

Re-enactment, Users Manuals and DNA Storage: methods for media art preservation

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Abstract

This paper discusses a novel approach to media art preservation led by Australian artist-archivist group Teaching and Learning Cinema, using the field of expanded cinema as a case study.¹ Works of 1970s expanded cinema (which combine celluloid film projection with live performance) are typical of the inherent “lossiness” of much 20th and 21st century media art.² While offering richly embodied experiences in their moment of enactment, expanded cinema’s ephemerality means that it risks falling out of circulation and thus becoming unavailable for future experience. Teaching and Learning Cinema, over the past 20 years, has evolved a methodology for preserving works of expanded cinema, featuring three overlapping approaches. First, intergenerational transfer is attempted: in this phase, younger artists learn about the work from its originators, and produce live re-enactments. During the second phase, a users manual is assembled, encoding the artwork as a set of instructions with the intention of making it available for future generations of performers and audiences. Thirdly, the archived material from phases one and two is stored on synthetic DNA, with a view to transmission into the deep future (perhaps 1000 years). While the first two phases are urgent, preventing the work’s immediate extinction, the third phase is speculative, broadening the enquiry to explore the question of cultural heritage across much longer timeframes.

Keywords

Media art preservation; time-based art preservation; archival practice; preservation; DNA storage; manual making; expanded cinema; re-enactment; media art history.

Expanded Cinema and the problem of lossiness

Expanded cinema – a niche area of experimental film practice – emerged in the late 1960s, with particular energy in England, Japan, Austria and USA. While experimental cinema involved the production of abstract films, non-narrative films, and structuralist interventions in the cinematic medium itself, the field of expanded cinema is characterised by experimentation with the live screening event. As Teaching and Learning Cinema, our collaborative

research since 2004 has placed particular focus on expanded cinema produced in the 1970s by members of the London Film Makers Co-op (LFMC). Characteristic works of expanded cinema produced by LFMC members include Annabel Nicholson’s *Reel Time* (1973), Anthony McCall’s *Line Describing a Cone* (1973), William Raban’s *2’45”* (1973), and Guy Sherwin’s *Man with Mirror* (1976). Each of these works incorporates a performative event and the participation of an audience (to varying degrees) as integral components of the artwork itself. [8]

In this paper we focus on a landmark work of expanded cinema, *Horror Film 1* (1971), by Malcolm Le Grice. This work involves three 16mm projectors with coloured celluloid film loops, a live performer with their back to the audience moving slowly from the projection screen to the projectors, and an audio soundtrack playing the sounds of a person breathing. Each time *Horror Film 1* is performed it is subtly different, depending on the dimensions of the space, the movements of the performer, and the spatial arrangement of the assembled audience.

Expanded cinema works like *Horror Film 1* were intended by their originating artists to be experienced in an embodied, co-present way, in the live moment. Documentation of specific performance iterations is available (in physical archives and on YouTube), and key scholars have argued that due to the inherent ephemerality of such performative artworks, viewing documentation materials can be a legitimate means of accessing them after the live moment has passed. [9] [10] However, our research also argues for the urgency of engaging in active intergenerational transmission, in order to offer future artists and audiences the opportunity to access the works with as much experiential richness as possible. [11] [12]

This paper describes the use of Teaching and Learning Cinema’s method for the experiential preservation of *Horror Film 1*. Two components of our method are outlined:

¹ For a survey of approaches to media art conservation, see [1]. Some significant contributions in media art conservation scholarship include [2] [3] [4] [5].

² The concept of lossiness is borrowed from the field of information science and is generally used to refer to data loss through file compression – see [6]. We use the term to refer to the loss of contextual and experiential “data” which we argue is inherent in ephemeral media art. For a lively discussion of lossiness and intergenerational transfer, see [7].

intergenerational transfer, and the creation of users manuals. Teaching and Learning Cinema's first attempt at using this method was produced for Guy Sherwin's *Man with Mirror*. The *Horror Film 1* project extends this research, and includes an additional component, the use of synthetic DNA as a long-term storage material.

Intergenerational transfer and re-enactment

Working as the artist group Teaching and Learning Cinema, the methodology for intergenerational transfer developed by the authors draws on our respective disciplinary training. Louise Curham is an experimental filmmaker and professional archivist with specific focus on the preservation of works of media art. [13] Lucas Ihlein works in the field of socially engaged art, which emphasises the intersubjective relations between collaborators and communities as central components of the artmaking process. [14] The mode of intergenerational transfer we have developed combines traditional archival research (for example, in the British Artist Film and Video Study Collection) with interviewing practices borrowed from oral history, augmented by social trust building (facilitated via spending extended periods of time with the originating artists and their families). The combination of these methods results in the accumulation of a strong understanding of a work's technical elements for live presentation, as well as gathering the contextual knowledge necessary to comprehend how the work was intended and received within its native cultural milieu.

The gathering of these complementary bodies of knowledge establishes the groundwork for the production of live re-enactments of the work by the members of Teaching and Learning Cinema. This is a crucial element in our push for intergenerational transfer, as it separates the artwork from the performing body of the originating artist. In the case of *Horror Film 1*, in recent years Malcolm Le Grice has declared he is too old and unwell to perform the work himself, and so it is only by "handing over" to others the knowledge of how to present and perform it that the work can now be experienced live. [15] We conceive of this process of intergenerational handover as a form of "custodianship", in which three elements have been agreed upon by Le Grice and Teaching and Learning Cinema: the technical requirements, a deep understanding of the cultural context specific to the work, and the intellectual property aspects which permit other performing bodies to confidently perform the work.

Users Manuals for the encoding of the work's "DNA"

Re-enactment of the work by the Teaching and Learning Cinema enables the work to "survive" beyond the lifespan of the originating artist. While this intergenerational transfer process is laborious (and enjoyable), it is only the first step in ensuring the availability to future generations of rich embodied experiences of works of live art such as *Horror Film 1*. The next challenge is to conduct long-term "succession planning" so that the work becomes less vulnerable to loss. This means thinking ahead about how to pass the work into the future, and how to diversify the community of custodians. If we think of the embodied "knowledge holding" role of TLC as akin to a form of data storage, the impetus to transfer this data storage to further custodians is perhaps like the concept of redundancy in data management: the more agents holding the data, the less likely the work will be lost. This concept is expressed in the "Lots of Copies Keep Stuff Safe" (LOCKSS) model, developed to preserve publications made available on the internet, such as open access journals. Its core principle is an accepted axiom in digital preservation: multiple copies, held in multiple locations on multiple formats, promoting long term preservation. [16] The LOCKSS analogy is relevant for Teaching and Learning Cinema because our intention is to harness the potential for preservation via wide distribution of multiple "copies". To work towards this goal the Teaching and Learning Cinema has worked with users manuals as tools to hold and transfer knowledge (technical, contextual, and intellectual property) and empower future artists to take on the work of custodianship.³

The work of "manualising" (as we have come to describe it) is partly inspired by the practice of creating performance "scores" made famous by George Maciunas and other Fluxus artists of the 1960s and 70s. Fluxus scores were short textual (often poetic) instructions indicating how a performance should be carried out. Such scores have a double ontology - enabling the creation of a work of live art, as well as existing as conceptual artworks in themselves.⁴ Importantly, for our work of preservation of expanded cinema via manualising, Fluxus scores also carry an intellectual property function - they tacitly give permission to other artists to perform the works. In fact, the concept of "freedom to perform by others" is built into the "DNA" of Fluxus works. [18] [19]

Unlike Fluxus artists, expanded cinema artists from the 1970s did not generally create scores. For this reason, our task involves creating "retrospective" scores, which we incorporate into our users manuals. In the case of *Horror Film 1*, we began assembling a workable score via interactions with Malcolm Le Grice in 2013, effectively becoming his "students" (or to use his term, training to be

³ For an extended discussion of users manuals and their application in performance re-enactment, see [17].

⁴ The concept of double ontology here is adapted from Claire Bishop's account of socially-engaged art (SEA). Bishop argues (following Guattari) that SEA needs to operate in both the artworld

and the broader social field, and that this doubleness troubles the criteria used to evaluate both domains [20].

his “understudies”). This dialogical process of learning how to re-enact the work reveals elements of the work which Le Grice had hitherto internalised. It is only through the attempt to transfer the work to other performing bodies that each element is made explicit and intelligible to others, and thus able to be incorporated into a score.

In addition to interacting with Le Grice in order to draw out the score for *Horror Film 1*, we also invited him to write down instructions for the work. Le Grice’s brief instructions (produced in 2023) include textual notes, diagrams, and photographs. These are preserved intact (with original typography and document layout) forming the heart of our users manual. While we noticed several gaps or omissions from Le Grice’s instructions, rather than altering or correcting them, we have used the common “track changes” function in word processing software to “annotate” them - thus leaving a trace of the layers of knowledge intervention as we build our own archival materials for future “users” of the work.⁵

To this annotated document, we append two further elements. First, a brief introduction, to allow readers of the manual to understand the historical and cultural context of *Horror Film 1*, as well as the context and rationale for our intervention as Teaching and Learning Cinema. Second, following the annotated instructions, we add documentation materials of each new re-enactment of the work, offering situation-specific notes on what worked, what went wrong, and recommendations for future performers. Our intention is that this “documentation of iterations” section should be perpetually open, building an ongoing folder which tracks the evolution of the work by Teaching and Learning Cinema as well as other performers. In this, we are inspired by Allan Kaprow’s *Push and Pull - A Furniture Comedy for Hans Hoffman* (1963). The score for this early “happening” is available from the Kaprow foundation, which encourages future enactors to engage in a feedback process, by including documentation from their iterations in an ever-growing dossier held in the Foundation’s archives. [21]

Curham conceptualises Teaching and Learning Cinema’s users manuals as including ‘tales of use’. [22] The manuals bring together the records from Teaching and Learning Cinema’s experiences of ‘using’ the original work (through re-enactment). Records contributed by future users of the Teaching and Learning Cinema manual add further ‘experience metadata’, described by Curham using the botanical metaphor of ‘growth rings’. [23] Crucially, in this model, *use does not wear out an artwork, rather it strengthens the work*. [24] Incorporating the experiences of future users into the manual is essential as it assists the work to continually evolve, and thus survive.

Current work-in-progress by Teaching and Learning Cinema to expand and enrich the *Horror Film 1* users manual involves the creation of a series of short YouTube

video tutorials, which show technical aspects of the work more readily than can be shared in text and diagrams. We are aware that as time passes, technical know-how about the operation and maintenance of 16mm projectors will become much less widespread. Teaching future users how to work with celluloid film may thus become part of our responsibility.

Synthetic DNA storage

As we prepare for the sharing of *Horror Film 1* with future custodians (beyond Le Grice and Teaching and Learning Cinema) we have simultaneously begun a new collaboration which concerns the question of the materiality of data storage. “Old media” like celluloid film is fragile and subject to decay, and this is one of the central “materiality challenges” that Teaching and Learning Cinema is working on with Le Grice. At the same time, we are working with Raja Appuswamy, a Data Science researcher from Eurecom in France, to explore the efficacy of using synthetic DNA to back up our *Horror Film 1* users manual. Appuswamy’s research indicates current magnetic data storage systems need to be backed-up and transferred every 20-30 years to avoid data loss. By contrast, current estimates show that data encoded and stored in synthetic DNA material can endure without loss, at room temperature, for more than one thousand years. [26] [27] [28] Appuswamy, Teaching and Learning Cinema, and Le Grice are in the process of experimenting with the creation of a synthetic DNA capsule holding the *Horror Film 1* users manual.

While synthetic DNA may solve some of the technical data storage problems inherent in digital archiving and preservation, our collaboration with Appuswamy has also prompted deeper philosophical questions. The production of an artefact (the synthetic DNA capsule) which will last for one thousand years has expanded our focus beyond the narrow concerns of keeping *Horror Film 1* available for near-future generations to experience. We conclude this paper with a set of speculative questions arising from this ongoing research.

From a technical point of view:

- How will we know whether our descendants will comprehend the instructions that we lay down for them in 2023?
- What metadata may be required to facilitate the unpacking (sequencing) of the DNA data in the distant future?
- What will we need to do to ensure that future users know how to handle the container storing DNA?
- Where should the capsule itself be stored to avoid destruction (nuclear fallout, climate disaster, etc)?

⁵ Our principle of leaving behind traces which alter a record in the archive connects with best practices in digital preservation. See [25].

And assuming future users are able to overcome those technical challenges, some broader questions arise:

- What aspects of culture are important to keep and pass on, and what should we let go?
- Who gets to choose?

To see the current iteration of the *Horror Film 1* users manual, see [29].

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Dr. Raja Appuswamy is an Assistant Professor in the Data Science department at EURECOM where he leads the Data Systems research group. His research focuses on developing novel processing and storage technologies to enable real-time analytics and long-term archival of Big Data in several application domains.