Artistic Concerns in Preservation: How to Preserve a Digitally-Born Artwork

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The rise of new technologies in the twenty-first century is accompanied by challenges in arts preservation that underscore the need to constantly adapt to new ways of approaching preservation issues. This article investigates the problems in preserving digitally-born cultural heritage and explores the connections between digital cultural heritage and preservation of digitally-born artwork. At the core of this study is the question of how to deal with and preserve digital cultural heritage in the changing world of technology, following a case study model with an emphasis on practical research. The results suggest that while the importance of preventing damage is crucial, further investigations are needed in order to fully treat issues concerning the accurate representation of the artist's intention.

1. INTRODUCTION

Contemporary cultures are inundated by multimedia. We might say that we now live in a multimedia-oriented environment marked by technological change in its essence, by the transformation and adaptation which naturally follows, and by the multiplicity of arenas that interconnect and touch upon each other [Eisenstadt 2007]. Ours is an era of both information and knowledge, supported by the globalization of communications systems and media. The Internet is an example of this global proliferation of knowledge and communication combined with the speed of rapid global cultural flux [Edelman 2017]. It is an environment of accelerated development of information and communication technologies (ICT) and technological innovations [Castells 2002], as well as equally rapid growth of new technologies [Edelman 2017]. In turn, as some media used in digital technology and art are becoming obsolete at an increasing rate, preserving a plethora of media in the arts is an uphill battle. The perishability of classic media such as film, the upheaval in new broadcast media, the near-ubiquity of the Internet, the explosive growth of digital media in a constantly evolving environment challenges us as we seek to preserve the original artworks [Depocas et al. 2004]. However, we should not confuse digitally-born data with digital data that were

converted from material objects, such as a scanned drawing by Picasso. An example of digitally-born data is computer art, which is computer-generated and digitally made without any other material. Scholars do address the preservation of this type of digitally-born data. In contrast, non-digitally-born data are taken from a material object that was scanned or otherwise transferred into digital form.

Museum Studies have touched upon how archives of scanned and born digital artworks housed in museums must be preserved [Kutner 2015; Harvey and Mahard 2014; Conway 2010; IMLS 2006; Chapman 2003; Shepard and MacCarn 2003; Granger 2000]. Also, the library community is calling our attention to the importance of scanning and creating databases to preserve original digital works [Harvey and Mahard 2014; Evens and Hauttekeete 2011; IMLS 2006; Arthur et al. 2004; Lesk 2004; Lusenet 2003; Chowdhury and Chowdhury 2003; Tanner 2001; Chapman and Kenney 1996; Rothenberg 1999]. Strategies for digital preservation in the world of cultural heritage are critical for the future, with special emphasis on preventing the deterioration of digital objects [Daigle 2012; Conway 2010; FADGI 2010; Rieger 2008; Strodl et al. 2007; Strodl et al. 2006; Rauch and Rauber 2004; Preserving databases 2003; Mellor, Wheatley and Sergeant 2002; Chapman 2000; Bearman 1999]. 3D digitization is also a way to preserve [Valentino 2012; Collmann 2011; Surendran et al. 2009; Conway 2000] as for example, 3D scanning of ancient Roman ceramics. The scholars cited above give more emphasis to the importance of digitization and archives of material objects, disregarding the preservation of the digital data itself and the media required for their storage. However, there does not seem to be the same emphasis on presenting ways to preserve the digital data, because raw data also need to be preserved. In addition, the hardware where the digital data are located is not given full attention in terms of preservation.   The subject of preserving, archiving and collecting technologies has also been considered [Van Saaze 2013; Aktive Archive 2012; Variable Media Network 2012; Graham and Cook 2010; Garcia and Vilar 2007; Rinehart 2000]. In addition, the same authors with the addition of Van der Hoeven and Van Wijngaarden [2005]; Preserving databases [2003]; Mellor, Wheatley and Sergeant [2002] and Rothenberg [1999], state that computer-based media urgently requires further attention and expertise.

2. PRESERVE THROUGH PREVENTION

As stated by Richard Rinehart "With digital art, there is no room for things to fall between the cracks…. If you don't do something to preserve it within a span of five years, it's not going to survive." [Harvey and Mahard 20xx:115].

In Depocas' view [2002], any attempts to preserve digitally-born art also need proper documentation, and he stresses many times, that what finally endures is this documentation. However, we should be aware that the loss of information when saving media to compressed formats such has JPG or MP3is inherent in the lossy compression algorithm adopted. Similar issues of lost data also arise with media playback and display equipment. As Wharton and Molotch [2009] asked: "when an installation's slide projector wears out, should its images be digitized for projection on a digital projector?".

The research across the preservation of digital data has been largely concerned with two predominant approaches for preventing the physical decay or the obsolescence of digital media:

migration and emulation. [Klaus et al. 2016; Van der Hoeven and Van Wijngaarden 2005; Preserving databases 2003; Mellor et al. 2002; Rothenberg 1999]. What is referred to as migration is when the material or tangible object is transferred into digital data. For Lawrence et al. [2000], "Migration preserves integrity and consistency." Emulation aims to simulate a certain digital environment that a digital object needs in order to be accessible. For example, a file from operating system A may be modified in order to be read by operating system B. Rotherberg [1999] delineates an ideal method for preservation by emulation. To be more specific, an example of emulation is when the Super Mario World videogame for Super Nintendo was emulated for the Nintendo Classic Mini released in 2016. Although what is lost in this emulation is highly subjective, in my experience the colors are too saturated, perhaps because of high-definition monitors that did not exist at the time of the original release. In this case, the improved quality creates a very different game, including the elimination of some of the original glitches [Albuquerque 2018]. It could be stated that in emulation there is a sense of loss in one way or another. Digitally-born art has both a physical (tangible objects) and virtual (intangible objects) part; this immaterial coding of any digitally-born artwork, just like computer software, is similarly based on 0s and 1s [Kittler 1995]. The physical parts we deal with are computers, hardware and components, electricity, formats, projectors, monitors, and the like. The artwork lives in these devices. The medium can also play a significant role in what an artist transmits through the work, as defended by McLuhan and Fiore [1989]. Although the medium may not be the artwork itself, the medium is an important piece of historical context for us to preserve for the future. Preserving computer heritage devices and media is essential [Pufal 2003], since this can be an obstacle for museums in preserving digital-born art which is not entirely material [Hairsine 2011]. Computer based works involve the computing devices as technical support, which can – but does not necessarily need to – participate in the creation of the aesthetic content of the artwork [Lurk and Enge 2008]. In relation to virtual data (intangible objects), in the digital arena we need to safeguard such data by decentralizing their storage, backing them up in different formats. Formats should be constantly updated since technology is always changing, therefore the lives of the devices are also in flux. Videotapes, hard drives, optical discs and any information storage systems have limited lifespans. Data users must transfer information from one system to another, or migrate it to newer technologies (e.g. analog video to digital video). Computer-based data can entail costly emulation or code re-programming in order to be accessible in a new technological system [Variable Media 2004]. For discussions of the factors involved in deciding the suitability of a file format for long-term preservation, we should consider the lifespan of every device that we are going to use. As an example, external drives have longer lifespans than USB sticks [Armsand and Fleischhauer 2003; Besser 2001; Brown 2003; Frey 2000; Lawrence et al. 2000; Sits 2000; Van der Hoeven and Van Wijngaarden 2005].

In a 2002 conservation project called "Archiving the Avant Garde: Documenting and Preserving Variable Media Art," a set of guidelines was offered to document and preserve media art. Some of the participating institutions were the Guggenheim Museum, Berkeley Art Museum and Pacific Film Archive, Walker Art Center, Franklin Furnace Archive and the Cleveland Performance Art Festival and Archive. They established four strategies for preserving digital art – documentation, migration, emulation and re-creation. A questionnaire made a distinction in their digitally-born artwork between the Virtual Data and the Playback Equipment (storage, emulation, migration, re-interpretation) – in order for artists to facilitate research about the conservation of their artwork. [Variable Media 2004]. Taken from the proceedings of a European project on the topic of preservation

in digital arts called Digital Media Art in the Upper Rhine Valley, it is equally important to maintain the integrity and quality of the medium through which the artwork will be read or played, as well as the devices where original artwork is located [Serexhe 2013].

Some artists already address these concerns in their artwork; Bill Viola and other artists provided "artist kits" or "archival boxes," which specified the physical aspects of his video installations even before the guidelines were set for digital preservation in 2002 [Corzo 1999]. Nam June Paik is one artist who allowed curators a great deal of flexibility in recreating the designs of his work according to their own interpretation [Hanhardt 2003].

For Joseph Beuys, a work of art is a finite being; he viewed his artwork as akin to living persons who are born, grow old and finally die. To that end, Beuys utilized organic materials such as wood, felt, or grease that deteriorates and perishes, much like people do. His reason for doing this was so that his artwork would be alive and eventually perish. For Beuys, his own artwork is a living organism that should not be restored; instead it should change like a human being that ages and gets wrinkles, scars, and broken bones. The wood should get worms and the metal is meant to rust. His intention was that his artwork should be transformed through time and die, so restoration or prevention of its decay worked against his intention [MNCARS 1994].

Glenn Wharton and Harvey Molotcht [2009] called attention to the idea that for artists, the aesthetic presentation may be one of the main concerns in preserving or not preserving media installations. However, for museums, foundations, curators and collectors there are fiscal, institutional, and cultural repercussions in decision-making about media installations. While Laurenson [2006] mentions that although artists may have described the work's presentation for future installation, there still may be discrepancies in the most current version of the work:"…there is documentation like score or scripts that ground the work within particular guidelines but does not presume identical rendition each time the work is re-created."

2.1   My View

As an artist, I will address my own digitally-born artwork such as computer art, video art and videogame art, which I often complement with multimedia installations in a kind of holistic symbiosis (these installations are either interactive or not) and experienced the difficulties of preserving these works as installations and digitally-born media. I started creating digitally-born artworks in 1998, but it was only in 2002 that I encountered some glitches in my early interactive computer animations. The cause of this was due to an update in Flash software and the lack of compatibility when nudging the file over to the Adobe Premiere video editing system. I thought at the time that in order to preserve this digitally-born data I should migrate it onto a physical mini-DV tape. In that moment, my animation video was in three different formats: inside a computer, on a CD and on mini-DV. My thinking was that in order to create more chances of keeping the backups long-term, I had better use different media for that purpose. I did this, also, because I am fairly organized when it comes to the labelling and storage of my artwork, and the technological glitch reminded me that I might need to diversify my storage procedures in the case that something unpredictable happened again.

"We need to get artists thinking from the get-go about how to make those choices...but art in variable media can't always be stored, migrated or emulated. A lot of times storage equals death for digital media," said curator Jon Ippolito in a guide to digital media preservation published as a collaboration between the Guggenheim Museum and the Daniel Langlois Foundation for Art, Science, and Technology [Depocas et al. 2004].

2.1.1   Labelling and archiving to keep the memory of the digital artwork in both tangible and intangible objects.

I began to approach the preservation of my own digitally-born artwork in the same way that museums document an artwork through labelling, securing photos, and managing data archives of a piece of art. Typically, I write a one-page description that includes high-quality still photography and specific technical needs that I keep printed in a waterproof folder inside a box where I can store them securely. I tackle this problem also by protecting an online data archive in the form of my website, which contains one-page descriptions and images of each of the digital works. As for the material approach, the use of gloves when handling is important, so that the salts and acids of perspiration do not damage the artwork. Also necessary is an awareness of how lighting, humidity and environmental temperature can affect the work, since these are all factors that can causean art object to deteriorate [Shelley 1987]. Works stored in plastics are susceptible to microscopic damage when exposed to wet cleaning methods, which are definitely best avoided [Ward, 1998; Fairbass and Williams, 1995]. I clean my artwork of the inevitable dust exclusively using compressed air, and I never use liquid cleaning solutions or water.

To summarize, the overall preservation methods that I use are similar to the steps of any preventive preservation:

- heat, ventilation, humidity, and any potential pests need to be accounted for in both physical and digitally-born artwork;

- clean dust from the physical materials which house the digital born artwork once a month with compressed air;

- migrate the digitally-born artwork onto videotapes such as Mini-DV or film. With photography, I convert digital photographs and print them into film negatives and positives;

- emulate any digitally-born artwork to change formats every five years or anytime there is a significant change in technology that will affect the artwork. For example, one reason I might need to emulate my interactive computer artwork into another medium is that once there is a Java update it stops functioning. Although the code will basically remain the same, slight modifications may be required when coding syntaxes experience shifts.

Similarly, video format that a player does not accept anymore, needs to be modified or updated for a more compatible player. Data storage in solid hard drives last longer and loose less data than mechanical "spinning" ones. Backups of the software for the survival of are digitally-born artwork. For example, in the videogame that I created in 2005 called ACTIVISM, I have the backup of the original software I used, and all the materials required for it to be played in the present day with current technology.

As an artist, I often consider the effects of time on my digitally-born artwork both in the near future and in the long term. I have to consider how the data will be affected, which software was used and which hardware, which physical bodies that have facilitated and will in the future facilitate the intention of my digitally-born creation. I think that to preserve digitally-born artwork we need to keep open-minds in alignment with what Jill Sterrett [2009] has suggested for art installations: we should make choices which are "open-ended" in keeping with what the artist has attempted to convey. Sterrett's discourse is concerned with the new challenges in preserving the works in contemporary installations for museums. In her view, it is imperative that conservationists remain very flexible when it comes to decision-making processes.

3. MATERIALITY VERSUS INTENTION

In one sense, to reconstruct a work requires imagination, and this new construction could be said to produce wholly new objects [Stanley-Price et al. 1996]. Moreover, evaluation of meaning in the public sphere is the force and reasoning behind any reconstruction. For Salvador Muñoz-Viñas [2009], there is no objectively superior way to conserve artworks. Alterations in the artwork are necessary for the preservation of its meaning, which has priority over the minimal damages which may occur in the conservation process. Muñoz-Viñas implies that it is nearly impossible not to cause a certain amount of damage, and this can be justified ethically to the degree that the original meaning of the work is preserved. For Muñoz-Viñas, the importance remains in the correct balance in terms of the artwork's integrity of meaning.

"Physical context always helps define a work of art, but this becomes more radically the case with installations that use environment to structure viewer experience" [Claire 2005].

Salvador Muñoz-Viñas [2013] discussed the complexity and changing meaning of heritage. Because of the rapidly changing era in which we live, adjectives like "old" have begun to lose their original meaning, as when a video game released ten months ago is considered "old." Therefore "heritage" can refer to material objects which are relatively recent, and professionals who are concerned with the preservation of "heritage" must be prepared to cope with a widening of expectations. "This is a completely different way of thinking about art," Ippolito [2001] said. "It's no longer about storage. It's about preserving intent, rather than bits or bricks." Invoking Thomas Kuhn's now commonly-used phrase to refer to rapid systemic changes, Ippolito professed that these intangible art objects are bringing about a "paradigm shift" as applies to contemporary art. The new paradigm, according to Ippolito's address at a 2001 conference at the Guggenheim Museum in New York, should be "as radical as the art it hopes to preserve."

An artist's intentions postmortem are subject to multiple interpretations that may not be what the creator intended [Clavier 2002]. Institutions are now initiating this level of dialogue with artists during their lifetime while in the process of acquiring the work [Cone 2002]. Furthermore, precedents for conservators across this type of artist-meets-conservator collaborative engagement have been set by the Guggenheim Museum and The Daniel Langlois Foundation for Art, Science, and Technology [Depocas 2002]. Growing out of this project is an ongoing research alliance between the New Art Trust, MoMA and Tate Museum called Matters in Media Art [2004]. This resource centers on the importance of taking into account the artist's intentions, and initiates initiatives toward direct

interviews or dialogue with the live artists as to the preservation of their artwork. Some researchers already bring attention to the importance of having an active dialogue between the artist's intentions and those directly enacting preservation, however the idea should be more widespread among all involved [Cone 2002, Depocas et al. 2004, Wharton and Molotcht 2009, Ippolito 2001, Laurenson 2006, Mancusi-Ungaro 1999, Muñoz-Viñas 2013, Serexhe 2013, Sterrett 2009, Stringari 1999, Wharton 2005, Wharton 2013, Wharton, 2016].

These dialogues hinge on the assumption that artists do experience a need to address preservation in their artwork, which may not always be the case. The artist duo JODI changed the colours and sound of computer game "Jet Set Willy" (1984) and recorded these versions on an audiocassette that could be played on the original ZX Spectrum video game console. The transference dropped some of the original physical interface, however they did not think that this would interfere with the experience; in fact, they often present this digitally-born artwork in multiple ways. Their production of "Jet Set Willy FOREVER" included the game on a ZX Spectrum, DVD, and video documentation of the artist demonstrating how to play with a set of written instructions and 60 prints showing the interior of the game [Dekker 2018, Leuzzi 2016, NEON 2016]. In their case, the documentation material is part of the artwork itself. How will institutions present the intention of this duo? It may be problematic to define what it really means to take into account the artist's intent; does it signify a process, as Wharton [2005] states, of "identifying the meaning, or artists intent"? What guarantee do artists have that conservators or institutions will follow all the artists' guidelines? I am fascinated with the yet undefined line wherein institutions might usurp artistic intent in favor of the historical record. Take the case of Joseph Bueys, for example: it may be a matter of debate whether museums or institutions will abide by the process of decay which the artist wanted for his artwork, or if museums will participate in steps to preserve it against his will.

For curator Dekker [2014], the context and discussions across internet art should always be communicated in procedures around its preservation, and that it could even take a position among top priorities. Since the end of the 1990's, I have felt the need to resolve this dichotomy between materiality versus intent in preservation of my more ephemeral works which often were digitally-born works or dependent on some form of technology and therefore subject to change. However, in the presentation of my own digitally-born art pieces I choose to vary my approaches over time. In the case of my computer art pieces and multimedia installations, both migration and emulation are solutions I use to preserve my intention.

My recent digitally-born art piece called "SuperMarioWord: ERROR..." is a game which is closely based on Super Mario World, but instead it is called Super Mario Word. For this video art game, I created two levels with built-in glitches. In a sense, these are not really glitches, because they are pre-programmed or intentionally implanted in the game, but in the context of the normal functioning of the game they would likely be perceived as "naturally occurring" glitches. Although I programmed them to be embedded in the game, these glitches still have additional, unpredictable variations. Dyson likens the preservation of video games with historical materials and equates their preservation with a kind of digital cultural heritage. Dyson states that the importance is not in the digital or material media but in the decision-making made about their preservation [American Journal of Play 2017].
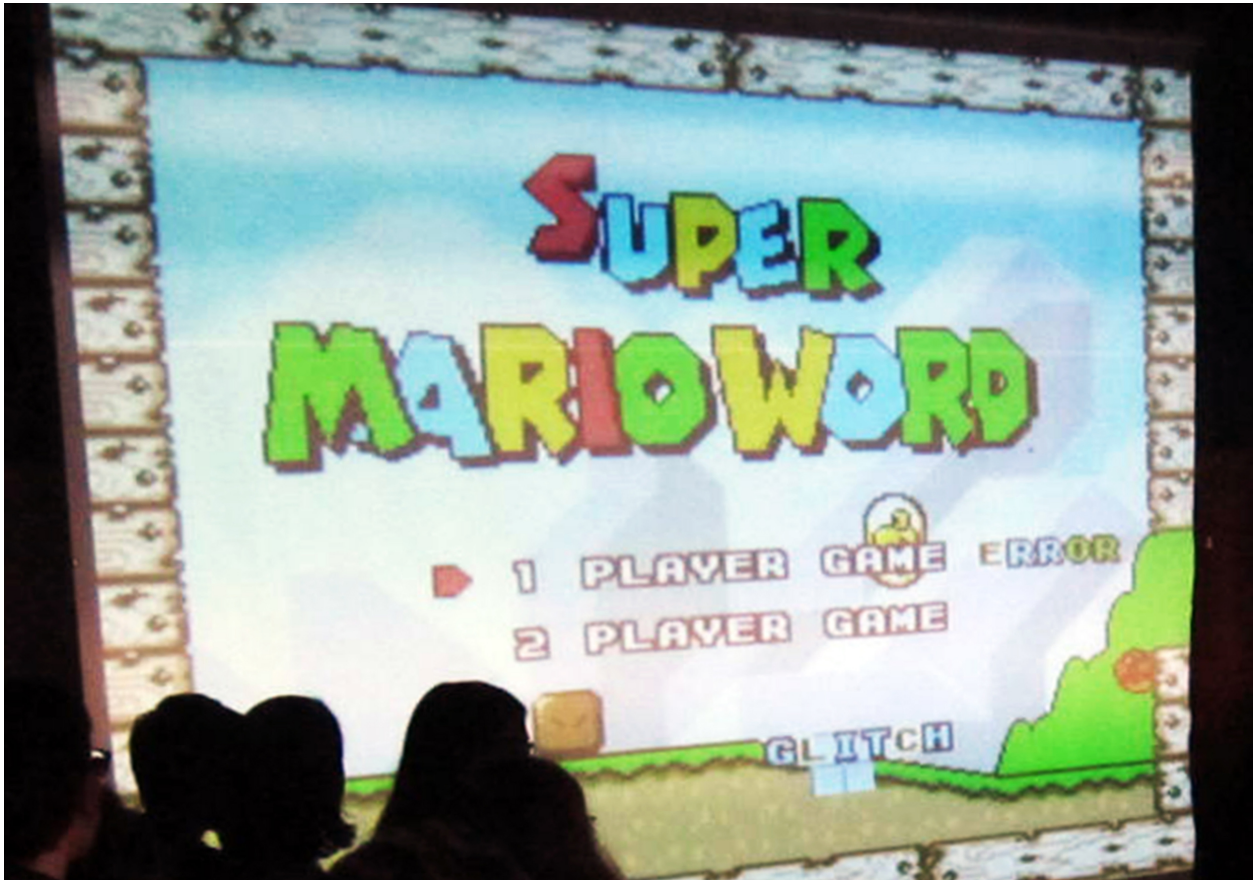
Figure 1. Videogame: SuperMarioWord: ERROR... [2013] by Beatriz Albuquerque.

The format in which my video art game exists is in a digital copy of the game that can be played on a computer. However, for the purposes of an art installation, I did not want a computer-based interaction with the public.

For this videogame art piece, the implied historical context is important for me, and so I referenced the original design by using a 3D printed sculptural shell of a console and hid the technology which actually runs the game underneath the shell based on a Raspberry Pi platform.

In this way, my intent was to emulate the look and feel of the SNES video game console from the 1990's. Preservation criteria for display are only the original in this case giving emphasis in what Laurenson [2004] proposes: that is, that the display equipment can involve assigning and identifying functional significance and their role in the artwork.

The intent behind this digitally-born piece of art is that it be playable and accessible in the emulated retro console environment that I created. Vital to the concept is to recreate the videogames of the past, with the unpredictability and behaviors of the videogame world of the 1990s. The work is accompanied by a one-page description, which includes a diagram and instructions on how to emulate the work with the 3D printed shell of the original console. A note about the fact that the

glitches in the game are designed on purpose and the user should not fix or debug them is also included. Emulating digital artworks often results in a loss of original color, sound or pixelization [Poynton 2004] as, for example, when up-converting a video from SDTV to HDTV [Ackerman 2002]. On the cusp of our new digital age in the late 1980s, Lowenthal argued that what is most important in preservation is the consistency and "continuity of form, of substance, of texture, of colour…" [Lowenthal 1988:141]. It is also possible that the dichotomy of material and immaterial (digital vs. analog) is not the pivotal issue. What takes priority is not whether the artwork was created from material or digital goods, but that the intent of the original manufacture can be emulated, reproduced, or repeated so it will not be lost. What follows Lowenthal's [1988] argument is not the gradual disappearance of the material in favor of the immaterial, but the acknowledgment that all media require faithful representation.

4. CONCLUSION

In this paper, there are lines of inquiry still left open for further study that may benefit the issues outlined here around preservation and conservation of both digitally- and non-digitally-born artwork. It is important to recognize and allow for these distinctions when discussing this topic.

To briefly distinguish what we do know from what we do not: first, we do have established perspectives from institutions such as museums and libraries that prioritize creating databases and archival systems. These systems of organization play a major role, emphasizing that the cultural heritage must be preserved on digital data. But in museum studies, there seems to be a lack of dialogue about how to preserve such digital data in particular formats, seemingly disregarding the preservation of the digital media containing them. What remains to be discussed is the assumption that digital media themselves are not perishable.

The above-mentioned artists, scholars and curators may differ in their points of view over the importance of preservation methods; having said this, I do believe in the value inherent in each of these perspectives. Some scholars prioritize digitalization of material goods over the preservation of digital data formats. Others recognize the perishability and short lifespans of digital formats. Still others are concerned with the methods of preserving or recreating artworks through migration or emulation, seeking to balance the purity of the artist's intention versus the longevity of the work.

In my case, my intentions concerning each artwork differs. At times, I may want the artwork not to be revived once the material structure or infrastructure of the software cannot be preserved. And there are other cases in which I would desire more continuity and longevity. For this reason, I leave detailed information about my intentions with each work of art.

The perishability of media presents a contradictory challenge in honoring the artist's intention in presenting the work. Artists may have specific, even idiosyncratic, instructions for preservation of their works. The example of Joseph Beuys is a poignant one, demonstrating the vast contrast to what may be standard or default preservation, since his artwork is meant, in fact, to deteriorate. The question remains: to what extent are museums and curators actively pursuing the intentions of the artists, preserving not only the artwork physically or in data form but in its intended actualization?

Regarding this last point specifically, it would be desirable to invite theorists, artists, curators and conservators to work together aiming at more effective actions in preservation, such as archiving and collecting technologies and digitally-born art. In addition, further investigation in all countries active in digital-born art would serve as a reminder that preserving computer heritage devices and media is an essential and vital part in preserving the intention of an artist's digitally-born artwork.

5. ACKNOWLEDGEMENTS

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