

Digital art preservation

Practical answers to theoretical issues

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Abstract— This paper gives an overview of the notions of authenticity, historicity and methodology in the digital art preservation field. These reflections result from a two-years research project on the preservation of complex digital objects. In this frame, I worked in close collaboration with the ZKM|Center for art and media technology in Karlsruhe, Germany, on the piece of digital art *Interactive Plant Growing*, to produce a preservation case study and a methodology proposal.

Index Terms—Authenticity, historicity, methodology, digital art preservation.

I. INTRODUCTION

“There are theoretical, methodological and practical problems associated with documentation, access, function, context and meaning of digital art, which require to be more systematically and scientifically addressed [...]” so said Perla Innocenti at the *Digital Art Conservation symposium* in Strasbourg in 2011. My paper echoes this research fellow statement from the University of Glasgow.

With interactive digital installations the technological devices are in the background, giving the opportunity to potentially interpret the artwork in different hardware and software environments. The conservation strategies promoting the technological change as means to preserve artworks by the systematic and continuous update of equipment raise many questions regarding to authenticity and historicity. If the authenticity of a work no longer lies in its materiality, what does it mean for an interactive digital installation to be authentic? If we update equipments systematically, what is the room left for historicity of digital technologies? Which kind of methodology may practically answers to these theoretical issues?

II. AUTHENTICITY IN DIGITAL ART ERA

With interactive digital installations, the mythic sentence from Marshall McLuhan “the medium is the message” has been replaced by “the practicability is the message” [1], meaning those artworks are behavior-centric. The digital medium used as means for artworks practicability leads to new conception of authenticity; a dynamic authenticity no longer lies in materiality but rather in a kind of *installed event*, quoting Pip Laurenson [2]. This theorist reminds us that

artworks authenticity is traditionally evaluated according to physical and material integrity. Then, the notions of authenticity and historicity are closely interrelated. To be authentic an object has to be in its historical state, meaning with the original materials. These objects are so considered as *autographic* [3]. With digital artworks, this notion evolves according to the ephemeral and unsustainable nature of their materiality. Pieces of digital art are rather *allographic*. Their authenticity is related to the artwork experience.

To ensure the sustainability of digital artworks we need to consider them as based on variable media. Sure we need physical artifact such as computer to run the software of the artwork but we are not tied to any specific computer according to the reproducible nature of digital. We are rather tied to a specific environment in which the software is readable. This specific environment may change or disappear according to technological development so we will update or adapt the software so it can be accessible. The artwork will still be considered authentic because it is not about the technology; it is about the event resulting from the interaction between the viewer and the computational system following specific properties and instructions which might be compared to musical score. And as a musical work is considered authentic if the musicians follow the instructions gave by the musical score, interactive digital artworks may be considered authentic if the museum or the institution exhibits it following a kind of score. This score would be a set of parameters that define each iteration of the artwork.

III. HISTORICITY AND LONG TERM ACCESS, AN IRRECONCILABLE CONFLICT?

Whether it is possible to move the practicability of the artwork from one technology to another while maintaining the authenticity, what about the historical and socio-cultural values of these artworks?

“Digital preservation consists of the processes aimed at ensuring the continued accessibility of digital materials.”¹ To ensure this continued accessibility, the ultimate solution is to continuously and systematically update and adapt the

¹ <http://www.unesco.org/new/en/communication-and-information/access-to-knowledge/preservation-of-documentary-heritage/digital-heritage/concept-of-digital-preservation/> (consulted on the 24 of June 2013).

hardware and software environment each time it is needed. However, by constantly updated this technological context, we give up on the historical materiality of the work. By sacrificing this historical anchorage we ultimately abandon the social and cultural context of the artwork.

This historical significance of visible and non-visible devices gives to the artwork an unprecedented incarnation as a witness of our technological past. This leads the conservator-restorer to reconsider the update approaches. This historical curiosity is at the heart of media archaeology and culture of repair promoting the conservation of the original technological environment - by means of repairing the non-functioning device with the help of spare parts or replacing it by a similar one, from the same period - in order to study the impact of technology on art practices and document the use of technology in all its manifestations.

Considering the deadline imposed by the availability of the spare parts, this techno-centric approach cannot ensure the long term accessibility of digital materials. Therefore, it seems there is a kind of irreconcilable conflict between long term accessibility and historicity of digital artworks; at least, in the same example of an artwork.

In the last decade, we saw appear a new approach in the digital art preservation field answering those two preservation needs. This approach stems from the reproducible nature of digital and a new dynamic way of thinking conservation. It is called hybrid strategy or hybrid initiative leading to two versions of a same artwork: a historical version and a "refreshed" version - refresh used as a synonym of update in computer terminology [4].

These hybrid initiatives would be a kind of step, not a goal, in digital art preservation, considering the unstable nature of these artworks materiality evolving in a technological landscape subject to the rhythm of socio-economic phenomena - causing sometime the so called planned obsolescence. This rhythm, which is different from that of art and memory, leads the conservator-restorers to freeze the time during couples of years. That way, the historical version will let the time to this particular part of our technological past to enter in the collective memory, and the "refreshed" version will ensure the long term accessibility to an alive and practicable digital art heritage.

An added benefit can be assimilated to this initiative: the possibility of comparison. Seamus Ross notices [5] that "firsts renderings of digital objects might best be referred to as an initial "representation or instantiation". The historical version being the initial instantiation, it could allow to validate the subsequent instantiation by comparison: the subsequent instantiation is authentic if, and only if, it is similar to the initial one by its practicability, its behaviors and its effect. Therefore, this initiative can usefully be applied to maintain the authenticity (for example, comparison of the visual artifact aspect, of the software speed etc.).

IV. INTERACTIVE PLANT GROWING, A PRACTICAL CASE.

The interactive digital artwork *Interactive Plant Growing* (1992, Christa Sommerer & Laurent Mignonneau) acquired by the ZKM|Zentrum für Kunst und Medientechnologie Karlsruhe in 1997, has been the practical case of this research.

This artwork is exhibited in a dark room where standing five plants (a moss, a tree, a fern, an ivy and a cactus) in front of a large projection screen. In this piece of digital art, virtual 3D plants appear in real time on the screen when the viewer touch or move his hands toward the real plants.

Technologically speaking, the electrical potential difference between the plant and the user's body is captured with the help of electrodes placed in the roots. Then these electrical signals are filtered, amplified and converted in digital data thanks to two hand-made electronic interfaces. These digital data are sent to the computer where the artwork's program will interpret them and display the corresponding virtual 3D plants (which look similar to the real plants).

This program (written in C language by the artists) originally operates on a SGI Indigo² Maximum Impact 10000 computer with an IRIX operating system. In 1999, the ZKM museum decides, according to its scientific and cultural project which is to study the impact of technology on art practices, to keep this installation in its original hardware and software environment. Indeed, according to the conservator, Bernhard Serexhe, this artwork is a good witness of the use of technology. Subsequently, the SGI is playing a significant role in this historical anchorage by being one of the first computers available for a large audience to offer amazing texture mapping at this time. This choice has been made possible by the availability of a large number of spare parts and complete desktops resulting from the commercial popularity of the SGI Indigo².



Fig. 1. *Interactive Plant Growing* photograph
© Sommerer & Mignonneau

To ensure preserving the practicability of the artwork in its historical state for a relatively long time, some preventive measures have been added to the purchase of spare parts:

- regular inspection during storage period as well as exhibition period to detect eventual dysfunctions,
- the stop of lending to avoid damages due to bad manipulation and travel,
- and a redundant backup of the whole software environment (program, operating system and graphics drivers) in case of hard drive failure.

Alongside these efforts, the ZKM produced with the artists a new and entirely separate installation in 2000. This new version, identical from the viewer side, runs on a IBM PC compatible computer on Windows 98 operating system after *porting* the source code from C to C++ language (and adding a portion of code to slow down the software speed). The aim of this new version is to ensure the long term accessibility of the artwork. It will also allow the loan of this artwork in order to promote interactive digital art all around the world.

This new version is currently obsolete but its role of “refreshed” version allows conservator-restorers to update and adapt it if necessary. The migration, the virtualization and the *cultivation*² strategies are currently considered by the museum and the artists, after I have done a treatment proposal resulting from my methodological diagram.

V. DIGITALIS, A METHODOLOGICAL DIAGRAM FOR DIGITAL ART PRESERVATION.

Which kind of methodology may practically answers to those theoretical issues of authenticity, historicity and long term access?

If there is a theoretical approach seems to be based on a simple precept of Perla Innocenti: “keeping the bits alive” [6], there is a lack of methodology for decision-making process in digital art preservation. In the frame of my master thesis in the Avignon Art School and my fellowship at the University of Maine (Still Water Lab, Variable Media Network) I studied all the international research conducted on digital art and variable media preservation (DOCAM, Rhizome, IMAP, PANIC, POCOS...) and I decided to conduct myself an experimental online methodological diagram³ aimed at helping museums stakeholders. The goal being to do a state of the art of the best practices in a logical path, to gather all these research projects’ results in the same place and potentially create a sharing platform to exchange point of view and practical cases.

This diagram is composed of four interdependent phases: documentation/archives, conservation plan (decision-making) preventive conservation and curative conservation. Each phase is divided in several steps that are needful to do or at least to consider in the preservation process. All the steps are clickable and available in three languages: French, English and German,

² Term mentioned by Neil Chue Hong, Software Sustainability Institute, The University of Edinburgh.

³ <http://digitalis.litchio.com>

and contains check-list and links towards websites, online tools, guidelines and documents.



Fig. 2. DIGITALIS, methodological diagram of the preservation of complex digital objects.

The circular shape of this diagram is driven by a need for a non-linear use. This choice results from the on-going process nature of digital art preservation. The methodological aspect allows a systematic approach by decomposing preservation in multiple, interdependent and needful actions following a lifecycle principle.

The DIGITALIS diagram is not descriptive but normative. It gives an overview of the paramount phases contributing to the preservation of a piece of digital art in a museum frame. It describes all the information you have to take into consideration before making any conservation treatment.

The documentation/archives phase aims the conservator-restorer at documenting the score of the artwork before making any paramount change that could endanger its authenticity. This score, called “optimum working conditions” in the diagram, is a set of properties that defined the identity of the artwork such as the implementation, the interface, the functional components by which the inputs are played back and the output are displayed, the reception of the artwork, the practicability (the way the viewer encounters the artwork and by which means), the produced effects, the representation artifact (visual, acoustic, textual) and all the information contributing to the meaning and the experience of the artwork. The information will allow the interpretation and the reinterpretation of the artwork in a new technological context while maintaining the experience of the artwork and keeping it both alive and authentic.

Several tools are available to document or gather this information such as the *Variable Media Questionnaire*. It is an online tool “designed to help a work’s creators and users write

guidelines for translating their works into new media once the original medium has expired"⁴ by documenting the artwork regardless of its technological context⁵. There are also the MANS (Media Art Notation System) a XML initiative from Richard Rinehart integrating both human-readable and machine-readable score [7], and the installation template from the Matters in Media Art project⁶ (Tate) enabling exhibit time-based media installations in proper conditions.

The second phase is composed of four steps focusing on the decision-making process. The first step named "identify equipment significance" is actually the step where stakeholders will decide whether the device has a historical significance. To be as objective as possible, the decision-making has to result from an interdisciplinary effort to decide if the device is a significant witness of our technological past. To figure it out, some criterions can be helpful as commercial popularity, spare parts availability, use of the device, people interest etc. This step is followed by an evaluation and analysis of the risks regarding obsolescence, dysfunction, skill loss, etc. This step leads to an analysis of the existing recognized conservation strategies (emulation, storage/repair, migration, virtualization, portage/*cultivation*, reinterpretation) in order to exclude the ones not feasible. The remaining curative strategies will be organized in terms of risks and resources requirements. To be successful the curative conservation strategies have to be associated with preventive conservation measures such as regular inspections, redundant data backup, digital curation or technological watch. The whole analysis will give rise to one or several treatment proposals. The last two phases give an explanation of each strategy as well as its advantages and disadvantages to help the decision-making. On the other hand, the check-lists will help for the treatment process.

Basically, this diagram helps the museum stakeholders to gather all the information that defines the parameters of each instantiation of the artwork in order to make a decision which preserves the artwork experience and therefore its authenticity. It also enables the stakeholders to ask themselves the right questions in order to maintain this authenticity despite the inherent variability of the artwork materiality. By being as objective as possible, it helps understanding the potential risks and benefits of each conservation strategies and ultimately choose the one which maintains as much as possible the artwork's practicability, behaviors, artistic concept and effects at each preservation cycle.

⁴ <http://variablemediaquestionnaire.net/> (consulted on the 24th of June 2013), project of *Forging the Future*, an alliance dedicated to building tools to help rescue digital culture from oblivion, leads by John Bell and Jon Ippolito from the Still Water Lab in the University of Maine, USA.

⁵ "This Questionnaire is unlike any protocol hitherto proposed for cataloguing or preserving works. It requires creators to define their work according to functional components like "media display" or "source code" rather than in medium-dependent terms like "film projector" or "Java." Quote from <http://variablemediaquestionnaire.net/> (consulted on the 24th of June 2013)

⁶ <http://www.tate.org.uk/about/projects/matters-media-art> (consulted on the 10th of June 2013).

VI. CONCLUSION

Maybe this diagram could be a methodological way "to represent what was originally presented to users by a combination of software and hardware tools acting on data"⁷ whether it is with the original or current tools. The DIGITALIS project is still experimental and has been created to be in constant evolution. The diagram needs to be used to become an efficient tool. By being used, the diagram will be gradually improved in its structure, its ergonomic and its content with the hope that one day it becomes an open-system adaptable to any kind of complex digital objects (so far, it is hypothetically efficient for interactive digital installations only, for example, the Internet-based artworks are not addressed). My goal being to produce an actual answer to the questions that leads the decision-making process in digital art preservation: Is there a discrepancy between the historical state of the artwork and its practicability? If we ultimately reinterpret the artwork in a new technological context, how do we know if we've kept its authenticity?

With this paper I hope to stimulate interest in my methodological proposal and initiate discussions about current and future best practices in digital art preservation answering the larger range of practical issues associated with the constant evolution of digital art practices.

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⁷ <http://www.unesco.org/new/en/communication-and-information/access-to-knowledge/preservation-of-documentary-heritage/digital-heritage/concept-of-digital-preservation/> (consulted on the 24 of June 2013).