmish 1996).

Artists’ perspectives and experiences are the focus of this research, and so I have been attuned to the full spectrum of ways that individuals have gone about caring for artworks and studio archives. In some cases, these practices have broken with the traditional goal of museums to make artworks accessible to future generations. As Dallas (2016) argues, this ‘wild frontier’ mindset, which valorizes professional practices as correct and individual digital curation practices as unruly and misguided, distorts the ability of archival science research to understand how digital objects are created and made sense of in particular contexts of use. In order to elicit and understand participants’ own perspectives and digital curation practices, I was especially careful in how I first presented the aims of my study and then how I conducted the interviews. I opted to use language of caring for artworks—rather than archiving or preserving—to avoid imposing the impression of a professional or ‘correct’ way of doing things. While my position as

a researcher coming from a school of information and library science may have given off this impression, I often discussed with participants that even professional archivists and conservators struggle with these issues and that the scholarly discourse is marked by countless questions and ongoing debates reminiscent of questions raised by the participants pertaining to their own digital curation practices.

Second, the other areas of my academic training in art history and literary studies have influenced my perceptions on art, artists, and artworks. In my training in these areas, I have been exposed to a broad range of ways in which the arts have been created, disseminated, and understood in many historical contexts from antiquity to the present. Across these temporal and geographic spectra, an overarching lesson from my academic training is the social and historical contingency of the categories of ‘art,’ ‘artist,’ and ‘artwork.’ In terms of contemporary art, specifically, I have studied many diverse perspectives on the problematic of defining these categories in the present moment and in recent history. Notably, these categories are debated not only by art critics and art historians but also by artists themselves. Many scholars have discussed conceptual art and related post-war art movements and tendencies as expanding the notion of the artwork beyond just the object to also function as a kind of metacritique of art itself, the art world, and art’s social function (Lippard 1973; Osborne 2013).

Throughout the history of art engaged with digital and networked technologies, artists have expressly pursued this kind of metacritique, often creating work that intentionally skirts traditional arts institutions and realizes other means for creating and disseminating art. For instance, Alexei Shulgin staged a number of collaborative online works, such as *Form Art* (1997), which invited artists to submit web-based artworks constructed from HTML form elements like check boxes and radio buttons. Though the competition occurred online, the work

mimicked juried arts competitions with its mock-serious application and judging process.

Throughout my training in art history, I have studied many examples of art engaged with digital and new media technologies and have developed an appreciation for the many ways in which these works function as art, including how they participate in critical discourses.

As with my background in LIS and archival science, my background in art history and literary studies also imposes potential biases or blind spots that I have attended to throughout the research process. In particular, I have been careful not to limit my analysis to only consider how artworks created by the participants fit within broader art historical lineages and trajectories. My research participants are in the midst of their artistic careers, and we often discussed projects in process or recently completed. Artists may be pursuing ideas that do not fit neatly into preexisting categories, or ideas from art history may not be top of mind as artists are creating new works—especially when artists come up against technical difficulties and make compromises to get something up and running.

Overemphasis on similarities to or differences from earlier eras can obscure those novel or emergent aspects of recent works. While participants reflected on how their work responds to or resonates with earlier artworks and artistic tendencies and generally how they see their work in these larger art historical and art critical conversations, this is far from the only factor impacting how they create, exhibit, and care for their artworks. Their information practices are also driven by issues and struggles at a remove from art worlds and art history but nonetheless fundamental to their information worlds. Artists' digital curation practices are shaped by their interactions with individuals and organizations in art worlds, but these are also shaped by actors and factors in the other social worlds that artists traverse, both those adjacent too and quite distant from art worlds. Art historical theories and ideas have added great richness to analysis,

but I have taken care to position art history and art worlds more generally as important but not determining forces in the complex social processes involved in digital and new media art curation.

Finally, my experience as a poet who has worked creatively with a variety of digital technologies has also contributed to my appreciation for artworks from the perspective of a creator. I have taken inspiration from countless poets, writers, and visual artists who have experimented with digital and networked technologies to produce alluring visual and experiential effects, as well as to push the conceptual boundaries of what constitutes a work of poetry or art. In my own work, I have taken up those ideas and pursued my own experimentation as part of my creative practice. In my training as a poet, I have taken studio art courses and collaborated with visual artists, leading me to see many continuities and overlaps between academic sub-disciplines like ‘electronic literature’ and ‘digital and new media art.’ As a poet, I am also sympathetic to how personal attitudes toward creative works can shift radically over the course of the creative process. Ideas for works can change over time, and rarely does a work proceed linearly from idea to final realization. Ideas can be rehashed in slightly different iterations, and ideas for new works can emerge unanticipated while creating something else. This firsthand sense of an artwork differs again from art historical understandings; even though some art history methods do attempt to trace the development of artworks over time, this is still a step removed from the individual or collaborators involved in creating a work. The perspective gained as a creator exists in productive tension with the tendencies from the archives and cultural heritage sectors that privilege the objecthood of information, especially in institutional contexts. This study has called for an expansive and inclusive understanding of art, artworks, and artists, and I have developed such an understanding throughout my personal experiences.

I also acknowledge that other aspects of my positionality have influenced how I approach the research. My position as a young, white, straight, English-speaking male has limited my ability to fully empathize with the experiences of others not coming from these positions of privilege. However, throughout this research I have made every effort to listen to and raise up the experiences of others. As I discuss below, my decision to select Paper-Thin as the case study for this research was in part motivated by the range of artists who have contributed to the platform, representing broad diversity in terms of gender, race, country of origin, age or stage in career, and creative practice. My decisions to interview additional individuals who played important roles in the artists' information worlds and to include these interviews in the coding and other analytical processes further broadened the range of voices represented. While I played the principal role of designing and carrying out the study—and my influence is ineluctable—the data and resultant findings encompass a huge span of perspectives on digital and new media art as well as the ongoing care of these artworks.

### **3.3) Study Design**

In this section, I detail how the methods sketched above have been deployed for the present study. I discuss selecting Paper-Thin as the primary case study and how this relates to the overall 'situation' of the research in terms of situational analysis. I enumerate the range of data sources I have collected for the case study, along with any considerations that impacted how I collected this data. I describe the data analysis methods undertaken, namely coding of interview transcripts, situational mapping, and close readings of various artworks included in Paper-Thin. Finally, I outline the criteria and means I have applied to evaluate the study.



### 3.3.1) Case Study and Sample Selection

The overall situation of the research is artists undertaking the digital curation of artworks and archival materials, including the range of actors, technologies, discourses, and socioeconomic factors impacting artists' information needs and practices. As a means to delimit this situation for the purposes of a research study, I employed a case study design, with the artist-run platform Paper-Thin as the central case. The overall platform of Paper-Thin, which comprises three volumes of artworks that have been presented across an online environment and an in-person installation, constitutes one unit of analysis. For Paper-Thin, I have been concerned with the artworks themselves—how they have been created, integrated into the platform, disseminated, and experienced—as well as the role played by Smith and Buckley as the curators of the platform. This includes how Smith and Buckley developed Paper-Thin, their work to curate the platform, and the issues they have experienced in the ongoing care of the platform. The individual artists who have participated in Paper-Thin also constitute units of analysis. I have been concerned with their participation in Paper-Thin, as well as their overall creative practices, particularly how they have gone about caring for their artworks and related archival materials as part of their artistic careers. As suggested in the two main research questions driving this study, I have been interested in both the individual artists' information needs and practices, as well as how these have been impacted by artist-run platforms for curating digital art. The case study design comprising both Paper-Thin as platform and individual artists as participants has elicited the desired interrelationships between these analytical levels.

The case study design is preferable to a wider-reaching sampling procedure, such as snowball sampling, as this case has enabled me to more fully consider the role played by artist-driven platforms for curating, disseminating, and caring for artworks. These kinds of platforms

have featured prominently in the art worlds of artists engaged with digital and networked technologies, and I determined that the most effective way to represent this was to include an example of such a platform in the study design itself. Focusing on a specific platform has also allowed me to more readily understand the art historical context of the artists and artworks and to use the art historical theories described above to enrich my analysis of the artists' digital curation practices. Rather than analyzing works by disparate artists, Paper-Thin is a cohesive project that I have been able to interpret as an artistic effort, conceived of and curated by Smith and Buckley. I have been able to place this particular platform within a broader history of artists' engagements with digital and networked technologies.

I chose Paper-Thin as the case for several reasons. First, I have access to Paper-Thin, based upon my existing relationship with one of the founders and curators. I met Smith through my earlier exploratory research (Post 2017a), as he was recommended to me for participation through a mutual acquaintance. Smith participated in this earlier study, and he discussed Paper-Thin as part of his own creative practice. In this interview, Smith described Paper-Thin as a kind of alternative archiving effort: Paper-Thin does not depend on the later judgment and efforts of cultural heritage institutions but instead takes strides to establish a shared community of concern among artists actively using VR technologies. These sentiments resonate with ideas in post-custodial and community archives discourses (De Kosnik 2016) and with emergent conservation paradigms for digital and new media art (Rinehart and Ippolito 2014) discussed in the previous chapter. A central motivation for my own research is the further exploration of alternative approaches for the preservation of digital and new media artwork beyond traditional custodial models, and Paper-Thin is a prime example of this kind of effort in effect.

Paper-Thin is also a current, ongoing project. The active nature of the project provides opportunities for research not possible when examining historical examples of artist-driven platforms, namely the ability to interview individuals involved while the project is still developing and decisions are being made. Paper-Thin also relates to a range of artist-driven methods for sharing and exhibiting work—both current and historical—enabling me to enrich my analysis through comparisons to these other examples. In many ways, Paper-Thin resembles artist-driven galleries, albeit occupying virtual rather physical space, as artworks by a variety of artists are displayed in a shared context. Paper-Thin also resembles artist-driven platforms that leverage digital networked technologies, such as [runme.org](http://runme.org/), a repository of software-based artworks,<sup>48</sup> along with other historical examples discussed in the literature review. Paper-Thin has been discussed in relation to other online venues for exhibiting art,<sup>49</sup> though research on online artist-run platforms is an emergent area of research from the perspectives of both LIS and art history. The choice of this case has enabled me to bring both perspectives to bear and to explore mutual intersections, overlaps, and tensions. Over the course of this project, I have discovered how insights generated in one discipline have relevance to the other, as well as points of tension and difference, where an art historical perspective differs from that of LIS.

Finally, Paper-Thin was appealing as a case because a wide range of artists have participated across the three volumes, representing a broad diversity in terms of age or stage in career, gender, race, country of origin, and nature of creative practice. While Paper-Thin as a platform centers around a particular set of technologies, the participating artists have used a much broader range of both digital and analog technologies in their respective creative practices

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<sup>48</sup> <http://runme.org/>

<sup>49</sup> <http://rhizome.org/editorial/2016/jan/20/review-rachael-archibald-carnate-in-pinking/>

and have engaged in a full spectrum of means, methods, and venues for exhibiting or otherwise disseminating their work. Faced with the intrinsic logistical difficulties of undertaking a dissertation research project, this case facilitated access to a group of artists with rich and varied bodies of experiences. Although by no means comprehensive or fully representative of all artists working with digital and networked technologies, this case and the participating artists speak to multifarious and dynamic nature of current art worlds.

As the curators of Paper-Thin, Smith and Buckley acted as intermediaries, introducing me to the participating artists via email. They explained my project and my interest in Paper-Thin and invited them to participate in my research. I then sent a follow-up email with further information about the project, what participating in the research would entail, and next steps to take if interested. Out of the 27 artists who have participated in Paper-Thin, I recruited 14 for participation in the study. I scheduled and conducted interviews with the 14 participants between November, 2018 and February, 2019. An additional three artists expressed initial interest in participating but ultimately were not able to participate in the study.

As I detail below, I also asked each artist to put me in touch with an additional individual with whom they have discussed digital curation issues and challenges. The original 14 participants put me in touch with 11 individuals, including artists, curators, collectors, and conservators. I interviewed all these individuals as well, coding these interview transcripts<sup>50</sup> and incorporating their perspectives into the overall analysis, effectively including all these individuals in the overall sample. As a primary goal of my analysis is to understand artists' information worlds—and the range of other individuals, organizations, technologies, and

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<sup>50</sup> One of these additional participants, Melanie Lenz, preferred to respond to a list of questions over email instead of arranging an interview. In this case, I sent her questions tailored from the semi-structured interview guide and coded the textual responses received from her.

discourses shaping these worlds—I felt that it was important to fully integrate the perspectives of these individuals into my analysis. All these individuals reported on rich experiences that brought up new issues entirely and added nuance to issues discussed by the original 14 participants. Table 1 provides an overview of all the participants. For each participant, I list his or her name and geographic location. I detail the participants’ roles or professional positions, and for the additional individuals recommended by the artists, I note which artist suggested them. For the artists who contributed to Paper-Thin, I list which volume they participated in. Further details about the participants’ creative practices and professional or personal life experiences relevant to the study are discussed where applicable in the body of the dissertation.

<b>Name</b>	<b>Group in study</b>	<b>Role(s)</b>	<b>Location</b>
Haseeb Ahmed	Participating artist (v1)	Artist, researcher	Brussels
Hugo Arcier	Participating artist (v1)	Artist, founder of creative studio	Paris
Gabe Barcia-Colombo	Suggested by artist (Rothberg)	Artist, educator	New York City
Cameron Buckley	Paper-Thin curator	Artist, curator, educator	Memphis, TN
José Carlos Casado	Participating artist (v3)	Artist	New York City
Sterling Crispin	Participating artist (v3)	Artist	Los Angeles
Stefano D’Alessio	Suggested by artist (Menegon)	Artist, educator	Vienna
Raul De Lara	Participating artist (v3)	Artist	Richmond, VA
Mark Dorf	Participating artist (v2)	Artist	New York City
Kathleen Forde	Suggested by artist (Ritiu)	Museum curator	New York City
Claudia Hart	Suggested by artist (Casado)	Artist, educator, curator	Chicago
Hunter Jonakin	Participating artist (v1)	Artist, educator	Minneapolis, MN
Melanie Lenz	Suggested by artist (Lomas)	Museum curator	London
Andy Lomas	Participating artist (v1)	Artist, educator	London
Kristin Lucas	Suggested by artist (Stearns)	Artist, educator	Austin, TX
Bryan McVey	Suggested by artist (De Lara)	Artist, collector	Chicago
Martina Menegon	Participating artist (v2)	Artist, educator, curator	Vienna

Brenna Murphy	Participating artist (v2)	Artist	Portland, OR
Zachary Dean Norman	Participating artist (v2)	Artist	Salt Lake City, UT
John Harlan Norris	Participating artist (v3)	Artist, educator	Lexington, KY
Marius Ritiu	Participating artist (v3)	Artist	Antwerp
Sarah Rothberg	Suggested by artist (Stearns)	Artist, educator	New York City
Paul Slocum	Suggested by artist (Murphy)	Gallerist	Los Angeles
Daniel Smith	Paper-Thin curator	Artist, curator, designer and fabrication consultant	Boston
Zack Spechler	Suggested by artist (Jonakin)	Museum curator	Miami
Phillip Stearns	Participating artist (v3)	Artist	New York City
Caroline Turner	Suggested by artist (Norman)	Artist, curator	Eugene, OR

Table 1 Overview of Study Participants

### 3.3.2) Data Collection

I collected various sources of data to address the research questions pertaining to both Paper-Thin as an arts platform and to the individual artists' digital curation practices. For Paper-Thin, I conducted a series of three semi-structured interviews with Smith and Buckley, each interview lasting approximately an hour. After an initial consultation with Smith and Buckley, I decided to conduct these interviews with both curators together, as they were able to jog each other's memories, raising issues and topics that I would not have known about otherwise. These three interviews roughly corresponded to the three volumes of Paper-Thin, touching on how Smith and Buckley created and developed each volume, their interactions with the participating artists, technical issues that arose in the process of creating the volumes, aesthetic or conceptual aspects of each volume, and how they are approaching the ongoing care of each volume. Supplementing these interviews, Smith and Buckley provided me with technical documentation, photographs, and other materials generated over the process of creating the three volumes of

Paper-Thin. I extensively examined the three volumes, undertaking close readings of the individual artworks in addition to considering the overall volumes as cohesive experiences.

For the individual artists, I also conducted semi-structured interviews with each of these participants as the primary data source. The interviews typically lasted about 60 minutes, with the shortest interview taking 40 minutes (Haseeb Ahmed) and the longest taking 90 minutes (Zachary Dean Norman). I conducted interviews using various video conferencing software (Google Hangouts or Skype), depending on the participant's preference. I recorded the audio of these interviews using a handheld digital recorder and later transcribed the interviews myself using the software Parlatype and LibreOffice Writer. These interviews covered the artist's creative practice in general, his or her experience and work with Paper-Thin specifically, experiences with other kinds of galleries or arts institutions both similar and dissimilar to Paper-Thin, and his or her digital curation and studio archiving practices. At the end of each interview, I asked participants for two follow-up items. First, I asked for participants to provide me with an example of a documentary information source (like a website, video, or book) illustrative of the kinds of information used to support their digital curation practices. As the interviews included in-depth discussion of the artists' information needs and practices, there were ample examples of sources that I was able to suggest to artists. Second, I asked artists to put me in touch with some other individual (like an artistic collaborator, another curator or gallerist beyond Paper-Thin, a collector, or some other museum or information professional) with whom they had discussed or actively worked on digital curation issues. Likewise, the interviews all included questions about other individuals or organizations involved in digital curation, so I was able to make suggestions if the artists themselves did not already have an idea of someone in particular.

11 of the 14 artists provided this documentary information source, which ranged from nonfiction books on science and technology to forum posts, and 10 put me in touch with at least one interpersonal information source. All 14 artists intended to provide me these additional items, but I suspect that busy schedules and other commitments took priority. In one case, Sterling Crispin did provide a documentary information source but could not get ahold of the individual with whom he intended to put me in touch. One participant, Phillip Stearns, put me in touch with two such individuals; and one of these individuals was another artist, Sarah Rothberg, who in turn connected me with another individual, Gabe Barcia-Colombo, both of which I included in my sample to increase the range of experiences and perspectives represented. The roles and relations of these interpersonal sources to the artists included collectors, conservators, colleagues in academic departments, and artistic collaborators. I conducted semi-structured interviews with these related individuals, focusing on their interactions and relationships with the Paper-Thin artists but also touching on their own experiences and practices. These interviews resembled those with the Paper-Thin curators and the original 14 artists, lasting approximately the same length and following the same procedures for recording and transcribing.

Both the documentary and interpersonal information sources contributed to my situational mapping methods and thus my understanding of the information worlds of these artists. Underpinning my research questions and study design is the notion that digital curation—both inside and outside of institutional contexts—involves a range of individuals and organizations, kinds of information, and technologies. All these actors and factors were explicitly discussed in the interviews, but these additional data sources enriched the overall case study. By offering distinct and at times divergent perspectives, the interviews with the individuals



suggested by the artists were especially important in helping me to arrive at a more fully formed model of the artists' information worlds.

In addition to experiencing the works each artist had contributed to Paper-Thin, I looked at select artworks each artist had produced for other contexts or venues. For all participants, I browsed the artists' personal or gallery websites, both as access points to artworks and to learn more about the artists' creative and professional practices. In most cases, I examined artworks discussed in the interviews, as these were often brought up as examples of particular preservation challenges or digital curation practices. I discuss many of these in detail in the following chapters. In my perusal of the artists' websites, I also encountered other works that were not discussed in the interviews but were nonetheless interesting as examples of an artist's creative practice or as works that raised pertinent questions about art and digital technologies. Several artists offered supplementary materials from their personal archives like documentation photographs or contracts covering the ongoing care of artworks collected by institutions. As needed to support art historical research of both Paper-Thin and the artists' works outside Paper-Thin, I also sought out additional resources, such as published interviews with artists, articles about the artists in various publications, or other texts and artworks relevant as points of comparison. Specifically, Smith and Buckley conducted interviews with the artists for v1 and v2, all of which are posted on the Paper-Thin site. I consulted these in particular for further details about the artists' creative practices, although I do not quote from these directly in the body of the dissertation. Unless otherwise noted, all the direct quotations in these chapters are drawn from the interviews I conducted with the study participants.

### 3.3.3) Data Analysis

I employed three analytical approaches in this study: coding the semi-structured interview transcripts to identify emergent themes and issues; situational mapping techniques to conceptualize, model, and interrogate the artists' and curators' information worlds; and art historical analyses to contextualize and historicize individual artworks along with Paper-Thin overall as an art platform. I now discuss how I applied each of these methods in detail.

As Charmaz (2014) describes, coding is a bridge between data collection and analysis, a crucial interpretive process during which the researcher makes sense of the data (160). I conducted a cycle of initial coding, during which I worked through all the interview transcripts to build up my corpus of codes. I followed this with a cycle of focused coding, in which I grouped the initial codes into emergent categories and themes. Although both cycles were systematic and comprehensive, both were also interactive, iterative, and comparative, as I developed and adapted codes through multiple passes of various interviews and arrived at new understandings of codes in moving from initial coding to focused coding. These interactions and iterations were bounded by systematic and comprehensive passes over all the interview transcripts to ensure that codes were accurately applied to all transcripts, especially since new codes were added or older codes were modified during the analytical process.

I used my research questions to direct my initial cycle of coding, attending to the digital curation information needs and practices of participants. Even still, my initial codes were wide-ranging as many issues and factors weighed on how the artists approached and thought about the care of their materials. Supplementing Charmaz's recommendations, I drew on Saldaña (2016) for coding guidance, who also advises two cycles of coding following a similar progression from a granular focus up to broader themes. For first cycle coding, Saldaña describes process coding,

or ‘action coding,’ as a related variant of the initial coding and commonly used in grounded theory studies (110). Process coding identifies actions discussed by participants, using gerund phrases to code these actions. I used process coding for actions mentioned by participants as part of their information-seeking behaviors or digital curation activities (for instance, “watching YouTube tutorials”). In addition to process coding, I also used the more generic descriptive coding, or ‘topic coding,’ which codes ideas, issues, environmental factors, and material things. I used this approach to code the technologies, individuals, entities, and issues that participants discuss as bearing on their digital curation information needs and practices, when these things are not explicitly associated with a particular action or process (for example, “virtual reality”). The descriptive codes fed directly into my situational mapping, as many of these entities played some part in the ecology of artists’ information worlds.

Finally, I used two related methods of affective coding (emotion coding and evaluation coding) to analyze the role that affect plays throughout the digital curation process. While affect is not explicitly emphasized in my research questions, LIS scholars have long recognized the importance of emotions in the information-seeking process (Kuhlthau 1991; Kuhlthau, Heinström, and Todd 2008). This is clearly true of artists caring for their artworks, as they invest time and energy in the creative process, and since the ongoing life of these works are integral to their artistic careers. I used emotion coding to identify and describe emotions explicitly stated by the participants (for instance, “frustration” if the participant says “I was frustrated when...”). Evaluation coding is intended to describe “judgments about the merit, worth, or significance of programs or policy” (Saldaña 2016, 140). I used this method to code participants’ attitudes and judgments regarding positions, discourses, or programs pertaining to digital curation. This

approach was especially useful in coding artists' broader attitudes regarding the curation and preservation of artworks, such as how to define the 'essence' of artworks to be preserved.

As Charmaz (2014) recommends, I wrote analytical memos to think through initial codes, to evaluate focused codes, and to raise focused codes into conceptual or theoretical categories (189). I also used Saldaña's (2016) description of focused coding, in which he illustrates grouping initial codes into related categories (240). In addition to analytical memos, I found it productive to engage in focused coding in concert with situational mapping, as these analytical processes generatively overlapped with each other. I built up my initial codes into several groups of focused codes. Some of these categories include information sources and information practices; curation and personal archiving practices; archival discourses and issues; technological issues and discourses; digital curation challenges; audiences; and contexts for sharing work.

Coding in constructivist grounded theory studies is deeply interpretive, reflecting a particular view of the researcher, even as he tries to learn about the perspectives of research participants. Essential to a constructivist approach to grounded theory, Charmaz (2014) encourages researchers to acknowledge and wrestle with their preconceptions and biases throughout the coding process, noting that striving for this self-awareness can enrich and direct analysis (156). Throughout the first and second cycle coding processes, I reflected on the codes that I created and applied, and how I organized these initial codes into focused codes and categories. I carefully considered how my biases might be influencing my choices or what interpretive possibilities I might be foreclosing through my decisions. Throughout the coding process, I wrote analytical memos to reflect on these choices, and I also maintained a code book in which I defined codes, distinguished similar codes, and developed my rationale for how I

applied the codes. I used NVivo to code the transcripts, as well as to help me keep track of and query codes through the analytical process.

Alongside these coding techniques, I used mapping techniques from situational analysis to identify factors and issues shaping the individual artists' information needs and practices and to analyze how these various factors and issues cut across the individual cases, influencing the social worlds shared by the participants. Clarke, Friese, and Washburn (2018) describe three mapping techniques: situational and relational maps, social worlds/arenas maps, and positional maps. The main goal of situational and relational maps is to lay out all the human, nonhuman, discursive, and symbolic elements identified as important to a given situation (127). These maps can then be used to analyze relationships between various elements, provoking avenues of inquiry and further analysis as the research explores possible connections. I iteratively created situational maps for each of the artists, as well as a set of such maps for Paper-Thin including the perspectives of both curators. I further created ordered situational maps in the form of spreadsheets organizing the various factors and issues into broad categories (e.g. human actors, nonhuman actors).

Social worlds/arenas maps chart all the social worlds and broader arenas that impact the collective structuring and action in the situation being researched. As Struass (1978) defines these concepts, social worlds comprise the discourses, organizations, sites, and technologies in a particular social group, while arenas constitute broader domains in which issues that cut across social worlds are negotiated. Clarke, Friese, and Washburn (2018) advise that a given project should include one social worlds/arena map developed iteratively over the course of the research (150). This map should position the particular situation being researched within a broader context, framing all collective actors and patterns of action impacting the situation even though

the research likely focuses in on one portion of this broader picture (160). Following this advice, I created one social worlds/arena map, updating and revising this map throughout the analysis and writing process. I identified the visual arts arena and the technology arena as the two arenas of importance for the situation being researched, with several social worlds occupying and intersecting both arenas, including local arts communities, online arts communities, the art market, art history and art criticism communities, software communities, and the information technology industry. Clarke, Friese, and Washburn (2018) suggest several lines of inquiry jumping off from the social worlds/arena map. This analysis informed much of the discussion carried out in chapter five, in which I elaborate how the artists' and curators' information needs and practices fit within broader information worlds. The final iteration of this map is included as Figure 20 in the chapter five.

For this study, I opted not to make positional maps. The aim of the positional map is to identify major debates, controversies, or contentious issues at play in a situation and to visualize where different positions on these issues fit in relation to one another. My research instruments were not designed to consistently elicit positions on any given set of topics, and although several participants did raise pertinent points on a range of issues significant to the cooperative activities of art worlds, I did not capture a sufficient breadth or depth in these positions to require a positional map. For future research, I may design a study with this method in mind, for instance asking participants about their thoughts on the role artists should play in museum conservation practices and comparing these using a positional map.

The art history methods are not as easy to delineate into procedural steps like coding or mapping, but they were equally as essential in my analysis. To generally describe these methods: I spent time looking at and experiencing the volumes of *Paper-Thin* along with other artworks

created by the artists for other contexts; I read background materials on these artworks and artists, including interviews with the artists, artist's statements, supplementary documentation provided by the artists, and critical writing about the artists; and I compared work by the artists in the study and Paper-Thin as an arts platform to examples from the history of art, in particular thinking about how Paper-Thin relates to and differs from earlier examples of artist-run exhibition spaces both virtual and in-person. I applied the theories from art history and media studies discussed above to drive these engagements with and comparisons across the range of artworks considered during the study. As with coding and situational mapping, I logged my art historical analyses in memos throughout the research process, for instance describing a particular artwork and thinking about how various theories or ideas shed light on the work. This kind of informal writing is essential in my approach to art historical analysis as I find writing to be a form of thinking. Across the analytical processes, these memos often served as a rough draft for ideas and observations more fully fleshed out in the dissertation.

While I have outlined these three sets of methods in turn, I want to emphasize the generative nature of the intersections and overlaps between these various analytical approaches. I did not conduct this research by discretely applying each method; rather the coding, mapping, and art historical analyses were all carried out in concert, iteratively throughout the research process. Insights gleaned from mapping informed choices about the codes I was using. Patterns identified during a coding session inspired me to look at an artwork in a novel way. I took up aesthetic issues discussed as significant for earlier works of net-based art and considered if these issues still influenced cooperative activities in current social worlds. My research questions demanded interdisciplinary methods and analytical approaches, and this suite of methods

(coupled with the theoretical frameworks of information worlds and art worlds) equipped me to pursue these questions to exciting, insightful, and often unexpected ends.

#### 3.3.4) Evaluating the Study

The primary goals of the study are to contribute to both the scholarly and professional discussions surrounding the curation of digital and new media art. Currently, this is an area of much activity and debate, all working toward establishing a sound sociotechnical infrastructure for ensuring the preservation of a digital visual arts heritage. In part, I have begun to evaluate my project based on how the findings of my research stand to add to these ongoing discussions. The curation of digital and new media artworks is a multifaceted problem, one that has already been worked on by innumerable people across many research projects. As outlined in the introduction, I see my project contributing to this larger problem by highlighting the perspectives and practices of artists to an extent that has not been achieved by previous research. In this regard, I believe the present study has been successful, surfacing significant findings about how artists care for their artworks and archives, as well as their attitudes and insights regarding contested topics on the preservation and conservation of digital and new media art. Many of the findings and related discussion points are novel in this broader scholarly discourse, and I will further assess the success of my dissertation by disseminating the results of this research to the scholarly communities engaged in this discourse.

Integrally related to my scholarly contributions, I have a commitment to ensuring that the results of this study feed back into the digital and new media arts community, in particular to benefit artists as they care for their artworks and archives. In part, I have evaluated my study based on how I have collaboratively worked with my research participants to faithfully represent their perspectives and practices. I have shared preliminary results of my research with all my



participants and have solicited feedback from them throughout the process, especially from Smith and Buckley as the curators of Paper-Thin. For Smith and Buckley, I have shared excerpts of the other participants' interviews regarding Paper-Thin (only with the participants' permission) as additional documentation for the curators to maintain in their personal archives. For all the participants, I have sent a draft of the dissertation along with a high-level overview of the main findings and takeaways. I made suggestions to guide their review of the draft as I did not want to burden them with the expectation of reading the full draft, although I welcomed them to read as much as they wanted if interested. My goal is that this sharing of preliminary results initiates an ongoing conversation, first to identify any specific points where I mischaracterized participants' experiences, but then to further inquiry into this area by raising new questions and issues not addressed in the interviews.

Following Conquergood's ([1985] 2013) model of dialogic performance, I have not only solicited this feedback on the dissertation draft as a final step but instead have sought to involve participants as collaborators in the research process. This has involved making myself available during the interview sessions to address any questions the artists have about digital curation or preservation. In many cases, the artists were very interested in this area of research and saw clear connections to their artistic practices. I have kept open lines of communication with the artists, making clear that I can continue to be a resource or point of connection for them if they have any questions about digital curation issues moving forward. I have also listened closely during interview sessions to ensure that I place due value on issues identified as particularly important within digital arts communities. As this research is largely exploratory—with the aim of guiding not only further research but also the development of information resources and tools to support artists in the digital curation of their artworks and archives—success will be born out by the

developments that continue to emerge from this particular study. I have striven to highlight issues and challenges raised by the participants so that the further developments from this study will stand to benefit digital arts communities.

Finally, an all-important criterion for success is completing the dissertation. The completion of the dissertation most immediately involves passing the requirements set forth by the university and securing the approval of my committee, but I also intend this in a broader sense as well. Above all, the dissertation has been a learning experience, during which I have learned how to conceive of, undertake, and complete a large research project. As a learning experience, I know that I have not achieved all my goals perfectly or completely, but I have grown as a scholar over the course of the project. In that, the dissertation has been successful. The present study has already opened up new research questions and lines of inquiry that I will pursue moving forward, buoyed by the experience and knowledge gained by completing the dissertation.

### **3.4) Summary**

In this chapter, I have detailed the methods used in the dissertation, both by providing overviews of the various methods and by discussing specifically how I have deployed these methods for my study. I have argued that constructivist grounded theory, situational analysis, and art historical approaches considering the relationships between art and technology complement the theoretical framework of information worlds, producing a theory/methods package particularly well-suited to address the research questions driving this study. I have also positioned myself as a researcher carrying out this study, considering how this has shaped the research from conceiving the study design through to writing the dissertation. I have acknowledged several aspects of my personal, professional, and scholarly background that have

shaped the research, and I have discussed steps taken to account for potential biases or influences introduced by my own position as a researcher. Finally, I have reflected on how I have already evaluated the study, as well as how I intend to evaluate the study in the future.

## **CHAPTER 4: DIGITAL CURATION INFORMATION NEEDS AND PRACTICES**

I discuss the artists' and curators' information needs and practices pertaining to the digital curation of their artworks and related archives, as well as the overall Paper-Thin platform, in this chapter. I have organized the chapter to largely correspond to the research questions as enumerated in the first chapter. To that end, this chapter is divided in two main sections: the first section describes the findings related to the first research question as to how artists navigate the digital curation of their artworks and archives, including the information needs and practices arising during this process; the second section covers the role played by Paper-Thin as an online artist-run platform for disseminating digital art, including the sociotechnical factors that have impacted the development and sustainability of this platform. An elaboration of the artists' information worlds and the impact of Paper-Thin on these information worlds is the primary subject of the following chapter. For reference, an overview of all study participants can be found in Table 1 included in chapter three, section 3.3.1.<sup>51</sup>

### **4.1) Artists' Information Needs and Practices**

In this section, I discuss artists' information needs and practices involved in the digital curation of their artworks and archives. I describe the information needs and practices as they emerge in the context of personal archiving practices, practices of care, and specific digital curation challenges. I then outline the various communities, organizations, other individuals, technologies, and information sources that all play a part in these information needs and

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<sup>51</sup> To reiterate the earlier stylistic note, I refer to all artists, curators, and others who participated in the study by their full names when I first mention them in the body of the text and then by their last names in subsequent references.

practices. In the following chapter, I develop how these myriad factors, actors, and issues come together and ecologically interrelate around pressing issues and discourses in the artists' information worlds. Table 2 provides an overview of the main digital curation challenges that artists in the study face, along with the personal archiving practices, practices of care, information practices, and other related factors and issues associated with each digital curation challenge. Table 3 summarizes the major information needs experienced by the participants and outlines the information sources and practices used to address these needs, organizations and communities involved in addressing these needs, and individuals acting as interpersonal sources of information, as well as additional factors impacting these needs. These tables are neither comprehensive nor universally applicable to all study participants; rather they serve to synthesize the main findings presented in this section.

<b>Digital curation challenges</b>	<b>Personal archiving practices</b>	<b>Practices of care</b>	<b>Information needs and practices</b>	<b>Related factors and issues</b>
Differences across versions of software or hardware	Saving data in formats for particular pieces of software; documenting works as they existed in older software	Migrating projects to newer environments; maintaining original hardware or software	Reading forums and official documentation to learn about differences across versions; experimenting with newer version to discover differences firsthand	Proprietary control of technology; unanticipated technology dependencies; considering whether original hardware or software is significant to the meaning of the work
Dependencies and interoperability issues	Documenting works if environments cannot easily be replicated; maintaining component parts	Crafting alternatives for dependencies or building robustness into works; documenting	Cannot anticipate changes in services or tools; how best to document context of works dependent on	External service controls data needed for artwork; sudden or unexpected

	of works (e.g. image files) in personal archives	dependencies in source code; attempting to minimize dependencies early on	unstable environments; working with media arts organizations engaged in these issues; relearning dependencies needed to run work	changes in service; guarding against dependencies requires in-depth technical knowledge
Legacy media and formats	Refreshing storage media; maintaining legacy media	Migrating work to new formats; saving work in relatively stable formats early on	How to set up storage systems; appraising older materials (whether or not to keep, refresh, migrate); understanding what formats are most secure or stable for the long-term	Obsolescence; technological dependencies (e.g. need floppy drive to access floppy disk); considering whether original media or format is significant to the meaning of the artwork
Data loss	Backing up data in multiple places (e.g. different geographic locations, on multiple drives)	Intentionally decommissioning artworks if maintaining data is no longer prioritized	Learning from past experiences of data loss; learning how to set up more sophisticated storage systems (e.g. RAID)	Storage media failure; external service controls data; data only stored in one place
Refinding data	Developing organizational schemas for personal archives; dedicating time to refind important data	Reusing and remixing older data for newer works to keep data active and revived in personal archives	Learning how files in complex digital objects need to be organized; adapting organization as files are refound over time; trying to anticipate future uses and building this into organizational system	Data stored across many devices; programs proliferate files and output complex digital objects; interest from collectors or curators to collect or reexhibit works

Ephemeral, dynamic, and complex nature of artworks	Documenting works that will be difficult to recreate or are inherently ephemeral; maintaining traces, outputs, and artifacts from work in personal archives	Recreating works; articulating significant aspects of works; making variable work that can be readily ported or adapted	Determining what the 'work' is to be preserved; developing an understanding of properties of materials and media; gaining documentation skills and developing critical approaches to documentation;	Obsolescence and other changes in technology over time; uncertainty over whether other parties will be interested in collecting or reexhibiting work at later time; resource constraints involved in documenting or recreating complex works
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Table 2 Overview of Digital Curation Challenges and Related Practices

<b>Information needs</b>	<b>Information sources</b>	<b>Organizations and communities</b>	<b>Individuals</b>	<b>Factors impacting information needs</b>
Learning about stability and longevity of formats, media, technologies	Technical documentation; information from company or manufacturer	Galleries; museums; media arts organizations; technology companies	Curators; conservators; gallerists; other artists	Proprietary or open-source status of technology
Contemplating aesthetic and conceptual aspects of ongoing care of complex works	Examples of artworks from art history; critical and art historical literature; models or documentation provided by established artists	Galleries (including those representing established artists); museums; local and online arts communities; academic communities	Curators; conservators; collectors; other artists; teachers and mentors	Availability of resources to undertake recreations; limited conversations in arts communities around these issues
Co-construction of digital and new media art exhibitions	Forums; direct experimentation (with curators, other artists); past experiences staging works;	Networked alternatives; galleries; museums; local and online arts	Collaborators; programmers; curators	Variation in available resources and technical support at gallery or platform

	technical documentation	communities; festivals		
Learning digital curation repertoires	Direct experimentation with technologies; working through technical difficulties in creating, staging, and caring for complex artworks; past professional or personal experience; documentation provided by established digital artists	Local and online arts communities; networks alternatives; galleries (including those representing established digital artists)	Other artists; gallerists; programmers; collaborators (including those in other fields)	Differing timescales (short-term for getting an exhibition up v. long-term care after exhibition); skills gained in process of creating and staging works inform ongoing care
Developing personal archiving practices, workflows, and organizational systems	Past experiences losing and finding information	Academic communities; residencies	Other artists; colleagues or peers in academic institutions	Time needed to manage information; difficulty anticipating future uses of information; these skills often gleaned informally in academic communities, not included in formal arts pedagogy
Negotiating social, cultural, political, and economic issues with art and technology	Creating artworks; reading critical theory, philosophy, scientific, and other bodies of literature	Residencies; incubators; galleries; conferences and festivals	Other artists; collaborators (including those in other fields)	These issues may influence the choice of technology, media, artistic technique
Learning about sources of funding and exhibition opportunities	Professional development sessions at residencies, arts organizations, and incubators	Residencies; incubators; local arts communities	Other artists	Geographic specificity of these opportunities



Gaining familiarity with technology, tools, media	Forums; tutorials; technical documentation; learning through the process of creating work; reverse engineering tools or other artworks; gaining inspiration from how others use new technologies	Academic communities; software communities; local and online arts communities; technology companies; fabricators and manufacturers; festivals	Developers and programmers; industry professionals; other artists	Experimenting with new technologies often intersects with expanding ideas about art, the art object, the role of the artist; experimenting with technology can be experienced as collaboration with machine
Learning about ideas from other fields and disciplines	Reading various bodies of literature	Academic communities; conferences and festivals	Scientists; friends; collaborators (including those in other fields)	These ideas often enter into creative practice as inspiration for new works
Reaching audiences	Past experiences exhibiting at various venues and interacting with audiences	Social media platforms; galleries; museums; local and online arts communities	Curators; audiences; other artists; collaborators (including those in other fields)	Different affordances of in-person and online exhibition spaces; limitations of commercial platforms for sharing art; interest in reaching audiences outside traditional arts spaces; artists can be working with abstracted notion of who the audiences are; collaborators and other artists can be first audience

Table 3 Overview of Information Needs and Sources

4.1.1) Digital Curation Challenges

The artists participating in the study spanned those still early on in their careers—either recently graduated from Master of Fine Arts (MFA) programs or still in these programs—to

those who had been actively making and exhibiting artworks for 30 or more years. Even for those still early in their careers, all the artists acknowledged the potential fragilities and vulnerabilities inherent in working with digital technologies and recognized the need for active practices of care integrated into their regular creative work. Many of the artists explicitly voiced uncertainties about the lifespan of either specific artworks or the various technologies used in their creative practices; all of the artists described experiences of an artwork becoming entirely unfunctional, putting extensive work into migrating older works to newer systems, or struggling with technical difficulties for current technologies. Several artists expressed similar sentiments that, to a degree, working as a media artist necessarily involves confronting the temporality of technology. As Smith reflects,

the people who are saying, ‘I’ll let history decide,’ are also often using more established media, and so it’s less of a problem...When you work with computers, you know that the computer you’re using now is completely different from one 10 years ago. Everything you make on it will be void in 10 years. You’re always experimenting, and generally failing, with whatever attempts you’re making to preserve. It’s part of the process.

In this subsection, I enumerate the challenges that the artists encounter. Although I will mention in passing some practices and strategies that the artists employ in response to these challenges, these are further fleshed out in the following subsections.<sup>52</sup>

#### *Interoperability, compatibility, and dependencies*

This group of related challenges—all having to do with getting different systems or software environments working together—was pervasive across the study participants. Artists encountered these challenges both in working with complex arrangements of current technologies as well as working across different versions of hardware or software environments.

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<sup>52</sup> When talking about practices, behaviors, or experiences shared by several study participants, I note the number of participants in parenthesis. If the number is four or fewer, I list the last names of the participants. This is not to suggest the generalizability to the broader population of artists, which I cannot claim given the limited scope of my study but rather to demonstrate how widespread some phenomena was across my study sample.

In a study of how artists interact with information systems, Eaglestone et al. (2007) observe that interoperability across environments and systems is a major factor either inhibiting or facilitating creative activities. Both in creating new works and caring for older works, artists work across many hardware and software environments, and in some cases, are more focused on the creative affordances of given technologies than the present or future obstacles that this mess of systems might pose. When those obstacles arise, though, artists experience a variety of information needs as they succeed or fail to move data across systems.

In some cases, these challenges arise as artists write their own code for a project but supplement this with scripts or libraries created by others. Both Zachary Dean Norman and Sterling Crispin note that this contributes to the complexity of a project, engendering a situation in which they cannot totally be sure whether they will be able to get something running again in the future. Describing software that generates models of plants for 3D printing, Crispin states that this “software I made is incredibly fragile because it runs on this one computer and maybe like no other computer. It took me like six months to figure out some issue. Now it’s figured out, and I’m terrified of upgrading my operating system because if it breaks, the software will never run again.” Norman remarks on a similar experience, describing the need to relearn skills and regain the necessary background knowledge to get a project working again after a significant lapse of time.

Artists also commonly encounter these challenges when moving a project from one version of a software or hardware environment to another—even when a vendor or company promises compatibility across versions. Several participants have experienced such inconsistencies as they worked across versions of Unity, a widely-used game engine. Unity Technologies owns the software but makes it available for free to personal users and supports a

robust user community. While Unity is popular among artists for these reasons, both Martina Menegon and Claudia Hart bemoan how changes across versions of Unity are poorly documented. Contrasting Unity with Maya,<sup>53</sup> another piece of commercial software, Hart stresses that the vendor Autodesk, which similarly caters to large industries as well as personal users, provide notices well in advance when particular features will no longer be supported, but “with Unity, it’s just like, ‘oops! why doesn’t this work anymore?’”

Instead of depending on the software vendor for information regarding updates and differences across software versions, artists find other sources to address the issues. As Unity is the engine used to create Paper-Thin, Smith and Buckley also discuss this difficulty with the software, recounting how they had to find documentation from a user forum about how to correct changes in the lighting system across versions of Unity. Absent this community-generated documentation, artists get to the root of the changes themselves. Menegon describes opening an older project in the latest version of Unity only to notice significant differences: “I just saw that the file was completely different: it was super pale, there was no depth, there was no shininess.” Although Menegon acknowledges that she could have sought out documentation to learn about the cause of these differences, she opted to redress these discrepancies herself based on her own understanding of how the piece looked in the older version of the software.

*Working with technologies, systems, and services maintained by other entities*

The artists’ experiences with compatibility issues suggest that these challenges arise in working with proprietary, open-source, and self-created software. In addition to backwards and forwards compatibility, artists experience other digital curation challenges when their works depend on proprietary technologies or systems and services otherwise maintained by other

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<sup>53</sup> <https://www.autodesk.com/products/maya/overview>

parties. This is an especially pertinent issue for net-based artworks that rely on specific web technologies or web browsers functioning in particular ways in order to achieve the intended aesthetic experience of the work. Also, many net-based artworks are created for and shared using online platforms or services, such that the life of these works is intricately tied up with the sustained availability of the platform. For instance, Amalia Ulman's extended performance on Instagram entitled *Excellences & Perfections* (2014), in which she documented (pretend) plastic surgeries while radically altering her persona in ways that shocked close friends and family, cannot be separated from the platform without dramatically altering the experience of the work.<sup>54</sup> These online technologies, platforms, and services serve not only as the means of production for these artworks but also the essential context for viewing.

For artworks created specifically for these platforms, artists struggle with how—if at all possible—to care for artworks outside the context of these platforms. Mark Dorf has participated in online exhibitions for both NewHive,<sup>55</sup> a free-to-use commercial platform for artists to create and share net-based work, and Neverland Space,<sup>56</sup> a curated arts platform run by the now defunct Y7K agency. At the time of writing, NewHive's services are not available, and the only evidence I have been able to find regarding the future of the site was a 'pardon our mess' splash page retrieved from the Internet Archive (see fig. 1). Neverland Space is still online, although the dissolution of Y7K puts the future of the platform in doubt. While Dorf maintains the constituent images for the works featured in these exhibitions in his personal digital archives, these are

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<sup>54</sup> Rhizome and The New Museum created a static version of the piece, which preserves some aspects of the Instagram web interface, but cannot recreate the experience of watching Ulman post photographs and respond to comments over the course of the performance. <https://www.newmuseum.org/exhibitions/view/amalia-ulman-excellences-perfections>

<sup>55</sup> <http://newhive.com/>

<sup>56</sup> <https://neverlandspace.com/>

removed from the context in which they were shared, disconnected from the other works on display and from the interfaces of the sites framing the shows. The artists in the study have developed strategies for documenting other kinds of ephemeral or site-specific works, which I detail below, but none have developed practices for capturing the context of net-based artworks shared within these commercial services. Webrecorder,<sup>57</sup> a web archiving tool developed by Rhizome, enables individuals to capture dynamic and interactive websites and could prove useful for artists seeking to document their own works, but none of the artists in the study currently document works in this way.

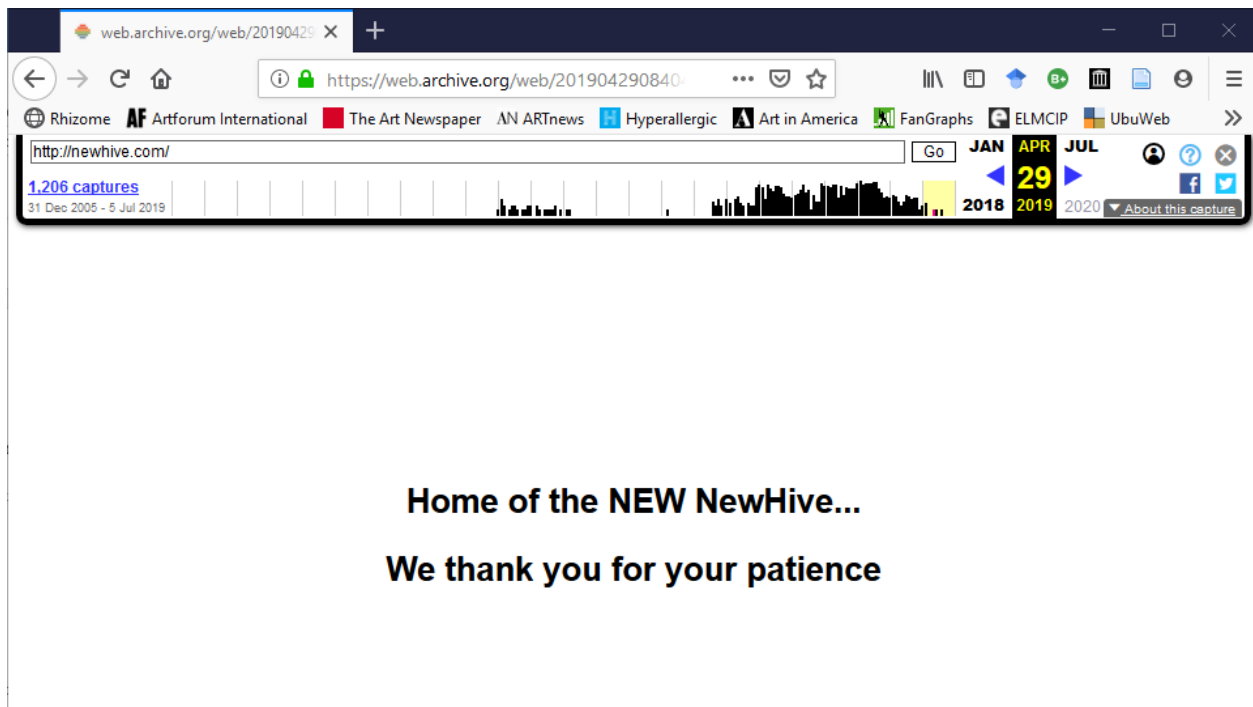


Fig. 1 Temporary splash page for NewHive. Available from: <https://web.archive.org/web/20190429084049/http://newhive.com/> (accessed August 19, 2019).

As Webrecorder demonstrates, these issues represent shared concerns for both artists as well as arts organizations and institutions dedicated to preserving net-based art. Although coming from different perspectives, both artists and these organizations have an interest in the

<sup>57</sup> <https://webrecorder.io/>

long-term viability of content on web-based services as integral to online culture, and both similarly struggle with the fickle nature of sites that change important functionality without warning or shut down entirely. As one example, the shared concerns of creators and organizations around the sustainability of commercial social networking sites were discussed at the National Forum on Ethics & Archiving the Web, hosted by Rhizome in 2018.<sup>58</sup> Artists want assurance that they will have continued access to and privileged control over the data uploaded to these services—or at least fair warning before a discontinuation or substantial change in service. Media arts organizations, such as Rhizome, strive to find ways to preserve artworks stored on these services but are also interested in documenting the broader part that these platforms play in networked culture.

Even when artworks are not created specifically for these kinds of platforms, artists use other kinds of commercial services or systems, the status of which impacts the ongoing care of artworks. Brenna Murphy creates labyrinthine websites with densely layered and collaged images (see fig. 2). Earlier on in her career, Murphy stored images used in these artworks on Photobucket, a once-free hosting service that now charges for use. As Odom et al. (2012) stress, web-based hosting and storage services facilitate sharing near the time of creation but are not designed or intended for long-term care. These authors discuss the limitations of sharing services for heirlooms and family memorabilia, but the same considerations hold for artworks, all of which have the potential for ongoing use and value over an unforeseeable amount of time. Faced with the dilemma of either paying an exorbitant fee to regain control of these images or to reupload all the older images via her web hosting service, Murphy chose instead to let the artworks composed with these images fall into disrepair, perhaps picking up the rehabilitation of

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<sup>58</sup> <https://eaw.rhizome.org/>

these works when she either has more time or the aid of an assistant. For now, Murphy is more interested in devoting time and resources to the creation of new artworks—a sentiment common across the study participants—but has learned from this experience relying on a commercial service. While not leading to a beneficial resolution for these particular artworks, the challenges encountered in this ordeal have nonetheless proved formative for Murphy’s digital curation practices moving forward. Murphy has endeavored to gain greater familiarity with HTML so that she can embed and manipulate images stored on the same server as her HTML files, a learning process I describe in more detail below.

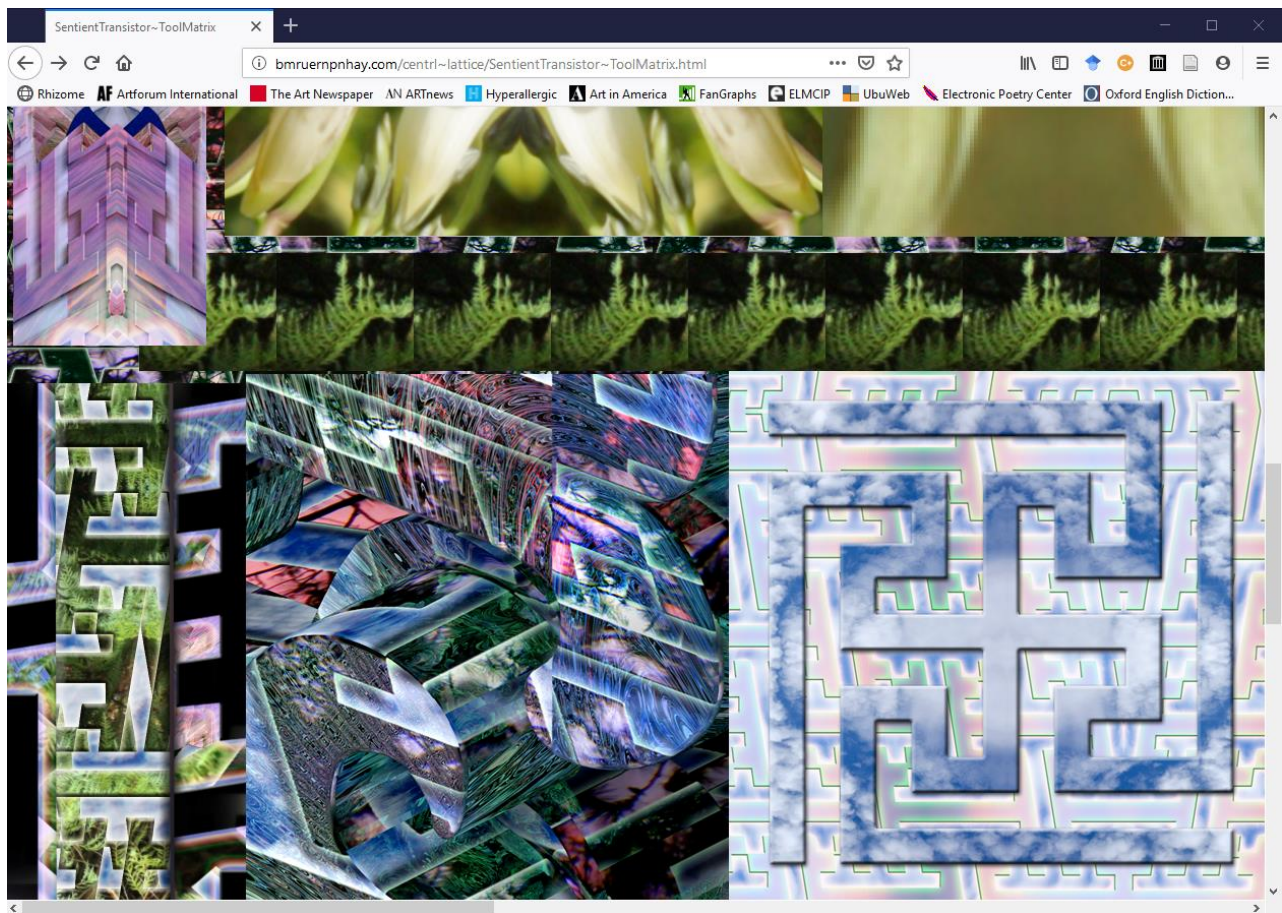


Fig. 2 Brenna Murphy. *SentientTransistor~ToolMatrix*. Undated. Website. Available from: <http://bmruernpnhay.com/centrl~lattice/SentientTransistor~ToolMatrix.html> (accessed August 19, 2019).



### *Legacy formats and media*

Similar to data locked into proprietary services or platforms, several artists discussed challenges relating to data stored on legacy media like floppy disks or optical disks or stored in formats that are now difficult to access with current software. This was especially at issue for José Carlos Casado, Kristin Lucas, and Hart, all of whom are later on in their careers. All three reflected on the changes in formats and storage media they had experienced over the course of their careers as well as steps taken to keep data accessible. Hart comments that her studio archives encompassed the history of digital storage media. In similar fashions, each of these artists has refreshed storage media and migrated content to new storage media over their careers.

While Hart has sporadically migrated older works to newer storage media over the past 30 years of her career, she has recently implemented a comprehensive migration of her digital archives, moving all materials into a Redundant Array of Inexpensive Disks (RAID) storage system. Increasingly, galleries and curators have been reaching out to her with a keen historical interest in her earlier works, which has motivated her to make sure these older materials are accessible on current technologies. Hart laments, though, that while she has been able to successfully move this content—and to learn the skills necessary to manage a RAID system—other older media artists might not be so fortunate. As many later-career media artists are just now receiving recognition by galleries, collectors, and museums, their significant early works may already be gone, whether outright deleted or effectively lost in a bevy of legacy storage media tucked away in attics, closets, or basements. Hart's case is instructive: many of the younger artists (6) stressed that they would not be motivated to undertake significant preservation actions on older works unless there was interest by a collector or institution in reviving the work; however, the work may likely be inaccessible by that time.

Although these younger artists were hesitant to pour resources into sustaining works that may never be of interest to institutions or collectors, artists earlier on in their careers recognized the potential challenges that storing data in proprietary or closed formats might pose and sought to learn about this issue. For instance, Dorf keeps updated on debates surrounding image and video formats through conversations with friends in the media industry who have insight into the stability of current standards. In general, many artists try to save artworks in open formats or create works in relatively stable media to guard against this challenge, as I discuss in a later subsection.

### *Data loss*

In the previous subsections, I have described threats to ongoing access to data, whether locked in to commercial services or saved in obsolete formats. Many of the participants (11) have either experienced significant data loss or expressed that data loss was a pressing concern. Dorf once had his laptop stolen, although he had backed up the data on an external hard drive. Raul De Lara recounts deleting everything on his laptop after backing the data up on an external hard drive—only to find out an error had occurred during the backup. Murphy describes uploading several large artworks to a server via her web hosting service but not immediately linking these to her main webpage; she came back from a trip to discover that her hosting service had ‘cleaned up’ her server space for her.

In all cases, the artists frame these events as part of a digital curation learning process, both recognizing their own oversights as well as other factors impacting long-term access to data. For Dorf, successfully recovering his lost data (if not his lost laptop) reinforced the benefits of taking these precautions. Murphy, who also lost access to images uploaded to PhotoBucket as discussed above, realized that the commercial interests of the companies offering these services

are often misaligned with the interests of individuals hoping to secure personally valuable information for the long-term. As a result, she expresses reservations about moving data into cloud storage services, even though the ability to access materials remotely would be convenient when she travels for shows and residencies.

While only a few artists have experienced large-scale data loss, many more (10) express trouble refinding works in vast digital archives spanning many machines and storage devices. As observed by researchers in the PIM field, digital information is as much at risk of loss due to idiosyncratic organizational schemes or just too much information to sort through as it is due to obsolescence (Marshall 2008a; Whittaker 2011). While Hart and Hunter Jonakin both discuss this as a challenge for finding older works, which may be saved on one particular hard drive somewhere, Norman relates this as an obstacle in his current creative practices. Working with Blender,<sup>59</sup> an open-source 3D modeling program, Norman maintains countless scene, asset, and object files, many of which he reuses across projects. As he states, he often finds himself scrolling through folders and folders of blend files because “there’s no way to preview what they are unless I open them or use a really specific naming protocol.” Unlike taking a photograph, in which the artist captures a moment that may be hard to recreate or may never happen again, Norman values the ability to return to digital scenes months or years later—but only if he can find the right files constituting the complex digital object.

This represents a challenge distinct from refinding simple digital objects, like a particular photograph or text document, which has typically been the focus of the PIM research referenced above and in chapter two. In addition to remembering where files are stored, artists creating 3D scenes, VR environments, or other complex digital objects common across digital and new

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<sup>59</sup> <https://www.blender.org/>

media artistic practice (Magruder 2014) also need to recall how the constituent files fit together into the whole work. For instance, Marshall (2011) proposes the development of federated storage tools to aid individuals in keeping track of digital materials saved across disparate local storage media as well as web- and cloud-based services; while this system might help individuals to keep track of discrete digital objects, this would not address difficulties in remembering how multiple digital files come together to compose an intricate 3D scene. As Norman laments, he lacks a tool that might assist him in this PIM task critical to both current creative activities as well as maintaining older works. Norman wishes he had an equivalent to Adobe Bridge,<sup>60</sup> database software for managing photographs, for complex digital and new media artworks. Further research on the PIM practices of digital artists, and other populations working extensively with complex digital objects like digital humanities researchers, could usefully explore how the complexity of these objects impacts organizational schemes and refinding success (or failure) rates. This added dimension to finding and refinding data stems from the complex and dynamic nature of many digital and new media artworks, further aspects of which I turn to next.

#### *Ephemeral, complex, or dynamic artworks*

As discussed in chapter two, the dynamic and complex nature of digital and new media artworks poses significant challenges for preservation, issues that have long been discussed in the literature on new media art conservation. To briefly review, Besser (2001) classifies these conservation challenges as inter-relational problems, or the fact that digital and new media artworks often consist of many interrelated components (both analog and digital), and translational problems, or the changes a work incurs as it moves across versions of hardware and

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<sup>60</sup> <https://www.adobe.com/products/bridge.html>

software. Addressing these challenges necessarily raises questions about the essence of the work: is the work defined by the materiality of the constituent components or by some broader experience or idea communicated by the arrangement of these components?

Artists recognize these characteristics of digital and new media artworks as challenges to the long-term functioning of a work, and also think through these questions about the essence of the work, but come at this from quite a different perspective than conservators or archivists. Artists' own perspectives might shift over the course of the creative process. As Crispin describes, he is not disposed to think about the long-term outlook for a piece while he is still in the midst of creation: "sometimes you're just so in the heat of the moment trying to make the thing that you don't want to slow down and worry about all that because you're not even sure if what you're making is good." Crispin expresses frustration at being confronted with these technological limitations to the ongoing life of a work. Despite the desire to pursue an idea without considering its archivability, Crispin acknowledges that these realities often quickly come crashing down.

I always say as an artist that your artworks are like liabilities. They're these babies that you create in the world. You have to take care of them and arrange for them to be shipped places. It's a real pain in the ass. Affording to even make the artwork in the first place, then once you've made it, being able to financially afford being able to take care of it afterward.

Although unromantic to think of artworks as liabilities, this is occasionally a necessity for artists seeking to build a career. Colleagues at New York University's (NYU) Tisch School of the Arts, Gabe Barcia-Colombo and Sarah Rothberg both stress this prosaic notion to their students: if you want to have a career as a new media artist, you need to make art that lasts long enough to be seen.

Many artists are drawn to new technologies precisely because they represent unexplored creative possibilities albeit untested and potentially fragile or ephemeral. For a recent project applying augmented reality (AR) to a series of copper paintings, Marius Ritiu reflects that he is still very much making sense of the limits and affordances of this technology: “after I have the main idea, the concept, I need to play with the aesthetic. I’m not really familiar, or I don’t have a clear view of what the digital side of this will be. It’s just something that I will need to figure out along the way.” Trained as a sculptor, Ritiu is inspired by the possibilities opened up by digital technologies. Creating the work itself is a learning process as he encounters both technical difficulties in initially staging the work and considerations for how future changes in technology might impact the work. During our interview, Ritiu thought through different options for preserving the AR component of the work, from saving an iPhone with the required application to recreating his own version of the application if and when the currently available commercial software is no longer supported. However, these were all considerations for some unspecified future time; Ritiu’s present imperative is to get the work functioning in the first place.

As with Ritiu, other participants (7) actively think about these questions pertaining to the essence of the work to be preserved into the future. Many participants (10) brought up similar considerations about how artworks had already changed or might change in the future, describing either actual or hypothetical decisions they had made or might make in caring for the work. While artists often think through these issues as they contemplate future changes in works, these considerations become concrete in a couple specific situations: when documenting a work that they know has a limited lifespan, which I discuss in the following subsection; or when negotiating the ongoing care of a work with collectors or institutions, which I delve into in the following chapter.

#### 4.1.2) Personal Archiving Practices

While not always proactively thinking about preservation—or even thinking in terms of ‘preservation’—all the artists undertake the digital curation of their artworks and archives, often with practices built into their regular creative work, such as backing up projects across multiple hard drives or sharing documentation photographs on personal websites. Through active and ongoing digital curation, artwork and archive often become densely entwined. Sjöholm (2014) observes that this ambiguity is reflected in the topography of artists’ studio and working spaces, both physical and virtual; as artists accrue materials and files, this accumulation (in various states of order) evidences processes of sense-making and creativity. As these spaces hold past works alongside materials for current and future projects, the studio as archive is a site of “productive remembrance” (512). Although artists in the study often talk in terms of an archives of their past works, these archives are neither fixed nor sequestered. Rather, artists work with and through their archives and personal archiving dovetails creative practices. In this subsection, I detail these personal archiving practices, elaborating the information needs and practices that arise in learning and carrying out these practices.

##### *Backing up data in many places*

Ubiquitous across the artists in study, all but one artist mention saving multiple copies of files in multiple locations as a fundamental personal archiving practice, including saving data on external hard drives, cloud storage services, and locally networked machines. Saving data constituting the work (such as source code and media files), data generated during the process of creating the work (such as files outputted from Photoshop, Blender, or other software used in the creative process), or documentation of the work (such as videos or photographs) form a material record that artists draw on to both care for older works and to address other creative and

professional needs as I discuss below. Even if artists are unsure of being able to recreate or restage older works in the future, they will at least have the data comprising the works and can assess technical or conceptual challenges involved in reviving the work at that later time. As Stearns succinctly summarizes, “I made the work. I’m on to the next work. I’m just going to try to make as many copies as I can and safeguard against at least bit rot.”

However, this spectrum of storage locations suggests that artists’ specific practices vary considerably within this broader strategy. Similar to Hart’s RAID system discussed above, Hugo Arcier maintains a locally networked storage system, with copies of works stored across several machines in his studio. Arcier, who also runs a creative media production studio in addition to his individual artistic practice, created this local area network (LAN) to facilitate data-intensive 3D rendering and to enable collaborative work among his small team, but Arcier recognizes that the redundant backup of data across this network is an added benefit. Arcier learned the skills and knowledge necessary to set up and manage this LAN through earlier work freelancing with a company. While he has not had trouble with this system, other artists without this technical background might find the requisite skills difficult to learn and that managing locally networked storage is an added burden on time and resources.

It is telling that only Arcier and Hart have developed more sophisticated storage systems than backing data up on hard drives or cloud services—the strategy employed by virtually all the other participants in the study—in both cases driven by greater needs than maintaining a personal archives. The demands of Arcier’s production studio have motivated him, while Hart has recently needed to expand the activities of her studio as more collectors and institutions have expressed interest in her body of work. With more clearly and specifically defined senses of how information saved now will need be accessed in the near and long-term future, these artists have



stored data in ways that facilitate these later practices of information use. Backing data up on a hard drive or in the cloud accomplishes a similar goal of making redundant copies of important information for safekeeping but is not tailored toward particular information practices for accessing and using that information again. As Jones (2012) describes, finding and keeping activities are conversely related, with information finding driven by a lack of information relevant to some need and information keeping driven by an anticipation of a need for information currently in hand (29). For Jones, ‘meta-level’ activities of maintaining and organizing critically link these finding and keeping activities. While Hart and Arcier have directly integrated future information use practices into their backup systems, organizing this information as they save it, other artists have developed more post hoc (or ad hoc) organizational schemes that likewise attempt to meet anticipated future uses—though these are not always easy to exhaustively or precisely delimit.

#### *Developing an organizational scheme for archives*

Practices of saving many data sources related to artworks and creative processes, and then backing that data up across multiple locations, directly compounds difficulties in finding and refinding materials for future use. Lee and Capra (2011) surmise that “the biggest differences between the PIM and ARM literature may be related to how they answer the ‘why not keep everything?’ question” (52). Individuals bring different needs and criteria to bear on what to save than do institutions, and relatedly individuals have divergent needs and criteria when it comes to organizing these materials. Artists use their archives for many different purposes, some of which I detail in the following subsections, and these use cases in part determine how archives are assembled and arranged. While artists are compelled to save a great deal of material to document past works, to create new works, and to speak to their artistic

legacies, logistical and resource constraints—coupled with the impossibility of fully anticipating or accommodating all potential future uses of personal archival materials—impinge on artists' ability to organize these materials.

Only a few participants attempted to implement and sustain more comprehensive organizational schemes for their archives. Arcier and Menegon both comment that they try to use the same folder structure for each project. Barcia-Colombo makes an effort to maintain a running catalog of his works but admits that this is difficult to keep up and somewhat disorganized across several spreadsheets; without a studio assistant, Barcia-Colombo needs to do this cataloging work himself, another task in an already hectic schedule. Perhaps the most detailed scheme of any of the study participants, Stefano D'Alessio has developed an entire workflow for his creative projects using the software program Trello (see fig. 3),<sup>61</sup> with to-do items for each stage of a project from conception to dissemination. Although not strictly an organizational scheme for his personal archives, this workflow serves a similar purpose as D'Alessio follows this to keep track of the materials and documentation associated with a given project.

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<sup>61</sup> <https://trello.com/>

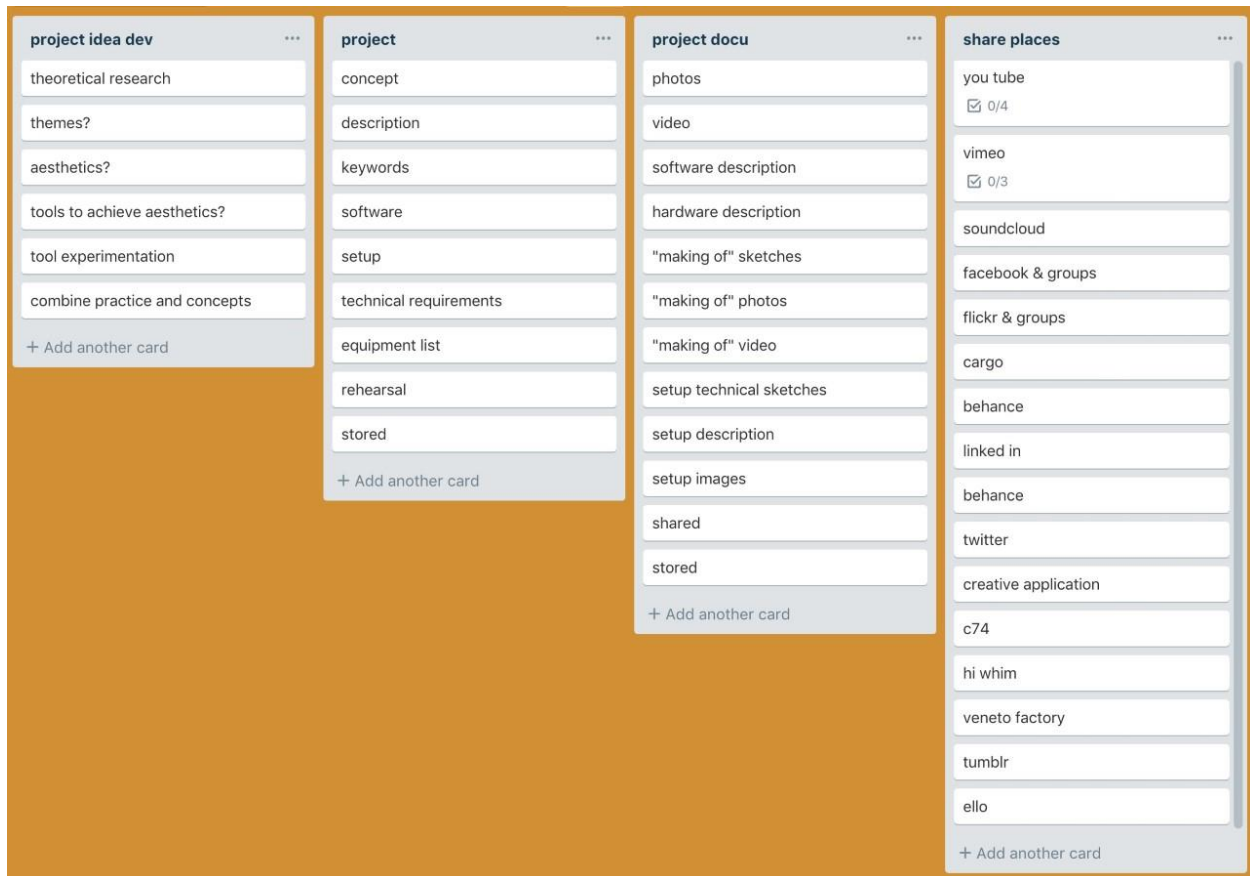


Fig. 3 Workflow for D'Alessio's creative projects (screenshot provided by participant)

Other participants rely on internalized organizational schemes to keep track of information, and others have resigned themselves to spending significant time to refind items. Norman reflects that “nothing is labeled on the exterior of the hard drive. I just kind of remember...I associate them with certain times of my life.” Elsewhere, however, Norman discusses challenges of not being able to find some asset or scene from a past 3D modeling project. Norris also relies on an internalized organization for his archives but states that he could find things when he needed. Other artists note issues with refinding older materials, although this is not always derided with frustration. For instance, Crispin expresses excitement at serendipitously uncovering older projects: “honestly, I’ll forget that that stuff exists. Then I’ll be looking through some folder from 2013, and be like, ‘oh wow! This experiment I started and

didn't finish was really cool!" Evidence of the 'productive remembrance' described by Sjöholm (2014), artists like Crispin return to their archives as founts of inspiration—regardless of whether these are particularly well organized.

As discussed in chapter two, practices and challenges related to finding and refinding information has been a focus of PIM scholarship. In many ways, the issues encountered by the artists and the strategies developed to address these issues accord with findings from the broader PIM literature. Comparing and synthesizing the results of two foundational studies on PIM practices for electronic documents, Barreau and Nardi (1995) find that individuals primarily rely on location-based methods for refinding information on personal workstations and storage media, recalling the directory or folder where something is likely saved and then browsing the list of files to identify the specific document (40). Although individuals carefully name files to reflect their contents, with some attempting to develop sophisticated organizational schema for their materials, these strategies generally fail and individuals fall back on location-based search methods (42). Revisiting four of the seven original study participants, Barreau (2008) longitudinal research reveals striking similarities in individuals' finding and refinding practices and challenges despite marked advances in information technologies and dramatic expansions in volume and access to electronic information. Although search engines have become the predominant means to find information on networked systems, individuals still rely on location-based browsing to find information stored on personal computers and removable storage media. This largely echoes how artists in the present study discuss refinding archived materials, by combing through directories or locating the one hard drive on which data for an old project has been stowed away.

However, the value and uses of archived information marks a significant difference between the artists in the present study and the populations studied by Barreau and Nardi, which comprised office managers and Apple employees respectively. Barreau and Nardi (1995) observe that individuals rarely find recurring uses for archived information pertaining to completed projects and reports, although Barreau (2008) stresses that individuals continue to save much if not all of this information as storage is relatively inexpensive and the time and effort required to appraise these materials is relatively demanding. As discussed, artists in the study also save much of the data associated with older projects and create extensive backups of this information, but this saving behavior is directed at least in part toward specific future uses of reexhibiting older works, maintaining documentation to use for funding and exhibition opportunities, and creating a record of their artistic careers. Barreau and Nardi (1995) conclude that PIM practices are intimately tied up with the contexts of how individuals use and intend to use information (43), and artists are driven by motivations quite different from office employees.

As Capra and Pérez-Quiñones (2006) outline, many factors specific to these contexts of use affect refinding behaviors, including the nature of the task for which the information is needed, how frequently the sought-after items are used, and task complexity. Capra and Pérez-Quiñones enumerate these factors to suggest possible trajectories for future PIM research, and the present study has surfaced a number of aspects particular to artists' PIM practices that warrant further study. While I have found that the potential to reexhibit works at a later time constitutes important appraisal criteria for artists, further research is required to understand how this motivation affects artists' organizing and refinding practices. For example, when and how is this information reappraised if works are not reexhibited? As I discuss elsewhere, holding onto materials from older projects can become onerous, prompting artists to decommission works,

delete data, or lose track of where information is stored. I have suggested that the complexity of artworks composed of many sources of data also impacts refinding, and future research might explore the import and effect of this complexity on PIM practices. Below, I discuss how artists reuse and remix data and materials from older projects to create new works. Creative reuse as a PIM practice, specifically one related to finding and refinding behaviors, has not been thoroughly studied and bears further research. The present study has not specifically focused on artists' PIM practices and challenges, although I have recognized this as an essential component of artists' digital curation practices more broadly. The research trajectories suggested by the present study all promise to advance knowledge of the distinct PIM issues experienced by artists.

*Saving traces, ephemera, and outputs of creative work*

As I have suggested, artists compile a wide range of materials, both digital and analog, into their personal archives: various kinds of data for digital artworks like images, videos, software, and scripts; analog components of hybrid works, such as sculptural elements in installation pieces; as well as ephemera and traces or outputs of past projects. This latter group of materials may be only tangentially related to completed works or may be evidence of aborted projects but in either case still worth holding on to for a variety of reasons. For instance, Norris retains sculptural assemblages of found objects that he uses in his process for making what he describes as 'conceptual portraiture.' He assembles these found objects into facial forms, takes photographs of them, collages these photographs together in Photoshop, and then creates oil or acrylic paintings based on these collaged digital images. He saves both the Photoshop files, with all the layers of different images, as well as the found object assemblages as evidence of his creative process. He returns to these objects and files himself as he creates new works and also

exhibits these sculptural assemblages alongside the completed works to provide insight into his process for audiences.

Similarly, Crispin has held on to various analog and digital ephemera from past projects. Especially for the analog materials, he is not sure whether these will be worth the effort and space needed to save them for the long-term. As with Norris, Crispin sees the value of returning to these traces from past projects, and he is particularly aware of how these might speak to his artistic career and legacy years down the line. At a future exhibition later in his career, these might prove interesting artifacts that curators can arrange for audiences to learn about the trajectory of Crispin's artistic work. In some cases, however, these materials get thrown into boxes and become "studio confetti," not particularly useful either for creative reuse or as artistic artifacts.

Overall, these decisions about what to save and how to save it contribute to the production of a future 'archived I,' a concept Douglas and MacNeil (2009) develop in relation to writers' personal archives. For Douglas and MacNeil, writers shape their archives with an eye toward posterity, constructing an 'archived I' that represents a particular perspective on their creative legacy. The concept applies equally to artists, as they also make decisions about what and how to save materials with these considerations in mind. As Douglas and MacNeil point out, though, these archives are often socially or collaboratively constructed, with many other individuals and a range of factors impacting how and why various materials are saved. For writers, these 'coaxers and coercers' might include editors, family members, or business partners (37), and artists encounter similar kinds of stakeholders influencing the shape of an archives. Ritiu and Menegon, who have both developed longstanding relationships with artistic collaborators, discuss how archival responsibilities get divvied up across collaborators. This

topic is especially sensitive for Ritiu, as his longtime collaborator has recently decided to break off and establish a solo practice, a significant juncture in Ritiu's artistic career that will reverberate through his archives. As I describe below, this collaborative shaping of the archives is a dynamic intrinsic to networked alternatives like Paper-Thin: both curator and artist make decisions and respond to technical issues that impact how a piece is initially created, as well as how the work gets documented and cared for moving forward.

### *Documentation*

As elaborated above, the kinds of materials that artists amass in their personal archives include not only artworks but also materials that capture the creative process. Documentation of past artworks represents a distinct class of materials important to artists' archives generally but especially to artists working with digital technologies. As artworks with digital components may have relatively short lifespans and may include interactive or performative elements that are difficult to reproduce, documentation may be the most enduring part of a given work. The artists in the study mostly captured works through video and photography but employed an array of techniques and looked to a range of perspectives on documentation from the history of art to inform these practices.

Many participants (17) saw documentation as surrogates that will likely outlast difficult-to-preserve pieces, albeit lacking significant experiential aspects of the original works. For instance, Jonakin makes machinima, or video play-throughs of video game artworks like *Jeff Koons Must Die!!!* (2011). While watching these machinima is quite a different experience from playing the game itself, the viewer of the machinima nonetheless enters into a ludic archives. Krapp (2011) defines machinima as consisting of "controlled gestures in a collective frame of reference in the history of technology and entertainment... [granting] access to gaming's



historical conditions of possibility” (159-60). More than a flat video, the machinima captures the repertoire of interactions available to the player, even if the original gaming technology no longer functions.

Across artistic engagements with digital technologies, artists negotiate this balance between preserving the experience of the work and capturing the gestures and interactions native to that experience in a more stable if limited archival format. For a site-specific installation using wind tunnels to explore mythical and scientific conceptions of wind, Haseeb Ahmed sought to create a feature-length film that would also act as an “object of experience,” sharing the same narrative and plot but functioning as a standalone work that could reproduce the experience engendered by the original installation. For Ahmed, this documentation is not just an historical artifact of a past installation that cannot be recreated but also an artwork in its own right that continues to have a dynamic life in the world.

Several other artists in the study similarly saw documentation as material surrogates that stand to outlast the initiating performance or ephemeral installation and, in turn, take on a distinct life as art objects. Some participants (5) noted parallels to performance art, conceptual art, and earlier media art of the 1960s and 1970s. While these earlier artists also explored methods for documenting ephemeral works, the ability for images and videos to circulate widely and quickly online has dramatically altered the context in which artists are creating documentation. The material traces of a performance or installation can now spread rapidly and instantaneously, in concert with the exhibition itself. Global audiences can view the documentation of artworks online at the same time as local audiences view the work in person. Leveraging this capability of the Internet, Oliver Laric, Aleksandra Domanović, Christoph Priglinger, and Georg Schnizter assembled an archives of such documentation photographs on

the website *VVORK* (see fig. 4). Though now defunct, *VVORK* served as an online repository with the aim of expanding visibility and access to art that viewers would not have been able to see otherwise (Domanović, Laric, and Jones 2015). With the rise in popularity of Instagram in the intervening years, these images circulate beyond an artist's or gallery's website and are generated and spread by audiences in addition to artists, curators, conservators, and other museum or gallery staff.

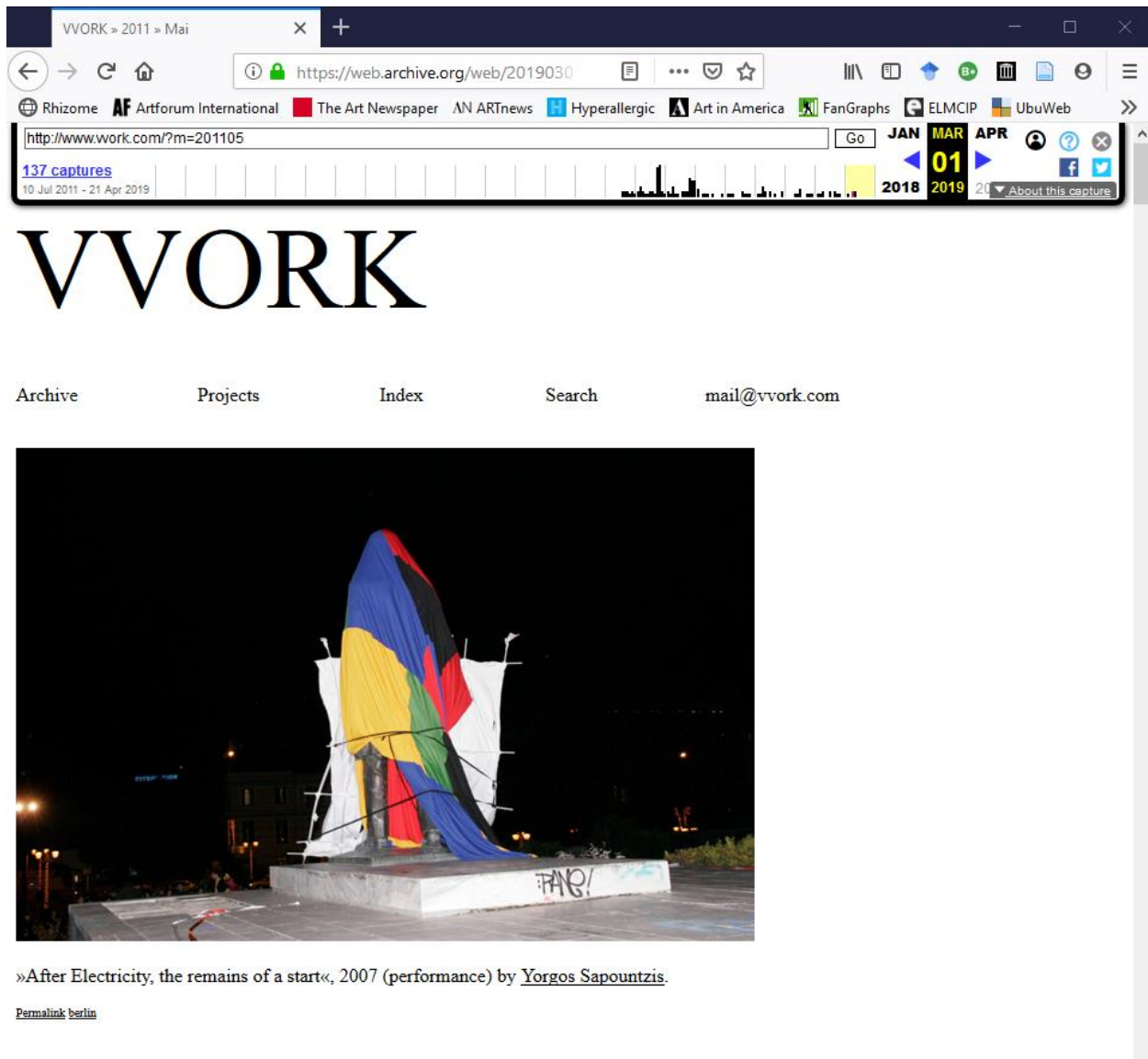


Fig. 4 Documentation photographs on *VVORK*. Available from: <https://web.archive.org/web/20190301205522/http://www.vvork.com/?m=201105> (accessed August 22, 2019).

Many study participants (14) discuss actively circulating images, other documentation, or artworks themselves online, both through personal websites and online platforms. Caroline Turner spoke to this from her perspective running IRL; this gallery exhibited VR artworks in its physical space in Cincinnati but also disseminated images of exhibitions through the gallery website and social media platforms. Both when the exhibitions were running, as well as now when the gallery is on hiatus, Turner asserts that the documentation possesses an identity and value beyond mere surrogate for the artwork: “I think that it’s equally important to have it online as it was to have the physical gallery space. The website is still hugely important. I still love those net.art traditions of 10 years ago...It creates this new space between the real world and the online world.” With IRL, Turner was interested in exploring this space between local and networked interactions with art objects, and to a degree, conflating these modes of aesthetic experience. This curatorial approach recalls Vierkant’s (2010) shifting notion of the art object in the era of mass networked distribution: the object on a gallery wall and the image on a screen are two variations on an art proposition, both equal in value, and both open to further artistic manipulation by anyone who might encounter it.

Turner integrates the circulation of images online as a conceptual component of her work, but artists also recognize the impact of this on their artistic practice and career more broadly. For all artists, even those making paintings or working with relatively stable media, documentation takes on new importance when more people will encounter an image on an artist’s website or social media profile than will ever see the work in a gallery. Documentation effectively becomes simulacra. In this light, practices for documenting works stand on par with practices for creating the work in the first place. De Lara expresses the strangeness of this situation: “there’s definitely a weird dialogue that happens in my head, where I’m like, ‘I did all of that work for a jpeg, for a

shitty jpeg.” The quality of documentation plays into both how work is received in the present—as a post in someone’s Instagram feed—as well as the future. As De Lara continues, “how do we engage in dialogue with the new technology and what’s happening, if our work is going to live as a jpeg in history?” Evident in De Lara’s and Turner’s reflections, many contemporary artists develop both critical approaches alongside technical skills in the documentation of their artworks.

The quality of the documentation and the degree to which the documentation translates the work become paramount considerations for artists, with implications not only for how general audiences encounter the work but also for how curators, collectors, and reviewers of grants experience art. De Lara explains how this has been an ongoing discussion among his fellow students in his MFA program: “if you only have shitty images of your work but the work is great, it’s shitty work because it looks bad. Some people have really incredible photographs and their work just sucks, but they look great on paper, they look great on applications.” While gaining skills needed to improve documentation is recognized as a real need by De Lara and his cohort, they are not receiving this training in their graduate program. Norris and Menegon reflect the ongoing impact of this lack of formalized training, both of whom discuss seeking information and resources to improve documentation well after they graduated from MFA programs. Norris has learned about approaches to documentation from a former professor, seeking advice on lighting and camera setups. Menegon continues to collaborate with a former professor, and she has learned about documenting interactive installations over the course of these collaborative projects. In both cases, though, these skills were gained outside of formal educational settings.

## *Archives as artworks*

The changing technological and social context for documentation blurs distinctions between archives and artwork. In other ways, artists discuss archiving as a creative or conceptual element shaping artworks, both expressly and unintentionally. Jones (2016) describes this broader trend in contemporary art as ‘archivalism,’ which encompasses a range of works that might critique archival principles as well as those that “display remarkable fidelity to the archives and processes with which they engage” (3). Although not mentioned by Jones, Antoni Muntadas’ *The File Room* (1994) demonstrates this conflicted position of archives as information systems—with the ability to both powerfully suppress and provide access to information.<sup>62</sup> A physical installation as well as an online database, *The File Room* aggregated data on instances of censorship; an open-ended project, viewers and visitors to the work could contribute their own experiences of censorship. The archives assembled by the project serves as a testament to the chilling effects of technologies for controlling information, while simultaneously leveraging these same technologies to give voice to the censored.

In my study, the most manifest example of this artistic tendency is Norman’s *Endangered Data* (2017- ongoing), a project that involves embedding climate data collected by the Environmental Protection Agency (EPA) into digital images. Using a cryptographic technique known as steganography, or encoding secret information within an otherwise ordinary document, Norman has worked with his brother, a computer scientist, to develop a tool that inlays this data into image files (see fig. 5). Reminiscent of heat vision goggles, the images depict the places from where the climate data was collected, but the pixels containing added information swell with neon-hued color.

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<sup>62</sup> A recently restored version of the work is available through Rhizome’s *Net Art Anthology*: <https://anthology.rhizome.org/the-file-room>

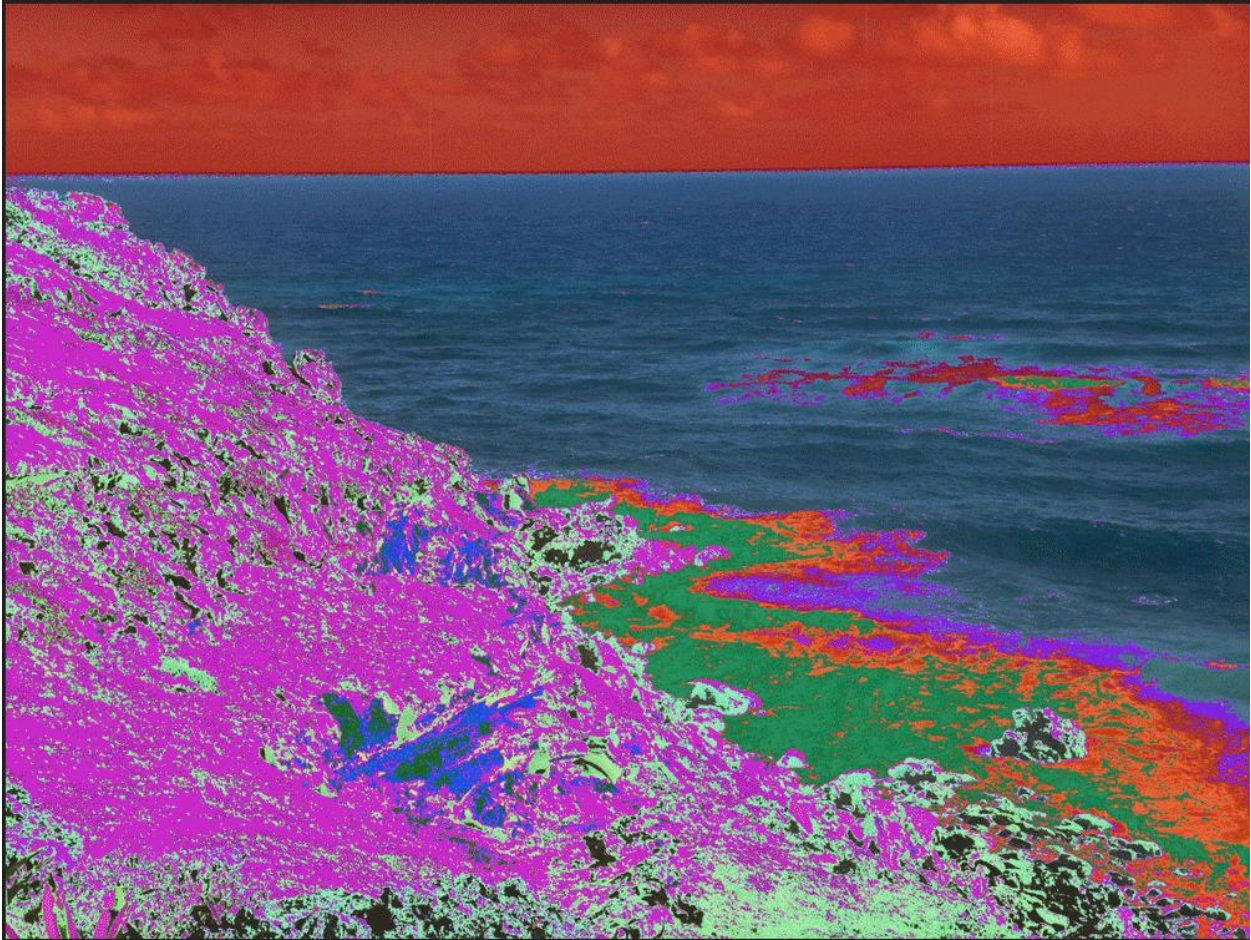


Fig. 5 Zachary Dean Norman, image still of Ragged Point Barbados from *Endangered Data*. 2017. Single channel video, dimensions variable. Available from: <http://www.zacharydeannorman.com/> (accessed August 23, 2019).

Norman initiated this series in response to actions taken by the Trump administration to remove mentions of climate change from US government websites and to threaten the ongoing viability of this data. Related to efforts by scientists worldwide to mirror these datasets outside the US, *Endangered Data* renders this otherwise unseen data curation labor strikingly visible. Norman surmises how the work interweaves his personal archival impulse with broader notions of cultural memory:

I wouldn't call myself a hoarder, but I'm really interested in why I feel compelled to save everything, and kind of archive everything. A lot of what I archive and save is really superfluous or frivolous, but there's this innate desire that tells me to do it. I'm interested in how information that's this vital...we could possibly feel like it might just disappear, we might lose all of this information, and how detrimental that might be. As soon as I

heard that people were doing that, I felt really compelled, and felt that I had a really deep connection to that fear that scientists were feeling or lay people were feeling.

*Endangered Data* functions as an archives, serving as an alternative repository for this data, and Norman's creative process for this series has effectively consisted of digital curation work. In this case, the practices and technologies of personal archiving court the practices and technologies involved in the maintenance of culturally, scientifically, and historically significant information—responding to a potential lapse in these societal information infrastructures. The artist doubles as archivist.

In addition to projects that explicitly investigate the poetics and practices of the archives, artists (9) also recognize instances in which archival and preservation-related issues unintentionally affect the creation and ongoing lives of artworks. Although elsewhere expressing frustration at being confronted with issues that impact the ongoing preservation of his artworks, Crispin also embraces “archiving problems [as] another compositional element that end up swerving the meaning of the work.” Whether shortly after the point of creation or decades later, actions taken to render a work archivable can introduce dramatic changes. Crispin acknowledges that “you just have to learn to accept it, and dance with it, and not fight it.” In this vein, Kristin Lucas integrated the inevitability of change or decay into her project *Yard Sale in the Sky* (2011-12), in which she sold off AR artworks in a parking lot in Austin, Texas for “yard sale prices.” Instead of treating these artworks as precious objects to be preserved in perpetuity, Lucas opted to bypass the archives altogether. Like any other yard sale trinket, these artworks are curiosities for the moment—perhaps stunning or enthralling—but not expected to last.

### *Using archives*

In addition to these conceptual and creative intersections between archives and artworks, artists use archives in more mundane ways like applying for grants, commissions, juried

exhibitions, or residencies. Across all artists in the study, these are active archives, with many individuals, organizations, and technologies shaping how archival materials are created, used, saved, and reused. Although these are ostensibly the ‘personal’ archives of the artist, Douglas (2018) calls for a broader understanding of records creation beyond the single named creator; such an expanded notion of the records creator is certainly born out with the case of artists’ archives.

For the study participants, many archival materials were created and saved for reuse as a result of social, interactive processes. Lucas describes writing grant and commission proposals as one of her primary strategies for keeping track of ideas. These documents are written to be shared with funding agencies but also serve the purpose of inscribing an otherwise intangible creative thought process. Lucas refers back to these documents as she works on projects and also copies passages in her exchanges with critics and journalists inquiring about her work. Ritiu mentions that he is in the process of creating a 3D model to send in as a proposal for an analog sculpture. The agency commissioning the sculpture has requested virtual models to get a better sense of what the eventual physical work would look like. As Ritiu muses, though, the artwork is in a sense archival before it has ever been actualized.

Artists express desires for their personal archives to be used by others in addition to themselves. Murphy conceives of her personal website as an evolving archives of her work, intended as an access point for audiences. Since Murphy creates websites as artworks, the artworks and the archives are selfsame: “that’s also become important for me in archiving because the format for how I can share becomes the format for how I can archive... Archiving is such an important part of the whole thing because that’s how it’s shared. Sharing and archiving are like the same for me.” Ernst (2013) ascribes this conflation of the active and archival



contexts of digital materials as an inherent attribute of networked technologies: “with digital archives, there is no more delay between memory and the present...immediate feedback [turns] all present data into archival entries and vice versa” (98). Whether just created or stored in archival repositories, individuals access networked digital information through the same assemblage of protocols and systems.

However, Bosma (2011) asserts that this characteristic of net art should not imply that the Internet functions as an artistic medium in the same sense as paint or stone. Breaking with the idea of ‘medium specificity’ proposed by the modernist critic Clement Greenberg ([1939] 2003), who touted the ability to foreground the specific characteristics of an artistic medium as a hallmark of an avant-garde approach, Bosma develops the notion of ‘differential specificity’ from Rosalind Krauss (1999). Bosma argues that the Internet (and indeed any network technology) is not a single medium but rather a complex ecology of many technical layers, all available for a huge range of artistic applications. Differential specificity highlights the ways in which artists work with both the sociotechnical and material properties of any or all layers of the network (Bosma 2011, 59). Returning to Murphy, differential specificity characterizes the creation as well as the care of her artworks. To keep her works accessible, Murphy updates how images and videos are embedded to reflect changes in HTML specifications, and she makes sure that the latest versions of files are stored on Internet-connected servers. Digital curation and artistic creation blend into a shared repertoire of practices, all of which involve attending to both the sociotechnical and material properties of various layers of technologies.

#### 4.1.3) Practices of Care

The example of Murphy maintaining her artworks as an archives via her website bridges personal archiving practices and practices of care, which I differentiate from personal archiving

as those digital curation activities undertaken specifically on artworks. As I have discussed throughout, there are certainly overlaps between the two sets of practices, with significant interaction between how artists manage their overall archives and actions taken to care for specific artworks. These artworks often consist of files stored in artists' personal digital archives, and other archival materials—like documentation, sketches, or schematics—are closely interrelated to the artworks, providing crucial information that guides the care of the artworks both in the custody of the artists themselves as well as those collected by institutions or collectors.

Despite these overlaps, I have found it useful for purposes of analysis to distinguish between these sets of practices. While not to the same degree as museums, artists do conceive of specific artworks as discrete entities to be cared for and updated as necessary, with special attention paid to these works that is not always afforded to the bulk of their personal archives. The personal archiving practices discussed above in many ways resemble practices and challenges discussed in the PDA and PIM literature—namely, amassing heterogeneous and dispersed personal information collections for a range of clearly specified and more amorphous future uses—although artists' distinct needs as a population inflect how they appraise, organize, and reuse personal archival materials. In contrast, artists' practices of care resemble preservation and conservation strategies discussed in the scholarly literature, such as migration, emulation, or recreating artworks on new technology (Rinehart and Ippolito 2014).

Still, there are marked differences between how artists approach the care of their works and the preservation and conservation strategies employed by museums and archives. A key difference is precisely the overlap between PDA and PIM practices and conservation strategies for artists as discussed above. Since these artworks exist as part of artists' archives, practices like

backing up files and developing organizational schemas directly aid artists caring for artworks in their custody. Another important difference is that while artists may be aware of conservation strategies carried out at institutions like emulation or capturing disk images, they are not necessarily undertaking these strategies in their own studios. In many cases, carrying out these conservation strategies requires hardware, software, or technical knowledge not readily available to artists. Institutional conservation strategies also involve ongoing work elapsing over a temporal horizon that exceeds many artists' ability to commit to the care of a given artwork.

As I discuss, artists have a stake in the long-term viability of their artworks but see this as the purview of collectors and institutions with the requisite resources to pursue these conservation approaches. Kathleen Forde, a curator at Borusan Contemporary,<sup>63</sup> mentions John Gerrard and Marina Zurkow as examples of artists whose work has been collected by the institution who are able to perform some of this conservation work, but in these cases, the artists have studio staff carrying out these activities in-house, and they build fees for this labor into contracts with collecting institutions. None of the artists in my sample have permanent studio staff (although Arcier has a staff for his media production studio, which is distinct from his individual artistic practice, and Casado occasionally hires developers to work on specific projects). Several of the artists in my sample (6) have either explicitly thought about or have already actively negotiated the care of artworks with institutions, which I describe in the next chapter, with remuneration for labor a key aspect of these negotiations.

Sitting between artists caring for works in their custody and institutions performing more large-scale conservation, smaller galleries and artist-run platforms like Paper-Thin are increasingly taking on responsibility for the digital curation of artworks. For instance, Paul

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<sup>63</sup> <https://www.borusancontemporary.com/en/>

Slocum at And/Or gallery has recently staged an exhibition featuring historic video game artworks, several of which Slocum painstakingly updated. The emergent practices of these networked alternatives are both similar to and different from the strategies employed by individual artists collecting institutions in significant ways that I detail in the following section and in the next chapter.

### *Alternates for dependencies*

Although artists who participated in my study do not routinely employ resource- and labor-intensive conservation strategies in their own practices, I discussed several cases with participants in which they have substantially updated works after some issue prevented pieces from functioning as intended. Referring back to the digital curation challenges outlined above, artists frequently mention artworks that have interoperability, compatibility, or dependency issues as requiring preservation attention shortly after the point of creation. This is not especially surprising as these artworks tend to be complex, involving the movement of data across disparate systems—often in ways not necessarily intended by those systems—in response to dynamic conditions or interactive inputs from viewers.

Crispin's *N.A.N.O. B.I.O. I.N.F.O. C.O.G.N.O.* (2015) is a prime example: a set of four, large statuesque sculptures, each with an embedded display pulling live stock market information from a Yahoo! application programming interface (API) (see fig. 6). Each figure holds a certificate asserting ownership of 100 shares of stock in various biotech companies, the display screen tracking the performance of these stocks globally. The ongoing life of these stocks is central to the meaning of the work, and so Crispin felt the need to develop an alternate way for the piece to function when Yahoo! rescinded public access to their stock API. Crispin was able to find another online stock API to replace the now defunct Yahoo! API but realized that it was

only a matter of time until this API would become unavailable as well. Learning from this previous experience, Crispin developed a canned dataset with historical information for the stocks of each of the companies included in the piece and reprogrammed the work to automatically switch over to this prerecorded information in the event that access to the live information is lost. Not only a solution to precarious access to a proprietary information source, this alternate strategy also guards against potential issues with a working Internet connection. While the alternate strategy departs from the way the piece is intended to function, this is a case where the artist was able to integrate his own decisions about the preservation of the work into the piece itself.

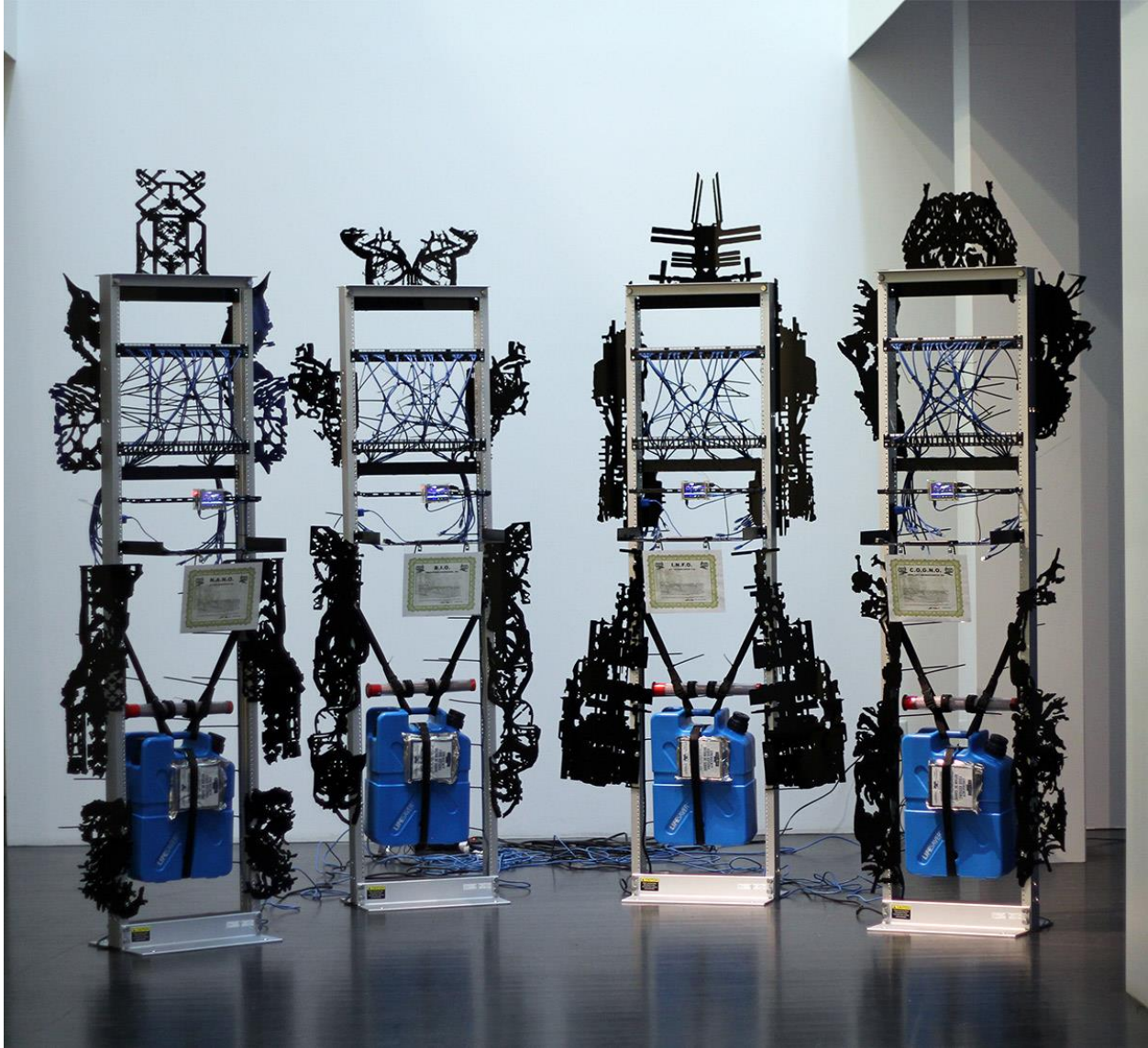


Fig. 6 Sterling Crispin, *N.A.N.O. B.I.O. I.N.F.O. C.O.G.N.O.* 2015. Aluminum Server Rack, Cat 6 Ethernet Cables, Zip Ties, Laser Cut Acrylic, Raspberry Pi MicroComputer and Keyboard, Emergency Food Rations, Lifesaver Jerry Can with 2 Year Nanoscale Water Filter, 100 Shares of Publicly Traded Companies (*N.A.N.O.*: Altair Nanotech Inc., *B.I.O.*: Hemispherx Biopharma, Inc, *I.N.F.O.*: RIT Technologies LTD, *C.O.G.N.O.*: Intellect Neurosciences Inc), 40 x 98 x 25 in each. Available from: <http://www.sterlingcrispin.com/> (accessed August 27, 2019).

Lomas avoids these dependency issues from the start by developing all his programs himself and not relying on other people's software libraries. For example, Lomas (2016) developed the *Species Explorer*, an interface for exploring multi-dimensional parameter spaces in the machine learning systems that he uses to create generative, morphogenetic sculptural forms. Lomas admits that this is more of an inadvertent benefit of his own "bad habits" to code

everything from scratch, but this has resulted in programs that run well for many years with minimal intervention. While Lomas can apply this strategy for guarding against future preservation issues (even if inadvertently), this is largely due to Lomas' skills and deep understanding of programming that he has accrued over the course of his artistic and professional careers. For artists without this well of knowledge, creating everything from scratch is not a viable solution to this digital curation issue.

Even if this approach solves the dependency issue, other challenges arise from coding everything oneself. Lomas acknowledges that his code is somewhat messily maintained and documented; while he can understand it sufficiently to make changes as needed, others will likely have great difficulty parsing it in the future. When several of Lomas' works were collected by the V & A, he refrained from handing over the source code—not out of concern for maintaining the intellectual property but rather because he did not think it would be intelligible to other individuals.

#### *Migrating artworks to newer environments*

Several artists (9) regularly migrate works to newer software or hardware environments, especially those working with game engines like Unreal or Unity and VR hardware like Oculus or HTC Vive. In many cases, artists want to use the latest version of the software or hardware and move older projects that they plan to reexhibit to the current version. As discussed above, this migration path occasionally results in changes to the works, which leads the artists to either seek out technical documentation or attempt to resolve the discrepancies themselves. Arcier describes such an issue for a project using Unreal, in which the quality of the sound depreciated when the project was moved to the latest version. This was relatively easy to fix, but he anticipates future migrations could become more complex and require more extensive work.

In these cases, the specific version of a software environment is not significant to the meaning or experience of the work—as long as the work plays more or less the same in the current version. In contrast, Rothberg discusses *Memory/Place: My House* (2014), a virtual recreation of her childhood home where viewers encounter digitized clips from videotape home movies interspersed through the space (see fig. 7), as a work for which the original hardware is integral to the meaning of the piece. Rothberg created the work in response to Facebook’s acquisition of Oculus VR for \$2 billion—at the time, an emerging VR headset manufacturer that had hitherto primarily received support from crowdfunding. Using the first release of the Oculus developer kit (DK1), Rothberg critically reflected on the impact of this technology for the digital mediation of memory: “if a company like Facebook, which is kind of the steward of the way we remember things via social media, owns this headset company, what does that look like and feel like?”

The question of maintaining the original hardware used to experience a digital artwork resonates with the historical debates over the limits and dangers of restoration discussed in chapter two. As Rothberg debates whether to continue using the DK1 hardware for viewers to interact with the work, she weighs many factors: on the one hand, the work was born out of her experimentation with this particular piece of hardware and the meaning of the work for her is tied up with this technological object; on the other hand, the DK1 headset suffers from many difficulties with user navigation and interaction that have been corrected in subsequent hardware releases. Updating the work to function on the latest headset might improve an individual’s ability to navigate through the virtual environment Rothberg created but might detract from the overall integrity of the piece. As argued by Morris ([1877] 1996), preservation efforts may obscure the dynamics of the material life of a given object, in this case, the significance imbued



by interacting with the original hardware, which would be lost if the work were migrated to a newer headset; but as articulated by Viollet-Le-Duc ([1845] 1996), the restorer may need to address certain practical concerns to maintain the utility of the piece in some shape or form.



Fig. 7 Sarah Rothberg, *Memory/Place: My House*. 2014. Virtual reality environment, Oculus Rift headset, swivel chair, CRT television monitor, carpet, dimensions variable. Available from: <https://sarahrothberg.com/> (accessed August 27, 2019).

As an early and largely untested prototype, the DK1 set poses significant issues for both Rothberg and viewers of the work. A combination of a slow frame rate and limited navigation controls make it difficult for individuals to move through the space—even making some people nauseous. When the first commercially available Oculus headset was launched, Rothberg characterizes the decision of whether to migrate the piece to the latest hardware as a “moral dilemma.” In conversation with Barcia-Colombo, a colleague at NYU as well as a curator for

one of the exhibitions in which the work was shown, Rothberg ultimately decided that the meaning of the work was tied up with the particular piece of hardware. As she puts it, “[if] I want to highlight this headset as this first moment of Facebook’s interest in this, then I have to leave it on this headset.” This decision has continued to pose challenges in the ongoing care of the work, such as the need to maintain increasingly finicky hardware with components that are difficult to replace. Rothberg maintains the original DK1 set along with a backup headset, all of which she plans to sell to a collector or institution interested in purchasing the work; but once these headsets no longer function, the piece cannot be repaired. Although her more recent pieces are not as conceptually invested in specific VR hardware as culturally-charged objects, Rothberg now intentionally makes works that can be more readily ported to different headsets, including the HTC Vive.

#### *Reworking, Remixing, and Reexhibiting works*

In the case of *Memory Place*, Rothberg determined that the artwork was necessarily tied up with a particular piece of hardware. In other cases—including other works by Rothberg—artists (9) decide to extensively rework or remix older pieces rather than maintaining the work in one predefined state. Opportunities to reexhibit works motivate artists to get older pieces functioning again, whether troubleshooting issues with the original hardware or software, reworking the piece for newer versions of the hardware or software, or remixing elements of older pieces to create altered or altogether new works. As D’Alessio describes, he waits for these opportunities to return to older works because this guarantees a return on the investment of time and resources put into getting an old piece running again. He recounts one occasion when he and Menegon collaborated on an installation piece; after the initial exhibition, they took the time to

fix issues that had come up in order to prepare the piece for future exhibitions—and no one has yet to show any interest in reexhibiting the work.

Whether and how a work gets refashioned or refurbished for a new exhibition is impacted by a range of factors, including the artist’s creative interests, the context of the show and the curator’s interest in the work, and the limitations and affordances of the technologies used in the work. All of this contributes to an ambiguous gray area between reexhibiting older works and remixing pieces, where it is difficult to determine when a reworked piece is an updated version of previously exhibited work or something new entirely. An artist and curator might want to reexhibit an older work more or less as it existed in prior exhibitions, but the original technologies constituting the work may no longer function in this way or the new exhibition venue may differ in important ways from earlier venues, necessitating a more substantial overhaul of the older work that results in significant departures.

Phillip Stearns describes an example of this negotiation when he reexhibited *Ambient Environments: Windows XP* (2018) as part of the “TRANSFER Download” exhibition put on by the Thoma Foundation.<sup>64</sup> For this piece, Stearns composed a few lines of code that scan the default background image of a given operating system, stretching a one-pixel strip to the width of a screen to generate a single frame, and then moving across the background image to generate subsequent frames. The frames are animated at a rate of 15 per second to produce a video of a slowly undulating color palette derived from the default background image. The projection screens for the Thoma Foundation show were larger than the target Stearns originally used to create the work, so he reworked the code in order to adapt the piece. The resulting reworked

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<sup>64</sup> <http://transfergallery.com/transfer-download-santa-fe/>

piece engendered largely the same end-result and viewing experience as the original, if differing slightly in the length of the video and the minute particularities of the oscillating color field.

In contrast to this, Murphy describes the potential to remix screen recordings documenting VR pieces into entirely new works: “it feels like a really good way to generate content that I can use for video art or even just stills for webpage art. It’s just a way to generate content, to generate material to be used in whatever way comes up.” This reuse of the archives for new creation illustrates Cowan’s (2004) finding that artists turn to older pieces as sources of information in their ongoing creative practices. Artists might revive techniques or subject matter used in older pieces, or they might take data from these works as raw material for different artistic practices, in this case from VR to video or net art. As discussed above, artists’ archives are active sites, rich with information for many purposes throughout artists’ careers.

#### *Using relatively stable media or formats for artworks*

While many of the above practices involve adapting works to changing technologies over time, artists may guard against these future changes by intentionally working with media, formats, or technologies that are relatively stable. Considering the relative stability and long-term viability of storage media and file formats has been a focus in the PDA literature and is often emphasized at PDA workshops and community archiving outreach events hosted by cultural heritage institutions. For instance, Spurgin (2011) finds that amateur and professional photographers alike debate the most suitable file formats for the ongoing care of digital photographs, comparing the merits of RAW and digital negative formats against JPEG and TIFF with considerations for both long-term preservation as well as the ability to edit and manipulate images recognized as important. PDA guides frequently provide recommendations for individuals on these issues, outlining the pros and cons of saving data in different formats for

websites (Cook 2018), audiovisual materials (Ng 2018), or photographs (Severson 2018). The Library of Congress has created an overarching resource with recommendations on sustainable digital formats,<sup>65</sup> informative for both professional archivists and personal digital archivists.

While many study participants (13) note awareness of this issue and strive to create work in relatively stable formats, these and other artists in the study also work extensively with emergent or complex technologies, such as VR, AR, and 3D modeling, lacking professional consensus regarding stable formats. Still, for emergent, experimental, or otherwise novel technologies, artists attempt to make conscious choices early on with the aim of augmenting the long-term viability of art created with those technologies. Along these lines, many artists (10) in the study consciously choose to work with open-source technologies, with Barcia-Colombo, Dorf, and Lucas all mentioning the potential stability of these technologies as an added benefit. Although these technologies might not be subject to the same planned obsolescence as proprietary technologies, open-source technologies are not inherently more stable: these technologies depend on a community of users and contributors for ongoing maintenance, even if the open nature of the code makes this community involvement possible. Regardless, the artists are not selecting open-source technologies purely because the code would be open and thus easier to update over time; rather, artists select these technologies both because they are freely available alternatives to increasingly expensive commercial software and because open-source technologies can be more readily forked, experimented with, and adapted to particular artistic applications.

As with open-source technologies specifically, artists in the sample are generally not selecting technologies for their creative practices with long-term stability as a topmost criterion.

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<sup>65</sup> <https://www.loc.gov/preservation/digital/formats/index.shtml>

Casado suggests that documentation can serve as a more stable record, and other conservation techniques can be applied to restore or recreate artworks at a later time, with these measures freeing artists up to explore the creative possibilities of a technology or media. “You don’t stop artists from experimenting and trying to do what is possible to do, just thinking about the future. It’s similar to 500 years ago when someone invented a special pigment for painting. You really didn’t know how it was going to last. 500 years later, you have restorers trying to figure out how to save that special blue.” Recalling Crispin’s comments about artworks as ‘liabilities,’ though, artists working with digital media frequently confront the precarious nature of these materials shortly after the point of creation, forcing them to make decisions about whether and how to maintain the works.

Even if all artists are not primarily concerned with the longevity of media, some artists (6) discuss seeking out information to learn about the media and technologies as an integral part of the creative practice. For instance, Casado has explored a new technique for painting aluminum with digitally-designed 3D textures for a recent AR sculpture, *I Don’t Know Why the Caged Bird Sings, Ah Me* (2018), installed in Marcus Garvey Park, New York City. He found information about the technique from various manufacturers and fabricators, but the novelty of the technique meant that the materials had likely not been tested outside of laboratory conditions. For Casado, creating an outdoor sculpture exposed to the elements became an experiment in the durability of the materials, generating information that he can apply in future works. This example illustrates an information-seeking process described by many participants: learning about technologies through a hybrid of documented information and their own creative experimentation and experience.

As a result, some artists develop a keen awareness of the longevity (or fragility) of the media they use. In the study, however, gallerists, conservators, and curators more actively work to ensure that artworks are moved to stable media or are created using stable media in the first place. For instance, Melanie Lenz, a curator at the V & A involved in the acquisition of Lomas' work, has discussed with the artist the archival quality of the paper and other analog materials used to print out his algorithmically-generated morphogenic forms. At And/Or Gallery, Slocum frequently works with artists to port interactive digital art onto Raspberry Pi machines; this is a process Slocum has honed over time, deciding on Raspberry Pi machines because these are durable, have been well documented, and use widely-available components that can be readily replaced as needed. As I discuss below, Buckley and Smith have also deeply reflected on the longevity of the technologies used in Paper-Thin, involving considerations that have impacted decisions made across the three volumes, such as the choice to use G-code in v3 as this is a relatively simple technology that can be easily stored and then interpreted by a range of systems at a later time.

While all of this suggests a marked division of labor in the care of artworks—with artists experimenting with technologies and media in the creation of art and curators and conservators sorting out preservation at a later time—the situation is of course far more complicated and dynamic. I have already stressed throughout that the relative stability or fragility of media impacts artists' decisions and creative processes before they ever directly interact with a curator, gallerist, or conservator. Even though Casado's comment suggests that he advocates for artists to freely experiment with technologies without concern for durability impinging on creativity, he consciously makes paintings free of digital components because these are easier to sell to collectors, for whom durability and care of works is a manifest consideration. As Becker (1982)

observes, the ongoing care of artworks has always involved negotiation and collaboration among many individuals, but the division of labor for digital artworks is still very much up in the air, a topic I detail in the following chapter.

### *Destroying or decommissioning works*

Due to the many factors discussed above, artists can find caring for artworks in their custody to be too onerous or otherwise resource intensive. This can lead to the decision to intentionally destroy or decommission artworks. For artworks with solely digital components, this destruction might occur inadvertently through benign neglect—through bit rot, or files getting lost in a jumble of folders, or software required for files stowed away on hard drives becoming obsolete—but artists need to make conscious decisions about maintaining works with analog components or works designed to run on particular pieces of hardware, principally because these objects take up precious space in artists’ oft cramped studios or homes. Murphy acknowledges that this consideration can impact the kind of work she makes with her artist collective MSHR: while they will always make installation works as part of their practice, they will occasionally opt to make purely digital pieces because they can easily hold onto digital files whereas the analog components will inevitably become “physical garbage.”

Directly related to artists’ physical storage space issues is the salability of their artworks. Even though he uses digital technologies in his creative process, Norris’ practice results in acrylic and oil paintings that are familiar to collectors, and he begins projects with the hope that many of his works will sell. Although the volume of paintings from a given project that Norris is able to sell fluctuates, with some bodies of work selling well and others not selling as well, this fluctuation does not stem from collectors’ uncertainties over painting as an artistic medium. Norris’ case is by far the exception, as many other participants in the study (11), including the



curators and gallerists of networked alternatives, struggle to sell works either partially or wholly comprised of digital components. Jonakin has sufficient space for old machines and custom-built hardware for his video game artworks to accumulate, but other artists run out of space—and patience—to maintain these material artifacts of prior works.

Stearns recounts how he has slowly realized the diminishing value and the increasing labor involved in holding onto the objects generated for past works. As he puts it, he has had to grapple with “when to stop caring about other people not caring.” Without collectors or institutions interested in acquiring his works or contributing resources toward the care of works, Stearns has not only routinely decommissioned works but has also shifted his creative practice in response. He has adopted a research-based practice that places more emphasis on the process and the conceptual or ideational outputs of works rather than the art objects themselves. As with Lucas, the proposal becomes an artifact of enduring value—a kind of surrogate for the art object that is far easier to maintain over time and continues to be of use in the artist’s archives.

#### *Variable artworks*

Artists recognize that many digital and new media artworks are inherently fragile or ephemeral and cannot be saved over the long-term in the precise form in which they were first created. Echoing my findings in the earlier exploratory study (Post 2017a), artists express a range of attitudes toward variability and change in their artworks over time. Stearns has come to peace with destroying the material artifacts associated with works and having pieces live on through proposals, schematics, and documentation. De Lara, who primarily works with wood and other analog materials for his sculptures, finds a poetics in letting materials or media age and deprecate over time. For instance, De Lara installed his piece *Invasive Species* (2018), a modular sculpture that can be adapted to different venues, at Burning Man, where it was subject to dust storms,

heat, sunlight, and other natural elements that will contribute to the deterioration of the work (see fig. 8). As dissimilar as wood is from VR, there is a marked resonance between De Lara's approach here and Rothberg's attitude regarding the Oculus DK1 headset for *Memory Place*: "if it breaks, it breaks, and that's the end of that."



Fig. 8 Raul De Lara, *Invasive Species (Burning Man)*. 2018. Wood, dimensions variable. Available from: <https://rauldelara.com/> (accessed August 30, 2019).

Either as a way to revive once-destroyed artworks at a later time or as a conscious strategy conceived before artworks become defunct, many artists and curators (17) discuss embracing variability as a digital curation practice for works stewarded by both artists and institutions. Consonant with how Rinehart and Ippolito (2014) describe recreation as a preservation strategy, many artists have considered how current works either in their custody or collected by institutions might be refashioned using different technologies at some point in the future. Beyond the remixing and reworking practices detailed above, only one of the artists in the study (Barcia-Colombo) describes entirely recreating works in this way—likely because this

strategy would play out over years or even decades—but several artists discuss ways in which this kind of variable media approach is either already baked into how they exhibit, disseminate, and generally think about their works or in preservation approaches that they would be open to pursuing with collectors and institutions in the future.

Jonakin’s video game artworks have been exhibited in a number of different venues and contexts, from festivals and museum spaces to the widely-used gaming platform Steam.<sup>66</sup> “I’m not a purist by any stretch of the imagination,” Jonakin assures as he describes the many different forms these works have taken. He has built custom arcade cabinets for some shows, and he has also given various institutions exhibiting the works leeway to craft their own similar arcade-style displays or to hook the works up with a television and standard video game controllers. In all these cases, Jonakin discusses how the works will be displayed with the curators but affords them sufficient flexibility to adapt the works to their physical spaces and the demands of a given exhibition. Recently, Jonakin has worked with Zack Spechler, a curator at the Young at Art Museum in Davie, Florida,<sup>67</sup> to show *Jeff Koons Must Die!!* (2011) both at the Art Miami festival and for an upcoming show at the museum, with the display of the work changing across these different contexts. Jonakin’s openness to adapting his pieces to different exhibition settings extends to his attitude toward future changes that might be required to keep the work functional. He suggests that he would happily use emulators in the future for his works, noting that video game enthusiasts have been some of the most avid developers of emulators that he could draw on for his own pieces.

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<sup>66</sup> <https://store.steampowered.com/>

<sup>67</sup> <https://www.youngatartmuseum.org/>

Norman has also disseminated *Endangered Data* in a variety of forms, ranging from videos explicating the project to artist's books with reproductions of the steganographic images. However, in Norman's case, this variability more stems from his own uncertainty over how best to get across the concepts and ideas driving the project than from the constraints of particular exhibition contexts. As the project is inherently digital—dealing with the stewardship of digital information, whether on government websites or embedded in images—Norman has struggled with translating the project into analog material artifacts for physical exhibition spaces. Even still, in these experiments with different dissemination methods, Norman has been exploring how the work can vary while still communicating the essence of the piece. For instance, he describes developing more sophisticated approaches to printing images from the work to more closely emulate the experience of seeing them digitally: “I tend to do it by dye sublimation on aluminum, which seems to parallel the format a little bit more closely: it's glossy, almost like a screen. It really doesn't feel tactile; it feels like liquid or something.” Through experimenting with the materials and learning these techniques, Norman has arrived at variable methods for presenting the same work in several divergent media.

Artists also consider how digital artworks might vary in the future when pieces are acquired by collectors or institutions. While Jonakin and Norman present examples of how works have varied across different galleries, involving negotiation with the curators at these exhibition spaces, the stakes of these kinds of negotiations increase when the custody of a work transfers from the artist to another party. As I discuss in the following chapter, the nature of these negotiations for digital and new media art is still very much in flux, but artists, curators, conservators, and other stakeholders are developing methods for defining the essences of

inherently dynamic or ephemeral works and for translating these parameters into actionable practices.

#### 4.1.4) Organizations and Communities

In this subsection, I enumerate the kinds of organizations and communities that feature in artists' information worlds, focusing on those that play significant parts in how artists approach, practice, and learn about the digital curation of their artworks and archives. While I provide examples along with some discussion of the role these organizations and communities fulfill, I more fully elaborate on how these organizations and communities fit into artists' information worlds in the following chapter. This subsection also excludes Paper-Thin and other similar artist-driven galleries and platforms as I discuss these at length elsewhere.

##### *Arts non-profits and centers*

Arts non-profits and media arts centers enter into artists' information worlds in several ways. Harvest Works,<sup>68</sup> Experimental Television Center,<sup>69</sup> and Eyebeam<sup>70</sup> have been important in providing access to media production technologies, spaces for exhibiting work, and artist's residencies. Additionally, these organizations create space for artists, curators, educators, and audiences to meet and discuss issues relevant to digital and new media art. For instance, a group of students studying media art conservation encountered Lucas' work at Eyebeam, sparking a project in which the students assessed the piece for potential conservation needs. Notably, many of these organizations are located in New York City, a hub for digital and new media art as well as art worlds more broadly. Stearns and Dorf, who both live in New York, discuss taking

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<sup>68</sup> <http://www.harvestworks.org/>

<sup>69</sup> <http://www.experimentaltvcenter.org/>

<sup>70</sup> <https://www.eyebeam.org/>

advantage of the resources offered by these organizations and participating in the local creative community in and through these centers. However, artists also mention similar organizations located outside New York, Los Angeles, or Chicago. Participants have attended residencies at the Banff Centre for Arts and Creativity<sup>71</sup> in Alberta, Canada and at the Ox-Bow School of Art in Saugatuck, Michigan.

Among arts nonprofits and centers, Rhizome deserves special attention. From its founding in 1996, Rhizome has been paramount in promoting digital and new media art generally and net-based art in particular. Rhizome has devised methods for collecting and exhibiting net-based artworks in their native online contexts, has fostered communities of digital artists through email lists and various programs, and has developed tools for digital art preservation. Artists in the study have drawn on Rhizome as an important source of information about net-based art and have also received grant funds and other resources supporting their creative practices. For instance, Murphy received funding from Rhizome to create a series of website artworks and later consulted with Rhizome staff on how best to update these works to function on newer browsers. Since Rhizome is affiliated with the New Museum, the organization also carries out activities that overlap with this institution, such as the recent *Net Art Anthology*, a collection of 100 significant works of net-based art featured both on Rhizome's site as well as in the New Museum galleries.<sup>72</sup>

#### *Museums and other collecting institutions*

Only a few artists in the study have interacted with museums in the acquisition of their artworks, but these exchanges have proved universally informative for these artists. MoMA

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<sup>71</sup> <https://www.banffcentre.ca/>

<sup>72</sup> <https://www.newmuseum.org/exhibitions/view/the-art-happens-here-net-art-s-archival-poetics>

collected video works by Lucas in the late '90s, shortly before the institution underwent a period of massive change in their practices and infrastructure for collecting, describing, preserving, and providing access to digital artworks (Saaze, Wharton, and Reisman 2018). Lucas recounts entering into discussion with MoMA staff during this period of transition; as they asked her about her creative practices, gathering information that would guide any necessary changes to her works, she learned about the established and emergent standards for video formats. Lucas has also learned about media formats and other technology standards through her interactions with Electronic Arts Intermix (EAI), both as they have distributed her work and as she has purchased pieces from them for different academic institutions where she has taught. Coupled with her experience working as an assistant for Tony Oursler, Lucas took away from these interactions with institutions knowledge about media formats and standards that she has applied in her own system for creating backups, masters, and copies of digital works.

When the V & A collected several works by Lomas, the discussions over the ongoing care of these works have helped both Lomas and the institution gain a deeper understanding of digital art curation issues. Lomas (2019) describes the outcomes of these discussions in a recent volume covering issues for museums collecting digital art. As Lomas' works were unlike other digital pieces collected by the V & A, the curation plan developed collaboratively between Lomas and the institution will serve as a precedent and model for such acquisitions in the future. Lomas has likewise benefited from this exchange, learning more about the requirements of collecting digital artworks in ways that can inform his future interactions with other institutions. As with Lucas, these interactions are bilateral negotiations, with artist and institution both learning from each other. For MoMA, Saaze, Wharton, and Reisman (2018) describe developing practices and systems for digital art curation as a long process of adaptive organizational change,

with success hinging on the willingness of staff across the organization to learn from each other as well as other stakeholders including artists.

NEW INC,<sup>73</sup> an arts and technology incubator at the New Museum, offers an example of another role that cultural heritage institutions might play in artists' information worlds beyond collecting artworks. Stearns, Rothberg, and Lucas have all taken part in this incubator, which provides artists, curators, developers, entrepreneurs, archivists, and others in the arts and technology arenas with a variety of resources including working space and professional development courses. Similar to arts nonprofits and arts centers, the incubator has also created space for community, fostering discussions around shared issues that impact all the diverse groups at NEW INC albeit in different ways. As Lucas describes, NEW INC has encouraged reflection around the formation of a broader community of individuals working creatively with technology: "we're a community, and this community shares certain values. We want to be engaged with new technologies critically, and also channel how they get used and have a voice in that and create new ways of using these tools." While Stearns, Rothberg, and Lucas all note that none of them have had extensive conversations about digital preservation issues as part of the incubator, NEW INC could stand as a model for institutions seeking to form a community around the digital curation of art and artists' archives.

#### *Universities and academic communities*

Many artists in the study (10) teach in both undergraduate and graduate fine arts programs at a range of educational institutions, from specialized arts school like the School of the Art Institute of Chicago to large public research universities like the University of Minnesota. Study participants point out several ways that their work at these institutions has informed their

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<sup>73</sup> <https://www.newmuseum.org/pages/view/new-inc-1>



digital curation practices and approaches. Artists make use of material and technological resources at their academic institutions. For instance, Lomas has used the 3D printers along with expertise proffered by staff at Goldsmiths' Hatch Lab makerspace. In some cases, artists talk with their colleagues in academic departments about digital curation challenges and strategies; in other cases, artists have had difficulty finding common ground with colleagues who do not extensively experiment with digital technologies in their creative practices. Several artists (5) mention discussing digital curation issues with students, all noting that they derive deep satisfaction from these interactions and often learn a great deal from how students are thinking about new technologies.

Many artists in the study (16) had either attended an undergraduate or graduate fine arts program or were enrolled in such a program at the time I conducted the research. While participants have found these educational programs generally instructive for developing fine arts skills, these programs were often lacking in developing skills for creating, disseminating, and caring for digital artworks. As discussed above, De Lara and his fellow students recognize documentation as a critical component of their creative practices but struggle with how best to document their works. Working with digital technologies involves a host of new skills not traditionally associated with the fine arts but nonetheless essential. In many instances, study participants wish that they had gained digital curation skills in these educational programs, lamenting that they have grappled with these issues on their own and have sought out other sources for this information. I return to this topic in the conclusion, where I outline some potential implications for arts pedagogy that have emerged from this study.

Outside of their home institutions, artists participate in academic communities through conferences and festivals. As in many academic disciplines, these events present opportunities to

meet with the ‘invisible college’ of individuals working in a specialized field (Crane 1972), in order to share ideas, discuss pressing topics, and brainstorm possible collaborations. Artists mention participating in several such gatherings dedicated to the intersection of arts and technology including Electronic Visualisation and the Arts<sup>74</sup> and Ars Electronica.<sup>75</sup> Artists also describe conferences as places to explore connections across disciplines, learning about the relevance of work in tangential or wholly disparate fields. For example, at the 2019 College Arts Association conference, Norman discussed his *Endangered Data* project on a panel with art historians and environmental scientists.

### *Commercial platforms*

Artists use a number of commercial platforms across their digital curation practices. Differing from the artist-run platforms like Paper-Thin that are the focus of the dissertation, commercial platforms also provide artists space and tools to create and care for their works but are under the propriety of a corporation. Artists use these platforms during the creative process, as with Rothberg, who keeps, manages, and maintains data for active projects on GitHub. Many of the artists (8) stress the increasing importance of Instagram in particular as a platform not only to disseminate their work but also to connect with curators, collectors, and other artists.

While Instagram is the predominant platform discussed by participants, artists mention other commercial platforms as new spaces to disseminate artworks. Jonakin, who has previously distributed his video game artworks through his personal website, has released his latest work, *Beating a Dead Horse with a One-Trick Pony* (2018), on the gaming platform Steam. Jonakin has experimented with the platform as a way to reach audiences beyond galleries and museums

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<sup>74</sup> <http://www.eva-london.org/>

<sup>75</sup> <https://ars.electronica.art/news/>

and reports compellingly strange results: the piece has been generally well received, but Steam curators and users have encountered the work as a video game first and artwork second (if at all). One negative review derides the game as a “generic art walking sim which also includes platformer elements and that only makes it worse.”<sup>76</sup> On the store page, Jonakin frames the work as an ‘ArtPG,’ with a trailer for the work enthusiastically advertising, “Running! Interactivity! More running!” Jonakin’s works sarcastically highlight both the potential and the limits of video games as an art form, and the scope of this recent piece encompasses the potential and limits of Steam as a platform for art as well.

In the following chapter, I discuss the complicated ways in which these commercial platforms have impacted artists’ information worlds and have entered into their practices and approaches to creating, disseminating, and caring for their artworks. It is worth highlighting here the overall conflicted relationship that artists have had with these commercial platforms. While artists acknowledge the important functions that these platforms serve—several have secured shows after curators happened upon their Instagram profiles, for instance—they simultaneously grappled with the implications of depending on these proprietary systems as a crucial component of their artistic practices. Several artists (5) dislike the constraints that these platforms place on how their works are presented (as another image in someone’s endless feed) and express concerns about being complicit in the capitalist programs in which these platforms are instrumental.

### *Software communities*

Distinct from either commercial or artist-run platforms, where using the platform itself constitutes participation in a community, I employ the term ‘software communities’ to describe

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<sup>76</sup> [https://store.steampowered.com/app/916010/Beating\\_A\\_Dead\\_Horse\\_With\\_A\\_OneTrick\\_Pony/](https://store.steampowered.com/app/916010/Beating_A_Dead_Horse_With_A_OneTrick_Pony/)

the broader range of interactions among and between users and developers occurring outside and around the use of a given piece of software. Software communities form in message boards as individuals troubleshoot issues and in both the official and unofficial tutorials created to guide users. While scholars have typically studied communities surrounding open-source software, such as how users of software can spark and spread innovations that drive development (Hippel 2001), my research finds overlaps and similarities in communities of open-source and commercial software. For one, artists adopt many types of software in their creative practices, often using open-source and commercial products within the same project; in addition, their participation in communities for open-source software closely resembles their participation in communities for commercial software. Their information practices frequently cut across these communities in ways that complicate firm distinctions not only between open-source and commercial but between communities for particular pieces of software as well.

These communities are not easy to circumscribe as there is a great degree of overlap in the membership, common information practices, and spaces where the communities form. For example, artists use the open-source Processing<sup>77</sup> as well as the commercial Max/MSP,<sup>78</sup> both programming languages for visual and multimedia applications. The ways for finding information about these technologies are similar: both host community message boards and other resources on their respective websites, and there is also a proliferation of unofficial documentation like video tutorials on YouTube and troubleshooting carried out on third-party forums like Stack Overflow. Even though open-source technologies ostensibly afford users a greater degree of access, with the flexibility to adapt the technologies to specific needs, many

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<sup>77</sup> <https://processing.org/>

<sup>78</sup> <https://cycling74.com/>

commercial technologies can be tailored through APIs. Menegon has taught herself C# so that she can do some custom scripting in Unity, and she describes gaining an in-depth understanding of both C# and Unity through the information practices sketched above much in the way someone might dig into an open-source system.

For these and other technologies, artists search for and use disparate information sources, with software communities forming through interactions across diverse spaces, spanning both the virtual and physical. Dorf observes that there is much fluidity between online and in-person digital art communities in New York, where he lives and works. Dorf provides a prime example of this: he posted on a Google Group about an issue he was having with the RGBD toolkit (a precursor to Depthkit,<sup>79</sup> a motion-capture technology for volumetric filmmaking), and James George, one of the developers for the system, responded with an offer to come by Dorf's studio and assess the problem himself. While software communities in other domains likely have similar overlaps between virtual and physical spaces, this fluidity seems particularly important in artists' information worlds. Through conversations at exhibition openings or arts festivals, artists form community around software (and hardware) used for art making, often interacting with individuals who frequent the same message boards and mailing lists. These software communities foster connections among artists but also to developers and people using the technology for other purposes. As I discuss in the later section on information sources, YouTube videos are especially ripe grounds for cross-pollination with hobbyist users of Unity, Blender, and other technologies.

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<sup>79</sup> <https://www.depthkit.tv/>

## *Audiences*

Audiences are important entities acknowledged by many of the artists, with the differences between audiences of online and physical exhibition spaces an especially pertinent issue. Dorf and Jonakin both suggest that online arts venues are more accessible to broader audiences. For one, online venues do not have the apparent barriers of elitism and air of exclusivity that many perceive at physical gallery spaces. As Dorf observes, many online venues feature works with technologies and techniques also used in movies, video games, and popular Internet culture. Visitors to Paper-Thin, for instance, traverse the virtual exhibition space using the same grammar of participation as an online game. Online venues also lower barriers to physical access, as audiences can view the work from their homes—if they have the requisite technologies. Jonakin counts this as a primary consideration for when he is creating work: “people can see it in their own home. That’s the power of it. Anything that limits that is a concern. That is a concern: do people even own the technology to allow them to look at it?” This was one of his motivations for releasing an artwork on Steam. This has also been a principal consideration for Smith and Buckley, who want visitors to be able to access Paper-Thin directly through their web browsers without additional downloads or technical requirements.

In addition to online arts platforms, artists also mention social media platforms as a means for reaching broader audiences via digital and networked technologies. Instagram is predominant among these, although some artists (Barcia-Colombo, Lucas, Norris) feel that the platform itself has the potential to influence their relationships to and interactions with audiences. These artists observe social and professional pressures to post compelling shots of their work in the studio and in exhibition spaces, characterizing this as a performance that may misconstrue or distort their artistic practices. Baym (2019) posits that this increasing influence of

social media platforms on the dissemination and reception of art requires artists to take on a new kind of relational labor, working to establish (at least the appearance of) an intimate connection with their audiences. While many artists (14) by and large express that they value opportunities to reach audiences—including collectors, curators, and other artists—through Instagram and other social media services, some (5) are wary of altering their artistic practice to either better suit the platform or to match the expectations of what they think Instagram audiences might like.

#### 4.1.5) People

In this subsection, I outline the variety of roles that different individuals play in the digital curation of artworks and artists' archives. I focus mainly on how these people function as interpersonal information sources for the artists, either by directly addressing targeted information needs or by fostering broader information-seeking or learning processes through their interactions with the artists. Becker (1982) stresses that the process of creating, exhibiting, and preserving work is inherently collaborative and that art worlds form as a product of this collective activity and shared concerns. From the perspective of LIS, I suggest that artists' information worlds take shape in much the same way, with artists learning digital curation skills—which is the particular focus of this research, although the point holds for other areas of artistic and curatorial practice—as a result of myriad individuals working together in many ways.

While a wide range of people in a variety of roles enter into artists' information worlds and play pivotal parts in the ongoing care of artworks and archives, it is equally important to emphasize the lack of such people for some artists. Several artists (11) lament not having a community in which digital curation matters are regularly discussed, resulting in limited conversations about the broader aesthetic implications of how digital art is preserved and minimal discussion of digital curation techniques and approaches. The presence (or absence) of

other individuals and institutions either willing to directly contribute resources to the care of a work or indirectly help by providing information or support is a major factor impacting the long-term viability of digital and new media art. For this reason, Stearns' deliberation on "when to stop caring about other people not caring" about his work is a refrain throughout this dissertation. Both social and technological infrastructures supporting artists' digital curation of their artworks and archives are essential for a vital digital visual arts heritage.

#### *Artistic collaborators and other artists*

Study participants frequently mention artistic collaborators and other artists as commonly involved in digital curation information practices, both as sources of information and by sharing in digital curation labor in collaborative projects. This finding accords with the existing literature on artists' information behaviors, as Cobble Dick (1996) and Hemmig (2008; 2009) both note that other artists in local arts scenes and broader social networks provide a fount of information on topics ranging from artistic techniques, details about how to work with various materials and media, and grants and exhibition opportunities. Study participants have learned about digital curation matters from informal exchanges with artistic peers, as well as through direct collaboration and experimentation with other artists. Artists in the study have developed digital curation skills, practices, and approaches in and through their creative work, learning by addressing challenges encountered in the creation and ongoing care of artworks, and this includes collaborative projects as well. In many collaborations, digital curation responsibilities are shared among artistic collaborators. Menegon and D'Alessio, who have worked with each other and have also worked together with the artist Klaus Obermaier on several projects, describe a well-established division of responsibilities that helps teamwork proceed smoothly. As Ritiu recounts, even though he took on the bulk of digital curation duties in his now-dissolved art duo,



he still benefitted from the ongoing dialogue with his collaborator in ways that cannot be emulated working as a solo artist.

Beyond formal artistic collaborations, artists have learned about digital curation through conversations with other artists at residencies, festivals, exhibitions, and participating in local and online arts communities. Often these conversations involve sharing knowledge about applying new technologies for various artistic techniques; study participants describe either asking other artists for help using new technologies or teaching others these skills themselves. Although these conversations center around creating new works, the knowledge and skills gained contribute to situated knowledges informing how artists care for works after the point of creation as well. Artists in the study remark that these conversations less frequently focus on skills specifically for the ongoing care of artworks, such as refreshing storage media, migrating works to new formats, or deploying emulators. Artists tend to seek out information related to long-term digital curation activities by looking to other more established artists as models for how this work might be carried out—either by the artist’s studio or by collecting institutions—gaining this perspective by talking with the artists directly, working with the galleries representing those artists, interacting with others who have collaborated with those artists, or through interviews with or other publications by those artists. For instance, the renowned media artist Rafael Lozano-Hemmer (2015) has published an essay online detailing his approaches and attitudes in the digital preservation of his own work, an exemplar that Rothberg has looked to when thinking about contracts with institutions and collectors regarding the ongoing care of her work.

#### *Scientists, developers, and other collaborators*

In addition to artists, participants in the study collaborate with people in a number of other occupations, most commonly developers and programmers but also scientists and other

kinds of domain experts. Ahmed observes that the art world has a particularly impoverished vocabulary for describing artistic collaboration—with ‘collaborator’ referring essentially to another artist creatively involved in a project—and that this term does not adequately cover the variety of people taking on diverse roles in some of his works. One manifestation of *The Wind Egg* (2016), a research-based project with multiple instantiations exploring confluences between scientific and mythological conceptions of the wind, took place at the von Karman Institute for Fluid Dynamics,<sup>80</sup> where Ahmed used wind tunnel technologies in a site-specific installation. Staging this work involved many people working together in a coordinated way, applying their expertise in service of the bigger project. As Ahmed reflects, “there were florists meeting with physicists meeting with sound composers and aeronautical engineers, all different kinds of people. Falconers were involved. People who would never really address one another are now joining to make this work.” The work itself becomes a site where other kinds of collaborations and affinities can form, branching off into new creative efforts.

While *The Wind Egg* is exceptional in the range of people involved, many works engaged with digital and networked technologies necessarily involve disparate kinds of expertise not always possessed by the artist. Principally, digital artworks require facility with the technologies involved. If artists do not possess the requisite knowledge or skills themselves, they can bring on developers or programmers able to achieve the desired result—or to work with the artist to shape the artwork as needed if the ideal effect is not possible with a given technology. Although Casado has a deep knowledge of many digital technologies from his decades of experience as an artist, he has increasingly hired programmers to work on more complex projects. At this point in

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<sup>80</sup> <https://www.vki.ac.be/>

his career, he does not want to put in the effort needed to update his skillset, especially when a programmer will be able to complete the work much more quickly.

Few artists in the study have the available resources to regularly hire developers, but artists routinely reach out to friends or others in their communities for short-term help or advice on programming issues. As noted above, Norman has worked with his brother, a computer scientist, to develop the scripts that embed climate data in images. The artists at NEW INC describe some formalized ways in which the incubator facilitates this kind of knowledge exchange, for instance through member-led workshops. As artists seek out information on programming and technical development work, software communities intermix with the artists' personal networks. Artists draw on this range of sources in concert as part of an ongoing learning process to develop the necessary skills to both create—and then care for—their artworks.

#### *Fabricators and industry professionals*

For information needs relating to specific materials or products, artists seek out information directly from industry professionals or the fabricators themselves. These individuals may be within the artists' personal networks; for instance, Dorf has several friends working in media production and he has asked them about the current state of image and video standards. More often, artists contact these individuals through the companies fabricating the materials or products. Casado has contacted several companies advertising the novel aluminum painting technology discussed above to compare prices and techniques. Crispin occasionally masquerades as an employee of a business to request material samples from various fabricators. While information about these materials can sometimes be found on manufacturers' websites, which De Lara mentions using, directly engaging with fabricators themselves often becomes necessary as artists incorporate the materials into artworks.

The involvement of fabricators recalls Burnham's (1968) notion of 'systems esthetics,' as many of the artists discussed by Burnham, including Robert Morris and Robert Smithson, made large-scale earthworks or sculptures that required industrial equipment and expertise. For Burnham, the communication technologies like telephones and fax machines that connected artists with these fabricators were central to the artistic process, the resulting artworks in many ways standing in relief of these information and production networks utilized to create them. While artists in the study do not always directly evoke the broader social systems effected by information and communication technologies in their art, information networks enter into the creative process as artists learn skills themselves and contract labor necessary to create complex technological works. Becker (1982) captures this in his argument that all art is the product of cooperative activity carried out according to some division of labor, but the idea of systems esthetics adds nuance to how this cooperative activity is coordinated and made available: through information and communication systems.

#### *Curators, gallerists, and conservators*

I touched on the role of curators, gallerists, and conservators as information sources above in my discussion of how artists learn through their interactions with collecting institutions, but these individuals also serve as important interpersonal connections for artists. Especially outside the process of having works acquired by an institution (the focus of the earlier discussion), artists learn from curators and gallerists through the process of arranging and staging exhibitions. As I detail in the next section on Paper-Thin as well as the next chapter, staging digital art in both physical and virtual spaces involves deeply collaborative efforts, with artist, curator, and support staff working through technical issues in what I describe as a co-construction of the exhibition. While exhibition spaces provide differing levels of technical

support, study participants (12) emphasize experiences in which both artists and curators embrace the co-constructive nature of this process to be the most mutually informative. Similar to Paper-thin, Turner and Ian Anderson, her partner in running the IRL gallery, actively recruited artists by promising support to help them create VR artworks. In working with IRL, Paper-Thin, And/Or and other galleries, artists in the study report benefiting greatly from this technical assistance, learning technical skills and gaining knowledge by working with curators and gallerists to address the inevitable issues that arise in staging digital artworks.

Some participants (6), including gallerists and curators, also mention conservation consultants working outside of major collecting institutions as a potential information source. Although no artist in the study has contracted a consultant for their own work, artists single out Ben Fino-Radin, founder of the digital art conservation business Small Data Industries,<sup>81</sup> as a prominent figure in this area, who first gained experience through his work at MoMA and Rhizome (Fino-Radin 2011). Lucas, who is currently working with the company American Cyborg on forthcoming arts archiving software,<sup>82</sup> notes that digital art conservation is a growth area with many consultants, companies, and tools emerging. While neither the artists in the present study nor scholars in the existing literature on artists' information behaviors highlight consultants or consultancies as commonly-used information sources, these individuals and organizations may become more integral to artists' information worlds in the future.

#### 4.1.6) Technologies

Rather than enumerate the myriad technologies artists use in their creative practices in this section, I instead discuss different ways that working with technologies have served as

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<sup>81</sup> <http://smalldata.industries/>

<sup>82</sup> <https://americancyb.org/>

informative processes for the artists in the study. I describe some of the information needs and practices attendant to modes of learning through the direct use of technologies, although I do not get into particular technical difficulties as these are discussed at length in other sections and chapters.

### *Learning through the process of creating work*

Hemmig (2009) finds that artists prefer learning about techniques and materials through practice, either through their own direct experimentation or by hearing from other artists about their experiences. While working with digital technologies often necessitates engaging with documentary technical information (which I discuss in the following subsection), artists in the present study digest these textual and other documentary information sources in and through the process of creating work. As Dorf articulates this, “it’s very difficult to just sit down and say, ‘I’m going to learn Maya today!’ I always need to have some sort of goal in mind that I work towards. That makes the navigation of this digital space—trying to find these tutorials or these forums—much easier because you have a question to ask, rather than I’m going to ‘learn this software.’” Although many artists express genuine curiosity about digital technologies in and of themselves, applying these technologies in the creative process is a primary driver of this interest as well as a means to learn the technologies.

Creating work is an experimental process to multiple ends: exploring some technology in order to learn its capacities and possibilities; but also experimenting with how a given technology expands the conditions for creating and disseminating artworks, potentially in ways that alter or question existing notions about art. Lomas’ practices with machine learning and evolutionary techniques exemplify the convergence of these various senses of experimentation. Lomas learns about these technologies as he develops systems for generating morphogenetic

forms, but creating the work also constitutes a process of exploration. Lomas describes tweaking parameters and sorting through many generations of slightly different forms before arriving at sufficiently interesting results that he selects for final works. Creating these works is a negotiation between his own interests and biases as an artist and unpredictable algorithmic processes guided by the interaction of dozens of parameters. For instance, Lomas describes an unpredicted turn in the development of his *Mutant Vase Forms* series (see fig. 9):

a variation on *Cellular Forms* that experiment[s] with using additional constraints and biases...the initial intention was to create forms that would be naturally fabricable as sculptures, but due to some bugs in the code the resulting structures have the tendency to grow tendrils and complex horizontal branches. The results show the growth system emergently exploiting the bugs to create unexpectedly rich and complex results.<sup>83</sup>

In addition to the planned unpredictability of the evolutionary algorithms, the complexity of coding software in general contributes to the emergent nature of the works. Lomas has encountered technical difficulties with bugs in the code and has incorporated this bug into the creative process itself.

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<sup>83</sup> <http://andylomas.com/mutantVaseForms.html>

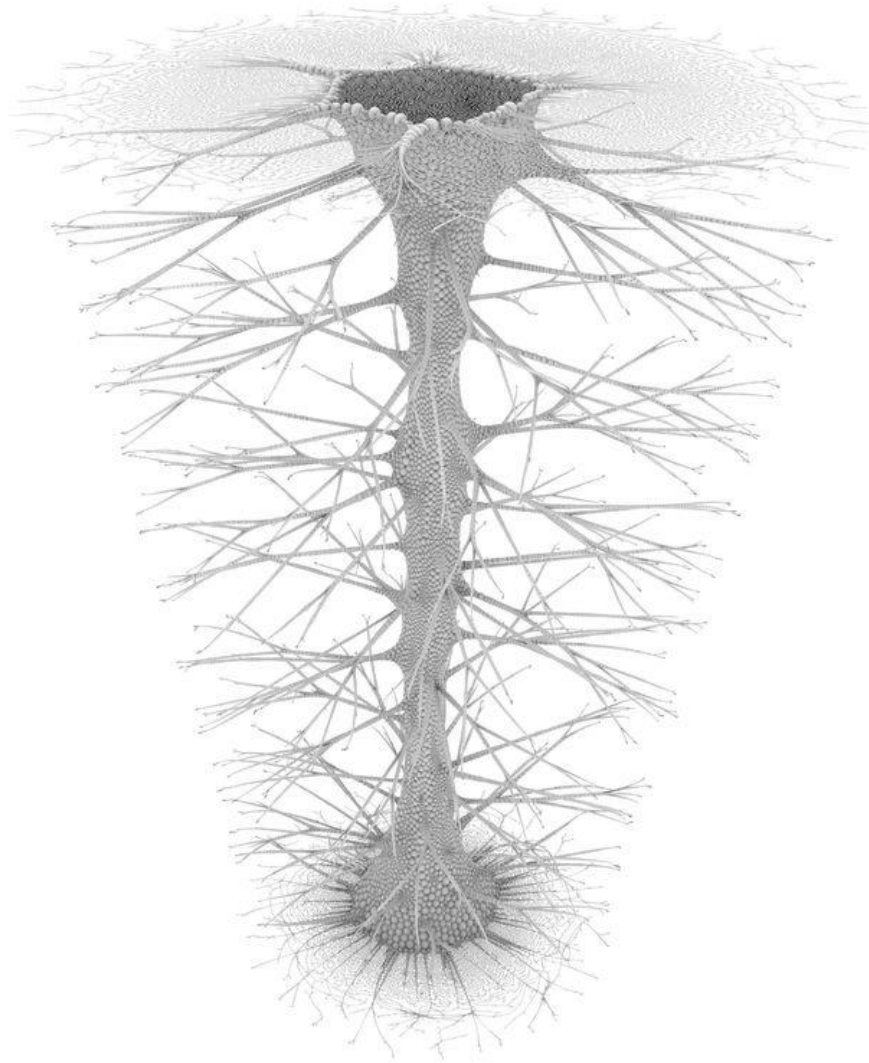


Fig. 9 Andy Lomas, from *Mutant Vase Forms*. 2018. Digital image generated by evolutionary algorithms, dimensions variable. Available from: <http://andylomas.com/> (accessed September 4, 2019).

Although Lomas' works have been exhibited in various galleries and have been collected by the V & A, the processes and technologies he employs unsettle notions of art, the artist, and the work of art. McCormack et al. (2014) enumerate many of the questions that generative art—artworks that derive from complex algorithmic processes not wholly controlled by the artist—raises in the critical discourses about both artificial intelligence and art, including the relative roles of the artist and the algorithms in the creative process and what constitutes the actual artwork. Boden and Edmonds (2009) suggest thinking about generative art in terms of an 'art



system' rather than framing the discrete outputs of these systems as bounded artworks. While these larger philosophical questions about the nature of creativity resist any clear or single answer, Lomas' practice demonstrates that his exploration of these technologies necessarily cuts across traditional art world boundaries, presenting and discussing his work at both scientific conferences and art museums.

Although artists may be driven to explore the possibilities of technologies for the creation and dissemination of art, artists continue to use these skills and techniques in the ongoing care of their works. Murphy has learned HTML and Cascading Style Sheets (CSS) for the creation of her website artworks, and she continues to apply this knowledge as she updates these pieces to adapt to changes in web browsers. In many ways, the need to update her websites has plunged Murphy deeper into the technical specifics of how browsers interpret HTML and CSS. Murphy started creating her works by copying and pasting code from W3Schools,<sup>84</sup> a site with web development tutorials, adapting and manipulating this code to achieve her desired results. In returning to these pages to update them, though, Murphy has needed to gain an understanding of changes in how browsers render some tags, especially for embedding videos and images into pages. To understand how browsers interpret the code, Murphy has had to be able to parse the code herself. Murphy has developed a familiarity with web technologies through her initial experimentation, and the ongoing digital curation of these works has encouraged a formalization of this knowledge.

#### *Reverse engineering or deconstructing process*

One mode of learning through the creative process is to actively deconstruct or reverse engineer technologies, either to gain a deeper familiarity with how some technique or technology

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<sup>84</sup> <https://www.w3schools.com/>

works or as an artistic process in and of itself. Stearns has pursued both aims in his recent creative practice working with a range of cybersecurity frameworks and tools, delving deeply into these technologies as part of his research-based practice. Through *Open Vault* (2017-ongoing), a faux-company peddling “weaponized malware” in packaging satirically evoking O’Reilly manuals (see fig. 10) and other software design trends, Stearns has considered the role of cybersecurity in corporate identity, global politics, and individuals’ daily lives. Key to learning the tools and frameworks inspiring this piece, Stearns has applied these technologies to pull apart information systems and networks—in one particularly notable instance, hacking into the system used in Paper-Thin v3, which I detail below.

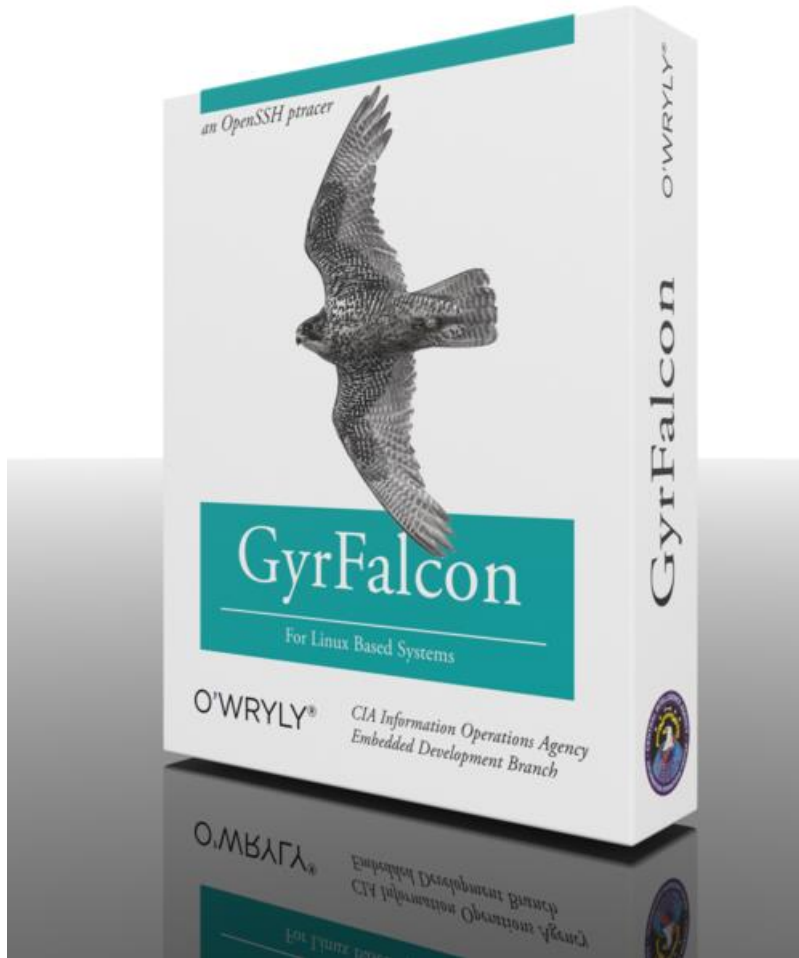


Fig. 10 Phillip Stearns, *GyrFalcon* (*Open Vault*), 2017. Software box, 265 x 210 x 50 mm. Available from: <https://www.open-vault.com/> (accessed September 5, 2019).

While *Open Vault* is a work about deconstructing technologies, artists in the study employ reverse engineering methods to learn artistic techniques for other kinds of projects as well. For instance, De Lara describes studying artworks or objects that he admires to figure out how they were made and how he might apply similar techniques, primarily for analog sculptures: “I like to decode how they make their work, and based on how they make their work, I get ideas, based on their processes, not necessarily to copy what they did, but like...oh, you can use wax to do this, or I didn’t know that you can steam bend wood, but now I know.” Starting from a

finished object, De Lara follows an information-seeking process that involves reading about different tools and techniques involved in the piece, watching videos of the tool or technique in action, and experimenting with the tool or technique in his own creative practice. As De Lara stresses, this is not to copy how the tool or technique was applied in the object that initially sparked his interest but rather to learn about what is possible with a material and to pursue those creative possibilities to new ends.

*Working with new technologies inspiring creative process*

De Lara works primarily with analog materials, and he follows the reverse engineering process described above principally to learn about tools and techniques for creating analog sculptures, but his involvement in Paper-Thin v3 offers a good example of how working with new digital technologies has also proved to be an inspirational and informative process.

Although v3 asked De Lara to draw—a rudimentary and fundamental skill for most artists—the context of v3, being in collaborative dialog with both another human and machine interactants, caused De Lara to see this technique so integral to his existing practice in a new light:

I definitely got a lot of inspiration from the way the machine was creating its own code because I do draw often. I draw with paper in a physical place, not on a computer...But the one with the computer, it was fun trying to have the hand gesture there and have the machine do these sharp gestures...it gave me a nice, fresh way to think about what drawing can look like.

As De Lara interacted with other HubWeek exhibits, he felt similarly inspired, “craving” more opportunities to experiment with digital technologies. He left v3 and the festival in general with an expanded sense of how digital technologies might fit into his creative practice.<sup>85</sup>

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<sup>85</sup> While most of the artists who participated in v3 did not physically attend the HubWeek festival itself, De Lara was sufficiently intrigued by the prospect of the festival overall and decided to attend in person. However, he participated in v3 in the same manner as the other artists, through a networked drawing application accessed via a personal computer or tablet.

De Lara's description of participating in v3 suggests how interactions with digital technologies can seem almost like collaborations—an experience Norris, Buckley, and Smith also recount in their participation with v3. Beyond v3, Lomas discusses how working with digital technologies can often feel like collaborating with the computer rather than using it as an artistic tool. As Whitelaw (2004) describes for generative art more broadly, using these technologies requires the artist to critically consider the role of the artist as creator and the creative potential of the machine (58). Even if artists take diametrically diverging stances—with some framing this relationship as mutually collaborative and others thinking of the computer strictly in terms of utility—the use of generative technologies raise these issues from the start.

Beyond generative algorithmic processes, artists in the study (13) found the complexity of digital technologies in general as inducing a productive tension, wresting them from a sense of being fully in control. While the complexity of these technologies can pose difficulties both in the process of creation and in the ongoing care of artworks, Casado frames this tension in a positive light: “that’s actually the only way you can grow as an artist: finding those problems and solving them...Technology is such a huge thing, it’s so infinite, you never know what you can get. The problem tends to be bigger, but it’s also the exciting part of it.” Casado compares this situation to artistic practices more broadly: whether working with analog or digital media, artists encounter new problems that engender new perspectives on a given medium. The difference with digital and networked technologies, though, is the scale and complex nature of these problems, involving the artist in branching information practices as they pursue new creative possibilities opened up by constructively working through these issues.

#### 4.1.7) Information Sources

In the preceding subsections, I have discussed a wide variety of information sources that artists draw on in the digital curation of their artworks and archives. Describing artists as consummate information gatherers, Hemmig (2009) suggests browsing is a primary information-seeking behavior for artists, who collect many kinds of information—even if it does not have immediate applicability—amassing sources that may prove useful, instructive, or inspirational at any point in the creative process. Hemmig’s finding resonates with Bates’ (1989) ‘berrypicking’ model of information seeking, articulating how individuals often do not go directly to a single information source for a discrete piece of information but rather pick and choose pieces of information, ranging across many information sources in iterative processes.

These information gathering models fit with the study participants’ digital curation information practices, which elapse over varying timescales and respond to a range of factors impacting how information is collected or generated, interpreted, evaluated, organized and used. Although information may be sought out for a discrete information need or task, information is more typically gathered over the course of working on one or more creative projects and incorporated into digital curation repertoires that the artists hone throughout their careers. In this subsection, I highlight the main types of documentary information sources that artists use, and in the following chapter, I elaborate how these varied information sources integrate into situated knowledges applied and performed to carry out digital curation work.

##### *Official technical documentation*

Whether artists are first learning to use digital technologies or artists are troubleshooting novel technical difficulties for long-used technologies, they rely heavily on technical documentation. This includes official documentation created by the developers or proprietors of

a given technology, as well as documentation generated by the community of users (who might also be developers in the case of open-source technologies). Both kinds of sources are critically important both for open-source technologies like Processing and for proprietary or commercial technologies like Unity. In fact, community-generated documentation may be more apt for certain information needs with commercial technologies, in cases where the official documentation is either sparse or overly abstruse. There are similarities in the kinds of information needs that both types of sources address, as well as similarities in how artists encounter these information sources in their information-seeking behaviors. For instance, as Menegon describes her general process of exploratory search when she needs to address a technical issue, she begins by using a search engine and assessing the relevance of various results, with sources from an official site presented alongside third-party forums and YouTube videos. While artists do not always discern between these types of sources in their information practices, I discuss each in turn to emphasize some important differences between the two.

Artists often engage in exploratory search across official and community-generated documentation, but there are also cases when official documentation is essential and the only information source adequate to address the information need. To make his games available on Steam, Jonakin has depended on the official tutorials and walkthroughs. Since the platform requires game files to be packaged in a particular way that is not directly supported by Unreal or Unity—for example, there is no ‘export to Steam’ menu option—individuals need to follow the instructions provided by Steam. Jonakin posits that someone with technical expertise and prior experience could make do without the official tutorials, but the process is sufficiently complicated that Jonakin has found the official documentation to be crucially important.

When both official and community-generated documentation are available for a particular technology, Murphy prefers watching a video uploaded to YouTube rather than reading through pages of technical documents. At least one artist in the study, though, avoids these user-generated walkthroughs. Crispin states that he almost always seeks out official technical documentation or third-party tutorials created by continued-education services like Lynda.com.<sup>86</sup> Even though these can be more time-intensive and may involve fees, Crispin finds these to be more thorough and more clearly structured, skirting the need to wade through potentially irrelevant or amateurish content on YouTube. While a number of artists (6) complain that many popular technologies for artistic production, including Unity and Oculus, have tended to offer sparse or spotty technical documentation, Rothberg suggests that these companies have improved their official documentation enough in recent years to serve as a primary information source.

#### *Community-generated documentation*

As noted above, many artists (10) use community-generated documentation in the form of do-it-yourself YouTube videos or posts on Stack Overflow threads alongside of or instead of official documentation. For Murphy, these information sources are easier to dive into, as they are coming from the perspective of another user trying to accomplish the same or similar task as the artist—someone who also might be new to the technology and developing familiarity by applying the technology in some project. In particular, the video format may be the most apt for the many procedural tasks that artists undertake with various software. Zhang and Capra (2019) find that individuals searching for information to support creative tasks (including writing, cooking, and crafts, as well as visual arts) use a range of information sources, but that individuals engaged in procedural activities show a significant preference for videos. By watching a video,

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<sup>86</sup> <https://www.lynda.com/>



an artist can follow what the instructor is doing and can replicate her actions without too much worry about missing a step. Complementing videos, forum posts are helpful in that these typically isolate particular issues, with responders offering directed solutions and, in the case of programming questions, often code that can be easily copied or adapted.

Aside from the ease of use, De Lara appreciates the creative energy and experimental inquisitiveness driving many users to make their own video tutorials. While official documentation illustrates how a technology is intended to be used, community-generated documentation often demonstrates hacks, exploits, or unanticipated uses of hardware or software. As De Lara puts it: “that has value, people who are like these undiscovered geniuses or artists, out there on the Internet doing weird things that like to create a lot of content for people for no benefit, but they just do it because that’s what they do.” While these users may not think of themselves as ‘artists’ in a fine arts sense, those who do work as visual artists see kindred spirits in these hobbyists who ply technologies to uncover unusual applications generative of strange or intriguing results.

Cornell and Halter (2015) identify the disappearance of fine art into the more generalized realm of popular culture as a predominant issue in digital and new media art worlds: the ability of anyone to easily create, manipulate, and share images puts into question the special status of the artist and the artwork (xxv). Lialina and Espenschied ([2009] 2015) advance the notion of digital folklore to describe the generative creativity of users of technology, rescuing archives of Geocities as evidence. As discussed in chapter two, artists formed ‘surf clubs’ in the mid-2000s to aggregate digital popular culture, framing this curation of the massive amounts of user-generated content as an artistic activity (Lonergan [2009] 2015). For this study, this wealth of

user-generated content also serves as an information resource for artists working with digital and networked technologies.

### *Published literature*

Among documentary information sources, artists most frequently mention using the various kinds of documentation described above to address information needs pertaining to technical issues encountered in the creation and ongoing care of digital and new media artworks. Often in conjunction with seeking out advice from someone else with relevant expertise and their own experiments working with the technologies in question, both official and community-generated documentation offer information needed to tackle and resolve particular technical issues. Taking a broader view of artists' information practices, though, artists face more than targeted technical issues in the digital curation of their artworks. As artists care for their works, they also contemplate the aesthetic and conceptual dimensions of artworks, and how these are impacted by the technologies they choose to create pieces as well as methods for caring for these pieces over the long-term.

While many of these considerations are discussed with other artists, collectors, curators, and others with a stake in the ongoing life of artworks, several participants (7) also draw on a range of published literature to think through these aspects of digital curation. Some artists mention key books that have served as touchstones in their thinking about art and technology: Crispin cites Davis' (1998) *TechGnosis*, a book about the often spiritually-hued discourses surrounding the significance of technology in society; Ritiu notes how *The Overview Effect* (1998), an astronaut's account of the psychological and cultural impact of witnessing Earth from outer space, has served as an inspirational jumping off point for several recent projects. In addition to books, artists discuss using scientific articles. For example, Norman has looked at

ecology research to inform *Endangered Data*, and Lomas both reads and produces literature on evolutionary algorithmic systems as part of his professional work as an academic. Artists also engage with art history and critical theory literature throughout creative and digital curation processes, with Dorf and Ahmed mentioning scholars Jane Bennet, Donna Haraway, Susan Buck-Morss, and Boris Groys all contributing to how they are thinking about the life of their artworks.

#### **4.2) Information Needs and Practices of Paper-Thin Curators**

In this section, I discuss the information needs and practices of Buckley and Smith as the curators of Paper-Thin. I make some comparisons with Turner and Slocum as individuals associated with galleries similarly exploring new means for disseminating digital and new media art. Although the focus in this section is on the core case of Paper-Thin, I draw out these points of comparison in the following chapter to more fully elaborate how these spaces function as networked alternatives, highlighting the dynamic and emergent roles that these kinds of alternative spaces play in artists' information worlds. Table 4 provides an overview of the aspects discussed for each volume, including the digital curation practices involved in creating, staging, and caring for the volumes, the technologies and tools used, and the sociotechnical factors impacting the digital curation practices.

In many ways, the curators and gallerists running these alternative spaces face similar digital curation challenges as the individual artists and employ comparable practices of care and personal archiving practices to address these issues. These gallerists and curators also struggle with hardware and software dependencies and also develop organizational schemas to manage burgeoning digital archives. However, gallerists and curators deal with the complicating factors arising from maintaining platforms, sites, and spaces that serve as both repositories for

upkeeping many artists' artworks and as access points for audiences of those works. I detail those issues in three subsections: I first provide an overview of Paper-Thin, through a narrative of how Buckley and Smith have initiated and developed the project along with descriptive analyses of the three volumes that have been staged to date; I then delve into various sociotechnical factors that have impacted the development and ongoing sustainability of Paper-Thin; finally, I discuss the two main ways that Smith and Buckley have conceptualized Paper-Thin and the digital curation practices associated with each of these models.

<b>Volume</b>	<b>Practices for creating</b>	<b>Practices for staging</b>	<b>Practices for ongoing care</b>	<b>Technologies</b>	<b>Sociotechnical factors</b>
1	Collecting artworks from artists; transforming and migrating works created in disparate environments to Unity; responding to feedback from MFA crits	Unity plugin to embed VR environment in browser; recreating project in Unity when it became clear that there would be no support to embed Unreal in browser	Storing backups of project; potentially maintaining hardware needed to view volume; creating video documentation of individual works and overall environment; encouraging viewers to download project	Unity; Unity browser plugin; web browsers; various 3D modeling software used by artists	Anticipating eventual support for new technologies; browser plugin eventually deprecated; curators doing significant work migrating pieces to Unity; difficulties recruiting artists to brand-new platform; limiting size of project to ensure reliable loading over networked connections; limited resources for long-term care
2	Creating and sharing Unity environment with artists at beginning of process; providing	WebGL to embed VR environment in browser; one artist did not follow instructions	Storing backups of project; potentially maintaining hardware needed to view volume; creating video	Unity; web browsers; WebGL	Artists have more experience with Unity and game engines; WebGL just gaining support in mainstream browsers at time

	artists with instructions to ensure compatibility	to make his work compatible, so his piece is featured separately	documentation of individual works and overall environment; encouraging viewers to download project		of creation; limiting size of project to ensure reliable loading over networked connections; limited resources for long-term care
3	Recruiting artists for ‘virtual residency’; negotiating specifics of installation with HubWeek; developing networked drawing application	Acclimating artists to networked drawing application; working out technical and logistical difficulties to keep networked drawing application running; discussing exhibition with audiences	Saving G-code generated by artists’ interactions with system; potentially sharing this G-code on Paper-Thin’s site; potentially recreating performance at later time; creating photo and video documentation of installation and performances	CNC machine; G-code; artists’ personal computers; video conferencing software; Processing; networked drawing application	Compressed timescale and other logistical constraints of festival; navigating tensions and different expectations of art and technology audiences at festival; working with artists with wide range of artistic practices; performative and site-specific nature of the project as conceptual and aesthetic considerations; limited resources for long-term care

Table 4 Overview of Paper-Thin Volumes

4.2.1) Overview of Paper-Thin

As discussed in the opening chapter, Smith and Buckley explicitly distance Paper-Thin from traditional notions of a gallery or institution, instead framing the project as a platform for exploring new ways of creating, disseminating, and curating art by leveraging digital and networked technologies. In this subsection, I provide a narrative description and visual analyses

of Paper-Thin, elucidating how the ideas driving the project have developed dynamically across the three volumes that have been created thus far.

*v1*

The first two volumes are VR environments, both accessible through Paper-Thin’s site and viewable in a web browser or as a standalone application downloaded to a local computer. A visitor to Paper-Thin’s site first confronts a sliding split-screen, moving the mouse to enter either of these VR environments (see fig. 11). Already from the teaser videos previewing each environment, a viewer can perceive v1 and v2 as remarkably different, these differences born out as she immerses herself in each volume. While v1 presents a familiar interior space, legible as an art exhibition with sculptural pieces set off against white walls, v2 feels like an alien landscape—the viewer’s avatar plunked down on a startlingly strange structure assembled by unknown hands.

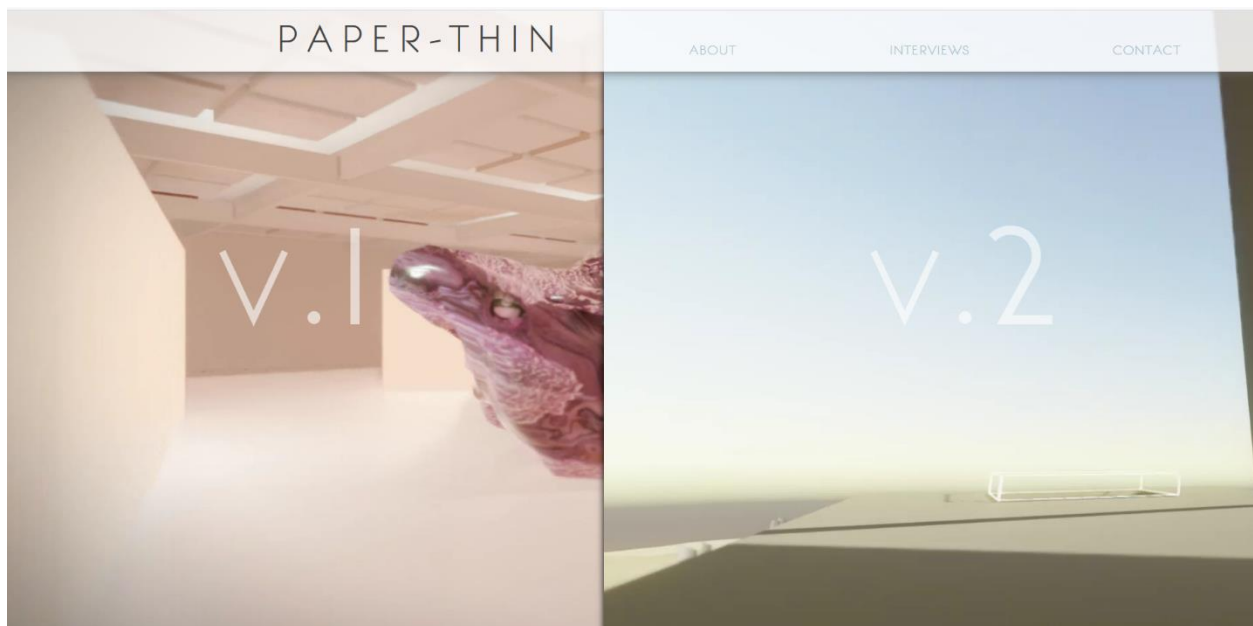


Fig. 11 Screenshot of Paper-Thin’s landing page. Available from: <https://paper-thin.org/> (accessed September 10, 2019).

The works housed in v1 also appear as uniquely virtual objects, achieving visual effects not possible for analog sculptures, but the distinctly digital nature of these pieces is masked somewhat by the uncanny museum-like setting. For instance, Lomas' *Cellular Forms* (2016) consists of dynamically mutating spheres that transform as the viewer navigates around them (see fig. 12). These living lunar molds recall artists working with biological materials, like Eduardo Kac's *The Eighth Day* (2001)<sup>87</sup> or Jenna Sutela's *Orbs* (2016),<sup>88</sup> both projects fostering artistically-altered organisms—but here Lomas magnifies the lifeforms and accelerates their growth as they stretch and contort unpredictably. Paper-Thin offers a natural setting for Lomas' evolutionary works: while Lomas typically prints out isolated manifestations to display in physical exhibition spaces, the algorithms driving these cellular forms can continue to play out in their native digital domain.

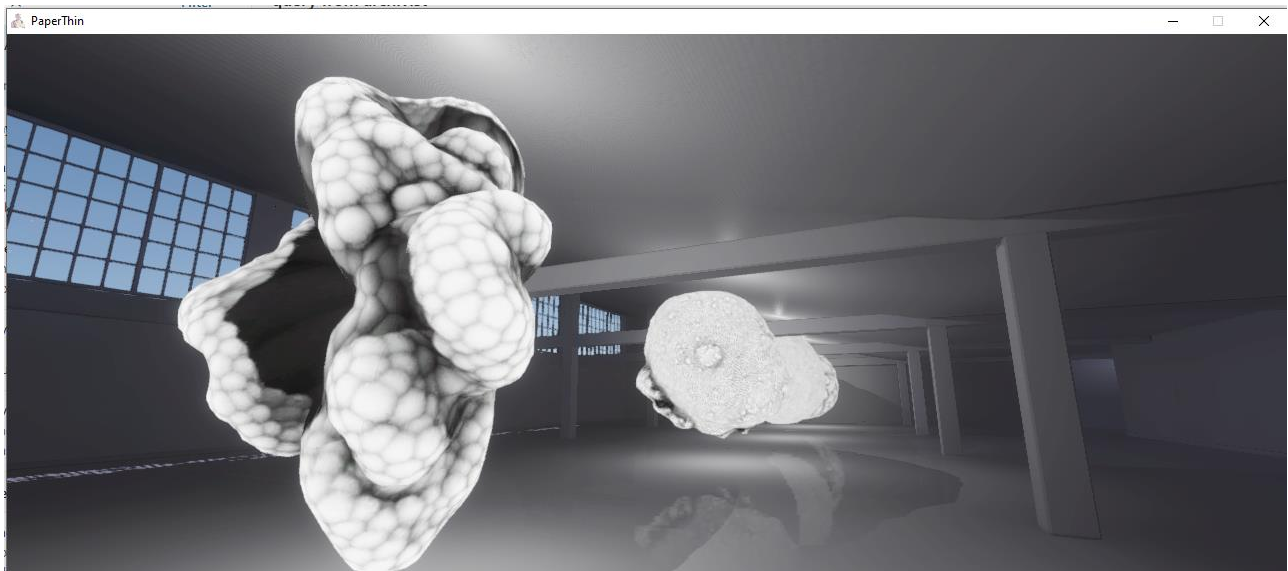


Fig. 12 Andy Lomas, *Cellular Forms*. 2015. Virtual reality, dimensions variable. Paper-Thin v1. Available from: <https://paper-thin.org/> (accessed September 10, 2019).

<sup>87</sup> <http://www.ekac.org/8thday.html>

<sup>88</sup> <https://rhizome.org/editorial/2016/aug/16/slime-intelligence/>

Buckley and Smith adopted the gallery-like environment as a vehicle to begin exploring the ideas motivating Paper-Thin. For the curators, v1 represented their first forays into working with these technologies and staging networked art exhibitions, and both their technical skills and ideas about Paper-Thin as an arts platform developed through this process. Smith and Buckley first conceived of Paper-Thin in a digital arts class while pursuing their MFA degrees at Indiana University. Striking up a friendship over shared frustrations in this class, the pair wanted to dive more deeply into learning about game engines and to explore how to push the aesthetic implications of these technologies for the creation and networked dissemination of art. The curators perceived key limitations with other online arts spaces in the early 2010s: some, like surf clubs or artists' Tumblr pages, were visually and conceptually compelling but failed to take full advantage of the interactive capacities of digital technologies; others, such as various galleries in Second Life,<sup>89</sup> were thoroughly interactive but lacked visual richness or critical engagement with the supporting technologies.

While v1 bridges these two poles—the curators crafted an immersive environment featuring visually-striking artworks that leverage the capabilities of digital technologies—the volume also evinces growing pains of an idea in progress. Smith and Buckley recount that their goal was to achieve a high degree of realism, establishing a convincing fiction of a gallery space for artists to then “systematically break” in surprising ways with digitally-fabricated works that defied expectations of what might be found in an art exhibition. However, as they presented versions of v1 in their MFA student crits,<sup>90</sup> they received substantial pushback: the environment

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<sup>89</sup> <https://secondlife.com/destinations/arts>

<sup>90</sup> ‘Crits,’ shorthand for critiques, are structured workshops common in MFA programs. Students present work in progress that their peers discuss, making suggestions for alteration or improvement, debating the artistic merits, and drawing connections to art historical precursors.



can be seen to merely replicate the prototypical white cube display context ubiquitous in contemporary art galleries and major museums, failing to clearly articulate the institutional critique the curators claim to be making. A review of v1 similarly criticizes the project for reproducing both the architectural tropes of the contemporary art gallery as well as common curatorial structures for presenting and contextualizing work. Fite-Wassilak (2016) admires the goal of creating an alternative space to display and preserve digital art but sees this potential left largely unfulfilled by work that functions in the mode of a “mimetic pun on the physical world.”

Smith and Buckley reflect that the critical intent motivating Paper-Thin was not fully formed from the start but rather continued to be forged throughout the process of working on v1. As Buckley acknowledges, “People thought we were more so just recreating the institution with all of its typical trappings. That was a really hard hump to get over. I don’t think it really happened until we got work in it, honestly, until we got people’s stuff in the space,” to which Smith adds, “I don’t think it happened until v2, really. I think it took the entirety of v1 to get through that.” In concert with learning the technologies—which presented its own challenges detailed in the next subsection—Smith and Buckley have honed their ideas for how Paper-Thin functions as an arts platform across each volume. All the volumes stand as discrete assays into the curation of art using digital and networked technologies, but the full sweep of Paper-Thin can only be understood by assessing how Buckley and Smith have adapted their approach with each new attempt.

However, v1 should not be written off as a learning experience en route to a more fully fleshed out version of a single, core idea. Although the curators have developed their curatorial methods and gained greater command over the constituent technologies with each volume, this does not represent a linear progression. Smith and Buckley present Paper-Thin as a platform for

artists to experiment with new technologies for creating and disseminating art, but this is also an artistic project of their own—a platform for them to experiment with an array of ideas for how digital and networked technologies can impact and transform curation practices. Rather than seeing *Paper-Thin* as a gradual development of one idea, I argue that each volume advances complementary albeit divergent digital curation repertoires; that is, many methods and approaches for curating digital art.

De Kosnik (2016) emphasizes that the nature of digital culture requires a shift in the conceptualization of an archives from that of the canon to the repertoire. Especially for digital cultural materials stewarded by the communities in which they were created, De Kosnik urges that “we can only now conceive of arguing that certain archival styles will persist—that is, certain ways of constructing and designing archives, certain types of archives, certain tendencies in archival practice—rather than arguing that specific archives will endure” (71). Taken together, the *Paper-Thin* volumes encapsulate a suite of these digital curation styles, or repertoires: varying ways that artists, gallerists, and curators might think about sharing and caring for artworks via networks. Taken separately, each volume is a kernel that can be taken up, expanded or altered, by others.<sup>91</sup> De Kosnik observes that digital curation repertoires are built up through individuals’ actions over time—not through any one set of recorded information but through many enactments of a style or way of doing something. While Smith, Buckley, and the contributing artists steward the particular artworks contained in each volume, *Paper-Thin* and exhibitions staged by other networked alternatives advance these digital curation repertoires by acting them out.

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<sup>91</sup> I intend ‘kernel’ both in the sense of an idea, as well as the computer science sense of the computer program at the core of an operating system. As with Linux, for example, the kernel is the basic unit shared among the community, which has proceeded to develop the kernel into many different operating systems.

Acknowledging the validity of the critical pushback for v1 summarized above, the institutional realism of this virtual environment does possess value as an approach in a digital curation repertoire. In particular, this method is well suited to highlight the tensions that digital and networked technologies engender between entrenched and emergent ways of reifying and collecting artworks. While some works in v1 risk folding into the white-wall trappings of the digitized gallery space, other pieces gain momentum precisely because of this realistic context. Jonakin's *Collector's Digital Art Piece* (2015) is apposite for this setting, gleaming gloriously under the digital simulation of track lighting (see fig. 13). As described on Jonakin's site, he designed this tongue-in-cheek piece for art collectors who want to invest in the surely booming and trendy digital art market but do not know where to begin.<sup>92</sup> Jonakin relieves the prospective collector of any uncertainty with a series of squat, unremarkable bars, distinguished only by the digitally-imitated 'material' in which they are cast. He further assures the collector by not only replicating familiar materials—diamond, platinum, gold, and silver—but also by artificially limiting copies of the work according to an established hierarchy of value, only producing one diamond bar but a thousand of the silver. So reverently displayed, the realistic gallery environment of v1 heightens the ironic tone of the piece—a skeptical collector might actually be convinced of the digital-platinum block's steep price tag of \$10,000.

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<sup>92</sup> <http://hunterjonakin.com/invest.html>

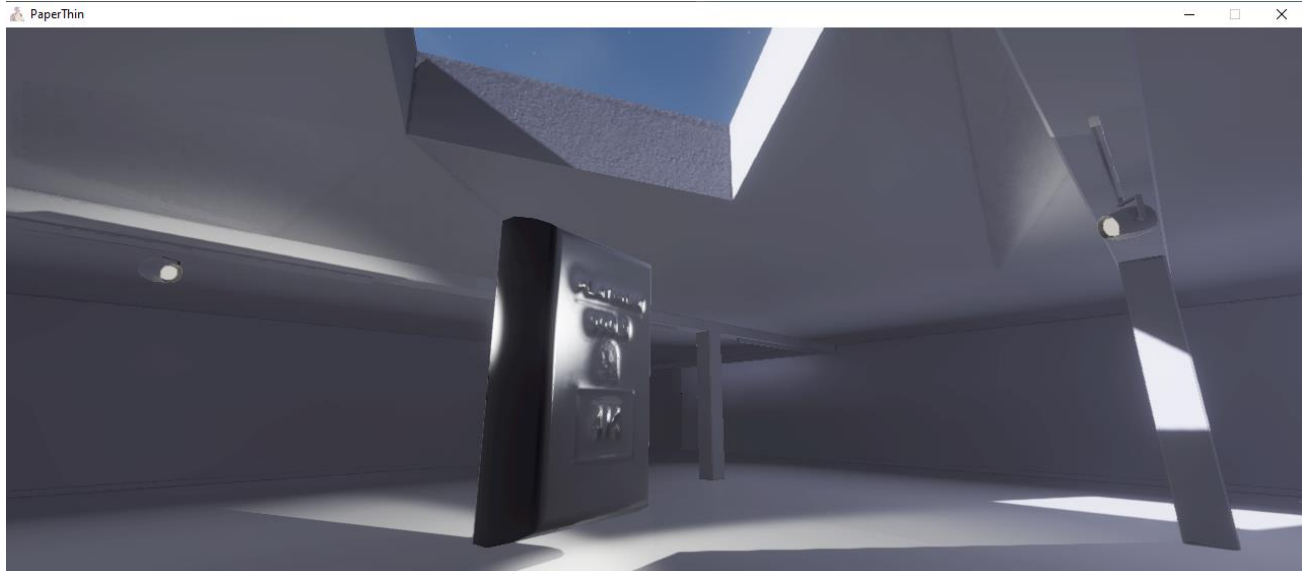


Fig. 13 Hunter Jonakin, *Collector's Digital Art Piece*. 2015. Virtual reality, dimensions variable. Paper-Thin v1. Available from: <https://paper-thin.org/> (accessed September 10, 2019).

Jonakin plays at virtualizing Benjamin's ([1939] 2003) notion of the aura imbued in unique artworks. While artworks have long held special cultural status, seeming to possess an ineffable power, Benjamin argues that reproductive technologies (film and photography in his case) "revolutionize" the social function of art: "instead of being founded on ritual, it is based on a different practice: politics" (257). Politicized in this way, cultural works created through reproductive technologies are not inherently democratic—and Benjamin warns of the violent outcomes of the fascist applications of these technologies in the spread of Nazi propaganda—but he points to other possible ends of this altered relationship between society and art. Importantly, these technologies enable all individuals to produce culture and to see themselves represented in culture, blurring distinctions between "author and public," producer and consumer, or artist and collector (262). The rarefied atmosphere of the art gallery emulated in v1 draws out the punchline of Jonakin's piece: the art world stokes the persistent return of the repressed aura even as technologies of digital reproduction become ever more important to artistic and curatorial practices. Networked alternatives like Paper-Thin explore the plenitude of social relationships for

art afforded by digital technologies, but the specter of art's market value cannot be so easily shaken.

If Jonakin's piece dramatizes the artificial constraints placed on the circulation of digital artworks in the current political and economic systems undergirding art worlds, Baird and Ahmed's *HWBMx8* (2016) demonstrates the capacities of digital information to exceed these limits (see fig. 14).<sup>93</sup> This work is one entry in a larger series developed by the two artists, *Has the World Already Been Made?* (2011 - ongoing), in which the pair endeavor to create an analog and digital databank of architectural motifs. Working as guerrilla documentarians, they make impromptu molds of features from the built environment, in turn rendering 3D models from these casts. From this corpus of fragments, each at once an index of a particular place and indicative of a broader architectural language, the artists create pieces that explore how various motifs repeat and replicate in structures around the world. In the piece for Paper-Thin, the artists created a 3D model of the corner of the Metropolitan Museum in New York. Recasting the space as a prehistoric cave painted with the artists' own handprints, the artists question the experience of art history as a continuum one might have walking through the Met. Rather, the artists execute a paratactical conjunction of the Met/cave painting, leaving the viewer to fill in the space between.

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<sup>93</sup> While Haseeb Ahmed participated in the study and discussed this piece with me in our interview, his collaborator on the work, Daniel Baird, did not participate in the study. My discussion of the piece here reflects what Ahmed told me, as well as additional research consulting both the artists' websites along with curatorial and critical writing.

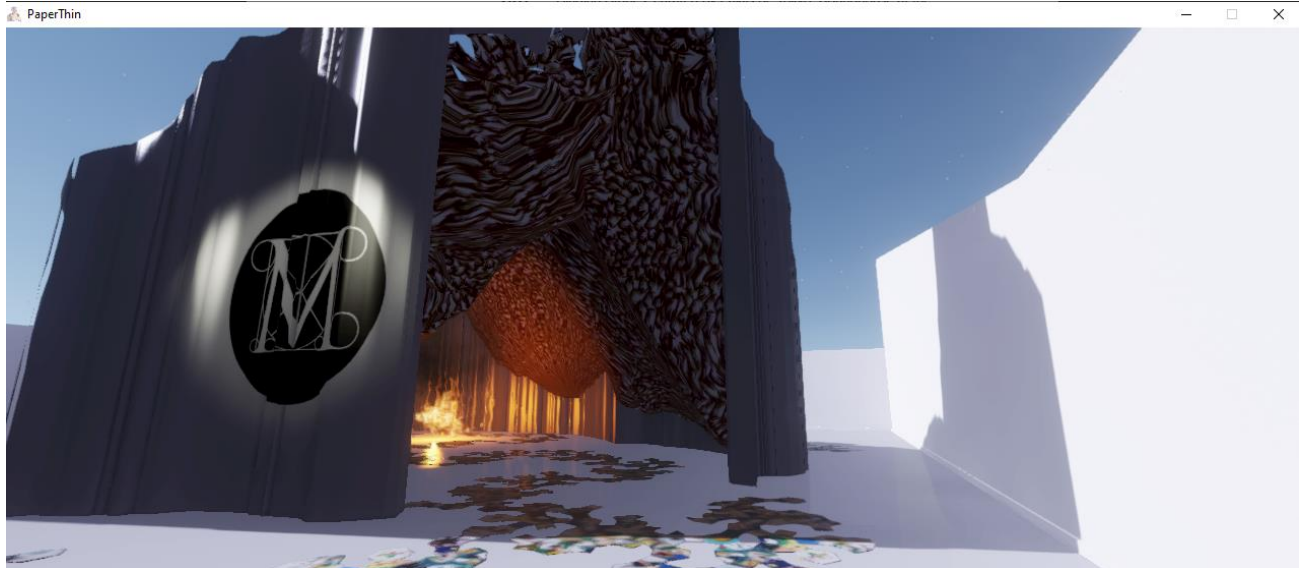


Fig. 14 Daniel Baird and Haseeb Ahmed, *HWBMx8*. 2016. Virtual reality, dimensions variable. Paper-Thin v1. Available from: <https://paper-thin.org/> (accessed September 10, 2019).

The project functions in the vein of Benjamin's ([1940] 1999) *Arcades Project*, a sprawling research effort left unfinished as Benjamin fled Nazi persecution ultimately leading to his death. Benjamin starts from the idea of the Parisian arcade as the prototypically modern architectural space, calling together all the disparate objects circulated by capitalist flows of value and exchange into a single place through which one can pleasantly stroll. Benjamin amasses bits of information from texts and images and organizes these against the grain of the order invoked by the arcade, seeking to draw out histories obscured by the smoothly assembled glass and metal. While Benjamin principally uses the textual technique of collage, Baird and Ahmed apply a 'database logic' that Manovich (2001) ascribes as the cultural form unique to digital technologies. Resisting a narrative linearity, the database encourages endless (and endlessly surprising) relationships between data. For artworks in this mode, both artist and viewer can tease out alternative configurations of the constituent information. Baird and Ahmed do not advance any particular narrative in this connection between the Met and cave painting but instead establish the conditions to derive countless such narratives.

Set within a realistic approximation of a gallery, this juxtaposition of two spaces for the display of art compounds and complicates. Baird and Ahmed's project of digital aggregation has itself been encapsulated in a complex digital object disseminated over a network. As with Jonakin's piece, *HWBMx8* benefits from the white cube exhibition context. To opposite ends, both pieces meditate on the circulation of digital information within the art world—the systems that seek to artificially constrain these flows as well as available practices for exceeding those constraints. The virtual environment of v1 immediately cues viewers in that these are decidedly works of art, which hampers the imaginative potential of some pieces but sets up other pieces to dramatically break with these expectations and highlight the distinct possibilities of online arts platforms.

v2

Immediately upon launching v2, the viewer may notice radical differences and departures from v1. She navigates a series of largely exposed platforms, moving across these spaces by way of planks while the daylight of the surrounding barren landscape rapidly changes from dusk to night and back to dawn again. Norman's piece *transform dot rotate* (2016) could be read as metaphor for the curatorial intent driving v2 and distinguishing it from v1. Norman quotes museum spaces with marble statues and columns, but the statues cyclically degenerate and reassemble and the columns scatter against the mercurial horizon (see fig. 15). Instead of subtly subverting viewer expectations of a virtual art gallery experience, the curators actively deconstruct the spatial conventions of art exhibition spaces and encourage artists to revel in the material and physical impossibilities of virtual space.

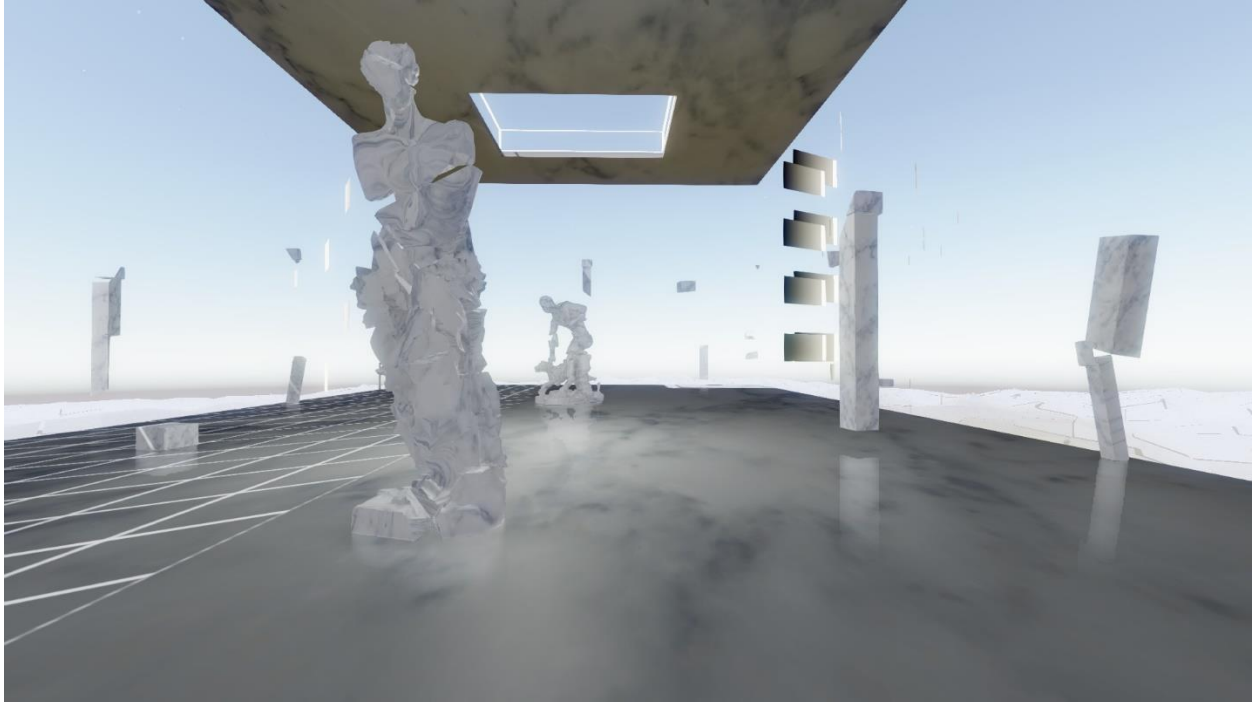


Fig. 15 Zachary Dean Norman, *transform dot rotate*. 2016. Virtual reality, dimensions variable. Paper-Thin v2. Available from: <https://paper-thin.org/> (accessed September 12, 2019).

Dissimilar from the unremarkable interior and predictable physics of v1, the overall atmosphere of v2 is striking and strange, drawing the viewer into an environment actively shaped by the artworks. While v2 maintains some aspects of the virtual gallery present in v1, with labels demarcating the different artists' contributions, the various artworks are far less discrete, less discernable either as distinct pieces or as separable from the exhibition space. Rather than a simulated gallery, v2 is a virtual site-specific installation, with each artist creating a piece that responds to the peculiar VR environment fabricated by Buckley and Smith—both adapting to the built structures while also altering them to the point that the artworks become selfsame with the environment. In Menegon's *I'll Keep You Warm and Safe In My People Zoo* (2016), cloned models of the artist's body pile up and spill out of a room built out of flesh-textured walls (see fig. 16). Murphy transforms the interior of a room into a dazzling funhouse of multicolored pipes



while Dorf adorns the exterior of the structure with glass panes that warp the viewer's perspective.



Fig. 16 Martina Menegon, *I'll Keep You Warm and Safe In My People Zoo*. 2016. Virtual reality, dimensions variable. Paper-Thin v2. Available from: <https://paper-thin.org/> (accessed September 12, 2019).

From most vantages, a viewer sees parts of works protruding or intersecting—Menegon's body doubles spiraling out of one space against the shimmering of Dorf's glass panes—all contributing to a sense that v2 constitutes a single environment constructed out of the shared efforts of the curators and participating artists. The quite different experience offered in v2 reflects significant changes in the digital curation approach employed by Smith and Buckley, both in how they worked with artists as well as how they managed the data constituting the volume. I detail this development in curation styles in the following subsection but to briefly summarize the differences: Buckley and Smith took on the role of integrating artists' 3D models into Unity for v1; for v2, the curators shared a stripped-down module of the environment from the beginning, enabling artists to design pieces specifically for the structure and to also take on

part of the work needed to make pieces functional in Unity. This different digital curation method reveals the possibilities for collaboratively constructing an immersive environment, achieving effects not possible in a traditional gallery space. While the curatorial and artistic undertakings appear differentiated in v1, with artworks stark against white walls, the creative efforts for v2 cohere into a world.

v3

Taking on a wholly different shape from the VR environments of the previous volumes, v3 first existed as an installation at the 2018 HubWeek festival, an annual event in Boston that brings together artists and representatives from across the technology industries. Interested in extending the scope of Paper-Thin beyond VR and web technologies, Buckley and Smith proposed a series of short-term virtual artists' residencies to run throughout the festival. With their proposal accepted, HubWeek presented an opportunity to experiment with other kinds of networked technologies and promised financial support to a project that had been sustained solely by Buckley and Smith up to that point.

The curators developed a drawing application with a simple user interface (similar to Microsoft Paint), along with a protocol that captures artists' sketching gestures as G-code<sup>94</sup> and transmits this data as instructions to a CNC drawing machine, which in turn executes the digital sketch on paper in real time. Smith and Buckley invited a total of 14 artists to participate, grouping the artists into seven pairs. The artist pairs worked remotely, each artist sketching on his or her personal computer or tablet with the CNC machine receiving instructions from both artists simultaneously and integrating these into a single sketch. Each pair performed one

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<sup>94</sup> G-code is a numerical control programming language, providing means for individuals to define sets of coordinates guiding the movement and positioning of various CNC devices like the drawing machine described above.

sketching session, each session lasting between one and four hours and typically generating two drawings. At the festival, the CNC machine and supporting networked apparatus, including video feeds to and from the participating artists, were installed in a shipping container—part of a ‘container village’ at the festival featuring art and technology exhibits (see figs. 17 and 18). Attendees witnessed artist pairs collaborating live while the CNC machine executed the drawings in real-time, alongside an on-the-spot gallery of the drawings completed by the previous pairs (see fig. 19).



Fig. 17 Installation shot of Paper-Thin v3. 2018. HubWeek Festival, Boston, MA. Photograph provided by Daniel Smith and Cameron Buckley.

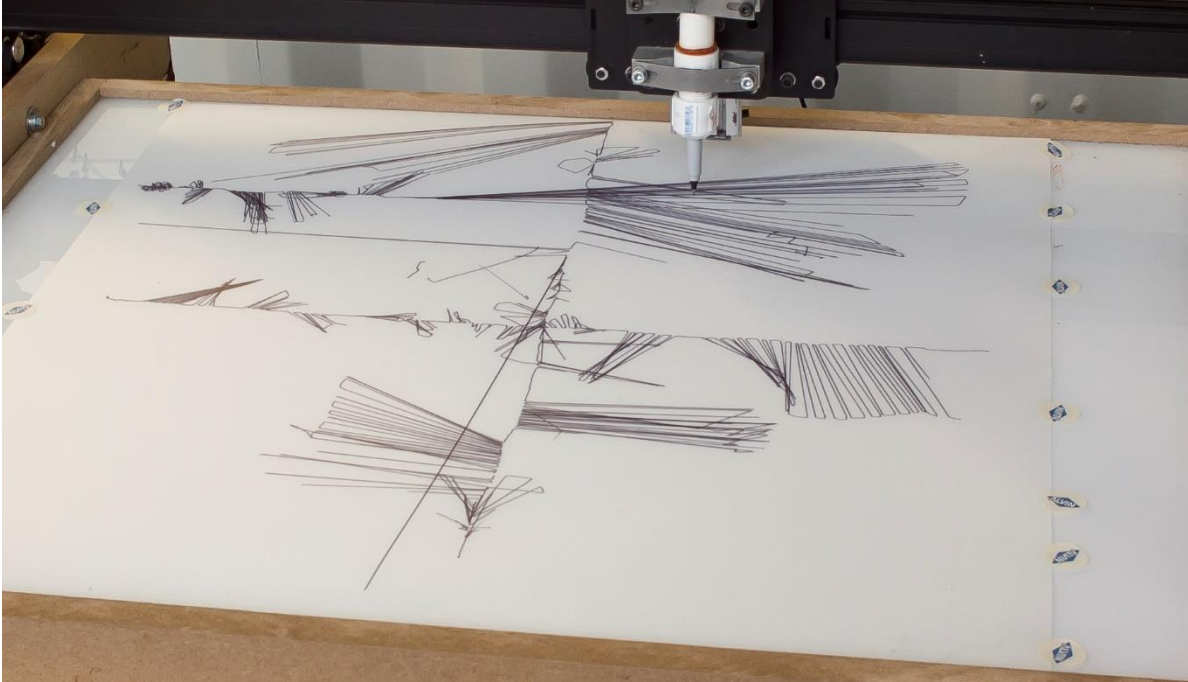


Fig. 18 Installation shot of Paper-Thin v3. 2018. HubWeek Festival, Boston, MA. Photograph provided by Daniel Smith and Cameron Buckley.



Fig. 19 Installation shot of Paper-Thin v3. 2018. HubWeek Festival, Boston, MA. Photograph provided by Daniel Smith and Cameron Buckley.

The 14 artists represented a wide range of practices, including artists like De Lara and Ritiu who had primarily worked in analog sculpture before participating in v3. Buckley and Smith designed the relatively simple and familiar user interface to the drawing application with

the intent that artists would not need a deep level of technical knowledge or experience to participate in the show. Coming from this diverse array of backgrounds, the artist pairs approached the remote and collaborative drawing experiment from many angles. Stearns took a particularly distinct approach to the collaborative drawing performance, applying the network reconnaissance skills he had been developing in his artistic practice to hack into the system Smith and Buckley had set up. Stearns decompiled and reconfigured the application so that no matter what either artist did, the CNC machine would not make a mark on the paper. Stearns messaged his collaborator, Annette Hur, to bring her on board with his intervention, prompting her to download the reconfigured application and letting her know how it would work.<sup>95</sup>

For Stearns, this intervention emphasized the performative and ephemeral nature of collaborating remotely over the network. Without a trace left by the machine, the artists' interactions would be reduced to a bare performance in time. As Stearns admits, though, "the technology at one point failed, so we actually do have marks on that one." Other artists took different approaches in how they collaborated over the network, but they all confronted the persistent materiality of the network and technical details of the application's functionality. Buckley and Smith initially conceived v3 for artists to alternate turns as they composed a drawing together, but they shifted the project to have artists simultaneously draw from their remote locations. However, the flow of instructions from two disparate inputs resulted in unexpected behavior as the CNC machine attempted to execute both artists' gestures. As Smith explains, "These [two streams of information] are irreconcilable, but it forcibly executes something. What ends up happening is that...it creates a web between the marks rather than executing the marks." Rather than a pure transcription of the individual artists' inputs and

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<sup>95</sup> While I invited Hur to participate in the study, she was not able to take part. My understanding of Stearns' and Hur's collaboration derives from my interviews with Stearns and Buckley and Smith.

responses to each other, the resulting drawing is a record of the machine's impossible task to interface between these diverging trajectories.

The curators discovered this bug along with the artists during the HubWeek installation. While some pairs struggled with this added wrinkle—the machine distorting their sketches and inhibiting the ability to clearly respond to the collaborator's marks—most artists responded generatively to the unexpected behavior of the machine. This complication caused the artists to come to terms with what it meant to draw using this networked system as instrument, reappraising deeply ingrained techniques for mark-making. More than drawing aided by a technological device, this networked application presented a novel artistic activity that the artists had to learn, apply, and manipulate in situ. Smith judges these drawings as documents of this novel collaborative process: “It’s a literal and new visual symbol for what is actually happening: we’re these two disparate artists from irreconcilable locations that are being forcibly transmuted into the same space.”

Ascott (1990) describes this shifting relationship between human and machinic actors engaged in a network as a principal characteristic of ‘telematic art.’ An artist who was among the early adopters of digital technologies, Ascott colors the new modes of creativity made possible by the interchange between humans and machines across networks in almost spiritual terms, as “the digital matrix that brings all new electronic and optical media into its telematic embrace” (246). While Ascott envisions a seamless flow of information across entities in the network—a ‘connectionist hypermedia’ that calls for a connective criticism—v3 more recalls the aesthetics of lag and latency that have informed many artists’ networking projects from the history of digital and new media art. Paulsen (2017) finds the technical difficulties involved in transmitting visual information across a satellite network to be a significant creative factor shaping Kit

Galloway's and Sherrie Rabinowitz's piece *Satellite Arts 1977* (1977). For this piece, the artists arranged a dance performed synchronously in California and Maryland, choreographed via a satellite video feed connecting the two groups of dancers. The dancers moved responsively to the lag induced by the transcontinental network, the dance taking place not in two separate locations but in the 'third space' of the screen. Similarly, although the artists participating in *Paper-Thin v3* made their sketches in disparate locations, the performance took place as the CNC machine congealed the separate sets of instructions into a single web-like drawing.

In both cases, artists contend with the ways that networked technologies modulate information in the course of transferring it. Networks are never wholly smooth or seamless, an observation Shannon and Weaver (1949) make as they theorize noise as the foundational concept of communication. Artists have repeatedly and variously dramatized this fundamental observation: net-based artists often draw attention to the hindrances and inconsistencies inherent to communication networks, creating works that break down or behave unexpectedly as a way to emphasize networks as a medium with material and technical properties to work with and against (White 2002). In Paulsen's (2017) estimate of Galloway's and Rabinowitz's project, the screen becomes a "chiasmic mirror," both joining actors in a shared virtual space while also reflecting back to each dancer her own embodied movements (116). For *v3*, the artists describe a different effect, encountering the networked CNC machine not as an interface to the drawing surface but as a third collaborator. As De Lara recounts, "there was one part where the machine drew for like 15 minutes, and I asked the artist, 'Was that you?' And he said, 'No,' and I said, 'that's not me either.'" With this unpredictability and complexity, the bug in how the machine reconciled the disparate streams of information birthed another creative actor composing the sketches.

More so than a set of sketches, Smith and Buckley see the process of collaboratively and remotely drawing over a networked system as constituting the artwork. The end goal of v3 was not to produce a series of drawings but rather to set up conditions for artists to experiment with the possibilities of networked technologies for artistic production. In this, v3 is akin to earlier net-based artworks, such as Robert Adrian's *The World in 24 Hours* (1982), in which the artist coordinated an exchange of artistic outputs over a network connecting 16 cities worldwide.<sup>96</sup> Arranged in conjunction with the Ars Electronica festival in Linz, Austria, the locus of activity shifted from one city to the next every hour, various artists in each city generating and disseminating artworks via computer terminals, phones, fax machines, and slow-scan television sets. While Adrian organized a globally-expansive network at a time when such systems were still emergent, v3 instantiates an intimate network focusing attention in on a few actors at a time when such systems are ubiquitous. Although each work is situated in quite distinct contexts, both present similar challenges for ongoing digital curation—both pieces are more concerned with the nature of the performed interactions over a live network than the material traces generated out of those interactions. Below, I discuss in more detail how Buckley and Smith have adapted their digital curation approaches for v3, and how these differ from the activities involved in caring for v1 and v2.

#### 4.2.2) Sociotechnical Factors

Across the three volumes, Smith and Buckley have grappled with many of the same digital curation issues that the individual artists encounter in their studio practices. However, the curators and artists alike face new sociotechnical challenges stemming from collaborative work using networked technologies, requiring the development of new digital curation practices or the

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<sup>96</sup> <https://anthology.rhizome.org/the-world-in-24-hours>



adaptation of existing approaches. I detail several major sociotechnical factors, grouping these into three main phases of creating, staging, and caring for volumes of Paper-Thin.

### *Co-constructing Paper-Thin with artists*

Although the nature of the curatorial interactions with the artists has shifted dramatically across the three volumes, all have involved active and ongoing collaboration between artists and curators to address myriad issues, both technical and aesthetic. I term this varied and variable collaborative work common to networked alternatives the co-construction of an arts platform. I describe how this co-constructive activity impacts the relationship between curator and artist more generally in the next chapter, but it is worth emphasizing here how this differs from curation in a museum or commercial gallery. Regardless of context, curation involves intensive and expansive negotiation between multiple parties; but for networked alternatives, this negotiation encompasses working out technical issues that threaten to crash the piece (or the whole platform) as part and parcel to aesthetic and conceptual decisions. Curators and artists together have actively shaped both individual works along with the systems undergirding the platform to successfully stage all three volumes of Paper-Thin.

This union of selecting and presenting artworks in a particular context along with managing data across information systems exemplifies the dual sense of ‘digital curation’ on artist-run platforms. Curators of networked alternatives perform curatorial functions typically ascribed to both arts curators and information professionals. In fact, these functions fuse together: selecting, presenting, and contextualizing work on the arts platform requires skilled handling of data and a deep understanding of the constituent information systems in order for the artwork to exist on the platform in the first place—let alone the ongoing care of these works after they have been exhibited. The arts and information science aspects of this work are mutually

integral to running the platform, such that the whole of this can simply be understood as digital curation.

As Dallas (2016) argues, this expanded sense of digital curation that seeks to include work beyond professionalized applications necessitates attention to the particularities of how these activities are carried out in varied contexts. In creating volumes of Paper-Thin, this digital curation work involves collaboration with artists to make sure that either discrete artworks or artistic activities will function on the platform. For v1 and v2, this meant getting works to run in Unity on a web browser; for v3, this meant acclimating artists to a novel networked application and empowering them to fully experiment with the potential of this system for artistic production. While Smith and Buckley have thought deeply about curatorial processes for facilitating these interactions, adapting them with each new volume according to needs and difficulties identified in previous volumes, the co-constructive nature holds across all activities for creating works for all volumes of the platform. Boutard (2016) describes a similar co-constructive characteristic intrinsic to the digital curation of electronic music, with many human and machinic agents involved in all stages of creation, performance, and ongoing care. As with electronic music, understanding the co-constructive nature of digital art platforms informs the critical analysis and interpretation of the artworks as well as methods for preserving, documenting, and potentially recreating these artworks in the future.

For v1, Buckley and Smith sought out artists with some experience working with digital technologies, but only a few of the artists had worked with game engines in general or Unity specifically. As the curators were both MFA students at the time—early in their artistic careers and launching this new platform—they felt the need to impose few restrictions on artists who were willing to participate in the first volume of this untested project, and even more, felt

compelled to contribute significant labor to adapt these artists' projects to Unity. Turner describes a similar experience in starting IRL, which she initiated with her partner Anderson as a BFA student at the University of Cincinnati. Anderson, a professional 3D modeler and developer with extensive knowledge of VR, facilitated artists' explorations of new technologies by troubleshooting technical issues, answering questions, and shouldering the labor needed to get complex works up and running in the gallery. Turner frames the technical knowledge, support, and resources that made this co-constructive approach to curation possible as an added benefit in recruiting artists as the gallery was just getting started. In both cases, these networked alternatives began as experimental artistic projects for the curators as well. To mature these nascent projects into manifest networked exhibitions, Buckley and Smith and Turner and Anderson have all assumed technical responsibilities as an essential part of curating a brand-new arts platform.

The activities involved in the co-constructive creation of v1 varied widely across the six pieces installed in the volume, but all required some form of wrangling objects and data generated in disparate software environments into Unity. For Baird and Ahmed's *HWBMx8*, Buckley and Smith received .stl files—a format intended for 3D printing—that they then recreated in Unity and assembled into the final VR cave replete with painted handprints and crackling fire. The curators recount several cases in which an artist would describe a desired visual effect or texture that they would then create in Unity and share with the artist for feedback. As all the discrete artworks occupied the same VR environment, changes made to install one work, such as lighting effects, might impact works already in the space. The works for v1 were installed over a period of six months, a new piece added each month; but rather than a steady rolling out of discrete artworks into an established VR environment, Buckley and Smith

characterize creating v1 as a continual process of destroying and rebuilding the project. As Smith summarizes, “every installation was sort of unbreaking the entirety of the space.”

New to both Unity and running an arts platform, Smith and Buckley learned about the technical and artistic aspects of curating throughout the process of creating v1. The curators were especially encouraged by their interactions with Arcier and Lomas, the artists for the final two installs of v1, as both these artists brought extensive technical expertise and could handle much of the labor Smith and Buckley had taken on for the previous four pieces. Inspired by these curatorial interactions, which were driven by discussions of the aesthetics and concepts of the work more so than technical details, Smith and Buckley endeavored to develop a more streamlined process for v2 and to select artists with a working knowledge of VR technologies.

Guarding against the need to ‘unbreak the entirety of the space’ with each new install, Smith and Buckley designed the environment for v2 before recruiting artists, fixing certain variables and assets at the onset while leaving other elements flexible for artists to manipulate. The curators shared this prefabricated environment with the artists as they created their pieces for the platform, providing detailed instructions for integrating their works into the space. Evidence of trying past experiences, the instruction document stresses, “we’re neat freaks because the project breaks if we don’t have common organization between all artists. Please bear with us, and follow the rules below.” Although the technical responsibilities were more evenly distributed for v2, this was still a co-constructive curatorial process, as the curators discussed both technical and aesthetic issues with the artists. However, the curators took steps to formalize what had previously been a far more chaotic (and resource-intensive) process. v2 was not without technical difficulties, and the curators took on the primary responsibility for ensuring that all of

the pieces functioned within the shared space, but the entire process required less time and effort to successfully create the volume.

Similar to v2, the curators sought to establish a functional system for v3 ahead of time that artists could then experiment with over the course of the festival—the key difference being that v2 followed the six-month timeline of a rolling exhibition, whereas v3 played out in a week. The streamlined process for v2 allowed Smith and Buckley to more selectively invite artists to participate in the project, as they recruited artists with a demonstrated background in digital arts. To an alternative end, the curators created the preprogrammed application used for v3 to more intentionally invite a broad diversity of artists to participate, drawing on artists working with analog materials and processes as well as digital. The application resembled commonly-used software drawing programs, replicating a ‘standard object’ by integrating the grammar of interactions and possible gestures found in these programs (Fuller 2005, 97). As Fuller describes, standardized objects form the foundation of media ecologies: standardized objects fit easily into existing systems, enabling humans and machines to both use these objects as intended and to repurpose the objects, reconfiguring how the objects fit within the broader ecology. The artists came to v3 knowing how to use a familiar drawing application, and this fundamental knowledge also empowered them to experiment with the application and subvert the conditions of v3 itself.

Although the curators created the application and set up the network for v3, the process of creating the volume was still deeply co-constructive albeit elapsing over a much more compressed time scale than the previous volumes. The artist pairs worked together collaboratively both with and against the CNC machine to construct the drawings. Throughout the process of creation, the artists learned the functionality of the system—and came up against the unanticipated bug in how the machine interpreted the instructions coming in simultaneously

from disparate sources—as they worked together to develop practices for drawing with this networked instrument. The curators also failed to anticipate the bug prior to the event, and so they grappled with this alongside the artists, coming to understand how this altered the application and v3 more generally over the course of the festival. As the artists and curators generatively acted within the unpredictable media ecology constituting v3, Buckley and Smith’s own sense of the volume evolved: their notions of what made v3 distinct from the previous volumes and their expectations for how v3 would exist after the conclusion of the event were transformed by the experience of the embodied performance of the work.

### *Staging networked exhibitions*

Across all three volumes, there is significant overlap between the processes and activities involved in creating and staging the exhibitions. This is especially the case for v3, in which creating the work constitutes the performance on exhibit, but v1 and v2 were also under-construction even as works were publicly displayed via Paper-Thin’s website. Despite this overlap, I make a distinction between creating the individual works as well as the overall volumes and staging these volumes as exhibitions in order to draw attention to a different set of sociotechnical factors shaping the platform. While I have discussed the co-constructive curation as a complex of factors pertaining to creating Paper-Thin, in particular shaping the relationship between artist and curator in marked ways, I now highlight the interactions between the curators and the constituent technologies required to stage networked exhibitions.

Facilitating artists’ experimentation with digital technologies for the creation and dissemination of art is an underlying aim across all Paper-Thin volumes. As part of this, the curators have embraced emergent technologies as integral components of the platform. While this has encouraged experimentation—with the artists and curators some of the first to adopt

technologies, applying them for unanticipated uses in artistic production—this has also posed significant challenges as the technologies quickly develop or as features promised by developers fail to materialize.

Buckley and Smith navigated these issues in particular as they tried (and eventually succeeded) in using WebGL (Web Graphics Library)<sup>97</sup> to display VR environments inside a web browser for v1 and v2. As described in the specification, WebGL is a JavaScript API for rendering dynamic media content within the HTML Canvas element.<sup>98</sup> While websites have long featured animations, games, and other interactive media embedded in the page, these have depended on external software plugins like Flash. As with the once ubiquitous but now deprecated Flash, these plugins required frequent updates and support varied considerably across browser vendors. The withdrawal of support has accelerated in recent years as media plugins like Flash have been identified as prone to security threats. For Smith and Buckley, WebGL held the potential to integrate visually-rich and interactive artworks into websites without requiring viewers to download (or subsequently update) plugins. Viewers could visit Paper-Thin’s site and seamlessly enter a VR environment in their browser.

However, Smith and Buckley began Paper-Thin at a time of transition between plugins and open web standards like WebGL. The perceived potential of these emergent technologies spurred Smith and Buckley to develop Paper-Thin in a particular direction—toward a VR environment accessible via a web browser—but the curators also weathered the difficulties of working with a technology while it was still actively being developed. In large part, decisions driving the creative direction of the project hinged upon the development of WebGL; while the

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<sup>97</sup> <https://www.khronos.org/webgl/>

<sup>98</sup> <https://www.khronos.org/registry/webgl/specs/latest/1.0/#1>

technology is ‘open’ in terms of the specification being published, WebGL has nonetheless been steered by the individuals associated with Mozilla, Apple, Google, and other browser vendors. Paper-Thin is made possible by this new technology, but the curators remain dependent on these outside individuals and organizations to develop the technology. As Buckley reflects, “I don’t like the phrase ‘cutting-edge,’ but it’s trying to do things that aren’t necessarily there. They don’t have an accessible way without us being millionaires and owning giant companies that could fund that kind of research.” Staging Paper-Thin, then, has involved anticipating certain decisions—if and when browsers would support WebGL and in what form—creating work with technologies part phantom, part manifest.

The challenges of working with still-emergent technologies impacted the curators’ and artists’ activities throughout the processes of staging both v1 and v2. Early on, Smith and Buckley debated between choosing Unreal or Unity to develop v1, first building out the VR environment in Unreal as this engine offered higher-quality visual effects only to entirely rebuild the environment in Unity when support for making Unreal accessible via a web browser was uncertain. While both Unreal and Unity promised eventual support for WebGL once adopted by major browsers, Smith and Buckley were unsure when this hypothetical support might be realized; however, Unity offered a browser plugin that made it possible to launch v1 without delay. By the time v2 was in development, WebGL had sufficiently matured and the curators used the technology for this volume. As a result, v2 still functions as intended and can be viewed today in a browser, while v1 relies on a deprecated plugin.<sup>99</sup> v1 can still be downloaded and run locally using a free version of the Unity player, but the significant feature of experiencing v1 in the browser is no longer readily at hand. The rapid rate at which a key aspect of v1 has become

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<sup>99</sup> <https://web.archive.org/web/20190914055504/https://unity3d.com/webplayer/>



obsolete illustrates the importance of this research into digital and new media art curation, and as I discuss below, requires Buckley and Smith to make decisions about the ongoing care of the project shortly after the point of creation.

Delivering VR environments directly to an individual's browser is a novel mode of artistic production and dissemination, and both the curators and artists had to adapt existing practices and expectations for working with VR technologies to this new display context. Artists primarily felt the impact of this change—from rendering VR environments as standalone applications downloaded to an individual's computer to running these environments dynamically in a browser—in the relative allowance for the amount of data in their files. Artists accustomed to working with large amounts of data, like Lomas and Arcier, discuss sacrificing a degree of visual detail to ensure that Paper-Thin would run reliably on viewers' computers. Smith and Buckley gained an understanding of the optimal size for these VR environments and worked with artists to fit projects within these constraints.

Although the curators did not rely on emergent technologies like WebGL for v3, the demands of staging the volume as a live performance at a festival entailed numerous technical difficulties. The source of these difficulties stemmed from the deployment of the relatively untested networked drawing application, resulting in the bug-or-feature discussed above, but this core challenge was exacerbated by a dramatically compressed timespan of a few days along with a host of other factors native to a festival environment. Among these, Smith and Buckley list spotty wi-fi coverage (important for a networked performance), the demands of interacting with swarming festival audiences (all while technical issues continue to percolate), and having the installation confined to a shipping container while the weather swung from baking hot to miserably rainy (the pleasures of Boston in October). Smith and Buckley describe how they

responded to all these challenges in turn but remark that the event was the most stressful of their artistic careers.

Beyond these localized difficulties, Smith and Buckley also characterize the HubWeek atmosphere as being especially fraught. The festival has attempted to strike a balance between participating artists and corporate sponsors, featuring both creative projects and product demos, but Smith, who lives and works in Boston, assesses that the emphasis has steadily shifted away from the arts in recent years. Smith sees HubWeek as a manifestation of Boston's political desire to attract investment from technology companies, driving the festival to become more and more a pitch with artists' projects as appealing decorations. For Buckley and Smith, this led to several strained interactions with v3 viewers, who questioned the practical value of the technology and their place in the festival—effectively treating the artwork as a demo. As I discuss in the subsequent chapter, technology companies often provide support and control the contexts for displaying digital and new media art, both facilitating artists' access to technologies and audiences while constraining their abilities to make critical statements about the technologies or technology corporations.

#### *Assuming responsibility for ongoing care*

I discuss Smith and Buckley's specific approaches to the ongoing care of all three Paper-Thin volumes in the next subsection, but here I point out the sociotechnical factors that impact this work. As curators of this networked alternative, Smith and Buckley have implicitly assumed responsibility for the ongoing care of the artworks disseminated on the platform. I characterize this role as implicit because Smith and Buckley have never discussed concrete plans for the long-term life of the volumes with the participating artists as part of the curatorial process. The focus of curating the three volumes has been on getting works and systems to function at the time of

the exhibition. While the curators have made no explicit obligation to care for these artworks beyond this point of initial exhibition, they do feel a responsibility toward the artworks, the artists, and the Paper-Thin platform overall. As discussed by Turner, who feels a similar responsibility toward works that have been featured at IRL, sustaining networked alternatives mutually benefits artists and curators. Artists appreciate having their works remain accessible (and not limited to documentation of defunct projects), while curators stand to gain from a thriving platform that other artists and audiences can continue to participate in. For Smith and Buckley and Turner, who are all also artists themselves, the benefit of the ongoing maintenance of these networked alternatives holds doubly so—these overall projects are artworks in their own right, and so the curators have a direct stake in the future of all the works featured on the platform.

As with other aspects of networked alternatives, the ongoing care of the artworks can be seen as a co-constructive process, although the burden of responsibility shifts almost entirely to the curators. Participating artists employ digital curation practices in the ongoing care of their own artworks, as discussed in the previous section of this chapter, but only curators are in the position to maintain the entirety of the platform displaying all the works in their shared context. For networked alternatives like Paper-Thin or IRL—and even with smaller galleries like And/Or—the difficult labor of caring for complex artworks dependent on changing technologies falls to a few individuals with limited resources. Although And/Or functions nominally as a commercial gallery, representing artists and selling works to collectors, Slocum takes on additional work to steward an archives of past exhibitions, recognizing that this constitutes a significant historical record of artists' engagements with digital technologies.

The same is true of the volumes of Paper-Thin, and as such, Buckley and Smith plan to keep these materials in perpetuity. However, they are not able to benefit from the past precedent derived from the organizational knowledge of a collecting institution—let alone the infrastructure or other resources. Although the curators initially conceived of Paper-Thin as a community-driven project, they have slowly realized that for the purpose of long-term digital curation the two of them comprise this community. The curators emphasize that this community aspect remains essential to the meaning of Paper-Thin as an artwork and an archives: viewers can readily download v1 and v2 (with plans currently under discussion to make accessible the G-code from v3), making the act of viewing the work simultaneously an act of further disseminating the work, all contributing to an ever-expanding archives of Paper-Thin. While this potentially limitless distribution of copies of Paper-Thin volumes spins a compelling metaphor for the digital archives that exist in and through networked circulation (Ernst 2015), Buckley and Smith lack any means for coordinating digital curation actions among and across this legion. Still, Smith and Buckley intend to continue caring for all volumes of Paper-Thin, seeing this responsibility as part of curating the platform. They have developed two distinct perspectives for how this digital curation might play out and respond to the differing needs of the VR environments of v1 and v2 and the networked performance of v3, which I compare in the following subsection.

#### 4.2.3) Paper-Thin as Archives

The shift from the VR environments of v1 and v2 to the live networked performance of v3 brought changes not only in the technologies explored for artistic production and the mode in which viewers encounter and experience the work but also the digital curation approaches and practices employed by Buckley and Smith. Above, I suggested that the curators adapted their

digital curation style across v1 and v2—from the institutional critique of v1 to the more collaborative world-building of v2—but the difference between these volumes and v3 constitutes a transformation in the curators’ conceptualization of what it means to archive Paper-Thin. Although all volumes of Paper-Thin have involved artists experimenting with digital and networked technologies, exploring the possibilities of these for artistic production and dissemination, the shape of this experimentation has transitioned from discrete artistic contributions in the gallery-like setting (albeit virtual) to what can be seen as an artistic experiment in the laboratory sense of the term. With v3, the curators set up a network, establishing parameters and conditions with many unknown variables, and let the artists push and pull at the boundaries of the system. In this case, the process and performance of the experiment itself is the artwork, and the material outputs in the form of drawings and G-code are only traces of this truly ephemeral work.

From the beginning, Buckley and Smith placed central importance on the ongoing care of the production generated as a result of artists’ participation with Paper-Thin. However, the nature of this ongoing care has necessarily adapted as Smith and Buckley have continued to develop their ideas about Paper-Thin as an arts platform. For the virtual environments of v1 and v2, Smith and Buckley conceived of the artwork as archives. In one of the earliest descriptions found on a capture of Paper-Thin’s site from 2015, the curators state, “These virtual installations will remain indefinitely accessible as both object and archive.”<sup>100</sup> Smith reaffirms this in the study, describing v1 and v2 as “total archives.” These are ‘total’ in the sense that the entirety of the artworks from these volumes are contained in the files available on Paper-Thin’s site. The VR environments co-constructively built by curators and artists constitute the artworks, and these are

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<sup>100</sup> <https://web.archive.org/web/20151128165417/http://www.paper-thin.org/>

effectively encapsulated in the Unity builds and executables (although these files alone are not sufficient to access this ‘total archives,’ which also requires software and hardware needed to run Unity). A viewer can access these at any point with the assurance that she is working with the same information as when the volume was first assembled.

Key to Buckley and Smith’s development of v3, the curators pursued another way of thinking about the long-term preservation of Paper-Thin. Recognizing the difficulties inherent to preserving the total archives of v1 and v2—dependent as they are on certain versions of Unity and specific operating systems among other dependencies—Buckley and Smith sought to create an archives of v3 that would be simpler and more flexible, even if this meant a loss of total information. The curators saved the G-code generated by the artists’ interactions with the drawing application throughout the networked performance; essentially a set of coordinates for each gesture by the artists, this G-code is a dataset that can be easily stored and readily reinterpreted by any number of software programs or even manual processes. As Buckley surmises, “it’s human readable. You could look at it, sit down with a pencil, and actually recreate it pretty accurately if you had some really dense grid paper.” Although G-code is legible in this way, Smith adds that this particular approach would require an inordinate amount of time; but the point stands that G-code is much easier to recreate than a Unity build, and a wide range of software programs can replay these coordinates to reveal the drawings as sketched by the artists.

As a way of thinking through these two ways of archiving Paper-Thin, Smith points to a comparison between approaches to archiving works by Eva Hesse and Sol LeWitt elaborated by Rinehart and Ippolito (2014). Both Hesse and LeWitt explored novel artistic media and techniques, but Hesse’s experiments with latex require intensive if not impossible material conservation to preserve “once-limpid vessels of light [that] gradually yellow and darken into

brittle shells” (4), while LeWitt’s line drawings live on as sets of instructions that are meant to be recreated time and again. In this analogy, the immersive environments of v1 and v2 are tied up in specific and concrete ecologies of software and hardware (even if countless copies of the Unity files can be made), while the performances in v3 can be readily replayed across variable formats and contexts. Smith and Buckley acknowledge that these replays in no way reconstitute the original networked performance—as with performance art, the work itself lasts for the duration of the performance. Unlike much performance art, though, the G-code is more than documentation of an ephemeral work, instead functioning closer to LeWitt’s instruction sets or the media art scores described by Rinehart (2007). This archive is incomplete, but it can serve as the foundation for recreating v3 in new forms and contexts distinct from the original performance. As the underlying principle behind Rinehart and Ippolito’s (2014) strategy of recreation, the variability inherent to digital technologies is turned into an asset rather than impediment to long-term preservation (47-8).

This comparison between artworks dependent on particular material instantiations and variable artworks resonates with Goodman’s (1976) distinction between autographic and allographic artworks and the rich discussion around this distinction in the philosophy of aesthetics literature. Allographic artforms, such as poetry or literature, are those that can be reproduced according to some precisely defined structure or notation. For these artforms, “all that matters is what may be called *sameness of spelling*: exact correspondences as sequences of letters, spaces, and punctuation marks” (115). In contrast, autographic artforms, such as painting, have “no such alphabet of characters,” constituted instead by the indelible marks made by the painter at the time of creation (116). Copies of a painting are forgery, whereas copies of a poem are reproductions. Refuting Zeimbekis’ (2012) claims that digital images explode this distinction

between allographic and autographic, D’Cruz and Magnus (2014) argue that the formatting of digital information, which enables a string of bits to be interpreted as pixels in a digital image for instance, constitutes a kind of notation—even if a human hand requires the aid of a computer program to copy this formatted sequence of bits.

As with performances of music or dramatic works, cases which Goodman and D’Cruz and Magnus acknowledge as ambiguous, recreations of variable artworks are not precise allographic copies in the sense of a reproduced digital image or an exactly transcribed poem but nor are they fakes in the sense of a forged oil painting. Levinson (1980) affirms Goodman’s distinction but stresses that all artworks, both autographic originals and allographic reproductions, are in some way historically-situated: “how a copy or performance has come about is as relevant to its authenticity as the provenance of an impression [in printmaking] is to its belonging to a given print” (380). Notational structures enable some artforms, such as literature or music, to be reproduced more readily than a painting or more genuinely than a woodblock print, but all of these reproductions have unique material existences and have been produced in different cultural contexts significant to the meaning of a given copy or reperformance. A contemporary printing of Mary Shelley’s *Frankenstein* may reproduce the same text as the 1818 (or 1830) edition but constitutes a distinct cultural object. Even nominally exact copies of a digital image are different in terms of a ‘forensic materiality’ attesting to the physical uniqueness of every object, in this case distinct sets of bits on electronic storage media (Kirschenbaum 2008, 10).

Still, the concepts of allographic and autographic art are useful for thinking about variable artworks, providing a vocabulary for considering the relative authenticity or integrity of variable recreations, as well as impetus for advancing systematic methods for notating digital and



new media artworks to facilitate allographic reproductions. I suggest in chapters five and six that digital and new media art impacts the shape of art history and the experience and appreciation of art more generally. As institutions and artists increasingly employ variable media approaches to digital and new media art curation, viewers, museum curators, critics, scholars, and other stakeholders will likewise need to develop new critical taxonomies and theoretical frameworks for understanding copies, reproductions, remixes, and recreations of artworks. Longstanding notions about forgery and authenticity, already stretched by Sherrie Levine's and Richard Prince's artistic approaches to plagiarism, are no longer sufficiently robust to attend to the plasticity of digital and networked technologies, the variability of digital and new media artforms, and the expansive digital curation practices of artists, conservators, curators, and others. Indeed, the concepts of allographic and autographic artforms may already be too impoverished, but the rich discussions that have developed around these terms may prove fertile for thinking through the issues posed by digital and new media art.

As Smith and Buckley have arrived at these two different conceptualizations of Paper-Thin as archives—the 'total archives' of v1 and v2 and the variable set of instructions for v3—they have discussed many of these emergent issues, considering what constitutes the 'artwork' to be preserved for each volume of Paper-Thin and the impact of recreating that work with various digital and networked technologies. These considerations have manifested in the particular digital curation practices and approaches that Smith and Buckley apply in the care of these works. For v1 and v2, the curators intend to maintain hardware and software needed to experience the VR environments as they were originally created. Although they have thought about migrating the works as new versions of Unity come out or emulating the current software on future hardware, the curators feel that the hardware and software used to first create v1 and v2

are essential to the experience of the works. Conceived as total archives, this original computing environment is in a sense part of the information constituting the works; altering this environment would inflect and distort the archives. Since Buckley and Smith have conceived of the archives of v3 as intrinsically variable from the start, future recreations of the G-code by the curators, the artists, or viewers of the work will revitalize a score that was intended to be replayed using many instruments.

Despite these different digital curation practices, broadly distributing the archives over the Internet is a critically important component for all volumes of Paper-Thin. Since they were first released, v1 and v2 have been available for visitors to download onto their local computers. Smith and Buckley are still considering the specifics of how they will present and make available the photographic documentation and G-code datasets from v3, but plans are underway for this as well. However, the makeup of the archives for v1 and v2 is quite different than that of v3: executable files generated by a piece of commercial software versus a human-readable dataset saved in a format that can be processed in many ways by numerous applications. As a result, the actions that viewers can perform on and with these broadly distributed archives is rather limited for v1 and v2 but substantially more flexible for v3.

As discussed in the previous subsection, Buckley and Smith initially conceived of Paper-Thin as a platform inviting community participation. The long-term persistence of the data constituting all three volumes depends on multiple copies of the archives surviving in distributed places. Both conceptually and concretely, the curators have integrated this aspect of viewer participation into the viability of the platform. As Smith describes, “it’s an archive that’s dependent on everyone else’s participation in it...It’s almost as if, by visiting the museum, you’re helping to preserve it—not just by paying admission, but by actually owning the art when

you leave.” This is true of all the volumes: viewers, whether fully aware of this or not, become digital curators of Paper-Thin. For v1 and v2, this has the effect of distributing lots of copies, putting into practice the Lots of Copies Keeps Stuff Safe (LOCKSS) principle that has long been a foundation of many institutional digital preservation programs (Reich and Rosenthal 2000). This strategy avoids depending on any one copy of a digital object, effectively guarding against data loss through storage media degradation or natural disaster, but stops short of addressing issues stemming from software or hardware dependencies. I find it likely that current versions of Unity will become obsolete long before all copies of v1 and v2 are lost.

When the v3 archives are made available for download, these will also benefit from distributing copies across viewers, and these viewers will be able to perform a far wider range of actions on this data. The participating artists, viewers in attendance at HubWeek, or later viewers alike will be able to variably restage v3 in new contexts that they construct. Sant (2017) urges a move away from thinking about performance documentation as secondary—a reified remains of a past event—and to instead embrace documentation as an active practice integral to the performance itself. Describing documentation in terms of digital curation, Sant argues that thinking about this archives of the performance from the beginning helps to build a living record that can be reused by many parties long into the future. Although the exact nature of how this ongoing access and use for v3 will play out remains to be seen, Buckley and Smith have approached documentation in this way: as an active practice integrated into the artwork itself.

As Rinehart and Ippolito (2014) discuss, the recreation strategy for preserving digital and new media art shifts the relationship between viewer, artist, curator, conservator, and any others involved in the ongoing life of a work. This echoes Williams’ (1977) critique of traditional notions of the author or artist as the prime agent in cultural creation. For Williams, writing (and

indeed all cultural production) is necessarily social as it depends on and takes part in the continual social reproduction of language. When we see language as the basis of culture rather than great works of literature, all speakers become cultural producers; when we see data as the basis of culture rather than systems or software, everyone on the network becomes a cultural producer. This understanding of the viewer as participant undergirds Paper-Thin's archives, as Smith and Buckley reconceive 'consuming' the artworks as an act of stewardship.

Crowd-sourcing digital curation raises a number of issues that trouble traditional notions of artworks and artists: if the ongoing life of artworks depends on the broader culture taking up and recreating digital art, this could threaten the artistic integrity of works, erode the cultural and technological context in which works were originally created, or override curatorial and critical assessment of the artistic value of works (Rinehart and Ippolito 2014, 171-184). Rinehart and Ippolito acknowledge the legitimacy of these concerns but also warn against inhibiting those novel aspects of digital and networked technologies that stand to shape and change cultural attitudes about art and practices for experiencing and interacting with artworks. The ready replicability of digital information makes possible a both/and approach to digital and new media artworks: conserved copies that attempt to hew as close as possible to the original cultural and technological context can be maintained in institutions, and these same institutions can support means, methods, and mechanisms for proliferative preservation (163).

Without the weight of institutional histories and organizational structures, networked alternatives can more flexibly adopt this both/and approach, perhaps laying the groundwork for more established institutions to follow the prototypes laid out by Paper-Thin and others. Buckley and Smith still assume somewhat traditional roles as caretakers of the Paper-Thin archives, assiduously stewarding the works by creating backups, maintaining hardware and software, and

generally ensuring the integrity of the art created on the platform. But they have also released all this data into the network, encouraging others to take a part in the digital curation of Paper-Thin. As earlier examples of networked art like *THE THING* demonstrate, though, even communities with strong participation face difficulties sustaining themselves. Daniels (2010) describes how the rapid commercialization of the Web irrevocably altered pre-Web frameworks like *THE THING*, as artists shifted away from participating in these communities to disseminating standalone projects on websites (22-4). The changes that might impact Paper-Thin remain unknowns, but for now, the archives live.

### **4.3) Summary**

In this chapter, I have presented my main findings on the information needs that the Paper-Thin curators and participating artists encounter in the digital curation of their artworks and related archival materials, as well as the information practices they develop and perform to address these needs. I have elaborated these findings over two sections, delving into the information needs and practices of artists who have participated in Paper-Thin before discussing the information needs and practices of the Paper-Thin curators. There are significant overlaps between these sets of information needs and practices, as all these individuals contend with similar digital curation issues and employ comparable personal archiving strategies and practices of care as they steward digital artworks and related archival materials. The principal difference, however, is that the Paper-Thin curators undertake these digital curation activities for a networked arts platform that brings together the work of many artists. In this regard, Smith and Buckley act as digital curators in the sense of selecting, presenting, and contextualizing artworks as well as the active and ongoing management of the data constituting these artworks.

Dividing the chapter into these two sections has been useful in organizing and presenting the findings according to the research questions driving the study, but of course, the reality of how digital and new media artworks are created, experienced, disseminated, and cared for is not nearly so neat. In the following chapter, I place these information needs and practices within a broader discussion of the factors shaping how the artists in the study and Paper-Thin curators approach digital curation. While I have outlined the many information needs, sources, and practices of artists in this chapter, I next seek to characterize the information worlds in which these information needs are experienced, information sources are consulted, and information practices are carried out.

## CHAPTER 5: ARTISTS' INFORMATION WORLDS

As discussed in chapter two, I draw on both theories of information worlds and art worlds to examine how the elements that comprise art worlds impact the information needs, sources, and practices of artists engaged in digital curation, as well as how these information practices actively shape art worlds. Put simply, I analyze the shifting patterns of cooperative activity involved in creating and caring for digital and new media art through the lens of information worlds. While I make use of some aspects of the information worlds approach, my main concern in this chapter is to understand the changing nature of art worlds as social worlds with an emphasis on the role of information and information practices. For instance, I discuss how information values for the curators of Paper-Thin differ from the participating artists, but I do not delve as deeply into the social norms or social types at play in the artists' and curators' information worlds. The primary way in which I have applied the theory of information worlds in this chapter is to position the artists' and curators' information practices discussed in the preceding chapter within the various social worlds that these individuals traverse.

As theorized by Jaeger and Burnett (2010), the concept of information worlds provides a framework for understanding the information behaviors of individuals in both localized and broader sociopolitical contexts, as well as for making analytical connections across these contexts (1). For the artists and curators in this study, these contexts are multifarious, to list just a few: the environs of their personal creative practices; the places and spaces, both real and virtual, where work is disseminated; the technologies used for creation and curation, along with the organizations and communities developing these technologies; the details of the artists' labor,

both remunerated and uncompensated; established cultural heritage institutions; and the innumerable issues the artists address in their works. These elements cohere into social worlds, which comprise the shared discourses, activities, organizations, sites, and technologies of groups of people (Strauss 1978, 122).

Becker (1982) describes an art world as a type of social world constituted by the collective activities of all individuals involved in the creation, exhibition, discussion, collecting, and preservation of art. While the study participants discuss many familiar aspects of art worlds like museums and art collectors, artists' information worlds also span open-source technology development communities and YouTube tutorials. The wide-ranging factors and actors playing into artists' information worlds likewise affect art worlds' institutions and discourses. As the collective activities that reproduce art worlds continue to transform—driven by the broader societal impact of digital technologies and the ways these technologies have been taken up for the creation, dissemination, and care of art—examining art worlds through the lens of information worlds provides an apt avenue into understanding these changes, and in particular the implications for the long-term digital curation of artworks and related archival materials.

I begin the chapter with an overview of the salient insights into artists' information worlds illuminated by this study, centering around an elaboration of a social worlds/arenas map that summarizes the many elements identified in my research. I detail important intersections between these social worlds impacting artists' and curators' digital curation practices and attendant information needs and practices. I then discuss how these various factors from many social worlds affect how artists exhibit, disseminate, and sell their works. I focus on the shifting relationships between artists and other stakeholders involved in the life of artworks, including curators, collectors, and audiences. I close the chapter with a reflection on how artists gain skills



to create and care for their works as part of broader situated knowledges cultivated through their interactions across these social worlds. Throughout the chapter, I attend both to the perspective of individual artists and the role of Paper-Thin and other networked alternatives. For the digital curation of artworks and archives, artist-run platforms and galleries occupy a critical position in current art worlds, providing artists with much-needed support in the creation, dissemination, and ongoing care of artworks that circulate outside of traditional collecting institutions.

### **5.1) Overview of Social Worlds and Arenas**

An information world does not refer to any one social world or arena but rather describes how information moves across the many small worlds and broader lifeworld an individual occupies. As Jaeger and Burnett (2010) describe, every person inhabits many small worlds, such as neighborhoods or communities formed around a shared interest, and information can be sought for and used within a particular small world, might flow between overlapping small worlds, or be received from a social institution like a museum or media outlet (145). Jaeger and Burnett apply the metaphor of soap bubbles in a sink to illustrate that these various small worlds are not easily separable, often intersecting and interacting with one another, all shaped by larger influences like communication technologies or political processes, which these small worlds in turn take part in and influence (37). Although every participant occupies a slightly different information world—and each information world is itself dynamic, as relationships between small worlds to each other and to the broader lifeworld shift—the depictions of participants' information worlds generated by the study exhibit significant similarities and suggest larger patterns in how information is sought after, used, valued, and saved in art worlds.

Underlying Becker's (1982) analysis is a fundamental supposition that art worlds function as social worlds, constituted in and through collective, cooperative action by many

people in various roles working in and outside of institutions. As discussed in chapter two, Becker defines ‘art worlds’ as social formations that emerge as this cooperative activity solidifies into routinized and recognizable patterns (1). Becker describes both how art worlds cohere and strengthen over time, as well as how art worlds change or new art worlds emerge, citing novel technologies, concepts, or experimental practices as generative forces spurring new art worlds. The critical point, though, is that “changes in art occur through changes in worlds” (309), as new artistic practices only endure when they form the basis for modes of cooperative activity.

New art forms do not cause new art worlds—nor the reverse—but rather both start and grow together. New artistic practices and new art worlds form when individuals come together “who have never cooperated before to produce art” (310). This description aptly captures the art worlds centered around digital and new media art that the artists in this study participate in and actively grow. The study participants have indicated the wide range of people, communities, and organizations that they interact with to gain information needed to create, disseminate, and care for their artworks. While these people and entities play familiar roles like curator or collector, new kinds of roles are just as crucial: programmer, environmental scientist, or do-it-yourself tutorial maker. Established organizations and patterns of collective activity remain important, such as museums collecting and displaying historically-significant works or commercial galleries selling works to collectors, but artists and others join to develop new patterns of cooperative activity as they produce and share artworks leveraging the unique characteristics of digital and networked technologies. Networked alternatives like Paper-Thin sit at the center of these emergent patterns of cooperative activity. These venues provide spaces for artists to experiment with digital and networked technologies and for audiences to experience work that often questions traditional notions of the art object. For works that circulates outside of the institutions

and organizations historically responsible for collecting and preserving art, networked alternatives pioneer digital curation practices and approaches necessary for sustaining a digital visual arts heritage.

While these digital curation approaches are certainly constituted through collective activity—involving artist, curator, and others in co-constructive processes of exhibition and ongoing care—it would be misleading to characterize this activity as communal. As Becker argues for art worlds generally, the constituent cooperative activity is often defined by divisions of labor, especially as art worlds solidify into regular patterns bolstered by resourced organizations. Artists, curators, conservators, gallerists, registrars, art handlers—all carry out their expected functions, these regularized exchanges between individuals facilitating cooperative activity. For networked alternatives, these divisions of labor are more malleable, still in the process of development, but the curators of these spaces tacitly take on a large share of responsibility for the ongoing care of artworks.

For the curators of networked alternatives in the present study, this labor is volunteered, taken on implicitly and lacking any formal agreement with the artists, and dependent on limited resources. This situation is distinct in important ways from the rogue archives that De Kosnik (2016) describes. In these fan fiction communities, individuals take on multiple roles, with readerly and writerly activities mutually constitutive. These rogue archives are more driven by a shared communal effort with many individuals acting as digital curators involved in the creation, organization, description, and ongoing access to collections. Similar to networked alternatives, though, rogue archives depend on largely volunteer labor carried out by individuals who have honed digital curation skills through these creative efforts. De Kosnik calls for a ‘theatrical gaze’ that illuminates the dimensions of human participation in these digital archives. Critiquing the

‘cold or machinic gaze’ that colors media archaeology, for instance, De Kosnik urges attention to how human activities work with and respond to technical systems and processes to form digital curation repertoires. This theatrical gaze brings into relief the crucial role played by a handful of individuals—literally, curators and gallerists of artist-run platforms and smaller galleries constitute the crux of the digital curation of artworks circulated outside of major arts institutions.

The Paper-Thin curators carry out much of the digital curation labor for artworks featured in the various volumes, and the participating artists similarly undertake significant digital curation work caring for artworks and related archival materials both in their custody and in institutional and private collections. However, the information worlds of these curators and artists encompass many individuals, organizations, entities, technologies, and communities across various social worlds. As described in chapter three, I have iteratively developed a social worlds/arenas map (see fig. 20) over the course of the research as a means to analytically map these various elements that enter into artists’ and curators’ information worlds. Throughout the research process, I have added to and altered this map, using the map to spark inquiries into various data sources while also arriving at a deeper understanding of the situation through the process of mapping itself. Although Clarke, Friese, and Washburn (2018) suggest that social worlds/arena maps, along with the other situational analysis mapping techniques, primarily serve an analytical purpose for the researcher, the social worlds/arenas map that I have developed also functions as an illustration of my research findings, summarizing the important elements identified in the artists’ and curators’ information worlds that have some impact on their digital curation information needs and practices.

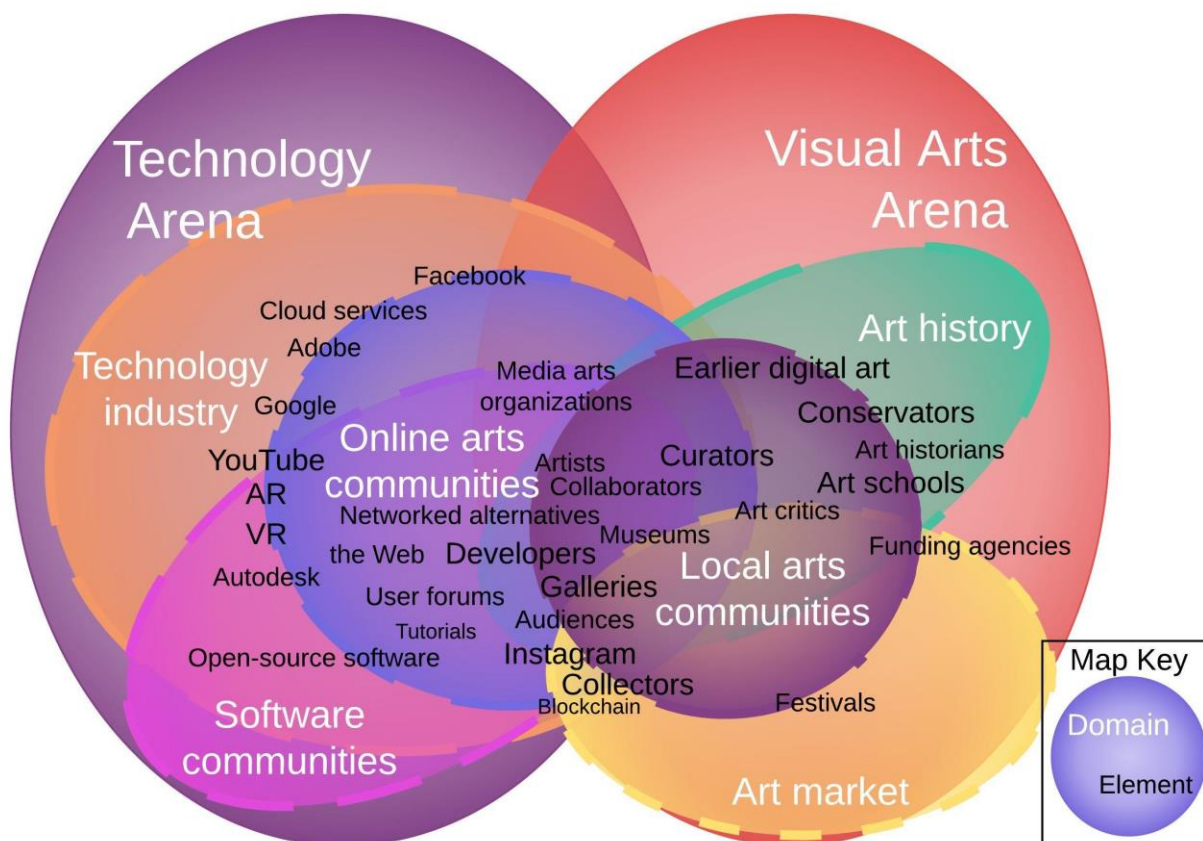


Fig. 20 Social worlds/arenas map providing overview of the key elements in artists' and curators' information worlds.

In the following sections of this chapter, I discuss a number of specific actors, social worlds, and intersections between social worlds that have had significant impacts on the study participants' information needs and practices pertaining to digital curation, highlighting how these aspects of the participants' information worlds reflect broader changes in art worlds and adjacent social worlds. Before turning to those discussions, I first explicate the various aspects of the social worlds/arenas map so as to aid readers in understanding the diagram. First, I note that, following Clarke, Friese, and Washburn (2018), social worlds/arenas maps are intended to be used in situational analysis to position the particular situation within a broader context (154). This map is not selfsame with the situation of artists and curators undertaking the digital curation of artworks and related archival materials at the core of this study, although the various social

worlds, arenas, and actors depicted all enter into this situation in various ways and to varying degrees.

Although each artist or curator occupies his or her own distinct and dynamic information world, this social worlds/arenas map provides an overview of the key elements identified across the study. As noted in chapter three, I have also constructed individual situational maps for each of the study participants as part of the research process, but I have not included these maps as figures in the dissertation because the social worlds/arenas map offers a more succinct and commanding overview of the range of elements at play in the participants' information worlds. For Clarke, Friese, and Washburn, social worlds/arenas maps elucidate how groups of people taking on a variety of roles are committed to collective actions that constitute social worlds (e.g. the cooperative activities Becker (1982) discusses for art worlds). As such, these groups of people fulfilling social roles are the focus of social worlds/arenas maps rather than particular individuals. Strauss (1978), whose work serves as a touchstone for the social worlds/arenas technique in situational analysis, enumerates discourses, activities, organizations, sites, and technologies as features of social worlds, along with groups of people fulfilling social roles, and I include this range of elements on my map.

Strauss (1978) defines arenas as larger domains of political activity where issues are debated and negotiated (124), both enveloping and exceeding any one social world. Arenas group together the issues debated and negotiated across society, while social worlds are dynamic domains formed through the cooperative patterns of activity responding to and acting on these issues, involving individuals, organizations, technologies, sites, and discourses. For instance, the technology arena is not identical to the technology industry since the technology industry is a social world constituted by the many individuals and organizations involved in the production

and distribution of commercial technologies whereas the technology arena refers to ideas, issues, and debates pertaining to technologies that are of concern for many areas of society. Specifically, I conceptualize the technology arena here as comprising issues related to the development, use, and history of digital and networked technologies, such as computers, computer networks, and software. The visual arts arena encompasses issues and political activity pertaining to the creation, experience, appreciation, and collection of art. As seen on the map, arenas can overlap with each other, the intersection representing issues and political activity shared by both arenas. Many issues relevant to the digital curation of artworks occupy this point of intersection.

The social worlds depicted on the map are the technology industry, software communities, online arts communities, local arts communities, the art market, and art history. Distinct from the technology industry as defined above, software communities (as discussed in the previous chapter) spring up around the interactions and exchanges among developers and users of software, including open-source as well as proprietary software. Online arts communities include individuals and organizations involved with net-based art broadly defined, such as artists, media arts organizations, and audiences, as well as developers and users of digital and networked technologies designed specifically for art. Local arts communities, in contrast, refer to the individuals, sites, and organizations in geographically-specific arts scenes. Those engaged with the study, appreciation, and stewardship of the history of art constitute the art history social world. The art market encompasses the individuals and organizations perpetuating the commercial sale of art works and all collectors of these works: private, corporate, institutional, or otherwise. As with arenas, overlaps between social worlds signify convergences of elements and shared sets of concerns for both social worlds; multiple social worlds can overlap with one another, representing aims, elements, or patterns of cooperative activity

common across all these social worlds. For instance, developers of Processing, a creative coding language, sit at the junction of many social worlds: these developers participate in software communities, interact with artists in online communities using Processing for net-based art projects as well as artists in local arts communities showing Processing-based pieces in gallery settings, work with the technology industry sector to make their software compatible with proprietary systems, and receive recognition for the art historical importance of this artist-driven programming language.

I have generally attempted to position elements on the map to reflect how these elements are related to one another and fit within the various social worlds and arenas. After completing the map, I concur with Clarke, Friese, and Washburn (2018) that social worlds/arenas maps are at best crude and simplified representations of complex social phenomena but are nonetheless useful as conceptual frameworks of these phenomena. The precise locations of each element on the map is not especially telling, but the overall array of elements and the general arrangement of these elements is suggestive of both key aspects of artists' information worlds as well as broader changes in art worlds and other social worlds either impacting or impacted by emergent patterns of cooperative activity for digital and new media art. As with the intersection of the two main arenas, multiple if not all social worlds on the map directly act on or have some tangential relationship to critical issues pertaining to artists' digital curation practices. Illustrative of this, many of the key social roles, technologies, and organizations discussed in the dissertation occupy the center of the map at the juncture of both arenas and most if not all social worlds: networked alternatives, artists, artistic collaborators, galleries, audiences, curators, and Instagram.

The other features on the map, including the size, color, and shape of map components, are not especially significant. I have chosen the colors of the various domains purely to



distinguish one from the other, with the goal of achieving some level of legibility and the ability to see where various domains overlap. Likewise, the design of the domain circles (some with ridges and others without) is only intended to help demarcate one domain from the other. The relative size of the domain circles does hold some significance—in that participants recognized the predominant influence of the technology industry on many aspects of digital curation and participated heavily in software communities and online arts communities across their information practices—but there is no absolute scale dictating these sizes. I mostly stretched and increased the size of different social worlds to accommodate the various elements included in those social worlds. As the technology industry, software communities, and online arts communities featured the most elements, I consequently grew the sizes and shapes of these domains. Likewise, I altered the size of the text labels for the elements to accommodate each element in the appropriate place on the map. Clarke, Friese, and Washburn (2018) suggest that all of these map features (color coding, patterned lines, size) can be used to communicate information about the arenas, social worlds, and elements (156), but I have only taken advantage of this communicative potential to a small degree. I will likely make more sophisticated and nuanced iterations of this map or other social worlds/arenas map in related areas as I pursue future research on digital and new media art curation.

Overall, I have arrived at the arenas, social worlds, and individual elements included on the map primarily through my analysis of the issues and aspects of digital curation that I discussed with my interview participants, but the construction of the map also reflects my own understanding of the broader research area, which has been informed by my past experiences and literature consulted throughout the research process. Acknowledging my interpretive role in constructing the diagram, though, I have generally strived for this final diagram to represent the

study participants' understandings, experiences, and reflections of the social worlds, arenas, and elements most important to the creation, dissemination, experience, and ongoing care of digital and new media artworks. For instance, Facebook and Instagram are not particularly proximate on the diagram—even though Facebook owns Instagram—because while the participants note Instagram as central to their practices for sharing art with audiences and connecting with artistic collaborators or curators, participants only mention Facebook as a dominant corporate player in the development of technologies and not as a platform integral to their regular digital curation information practices. I can imagine constructing a radically different social worlds/arenas map of the same research area if I had conducted my research with a study population of primarily art historians or technology developers. The social worlds/arenas map is intended to provide broader context for the particular situation under study, but it has still ultimately been developed in and through the lens of artists undertaking digital curation work as part of their artistic practices.

The map sheds light on many findings regarding artists' information needs and practices from the previous chapter, for instance outlining various information sources or sites of active discussion for digital curation issues and positioning all of these in relation to one another. In the following sections, I place these information needs and practices within the context of artists' information worlds, which encompass and enter into the various social worlds and arenas depicted on the map. As artists find, use, create, collect, and interpret information crucial to their digital curation practices, they participate in the cooperative activities constituting these social worlds and are in turn impacted by the other individuals, organizations, sites, technologies, activities, and discourses driving these social worlds. The social worlds/arenas map above provides a visual overview of the subsequent discussions of how artists' digital curation information needs and practices develop within artists' information worlds and how these

practices of caring for digital and new media art indicate and touch upon broader changes in art worlds.

## **5.2) Permeable Art Worlds**

The study participants occupy and operate across many social worlds, developing and performing digital curation repertoires comprising approaches, skills, and techniques shaped by information found, generated, interpreted, and used from these diverse contexts. Art worlds feature prominently in these artists' information worlds—heavily influencing how they think about the creation, exhibition, and ongoing care of their artworks—but the other social worlds artists occupy, along with changes in the broader lifeworld, likewise shape the kinds of information that artists interact with, how they value and make sense of that information, and the practices they develop to apply and use that information in the digital curation of their artworks and archives. The information needs and practices discussed in the dissertation shed light not only on how artists create and care for their artworks and archives but also on the shifting intersections and interrelationships between art worlds and other areas of society.

I first delve further into the local and online communities that artists traverse in their information practices, suggesting how these increasingly diverse and disparate communities bespeak larger trends in shifting art worlds. I then turn my attention to intersections between art worlds and the corporate technology sector. Placing study participants' experiences in a longer history of interactions between visual arts and corporate technology social worlds, I reprise the earlier discussion of the digital curation challenges artists encounter as they work with commercial technologies. Finally, I consider the relationship of art criticism and art history to digital artistic production, specifically addressing how artists' digital curation practices

effectively create the material record that current and future critics and art historians rely on and respond to in their work.

### 5.2.1) Local and Networked Arts Communities

Artists in the study actively participate in their local arts communities, with these social worlds often constituting a central locus in artists' information worlds as they interact with artistic collaborators, professors or other mentors, curators, and institutions in their city or region. This echoes findings from earlier literature on artists' information needs, for example, that artists learn technical skills from peer artists (Hemmig 2009) or hear about professional opportunities by participating in local arts scenes (Cobbledick 1996). However, these local social worlds intersect with both online arts communities and software communities, in some cases from a direct convergence of participants in local and networked communities and in other cases from engaging in very different kinds of interactions and seeking out information not available in the local community. As Menegon searches and posts in user forums to learn C#, for instance, this information searching occasionally takes her far afield of digital art applications for the programming language, requiring her to translate scripts and documentation provided by developers working in some other domain.

For art worlds more generally, New York City remains arguably the global capital of artistic activity, as well as a key inflection point—that is, a point of intersection between social worlds that seeds cross fertilization altering both social worlds. As a capital of artistic activity as well as countless other social, cultural, economic, and political domains, New York sits at an inflection point of all the social worlds in the diagram above. New York is home to art museums, art magazines, auction houses, and academic art departments driving art critical and art historical discourses along with concentrations of technology industry offices and capital investment

rivaling Silicon Valley. The New Museum has developed the NEW INC incubator discussed above, which intentionally cultivates communities of individuals and organizations active across the technology and arts arenas to foster the exchange and creation of information and knowledge pertaining directly to fertile issues at the junctures of these social worlds.

The information worlds of artists living and working in New York, as well as other cultural capitals like Los Angeles and Paris, differ dramatically from those in other cities and regions as these artists more fluidly move across these various social worlds in their regular artistic activities, benefitting from information that is generated by and only available at these points of inflection. Artists living and working in major arts scenes have access to a greater number and diversity of arts institutions as well as the opportunities to exhibit work, participate in cultural events, and take advantage of informational and material resources that these organizations offer. Occupying an arts scene rife with individuals and organizations that also populate technology-related social worlds, though, shapes how artists encounter and seek out information as they develop and perform digital curation practices.

Dorf highlights the significant impact of this fluidity between online and local arts communities in New York:

I've found enough people now, in my world, if I need something with VR, I'll talk to my friend Alfredo, or if I need something with this, I'll talk to Claudia. We're all familiar with one another's work, and we've been around one another long enough now to know what each person's resources are. I don't mean that in like a quantified using a human as a tool. It's like, we know one another, we're familiar with one another. We're comfortable having these kinds of conversations.

Dorf has developed these interpersonal connections in this social world over time, through attending exhibition openings and hanging out at arts spaces featuring digital and new media art but also by engaging in online art projects and posting on message boards—often interacting with the same individuals online as in-person. Working in a thriving arts scene where many other

artists are also experimenting with digital and networked technologies affords opportunities to share skills and resources, as mentioned by Dorf; and this community of artists also stokes broader, ongoing discussions about open questions relevant to how digital and new media art is exhibited, collected, and experienced. More formally, these discourses are also hosted and furthered by institutions like Rhizome and publications like *Artforum*, opening up space for discussions among a wider range of participants, but again these entities are based in New York as are many of the discussants.

For participants working as faculty in academic art departments or for those who are students enrolled in arts degree programs, universities are an important local feature of artists' information worlds and another potential point of inflection with other non-art social worlds. As discussed above, Lomas, who has recently joined the faculty at Goldsmiths, and Barcia-Colombo and Rothberg, who are colleagues at NYU, all draw on material resources provided by these institutions and interact with colleagues and students to discuss both specific and overarching issues related to the creation and care of digital and new media artworks. Menegon and Norris have both gained information guiding their documentation practices from former professors. For others, however, aspects of departmental culture, organizational structure, or other features can impede or outright discourage the exchange of information about digital curation issues. At the Minneapolis College of Art and Design and the University of Minnesota, Jonakin comments that he is the only one working with a particular digital technology: "I'm a little bit on an island here. There are people doing cool work, just not specifically using game engines." Hart, who has long taught at the School of the Art Institute of Chicago, expresses that her work with emergent digital technologies has been consistently misunderstood by colleagues for whom 'new media' means photography and film.

As observed in the literature, these kinds of institutions and organizations anchor local arts communities and generally play significant roles in artists' information worlds by facilitating access to historical artworks (Pacey 1982; Dane 1987; Layne 1994; Frank 1999), fostering connections among artists and other collaborators (Cobbledick 1996; Hemmig 2009), and providing guidance on a range of technical and creative practices (Bennett 2006; Leousis 2013). However, study participants have not typically developed digital curation practices through formal information resources, tools, or instruction offered by information institutions like museums, academic art departments, or libraries. Furthering Mason and Robinson's (2011) finding that many artists felt "unprepared for the world of practice" following their formal arts educations (178), lacking professional skills for marketing and selling their work, many study participants have not learned digital curation skills in these settings, such as data management or digital preservation, of equal necessity for the world of practice.

While many participants have enjoyed residencies and other interactions with arts institutions, museums and arts organizations have likewise played minimal roles in helping artists to develop digital curation practices. Rather than through interactions with established institutions and organizations, artists have largely developed information practices related to the digital curation of their artworks and archives through their own creative activities or through shared efforts with curators of networked alternatives like Paper-Thin or other smaller galleries and arts spaces. For both Menegon and Turner, this has involved using digital technologies to initiate and expand the inflection points between local and networked arts communities that are so prominent in cultural capitals like New York City. Drawing inspiration from Radiance,<sup>101</sup> a curated databank of VR art projects, Menegon has joined several artists to start a cooperatively-

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<sup>101</sup> <https://www.radiancevr.co/cooperations/cooperations-2019/>

run gallery space in Vienna for showcasing digital and new media art. As previously discussed, Turner began and ran IRL with the idea of using networked technologies to connect artists working around the world to the local arts community in Cincinnati. In both cases, artists and curators nurture and mature digital curation repertoires by actively forging intersections between local and online arts communities. Artists inhabit—or initiate—these inflection points between social worlds as they foster communities around digital and new media art, and they develop digital curation skills and practices in the process of participating across these local and networked communities.

More than a point of access to information, artists use networked technologies to constitute new modes of sociality—of relating to each other and to the social whole—which make possible ways for creating and disseminating artworks that do not resolve to the exchange of discrete art objects. Ries (2010) describes earlier art engaged with information technologies, such as *The World in 24 Hours* or *THE THING*, as exploring a “pure sociality,” or “a certain self-referential, self-reinforcing perception of others: the social for its own sake, unembedded in goals and actions” (74). Artists involved in these were not creating standalone artworks but rather sought to establish social and technical structures that enabled a sociality of “being-singular-plural” among artists (76). Ries observes that these structures function as sculptures, blocking out space for social worlds, “a space of exchange between one and many” (77).

Artists today operate in very different social and technological contexts: as Ries notes, the modes of sociality explored by early net-based art have been absorbed and commercialized in “social software” systems that have only become more prevalent since Ries’ essay was first published (79). Through networked alternatives, artists reappraise and reapproach artistic attempts at a pure sociality, albeit working consciously within a media ecology where a



thoroughly commercialized Internet infrastructure and the dominance of platforms like Instagram are key. Paper-Thin, in particular, represents an ongoing inquiry into the possibilities and limits of artistic collaboration over, through, and within networks—with hardware and software systems actants in this process—as the curators and artists effect a social sculpture partially enveloped by an existing sociotechnical infrastructure that can never fully be directed or altered. Digital curation practices carried out by those participating in networked alternatives both initiate and sustain a fragile sociality, continually enlivening means of artistic production as exchange and social relation by addressing the broad spectrum of issues that otherwise impede access to, use, and reinterpretation of digital information.

#### 5.2.2) Intersections and Tensions with Information Technology Industries

Artists' and curators' digital curation practices, both in their own creative practice and in their participation with networked alternatives, are learned and performed in working with technologies that have almost always been developed by the commercial sector. In the case of open-source technologies like Blender, artists and curators manage digital objects and data within and across media ecologies populated by proprietary systems and commanded by standards, which, even if they are nominally 'open,' are in many cases driven by dominant technology companies, including Apple and Microsoft. Regardless of some artists' strong commitments to open-source technologies, which was true of many study participants (10), the information technology industry pervasively enters into artists' information worlds: in ways experienced both immediately, as with the availability (or unavailability) of documentation for a proprietary technology, and indirectly, as with the algorithms used to guide flows of information in artists' social media feeds.

Specifically for artists working with digital and networked technologies, much digital and new media art is created, disseminated, and experienced in contexts shaped by technology companies. For instance, Lucas mentions participating in residencies or funding opportunities sponsored by technology companies as a way for artists to gain privileged access to technologies, in some cases beta or unreleased versions of new software and hardware. Turner (2018) reports the wide reach of Facebook's corporate arts program, which employs five curators across four continents and hosts several artist-in-residence programs. The HubWeek festival, the venue where Paper-Thin v3 was exhibited, represents another example: an arts and technology festival where artists share floorspace with corporations, artworks are seen in the same light as tech demos, and artists shoulder expectations to show off 'innovative' applications of the latest technologies. As discussed in the previous chapter, Smith ascribes the increasing emphasis of the festival on technological innovation as part of a larger push to attract tech capital to Boston, political desires in which participating artists' creative labor is implicated and exploited. These are only recent examples in a history that extends throughout the commercial development of computing technologies. Bell Labs has sponsored Experiments in Art and Technology (EAT), a series of collaborations between artists and engineers initiated by Robert Rauschenberg and Billy Klüver in 1966 (Morris 2006), which continues today.<sup>102</sup>

While participants in EAT explored the artistic possibilities of experimental, not-yet-commercialized technologies, the history of digital and new media art has also been driven by artists adopting, deconstructing, and deploying the latest-released consumer technologies. As Rush (2005) recounts the mythic origins of video art, Nam June Paik walked into a store and serendipitously purchased a Sony Portapak videorecorder one day in 1965, proceeded to tape a

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<sup>102</sup> <https://www.bell-labs.com/programs/experiments-art-and-technology/>

festive street scene of the Pope visiting New York City, and then showed the video to other artist friends later that evening (85). Both Rush and Boyle (1997) situate this narrative alongside other early adopters of video, including Andy Warhol and those involved in guerrilla television cooperatives like Frank Gillette, but the story about Paik captures the appeal of readily available consumer electronics for artists and other cultural producers. By visiting a store (or now, by downloading some files), artists can easily access novel technologies that have never before been used for artistic production. This curiosity and desire to explore new modes of artistic production has motivated many of the study participants to engage with a broad range of technologies, from creating and coding their own tools and taking up others' open-source projects to acquiring the latest commercial products.

The predominant influence of commercial industries and the overarching capitalist economic system on the creation and circulation of cultural products has also been an enduring concern throughout the history of critical theoretical discourse. Taking a more overtly cynical view of the political possibilities of new technologies than Benjamin ([1939] 2003), Horkheimer and Adorno ([1944] 2002) decry the commercialization of culture, excoriating the 'culture industry' for mass producing monotonous programming deprived of any pretense toward art: "film and radio no longer need to present themselves as art. The truth that they are nothing but business is used as an ideology to legitimize the trash they intentionally produce" (95). Enzensberger (1974) advances Horkheimer and Adorno's ideas about the culture industry, describing this as a 'consciousness industry,' the ubiquity of commodified cultural products contributing to an 'industrialization of mind' that inculcates society in a capitalist ideology. Williams ([1974] 2003) provides an analysis that affords individuals a more active role in receiving and participating in commercialized culture but nonetheless argues that the nonstop,

“irresponsible flow of images and feelings” (92) emitting from television sets communicates a deeper ideological message. “The apparently disjointed ‘sequence’ of items is in effect guided by a remarkably consistent set of cultural relationships: a flow of consumable reports and products, in which the elements of speed, variety and miscellaneity can be seen as organizing: the real bearers of value” (107).

The relationship between individuals who use and interact with media technologies and the companies who maintain these information systems continues to be of paramount concern in current discourses around platform capitalism (Srineck 2017), or alternatively platform cooperativism (Scholz 2016). Study participants reflect on the particularly fraught position of artists in these current issues, as they are often at the vanguard of adopting new technologies to explore untapped creative possibilities but in doing so contribute to corporations’ aims and goals, even if indirectly. As Rothberg assesses the situation:

you can critique the system, but you’re also still popularizing it, and you’re also still in the pockets of these places. Whether or not your work is being directly funded by these big, Silicon Valley places, you probably indirectly...whether your teaching practice is that, or freelancing in that world, you’re all caught up in this weird system. It’s unique to hardware-driven projects, as opposed to more traditional media.

Rothberg’s creative work with Oculus epitomizes the tensions and contradictions at play. While Rothberg’s aim has been to stake out a critical position, creating work that interrogates and pursues the implications of Facebook dominating the technical infrastructure for emergent memory-making practices, she reflects on the difficulty of sustaining this critical gaze when the artist is dependent on the corporation to support and develop the technology used in the work—and, frankly, when the artist is excited by the creative potential that the technology presents.

Artists working across the full spectrum of artistic media have investigated the intersections between art and capital, such as Hans Haacke’s *Shapolsky et al. Manhattan Real*

*Estate Holdings, A Real-Time Social System as of May 1, 1971* (1971); the piece, which comprised a series of photographs documenting a predatory and influential New York real estate group, was set to debut at the Guggenheim until the show was cancelled just weeks before the opening, deemed an “alien substance that had entered the art museum organism” by the museum director Thomas Messer (Haacke [1995] 2016). However, as Rothberg points out, digital and new media artists occupy a unique position in that the entities they are critiquing are also those developing and maintaining the artistic tools and media used to create the works staging and furthering the critique.

This directly impacts artists’ information practices pertaining to digital curation, as they are in many cases dependent on corporations to supply information needed to guide digital curation decisions—or otherwise suffer from a lack of information when these corporations change the technology without full transparency to the users. For instance, Casado relates how a company offered free use of a new AR system to early adopters only to start charging recurring fees to maintain AR objects created with the system. Although Casado has managed to secure ongoing free use of a version of the system tailored for arts and education users, the company remains a crucial entity in maintaining the work but one that Casado will never be able to rely on for complete information about the status of the underlying technology or the associated business model. This imbalanced information relationship not only complicates Casado’s care of his artworks but also inhibits the further circulation of the pieces dependent on this technology. Casado observes that he could not in good faith sell this work to a collector or have this work collected by an institution, unless the collector was willing to become an intermediary to the company retaining ownership over the technology. Ultimately dependent on this proprietary

technology, a collector, institution, or Casado himself could only truly exert full agency over the life of artworks if the pieces were recreated using an AR technology that they controlled.

Given the snaking interdependencies of technological systems in which all digital and new media artworks are to some extent situated, this level of complete control over information needed to guide digital curation can likely never be attained—by artists, curators of networked alternatives, or even by major cultural heritage institutions. Still, many artists frame their digital curation activities and supporting information practices as a means to exert a greater degree of agency over how their works persist and continue to be experienced. As Murphy reflects, “learning the coding feels very empowering. Now, I actually know what the code is. I can just save them as text files. I have my folder layout, it’s clearer in my mind what all of that means and how it’s all organized. I can easily have the HTML files in the folders with the images saved on whatever external hard drive will hopefully not get lost.” Murphy’s knowledge of how browsers render websites has manifested in digital curation information practices for organizing and maintaining the data constituting her artworks. As web technologies change, though subject to decisions by entities like Apple, Google, and Mozilla, Murphy will continue to be able to exercise this control over the context in which her artworks function, circulate, and are experienced—all one in the same for her website artworks.

Artists’ digital curation practices necessarily proceed in information worlds marked by asymmetries of control over and access to information. These digital curation practices echo, and in many cases, overlap with artistic practices that critically engage with the socioeconomic conditions governing how digital and networked technologies are developed, deployed, adopted, and maintained. Artists often confront these conditions head-on in the long-term care of artworks, regardless of whether their artworks consciously took on this critical dimension at the

point of creation. As I suggest in a later section, though, information seeking and learning carried out in the creation of artworks feeds into the situated knowledges that artists apply as they continue to care for their artworks. Similarly, artists hone critical perspectives as they work at the intersections of their own small worlds and technology industry social worlds that shape both creative and digital curation practices. Schiff (2010) argues that art making can function as a sensemaking process, and I suggest that digital curation practices contribute to and extend this sensemaking process. In working with digital and networked technologies to create and then care for artworks, artists necessarily grapple with the political and economic factors impacting the longevity of these technologies in ways that are directly reflected in artists' information practices.

### 5.2.3) The Shape of Digital Art History

The changing conditions in art worlds and shifting relationships with adjacent and overlapping social worlds have emerged out of longer histories of art and technology. The issues that study participants are currently facing and the ideas they explore in their artworks resonate with works, theories, and tendencies from throughout art history. For digital curation, specifically, many participants have looked to the methods that earlier artists working in new media, conceptual art, installation, and performance have employed in caring for their artworks. As discussed in the preceding chapter, artists contemplate documentation strategies that have been used for earlier forms of ephemeral or highly-variable art, thinking through how these historical approaches both differ from but can nonetheless inform documenting art made with current and emergent technologies.

In his own practice and in working with his students, Barcia-Colombo stresses that this is “not a new problem. I think that’s something that people forget about when they come to school.

Working with neon was a big deal in the '40s. Artists have been working with motors and sound works and those sorts of things 50 or 60 years ago. It's not like when we got Arduinos and small projectors that it suddenly became a thing." For Barcia-Colombo, a key difference today is the pressure—whether self-imposed or aggravated by external factors—to produce and share work at a rapid clip that does not often abide time for careful reflection on how a piece might be documented, conserved, or recreated at a later time. Many participants (12) admit that archival and preservation concerns are necessarily suppressed in their creative practice, not wanting worries about how a work might be cared for to interfere with the creative process when it is not yet realized, and are necessarily deferred in their broader artistic practice, preferring to devote time and resources to creating new works. But participants also recognize the near-, mid-, and long-term value of artworks that reliably function and high-quality documentation of more intrinsically ephemeral works, all of which opens opportunities to reexhibit pieces, sell work to collectors, apply for grants and residencies, and more generally leave a record that can be appreciated by future audiences, including curators and art historians.

Artists work in dialogue with ideas, artists, and artworks from art history, but their own place in this history is a mercurial matter, in large part determined by future actors and subject to change over time. For art historians, curators, and critics, however, digital art history is of immediate importance. By 'digital art history,' I mean both how art historians are adopting computational methods to study works from antiquity to the present, such as the analysis of large image corpora (Manovich 2015) or the 3D modeling of art objects and architectural environments (Favro 2006), as well as emergent methodologies and historiographical approaches for studying digital and new media art. The latter is more relevant to the present study, but the ways in which art historians study and historicize digital and new media artworks are wrapped



up in more sweeping disciplinary (and interdisciplinary) changes to the methods, practices, and definition of art history as an academic undertaking (Zorich 2012).

All of the digital curation issues and challenges associated with digital and networked technologies discussed throughout the dissertation pose pressing difficulties for how art critics and art historians historicize and write about digital and new media art. The fast pace of technological development, the complex interdependencies, and organization (or lack thereof) of files and metadata all impact the longevity of artworks for artists as well as those who would like to experience or study the artworks. As Kuni (2010) laments, “that many early works were not documented in time with the available art-historical tools turns out to be an existential problem, primarily for an art history that aspires to be worthy of its name” (194-5). The loss of any surviving record for much past artistic activity engaged with digital and networked technologies already represents a lacuna undermining the very possibility of a digital art history. The dynamic sociotechnical contexts of digital and networked technologies—namely, the quick pace at which society adopts, adapts, and transforms the uses and cultural significances of computers and information systems—presents further difficulties for historicizing any material traces or complete works that do persist.

Beyond technological and material difficulties, Stallabrass (2010) elaborates many social and aesthetic aspects of 1990s net art in particular that are antithetical to art history. Many works were intentionally unbeautiful, reveling in a ‘web vernacular’ rather than ideas of form and composition from the received artistic tradition (Lialina 2005). Accessed and experienced through computer screens, many arts institutions and festivals have fumbled over how to present digital artworks in gallery spaces (Stallabrass 2003, 121). Many 1990s net artists also embraced activist artistic lineages, seeking a sociopolitical role for art outside institutions and emphasizing

the ability for individuals to encounter digital art as part of their everyday interactions with technologies. While Stallabrass discusses the inclusion of 1990s net art into art history, these issues echo challenges throughout the history of digital and new media art, which have generally been ghettoized in arts institutions and art history (Bishop 2012), as well as issues currently faced by study participants. In academic art departments, local arts scenes, art markets, and arts institutions, many artists still feel that digital and new media art is marginalized and misunderstood.

As Stallabrass (2010) concludes, though, art history may still lay claim to net art, specifically, and digital and new media art more generally (175), but ‘digesting,’ to invoke Stallabrass’ term, these artistic practices, works, and traditions promises (or threatens) to transform art history in the process (179). Kuni (2010) also frames the daunting undertaking of a digital art history as an opportunity—to break with linear narratives that monumentalize mostly Anglo-European male artists and instead see art history as a “system of stories” (187). These changes to and within art history have been playing out over the preceding decades, and the discipline will continue to evolve with ramifications manifest in the theories, methods, and approaches applied by art historians. For net-based artworks, Kuni suggests that it makes more sense to think about scholars as art archaeologists rather than historians (197), digging through obsolete technologies, recovering obscured source materials, and interpretively piecing fragments together into almost-wholes. As this media archaeological orientation to digital art ultimately depends on the persistence and durability of a material record in the form of both artworks and artists’ archives, the empowerment and support of artists’ digital curation activities simultaneously seeds the future of digital art history.

### 5.3) Changing Conditions for Exhibiting, Selling, and Experiencing Art

Many stakeholders shape this long-term life of digital and new media artworks, including artists as well as curators, collectors, and audiences. These and other myriad stakeholders have long entered into the dynamic lives of artworks more generally, but changing conditions for exhibiting, selling, and experiencing digital and new media art substantially alter the roles played by these various individuals. As artists use digital and networked technologies to explore new modes of artistic production, these networked exhibition contexts blur distinctions between acts of creating, disseminating, and viewing artworks. Social, cultural, and technological details of the time significantly influence how net-based art is both created and experienced, but the essential feature of the work existing in and through a network is a constant across this diverse history. Daniels (2010) discerns three phases of an artistic network avant-garde, distinguishing between early experimentation with networks in the 1980s, artist communities built and sustained through networks in the early 1990s, and the emergence of more discrete artworks in the form of artists' websites and software programs from the late 90s onward. Despite these differences, all net-based art shares a fundamental similarity in that its dissemination over computer networks is integral to the artwork.

This key feature of net-based art has initiated many departures from how artworks have traditionally been exhibited, collected, and experienced by audiences. Seeking to encapsulate the fundamental differences between net-based art and art objects intended to be exhibited in physical gallery spaces, Sakrowski (2010) describes net-based art with the term 'net art *activities*.' Unlike more static art objects such as paintings or even more ephemeral performance artworks, net-based artworks exist dynamically through their circulation over networks, in a state of being "always already exhibited and enacted as production or performance" (209). This

accurately characterizes the three volumes of Paper-Thin, as well as many of the other artworks produced by study participants for other exhibition venues, all shared over networked systems. In discussing both Paper-Thin and other projects, participants shed light on how this dynamic nature of digital and new media art has knock-on effects for the ongoing care of works. The roles of curators, collectors, and audiences remain in flux as these individuals navigate the changing conditions introduced by net-based art. Even for digital artworks that are not necessarily circulated over networks, the need to upkeep artworks shortly after the point of creation puts this art in a perpetually unstable state that similarly alters artists' relationships with curators, collectors, and audiences.

### 5.3.1) Relationships between Artists and Curators

Dekker and Tedone (2019) articulate how curating on web-based platforms positions aesthetic considerations for how art is presented within a shifting constellation of human and machinic agents influenced by a range of sociotechnical factors. The authors arrive at the term 'networked co-curation' to describe how curators of online platforms perform ongoing labor to stage and maintain exhibition contexts, necessarily working in concert with this broader media ecology. The notion of curation proceeding in collaboration with both human and machinic actors resonates with the co-construction of networked exhibitions described above. For Paper-Thin and other networked alternatives, artists and curators work together to present artworks but only by managing data as it moves across environments and systems. Dekker and Tedone's elaboration of networked co-curation highlights that this co-constructive activity of artist and curator is situated in a media ecology with myriad sociotechnical specificities.

For both artist and curator, this drastically changes curatorial interactions as conceptual and aesthetic aspects become entangled with technical details for configuring the data, hardware,

and software elements composing artworks. Murphy bemoans that the first email with a curator succinctly covers how a particular piece might fit conceptually within the theme of an exhibition, while the artist and curator spend the next 100 emails mulling over technical requirements and issues to get the piece functional in time for the show. Murphy regrets that the necessity of dealing with these various issues detracts from time that might otherwise be spent discussing ideas or earlier works from art history informing the show but acknowledges that these technical issues are deeply tied up in the aesthetics of her works. “Troubleshooting how the cables are going to be run from here to here, I would definitely count that as part of my creative practice. Making lists in Amazon of what cables we need, that feels like less creative, but it is still part of the practice.” Even if the piece does not explicitly address these material conditions, technical specificities like needing a certain cable constitute conditions that both artists and curators generatively work with and against to create—and then care for—networked exhibitions.

In terms of information worlds, these curatorial exchanges meshing aesthetic and technical concerns reveal developing ambiguities in both the social types of artist and curator as well as how the information needed to stage networked exhibitions is valued by both of these groups. Assessing the evolving role of curators from the 1960s to the present, O’Neill (2012) describes curatorship as a “constantly shifting and adaptive discipline,” with curators increasingly positioned as creative actors in the artistic process: not only have curators come to be seen as the ‘author’ of exhibitions, but many artists also take up curation as an artistic practice (49). The latter is true of Paper-Thin, as both Buckley and Smith conceive Paper-Thin as an artistic project, and while the curators have also played an integral role in bringing together works from the participating artists, this has encompassed digital curation of the constituent data as part of the curatorial selection and presentation of art. As discussed in the previous chapter,

staging artworks on the platform has often required the curators to transform or entirely recreate digital objects produced by the artists. For networked alternatives, curators assume a creative agency in how artworks are staged by negotiating choices with the artists and executing decisions at a technical and material level that directly impact how the artworks function and are experienced.

In the previous chapter, I described this process as a co-construction of the exhibition. As both artists and curators encounter shared information needs in this process and discuss these technical issues throughout the curatorial exchange, the information practices involved in staging and sustaining networked exhibitions are also deeply co-constructive. Information needs are constructively articulated throughout curatorial discussions as artist and curator either explicitly identify what will need to be done to get an artwork to function or otherwise come up against unforeseen technical challenges as they attempt to stage the artwork. Although this is a collaborative process blurring creative roles of artist and curator, each group does have distinct responsibilities—ultimately, Smith and Buckley need to ensure that volumes of Paper-Thin work as expected. Artists participate in the construction of the exhibitions, but the curators oversee the entire process and coordinate across the artists and the artworks.

While the information needs are co-constructively articulated, the varying relationships of the artists and curators to the overall platform result in differing means of valuing the information required to address these needs. Jaeger and Burnett (2010) define information value as a “continuum of attitudes and perceptions concerning access to and exchange and use of information across range of social contexts” (43), comprising both the content of the information as well as the ability to control the information (40). Jaeger and Burnett also emphasize that information’s value is “fundamentally local,” intrinsic to the context of a specific information

world (47), and so even though the artists' and curators' information worlds overlap to a great degree, the responsibility of the curators to manage the entire platform colors their perception of the information needed to stage and then care for networked exhibitions. Both artists and curators similarly value the content of information needed to address digital curation issues encountered in the process of staging networked exhibitions, but the ongoing control of this information—both the continued facility with the technical skills needed to maintain the platform and control over the platform as an archives of information—ultimately rests with the curators.

This is not to say that only the curators find value in the longevity of the platform and the artworks featured on it. Norman and Menegon both stress that they rely on Smith and Buckley to keep v1 and v2 of Paper-Thin accessible, as these volumes are the only way to experience their artworks outside of documentation. Smith and Buckley take on a great deal of overhead in terms of both archival storage and labor, though maintaining Paper-Thin as a viable platform has reciprocal benefits to both participating artists and the curators. The artists and curators alike have professional and personal stakes in both realizing their creative efforts and maintaining a material record of those efforts. However, the marked distinction between the curators who have control over the information needed to sustain the overall platform and the artists who have only contributed pieces to the platform does hold significant implications for ongoing care. The curators have ceded sole control over Paper-Thin as archives—freely distributing the volumes of Paper-Thin online—but the digital curation of the artworks on the platform nonetheless requires concerted and coordinated activity.

Menegon mentions how the networked nature of Paper-Thin (as well as other online arts platforms she has worked with) both facilitate and impede the collaborative co-construction of exhibitions. On the one hand, artists from the around the world are able to contribute work to an

exhibition accessible online; on the other hand, these artists are not able to come together in the same space to mutually shape the exhibition in real time. Staging networked exhibitions involves inherently co-constructive efforts—but these efforts are also largely conjunctive, each effort building on the last in a series of discrete exchanges. Buckley and Smith perform the crucial function of coordinating this discretely conjunctive process in staging exhibitions and continue to assume this coordinating role for the ongoing care of these artworks. As the social roles of artist and curator blur with networked alternatives, patterns of cooperative activity and divisions of labor remain ambiguous and emergent. Buckley and Smith have forged their own models for working with artists in the process of staging Paper-Thin, and they now confront the need to forge their own models for coordinating the ongoing digital curation of the platform.

### 5.3.2) Relationships with Collecting Institutions and Private Collectors

As with staging works on networked alternatives, negotiating the long-term care of digital and new media artworks acquired by private collectors and institutions is likewise a co-constructive process. Both situations reflect Becker's (2006) observation that 'finishing' a work of art is a "political process that is continuous and never settled for good" (24). Becker holds that all cultural works undergo these open-ended negotiations, as future audiences, editors, conductors, curators, and countless others make choices that change the 'final' shape of a novel, piece of music, or visual artwork. For digital and new media artworks, though, these processes of negotiation manifest along technical and material dimensions—that is, involving choices directly pertaining to the techno-material composition of the work—and often elapse far more quickly and dynamically than for other kinds of artworks. For Paper-Thin, artists and curators discuss these choices throughout the process of staging networked exhibitions, although as noted above, considerations for the ongoing care of these works remain largely unstated, with the curators



implicitly taking on digital curation responsibilities. The key difference when works are acquired by collectors or institutions is that these negotiations are rendered explicit in the contractual exchange of custody. Despite this explicit transfer, artists and collectors must still navigate uncertain expectations as to who should be responsible for which aspects of ongoing care. Far from simplifying matters, the effect of a contract (or other legal protections) to treat digital and new media artworks as fixed objects can dramatically inhibit the ongoing access to and preservation of these works (Rinehart and Ippolito 2014, 141).

As private collectors and institutions increasingly obtain works dependent on digital components, methods for accommodating variable conservation approaches in collection agreements are maturing, but this is still very much an area of uncertainty for artists, collectors, and institutions. Graham (2014) and London (2010) both outline a range of approaches museums have begun to adopt outside of the traditional acquisition of art objects, from commissioning new media artworks without necessarily committing to long-term care or licensing works for temporary display. Curators of established institutions in this study also mentioned these options for exhibiting digital and new media art. At Young at Art, a non-collecting museum, Spechler emphasizes the appeal of licensing digital artworks, an approach that affords the institution flexibility, as licenses can be more easily extended or altered than acquisition agreements, while still compensating the artists. For Borusan Contemporary, Forde mentions commissioning new media art as a way to obtain unique artworks fashioned specifically for the institution; although for the Borusan, these commissions often do enter into the permanent collection of the institution along with the non-commissioned works also collected by the institution.

For artists, private collectors, and institutions, selling and acquiring extant artworks holds many benefits not conferred by these other collecting methods. Artists appreciate the prestige of

having works in the permanent collections of major institutions, and many collectors want the ability to resell pieces at a later time. The need to either maintain or update digital and new media artworks as technologies change or become obsolete decidedly alters how both private collectors and institutions approach the acquisition of these works as art objects. In this study, participants raise concerns around two such related issues: whether private collectors or institutions are interested in taking on the responsibilities associated with caring for digital and new media artworks—and regardless of interest, if they are actually able to fulfill these obligations.

Lucas describes a project that frames collecting AR art objects in terms of adopting a pet. She presents the potential collector with a questionnaire assessing their ability to care for the artwork: will they be able to perform the digital curation equivalent of feeding, walking, and generally attending to this object? As Lucas reveals, “I never once let anyone adopt them. I just collected the forms because clearly no one was capable.” The project makes clear the vulnerabilities of digital artworks, highlighting reasons why both artist and collector might be hesitant to take on untold responsibilities. Adopting a dog or cat is an experience full of wonder and excitement—until the pet’s storage media needs to be refreshed. Some of this hesitancy can be assuaged if the relationship between artist and private collector is sustained beyond the point of transaction. Bryan McVey has collected a number of pieces by De Lara, though these acquisitions emerged out of an ongoing friendship between both artists. In addition to collecting works, McVey has also helped De Lara to exhibit his modular sculpture *Invasive Species* at Burning Man and has taken on responsibility for temporarily storing the work after the festival. As a friend first, McVey maintains a personal interest in De Lara’s work and career as an artist,

forming a strong and mutually trusting relationship that alleviates potential concerns for both artist and collector in transferring custody of variable artworks.

Although collecting institutions likely have conservation staff, resources, and infrastructure at their disposal, negotiating the long-term care of digital and new media artworks acquired by these institutions is also marked by uncertainty with study participants recounting a broad range of experiences in having their works collected. Lomas, who had several works collected by the V & A, appreciated rigorous and in-depth conversations with the conservation staff. Lenz provides an overview of these discussions, which covered the material and technological components of the works, anticipated future conservation challenges, and charted conservation approaches in line with Lomas' understanding of the intended experience of the works. Although Lomas notes that the prints and 3D models of his morphogenetic forms are novel among the institution's current holdings, the V & A staff have organized the acquisition process to accommodate wildly variable kinds of digital and new media art.

In contrast to this encouraging experience, Rothberg discusses having her piece *Touching a Cactus* (2017) collected by an institution that lacked an established procedure or protocol for acquiring digital and new media art. For the piece, the viewer sits among shelves of small cacti, donning a VR headset to read an immersive, permutating poem populated by animated cacti (see fig. 21). Unlike her first experiment with VR discussed in chapter four, Rothberg intentionally designed *Touching a Cactus* to be updated to new versions of VR headsets and game engine software as well as for the installation itself to be flexibly adapted to different exhibition spaces. Although the collecting institution did not present Rothberg with questions about how the piece might be variably conserved in the future, she provided them with an information packet outlining the details of the piece, emphasizing the essential elements that should persist across

installs and pointing out the components that can be swapped out as needed. Rothberg transferred much of the same information to the institution as Lomas did to the V & A, with the key difference that Rothberg carried out the labor to assemble the necessary information absent established policies or methods on the part of the institution.

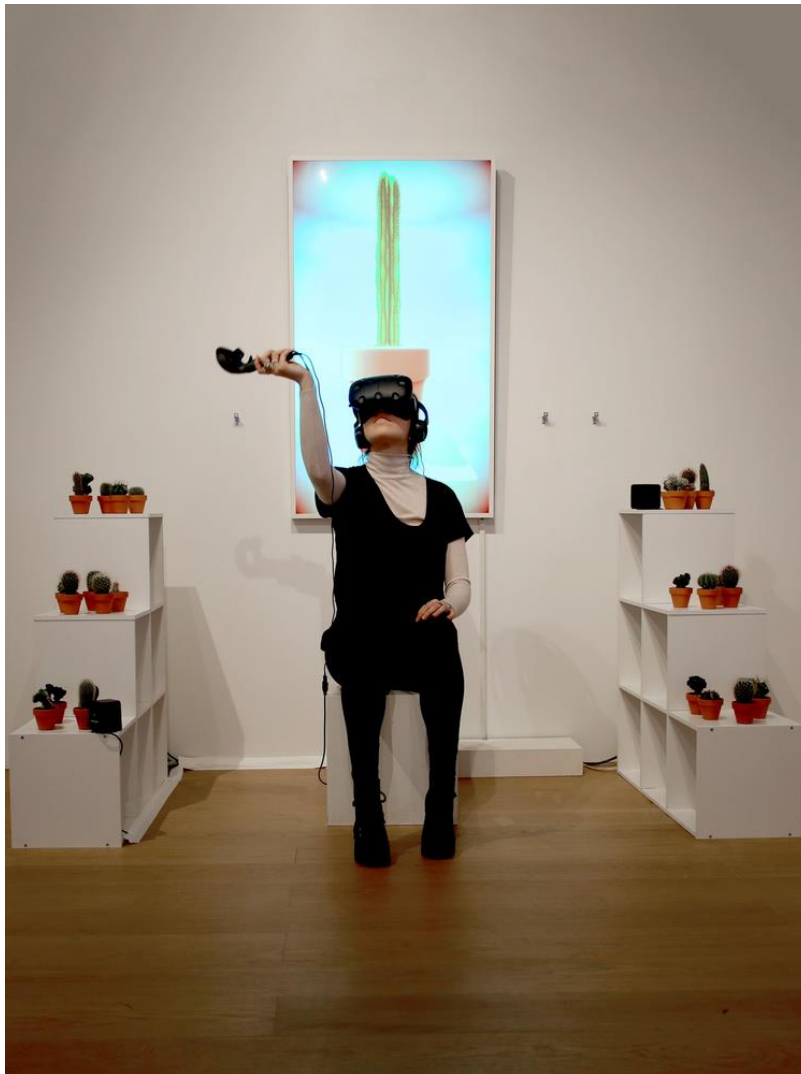


Fig. 21 Sarah Rothberg, installation shot of *Touching a Cactus*. 2017. Cacti, VR headset, immersive environment, dimensions variable. Available from: <https://sarahrothberg.com/> (accessed October 1, 2019).

Among the outcomes of not having a forward-looking acquisition agreement, collectors and institutions can be unsure about who is responsible for carrying out upkeep, updating, or other recurring maintenance work. Both Barcia-Colombo and Casado recount needing to restore

artworks after an institution or private collector lost access to data on obsolete storage media. The artists were easily able to provide the collectors with the lost data—culled from the artists’ personal archives and migrated to current storage media by the artists—but it is easy to envision alternate scenarios in which the artist has also lost access to the data, effectively terminating the work he had entrusted to a collector or institution. While neither the labor nor material costs were particularly onerous in these cases, shortsighted collecting practices can also lead to an unclear understanding of whether the artist is primarily responsible for upkeep activities and how the artist should be compensated for this work. Several participants (Barcia-Colombo, Forde, Rothberg, Slocum) mention instances in which they or other artists built recurring maintenance costs into acquisition agreements, specifying whether this work needs to be carried out by the artist or can be contracted to conservation consultants or other professionals.

Overall, the process of transferring an artwork from artist to collector or institution involves negotiation among several stakeholders about the long-term life of a complex object. The essence of the artwork to be cared for and preserved is core to these discussions, as the understanding of this essence informs specific details about preservation and conservation actions. As Heslop, Davis, and Wilson (2002) suggest for digital objects generally, digital and new media artworks can be thought of as performances contingent on many intrinsically dynamic components; clearly articulating the essence of this performance can greatly aid present and future efforts to care for the object. The benefit of structuring long-term digital curation around a clearly defined essence of the work is a theme in the literature on digital and new media art conservation as well as digital preservation more broadly. For instance, this is the motivation behind digital art conservation efforts like Rinehart’s (2007) Media Art Notation System or the Variable Media Questionnaire (Depocas, Ippolito, and Jones 2003) discussed elsewhere in the

dissertation. However, pinning this essence down in clear terms is challenging as potential digital curation practices remain dependent on still-developing strategies like emulation and the unknown capabilities of future technologies—these difficulties are only compounded when institutions lack established procedures for soliciting information needed to articulate (or approximate) the essential elements of a work.

A deeper issue that cuts across these various difficulties is who should define this essence. Implicit to many existing conservation approaches for gathering critical information about the work, such as artist interviews (Abraham and Beerkens 2012), is the ultimate authority given over to the artist's intent. In the examples of institutions collecting works described above, the artists, curators, and conservators have attempted to best capture the artist's intent as a guide for future preservation actions. While the artists are certainly fundamental stakeholders, artworks also enter into and participate in broader processes of cultural production as they are taken up by viewers both inside and outside of institutional contexts. For art constituted in and through circulation over networks, the very nature of these works challenges any primacy that might be accorded to artists over the ongoing life of these pieces. Rinehart and Ippolito (2014) propose a model of the Open Museum as a way to think about how authority over the ongoing life of digital and new media artworks might be shared among artist, institution, and audiences. The Open Museum would function as an online repository for digital and new media art, both storing copies of works adhering to the artists' original intent while also making source code and data available for remixing by others (110).

A significant risk of an overly open model is the loss of context for understanding the work. Even if this is maintained by the Open Museum, it is easy to imagine data straying far and wide to the point where its current users have no sense of the artwork from which it originated.

This is perhaps an effect of cultural production more broadly—we use words coined centuries ago and adopt clothing styles fashioned on other continents—but this also threatens to efface the situated and embodied experiences that go into generating artworks. Lucas highlights the importance of work by The Feminist Institute,<sup>103</sup> for instance, to recuperate the stories of women artists that have so often been overwritten by the predominantly male, white, and heteronormative perspectives driving art critical and historical discourses. However, rigidly hewing to requirements set by the artist is not necessarily the best way to ensure the long-term viability and integrity of the artwork. Lucas recalls encountering restrictions for video works she has wanted to show in classes, these strict display instructions marrying the work to obsolete equipment. Artists cannot fully anticipate future technological changes, and so forbidding flexible interpretations of artists' intents (or ignoring their intent altogether in some cases) perhaps poses a greater risk to the integrity of an artwork than pushing the piece outside the bounds of the artist's original intentions—that it will no longer exist in any sense.

### 5.3.3) Relationships with Audiences

How digital and new media artworks are disseminated and experienced by their audiences is key to the question of who has authority over guiding the ongoing life of artworks and how that gets carried out in the form of specific digital curation practices. As I suggested in the preceding discussion, general audiences beyond curators and conservators also have a direct stake in the long-term care of art as these works enter into broader processes of cultural production. Expanding on Yeo's (2010) critical observation that librarians and archivists control how the significant properties of digital objects are defined and how these properties get preserved across digital curation lifecycles, the negotiations determining the care of digital and

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<sup>103</sup> <https://www.thefeministinstitute.org/>

new media artworks in private or institutional collections directly involve only a few parties and exclude how broader audiences might interpret the work. There are notable exceptions to this arrangement, such as Jones and Muller's (2008) efforts to capture audience members' experiences of David Rokeby's interactive installation *Giver of Names* (1991 - ongoing)<sup>104</sup> or the Guggenheim's 2004 *Seeing Double* exhibition mentioned in chapter two, in which the museum exhibited original and emulated versions of work side-by-side and solicited audience responses comparing the different versions.

These efforts are still filtered through the institution with custody over the work; the institution mediates and integrates information gathered from viewers into the record of the work. For many artists in the study (7), both artist-run platforms like Paper-Thin as well as commercial platforms like Instagram hold the potential to share works outside of these institutional boundaries. Both these kinds of platforms expand access to the artworks, reached through an Internet connection instead of the doors of a museum. However, social media platforms like Instagram facilitate more direct interaction between the viewer and the artist than artist-run platforms, which, in the case of Paper-Thin at least, do not have any messaging or other socially-connective features built-in. As Arcier comments, "I didn't have feedback from people seeing it. Sometimes, it happens in a real place or at a festival, people talking on Instagram, or sending messages, stuff like that. I didn't have that there. I don't know how many people have seen it." Murphy begrudgingly uses Instagram because of the ways in which the platform supports interaction and exchange across a community but laments how art communities get lost within all other social communities: "it seems like it's always one thing

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<sup>104</sup> The Daniel Langlois Foundation has amassed a rich record of materials documenting this piece, including installation views, interviews with the artist, specifications for the piece, along with audience interviews. <http://www.fondation-langlois.org/html/e/page.php?NumPage=2121>



where everybody is: all your aunts and uncles and cousins. I want something that's just for the art community, that's just for sharing images, that doesn't have all of my family, and all of these other people also there." Artists may find that kind of direct interaction with art world audiences at physical exhibition spaces but, again, at the expense of more expanded access afforded by networked platforms. On Paper-Thin, many participants express a sense that they were reaching new and broader audiences but lacked any means to directly gauge this reception.

Without a doubt, Instagram is the most powerful and pervasive networked platform for disseminating artworks. Networked alternatives or the artist's own website may afford artists greater agency in how they present their work, but these do not benefit from the network effects of the global population of users who are already on Instagram. As Jaeger and Burnett (2010) observe, networked technologies, systems, and services have long fostered the growth of communities by melding information access with social interactions (88). Instagram is a central juncture point in artists' information worlds, connecting artists with viewers, including curators, collectors, and other artists. These diverse audiences not only access information about the art and the artist, such as photographs of artworks or an overview of the artist's friends and followers, but also gain access to the artist herself.

The role of Instagram in suturing together many disparate communities—becoming the platform where artists share work with their friends and collaborators, arrange shows around the world, garner interest from private collectors, and also maintain a public-facing record of their creative and professional activities—has impacts across artists' digital curation activities. For D'Alessio, Instagram functions as a tool to quickly generate and share photographs documenting current projects or exhibitions. D'Alessio notes the ease of taking a photograph and posting it to the platform through an app on his phone. Capturing the exhibition and simultaneously sharing

this information, these documentation photographs double as advertisements for the artist's work. D'Alessio admits that the social nature of this documentation has influenced how he goes about creating and then caring for this data. Talking about a similarly important platform, D'Alessio discusses how he has updated documentation on YouTube to match changes in the style of videos popular on the platform: "I really recognized that the YouTube pace of the viewer got shortened, got faster. The videos didn't work for that anymore. I had to do it, cut it faster, make it shorter, make it more sparkly and fast." As noted in the preceding chapter, artists feel the pressure to post to social media platforms, and Instagram in particular, presenting a photogenic and compelling depiction of their creative and professional selves.

While recognizing that Instagram shapes how they perform their identities as professional artists online, artists were especially leery of this influence worming back to the root of the creative process. Sanchez (2013) describes this subtle feedback loop between the creation and display of artworks and the circulation of images online, both impacting how works are exhibited in gallery spaces as well as the kinds of artworks that are created in the first place. Expanding on Sanchez's litany of artists making particular kinds of abstract paintings that pop when viewed on a small phone screen, we might add a current crop of 'gramable' artworks: pieces impressive in scale or contrast, as well as those especially amenable to selfies. The participants expressing the most concern over this trend are educators, all working with younger students who are immersed in Instagram while they are developing their artistic practices and ideas about art. Barcia-Colombo finds that students begin with an impetus to create work for Instagram, and he strives to get them thinking beyond this platform as the context for sharing the work. As he stresses to his students, "the reason shouldn't be to put it on Instagram and get likes...It's just a fleeting desire. It's not going to be important at all."

Younger students are mired in these issues, but so too are more established artists along with curators, collectors, and others involved in art worlds. The role of Instagram and other social media platforms in art worlds continue to grow, raising many pressing questions that as of now cannot be completely answered. As a Facebook product, the long-term viability of Instagram is currently unknown, rendering any patterns of information sharing and collective activity built around the platform intrinsically unstable. Facebook's stake in the data uploaded by artists can only be partially surmised, although the clear motive to compel individuals to use the platform and consume advertisements alongside images of artworks alone is unsettling and runs counter to many of the artists' social and political desires. For broader art worlds, the impact of Instagram on art markets and commercial galleries continues to develop. The traditional gallery system at large is currently undergoing massive restructuring in response to a number of factors, but the increasingly prominent function of Instagram and other networked means for encountering artworks is principal among these. All these questions require further research beyond the bounds of the present study, and I pursue some of these implications in the concluding chapter.

#### **5.4) Gaining Skills to Create and Care for Artworks**

Artists experience a huge range of information needs as they carry out digital curation activities for their artworks and related archival materials. Across the participants, I have found that artists are driven to learn new skills to create and share artworks, but they continue to employ these newly acquired skills in the ongoing care of artworks. Diverse and far-reaching patterns of information seeking are embedded into the creative process as artists explore the limits and possibilities by working with technologies to create and share artworks. As discussed in the previous chapter, information sources span interactions with artistic collaborators, cultural

heritage organizations, and software communities, and involve iterative experiments with and deconstructions of technologies. I argue that the information seeking that artists practice in the creation of new artworks constitutes a learning process as artists gain skills as part of a deeper understanding of the technologies used to create works. Artists apply this critical technical literacy across digital curation activities, both to create new artworks using the same technology as well as to care for older artworks as they are reexhibited, updated, migrated, or recreated.

In my initial discussion of information needs as a foundational concept in chapter two, I noted that while artists experience information needs in creating and caring for artworks, these are not discrete needs only associated with some easily delimited task. Du's (2014) conceptualization of the information seeking process as a journey more aptly fits how artists gain technical skills through protracted experimentation with technologies—often elapsing over the course of several projects or artworks. While Du provides a more expansive framework for thinking about how individuals seek out, make sense of, and use information in working on some complex activity, the information journey is still constrained by an overly linear model that begins with some work task and ends with the successful use of information to complete the task (1863). The linear nature of Du's model may be a product of the author's study population of marketing professionals; the author finds that these individuals typically engage in purposive and goal-oriented information seeking, largely directed at the completion of particular tasks (1864). In contrast, artists' information practices in the creation and care of artworks are more open-ended, fueled by the creative impulse behind some project or a general curiosity to explore the applications of some technology for artistic production.

Rather than a journey marked by start and end points, I see artists' information-seeking practices as integrated into ongoing learning processes that can be isolated as specific needs

associated with particular tasks but are also situated within larger creative endeavors—potentially spanning entire artistic careers. Existing scholarship around information seeking as learning provides a way to begin thinking about how artists gain digital curation skills through the work of creating and caring for their art. Rieh et al. (2016) describe information seeking as learning through the model of comprehensive search: in this mode of searching, individuals critically integrate information from diverse sources and perspectives across discrete search sessions to construct knowledge about some topic (24). The authors place comprehensive search within a broader constructivist epistemology and pedagogy, illustrated by Bloom’s (1956) taxonomy, which frames learning as an active process proceeding from the acquisition of information up to the creation of new knowledge. Though an experimental study with 31 undergraduate students, Ghosh, Rath, and Shah (2018) advance this model of searching as learning, finding many search activities that directly contribute to the cognitive modes in Bloom’s taxonomy to more fully explain how “learning occurs while searching, or how searching facilitates the process of learning” (23).

I suggest that the findings of the present study accord with this model of searching as learning, as the artists learn digital curation skills through information-seeking practices, but I would also critique the constrained ways in which this existing research understands both searching and learning. Beyond the web resources discovered through search engines that constitute the focus of much searching as learning research, the artists’ information practices immerse them in interactions with a wide array of individuals, communities, and technologies; nor can the plenitude of the learning processes emerging from these interactions be fully captured by cognitive frameworks like Bloom’s taxonomy. Learning digital curation skills and approaches also comprises deeply social and material dimensions that both exceed and engulf the

lone individual constructing and applying knowledge. To grasp the many factors impacting artists as they learn and perform digital curation skills, I frame knowledge as not only constructed but also situated—within bodies occupying social worlds and participating in media ecologies.

As Haraway (1991) observes, the notion of situated knowledge radically alters conceptions of both the knower and what is known. “Situated knowledges require that the object of knowledge be pictured as an actor and agent, not a screen or a ground or a resource...actors come in many and wonderful forms. Accounts of a ‘real’ world do not, then, depend on a logic of ‘discovery,’ but on a power-charged social relation of ‘conversation’” (198). As an object of knowledge, digital curation skills are enacted by artists in conversation with other individuals like curators and collectors, technologies constituting the artworks, and their own bodies as they carry out this labor. Artists’ information practices drive the construction of these situated knowledges—but the many kinds of information that artists seek out do not exist as inert resources—rather, artists dialogically interact with information as it is transmitted and recorded by particular technologies within and across various social worlds.

Artists develop these situated knowledges throughout their artistic careers, developing deep familiarities with technologies, facility with artistic techniques, and an expanding ken of the sociocultural dimensions of their creative practices, with all of these knowledges playing into decisions and activities involved in the ongoing care of works as much as the creation of new works. Artists become adroit using particular technologies and systems, learning how to achieve some effect or accomplish some task in Photoshop for instance, but this deep familiarity extends beyond any one technology to resonate with the broader media ecologies in which these artworks circulate. This resonance can be felt not only in the intricate dependencies of hardware and

software systems immanent to the dynamic structure of media ecologies but also in the grammar of interactions embedded into the human-machine interfaces across these media ecologies.

Cramer and Fuller (2008) describe user interfaces as ‘symbolic handles,’ suggesting that these grammars of interaction can easily conform into established design paradigms common across systems but can also afford artists rich sites for play, experimentation, critique, and epistemological disruption (152). Artists in the study discuss both sides of this as important to applying digital and networked technologies for artistic production, becoming conversant with the logic underpinning certain kinds of technologies, such as game engines or 3D modeling software, to then push the technology to unexpected uses.

Artists cultivate and apply situated knowledges in the production of new artworks as well as in the ongoing care of older artworks, the activities involved in both processes often overlapping and coextensive. As discussed in the previous chapter, digital curation activities associated with updating and upkeeping works are often motivated by opportunities to reexhibit work or to generally keep work available through the artist’s website or other platform. This requires the artist to dive back in to the technologies initially used to create the work, either to revitalize the work using these same technologies or to adapt the work to a new set of technologies, resituating how the artwork functions in a transformed media ecology. Norman details the practices involved in working on earlier pieces, including redownloading software libraries and reconfiguring data constituting artworks, not as precursors to carrying out digital curation activities but as integral steps to relearning the skills needed for this labor. As Norman emphasizes, “I think that’s a fairly important practical consideration, not necessarily in terms of archiving these works, which still live on the hard drive, but in terms of accessing that archive, and enacting that archive.” As the artist’s relationship to technologies and artworks drifts over

time, so too do his situated knowledges. Digital curation enacts the archives, to use Norman's term, often requiring artists to reposition themselves in a dynamic media ecology of machines, software, and other collaborators to ply the techniques needed to care for artworks.

Paper-Thin has played a pivotal part as these artists have developed situated knowledges, both in the creation and care of artworks on the platform and extending to their creative practices more broadly. Among the aims for Paper-Thin, Buckley and Smith want the platform to empower artists to experiment with digital and networked technologies, exploring new possibilities for artistic production. Lave and Wenger (1991) describe situated learning as the process of developing these kinds of situated knowledges through 'legitimate peripheral participation' in activities of concern alongside other individuals possessing varying degrees of expertise and experience. As Wenger (1998) further develops this concept, the individuals sharing in these pursuits constitute communities of practice. Individuals new to some area benefit greatly by joining in these communities of practice, the participation in which fosters their situated learning. Although many aspects of artists' creative processes are solitary, this research has demonstrated that learning digital curation skills, approaches, and repertoires often puts artists in contact with various groups—including artistic collaborators, developers, users of software, or curators—that exhibit characteristics of communities of practice.

For Paper-Thin, specifically, one feature of this networked alternative is its ability to bring artists and curators together to experiment with the application of some set of technologies to the creation and exhibition of artworks, functioning much like a testbed for legitimate peripheral participation. The co-constructive nature of curating and creating Paper-Thin volumes promotes processes of learning and exploring the technologies as mutually reinforcing—and in fact, as two aspects of a larger process. The curators supply initiative to use the technologies,



either facilitating or directly providing access to the creative tools, while also assisting in technical issues and ultimately coordinating efforts to exhibit and then care for the works generated through these experimental processes. Even though artists across all three volumes have come to Paper-Thin with varying levels of experience using digital technologies, those both with and without an existing deep familiarity have similarly engaged in learning and exploration processes through their involvement with the platform. Ritiu, who had not extensively worked with digital technologies in his creative practice, has discovered new avenues for artistic production; while Lomas and Stearns, both of whom possess a significant level of technical expertise, have used the platform as an opportunity to test out creative practices.

Perhaps more than any of the participating artists, Smith and Buckley have engaged in profound processes of learning and exploration to develop the situated knowledges necessary to curate Paper-Thin. Goriunova (2012) argues that an ‘organizational aesthetics’ undergirds the cultural production of networked arts platforms, which she describes as a self-reflective speculation on the human, machinic, and sociocultural forces that both constitute the platform and push the platform to change (18). Conceiving of arts platforms as living organisms that thrive and fluctuate through the interaction of many people, technologies, and cultural objects produced on the platform (20), this organizational aesthetics can be localized in particular actors, like curators making decisions impacting the future direction of the platform, but is also emergent in the vitality of the platform over time. In the frame of information seeking as learning, the organizational aesthetics of a platform can be seen as the situated knowledges needed to sustain the platform, which involve the maintenance of older, existing works along with the conditions to spark new creative efforts. Through reflection and speculation, Smith and Buckley have developed information practices to work with artists and curate artworks on a

platform constituted through dynamic networked contexts. In step with the process of enacting the archives described by Norman, the digital curation of a networked alternative enacts the platform.

### **5.5) Summary**

In this chapter, I have discussed how the artists' and curators' information needs and practices are shaped by diverse social worlds, and in turn how these information practices shape those social worlds. As I situated artists' information needs, practices, and sources in the contexts of both art worlds and information worlds more broadly, I have highlighted some of the numerous social, political, economic, cultural, and technological factors that impact artists' digital curation activities. While the focus of this chapter has been on the interaction of these factors and the effects on how artists develop and perform digital curation as integral to their broader creative practices, these discussions also suggest important implications for other areas and actors involved in the cooperative patterns of activity for creating, disseminating, experiencing, and caring for digital and new media art. I touch on these in more detail, with an eye toward the potential for further research into these open questions, in the concluding chapter.

## CHAPTER 6: CONCLUSION

This dissertation research has centered on the information practices of artists and curators caring for digital and new media artworks as they are created and exhibited outside of the established cultural heritage institutions traditionally responsible for stewarding visual artworks. In describing the emergent patterns of cooperative activity involved in these digital curation repertoires, I have hit upon many changing aspects of artists' information worlds—including the art worlds and other social worlds that play into these information worlds—that bear further discussion and research. The issues that artists and curators of networked alternatives face as they create, share, and care for digital and new media artworks fit into larger questions currently being addressed by arts institutions, commercial galleries, collectors, and many other entities. Companies are pushing new technologies like blockchain as a means to sell and authenticate digital artworks as unique objects (Vierkant 2018). Arts educators are rethinking pedagogies as they integrate digital creative practices into academic degree programs (Alexenberg 2008). Museums are pursuing new ways to collect and exhibit digital and new media artworks (Graham 2014) and are generally reconceiving their role as cultural stewards in relation to digital culture.

While I cannot attend to these broader changes in depth in this concluding chapter, I will lay out some specific implications and trajectories for future research as suggested by the findings of the present study. I first consider the relatively minor role of arts institutions in artists' information worlds and put forth some ideas for how these institutions could nurture post-custodial and community-driven approaches to enter into artists' information practices and engage with the care of digital and new media artworks earlier on. Similarly, given the lack of

training in digital curation skills and techniques that artists have received as part of their formal arts education, I postulate some ways that information resources and tools could be developed and better integrated into academic fine arts programs. I conclude by reflecting on the limitations of the present study and by outlining particular efforts building directly on the findings of this research that I plan to pursue in the near future.

### **6.1) Implications for Cultural Heritage Institutions**

Museums have been principally if not exclusively responsible for the long-term care of artworks and related archival materials, since the late 19<sup>th</sup> century in Europe and North America and, from the late 20<sup>th</sup> century to the present, increasingly in all other parts of the world. Many arts institutions have pioneered the collection, exhibition, and conservation of digital and new media artworks over the course of the last couple decades, with these efforts intensifying and expanding especially in recent years. However, these institutions have played a relatively minor role in the information worlds of the artists participating in my study as it pertains to developing and performing digital curation practices. These institutions enter directly into artists' information worlds in the process of acquiring artworks and negotiating the long-term care of these works, but even as arts institutions collect more digital and new media artworks, this represents only a thin slice of current artistic engagement with digital and networked technologies. For the vast number of artists whose works are not collected by arts institutions, the digital curation of their own artworks and archives is a core component of their artistic labor, as they become the first—and perhaps only—stewards of this cultural production.

As those inside and outside of institutions develop new approaches for the long-term care of digital and new media artworks, these emergent practices are driving massive transformations in the patterns of cooperative activity in art worlds and significant changes in how institutions

deploy their resources. This transitional period presents an opportunity for institutions to reconsider their roles and responsibilities regarding the preservation of and access to cultural heritage. Rather than concentrating information, material resources, and individuals with skilled expertise in museums and archives, institutions may instead seek to distribute these resources and cultivate the information, practices, and skills already burgeoning in communities. As Becker's (1982) conception of art worlds makes clear, cultural heritage institutions actively participate in cultural production by collecting, exhibiting, and historicizing canons of artworks. This custodial model fails in key ways for digital and new media art, as the digital curation labor integral to this kind of cultural production encompasses and exceeds the care of discrete art objects, and as the digital curation work needed to ensure the long-term viability of this cultural production begins with the artist.

In addition to collecting and caring for digital and new media artworks that have been deemed historically significant, cultural heritage institutions might reorient their roles in processes of cultural production to support artists' digital curation efforts earlier on. The findings of the present research can guide post-custodial and community-driven efforts to this end: by illuminating the kinds of information artists are seeking out, generating, and using; by describing the practices and skills artists are performing; and by surfacing the issues that pose persisting challenges for artists as they interact with information to develop and deploy these practices. Any such initiative to support artists' digital curation practices—especially those pursued by cultural heritage institutions and arts organizations and involving the investment of time, money, and other resources—should be based on an empirical understanding of artists' practices, targeting the kinds of information and tools that artists need and will find valuable, rather than proceeding from a notion of professionalized digital curation best practices abstracted from the

work artists are carrying out on the ground. Next, I lay out a few examples of what these kinds of resources, tools, or services might look like, although these are meant to be suggestive rather than exhaustive, and the development of any such initiative would benefit from further research investigating the particularities impacting how that initiative might be deployed.

While artists have access to a plethora of information resources providing guidance on working with digital and networked technologies through forums, YouTube tutorials, and official documentation, these resources rarely address issues specific to the digital curation of artworks and related archival materials. Through workshops or published resources, cultural heritage institutions could supplement these existing information resources by discussing the art conservation aspects of digital curation activities like migrating data across formats or documenting source code. Published materials, such as handbooks or videos, could prove useful to many artists looking for specific guidance on digital curation techniques and approaches, but there is also a distinct need for space for artists to engage other artists, along with professional conservators and archivists, in conversation about the broader implications and consequences of the long-term preservation of digital and new media artworks. Many study participants note that they lack communities in which to discuss issues pertaining to emulating or recreating artworks using new technologies, although they recognize that these might be the only viable preservation strategies for their artworks in the future. By hosting workshops or forums that bring artists together with LIS professionals and scholars to expressly discuss these issues and the varying stakes of these groups, cultural heritage institutions could address a significant gap in artists' information worlds.

Along with limited information resources addressing digital curation for artworks, artists do not have a wide array of tools at their disposal that are designed specifically for the long-term

care of digital and new media artworks or the management of related data. Companies like American Cyborg, mentioned in chapter four, and Getting Your Sh\*t Together<sup>105</sup> are increasingly meeting this need by developing database software and other tools to help artists keep track of their artworks with the goal of supporting artists' professional activities such as applying for shows, securing grants, and selling works to collectors. These kinds of tools are valuable aids to the kinds of personal archiving practices outlined in chapter four, all of which are core to artists' digital curation activities, but these tools do not directly help with caring for complex digital and new media artworks that may need to be updated, recreated, or documented in ways attentive to interactive or dynamic features of the work.

Cultural heritage institutions could contribute to the development of these kinds of tools, ideally following open-source production models that actively seek artists as testers or developers. Webrecorder, which I have mentioned at points throughout the dissertation, is an exemplary effort in this regard; supported by Rhizome, this tool enables users to easily archive interactive webpages in individually-maintained collections. Similar tools could be developed to aid in the digital curation of VR environments, AR objects, or creative code written in a variety of programming languages. In line with the information resources and workshops discussed above, cultural heritage institutions could also undertake efforts to make artists aware of available digital curation tools and provide training for how these tools can be integrated into existing studio practices.

Along with artists, curators of networked alternatives carry out digital curation work under precarious conditions, investing their own labor and financial resources to sustain both access to existing digital and new media artworks as well as conditions for creation and

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<sup>105</sup> <https://www.gyst-ink.com/>

dissemination of new artworks. Following post-custodial models that have been pursued for managing, preserving, and providing access to archives and records, established cultural heritage institutions could provide material resources and professional support in caring for digital and new media artworks without obtaining full custodial control of the artworks. As Flinn, Stevens, and Shepherd (2009) caution, these kinds of arrangements require both information professionals and records creators to grapple with potentially conflicting approaches to caring for materials, with these negotiations playing out in the broader context of shifting power dynamics between the institution and the community.

As an example of this, museums could maintain storage infrastructure following the model of institutional repositories (Lynch 2003); artists could deposit works and related archival materials into the repository, which would then carry out some basic digital curation functions ensuring the integrity of the digital objects. Such an arrangement could be particularly fraught for digital and new media art: artists may intentionally circulate their works outside traditional institutional settings; and institutions may struggle justifying the investment of material resources for artworks that have not officially entered institutional holdings. For major art museums to fully embrace post-custodial models in the exhibition, historicization, and ongoing care of artworks would involve transformative changes for institutions and artists alike—all of this significantly altering patterns of cooperative activity across art worlds.

While artists and institutions may be hesitant to try out such a model, institutions may want to eventually collect works initially shared and exhibited in networked alternatives like Paper-Thin. Curators of networked alternatives may be open to this as well, after the project has run its course and ongoing maintenance becomes onerous. For instance, Slocum has considered eventually handing over the records and archives of And/Or to an institution like Rhizome at



some point. However, as Sakrowski (2010) contemplates a hypothetical exhibition of the networked arts community *THE THING*, the inclusion of artworks that were initially created for circulation over networks necessitates interpretive and, at turns, poetic adaptations to more traditional and staid institutional settings. Collecting and caring for works first created for artist-run platforms will similarly require institutions to alter existing practices more suited for discrete, standalone artworks. Rather than acquiring a single artwork, institutions may need to collect the entirety of Paper-Thin, for instance, including the related archival materials, all of which could be maintained as a densely interrelated ecology of artworks, information systems, and bodies of data. In this situation, museums might adopt perspectives and approaches culled from records management alongside art conservation.

Any of the above ideas would need to be driven by the communities of artists, curators, and others engaged in digital creative production and would need to remain sensitive to the actual needs and desires of these communities. I am not suggesting that institutions develop information resources and tools that reinforce professional best practices for digital curation or that museums should take an ultra-custodial turn, attempting to bring all digital artworks facing preservation issues into the institutional fold. Ultimately, the digital curation of artworks and archives depends on communities of individuals and organizations, and the above ideas represent ways that established arts institutions can take active roles in working with these communities.

While major arts museums like MoMA, the Guggenheim, the Tate, and the Whitney—all of which have pioneered digital and new media art preservation and conservation methods—could spearhead these kinds of post-custodial and community-driven efforts, I more so envision media arts organizations like Rhizome and Harvest Works stepping into these roles, as these kinds of organizations provide more accessible entry points to artists and function in closer

proximity to current artistic production. These two organizations, in particular, have already taken leading roles in fostering communities around digital artistic production, providing resources and space for artists to create and care for digital and new media artworks. Moving forward, I aim for my present and future research to contribute to the development of similar kinds of efforts in arts organizations supporting communities in regions beyond New York and involving artists, curators, and others engaged in a broad range of artistic practices.

## **6.2) Implications for Arts Education and Pedagogy**

Academic arts departments and degree programs are another core feature of many artists' information worlds. As Hemmig (2008) notes, much of the existing literature on artists' information needs and behaviors focuses on student and faculty artists in academic settings, placing academic libraries at the center of artists' information practices. However, in the scholarly literature, as well as the present study, academic art departments do not feature prominently in artists' information seeking pertaining to digital curation issues. Many artists in the study (16) mention their BFA or MFA programs as places where they received formal training in artistic techniques and got immersed in ideas from art history, but some point out that they were not exposed to issues critical to the ongoing care of digital and new media artworks and the related data.

Educators in programs focused on digital media, such as Rothberg, Barcia-Colombo, or Hart, may be notable exceptions to this, as they discuss intersections and implications of preservation issues with the aesthetic experience of the work for present and future audiences. More broadly, arts educators and scholars of arts education have addressed the need for changing pedagogical approaches for training artists working with new technologies (Alexenberg 2008) and frame learning these technologies as a way to develop a critical literacy about the role of art

in digital culture (Freire and McCarthy 2014). As more artists work with digital and networked technologies from early on in their careers—and as more of these artists step into roles educating and mentoring the next generation of artists working with these technologies—degree programs and classrooms will become central sites for young artists to begin thinking about digital curation as integral to their creative practices. Further research in this area will be instrumental in formally integrating digital curation skills and approaches into curricula.

Alongside broader discussions about art and digital culture, such as the influence of Instagram over artistic production as mentioned by Norris and Barcia-Colombo, the present study suggests that there is great potential for improving how PDA and PIM skills are taught to art students. Many of the digital curation issues that artists encounter stem from managing large and complex bodies of information, including information generated from their creative practice like data constituting artworks or process materials like sketches, images, and prototypes, as well as other kinds of information and digital objects like scripts and software libraries culled from open-source projects. Courses addressing the issues associated with unruly personal information collections and strategies for organizing these collections could benefit artists early on, as the information practices they develop as students will shape their personal archives for the rest of their careers. As Hart has needed to comb back through materials generated over her decades-long career, she deeply regrets that she had not received any guidance (or warning) on digital curation matters when she was in school.

Digital curation instruction, including PIM and PDA skills as well as more involved preservation activities like migration and emulation, could be delivered in studio and seminar classes, as well as through library information sessions. As part of studio or seminar classes, students could discuss the relationship between digital curation practices and other creative

decisions about choice of materials or how artworks are exhibited. For example, returning to Rothberg's decision to maintain the Oculus DK1 headset as an essential component of *Memory/Place*, students might similarly negotiate the aesthetic or conceptual reasons for maintaining particular pieces of hardware along with the challenges this choice might entail. Supplementing this classroom instruction, librarians and other information professionals associated with academic art departments could provide information sessions targeting faculty with specific tools like databases for managing information about artworks or aimed at developing particular skillsets like documenting code. Bennet (2006) suggests a number of strategies for art librarians to form interpersonal connections with art students as a way to both gain a better sense of these students' needs and to encourage students to see the art library as a hub for diverse kinds of information beyond books and images.

De Lara and Norris both mention that their experience with Paper-Thin has inspired them to think about the pedagogical applications for digital and networked technologies. Even for artists not expressly interested in creating digital and new media artworks, De Lara and Norris suggest that bringing digital technologies into the classroom could be useful in teaching old techniques in new ways or to open students up to entirely novel artistic approaches. De Lara proposes using VR tools as a way for students to undertake certain formal, rote exercises required in entry-level classes without wasting inordinate amounts of materials. Norris imagines introducing a networked drawing application similar to that used in v3 to his students as a way to think about artistic collaboration in an expanded sense. Especially in digital media programs, students are already exploring the possibilities of digital and networked technologies, but these suggestions represent strategies for instructors to introduce technologies toward targeted educational goals.

For other populations of artists, public libraries could also be a locus for digital curation information resources and instruction sessions, as well as a forum to discuss aesthetic and conceptual implications of digital curation approaches. While academic art departments and programs occupy important roles in many artists' information worlds, other artists do not receive formal training in BFA or MFA programs or come to visual art through a related discipline like music or creative writing. Artists who are later in their careers, well removed from a BFA or MFA program, may also want digital curation instruction, especially if they are in a position like Hart, needing to manage years' worth of old projects and personal archival materials. Copeland (2015) makes the case for the public library as an ideal location for a digital archives comprising materials contributed by the community and sustained through the library's resources and the staff's technical expertise. In the process of building and sustaining such a community digital archives, librarians could work with community members to help them learn digital curation skills facilitating the care of materials in their custody or copied into the shared storage infrastructure. I hope to build on my earlier efforts in this vein to establish artist's archives at the Durham County Library (Post 2017b) and pursue similar projects to grow resources and community archiving infrastructure specifically for artists working with digital and networked technologies.

### **6.3) Limitations of the Study**

As mentioned in chapter three, one of the criteria for evaluating this dissertation is that the present study will serve as the foundation for future research. In discussing possible trajectories for future research, I also need to acknowledge the limitations of the present study that this future research may address. A principal limitation is the relatively small size of my sample. The case study design enabled me to focus my analysis on Paper-Thin, positioning this

particular platform within a broader history of artists' engagements with digital and networked technologies. The artists who have participated in Paper-Thin that I was able to recruit for the study discussed with me a rich body of experiences pertaining to the digital curation of their artworks and archival materials. However, I recognize that Paper-Thin is only one example among many other current platforms, galleries, and artist-run spaces for exhibiting digital and new media artworks; the artists who participated in the study are only a few individuals from a much larger population, the exact size of which is difficult if not impossible to gauge. Through the findings of this research, I have developed bases for theories about artists' digital curation information needs and practices and have articulated the emergent patterns of cooperative activity for the curation of digital and new media art as observed, but I have not reached a level of theoretical saturation. My ideas about artists' information worlds and patterns of cooperative activity centering around networked alternatives need to be further developed as I continue my research.

In further developing these ideas, my goal is not the generalizability of my findings as this is typically understood for research using quantitative methods. Much qualitative research, and grounded theory specifically, cannot readily be evaluated in terms of generalizability by mechanisms of statistical significance, relating findings from a sample to a broader population. Corbin and Strauss (1990) argue that the usual canons of significance, theoretical validity, generalizability, consistency, reproducibility, and verifiability for assessing 'good science' should be maintained for grounded theory research but that these need to be redefined "in order to fit the realities of qualitative research and the complexities of social phenomena" (4). For Corbin and Strauss, grounded theory researchers aim for representativeness "of concepts, not of persons," and achieve this representativeness and consistency through theoretical sampling (9),

eventually constructing theories that specify conditions linked through particular social actions and interactions leading to definite consequences (15). Now that I have gained a deeper sense of the phenomena under study, have developed an initial set of codes and categories, and have articulated burgeoning ideas about the various individuals, communities, organizations, and kinds of information involved in artists' and curators' digital curation practices, I can select samples in further research to build toward theories that meet the evaluative canons for qualitative research outlined by Corbin and Strauss and others.

Specifically, I would like to study other examples of what I have termed 'networked alternatives,' to see how these other examples might expand and alter my sense of this idea, which I have derived from my observations of Paper-Thin and, to a lesser extent, IRL and And/Or. Key to this, I need to not only study other current examples of artists' engagements with digital and networked technologies but deepen and extend my art historical research in this area. The art historical research I have conducted for the present study has offered invaluable richness to my analysis of the data generated from my interactions with the Paper-Thin curators, the participating artists, and the other participants involved in the study, but these connections to earlier examples and ideas from art history remain shallow, with many trajectories for inquiry left unexplored. Further consideration and application of ideas about the social, cultural, material, economic, and political relationships between art and technology, in particular from the cultural Marxist tradition, promises to add intellectual nuance and rigor to the social scientific theories I hope to develop as my research progresses.

Finally, I would like to highlight some of the limitations in data collection and data analysis that I experienced in the course of the present research. Given logistical and financial constraints, I was not able to visit the artists' studios in person or to see firsthand many of the

artworks created or discussed by the study participants. Conducting interviews via video conferencing software enabled me to speak with artists living and working around the world—and these interviews proved uniformly insightful—but there are some aspects of artists’ digital curation and broader artistic practices that are best communicated through direct interaction and experience of artists’ working spaces. For instance, I could not get a good sense of artists’ personal archives of analog materials or the arrangement of their workstations and attendant creative tools and artistic media over a video feed. Concerted and in-depth research of artists’ PIM issues and strategies, for example, may benefit from being physically proximate as a researcher to observe artists’ embodied and situated practices as they find, organize, and use information. Especially as I found geographic location to be an important factor in shaping artists’ information worlds, I may plan future research around visits to particular locations to better study artists’ information practices within the context of local arts communities, as well as to gain a direct appreciation of artists’ digital curation as it is practiced in a variety of working spaces.

Similarly, while I was able to interact with artworks that could be fully accessed with a web browser, such as Paper-Thin volumes 1 and 2, many of the digital and new media artworks created or discussed by the participants had some analog components, were part of site-specific installations or gallery exhibitions, or were no longer on display. I was not able to directly interact with or experience those artworks. In particular, I was not able to attend the HubWeek festival featuring Paper-Thin v3. As with much art historical research, my knowledge and experience of these works was secondhand: through documentation photographs and videos, the artists’ descriptions, or accounts written by others. While this has not fully inhibited me from critically thinking about these artworks and using my reflections on these works to arrive at



insights about artists' digital curation practices and information worlds, there are certainly aspects of these works that I would have only noticed by experiencing them firsthand. Limited access to digital and new media artworks—in particular those that are inherently ephemeral or intentionally variable over time—will always be a consideration for research in this area, but I may also plan future research around visits to specific exhibitions or to see particular artworks as they are cared for in artists' studios and archives.

Despite these limitations, I believe that the present research has met the criteria for success that I outlined in chapter three. These limitations largely stem from the exploratory nature of the research, as I have investigated phenomena that has not been thoroughly covered in the existing literature. As such, this research remains work in progress as I continue to develop the ideas, findings, and theories suggested by this study. Additionally, other limitations have come from the temporal, logistical, and financial constraints endemic to conducting dissertation research, specifically, and academic research more generally. While these limitations have shaped my research considerably, they have not impinged on the validity or reliability of the data collected and analyzed in the present study, and so the findings of this research constitute a sound foundation on which to pursue future research in this area, which I detail next.

#### **6.4) Directions for Future Research**

In the preceding sections, I have already hinted at some potential future endeavors that follow from the dissertation. I now detail some specific research efforts that I plan to take on in the coming years. Foremost, I want to continue research into the role played by networked alternatives in the long-term care of digital and new media art. Among the primary findings of the present research, artist-run platforms like Paper-Thin and other kinds of smaller gallery and exhibition spaces perform crucial functions in the emergent patterns of cooperative activity in the

creation, dissemination, and ongoing care of digital and new media artworks. These networked alternatives provide artists space to experiment with new technologies, although the curators assume extensive roles and responsibilities as they troubleshoot technical issues involved in the creation and staging of exhibitions and continue to care for artworks in the face of unknown variables and factors of technological change. I plan to expand on the present case study of Paper-Thin through a comparative analysis of other current spaces discussed by artists, including the Digital Museum of Digital Art,<sup>106</sup> Neverland Space, Rainedance VR, and others. In the opening chapter and at points throughout the dissertation, I have suggested how current networked alternatives like Paper-Thin can be seen in a broader history of artist-run exhibition spaces. My future research on this topic will seek to flesh out the similarities and differences between these current artistic practices and earlier examples, more fully draw out relevant ideas from the history of art, and ground these comparisons in a more developed historical account of artists' engagements with digital and networked technologies.

As part of a more intensive investigation into artist-run platforms for creating and exhibiting digital and new media art, I would also like to pursue more focused research on the intersections and overlaps of the many social worlds discussed above. As I suggest in the previous chapter, the artists' and curators' experiences with Paper-Thin illustrate broader transformations in art worlds and adjacent social worlds. Networked alternatives, in particular, configure and mutate relationships between local and online arts communities in evocative ways that bear further consideration. As another point of comparison, I am interested in putting this research in a more sustained dialogue with scholarship on open-source software communities, specifically, and scholarship in the areas of computer supported cooperative work (CSCW) and

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<sup>106</sup> <https://dimoda.art/>

science and technology studies (STS) more generally. In addition to artists' own engagements with open-source software, the present research has illuminated ways that artists' information practices and patterns of cooperative activity potentially mirror or parallel those of developers and users of open-source software. Methods, theories, and approaches from CSCW and STS would provide compelling lenses to examine and elucidate comparisons across these domains.

The outcomes for all this research will be information resources, tools, and services supporting the digital curation practices of artists, curators, gallerists, and others involved in the care of digital and new media artworks, both inside and outside of cultural heritage institutions. In the preceding sections, I have discussed the shape of some of these outcomes, which may take the form of museum outreach efforts, instructional resources for arts educators, or community archiving initiatives at public libraries. Throughout the present study, participants have mentioned tools or resources that they would greatly appreciate as they grapple with digital curation issues, speaking to the potential value for the outcomes of this research. The dissertation is a foundation on which I will continue to build with this future research.

## **6.5) Summary**

In this concluding chapter, I have stepped back from the present study to consider how the findings stand to contribute to other areas of practice and scholarship as well as lead to future research efforts. I have detailed implications for two potential audiences for the dissertation: cultural heritage institutions that have traditionally been responsible for the stewardship of visual artworks; and academic fine arts programs that equip artists with creative and professional techniques applicable throughout their artistic careers. Along with implications for these audiences, I have envisioned how the present study will inform my research program moving forward. As this study will serve as a foundation for these future research trajectories, I have also

outlined the key limitations of the present study that I plan to address as I pursue further research in the area of digital and new media art curation.

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