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Post *Wow*, is Less More? A Critical Approach to Animated Mapped Projection for Art Historical Knowledge Sharing
The Twentieth-Century Mural as a Case Study

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Abstract This paper critically considers digital curatorial practices, increasingly used both in commercial and museum settings, involving the animated mapped projection of digitised works of art. It draws attention to the problematic and common misuse of the term 'immersive' to designate such practices and examines their effectiveness for art historical knowledge sharing and meaning making. Through first-hand observation of a number of such exhibits, the paper considers the lessons that can be learned from them and how they would specifically apply to a corpus of twentieth-century frescoes that make up the study object of a research project on art historical digital curatorship.

Keywords Digitised art curatorship. Immersivity. Mapped projection. Animation. Stakeholder co-creation. Twentieth-century murals.

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1 Introduction

Mid-twentieth-century murals, a key piece of the socio-political history of modern art, constitute a vulnerable heritage that is largely unknown to society. A visibility problem has hitherto been a major factor – among others, not least some of the murals' political associations – limiting the academic study and public awareness of this form of art in Europe. Murals were mostly created as an intrinsic part of architectural structures, and their fate has therefore been subject to changes of ownership and use in the buildings housing them. Today, mid-twentieth-century murals that have survived demolitions and refurbishments often find themselves in sites with limited or no public access. Their very architectural nature, moreover, has hitherto hindered their inclusion in museum and gallery exhibition circuits. The surviving murals of those decades, therefore, whether created for public institutions, corporations, churches or commercial spaces, remain vastly underexplored.

Computational tools and digital display technologies now make it possible to reclaim the visibility of murals for scholarly study and public exhibition and discussion. High resolution digitisation can create detailed renditions that act as digital records for preservation purposes – of special significance in the case of endangered works – and can be integrated in 3D models of their architectural setting for online study and dissemination. Crucially, the digital images of the murals can also be used to display them by means of projection in a museum setting under conditions that recreate, if not the original architecture, at least two key features of the original works: their scale, and the embodied, spatial, and collective modes of reception that are experienced in their physical location.

However, the exhibition of digitised works of art through large-scale projections raises major curatorial issues. The last few years have seen a proliferation of commercial venues across the globe offering digital displays of works of art in what is generally referred to as 'immersive experiences'. These tend to be based on all-enveloping animated mapped projections of deconstructed and amplified digitised paintings by canonical names in the history of art, complemented, as the case may be by more or less interactive VR, XR, AR elements. The popularity of this kind of manifestation is increasingly drawing the attention of art museums keen to explore ways to harness the potential of some of the devices proposed in them – 'immersivity', interactivity, animation – for their own curatorial purposes. The adoption of this exhibit model in a museum setting raises significant challenges regarding art historical knowledge communication and audience engagement and agency. These issues are being addressed in an exploratory project that critically considers the use of computational tools and digital strategies for a meaningful and

engaging two-way communication on art historical objects in a museum setting.

The project *Lime, Pigments, Pixels, Motion – Bringing Modernist Mural Heritage Back to Public Life*[1] addresses this issue taking mid-twentieth-century mural paintings as its object of study.

An international team of researchers, with specialisms in art history, social history, heritage conservation and virtualisation, animation, digital and tangible curatorship, audience engagement, and contemporary art practice, will test a critical digital curatorship approach on a small corpus of fresco murals as a pilot study to assess its effectiveness, societal impact and replicability potential. The corpus under study comprises seven murals (dated 1944-1960) produced in Oporto by Dordio Gomes (1890-1976). Gomes is a recognised figure in the generation of modernist artists that laboured under the dictatorial Estado Novo regime. In his 25 years as professor at the Porto High School of Fine Arts, he set up the first fresco painting course in Portugal. While his easel oeuvre has received ample historiographical attention, his murals were only once the object of a small exhibit that was limited to the display of preparatory drawings (Castro, Machado, Vasconcelos 1997). A recent overview of his overall oeuvre stresses the centrality of the mural – and fresco in particular – to his artistic practice and teaching (Castro 2021) and grounds this project's objective to explore it for the first time in depth. Gomes' Oporto murals are a representative body of works: three were created for public institutions (City Hall, a courthouse, a university), two for commercial establishments (a café and a bookshop), and a further two for the Catholic Church. Subject to the commission brief in each case, his murals cover a variety of themes, from celebrations of life and the arts to classical mythology and historical and religious themes. Two of them are publicly accessible, four are only partially

1 Research for this paper is funded by Portuguese national funds through FCT – Fundação para a Ciência e a Tecnologia, I.P., under project 2021.00456.CEECIND. The paper also results from the following projects led by Nuria Rodríguez Ortega, Universidad de Málaga: *Estudio e interpretación del dominio de las exposiciones artísticas como sistema cultural complejo mediante analítica de datos y procesamiento del lenguaje natural* (PID2021-125037NB-I00); *Ecosistema de datos abiertos y enlazados del subsector cultural de las exposiciones artísticas: formalización ontológica, soluciones tecnológicas y modelos de explotación para la generación de conocimiento y valor en el ámbito de las ICC* (PY20-00508); and *Diseño de un modelo semántico guiado por ontologías del dominio de las exposiciones artísticas para la generación de conocimiento y valor en el ámbito de las Industrias Culturales y Creativas* (ICC) (UMA20-FEDERJA-126).

Currently being developed at Art History Institute, Universidade NOVA de Lisboa – School of Social Sciences and Humanities / IN2PAST – Associate Laboratory for Research and Innovation in Heritage, Arts, Sustainability and Territory, involving also researchers from Universidad de Málaga; FBAUP – School of Fine Arts, University of Porto; Universidade Católica Portuguesa; Leeds Beckett University; and Reial Acadèmica Catalana de Belles Arts de Sant Jordi, Barcelona.

so, one has been removed to a private collection. All are due for in-depth examination.

Using advanced photogrammetry, the project is converting the lime and pigments of these frescoes into the pixels of interactive 3D digital twins (Roque Martins, Crespillo Marí 2023). High resolution, small tile photogrammetry allows for the tridimensional capture of subtle but crucial variations in texture on the murals' surface – including the seams that denote a fresco's production *giornatte* – as well as the curved format of some of the works under study. In addition to incorporating the digital twins into 3D architectural models of the spaces housing them, the team is extracting high resolution 2D images of the murals for large-scale projection purposes.

The use of these materials in a pilot exhibition planned for the first quarter of 2026 in Oporto is intended to test the communication potential of some of the practices now common in digital exhibitions – immersivity, interactivity and animation – while heeding recent calls for a critical, ethical and sustainable deployment of digital technologies in cultural ecosystems, in ways that may reclaim the museum as a space for unhurried reflexion, aesthetic contemplation and meaningful social interaction (Rodríguez Ortega 2023a). We live in a hyper-technological society that requires new approaches when it comes to the human-technology connection in museums, where

> the techno-critical interface must operate as a form of techno-dissidence and techno-resistance, creating situations of conflict and producing counter-interfaces. (2023b, 20)

Hand-in-hand with this critical digital approach, the project will attend to the distinctly social dimension of mural painting (Farré Torras 2023) and its sometimes dissonant nature as heritage, by adopting a public humanities approach to its object of study, placing audiences not as passive downstream recipients of scholarly knowledge, but rather seeking their upstream involvement in research and co-creation activities (Fischer, Mantoan, Tramelli 2023). In this regard, understanding public perceptions of the murals in question is deemed essential to help establish their current societal value and promote public agency in discussions among stakeholders on potential intervention and/or conservation measures. To this end, and in collaboration with the institutions housing the murals, local communities will be encouraged to contribute to the research effort from its early stages in online and in-person public canvassing activities, while art students will be invited to enter into a critical dialogue with the murals. They will be given the possibility of contributing to the exhibition with creative responses to the murals both in tangible form – with a special emphasis on illustration – and in digitally animated short films using the 2D images extracted from the digital twins.

The *Lime, Pigments, Pixels, Motion* project is in an early stage of development, with work simultaneously underway on three tasks: (a) field research to advance art historical knowledge on the works under study, understand their reception over time and their heritage relevance to today's society; (b) digitisation to provide the 3D and 2D images to be used for communicating the knowledge acquired in field research; and (c) a critical examination of current techno-mediated strategies for art historical curatorship, to help define the basic principles that will guide the design of the digital components of the exhibition. The critical examination described in task (c) above forms the basis for this paper and is grounded on the understanding that technologies not only reconfigure exhibition practices, but also their audiences; they do not play a mere auxiliary role, but fundamentally transform the possibilities for audience interaction, participation and learning. Techno-mediation therefore poses significant challenges with regard to the design of curatorial narratives in which objectives, methods and outcomes effectively reconfigure an exhibition space in which the viewer is no longer a mere passive spectator (Rodríguez Ortega 2023c, 383-422).

The following discussion considers these challenges from a theoretical perspective as well as from the first-hand observation of a number of digital exhibits (listed at the end), involving the animated, mapped projection of digitised works of art. The eight exhibits referred to here are a representative sample of a larger overview of digital exhibitions and displays, in both commercial and museum settings, that were visited by one or more of the authors between July 2017 and October 2023, in order to learn from their strengths and drawbacks and help devise the project's own strategy for the murals' exhibition. They comprise four 'immersive experiences' in commercial venues, another two in museums, and two digital installations by contemporary artists in dialogue with objects in museum collections. A further museum exhibit, recently opened at Paris' Grand Palais Immersif, though not yet visited by the authors, has been included in the analysis given the typological affinity of its object of study – street art – with the murals under consideration here. Observations regarding this particular exhibit are therefore based on official videos available online. An in-depth examination of any one of these events would be beyond the scope of this paper. Rather, the purpose here is to reflect on the potential effectiveness of two key elements of their digital curatorial strategies – namely immersivity and animation – for art historical knowledge sharing. The discussion will moreover consider a generally overlooked, yet crucial, issue often observed in the techno-mediated exhibition of digitised works of art: the disconnect operated between the digital rendition of an artwork and the material physicality of the object purportedly being displayed.

2 The Immersive Misnomer

The term 'immersive' has become commonplace as a catch-all for widely differing curatorial strategies ranging from more or less enveloping audio-visual projections to AR, XR and VR experiences requiring the use of individual viewing devices. With two exceptions, namely the two art installations, at the Prado Museum and the National Gallery, all the exhibits contemplated in this study incorporate the term 'immersive' as either part of the event title, particularly in commercial venues, or in its description. Among these, Paris' exhibition and museum complex Grand Palais has even created a subsidiary with its own permanent venue dedicated to the "production, operation and distribution of digital exhibitions".[2] Branding it Grand Palais Immersif, it applies the term to the institution itself, a world renowned cultural referent, thus inaccurately sanctioning it as an umbrella designation for what it then describes as a mix of "audio-visual, narrative, interactive and immersive content".[3]

This use of the term immersive is problematic. An art exhibit will be truly immersive when its narrative integrates the neurocognitive and somatic multisensory nature of the subject-spectator, heightening, in turn, the viewer's relationship with the work while enhancing a transfer of knowledge and formative learning through continuous in situ feedback (Crespillo Marí 2022; 2023).[4]

The exhibits under consideration here, again with the exceptions mentioned, present themselves as immersive when, in reality, what they offer would be more accurately described as enveloping or surrounding. Their approach relies largely on the use of more or less sophisticated means of image projection, spatial sound, motion sensors, touch screens, and even a type of dynamic lighting capable of dramatically altering the atmosphere with little to no actual co-creation by the viewer. The enveloping exhibit is rather a techno-mediated narrative subgenre where the sensory experience (if well executed) surrounds viewers but does not immerse them.

Although digital objects, aesthetic approaches or other ways of experiencing art are generated from these, the curatorial content, for the most part, lacks deep narrative or pedagogical impact (Rogovsky, Chamorro 2020, 141-8). In an approach closer to disseminative gamification, the viewer is offered another way to come into contact with certain manifestations of the history of art, without actually

2 https://grandpalais-immersif.fr/en/who-are-we.

3 https://grandpalais-immersif.fr/en/who-are-we.

4 The 2022 citation refers to a PhD thesis that is embargoed until September 2026. Some of its findings relevant to the issues at hand were published in the 2023 article cited here.

being included in a critical or reflective dialogue with them to complete the in-situ experience. Such an approach distorts the concept of effective techno-mediation, replacing it with that of mass spectacle.

In this type of experiences, the environment is designed to capture the sensorial attention of the subject-spectator through external and interactive stimuli. The viewer remains a largely passive participant, captive in the large-scale spectacularity of displays that tend towards sensory overload and leave little room for any critical or reflective engagement with the works of art supposedly being presented. These, in fact, often become hard to discern in any meaningful way. In their ostensible purpose to 'immerse' the viewer, these productions deconstruct, fragment, magnify and animate the works, often beyond recognition, so that their images can be made to fit the available projection surfaces. The itinerant character of many of these exhibits, moreover, requires subordinating the integrity of the artworks to standard parameters that allow the adaptive deployment of their images on the walls and floor (ceilings are rarely included) of widely differing projection venues. While in thoughtfully conceived configurations this kind of display offers undeniable educational potential – some of the venues position themselves as edutainment providers – it does not create the conditions for actual immersion, where the subject has agency for aesthetic-cognitive exploration in an intra-spatial and temporal sense at an emotional level.

The commercial misuse of the notion of immersivity has been denounced by contemporary digital artists who point out that it trivialises the work, creative input and rigorous research that goes into generating actual multisensory environments (O'Brien 2022; Batty 2024). Drawing attention to the same issue, Vitor Blanco positions this type of enveloping audio-visual production as a modern day iteration of a genealogy of surround spectacles going back to nineteenth-century panoramas and cinema of attractions (2023). This, in Blanco's view, undermines their claim to novelty and to ushering "the future of cinema and museums".[5] While the conceptual parallelism between nineteenth century panoramas and today's enveloping audio-visual exhibits is indeed recognisable, it does not necessarily invalidate their potential value to the future of museography. In fact, Malani's installation at the National Gallery is more accurately referred to as a "panorama" of video projections that "immerses the viewer";[6] that is, the museum correctly acknowledges the genealogical link with this nineteenth century device and uses the term 'immerse' in a more vague, figurative sense, while staying clear of

5 https://idealbarcelona.com/en/ideal/.

6 https://www.nationalgallery.org.uk/exhibitions/past/nalini-malani-my-reality-is-different.

designating the exhibit itself as immersive. For its part, strategic moves such as that by Grand Palais to open its own digital exhibition venue suggest that panoramic/enveloping audio-visual productions, with a greater or lesser degree of interactivity and perhaps eventually actual immersivity, are not just part of the future for museums, they are already part of their present.

It becomes therefore imperative to address this transformation in museums and cultural spaces and understand curatorial practices as delocalised and expanded territories (Fernández 2022), bearing in mind that the concept of museum communication in the post-digital era is characterised by the prevalence of digital and/or computational technologies offering personalised experiences (Justicia, Vergara, Mahecha 2022). Re-thinking the ways in which the viewer is included in narrative fluctuations and content organisation, management, policy and questioning becomes necessary to re-territorialize the exhibition space. Techno-mediated dialogic design must transcend visual novelty and spectacle, providing a level up in terms of layers of meaning and context. It must take into account the complexity of an effective curatorial design that sets forth the story as multidimensional experimentation through technology, capable of expanding the understanding of the object and enhancing the critical and reflective investment of the reader/viewer, while preserving the integrity of the artistic manifestation as a document.

Exploring collaborative, interdisciplinary avenues with a view to enhance narrative capacity in the field of content curation requires a rigorous use of terms and concepts. Within the framework of content curation (techno-mediated and interactive), interaction and immersion are often wrongly used as interchangeable terms. Although both expand the traditional limits of the work within a specific cultural space, individual learning happens differently in each case: interactivity places the user 'in front of', immersivity places them 'within', with different implications for the type of contents to be displayed and the ways to do so. In immersion, the experience is performative and occurs within a digitally generated controlled space. It implies a direct work-spectator relationship that challenges conventions without diluting the ephemeral nature of aesthetic perception and promotes critical reflection in situ on the artistic manifestation (Musitano 2022). The interactive does not have to transcend the physical limits of the environment, while immersion (linked to virtuality) does, both temporally and spatially, generating a ubiquitous fictional space (digital twin) that emulates reality: the viewer becomes a diegetic protagonist 'within' the story itself and not 'in front of' the experience.

Thus, it becomes necessary to rethink the use of this technology and acknowledge the professional significance of the exhibition curator in creating innovative solutions that take into account effective

response models in terms of participation and learning. Carefully using the word immersion or immersivity – not as a synonym for either interactivity or enveloping projection – implies taking into account the processes of expected engagement through multisensory resources designed to provide psychological, cognitive, physiological, kinaesthetic and somatosensory depth to the individual experience of what is exhibited.

Interaction requires visual, auditory or tactile elements that stimulate the imagination from the outside. The immersive is linked in itself to the virtual, while the interactive redefines its strategies independently in the real-physical environment. The interactive presents the user with a type of narratives and metanarratives that do not necessarily revolve around the physiological, transforming their perception dynamically through layers of previously given information, without these being integrated at a proprioceptive level. Research in this field must proceed from precisely defined concepts, promoting and enriching the knowledge transfer while highlighting the need for a techno-critical approach derived from the user-technology interaction from a doubly functional perspective: rethinking techno-mediated content curation and expanding interdisciplinary knowledge in this field (Navarro-Newball 2023, 137).

While inherently different, both immersion and interaction are capable of providing a personalised experience. It is therefore essential to re-evaluate these experiences from a critical and experimental museography, emphasising their qualitative evaluation (through continuous feedback) and enhancing the emotive response of visitors (Aguilar Rojas 2020, 81). Making a correct use of digital and computational technologies in order to generate significant experiences, is of particular relevance in those cases in which the work dematerialises to become its digital equivalent.

An actual immersive space should be a place of dynamic interaction and diverse perception. Terms such as immersion or immersivity must be analysed from a multidisciplinary perspective, addressing the relationship that this concept maintains with the physical-real space (aesthetic and sensory experience) but also with the virtual, as it psychologically and kinaesthetically affects the subject of the experience (Mosqueda Gómez, Olivares Soria 2020, 97-100). The immersive offers a plane of symbolic reality that transcends the controlled enveloping projected environment, since we are faced with a phenomenal abstraction where the body coordinates are located in space and time, generating, in turn, a subjective experience influenced by the proprioceptive perceptual and cognitive conditions of an environment mediated by technology.

To complicate things further, researchers and creators have also been exploring the notion of semi-immersivity. For some, it is possible to create intermediate approaches in which users can interact with

a virtual three-dimensional environment, while maintaining some form of contact with the real world. This, in short, would be mixed reality (Marotta, Addati, Montes de Oca 2020), where immersion as a knowledge transfer tool from the perspective of critical museography can take on different degrees of application. At the other end, non-immersive devices (a projection) present a non-immersive virtuality that facilitates interaction in physical environments.

The use of the term 'immersive' is erroneous whenever there is no direct participation by the user in the construction of the integral content of the work, satisfying a unique connection with each person through diverse visual inputs that redefine the social and educational role of the cultural institutions of our time. Actual immersion implies a connection between the individual and the environment, not only at a physical level, but also physiological one. The user takes on a central role in which space, narrative and perception challenge the limits of the tangible. The relationship with the work is modified through technological mediation itself, putting the subject at the centre and not the work as the sole condition for the acquisition of knowledge (First Person vs Third Person).

The immersive: • psychological, cognitive, kinaesthetic, sensitive and somatic/ soma-aesthetic stimulation • mind and body • proprioception and conduct/ behaviour • everyday fidelity • spatial/temporal virtuality • phenomenology of perception and aesthetics of reception	Can involve interaction and participation of the user (user as the work's protagonist)First Person – the viewer co-creates by filling in gaps and creating subjective narratives that include unique behaviour
The interactive: • psychological, cognitive and soma-aesthetic/non-somatic stimulatio • active participation • expanded communication	Does not have to entail immersion of the user (the work and its qualities as protagonist in front of the user)Third Person – the viewer chooses among information already given, co-creates by creating alternative narratives that include a unique behaviour
The enveloping: • psychological, cognitive, soma-aesthetic/non-somatic stimulus • expanded experience • active participation • experiential communication	Can be interactive but not immersiveThird Person – participation as a passive observer, without co-creation of given content

The incorporation of digital and/or computational devices in museum environments facilitates communication and understanding of artworks as long as such devices are used correctly. Coccia (2023)

highlights the importance of a correct conceptualisation of museographic design from current curatorial perspectives. An interdisciplinary approach to the problem will integrate new technologies in interactive, exploratory and dynamic approaches that delve into the expectations of viewers themselves within the framework of the exhibition apparatus. In this sense, the interpretation and experience must stimulate the senses through the recreation and active participation of the visitor, appealing to their empathy so that they aesthetically engage with the proposed narrative (Valverde Martinez 2020). By establishing an active dialogue with an increasingly techno-intelligent viewer curators can tap into valuable feedback to generate experiences that are more dynamic, personal and enriching (Aránzazu-López, Bahamón-Cardona, Beltrán Cardona 2018) at an intellectual and physical level.

The *Lime, Pigments, Pixels, Motion* project will critically explore all these avenues – immersivity, interactivity, spatial mapped projection – as they apply to the effective communication of its specific object of study. Murals present their own challenges for techno-mediated curatorship, not least their scale, architectural and functional site-specificity, and the collective reception conditions of their original location. While immersivity opens up exciting possibilities to expand the viewers' experience of the murals at a psychological, sensory, intellectual and physical level, it also currently requires the use of head-mounted devices that create a markedly individualised experience (Thurow, Del Favero, Frohne 2020, 20), contrary to the fundamentally collective nature of this form of art. Certain forms of mixed reality allow for a degree of social interaction. For example, the VR section at Dalí Cybernetics made it possible to identify where other participants were physically located within the digitally generated environment. This allowed viewers to walk freely around it without bumping into each other, and to maintain a conversation, albeit without actually being able to see facial expressions or body language, which compromised intersubjectivity.

Therefore, regardless of how immersivity and interactivity may be configured at the project's experimental exhibition, it is envisaged that large-scale, non-immersive, projections will need to be part of the curatorial strategy in order to create conditions for collective, inter-subjective reception. The anticipated necessary recourse to such projections, for its part, prompts further questions as to the curatorial value of enveloping/surrounding displays. Audience observation at the exhibits included in this study shows a tendency by viewers to position themselves rather statically within the projection area. Whether random seating is available or standing is the only option, viewers tend to either follow the projection mostly on one wall/screen, with occasional glances at either side wall, or they position themselves facing towards a corner, so as to follow the projections

simultaneously, as far as feasible, on two walls placed at a 90° angle to each other. About half of the surround projection, therefore, is effectively lost on most viewers. In fact, in the venues visited, most of the projections were designed for two walls, and displayed symmetrically on all four. From a curatorial perspective, and taking into account financial and environmental costs, rigorous consideration must be given to the real value of placing viewers in 360° projection spaces unless the curatorial discourse makes full narrative use of the surround environment.

3 Animating Digitised Works of Art

The extent to which animation can contribute to a meaningful viewer experience, whether in immersive settings or more or less enveloping projections, will be a further enquiry line for the project. Animation is extensively used, and often abused, in the digital exhibits under consideration here. The attention-grabbing power of images in movement is deployed to great effect to provide viewers with a playful sensorial experience. Beyond this, however, museums must critically scrutinise its potential to enhance knowledge sharing and foster a questioning engagement with the artwork, as well as the pertinence, or lack thereof, of setting in motion works of art that were conceived as static compositions.

Attending to this challenge requires an interdisciplinary approach that includes animation as a field of study in itself, taking into account its theoretical framework and history. Animation scholars are increasingly incorporating digital humanities methods to study temporality, space, and the historiography of animation, amongst other topics. Based on structuralism, semiotics and Franco Moretti's *Graphs, Maps, Trees* (2007), Kevin L. Ferguson's (2017) approach to the digital humanities isolates aspects of animated films that result in abstract models, such as graphs and "summed frames", a single picture composed of millions of film frames that resonates with abstract painting. Equally inspired by Moretti is the ongoing digital humanities research project AniVision coordinated by Erwin Feyersinger (Universität Tübingen, Germany), Franziska Bruckner and Matthias Zeppelzauer (both part of Fachhochschule St. Pölten, Austria). By combining quantitative methods with AI technology, which detects animation sequences from archived ephemeral films, this project aims at expanding the historiography of animation in Austria, East and West Germany from 1945 to 1989 (Feyersinger 2023).[7] In-

7 Research project *Animation in Ephemeral Films from Austria, East & West Germany between 1945 and 1989: A Combined Film Analysis and Computer Vision Approach*.

terestingly, the application of these methods to animation, especially when it comes to abstract models, tends to convert movement, a key dimension of the medium, into static images.

In parallel, animation is increasingly being used as a tool for the digital humanities. While addressing the category of "useful animation", Suzanne Buchan (2020) notes that animation is a powerful data visualisation tool and requires a wider discussion regarding its pervasive and multidisciplinary nature within the digital humanities. In addition to the data visualisation usually conveyed by time-lapses of maps and graphs, art history and archaeology frequently resort to 3D CGI simulations to reconstruct historical monuments and cities (Forte, Murteira 2020), in which certain features or events – the flow of rivers, a chariot race – appear animated. [8]

For its part, the animation of works of art, specifically paintings, has long been explored in films that provide valuable precedents for museum curators to reflect on. Even before the short *Beauty* by Rino Stefano Tagliafierro (2016), who animates digital high quality reproductions of Thomas Hill, William Adolphe Bouguereau and Caravaggio, and the highly popular feature film *Loving Vincent* by Dorota Kobiela and Hugh Welchman (2017), who combined rotoscopic with painterly techniques,[9] there were animated shorts by acclaimed animators addressing art works. Among these are *Eine Murul* (A Meal on the Lawn) by Priit Pärn (1987), who evoked Manet's *Le Déjeuner sur L'Herbe* (The Luncheon on the Grass), *Le Sujet du Tableau* (The Subject of the Painting) by Georges Schizgebel (1989), *Daumier's Law* by Geoff Dunbar (1992), and *Stuart* by Zepe (aka José Pedro Cavalheiro 2007), who paid tribute to the Portuguese modern cartoonist Stuart Carvalhais. These short films appropriate paintings and caricatures in more or less creative ways: by incorporating the graphic style of the original artists; by recreating the atmospheres of the paintings; by bringing together different pictures into a single narrative; by displaying a metamorphic play of brushstrokes and erasures. Other films include Maarten Koopman's animated series *Famous Paintings*, which explore the atmosphere and the construction of each painting. Like Koopman's films, the *Eine Murul* 2011 version, an award-winning short film by students of the Estonian Academy of

https://uni-tuebingen.de/en/fakultaeten/philosophische-fakultaet/fachbereiche/philosophie-rhetorik-medien/institute-of-media-studies/research/research-center-for-animation-and-emerging-media/anivision/.

8 Research project *Lisbon Pre 1755 Earthquake*. http://bit.ly/lisbon1755; research project *The Roman Circus of Olisipo (Roman Lisbon)*. https://www.youtube.com/watch?v=7MjKcoqY_vY.

9 The rotoscope was invented in 1915 by Max Fleischer, known for creating Betty Boop with his brother Dave. It consisted of a easel where live action footage was projected and could be traced frame by frame, enabling very fluid (life-like) movements.

Arts that dialogues with Pärn's film, resorts to 3D stop motion animation, a technique that significantly alters the medium of the original painting and resonates with the tradition of the *tableau vivant*.

In contrast, Tagliafierro's *Beauty* is a digital animation of a medley of paintings that simply puts into play the expected movements of the figures resulting in an uncanny feeling lacking the creativity of previous animated renditions of artworks. In that sense, it is similar to a digital animation of paintings shown in the *Eternal Mucha* exhibit at Grand Palais immersif, where figures motioned gently over the background without little surprising or innovative input. Other museums have commissioned animations of works in their collections, as was the case of Kandinsky's *Bleu du Ciel* (Sky Blue) made by C.A. Halpin and commissioned by the Pompidou Centre in the 1990s and have increasingly adopted animation to advertise exhibitions.[10]

A premonitory word of resistance to such practices comes from André Malraux's seminal *The Imaginary Museum*, in which the author expressed his opposition to the animation of paintings. Writing before any of the above-mentioned animations had been produced, Malraux observed:

> Anyone indifferent to painting instinctively animates paintings and judges them based on the spectacle they suggest. (1965, 18)

His understanding of animation here seems less associated with physical movement than with the emphasis on the theatrical and emotional depiction. The author's use of the term 'animation' is inferred from his quotation of Stendhal emphasising the ideal of artistic beauty linked to liveliness and the "expression of the movements of the soul" (18). Even if Malraux's use of the term refers less to movement than to an etymological and broad sense of animation as 'soul' and the act of 'bringing to life', his critique still raises questions as to the pertinence and purpose of animating works of art for curatorial purposes.

In a digital exhibit, animation can be a powerful tool to help make visible the creative and production processes behind a work of art. It can also be effective in bringing formal and narrative aspects of the work to viewers' attention. *Painting in Motion*, the animated exhibit based on works by Portuguese-French artist Maria Helena Vieira da Silva (1908-1992) was initially produced for a large projection space at a shopping mall in Lisbon, and was aimed at a wide audience unfamiliar with this painter. The exhibit was then reused at this artist's

10 In Portugal, recent exhibitions of two major Portuguese avant-garde artists, *José de Almada Negreiros: A Way of Being Modern* show at the Calouste Gulbenkian Foundation in 2017 and *Amadeo de Souza-Cardoso / Porto Lisboa / 2016 – 1916* show at Museu Nacional de Soares dos Reis and Museu Nacional de Arte Contemporânea – Museu do Chiado in 2016 and 2017, had TV adverts involving the animation of these artists' works.

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museum, where it had to be adapted to fit a much smaller projection space. Though in its new, spatially constrained setting, the high-pace of the motion can at times make for uncomfortable, even dizzying viewing, the animation concept does manage to make visible certain traits of this artist's work, such as the tensions between abstraction and representation, and a subtle play on tridimensionality in her otherwise apparently bidimensional compositions, as well as suggesting narrative interpretations based on the works' titles. The animation, however, is conceived as largely one-way, it tells stories that viewers observe passively, with little incentive to create their own interpretations on the works displayed.

Animation also has the potential to respond to an existing work as a creative interpretation that fosters interartist and intermedia dialogues. That was the case of two animated installations inspired by existing works in museums' collections: *When I Count, There Are Only You… But When I Look, There is Only a Shadow* (2012-13) by Iranian artist Farideh Lashai (1944-2013), and *My Reality is Different* (2022) by Indian artist Nalini Malani (1946-).[11]

Lashai's piece was based on Goya's *Los Desastres de la Guerra* and was posthumously shown as an invited work at Museo del Prado in 2017, while Malani created an enveloping installation drawing upon numerous paintings at the National Gallery as a Contemporary Art Fellow of the museum. Malani's panoramic format brought together sound and multiple juxtapositions of animations that addressed the process of drawing, painting, and erasing, in an intentionally cacophonic and disruptive installation quite challenging to the viewer. In contrast, Lashai's *When I Count, There Are Only You…* avoided multiple stimuli and was projected onto a single wall. In doing so, the work encouraged focus on a sober intervention, while keeping closer to the original work's format. Her projection of a series of digital reproductions of Goya's engravings not only evoked the storyboard set up, but also seriality in contemporary art. The artist removed all the human figures, leaving the backgrounds deserted. As a lantern light slowly moved around and illuminated each engraving, the figures reappeared animated as ghosts, thus highlighting the human loss caused by war in a melancholic atmosphere enhanced by Chopin's *Nocturne 21 in C Minor*. The erasure and the reanimation of the engravings provided by the digital tools did not simply enact expected movements. They produced a powerful interpretation of Goya that reinforced his denunciation of the impact of war.

An informed and reflective animation project therefore can and should enrich the experience of a digitised work of art. The murals

11 References and links to these are included in the Digital Exhibits list at the end of the document.

under study in the *Lime, Pigments, Pixels, Motion* project offer several avenues to explore in this regard. In addition to the more obvious choices such as recreating the production process of a fresco or simulating a virtual restoration process for those in worse conservation conditions, the project will delve into the more complex issues of animating the actual forms, figures and narratives depicted in them. Animation projects undertaken in collaboration with professionals and arts students will be grounded on art historical research on the mass communication function of murals, and the social and political dimension of the themes expressed in them, while fully taking advantage of the singularly dynamic composition style that characterises this particular corpus.

4 Bridging the Digital-Material Divide

A further issue commonly observed in exhibitions involving the mapped projection of digitised works of art – whether in commercial or museum settings – is a stark dissociation between the original physical artwork and its digital rendition. Partial images of paintings shown in motion at as large a scale as the available projection surfaces will allow, generally fail to convey key formal and material aspects of the artworks they ostensibly represent, such as their actual proportions, composition and textures, among others. Again, while such deconstruction and magnification may be an effective strategy for storytelling and sensorial purposes, it can, and often does, dematerialise the original works beyond any recognition. From an art historical curatorial perspective it would be desirable to also provide a more integral view of the works on display so as to give audiences greater interpretive agency based on the works' original configuration.

In a museum setting this dematerialisation of the work of art produced by its digitised projection can be countered, to a certain extent, if the viewer has access to the object in question elsewhere in the venue, though this still poses the challenge of creating an effective visual link between them. At *Painting in Motion*, for example, this was attempted by means of a panel at the entrance of the digital display area, showing scaled down reproductions of all the paintings included in the audio-visual show, most of which were then available to viewers in the museum's various rooms.

Referring viewers to originals elsewhere in the premises, however, is not an option generally available to commercial venues, where the absence of museum-standard conditions regarding humidity, temperature, and security advises against displaying original works. Some commercial exhibitions have nevertheless attempted to account for the physicality of the original works, or at least acknowledge their existence as such, albeit with mixed results.

Frameless' positioning as a venue "where art breaks free" of its frame is intended to legitimise its unapologetic 'deconstruct-magnify-animate' approach. Disassembling "some of the world's greatest works of art" so as to present them "in ways never seen before" is the whole *raison d'être* of this "multisensory experience". As such, no effort is made to show the paintings themselves in any way resembling their original form, and their existence as source material for the show is only acknowledged at the entrance of the four projection rooms in panels showing small, uniform, square-shaped partial views of the works.

At the *Van Gogh* exhibit, within the informative display area that precedes the mapped projection room, viewers come across a long wall hung with reproductions of some of the artist's paintings printed onto canvas on stretchers. While this solution gives viewers the opportunity to contemplate the compositions at length, in their actual scale, it also creates issues of accuracy and veracity. Flat printed images cannot account for the particularly rich textural qualities of Van Gogh's actual paintings. Were the images printed on paper, there would be no doubt in any viewers' mind that they were looking at posters, printed reproductions of paintings. Instead, the fact that these images are printed on canvasses creates a false sense of authenticity, an illusion to viewers that they might be standing before actual paintings. For those familiar with the artist's dense and dynamic brushwork, the printed canvasses make a poor substitute for the real thing; those unfamiliar with it may well go home after the visit with a highly distorted perception of what a Van Gogh painting actually looks like.

For their part, visitors to the Barcelona iteration of the *Monet* exhibit were greeted at the entrance to the projection area by an original study of one of the artist's water lily paintings. This was a one off occurrence among the many iterations of this exhibit, the result of a loan by a local collector, which required the construction of a special case for it. It acted as an effective place marker for the kinds of tangible artworks from which the animated projection was produced. Once inside the videomapping room, at least at one point in the 30 minutes of swirling images, the projection slowed down to show, on all four walls, large-scale compositions Monet conceived as part of a panoramic arrangement of water lily paintings at l'Orangérie in Paris. At IDEAL, the images of these paintings were projected at (presumably) real-life scale, complete with their frames, in high resolution and lighting effects that mimicked their 3D reality, against a white background simulating a flat version of the curved gallery walls at l'Orangérie. The still images didn't last long enough to discern which they represented among the dozens of paintings Monet created in similar sizes and theme, but for a few brief seconds viewers were at least given the opportunity to make a visual and

conceptual connection between the all-enveloping digital display of moving shapes and colours, and the historical, material objects from which it derived.

In museums' adoption of mapped projection, therefore, a case can be made for the combined used of static and animated images of the artworks forming any given digital display. Even a brief static projection of a painting, in its actual size, before it explodes into motion all over the walls, can go a long way to allow the viewer to visually apprehend what it is they are actually seeing. Audiences not necessarily familiar with the original works would thus be given pause to observe, interpret, make sense of how its different elements work together as an artistic composition, and perhaps recall it in any future encounters with the same work, whether in original or reproduced form.

At the *Monet* exhibit, the choice of a large-format painting for a moment of pause, of still projection, was likely not arbitrary. By their very scale – the Orangérie's paintings are 2 m high by 6 to 17 m wide – the works in question occupied most of the projection area available on each wall as stand-alone pieces that could be contemplated by viewers from any point in the room. Taking advantage of the monumental dimensions of its exhibition objects, *Loading. L'art urbain à l'ère numérique* has adopted a similar curatorial strategy. Its street art works are displayed for the most part as full-sized still images, many of them showing their actual urban context. In addition to time-lapse videos of artists at work, motion here appears mostly circumscribed to the animated transitions between images, murals moving slowly in and out of the projection area, with time for audiences to visually apprehend the reality of each one.

The scale of the murals encompassed by the *Lime, Pigments, Pixels, Motion* project makes them equally suitable for static projection on large surfaces, allowing for their leisurely contemplation, in addition to any animated display that may be devised for story-telling purposes around their creative process, iconography, etc. as described in the previous section. Moreover, the fact that the exhibition is to take place at a venue with museum-standard conditions opens up additional possibilities to enhance associations between the digital – static, animated, and mapped images of the murals – and the material in the tangible display area. The latter will comprise archival and artistic evidence of the production process of the murals, such as photographs, painting materials, and preparatory drawings, as well as some of the full-sized cartons that were used to transfer the designs to the wall. This area will also include a contemporary, tactile, fresco piece, produced in collaboration with arts students, to illustrate the various stages involved in the production of a mural using this ancestral procedure. Further bridging the digital with the material, the project team will work with the institutions currently housing the

murals in order to schedule a programme of on-site visits that will give audiences the possibility of experiencing and discuss the murals in their actual architectural and spatial setting.

5 Closing Considerations

In competing for audiences' attention in a highly technologised society, it might be tempting for art museums to uncritically adopt digital spectacularisation strategies deployed so far to apparent success in commercial venues. In addition to issues of long term financial and environmental viability (what happens with these costly, energy intensive investments once the novelty begins to wear off? Do they simply get 'upgraded' to even more spectacular solutions?), a profound reflection is called for as to their actual value for art historical curatorial purposes. Techno-mediated museum design must transcend visual novelty by providing additional layers of meaning and context, while creatively researching solutions to give viewers greater co-creation, interpretive, and contemplative agency. A fundamental aspect of this research involves taxonomical analysis to ensure an accurate use of terms that inevitably end up shaping the critical and discursive transformation of the exhibition field. 'Immersive' emerges here as a particularly problematic term. It has been co-opted by commercial venues, and often by museums too, to vaguely designate an array of digital display strategies in which actual immersion is rarely present. Attention is already being drawn to the unwelcome trivialising effect this can have on rigorous research and creative efforts currently taking place around actual immersivity.

Beyond taxonomy, major challenges emerge for museums looking at defining clear and transparent content management policies based on responsible innovation, ethical reflection on the profession, and curatorial practices that are respectful of works of art displayed through digital means. The exhibition of digitised works of art cannot reduce itself to applying a standard 'deconstruct-magnify-animate' formula to every which object. A work of art, even when digitised, is far more than its image; it is matter and manual work, it carries historical and social context. How do we translate all of this into a meaningful digital discourse? How do we relate it to the physical object that has travelled through time and today sits somewhere else maybe in that same museum, maybe in another? Even more challenging, how can computational technologies and digital display strategies help museums and their audiences bridge the gap between objects designed for leisurely contemplation in bygone times and their relevance for the ever faster-paced visual culture of the twenty-first century?

Taking twentieth-century frescoes as its object of study, the *Lime, Pigments, Pixels, Motion* project will begin to address these issues

working from the hypothesis that an ambitious display of technological prowess, however spectacular, may not necessarily be more effective than a selective and more subtle use of technology in adding value to audiences' experience of digitised works of art while encouraging a reflective engagement with them. The digital exhibit overview summarised here has allowed the project's team to sketch a number of basic premises that are expected to guide the exhibition's design. Adopting a 'less is more' approach, priority will be given to large-scale, non-immersive, non-enveloping projections enabling modes of collective, inter-subjective reception. These can be complemented by monitors offering interactive 3D architectural models of the murals alongside textual information. The exhibition will offer both static projections, allowing unrushed contemplation, and animated displays. Created in close cooperation with professional and student animators, the latter will seek to convey the creative and production processes of the murals as well as explore and engage with their narrative content. Finally, the overview of digital exhibits has brought to the fore a pressing need to bridge the digital-material divide when presenting digitised works of art. A fundamental consideration underlying all design and layout aspects of the exhibition will therefore be to enhance visual and conceptual connections between the digitised murals, all the documentary and preparatory materials on display, and the original murals throughout the city. In this regard, a number of initiatives have been designed to involve the institutions holding them and engaging broader society at various stages of the project, the ultimate aim of which is using technology to bring the murals back into public life.

Digital Exhibitions

Dalí Cybernetics, IDEAL Centre d'Arts Digitals, Barcelona, 21 September 2022 to 21 August 2023 (visited 25 February 2023) https://idealbarcelona.com/en/agenda/cybernetic-dali/.

Eternal Mucha, Grand Palais Immersif, Paris, 22 March to 5 November 2023 (visited 11 July 2023) https://grandpalais-immersif.fr/en/agenda/evenement/eternel-mucha.

Frameless – Immersive Art Experience, London, 7 October 2022, ongoing (visited 23 July 2023) https://frameless.com/.

Loading. L'art urbain à l'ère numérique. Grand Palais Immersif, Paris, 6 December 2023 to 26 July 2024. https://grandpalais-immersif.fr/agenda/evenement/loading-lart-urbain-lere-numerique.

(Observations based on official videos available on YouTube) https://www.youtube.com/watch?v=QFuJcbnE_Yohttps://www.youtube.com/watch?v=oSCy54ZlMlwhttps://www.youtube.com/watch?v=k0Ql7G1Uf1Q.

Monet, the Immersive Experience, IDEAL Centre d'Arts Digitals, Barcelona, 24 October 2019 to 20 July 2020 https://idealbarcelona.com/en/agenda/monet-lexperiencia-immersiva/.

My Reality is Different, Nalini Malani at the National Gallery, London, 2 March to 11 June 2023 (visited 15 March 2023) https://www.nationalgallery.org.uk/exhibitions/past/nalini-malani-my-reality-is-different.

Painting in Motion, Fundação Arpad Szenes Vieira da Silva, Lisbon, 24 June 2022 to 31 December 2025 (visited 29 October 2023) https://fasvs.pt/eventos/vieira-da-silva-pintura-em-movimento/.

Van Gogh, The Immersive Experience, London, 21 September 2021, ongoing (visited 3 February 2023) https://vangoghexpo.com/london.

When I Count, There Are Only You… But When I Look, There is Only a Shadow, Farideh Lashai at Museo del Prado, Madrid, 30 May to 10 September 2017 (visited July 2017) https://www.museodelprado.es/en/whats-on/exhibition/the-invited-work-farideh-lashai/48b351d4-4744-4443-bbfe-ba7f268b66b9.

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