Augmenting Our Approach to Preservation: Documentation of Experience for Immersive Media

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ABSTRACT

Immersive media, comprising technologies such as virtual reality (VR), augmented reality (AR), mixed reality (MR or XR), and 360° or panoramic projection installations, requires extensive documentation as part of preservation efforts. These go beyond existing methods for software-based and interactive works due to their technological complexity and rapid obsolescence cycles. Taking up one recommendation for further work identified in Ensom and McConchie (2021), this paper considers the experiential dimension of immersive media (IM) and its significant role in preservation and future access. A holistic approach is outlined, offering relevant techniques and considerations both from established interactive media preservation and from other disciplines that deal with experience. The process of creating documentation and how it may be used over time is also considered, advocating for decolonial ethics and open institutional practices to best serve IM works and their publics.

"... determining what and how an artwork continues is more important than what and how to preserve it. In these cases, documentation may guide the continuation of a process."

Annet Dekker, "The Challenge of Open Source for Conservation" [1]

Introduction

Immersive media (IM) is a class of technologies that aim to create an immersive environment for viewers that currently includes virtual reality (VR), augmented reality (AR), mixed reality (MR or XR), and 360° or panoramic projection installations. The preservation of IM, whether for historical reference of these technologies or for re-exhibition of artistic/creative

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[1] In *Performing Documentation in the Conservation of Contemporary Art*, edited by Lúcia Almeida Matos, Rita Macedo and Gunnar Heydenreich (Lisbon, Instituto de História da Arte, 2015:124-132).

works, is a growing field of study and practice, responding to the increasing use and collection of IM within cultural sectors.[2] Existing research and guidance builds on the principles and techniques of digital preservation used to assess, create documentation, and reactivate works that can be generally described as complex assemblages of digital assets, hardware, computing processes, and interactivity.[3] IM benefits from these strategies, but its unique characteristics lead to unique preservation needs.

In this paper I take up one recommendation for further work identified in Ensom and McConchie (2021) to consider the experiential dimension of IM and its significant role in preservation.[4] Experience is a main focus of IM producers, whether commercial or artistic; IM is designed to create affective moments of self-awareness, empathy, loss of selfhood, wild visioning, or to make "real" the otherwise impossible.[5] While it can be argued that any artistic medium might do so, the fundamental purpose and goal of IM is to take hold of a viewer's perceptions, manipulating their senses to explicitly extend or replace their reality. An IM experience could involve visual intervention only, whether through a head-mounted display (HMD), mobile device, or projected environment. Or experiences can be multi-modal, with haptic devices that provide bodily feedback through vibrations; added scents and air movement timed to coincide with events in the virtual environment; and means of navigation designed to 'make sense' to our bodies and minds in these different worlds to reinforce the sense of 'being there'.

As discussed in Ensom and McConchie (2021), competition to develop greater immersion or presence drives the development of new equipment models and software upgrades, often at a more rapid pace in comparison to other digital media systems.[6]

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[2] See Bibliography for a recent list of published IM studies.

[3] See, for example: Tate, "Software-Based Art Preservation – Project," Tate Projects, https://www.tate.org.uk/about-us/projects/software-based-art-preservation; Trevor Owens, *The Theory and Craft of Digital Preservation* Baltimore, Maryland: Johns Hopkins University Press, 2018; Annet Dekker, *Collecting and Conserving Net Art: Moving Beyond Conventional Methods*, New York: Routledge, 2018; Janet Delve and David Anderson, *Preserving Complex Digital Objects,* London: Facet Publishing, 2015; The Variable Media Network website: https://www.variablemedia.net/e/index.html.

[4] Ensom, Tom and Jack McConchie, "Preserving Virtual Reality Artworks" (Tate, August 13, 2021), https://doi.org/10.5281/zenodo.5274102.
[5] As a starting point, see for example the browser-based version of Marshmallow Laser Feast's *In the Eyes of the Animal*: http://intheeyesoftheanimal.com/.

[6] For example, one case study VR artwork that was first exhibited in 2018, and was revisited in 2022, was created with software that had released 8 subsequent versions and a major upgrade within that time period. 3 generations of hardware had also subsequently been released by the company that made the equipment used in 2018.

Requirements of user and developer accounts to activate hardware and access content is established by for-profit companies that have little to no interest in preservation needs. Plugins and runtime requirements effectively lock in the necessity to use certain vendors by being 'baked-in' to the software. These circumstances create multiple levels of obsolescence that have pressing and severe implications for IM preservation efforts.

The pressure of rapid changes, along with the intentional high degree of hold on viewers' perceptions in IM, create a need to incorporate experience into preservation strategies. Documentation is a common tool in preservation strategies, gathering information such as display specifications, artist interviews, condition assessments, iteration reports, and conservation treatment records for reference over a collection item's lifetime. Some degree of qualitative information is naturally part of such documentation, like identifying artist preferences and curatorial decisions, but experience itself is rarely considered to be part of a work and therefore is not included comprehensively in documentation. This paper explores why an expanded approach to documentation is necessary for IM and how it could benefit both IM works and future audiences, seeking ways to improve documentation processes and preservation outcomes for the stewards, researchers, and viewers who will want to understand, or have their own access to, the experiential aspects of IM works.[7]

The Elements of 'Experience' for IM

A basic premise in my discussion of IM works is that experiencing them is a moment of entanglement between human and technological elements. One cannot be fully separated from the other in an adequate description of an encounter with an IM work; it is precisely their interaction during the moment of immersion that matters when encapsulating or trying to understand that experience. Artist intent is a standard guidepost for documentation and stewardship decisions, but there is always an element of the work entering a new phase once audiences are part of the dynamic. For IM, I argue that audience experience is a product of the individual encountering a work, artistic intent, the performance of technologies, and socio-technical context. Unpacking what each of these elements contribute to immersive experience before going further will aid in understanding what is involved in creating documentation of it.

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[7] A helpful guide to planning for possible user needs is in: Sharon McMeekin, "Understanding User Needs" Digital Preservation Coalition, September 7, 2021, https://doi.org/10.7207/twgn21-10.

Broadly speaking, in a collections context, documentation seeks to identify aspects of works that can be made to persist over time, which can be achieved through preservation or reproduction. The nature of experience, though, is inherently contingent and ephemeral. Our perceptual systems are embedded in our individual and imperfect bodies, and our processes of creating and recalling memory can be unreliable.[8] The events of our lives influence our interpretations such that no two experiences are exactly the same, or even reproducible in the same person. It follows that there is no authoritative Experience to be identified by formula for documentation. Rather, in this research "experience" can be taken as a definitive moment of encounter between an IM work and a person. It is that person's perceptions and interpretations that are of value, along with how IM technologies contribute to them.

The human element also comes into play when considering how information about experience is gathered and leveraged. Creating documentation of IM experiences is itself an expansion upon conventional processes, and it further provides an opportunity to rethink the extractive, imperial legacies of Western collecting institutions. Feminist and decolonial ethics can inform how this exchange of information is set up and conducted through fostering a relational dynamic with participants who share their experiences, based on autonomy and respect. Care should be taken to establish fair, agreed-upon practices around ownership, access, and use of such documentation because of its personal nature.[9]

The technological element is present in experience of IM in obvious ways because it requires the use of various kinds of equipment—but for the purpose of documentation it is worthwhile to take a step back and examine how the relationship between technology and experience is conceptualized. Apropos to the topic at hand, I've borrowed terminology from VR as a device to illustrate two different approaches to documentation: *outside-in* and *inside-out*. In VR, these terms describe methods of motion tracking through calculating the physical orientation of interactive users. Outside-in tracking uses external devices set up in a space to

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[8] Memo Akten's VR artwork, *FIGHT!* (2017) exploits the limits of perceptual faculties and the individual nature of perception. Osman Serhat Karaman discusses the challenges of documenting this work in his presentation at the "Documenting the Interactive Documentary" webinar hosted by the Preserving Immersive Media Group on November 6, 2020: https://www.youtube.com/watch?v=emp3oy81Td8.

[9] For an overview of anti-imperialism in knowledge work and memory institutions, see Ariella Aïsha Azoulay, *Potential History: Unlearning Imperialism*, Verso Books, 2019. In the context of digital media and archives in particular, see: Caswell and Cifor, "Neither a beginning nor an end: Applying an ethics of care to digital archival collections," in *Routledge International Handbook of New Digital Practices*, eds. H. Lewi, W. Smith, D. vom Lehn, and S. Cooke, 159-168, 2019; and L. Smith, J. Wood, G. Oakes, and M. Grant, "Exploring Ethical Considerations for Providing Access to Digital Heritage Collections," Digital Preservation Coalition, September 30, 2021. https://doi.org/10.7207/twgn21-18.

observe where a head-mounted display (HMD) and handheld controllers are, whereas inside-out tracking enables the HMD to be the point of origin for positional data.[10]

In a documentation context, an *outside-in* approach takes the technical characteristics of hardware and software as its starting point, where the material properties determine how content is rendered and experienced. A typical approach to technical documentation is to record the features, specifications, settings, and other parameters of hardware and software in order to preserve their behaviors and support the possibility of a specific experience. By contrast, an *inside-out* approach is user-centered, where experience of the content reveals significant properties that guide decisions as to how content is rendered. Aspects like motion quality, degree of presence, or reaction times for interactivity can inform methods of display. In the event of replacing obsolete equipment or assessing the outcomes of a migration project, an inside-out approach adds experiential metrics to the evaluation.

In other words, an outside-in approach focusing on the technical specifications of IM hardware and software systems is a way to describe '*what* it was', while an inside-out approach incorporating experience can give a sense of '*how* it was'. Our current framework for documentation is designed for the former, and often lacks detailed information about the latter. These two approaches are not mutually exclusive; neither equipment nor experience alone can adequately account for all of the significant aspects of IM, so they must go hand-in-hand within an expanded documentation framework. Artist intent can complement outside-in and inside-out approaches, supplying certain goals for how a work is instantiated and establishing boundaries for change.

Some aspects of artist intent and audience experience are also bound up in socio-technical context, which is the milieu of culture and technologies of a given time and place. Sheila Jasanoff describes the phenomenon as "sociotechnical narratives," which are "collectively held, institutionally stabilized, and publicly performed visions of desirable futures, animated by shared understandings of forms of social life and social order attainable through, and supportive of, advances in science and technology."[11] As I have framed it in this paper, socio-technical context is more specifically the interrelatedness of social values and

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[10] Outside-in tracking uses optical sensors or infrared beacons set up around the perimeter of a defined space to track a VR head-mounted display (HMD) and handheld controllers through a process akin to echo-location. Inside-out tracking attaches sensors to the HMD being worn by a user to establish an initial location, then tracks changes to determine current position for the user and the relative position of handheld controllers. See Ensom and McConchie (2021) for more details.

[11] Sheila Jasanoff, "Imagined and Invented Worlds," *Dreamscapes of Modernity: Sociotechnical Imaginaries and the Fabrication of Power*, eds. Sheila Jasanoff and Sang-Hyuan Kim, Chicago and London: The University of Chicago Press, 2015, 4.

technologies, which is contingent to some degree on time and place, and influences technological encounters.

Artists engage with socio-technical context through, for example, the use of cutting-edge technologies like IM for their novel aesthetic effects, or choosing to use or preserve legacy technologies in their artworks, such as cathode-ray tube (CRT) monitors. These choices communicate something to viewers about how the artist values that technology, but how the message lands, and is interpreted, can change over time. Socio-technical context is constantly evolving through incremental shifts, and changing course with innovations that become subsumed and built upon. Think of the first-generation iPod in 2001, and the feeling of excitement people had in response to its design, capacity, and interactivity in comparison to the instantly outdated portable CD player. Today one might appreciate the iPod as a breakthrough innovation, but the same feeling of excitement can't be induced.

The cycles of improvement and innovation are accelerated in IM and related fields like real-time rendered digital artworks,[12] contemporary gaming, and visual effects in cinema. Their emphasis on high-resolution, hyper-realistic renderings create the conditions for a rapid aging process where content can look dated within a matter of years or even months. Audiences have access to memory banks of relatively recent experiences across digital visual cultures that influence their judgments of quality. If an artist's intent is to take advantage of the 'newness' or 'realness' value of IM technologies, the experiential impact that it might carry when initially released will not last long at the current pace of development.

The social and cultural aspects of technological encounters are particularly impactful parts of understanding *how it was*, but cannot themselves be preserved—only hinted at. Archival information and artifacts can help to relate these aspects, which is a significant part of the work curators undertake in collecting and exhibiting.[13] How socio-technical context can be harnessed in future presentations of IM will be an intricate endeavor that may itself require some degree of innovation. Restorations of media artworks engage with socio-technical context in making decisions that can affect how a work does or doesn't remain anchored in a particular technological moment by either maintaining or replacing hardware, updating unsupported

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[12] For example, works by John Gerrard (http://www.johngerrard.net/) or Ed Atkins (https://vimeo.com/585831115).
[13] Socio-technical context is especially apparent in exhibitions of design and technology, for example, the "Totally 80s Rewind" exhibition at Living Computers Museum + Labs. The Cooper Hewitt, Smithsonian Design Museum's Digital Collections Materials Project (DCMP) report, "Designing the Future of Design," speaks to these concerns from a collecting and preservation point of view.

programming languages, or otherwise enabling continued access through changes to the original system as elements age.[14]

Given the complex interactions of the multiple elements at play during encounters over an IM work's lifetime, it would be foolish to expect that experience could be described completely—and we all know this at some level. If there were any means of fully conveying experience to other people, we would be living in a very different world! So, to further hone in on what the goals of documenting experience of IM might be, we can safely say that it will never be to make an experience *replicable*, per se. Rather, it is reasonable to make it *accessible* in some form for the purpose of understanding the nature of encounters with particular IM works in a certain socio-technical moment.

With the combined pressures of rapid technological obsolescence and the constant evolution of socio-technical context, the window for primary experience of IM might be very brief—perhaps a single activation period of exhibition. It is safe to assume that there will be changes to hardware, software, and other technical infrastructure to maintain access to IM content over time, in line with similar cases in other time-based media. Outside-in and inside-out approaches to documentation, along with evidence of the socio-technical context, can together provide rich information about a particular moment in the lifetime of an IM work for continued stewardship efforts, scholarship, and presentation to future audiences.

Precedents for Gathering Information about Experience

It has long been recognized that user experience is an important component of interactive works, and several methods to create documentation of these illustrative, subjective moments have already been proposed.[15] These existing methods involve a variety of

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[14] An account of artwork reconstruction acknowledging a "techno-social moment" at MIT is in Morgane Stricot, "Retro-Engineering and Alternative Histories: Possible Roads toward Media Archaeological Reconstruction," *Leonardo* 50, no. 2 (2017): 192–93. See also Jonathan Kemp, "Practical Ethics v3.0: Version Control" (July 31, 2020), https://www.academia.edu/43756413/Practical_Ethics_v3_0_Version_Control, which further discusses this and other works from a conservation perspective.

[15] See Caitlin Jones and Lizzie Muller, "Between Real and Ideal: Documenting Media Art." *Leonardo* 41, no. 4 (2008): 418–19; Annet Dekker, "Enabling the Future, or How to Survive Forever." *A Companion to Digital Art.* Ed. Christiane Paul. Sydney: John Wiley & Sons, Inc., 2016; K. Kwastek, "Documenting interaction," in G. Giannachi & J. Westerman (eds), *Histories of performance documentation: Museum, artistic, and scholarly practices*, Routledge, Oxon, pp. 132–148, 2018; Gabriella Giannachi, "Documenting Digital Art: The Role of the Audience." Maastricht Centre for Arts and Culture, Conservation and Heritage, 2020, https://ore.exeter.ac.uk/repository/handle/10871/121537, and R. Fromme and S. Fauconnier, "Capturing Unstable Media Arts: A Formal Model for Describing and Preserving Aspects of Electronic

information-gathering techniques such as screen-recordings with narrated walk-throughs of interaction; interviews with participants at different points to capture both primary experience and reflected experience; questionnaires; wiki sites; and custom database software.

Information about experience can be time-consuming and resource-intensive to gather, process, and store. Maintaining and accessing the data can be just as challenging as other time-based or digital items. These factors have understandably been obstacles to comprehensive adoption into documentation workflows for interactivity, where high work loads and limited staffing are common challenges. However, the nature of IM forces the issue of integrating experience into documentation and preservation practices; it cannot be disentangled from the technological effects of IM, so it must be considered as part of the work and can no longer be an optional or extra feature of documentation. Stewardship of IM has to account for these resources during acquisition and subsequent iterations within a collection setting, or risk unmooring the work from significant properties as changes are made.

So if documentation of experience must be done, how best to do it? While recognizing established ways to document interactive media, I want to take the opportunity to look further afield at other qualitative research methodologies, and incorporate more recent theory and practice within conservation. Taking cues from established disciplines can help to better understand how we might talk about experience and develop more effective documentation.

"Presence" or a sense of "being there," is a measure of immersion used by IM designers, engineers, and researchers in the course of their work.[16] In addition to the affordances of the technological system, there are behavioral, cognitive, and physiological aspects that form the experience of presence.[17] Several disciplines contribute knowledge to these areas, including psychology, neurology, phenomenology, information studies, and ethnography. There is exciting research about experiential processes, particularly in neurology and cognitive psychology, that is beginning to lay out the complex mechanics of human perception and meaning-making in

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Art", in U. Frohne, J. Guiton, and M Schieren, eds. *Present Continuous Past(s): Media art: Strategies of Presentation, Mediation and Dissemination,* Heidelberg: Springer Verlag, 2004.

[16] James J. Cummings and Jeremy N. Bailenson. "How Immersive Is Enough? A Meta-Analysis of the Effect of Immersive Technology on User Presence." *Media Psychology* 19, no. 2 (April 2, 2016): 272–309. https://doi.org/10.1080/15213269.2015.1015740; and International Society for Presence Research webpage: https://ispr.info/.

[17] A comprehensive accounting is in Dooley Murphy, "Virtual Reality Is 'Finally Here': A Qualitative Exploration of Formal Determinants of Player Experience in VR," in *DiGRA '17 - Proceedings of the 2017 DiGRA International Conference*, vol. 14 (Melbourne, Australia: Digital Games Research Association, 2017).

more nuanced ways.[18] Such research shows just how contingent and constructed experience is, proving that one's perspective is truly one of many. What we can take from these findings is that there is no single representative experience of an IM work that encompasses all possibilities, so multiple perspectives should be sought in order to do justice to this diversity. There are several approaches to how such information is gathered, and what form it takes.[19] Depending on the particular IM work and available resources, the following examples could be helpful in forming a documentation strategy.

Phenomenology studies subjective experience, setting aside presuppositions and building characterizations of the object of study (whether it is an event, material item, process, etc.) through descriptions given by individuals.[20] Phenomenological knowledge is characterized as pathic and poetic; it is first person knowledge or testimonial information. It is differentiated from cognitive, procedural, third-person knowledge or technical information.[21] Phenomenology is the basis of popular tools of qualitative research, such as interpretative phenomenological analysis (IPA), in which experience is explored "in its own terms" to identify consistent themes or points within a set of examples.[22] The 'data' gathered in phenomenological studies are inherently unique to some extent and aren't necessarily expected to conform to logical processes of analysis developed for quantitative data. IPA and other phenomenological methods lean on the framework of grounded theory to follow the evidence to conclusions through comparative analysis, rather than using evidence to prove a hypothesis.[23] The IPA

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[18] Oliver Sacks, *The River of Consciousness*, New York: Alfred A. Knopf, 2017; E. Bruce Goldstein and Johanna C. van Hooff, *Cognitive Psychology*, Andover: Cengage Learning, 2021.

[19] Here I offer an excellent breakdown of the many classes or types of information, and how they interrelate: Marcia J. Bates, "Concepts for the Study of Information Embodiment," *Library Trends* Vol. 66, Iss. 3, (Winter 2018): 239-266.

[20] An example of a phenomenological digital media study: Maria Howard and Hilary Bussell, "Habituated: A Merleau-Pontian Analysis of the Smartphone," *Library Trends* Vol. 66, Iss. 3, (Winter 2018): 267-288.

[21] T. Gorichanaz, "A first-person theory of documentation", *Journal of Documentation*, Vol. 75 No. 1, pp. 190-212, 2019; Lambros Malafouris, *How Things Shape the Mind: A Theory of Material Engagement*, Cambridge, Massachusetts: The MIT Press, 2013.
[22] J.A. Smith, P. Flowers, and M. Larkin, *Interpretative Phenomenological Analysis: Theory, Method and Research*, Los Angeles: Sage, 2009. See also A. VanScoy and S.B. Evenstad, "Interpretative phenomenological analysis for LIS research", *Journal of Documentation*, Vol. 71 No. 2, pp. 338-357, 2015, doi: 10.1108JD-09-2013-0118.

[23] A short overview of grounded theory for beginners is in Chun Tie, Ylona et al, "Grounded theory research: A design framework for novice researchers," SAGE Open Medicine Vol. 7 2050312118822927, 2 Jan. 2019, doi:10.1177/2050312118822927.

methodology could be useful for gathering testimonial descriptions of IM experiences and drawing out the significant properties for documentation through its processes.

Ethnographic models developed to study cultures offer other methods for gathering and characterizing experiences. Perhaps most germane to IM is the study of digital cultures, where it is common for people to become enmeshed in the virtual worlds of gaming and other online communities, and the qualities of technologies and their value to some are discussed and debated.[24] There is a fair amount of crossover between IM and gaming, both in terms of content and preservation strategies, which can be drawn on.[25] Even for non-game oriented or artistic pieces using IM, learning about the cultural aspects of IM experiences can help to pull out the influences that socio-technical context has on a particular encounter. An ethnographic approach can also reveal how one's experience is affected by aspects such as the anticipation of standing in line, watching others within the IM experience, or traveling to a special destination where the IM work is installed.

In ethnography, the researcher's perceived involvement in the culture or relationship to it is an important consideration. There is intentionality and responsiveness built into the types of questions asked and the overall shape of data gathering (i.e., directed or free-flowing interviews) with an awareness that the method will influence what is offered by subjects.[26] Considering these aspects of information-gathering alongside feminist and decolonial practices strengthens an ethical approach to identifying and working with participants.

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[24] See, for instance, Tom Boellstorff, Bonnie Nardi, Celia Pearce, and T.L. Taylor, *Ethnography and Virtual Worlds: A Handbook of Method*, Princeton: Princeton University Press, 2012.

[25] Game developers have embraced the immersive interactivity of all of the IM technologies, and gamification influences educational installations as well (for example, the Climate Converter at Museum of New Zealand Te Papa Tongarewa). Preservation strategies such as media archaeology and emulation owe a great deal to game enthusiasts for advocacy, debate, and tool development, which have benefitted digital preservation and media conservation. The University of Michigan Library's Research Guide on Video Game Studies has a comprehensive list of game preservation initiatives: https://guides.lib.umich.edu/c.php?g=282989&p=5955093. See also H. Stuckey, M. Swalwell and A. Ndalianis, "The popular memory archive: Collecting and exhibiting player culture from the 1980s," in A. Tatnall, T. Blyth and R. Johnson (eds), *Making the history of computing relevant*, Heidelberg: Springer, 2013, p. 215–225; and Melanie Swalwell, "Moving on from the Original Experience: Games History, Preservation and Presentation," *DiGRA '13 - Proceedings of the 2013 DiGRA International Conference: DeFragging Game Studies* Vol. 7 (August 2014), http://www.digra.org/digital-library/publications/moving-on-from-the-original-experience-games-history-preservation-and-presentation/.

[26] For a concise overview of reflexive ethnographic approaches, see Daniel Boxberger, "NPS Ethnography: Ethnography in the Parks," Park Ethnography Program, National Park Service, U.S. Department of the Interior, February 27, 2003, https://www.nps.gov/ethnography/training/taps/history.htm.

One of ethnography's tools, oral history, can also be called on here as a practice of gathering memories to build historical references.[27] Interviews with artists, communities, and other stakeholders are increasingly common within conservation and preservation, and these skills can be applied to oral history interviews as well. Testimonials within this realm can be as specific or wide-ranging as needed to create records of the moment of IM experience, and could stand on their own as evidence without further analysis. Particularly useful quotes could be highlighted for quick reference, and added to other documentation records as appropriate.

Audio description methods developed to accommodate accessibility for patrons of galleries, museums, and historical sites model precise narrative observation of an object, event, or environment.[28] Audio description is meant to provide a means to fuel exploration, questioning, and to make one's own interpretation of what is given. There are many styles of audio description, from straightforward characterizations to more evocative productions. While some audio description professionals advocate for limiting their scope to what is right there in the moment, others incorporate contextual information about creation and history, or even supplemental material (such as a musical response to light shows) that might offer other pathways to understanding.[29]

For preservation purposes, precise and evocative descriptions with language can provide a form of access to an IM work's activated state, and can incorporate elements of experience.[30] This intentional narrative form could draw together objective information (what equipment is used, where and how they are installed in a space), qualitative aspects (lighting levels, how VR equipment fits), and the resulting experience produced for that person. Audio description is developed around the principle of empathy in order to enable experiences for another person, so thinking about what makes that possible alongside being attuned to one's own experience is integrated in the process. It offers a way to synthesize the many pieces of information that already go into various forms of documentation, while representing primary

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[27] A digital media-specific perspective is in L. Muller, "Oral history and the media art audience," in Dekker A (ed.), *Archive2020: Sustainable archiving of born-digital cultural content,* Virtueel-Platform, Amsterdam, Netherlands, 2010, pp. 69-81; and L. Muller, "Towards an Oral History of New Media Art," Montreal: Daniel Langlois Foundation, 2008, https://www.fondation-langlois.org/html/e/page.php?NumPage=2096.

[28] Audio description training and services are being developed as inclusivity is prioritized in cultural spaces. For example, see the VocalEyes website: https://vocaleyes.co.uk/services/museums-galleries-and-heritage/.

[29] The *Illuminated River* audio description set includes historical information and musical compositions: https://vocaleyes.co.uk/illuminated-river/.

[30] Tate's "Audio Description: Works by Ima-Abasi Okon – In the Gallery" is one example of an artwork installation experience: https://www.tate.org.uk/art/artists/ima-abasi-okon-30538/audio-description-works-ima-abasi-okon.

experience and possibly supporting secondary experiences through listening. Adopting or adapting the techniques of audio description could supplement documentation and provide robust, yet succinct reference to an IM work activation.

It is also worth mentioning that technical narrative is another descriptive tool, although more focused on the technologies themselves. These have been used in time-based media conservation to logically connect the functions and relationships within technological systems, and can be a more accessible way to understand what is happening 'under the hood' for people who are not fluent in, or even familiar with, the technologies being used.[31] Because of the fundamental role that technological systems play in IM, and the complexity of their functions in rendering a work, writing a technical narrative can help clarify how the system works and why some decisions were made in terms of compatibility or effect. Interviews or walk-throughs with programmers and/or designers with whom artists worked may be necessary to make sure that all important elements are highlighted and explained clearly.

Human-computer interaction (HCI) is another field of research into experience, which perhaps most closely aligns with media preservation aims. HCI methods have been developed to inform the design process for digital user interfaces and technological products.[32] Depending on the goals of research, HCI evaluation methods can include a wide range of information gathering and analysis including interviews, focus groups and surveys, diary studies, usability tests, and automated data collection from the interfaces being tested. HCI's methods of evaluation and analysis are appropriate for gaining insight into how IM technologies contribute to user experience, either with the original technical system or comparing a later iteration using different hardware and/or software. In some IM development environments, tools for tracking user input or measuring graphics performance could be used to gather technical information to be associated with qualitative feedback from users.[33]

Within the methodologies outlined here lies potential for gathering experiential information at any time (from production to exhibition and beyond), and from a variety of users

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[31] For instance, see Mark Hellar, "The Role of the Technical Narrative for Preserving New Media Art," *The Electronic Media Review, Volume Three: 2013-2014,* https://resources.culturalheritage.org/emg-review/volume-three-2013-2014/hellar/; or Tom Ensom, 'Technical Narratives: Analysis, Description and Representation in the Conservation of Software-based Art', Ph.D., King's College London, 2019.

[32] For an overview of research methods, see: Jonathan Lazar, *Research Methods in Human-Computer Interaction*. Cambridge, MA: Morgan Kaufmann Publishers, an imprint of Elsevier, 2017.
[33] Tools for IM, like everything else associated with it, are subject to rapid obsolescence. Rather than suggesting particular tools in this publication, the Preserving Immersive Media Knowledge Base hosts a living document of resources that can be updated by its community of users: https://pimkb.gitbook.io/.

or observers (the artist, a programmer, audience member, curator, etc.). Having a range of experiences, from what might be called the first instance of an IM piece, to subsequent generations that may use different technological systems replacing obsolete components, affords future researchers and stewards a richer array of information to draw on. A diverse pool of users, from the creator(s) to those unfamiliar with the work itself or IM in general, offers more perspectives and insights.

Expanded Roles for Documentation

The current precarity of IM systems can put extra pressure on documentation to tell us about a work when it isn't otherwise accessible. If the collection of digital files, software, and hardware can't be activated to show an IM work, they have limited value in relating what the work as a whole is. They can be approached as artifacts, but this is more suited to research by people with enough familiarity or expertise to extract information and make sense of the pieces.[34] In this media-archaeological context, it is a tall order to convey the work holistically to a general audience or researchers who aren't proficient in the underlying technologies of IM.

I'd like to return to the inside-out approach proposed earlier in this paper to further explore how it can be incorporated into documentation practices for IM, given the stakes of what can be lost through obsolescence. If documentation might be relied upon to provide some form of access to understanding an IM work, it will need to do more than informing stewardship and exhibition choices behind the scenes; documentation will need to provide routes to understanding both *what* and *how* the work was while conveying its experiential dimension.

This might be facilitated in part by alternate approaches to collections records, which are where information about collection objects (whether they are IM works, archaeological objects, etc.) are compiled. Collections records are often created with specialized collection management software, such as The Museum System (TMS) Collections[35] or Argus,[36] but records also take the form of text documents, images, videos, and so forth, which might be compiled on a shared file server within an institution.[37] Staff can typically access provenance,

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[34] The results of treating VR equipment as artifacts is described well in Campbell, *A Rift in Our Practices, Toward Preserving Virtual Reality*, 2017, pages 44-45 and 50-53.

[35] https://www.gallerysystems.com/solutions/collections-management/

[36] https://lucidea.com/argus/

[37] Collections record management is scaled to the collection's need and how the information can be stored and accessed, but often takes several forms such as collections management software, digital file

exhibition history, physical and digital components (such as dedicated equipment and program files for IM works), condition reports, and conservation treatment records.[38] These records have primarily been used internally to conduct the business of managing collections, but their contents are increasingly being made public, at least in part, through connecting data like titles, dimensions, medium lines, and exhibition histories to online collection sites.

A posthuman collections approach, as outlined by Fiona Cameron, a researcher in Museum and Digital Heritage Studies, draws in information beyond the object itself.[39] Rather than basing a collection object's definition and value on its material composition and history, a posthuman collections approach sees "objects as thingness and as socio-material compositions."[40] It is a holistic approach to information-gathering, holding both material (thingness) and how an object interacts with the social realm, viewing that relationship as mutually affective (socio-material compositions). A post-human collections approach expands what type of information is significant, and strives to encompass the contextual details that add to its value.

An example that Cameron gives to illustrate this approach is a partially melted and muddy plastic bucket in an Australian history collection;[41] in the context of a history museum, it may seem inappropriate to save a mass-produced consumer item that might be mistaken for rubbish. But considering that this bucket's current state carries the effects of fighting historic fires and saving a home, the disfiguration and mud become a portal to an important story that can resonate powerfully—or at least become more enlivened as a historic moment. Gathering and relaying such stories and contextual information more easily enables one to imagine the circumstances that led to the bucket's state and the accompanying experiences of its former owner fighting to save their home.

storage, wiki sites, digital asset management software, and physical storage for paper and materials archives.

[38] An often-discussed topic for contemporary art and time-based media is that it can be challenging to fit necessary information into CMS systems that have been designed around more traditional collection objects like paintings or sculpture that are typically self-contained and persistent, unlike works that might be exhibited in varying iterations or use exhibition copies of objects or digital files.

[39] Fiona R. Cameron, "Posthuman museum practices," in R. Braidotti & M. Hlavajova (eds.), *The posthuman glossary* (pp. 379–392), New York, NY: Bloomsbury, 2018; and Fiona R. Cameron, "Theorising heritage collection digitisations in global computational infrastructures," in H. Lewi, D.W.S.Vom Lehn, and S. Cooke (eds.), *The Routledge International Handbook of New Digital Practices in Galleries, Libraries, Archives, Museums and Heritage Sites* (pp. 55-67), London; New York: Routledge, Taylor & Francis Group, 2020.

[40] Cameron, F. R. (2018). "Posthuman museum practices," p. 349.
[41] Ibid.

This avenue to experience seems relevant to creating and presenting documentation of IM works. It shows the importance of stories in the process of engaging audiences, and activates the human capacity for imagining another's experience. The inclusion of socio-material aspects in an item's history and current state acknowledges that while we shape the world around us (e.g., contributing to climate change, or creating VR systems), those things in turn shape us and together create the changes that make their histories interesting or relevant.

Another option for record-making is the notion of body-archive, which involves a more personal dynamic. It is rooted in performance studies and was further elaborated for the context of conservation by Hélia Marçal.[42] For intangible heritage like performance art, there are few material or technical aspects to document for scholarship or potential future re-performances.[43] It is *what happens* and *how it happens* during the performance that can provide meaningful documentation. Such information at least partially comprises embodied knowledge, which Marçal shows could be accessed through various roles, from observer to observer-participant to direct participant. The conservator can become another body-archive, translating their experience of performance or event into documentation "through the provision of autoethnographical and reflexive accounts about the participatory process."[44] These accounts contribute to "constructing the narratives that surround the conservation of such artworks," which Marçal points out should also capture what cannot be translated and what is left out.[45]

The body-archive approach makes space for conservators to add their experiences to documentation, through their more focused lens on what may be needed to care for a work over time and accurately represent it through documentation for future understanding. Marçal's acknowledgement that there will always be something left out, due to the nature of experience

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[42] Marçal, Hélia Pereira. "Conservation in an Era of Participation." *Journal of the Institute of Conservation* 40, no. 2 (May 4, 2017): 97–104. https://doi.org/10.1080/19455224.2017.1319872.

[43] "Re-performance" is an area of debate; see: Christian Berger and Jessica Santone, "Documentation as Art Practice in the 1960s," *Visual Resources* 32, no. 3–4 (October 1, 2016): 201–9, https://doi.org/10.1080/01973762.2016.1241030; Jonah Westerman and Gabriella Giannachi, *Histories of Performance Documentation: Museum, Artistic, and Scholarly Practices*, London: Taylor and Francis, 2018; Tancredi Gusman, "Between Evidence and Representation: A New Methodological Approach to the History of Performance Art and Its Documentation," *Contemporary Theatre Review*, 29:4 (2019): 439-461; Laurenson, Pip, and Vivian van Saaze. "Collecting Performance-based Art: New Challenges and Shifting Perspectives," in *Performativity in the Gallery: Staging Interactive Encounters*, O. Remes et al. (eds.), 27–41, Berlin: Peter Lang, 2014; and Bern Academy of the Arts, Institute Materiality in Arts and Culture, "Performance: Conservation, Materiality, Knowledge," (website), https://performanceconservationmaterialityknowledge.com

[44] Marçal, "Conservation in an Era of Participation." *Journal of the Institute of Conservation* 40, no. 2 (May 4, 2017): 102.

[45] Marçal 2017, 102.

and its imperfect translation into more persistent information systems like language and documents, also validates resistance to a completionist, imperial model of knowledge that collections management systems (and collecting itself, for that matter) are designed for. It allows for the human element to enrich the system in the subjective narratives of reflexive, autoethnographic documentation, which may offer more poignant insights and ways to connect to intangible elements like experience of IM works than lists of technical specifications.

The project "Reshaping the Collectible: When Artworks Live in the Museum" at Tate has also explored how ephemeral and performative artworks challenge museum practices.[46] One approach used during the project was to identify individuals who might act as 'transmitters', who carry knowledge about a work and can be present at each activation to pass on that knowledge and shape outcomes.[47] The opportunity to communicate their experiences directly to others (who could be considered 'receivers') to guide and refine the qualitative aspects of the performance transcends what might be gleaned from a document alone. The person-to-person interactions allow access to a transmitter's embodied knowledge through memory and exchanges beyond words, including immediate feedback to hone a performer's skill in activating a work in a particular way. Such qualities are examples of Marçal's acknowledgement of what is left out of documentation because it cannot quite be translated into those forms.

While I have introduced the post-human collections, body-archive, and transmitter/receiver approaches and the creation of documentation as primarily active within institutional settings under the control of collection care staff, I believe a wider inclusivity of participants is beneficial. Perhaps removing the intermediary of institutional representation from information-gathering processes would allow more, or at least different, accounts of experience to be added to records. A supporting role that is grounded primarily in providing infrastructure for open records would shift the dynamic away from gate-keeping, which has been a criticism levied at institutions, and toward wider engagement with their purposes.

There is precedent for more open practices of care in the conservation of Indigenous and World Cultures collections, with direction from communities and greater autonomy in intent

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[46] Marçal was also involved as a doctoral researcher. A description of the multi-year research project, as well as outcomes, can be found on Tate's website: https://www.tate.org.uk/research/reshaping-the-collectible.

[47] From "Behind the Scenes: Conserving Tony Conrad," a part of "Reshaping the Collectible: When Artworks Live in the Museum," Tate: https://www.tate.org.uk/art/artists/tony-conrad-25422/conserving-tony-conrad.

and interaction.[48] Records themselves can be created and edited more widely on collection management systems like Mukurtu, or wiki platforms.[49] Involving the audiences of IM works more directly, and opening the field of responses to enthusiasts, experts, and beyond to share their experiences and knowledge, adds to what is available in documentation with different perspectives. It could also lead to greater incentive for publics to become involved in the cultures of collecting and stewardship, in line with decolonial movement.

A final thought about documentation of IM for future audiences is not to foreclose upon what the work is, but to allow it to have a continued life and relevance. Is there a way to leave room for new viewers to have their own experience of the work through these forms of documentation? Abandoning the notion of reproducing some authoritative Experience of an IM work, and rather, enabling an encounter in the present with *what it was like* or *what it does*, might create that type of space for new experiences. The inside-out approaches to expanded forms of documentation discussed in this section appeal to the human urge to relate and understand, working with ways of sense-making and providing greater means of being carried forward.

Conclusions and Open Questions

In this paper I have endeavored to parse out what is meant by 'experience' in the context of IM preservation, draw focus on achievable goals for documentation, and introduce a variety of methods to meet them. Because the experiential dimension of IM is crucial to understanding works holistically, adding information about *how it was* to *what it was* in documentation will better support stewardship decision-making. Given the steep challenges involved in maintaining the ability to activate and interact with IM works in the longer term, it can be expected that its

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[48] For example, see these articles: Glenn Wharton, "Dynamics of Participatory Conservation: The Kamehameha I Sculpture Project," *Journal of the American Institute for Conservation*, 47 (2008):159–173; Kuukua Anna Buduson, "Collaborating with a Source Community to Conserve two Sámi Coffee Bags by Combining Established Conservation Treatments and Traditional Preservation Methods," *Studies in Conservation*, 2022 DOI: 10.1080/00393630.2022.2051959; and Erina McCann & Jade Hadfield, "Looking Back to Move Forward: Continuing Community-centric Practices for Conservation and Collection Care of Pacific Collections in an Australian Museum," *Studies in Conservation*, 2022, DOI: 10.1080/00393630.2022.2066318.

[49] "Mukurtu is a grassroots project aiming to empower communities to manage, share, and exchange their digital heritage in culturally relevant and ethically-minded ways." Webpage: https://mukurtu.org/. MediaWiki is a base technology that can be used as a content management system: https://en.wikipedia.org/wiki/MediaWiki. The San Francisco Museum of Modern Art built a collaborative wiki site for its media collection in 2016: Martina Haidvogl and Layna White, "Reimagining the Object Record: SFMOMA's MediaWiki," *Stedelijk Studies Journal*, no. 10 (September 28, 2020), https://stedelijkstudies.com/journal/reimagining-the-object-record-sfmomas-mediawiki/.

documentation will be leaned upon when considering replacements for obsolete equipment, or even to represent works when they can't be activated.

Incorporating experience into documentation offers opportunities to approach record making and access differently as well. Braiding together artist intent with outside-in and inside-out approaches can more fully describe what is important to carry forward in IM works, contextualizing technical specifications and material characteristics, user-centered and performative qualities, and conceptual significances. Considering authorship and positionality as part of gathering experiential information acknowledges the power dynamics involved in creating knowledge through valuing others' perspectives. Adopting the relational practices of feminist and decolonial ethics moves away from imperial, extractive attitudes, and aligns collections practices toward working with and for the people they serve.

The intangible nature of experience produced by encountering an IM work has many parallels to performance art, which could be more fully explored as a framework for documentation of IM experiences. Ephemerality, relics or artifacts, documentation as stand-in, networks of interactions, questions of re-activation, and iteration are also relevant to IM systems and artworks. There has been robust research and development of performance documentation resources at Tate over the past decade as part of the projects, "Collecting the Performative" and "Documentation and Conservation of Performance."[50] Scholarly work around collection, preservation, and exhibition of performance art is also a lively area of debate that might inform approaches to IM works.[51] Some connections have already been established around performativity and conservation work, and those theories could be applied to IM case studies to take them further.[52]

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[50] Collecting the Performative webpage: https://www.tate.org.uk/about-us/projects/collecting-performative; Documentation and Conservation of Performance webpage: https://www.tate.org.uk/about-us/projects/documentation-conservation-performance. Further discussion of this research is in: Louise Lawson and Helia Marçal, "Unfolding interactions in the preservation of performance art at Tate," in *Transcending Boundaries: Integrated Approaches to Conservation. ICOM-CC 19th Triennial Conference Preprints, Beijing, 17–21 May 2021*, ed. J. Bridgland. Paris: International Council of Museums.

[51] See footnote 43 for references.

[52] See Joel Taylor & Hélia Marçal, "Conservation in the Performative Turn," *Studies in Conservation*, 2022, DOI: 10.1080/00393630.2022.2067717; Brian Castriota, "Object Trouble: Constructing and Performing Artwork Identity in the Museum." ArtMatters International Journal for Technical Art History, Special Issue 1, 12–22, 2021, https://www.amjournal.org/special-issue-1; G. Giannachi, "At The Edge of the 'Living Present': Re-enactments and re-interpretations as strategies for the preservation of performance and new media art," in G. Giannachi & J. Westerman (eds), *Histories of performance documentation: Museum, artistic, and scholarly practices,* Routledge, Oxon, 2018, pp. 115–131; the "UNFOLD: Mediation by reinterpretation" and "Capturing a Moment: Where net art and performance meet" research projects at LIMA: https://www.li-ma.nl/lima/projects/research; and Helia Marçal, "Towards a relational ontology of conservation," in *Transcending Boundaries: Integrated Approaches to*

Future needs that documentation could support are still conjectural at this time, although based on difficulties already being experienced for collected IM works.[53] After the flurry of activity at acquisition comes the period of uncertainty while a work is in a dormant state—unactivated and/or in storage—when it is impossible to know a performative work's condition.[54] How documentation might be used in an expanded capacity will only be answered as preservation and exhibition activities are taken up over time. Indeed, these activities themselves will likely shift in response to the challenges that IM works pose to established methods. The inter-relation of preservation and exhibition means that they will evolve together as creative solutions are crafted. When IM works are revisited, new questions will likely arise and existing ones may become more focused, warranting further work to refine how IM documentation is approached.

It is my hope as a member of this practicing community that the ideas and resources presented in this paper can start us off on the right foot down the path of unknowns ahead for the preservation of IM works. There are many different types of collections and contexts where this task will be met, and each case will have something to offer for the benefit of others. The spirit of this paper is rooted in the recognition of collaboration, and I am sure that methods of IM documentation will be taken up, continued, and improved upon as we navigate preservation of these complex works.

Conservation. ICOM-CC 19th Triennial Conference Preprints, Beijing, 17–21 May 2021, ed. J. Bridgland. Paris: International Council of Museums.

[53] Evidence is not yet widely published in the field, but presentations at Preserving Immersive Media events in 2020 speak to the array of preservation questions and struggles: https://www.youtube.com/channel/UC1z5czlykhTRQnaYQPhinAw/videos.

[54] "Technology-based art is considered to be more sensitive to damage, loss, misinterpretation, and incorrect installation than a traditional artwork, due to its very specific and sensitive relationship to time, space, and concept." Time-Based Media Art Conservation program webpage, Institute of Fine Arts, New York University: https://ifa.nyu.edu/conservation/time-based-media.htm. The term "dormant" is specifically borrowed from Tate's "Documentation and Conservation of Performance Art" glossary of terms: https://www.tate.org.uk/about-us/projects/documentation-conservation-performance/strategy-and-glossary

Resources

The Preserving Immersive Media page on Tate's website describes the ongoing project and has links to resources such as the "Preserving Virtual Reality Artworks Report" and "Acquisition Information Template."

https://www.tate.org.uk/about-us/projects/preserving-immersive-media

The Preserving Immersive Media Knowledge Base is a volunteer-driven, living wiki that gathers information about IM preservation methods and resources: https://pimkb.gitbook.io/

The Preserving Immersive Media Group (PIMG) is a mailing list and meeting series established by the Preserving Immersive Media Project, based on Group.io: https://groups.io/g/pimg/

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