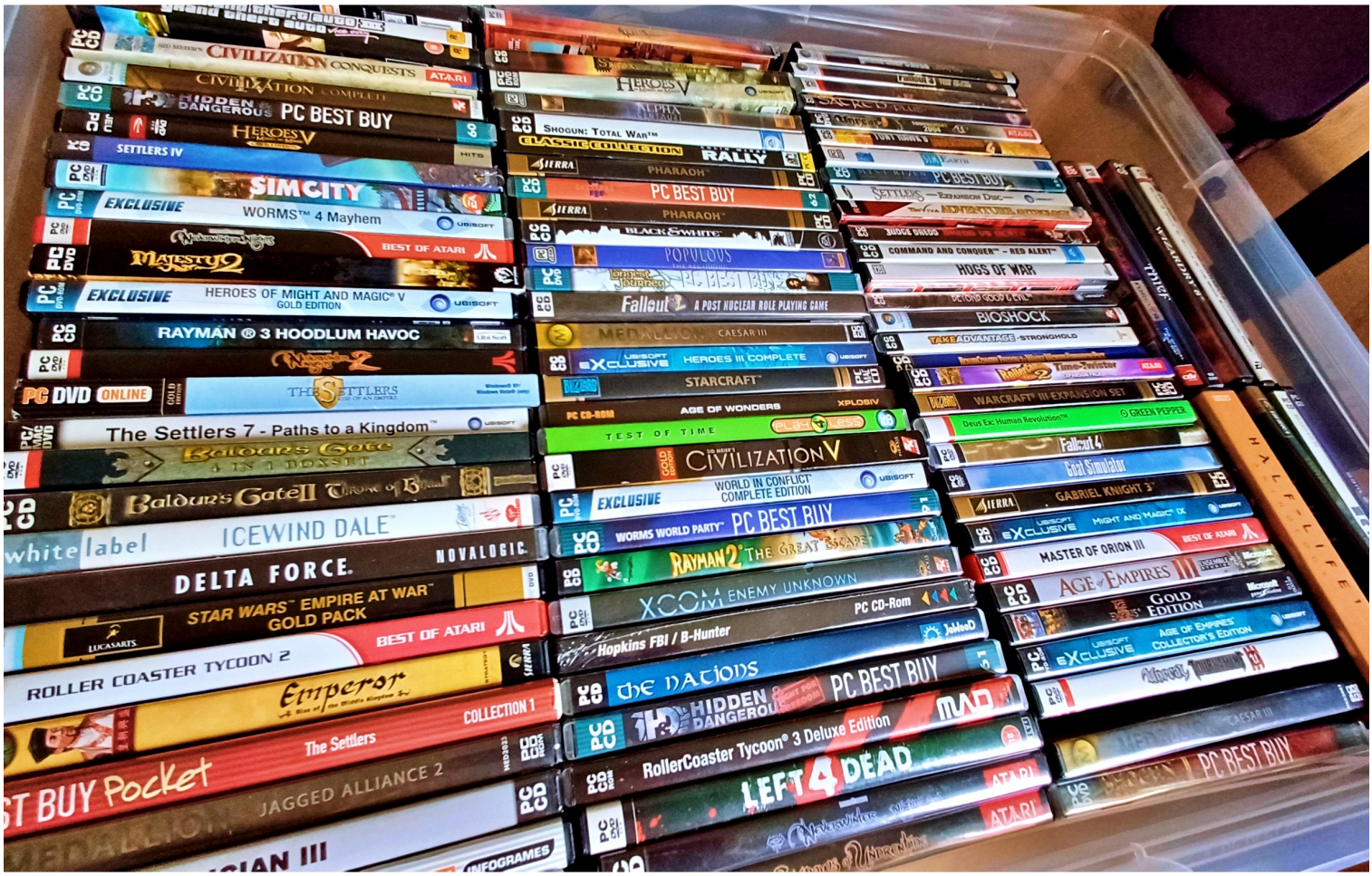
Preserving digital culture & heritage: A study of PC video game collectors navigating the technological,social and legal landscapes of their field



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Semester 10 (Master in Techno-Anthropology)
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Abstract

Video games have been a part of current societies and cultures for roughly half a century. They can be analysed from many perspectives, for example as technological artifacts, techno-social phenomenon or indeed, as art and entertainment. Despite the socio-cultural importance of video games, it is one format whose early decades suffer from a lack of wide-spread documentation and archival availability. Video game preservation has become an increasingly important aspect of gaming culture in the present. The aim of this project is to see how PC video game collectors are engaging with video game preservation on the individual level, the physical, cultural, ethical and legal obstacles they face and how they navigate them.

Introduction

“The vision of time is broad, but when you pass through it, time becomes a narrow door.”

— Frank Herbert, Dune

Over the past fifty years, video games have become integral to contemporary societies and cultures (White, 2020). These artifacts can be studied through various lenses, including as technological innovations, socio-technological phenomena, or as forms of art and entertainment. Unlike earlier generations, whose cultural zeitgeist was influenced by films, music albums, or literature, video games have emerged as a defining medium for recent cohorts (Goslin, 2019). Despite their current socio-cultural significance, video games, unlike those other forms of media, suffer from a lack of extensive documentation and archival accessibility during their formative decades. One reason for this state of things being that historically speaking, video games have had a shorter shelf-life when compared to those other types of media, because the focus has always been on the newest technology, the latest releases and in general constantly looking forward at the ‘next generation’ of gaming platforms (Newman, 2009). As a result of this approach the developers of the hardware and software platforms had no real incentive to ensure that the newest model of their products are backwards compatible with older video games (Lee, 2018). That said, even when backwards compatibility of one form or another exists, such as is the case of Sony’s PlayStation 5 being backward compatible for nearly all PlayStation 4 software, this does not tend to

carry on through further generations of the same platform. Meaning that games for the older PlayStation 3, 2 and 1 would not run on the PlayStation 5 (Skuse, 2022).

As a life-long computer user and gamer, having used various types and generations of computing hardware for more than 30 years, the issue of PC video game preservation is one that is of particular personal import.

When most gaming-related issues are being discussed the realm of pc gaming is oftentimes ignored, which has always been something of a dichotomy, seeing as how video games could not exist if computers would not. More so, when considering how any console emulation effort requires a computer to begin with, though I will talk in detail about these things much later in the report. As a result of this partial gap in the gaming community discourse, meaning about the preservation and documentation efforts for PC games, especially older PC games are even less addressed and looked at. This project aims to identify the ways in which individual video game collectors and preservation communities engage with the activity of video game preservation. What they identify as main obstacles and how they negotiate them, or intend to negotiate.

When it comes to culture, things inevitably get lost. My interest, passion and aim is to preserve as much information and hands-on know-how, related to PC video games of the distant and recent past. This is meant to help future academics and other interested parties, private individuals especially, to look back at how games and their associated socio-cultural and technical eco-systems, were in their original intended experience, so that they can use this knowledge to fill in the context of whatever it is they are interested in studying.

Problem Analysis

The imperative to preserve PC video games, hardware, and supplementary materials associated with video gaming culture is not novel. Various organizations have undertaken efforts in this realm, differing significantly in visibility and focus.

The Internet Archive

The Internet Archive, established in 1996, represents one of the most widely recognized endeavors in digital preservation. This non-profit initiative functions as a virtual repository, encompassing diverse media such as text, films, music, and software, alongside web archives accessible via its Wayback Machine feature (Internet Archive, 2016). While valuable for both academic researchers and enthusiasts, the Internet Archive has encountered challenges to its sustainability. For instance, a Distributed Denial-of-Service (DDoS) attack on October 9, 2024, resulted in data theft and temporary loss of functionality (Warren, 2024). Moreover, video games and related cultural artifacts are not prioritized within its broader preservation agenda. Granted, this is a potential vulnerability which has to be taken into account when talking about most, if not all, publicly facing online spaces. The organization also faces uncertainty due to shifting technological policies and geopolitical dynamics, which exacerbate risks to its continued operation.

Computer Museums

Computer Museums are maybe the secondary step in mainstream awareness one makes when talking about documentation and preservation of video games culture. While also by no means a new concept, the presence of computer museums tends to be concentrated in regions of high population combined with a historically high purchasing power. There are valid reasons for this, a large population with more money than the average means a larger proportion of said money could be spent on what have historically been niche, and for most, luxury items, meaning computers or similar gaming devices. While computer museums do great work and as much as they can, in particular documenting and preserving local or regional computing history and culture, they are limited by their very existence. Their geographical limitations inherently restrict their scope, leading to an incomplete representation of global developments in gaming technology and culture.

GOG (formerly known as Good Old Games)

GOG is a software distribution platform that has historically focused on making older pc games, not only available for purchase digitally but also to make them playable on modern operating systems and hardware. By ensuring compatibility with modern hardware and operating systems, GOG contributes to the accessibility of historic gaming experiences. Distinctively, the platform offers DRM-free games (GOG.com, n.d.), which enhances user access and ownership. DRM stands for Digital Rights Management and it refers to a number of technologies meant to control the access to

copyrighted material (FORTINET, 2024). One of the major issues with preserving older video games is that they were designed and built with certain hardware and platform formats and standards in mind and once those standards changed, those games remain in the past, unless they are updated by their rights holders. GOG, as a commercial enterprise, has taken upon itself to do as much of the work required to both track down and remunerate license holders as well as to make the games function on modern platforms. As opposed to both the Internet Archive and the upcoming section, GOG is set in the European Union, so very different copyright and licensing laws apply.

Video Game History Foundation Library (VGHFL)

The Video Game History Foundation Library is a mainly-online, US-based, non-profit organization dedicated to documenting and preserving video game-related materials. They are funded through donations from the public and focus on magazines and other textual documentation, not the video games themselves. However, even if they would, the United States copyright laws restrict the ability to share digital access to out-of-print video games with researchers (Gamehistory.org, 2025). This limitation underscores the broader legal challenges faced by preservation efforts in the domain of gaming history. More on this later in the report. Everything that is present on their website exists in their physical archive, or they have permission to share digital copies of said material. Should be noted that they will not share items that are still digitally available, such as particular magazines.

Software Preservation Network (SPN)

The Software Preservation Network formed in 2016 and is an amalgam of specialists from diverse backgrounds, aiming to ensure that software is curated and preserved, seeing it both as having both cultural value as well as it being critical information infrastructure needed to access existing digital data. The organization is based in the US and is involved in different facets of software preservation efforts. These range from applying for research grants related to aligning international law and policy related to software preservation to interventions in the tri-annual DMCA rulemaking process, and several more (Software Preservation Network.org, 2021).

Online activism

Over the past decade there have been several online-based actions that have been related to the preservation of videogames. Recently, as of the writing of this report, possibly the most relevant being the “Stop Destroying Videogames” European Citizens’ Initiative. This is a EU Petition meant to address how many publishers are basically destroying the video games they have sold to customers as good with no expiration date, by making them completely unplayable once support from them ends. This type of unregulated planned obsolescence is not only anti-consumer but it also makes preservation pretty much impossible (www.stopkillinggames.com, n.d.). As it happens with many such petitions, these are unlikely to end in any real world results, seeing as how the major publishers are large and powerful corporations with deep lobbying pockets. That notwithstanding, it is important to support these types of petitions if for no

other reason than to increase the awareness of the importance of video game preservation.

Miscellaneous online archives

There are also many, random looking, places on the internet where one can find various parts of video gaming history - be it the video games themselves or popular gaming magazines from one country or another. These websites are by far the least visible since they never really advertise themselves, and tend to be started and maintained by die hard, passionate members of the community. These types of websites may be known on some private and obscure message board or Discord server but in as far as the wider Internet awareness is concerned these places might as well not exist. While the niche nature of these places is not necessarily a disadvantage, the solo, or almost solo, maintainer aspect of it means these places can sometimes disappear without any warning, subject to the changing nature of the maintainer's life. Maybe they are going through financial hardships and cannot afford the domain and server space anymore, maybe their interests shift dramatically and what used to be important and worth putting time in does not anymore, a lot of unknown variables can happen and unique resources can disappear forever.

As enumerated above, there are indeed preservation efforts out there however, when we are talking about a socio-cultural phenomenon that has been ongoing for roughly half a century, it is observable how any one effort, project, platform or initiative, can not suffice. Not only because of this length of time but also because of the sheer

diversity of technologies, media formats and general modes of practice that video gaming has used over the decades. In the upcoming section of the report I will describe the reasons that make all of these preservation efforts, as well as future ones including this report, relevant.

Why is preservation of video games important

Preservation of video games extends beyond their entertainment aspect – it serves as a safeguard for cultural memory and provides valuable insights into historical, technological, and societal developments. During and after periods of sociotechnical collapse, documentation enables societies to rediscover lost knowledge and rebuild effectively. The Renaissance, for instance, was fueled by the rediscovery of Classical texts, highlighting the profound impact of preserving cultural and intellectual artifacts (Hankins and Palmer, 2008). Certainly, one has to keep perspective when drawing a parallel between the fall of the Roman Empire and that of Atari, but the point I am making is how similar the two are, when looking at it from the perspective of how proper documentation and preservation would have possibly decreased those roughly seven centuries to maybe only a couple, before European civilizations could really restart progressing technologically at a decent rate (Ward-Perkins, 2006). Likewise, I am also very conscious of the fact that preserving the hardware and software associated with the Magnavox Odyssey released in 1972 is maybe not on the same level of historical importance as is the preservation of the Apollo 11 Moon Lander computer from 1969,

but that is not to say the former has no historical importance from a cultural heritage standpoint and as such it is not worth preserving (The Wall Street Journal, 2019).

Truly, it has become rather clear over the centuries that even in some of the most difficult of times, human societies will turn to art, entertainment and games, as a means of coping with their surroundings (Cmentowski and Krüger, 2020). We do not even have to go very far into the past for both academic and personal anecdotal evidence of this, seeing as how there have only been three years since the end of the Covid-19 pandemic (Ascolani et al., 2020). Beyond what can be seen as a major societal impulse, or even a primal instinct, playing, gaming and video games in particular have developed into more complex parts of human culture.

Cultural Significance

Video games, despite their relatively recent origin, hold historical and cultural significance. White (2020) considers that video games have undeniable cultural and historical relevance, LeBlanc (2021) likewise sees video games as holding a place of modern cultural significance while Harkai (2022) makes a very detailed and condensed description of video game history while showing how it is indeed part of cultural heritage. The United Nations Educational, Scientific and Cultural Organization (UNESCO) adopted a Charter on the Preservation of the Digital Heritage in 2003. According to Article 1, digital heritage covers distinctive resources that embody human intellect and creativity, spanning cultural, educational, scientific, and administrative domains. It also extends to technical, legal, medical, and various other forms of information, whether originally produced in digital form or subsequently converted. This

digital content may take the shape of textual documents, databases, dynamic or static imagery, audio recordings, graphics, software applications, and web pages. In order to be classified as heritage, such materials must possess enduring value and significance, warranting their preservation for future generations. Notably, the concluding provision of Article 1 emphasizes that digital heritage constitutes a shared legacy for all of humanity, irrespective of language, geographic location, or disciplinary field. This interpretation logically leads to the assertion that video games—recognized as software and as a distinctive medium for human knowledge and expression—should be acknowledged as digital assets within the cultural heritage landscape. The Charter continues with Article 2 where the preservation of digital heritage serves the crucial purpose of maintaining its accessibility for the public. Therefore, materials classified as digital heritage—particularly those within the public domain—should remain available without undue restrictions. It is essential to reaffirm and promote an equitable balance between the legitimate rights of creators and other stakeholders and the broader public interest in accessing digital heritage, all in accordance with established international norms and agreements (UNESCO, 2009).

Signals from within the community

In my prior work (Eremia, 2025) which was focused on whether digital technology in the form of gaming technology, mediates memory and one's sense of self, I talked to three retrogaming collectors, which I consider to be specialists in the field. While the conclusions of that project are not wholly pertinent to this one, what is relevant is how all of them were concerned about the future of retrogaming. They all talked about how

preservation of video game titles, hardware and know-how related to both, is important and necessary, while at the same time being cognizant of how limited their ability to participate in it as individuals is.

A study conducted by the Video Game History Foundation (2023) revealed that 87% of classic video games released in the United States before 2010 are endangered. By “classic video games” the study refers to video games released before 2010, underlining how no decade previous to the 2010s features a video game availability higher than 20% (Lewin, 2023). This does not mean that all of those video games are lost, at least not yet. It means that they are close to impossible to access for anyone who is not incredibly involved and invested in one or more forms of retrogaming, be they a private citizen or an academic. Limited availability of such games poses challenges to academic research, cultural appreciation, and the continuity of gaming traditions.

This project is focused on PC game preservation for several reasons. Firstly, because of my breadth and depth of experience and knowledge with PC gaming for the past 30+ years as well as having been part of numerous gaming-centric communities over the years. I have been actively engaged in the overall PC retrogaming collecting community as well and as such, I am keenly aware of the types of discourses that are out there. This leads me to the second reason which is that PC gaming is oftentimes ignored, sometimes on purpose, when video games and gaming history is being discussed online. This phenomenon is not limited to PC gaming though, because the bulk of academic research, and indeed general internet discourse, about gaming comes from the US and this has led to a US-centric view of gaming history to be taken as the default (Pepe, 2025). Indeed the lack of awareness or understanding that the European

gaming market of the 1980s was extremely diversified and still very much thriving during and following what the US-based sources consider to be the ‘videogame crash’. Europe had several different platforms at various degrees of popularity in different countries. The Commodore 64 and Spectrum ZX being the two best known actors for the continent during the decade. The Nintendo Entertainment System, for instance, seen as the savior of the US gaming market had nowhere near the same impact in Europe with the Sega Master System being the console that did best (Damiano Gerli, 2022). These were very different lived experiences between the two regions and when one dominates the discourse, that one creates the narrative to the detriment of the second. As such, the main obstacle to preserving PC games, on a more global scale, is making sure that more people are aware of not only its existence, but of its history.

Obstacles towards preservation of video games

The obstacles video game preservation faces are numerous and rather diverse. They range from the physical and material, to the legal and ethical.

Media decay

Despite the digital nature of video games, there are some underlying physical realities we must contend with. This reality being that any game, or software in general, stored onto a physical medium, regardless of that media’s characteristics or the technology with which the writing is done, will eventually degrade due to the simple

passage of time (White, 2020, p. 578). The term ‘bit rot’ is one that comes up when referring to information written on magnetic formats, such as compact cassettes and floppy disks. The material’s magnetic properties ‘fade’ over time, making the information written on them less likely to be properly read at first, and it becomes steadily more corrupted till it is eventually completely lost (Team, 2009). Durno (2016) observes from direct experience that many 5.25” disks were still readable 30+ years after their creation; however mentions that disks that were more heavily used did not last as long. He also mentions that when it came to the smaller, and sturdier-looking, 3.5” floppies, their damage rate was higher even if they were on average 10 years newer than their larger predecessors. Producers at the time, such as Verbatim, would generally tout their product to last for 30 years (Atarimagazines.com, 2025). At the same time it is likewise worth noting that the Canadian Conservation Institute considers floppy diskettes to last anywhere from 5 to 15 years (Canadian Conservation Institute, 2020). Optical media is not immune to such effects, despite it being a wholly different technology. In this case the phenomenon is widely called ‘disk rot’, although it was known in the past as ‘CD-rot’ or ‘Laser-Rot’, though these last two are not used anymore. The chemical composition of the various layers that a CD, DVD or Blu-Ray, are made of can be affected by factors such as age, storage, handling as well as oxidation and hydrolysis. According to the US Library of Congress tests, CDs have a life expectancy of 10 to 100 years (Loc.gov, 2025). The retrogaming collectors from my previous work already reported problems with disc rot (Eremia, 2025) and while many pieces of older hardware can still be repaired and maintained, there will come a point where the parts required will simply

cease to exist, because they have not been in commercial use for decades and nobody is producing them anymore.

Obsolescence

Newman (2009) almost in passing, describes the video game industry as one of “inevitable technological progress” and a cursory glance over the past three decades of marketing, development and discourse within and around the industry, will reveal it is a well-condensed way of describing it. The focus has always been on looking forward to an upcoming new release, new technology, to some new way of doing it and as a result almost completely replacing the old. Due to this churn rate of gaming technologies, coupled with marketing touting the “perpetual upgrade” within this “perpetual innovation economy” as Kline et al (2003) observe, what seems to be a natural connection between obsolescence and technological progress is created in the discourse around video games.

Physical format obsolescence

When looking at PC video games in particular, there are several types of obsolescence we are contending with. On the one hand, there is the obvious physical format obsolescence that is implied in the prior section on media decay. Starting with the 5.25” floppies, they were replaced by the 3.5”, which were then replaced by the CD, followed by the DVD, followed now by digital downloads. Most games that were released on the earlier formats, were not then subsequently re-released on newer ones,

thus freezing their status and cultural reach in and around the time of their release. Lewin's (2003) earlier referenced article and study attest to this.

Operating system obsolescence

The following layer of PC gaming obsolescence has to do with the operating system, or OS, that a game was developed for. Just looking at the Windows OS, in overview, games developed for older Windows versions will absolutely refuse to run on newer Windows versions, out of the box, as it were. There are some deeper options and features a slightly more advanced user can look up and try, but that is not a guarantee the games will work afterwards (Intel, 2024). And this is not an issue for the developer of the OS necessarily, since it can be argued they only offer the sandbox and it is up to the various game developers to play within its confines. The problem arises when the sandbox changes and the developers have moved onto other things and are not interested, capable, or in most cases, still around to rebuild their castles in the new sandbox.

(Particular pieces of) Hardware obsolescence

There is yet another layer of obsolescence when discussing PC video games. In case the previous two are indeed surmounted, there are situations where some older PC games will refuse to function on newer hardware, than the one they were designed for. The examples of these situations are not usually of great enough importance to warrant write-ups by publications or academics; however, community forum message

boards have been the places where these types of problems come to light (Overclockers UK Forums, 2011).

Server shut-down obsolescence

Many people will be at least passingly aware of the concept of a Massively Multiplayer Online game, or MMO (Massively Multiuser Online Game, 2008). Despite the user having to install the games on their machine, these games will only ever work when connected to the Internet, seeing as how they are predicated on interacting with other human players. The issue here is when a developer or publisher of said MMO game is incapable, or unwilling of supporting their game any longer and shuts down the servers. The players will not be able to play their game anymore. In a very similar vein, many recent video games require an active connection to the internet for them to register with a server in order to play the game, even when we are talking about video games that have a single player component, as well as an online one. These games are susceptible to the same problem and this dovetails into legal issues related to consumer rights, which will be tackled later in the report (Editor, 2022).

Technological ecosystem obsolescence

One can not talk about PC game obsolescence and not, at the very least, mention the demise of Flash games, a separate sub-genre of browser-based video games which ruled the online gaming zeitgeist of the mid-to-late 2000s. The reason for their demise was not the shutting down of servers, nor the folding of their developers,

seeing as how most of them were quasi-anonymous individuals making short gameplay experiences, it was the fact that Flash technology stopped being supported by browsers (Fiadotau, 2020).

(The absence of) Money

The availability of funding is one aspect that is rarely discussed directly, when it comes to more niche cultural endeavors. Individual collectors invest unknown sums of money over the span of their passions, which could last from years to decades. When it comes to more organised approaches, the need for reliable sources of funding is an existential one, as evidenced by the Japanese Game Preservation Society which does not manage to pay the rent for their premises from the funds they get from their supporters, the head of the society covers the remainder of the rent (Szczepaniak, 2025).

Environmental factors

Environmental factors such as heat, humidity, UV exposure, animal fur, dust and smoke are sometimes glossed over but they likewise need to be considered (LeBlanc, 2021), if and when all the previous obstacles have been surmounted, in one manner or another. Even when these environmental factors are being considered, there is yet another aspect that tends to get left out: where exactly are these video games supposed to be stored under these not-loose environmental requirements, in order to prolong their lives. There are inherent spatial limitations, when it comes to preserving

physical media and hardware, to obvious financial limitations related to owning or renting said physical spaces, not to mention all the other expenses related to procuring and maintaining the preserved artifacts in such a way that they do not degrade or not degrade further.

Then there is the issue of availability, depending on where one is in the world, certain things will be harder, nigh impossible, to get. Physical availability is one major aspect, and obstacle, of collecting older video games, but it's basically an impossibility when it comes to video games released exclusively digitally. Lastly but certainly not least, there are potential legal barriers which can hinder people from preserving video games as well as from tinkering with the hardware, depending on where on the planet they happen to reside.

Legal obstacles

The legality aspect is possibly the most on many people's minds. As mentioned earlier in State of the Art, the US Copyright Office decided in October of 2024 to not allow libraries and archives to share remote digital access to out-of-print video games from their collections with researchers (Salvador, 2024). There are also legal challenges and obstacles coming from large and important companies that have had an important impact on gaming history overall, such as Nintendo's well-known approach of fighting any type of preservation or modding attempt of its software and hardware. The company in essence, is undergoing a slow and steady process of rewriting its history, as it makes fewer older games available on newer platforms and actively stops their fans from preserving those titles via emulation (Modern Vintage Gamer, 2024). Nintendo is

not the only company that holds these anti-consumer views, for certain, but it is the company that is most aggressive about it. This may be due to how Japanese copyright laws work, and this is indeed the looming specter over most people, most individuals, who might want to take their preservation activities more seriously, a lack of awareness and of transparency related to the type of copyright laws they live under.

Nintendo is not by any stretch of the imagination the only large name in the gaming industry having clearly anti-consumer policies and further plans. Ubisoft for instance, one of the largest game publishers with mainly European ownership, has been the source of many a scandal in the gaming community over the past couple of decades however recently, its director of subscription said that what is needed for their continued growth is for gamers to stop wanting to own the games they play, and instead rely exclusively on subscription-based digital distribution and game streaming platforms (Gamedeveloper.com, 2024).

Research question

How do grassroots video game collectors and preservation communities negotiate technological, legal, and cultural barriers to digital PC game preservation, and what does this reveal about the socio-technical ethics and infrastructural politics of memory in the digital age?

- What type of activities, resources or tools would be needed to make preservation easier?

Methodology

The Single Participant Asynchronous Workshop

In this section I will describe the research logic chain that led to me developing my own subtype of future workshop. I will start with a look at a systematic review of the field of Participatory Design (PD), then I will describe this project's set of circumstances, after which I go through the major components of the concept and by the end the structure of my finalized workshop will become clear.

Participatory Design, Future Practice and Workshops

Wacknig, Daly and Verma (2024) made a systematic review on Participatory Design (PD) and its potential for future practice. Participatory Design has historically been an approach aimed at closely involving stakeholders, usually users, in the design process of technologies. Over time the process of PD has evolved and has become less rigid in its definition and application and has become more of "an overarching term encompassing projects that engage stakeholders in multiple ways at various stages of design work." (p. 1). They looked at 88 articles relating to PD practices, with the publication cutoff being May 2022 (p. 2). A quick summary of their findings offers a good overview of the versatility of PD. They identified five types of Participatory Design Research:

- Participatory Design Process Applications,
- Participatory Design Technique Analysis,

- Guidelines for Participatory Design,
- Participatory Design Principles,
- Reflections on Participatory Design (p. 5).

Further they found four large categories of projects and processes in which PD was applied: the design of Artifacts, the Design of Intangible Systems, the design of Physical Systems, Design Process Critiques (p. 6). In regards to participant pool, these were made of:

- target stakeholder demographic in 19% of the articles,
- expert users by application in 5% of the articles,
- open to the public in 10% of the articles,
- volunteers in interested organizations in 11% of the articles,
- employees from a stakeholder company in 16% of the articles,
- students from a class in 9% of the articles (pp. 6-7).

In terms of the techniques that were used as part of the participatory design process the authors mention that most of the papers used at least two techniques. The techniques are as follows:

- participatory workshops were used in 73% of articles,
- stakeholder interviews in 69% of articles,
- prototyping with stakeholders in 59% of articles,
- context-specific activities in 22% of articles,
- update meetings with stakeholder in 15% of articles,

- committee of user representatives in 16% of articles,
- focus groups in 11% of articles,
- public hearings in 10% of articles,
- stakeholder observations in 49% of articles,
- stakeholder surveys in 19% of articles,
- competitive benchmarking in 7% of articles,
- historical document and data analysis in 15% of articles,
- infrastructuring for continued participation in 10% of articles,
- stakeholder personas or scenarios in 8% of articles (pp. 13-15).

This variety of types, stakeholder approaches and tools, reveal how dynamic and evolving participatory design is, in terms of practice. In fact, the effectiveness of PD lies in its flexible, iterative nature, even while the field itself can appear loosely defined. This latter appearance could be a by-product of PD's context-dependent versatility. Participatory workshops were the most popular tool and worth exploring as a tool for this current project.

This Project's Backdrop

In an ideal world, I could get my retrogaming collecting specialists in the same room and engage with them directly, and have them engage with each other directly as well. We do not live in that world unfortunately, seeing as how my informants live in different countries around the world. Not only is it impossible to get the workshop

members in the same room physically, but it is highly unlikely to even get them in the same virtual room, at the same time, seeing as how they are all grown adults with different schedules and responsibilities, who also happen to live in different time-zones. However, I am certain their insights into the matter at hand are highly relevant and I want them for my project. What to do? I could use semi-structured in-depth interviews again (Eremia, 2025) however these would not be as revealing in this situation, seeing as how I want to give them more time to think about the problems at hand. A more participatory approach is needed.

Single Participant Asynchronous Workshops

Some amount of prior work has been done in the development of asynchronous workshops for various purposes: managing anxiety and stress (Lee, Bowman and Wu, 2022) and for the professional development of graduate student instructors (Tetu et al., 2024). It has to be said however, that this previous work is rather limited, these two papers being the single couple of papers that related directly to asynchronous workshops, with some others being adjacently related but unfortunately not relevant to my set of circumstances. Due to the differing personal schedules and the different time zones, whatever tool I develop has to be single participant-focused and asynchronous. It does seem however, that others have been thinking about this approach and at least one online company posted a description of how they run their asynchronous workshops. They create a self-guided workshop which their team members can engage with over the entire span of a day. It starts with framing the problems, explaining what

resources the team has at their disposal and then basically letting everyone go about their business. A few of the insights they offer as to the design of such a workshop include setting up a clear agenda, timeframes and expectations from the workshop, as well as being available throughout the day in case people do want to collaborate in real-time or need clarifications (FutureLearn, 2021). All of these are very important to consider going forward with my workshop design.

Future Workshops

Work in regards to future workshops has proven to be much more popular. The Future Workshop (FW for short) refers to a collaborative and communal approach to solving problems related to a particular society, community, group or field. It was initially developed as a means of enabling oppressed groups to develop ways of dealing with real-life problems. It likewise deserves mentioning how FW was developed in and for the practical world, as opposed to it having been concocted in academia. This means that the current shape of this method has been formed over the past seven decades through countless and varied applications and evaluations. The general framework of a FW is comprised of five phases:

1. The preparation phase: in which the themes, participants and methods, as well as the various rules, time tables and facilities are set by the organizers and facilitators.

2. The critique phase: this is where the problem at hand is critically discussed and thoroughly investigated. Brainstorming is mentioned here as the preferred technique for critique followed up by organising the ideas into sub-themes.
3. The fantasy phase: in this phase the participants are asked to develop a utopian vision of the future. Brainstorming is mentioned again as a technique but others can be used as well.
4. The implementation phase: is where the earlier developed utopian ideas are evaluated in regards to their practicability and an action plan is created.
5. The follow-up phase: in this phase the action plan is analysed and changes can be performed, maybe new FWs are planned (Victor, 2006).

One relevant example of applying FW in a different domain beyond the socio-political, is the concept of the Future Technology Workshop, which aims to have individuals with knowledge or experience in a specific area of technology use, to imagine and design interactions between current and future technologies and activities. The general structure of this type of FW is as follows:

1. Imagineering: this is where the participants think of future activities in relation to their design task. The main method mentioned is brainstorming however it is important to note how the future this refers to is a far future.
2. Modelling: during this phase the participants create low-fidelity prototypes of these future activity contexts.

3. Role Play: in this phase the participants engage in the creation of scenarios around the prototypes they create and act them out.
4. Retrofit: at this point in the time the participants are asked to change the scenarios to make use of current technologies.
5. Everyday: in this part of the workshop the participants now talk about their current, real life, activities and problems related to carrying them out.
6. Futurefit: the participants are asked now to further modify their models so as to support current as well as future activities and try to “sell” them to the rest of their team
7. Requirements: the participants list what would be needed for future technology (Vavoula and Sharples, 2007).

It is important to note how the general structure listed first can be modified and added to, depending on the context. I looked at the concept for Future Technology Workshop because it nominally could have applied to my project however, considering the earlier mentioned backdrop, I decided to instead take phases from both of these examples and customize them for my particular needs. The similarities have to be noted first, namely the focus on future, maybe fictional, situations, the copious amount of brainstorming and the calibrating of those future situations to more actionable present-day applications. These will be the main pillars on which I will design my single participant asynchronous workshop.

My design framework for a Single Participant Asynchronous Workshop (SPAW)

- Introduction of theme, explaining time-frame and how the workshop will work.
- Think of solutions that could exist in the sci-fi future, but think STAR TREK, not DUNE - these can be technologies, artifacts, maybe even institutions as well as potentially the speculative scenarios as to how these would be used - these should be plausible and possible, no time travel and such.
- Retrofit those concepts and scenarios to current day technology and resources, however keeping in mind that these should support future activities as well.

The development of this different approach to future workshops was more than simple convenience caused by the set of circumstances described earlier. Developing the SPAW workshop (Appendix 4) was a deliberate choice, a more experimental way of doing this type of research. The purpose of this approach is to condense and crystalize decades worth of knowledge, experience and know-how which the specialist participants have gathered.

Purposive sampling

The approach of this project is nuanced and markedly in-depth. I am not interested in seeing what large swathes of the retrogaming community think about how to deal with the preservation of pc games, I am aiming for specialists in the field of retrogaming collecting, people who have hands-on experience with the challenges of retro game collecting since they are most interested and aware of the importance of preservation. Nyimbili and Nyimbili (2024) describe that the participants in a purposive

sample “should have the required characteristics to stand as representatives of the population”. The specialist participants are information-dense subjects, ideal for generating in-depth insights.

The Participants

The individuals participating in this project are all engaged with the broader retrogaming community, albeit to varying extents and through distinct avenues. Despite this shared sphere of interest, there is not that much overlap between their interests or personal lives otherwise. Additionally, personal disposition plays a role; for instance, one participant has chosen to remain largely anonymous even within the online community activity, preferring to be known only by their online ID, and choosing to communicate exclusively through text, while another is a relatively public figure having a YouTube channel focused on retrogaming. My interactions with the participants originated exclusively within digital environments oriented toward retrogaming, where we became acquainted over the course of several years. Through a combination of factors, these initial interactions developed into ongoing online relationships. The existence of such pre-established rapport — sometimes cultivated over a period of years — proved instrumental in fostering a sense of mutual trust between the participants and myself. Spradley (1979) emphasizes that rapport is among the most effective tools available to researchers, as it allows for a more fluid and responsive conversational style. Granted this project does not make use of interviews – which is the subject matter discussed by Spradley (1979); however, the presence of rapport is

important to mention since it surely played some role in the participants' level of comfort with the method I proposed.

The participants in this project are two males and one female, with ages ranging from early ‘30s to their late ‘30s. Unfortunately, the British collector from my previous project (Eremia, 2025) could not participate this time around due to a health scare. Thankfully, the Canadian collector could participate. One participant, based in Denmark, is employed in the IT sector, is single, and does not have children. The Portuguese participant is employed in digital marketing, is not currently in a relationship, and also has no children. The Canadian participant is currently unemployed, not currently in a relationship and living with their parents. The internal diversity among the participants — in terms of professional background, domestic arrangements, and national context — serves to illuminate both the shared experiences and divergences within the group, providing a nuanced foundation for analytical insight.

Participant consent

Consent for participation in the project has been granted, the participants being cogent that they could retract their consent at any point during the process. Due to not requiring any extraneous details about their lives beyond those that were already mentioned in the report, it was decided that anonymizing the participants was the best approach so as to maintain the focus on the insights they offered.

Coding

The empirical data provided by the participants, available in the Appendix, will initially be analysed through thematic analysis. The themes are based on the empirical data and were concluded through inductive reasoning (Byrne, 2022).

The identified themes are:

- Technology - this theme encompasses the technological obstacles, limitations and possibilities.
- Cultural importance of preservation - this theme looks at the view of the participants on video games as human cultural heritage.
- Piracy - the theme covers the participants insight into the piracy aspect inherent when discussing video game preservation.
- Corporate inertia and/or hostility - this theme focuses on the impact of corporate policies and how they affect the possibility of preservation.
- Importance of enthusiasts - this theme centers on the importance that enthusiasts and the communities they form and how these are crucial to preservation.

Coding the empirical data through the frame of these themes allows for the clear association of common aspects between the participants as well as the various differences in their identification of obstacles and possible solutions. A further look at the data through the lens of discourse analysis allows for further nuancing of each

participant's thoughts and beliefs related to the problem at hand (Jones, 2024). Finally, the upcoming theoretical framework will then be applied to the results of these two phases of analysis.

Ethical considerations

In any context where human beings engage in the study of other human beings, the influence of bias is an inescapable concern. Bias has the potential to shape and alter a researcher's interpretive lens before there is any empirical data to be interpreted. Although the adoption of a framework based on collapse informatics and infrastructuring is intended to provide a rigorous and relatively technical structure for inquiry and analysis, certain limitations remain. Among these are the small number of informants and their prior familiarity with the researcher, myself, both of which may raise concerns regarding partiality.

As previously outlined, the three informants represent distinct individuals with diverse backgrounds and perspectives. This diversity is likely to make both their shared experiences and divergences readily observable in the empirical data. Crucially, the objective of this research is to gain the insights they have developed as individuals involved in complex relationships involving gaming technology and their broader socio-technical environments. The focus of the project is not on their interpersonal connections with the researcher. However, these pre-existing relationships have afforded a practical advantage: they facilitated access to participants and significantly increased the probability of obtaining rich empirical data which they have been

unknowingly processing for likely years and which they would maybe not be as willing to impart to an unknown researcher.

Method limitations

The primary limitation of the method is its experimental nature. Doing something new and different will always involve a certain number of limitations depending on various circumstances. In the case of this project, these circumstances relate to the availability of time, as well as that of pre-existing relationships between the researcher and the specialist participants involved. Namely, any report can benefit from more time and more participants, generally speaking. The experimental nature of the SPAW concept though, is a limitation because it is new. That said, it is meant to be customized and used on smaller numbers of informants, it is meant to work much more like a scalpel rather than a sword.

A plethora of other methods and tools were considered for this project, including semi-structured interviews, focus groups, personas and cultural probes. Semi-structured interviews, while indeed a time-tested method for anthropological empirical data gathering, especially deep and thick data, had already been used in my prior project (Eremia, 2025) and the type of insights that I was looking for in this project were different than those that could be extracted during an interview which would be undoubtedly very limited in time. Focus groups would not have allowed for the depth a future workshop would and likewise are prone to logistical difficulties as well as social dynamics, with some participants potentially dominating the discussion (Lazar, Feng

and Hochheiser, 2017). Personas are a great tool to keep designers focused on their users however they only do this by simplifying large pools of data, condensing features into the most common aspect and oftentimes ignoring smaller nuances (uxpajournal.org, 2021). In a very clear sense this would be counter to the type of deep and well-thought out insight I needed for this project. Cultural probes were considered for a time as well, however the drawbacks of the type of unstructured data they tend to result in, as well as ambiguity of interpretation, the need for a large pool of participants to make up for those who may not engage with them meaningfully, as well as the potential problems of data recovery and general difficulty in replication meant that they would not be a good choice for this project (Gaver, Dunne and Pacenti, 1999).

The following section provides a detailed overview of the theoretical framework employed in this report, alongside discussions reflecting their relevance and application to the current project.

Theory

While the upcoming theoretical framework may initially appear to be an unconventional choice, at least in part, the interrelated concepts and connections that are highlighted underscore its relevance.

Collapse Informatics and Practice

Tomlinson et al. (2013) talk about systems collapse at society levels, events that have been seen in the past with the fall of major civilizations such as the Roman Empire and the Bronze Age Collapse. Considering those examples and many others throughout history, they discuss how our contemporary global civilization, despite its growth and development over the past couple of centuries, is not guaranteed to be immune to situations of collapse, or at the very least decline. With that as a backdrop, they explore the concept of collapse informatics as a means of developing sociotechnical systems in the relatively stable and abundant present to prepare for future scenarios of scarcity, through the careful study of the past. When talking about societal or civilizational collapse, it is important to create the distinction between collapse and the much more popular term of ‘apocalypse’. An apocalypse refers to a very rapid rate of collapse, on the scale of days to weeks and it is a very popular term in fiction. In reality, collapse is much more likely to take place gradually, over a much longer period of time. Predicting an upcoming collapse is speculative, with different views on this focusing on equally probable sources. One argument they list in the paper talks about how our current reliance on fossil fuels has already peaked and we are seeing diminishing returns from this while another argument talks about how environmental shifts could cause civilization-scale collapse “within the century” (p.3). For the purposes of their paper the term ‘civilization’ is defined as “a large, complex society, where a society is a collection of cooperating individuals” while a ‘global civilization’ is one where “there is cooperation between globally distributed individuals” (p.4). As such, when referring to the collapse of a global civilization, this is considered as “the transition from a state of affairs in which

such cooperation exists to one in which it no longer exists or is severely attenuated" (p.4). One clear aspect of previous collapses from across human history is that scarcity of materials, of many types, becomes a major characteristic. This scarcity can apply to anything from food, energy and raw materials to crumbling infrastructure. The idea of collapse informatics then is one which needs to take into account not only the needs and possibilities of today but focus more on the limitations of one or more, possible scarce futures. After all, this is about preparing for a somewhat lesser, reduced version of things. Discussing the potential of 'civilizational collapse' is understandably not a fun intellectual exercise, however it is an important one to engage with since history has shown on more than one occasion that no complex civilization is exempt from it. This is where collapse informatics makes a much better partnership with practice than one would initially envision. Considering the importance, penetration and ever-presence of information and communication technology (ICT) in our contemporary civilization, this situates many of its forms as every-day practice. Many artifacts, be they physical or software in nature can "enter streams of practice through market mechanisms and open source development." (p.5). Furthermore the processes also allow for these "artifacts to penetrate independently of legislative processes or massive changes in ideology." (p.5). While legislative processes and ideological development should not be ignored, seeing as how they always tend to come into play in some forms or other, "markets and technical innovation operate with their own dynamics and agency" (p.6).

Practice Theory within the Collapse Informatics Context

Tomlinson et al. (2013) define practice “as developing and occurring in complex collective sociocultural contexts, not as individualistic behavioral adaptations to changing circumstances or as general societal norms.” (p.6). They make it a point to mention how practice theory is not the same as describing practices and that for the purposes of collapse informatics, their approach is focused on “closely observed ethnographic investigations of technology and its uses in everyday life” as well as the consideration that technology is a major mediator of human activity (p.7). Though this leads to a problem when considering the more strict considerations of practice theory in general which tend to be focused on the present. On the face of things this comes into direct conflict with the idea of collapse informatics, seeing as how it is concerned with the future. The way in which the paper’s authors resolve this tension is by “expanding the time scale across which the notion of practice is considered”, couple this with working comparatively across several cases and highlighting that their findings and designs are provisional, making sure to constantly monitor the present in order to “recalibrate notions of the future” (p.7).

When they talk about expanding the temporal consideration of practice theory, they are talking about adding the context of time, or history, to the traditional ‘here and now’ of practice theory. In essence, expanding it to what could be described as: ‘here, now, before and after’, this approach leading to potentially deeper and more interesting findings (p.8).

In regards to the comparative study angle, engaging with this approach can reveal “what is common across cases” not to mention differences, thus aiding with the

detection of concerns and conditions which could be addressed in collapse informatics designs or likewise lead to a wider range of potential designs (p.9).

Monitoring the present is likely to be the more difficult aspect of collapse informatics. Seeing as how “the practices of interest” are situated in the future, there is a clear need to keep continuous track of the present to ensure that whatever potential solution you design, does not get voided by one or more events in the present and very near future. Or indeed if better options have appeared in the meanwhile. This type of an approach is likened more to a longitudinal study in which the present and future are in continuous play with one another. Not simply one informing the other but actively changing and developing together. However, unlike epidemiological studies, for instance, within collapse informatics one has to “be open to new inputs given the dynamic, unpredictable mix of social, economic, political, and environmental forces that can impact practices of interest” (p.9). One extremely interesting, and valid, point is brought up while discussing this aspect, namely how the energy use of ICT impacts a region’s economic and political conditions. In a similar vein, the paper also suggests that when zooming out even farther and considering the efforts to reduce global inequality will likely change the cost and price of raw materials and labour thus, perhaps, turning ICT solutions into expensive considerations.

> A plan to knit together present and future through empirical study of practice, joined to concomitant development of practice theory, has the potential to reveal alternatives for practice, the objective of collapse informatics.” (Tomlinson et al., 2013, p.9)

Reflexive Practice

One fundamental aspect of practice theory that is still, somewhat at odds with collapse informatics is the idea of practice as the result of a habitual activity. And while that may not seem a problem at first, one aspect of a habit is that by its very nature, it does not change, that is what makes it a habit. So with collapse informatics looking to continuously adapt its practice, this is why the aspect of habit is technically in conflict. Indeed, the authors look at collapse informatics as a means of examining “practices beyond reactive maneuvers – practices that, in fact, purposefully seek to unseat everyday practice” (p.10). The authors acknowledge this potential conflict, however they find a way forward and beyond it by concluding that the interest of collapse informatics is to “study practices that themselves are object of contemplation as well as enactments of praxis (in the sense of everydayness).”(p.11). This further means that one way of pursuing this is by “examining groups purposefully experimenting with practices and their associated technologies” as a means of getting an empirically grounded sense of what could be done, or could be of use, in the eventuality of a collapse (p.11).

The authors then offer as examples a series of images from different types of self-sufficient initiatives. The first one being a motorcycle repairing community who build bikes from scrap parts for others and are compensated with the resources they need to build bikes for themselves. This is considered to be a type of ‘redirective practice’ because “it presents and alternative to discarding old bikes and purchasing new ones” (p.11). From a collapse perspective this community is developing skills to better adjust to possible collapse conditions, in this case eliminating the reliance on newly manufactured things as well as working as an example of conservationist practice which

could inspire others to adopt it for themselves, or to adapt it (p.12). The second image is of “suburban curbside farming” which represents the conversion, or better said re-conversion, of suburban lawns into small scale food gardens (p.12). This type of approach, as well as those of suburban and peri-urban farming has a clear place within the potential collapse scenario, allowing small numbers of people to have access to food during periods of scarcity or stoppage of food imports. The fourth image shows drinking water flowing from a very thin tap and this is of extreme importance because water is “an essential element of life at risk under many collapse scenarios” (p.13). The practice of home water filtering is already supported by a large industry in the US but that cannot be said about the rest of the globe.

Modes of approaching Reflexive Practice

The researchers propose two different populations of interest to study in relation to collapse informatics: “people who believe collapse is imminent” and who are planning ways of dealing with it, and “people envisioning technological development” in such ways that it could fit into a possible future of collapse (p.14). The first group is called to be “purposefully marginal” because while they act outside conventional societal expectations, is of their own choice and doing, as opposed to being marginalized through economic or societal circumstances. The second group is defined as “technofuturists” seeing as how they are not necessarily motivated by the belief in an imminent collapse.

Purposefully Marginal Groups

Any contemporary complex society has featured a “margin” of “artists, free thinkers, anarchists, historically separate groups (such as the Amish), activists, and radical intellectuals” who have never aligned with what the wider culture had been doing. These marginal groups can express themselves in various ways, from a “contradiction” within society, mayhaps inherent in any complex society, to being actively “opposite” to what is considered the mainstream, to acting as the “vanguard for what they hope will someday be mainstream practices” (p.14). Regardless of where exactly they position themselves, their distinctive practices place them in critique of society at large and as such they are set on the margin. The authors mention several such groups of interest to consider for future research such as those engaged with the practice of aquaponics, survivalists and freegans. These are only a few example though, and the authors declare that they are interested in the everyday practices of these groups “beyond the basics to inquiring about practices related to collective emotional, spiritual, aesthetic, and civic needs” (p.16).

Technofuturists

Tomlinson et. al (2013) make a clear differentiation when describing what their technofuturists are and what they are not. In their case these are not “academics or pundits who engage in predictive exercises, but those conducting hands-on experiments with new practices of design and manufacture”(p.16). They go further and consider this category as being “collectives of technically skilled individuals with different expertise” whose groups arose from either having lived in a collapse scenario,

realizing that such a scenario can easily affect them or carefully observing events that almost lead to collapse and considering these events “could reasonably happen again”. The other main difference between technofuturists and the earlier marginal groups is that they mainly focus their practice on “technological artifacts, hardware and software”. The authors consider these types of technologies may play an important role in a possible collapse scenario. The examples mentioned for this group is the concept of a “FreedomBox” which would act as a physical device meant to encrypt communications and network with others away from the prying eyes of governments or corporations, the “Internet in a Suitcase” which works from a similar idea and 3D printing technologies (p.17).

Collapse Informatics and Practice as Design

Everything that has been talked about in terms of Collapse Informatics and Practice now comes under the umbrella of how to engage with it as design practice. The authors consider that in order for the concept to be taken to its most fruitful conclusion “collapse informatics design entails not just an account of what is invented, proposed as intervention, or innovated”, but at the same time consider and “account of what is implied for changing practices and conditions and the long term value proposition” when describing why particular practices are more effective than others in collapse scenarios. They end the paper with a few suggested “fictional abstracts” for other to possibly take up as individual research projects. These being the “Climate Change Habitability Index” which aims to connect “local conditions to global trends with respect to informing

changes in practices over longer time horizons” relating to climate change (p.20); the second idea is entitles “Wisdom of Years” which proposes a series of videos being recorded by older individuals who may have “collapse-relevant knowledge of practices that younger people typically lack” and how these type of videos can act as a repository of such knowledge for at least as long as where they are stored is still online and functional (p.21). The third suggestion is “Local Smart Grids” meant to analyse how practices used for power usage and management tracking for larger institutions could be applied onto smaller communities, in particular in communities that rely on renewable energy where there are intermittency problems due to various external factors (p.22). The last theme is that of “Currency, Infrastructure, and Practice” and focuses on how currencies are based on concepts of trust in a centralized authority which also acts as a gatekeeper. This suggestion is meant to look at current practices around markets and currency as well as investigating new practices related to currency, in particular crypto, and how these new technologies and digital technological artifacts could be compatible with certain scenarios of collapse (p.23).

Infrastructuring and the formation of publics

Le Dantec and DiSalvo (2013) describe the intertwining of science and technology studies (STS) and design, in particular participatory design since they both feature a common overlap when it comes to the concept of ‘publics’ and how they “specifically address the ways in which participants endeavor to enact desired futures and prompt change”. Their article further develops the discussion around publics by

investigating the “socio-technical mechanisms for constituting and supporting a public” which is what is referred to as ‘infrastructuring’ (p.242).

What is a ‘public’

The authors describe their vision of the ‘public’ as being made up of “a plurality of voices, opinions, and positions” further contending that there are many publics, not just one. They base their approach on that of John Dewey who not only described “a plurality of publics” but also conceived the public as not “a single generic a priori mass of people, but as a particular configuration of individuals bound by common cause in confronting a shared issue”. The individuals making up such a public are trying to address issues and their consequences (p.243). One important addition the authors make to their concept is to acknowledge that Dewey was considering publics in relation to wide scale issues which affect things at state level, and they apply it to “particular communities”. These communities are either physical or formed around “distant and mediated interactions” (p.244). These characteristics should not be construed to think that even such a particular public would be homogeneous, in fact they conclude their vision by saying that a public is a “messy conglomeration of many stakeholders who might in other settings, around alternate issues, be at odds with each other” (p.244).

A public’s attachments

A public is formed as a result of an issue, however that is not where the concept concludes. Each public will have its own perspective on said issue, which in turn is

informed by how the public related to the larger world around. These relationships are diverse and involve individuals, a community's resources and objects. The authors describe these relationships as 'attachments' to issues, the term meaning to represent "the interplay of 'dependency' and 'commitment to' that occurs as a public forms" and they begin to make use of the resources of their members. Attachments are important to understanding the tensions and "conflict inherent in the constitution of publics" because they represent the "interplay and emergence of dependencies and commitments" which develop as a result of a public's formation (p.246). Both the formation of publics and their resulting attachments "seem to be just the kind of politically engaged positions advocated within PD" and they also provide PD "with a pragmatic perspective for engaging community settings" (p.246).

Publics and infrastructuring

Acknowledging the formation of publics and the relevance of their attachments are important steps towards "understanding forms of civic action that center on marshaling diverse resources to confront particular issues" however additional work needs to be done in order to develop socio-material or socio-technical structures to address the issues that created the publics in the first place. The authors introduce and describe here the concept of 'infrastructuring' which looks at these potential socio-technical or material structures as "ongoing infrastructure" as opposed to treating them as "designed systems as fixed products". This is at first a bit counter to PD which is "concerned primarily with design-for-use, centered on useful systems" but when approaching it as more of a perspective on PD to aim it at "design-for-future-use". An

encapsulation of this is to consider infrastructuring as “the work of creating socio-technical resources that intentionally enable adoption and appropriation beyond the initial scope of the design” with the extra added clarification that this process “might include participants not present during the initial design” (p.247). The authors then connect the dots, as it were, between publics, attachments and infrastructuring by analysing two projects that fit the infrastructuring mode or practice of PD.

The first example is a project aimed at understanding how existing technology impacts homeless communities. At least that is how the project began however, as the project developed it shifted to engaging the members of the homeless community in co-designing a system that would improve resource-sharing and support services. The care providers were engaged via workshops, with whom over the period of several months a mobile information system was developed. The information system was designed to enable both care providers as well as shelter residents to exchange critical information relating to things like housing, job opportunities, healthcare and others. During the design process however, the residents were asked about their opinion on the designs and were encouraged to suggest features or improvements that reflected their priorities. This began an iterative process of alternating the design sessions between the staff and the residents based on their priorities. This approach not only fostered an increasing sense of agency among the residents but likewise allowed the staff to enhance and reconfigure the way in which they served their purposes. The project not only created two distinct publics but also created a socio-technical structure for both of them to use when working towards addressing the issues of administering limited resources and sharing information (pp.248-251).

The second example differs from the first one by addressing a single public, from one neighborhood, to improve its relationship with “technology-enabled communication services” as a means of collecting and interpreting environmental data (p.251). Workshops were conducted to help the participants develop technical skills relevant to environmental sensing, during which the participant residents of the neighborhood began questioning and redefining their engagement with local issues. In time the community members started collecting environmental data and learned how to interpret its significance in the context of their everyday lives which in turn led to the formation of a more fluid and informal type of public than in the first example. It can be said the community itself became an active participant. This lead to the participants gaining a new sense of agency in influencing local decision-making and the project overall showed how the act of participation in design reshaped not only the participants’ relationship with technological systems but also between themselves as a public, or community, and external events that affect their neighborhood (pp.252-254).

The authors reflect in their conclusion upon the implications that infrastructuring has in shaping publics. They also consider that PD can do more than simply facilitating stakeholder engagement but likewise contributes to the formation of not only publics but also their attachments. Ultimately arguing how participatory design is a political act, beyond that of making functional systems, it also helps to shape social realities, with infrastructuring empowering communities and creating publics that actively engage with pressing societal issues (p.260).

Analysis

The participants each supplied their results after going through the SPAW in different text files which were converted into pdf format while maintaining the original formatting and spelling (Appendix). The upcoming section starts with thematic analysis, followed by a short discourse analysis to then conclude with how the empirical data can be interpreted through the chosen theoretical framework.

Thematic analysis

Technology theme

Interesting to begin discussing the technology theme by pointing out how all the collectors do not see technology as a limiting factor, when it comes to preservation. Withe the Portuguese collector remarks that the “obstacles regarding videogame preservation are no longer technological, we’ve surpassed those limitations arguably since the early 2000s.” (Appendix 2), the Canadian collector considers that “it’s super cheap to make these systems… just put ROMs in it and game away.” (Appendix 3) and the Danish collector considers that hardware emulation, especially in the future “would be an option” (Appendix 1). Deserves noting how the Canadian collector is talking about handheld systems in that quote and when referring to PC game preservation considers that “we are doing a fairly good job when it comes to preserving games on PC”(Appendix 3). There is a clarification that is required here which can only be supplied by one who is involved in this field, the “we” that the Canadian collector uses

refers to the retrogaming community, the enthusiasts which will be talked about some more later. The Danish collector is more analytical and tech-focused, perhaps due to their professional background, and also identify several of the obstacles mentioned earlier in the report like disk and hardware rot, the need for physical storage space but also mentions the need for proper indexing of video games, and the need to bypass DRM (Appendix 1).

Cultural importance of preservation theme

All the participants echo the earlier description of video games as cultural heritage, the Canadian collector considering gaming to be art made by passionate people and that it also is “our history and how we expressed ourselves as well as relics of our time we can look back too.” (Appendix 3). The Danish collector points to the need of archiving video games in centralized locations and online archives, much as we do with other types of culturally-relevant media, though this last part is the researcher’s inference considering the interaction with this collector during the previous project as well as other private interactions with the participant (Appendix 1). The Portuguese collector on the other hand connects to the theme via their mention of public domain and copyright laws, both of which relate to other types of culturally-relevant media (Appendix 2).

Piracy and Corporate inertia and/or hostility themes

These two themes, while distinct, have to be looked at together, because one partially begets the other. The Canadian collector considers there are many companies out there, involved in the gaming industry overall, pointing at Nintendo in particular, who “don’t really care about gaming as art”. In regards to piracy, they bring up the problem of old games that are not available for purchase anymore, except on the second hand market and makes a clear distinction between modern remakes or remasters of older video game and the original release saying that “if your game isn’t the exact game we got when it came out then the original is still fair game.” (Appendix 3). The Portuguese collector likewise agrees with the overall views of the Canadian collector saying that “companies have no monetary incentive to preserve games” and also addressing how some “videogame companies have proven a threat to archive.org due to copyright issues” (Appendix 2). The Danish collector is again much more tech-minded and suggests that modern technology could eventually develop some form of universal DRM bypasser which could help with using any CD “without worrying about the requirement fo physical disks” (Appendix 1). More on piracy will be discussed later in the report.

Importance of enthusiasts theme

All the participants agree upon the importance of fan communities as agents of video game preservation - this should come as no surprise seeing as how all of them are involved with this to some extent or another, hence why they are the participants chosen for this project. That said, their perspectives on this commonality are quite

nuanced. The Canadian collector considers that large gaming studios should not fear fan projects and that fans should host ROM/ISO sites (Appendix 3). Connected to the ROM issue, the Portuguese collector talks about how “most ROM websites are no longer run by fans who do it for passion” (Appendix 2). The Danish collector’s take focuses on how any potential future databases should be open to everyone and feature AI to help people find games. This collector also mentions how hardware emulation projects are usually fan-started and lead.

Discourse Analysis

Going beyond the thematic analysis now, it is worth taking a closer look at the SPAW responses themselves, the documents not the meaning or value of their content. As mentioned throughout the thematic analysis, the Danish collector’s document reflects the SPAW phases and is very analytical and to the point. It is formatted as a bullet point list with a simple to understand structure. The Portuguese and Canadian collectors on the other hand, both offered much more verbose, prose-like responses. The Canadian collector is quite emotionally charged and fan-centered, focused on moral arguments as well as a distrust of corporations. The Portuguese collector is politically analytical and looks at the problem and its solution through the lens of legislative change. These aspects not only reflect the individuality of each of the participants but likewise show how different the responses to the same prompts can be, when participants are not in the same room and do not have to create and format one communal type for response to a workshop.

Theoretical framework analysis

I posit that in the realm of video games, we have been experiencing an uninterrupted chain of systems design, build-up and collapse since roughly the 1990s, maybe even earlier (Persson and Medin, n.d.). The cornerstone of this assessment resides in the rapid advancement and acceleration of the development of digital technology during that decade, when the business monopolies of the earlier decades started crumbling, as newer players from all over the world started being able to compete on a much more global market than before.

We can look at the various generations of different technologies as systems and this does not require any degree of abstraction. For instance, using the example of audio playback technology and hardware. From vinyl record players, to compact cassettes, to then audio CDs and now the world of streaming, each of these different technological approaches to audio playback created their own orbiting socio-technological systems. These systems encompassed the realms of hardware, media formats, the varying approaches to employing those formats as well as parallel cultures and subcultures within these systems, each with their own differing communities, interests, goals etc. All of these were ecosystems which collapsed, to a large extent, in turn, with the introduction and popularization of the following audio playback technology (Chatterjee (Mukherjee), 2022). It can be counter-argued that vinyl records have made something of a comeback, as described by Palm (2019) and there is even a minor resurgence of compact cassette tapes looked at by DEMERS (2017), both of which are indeed true, however we need to look and consider why these systems are seeing a resurgence, as well as the scale at which this is happening at.

First of all, we must consider the timespan that has passed from the height of either vinyl or cassettes to the present. It has been roughly three and a half decades for vinyl and two and a half decades for cassettes, when looking at most of the Western world. Human civilizations, here meaning large and complex societies, also recovered from prior collapses, eventually, but they never return to as they were, even if they maintained some aspects of the past (Marshall, 2019). The same is true for the resurgence in analog playback devices.

Analog Revival

Notably, certain systems, such as vinyl records and cassette tapes, have experienced niche revivals decades after their peak usage. These resurgences, largely driven by collectors and enthusiasts, highlight the pivotal role that dedicated communities play in preserving technological artifacts, knowledge, and practices (Dominik Bartmanski and Woodward, 2020). While the scale of such revivals is limited compared to their historical prevalence, the principle of collectors serving as custodians of cultural memory parallels the preservation practices found in retrogaming communities. It should also be noted that most, if not all of these collectors, do their best to maintain the period-appropriate playback hardware for their audio formats, despite the majority of said recordings now either being available as pretty high-quality digital downloads (Audiokarma Home Audio Stereo Discussion Forums, 2012). This is where we find a crossover between audio collectors and retrogaming collectors. Retrogaming collectors have been doing the same thing, but within a timeline with a

much larger number of subsequent systems, meaning here both hardware gaming systems and socio-technological systems (Eremia, 2025). A timeline which oftentimes diverges into several different strands that sometimes rejoin the main timeline but more often than not get cut off, in fact, collapsing with very little effect upon the main narrative.

Collapse Informatics in the present

When looking at the examples offered by Tomlinson et al. (2013) relating to monitoring the present, what they offer as potentials have in fact happened in the time that has elapsed from the publishing of their paper and the writing of this one. Starting with the potential impact of ICT's energy use on a region's economics and politics, and may I add the environmental, this particular point has been evidenced many times over during the past several years during the latest crypto boom, for instance by Tangermann (2023), as well as even more recently by various AI development companies buying nuclear power plants to fuel their insatiable machines (Stover, 2024). Both of these types of events were difficult to predict even as early as five years ago. In regards to the potential change in prices of raw materials and labour, likewise something that could not have been predicted five years ago, not even one year ago, is the current turmoil and shocks that the global economy is suffering as a result of the current US administration's tariff policies (Barata da Rocha, Boivin and Poitiers, 2025). Not to mention the yet to be felt future ramifications of the uncertainty and market instability present while writing this report (Lee, 2025). Adding another contemporary example of a

major, collapse-style event that will have to be more carefully considered in the future is the recent, unexpected and massive energy blackout that took place in the Iberian Peninsula. On the 28th of April 2025 “the entire electrical system of Spain and Portugal shut down” (Raúl Bajo Buenestado, 2025). Energy was returned within 23 hours in Spain (NASA Earthdata, 2025) and within 18 hours in Portugal (Gillespie, 2025). Power outages, blackouts or brownouts, are not extraordinary in themselves, however the large scale of the Iberian Peninsula Blackout happened while this project was ongoing and it materialized some aspects of collapse informatics that are discussed by Tomlinson et al. (2013) when they describe the diminishing or disappearance of energy infrastructure in a collapse scenario. Evidently, in such an event and in such a case, there are more pressing matters to attend to than gaming, however, that does not mean that it should not give one food for thought.

One of the fundamental concepts behind collapse informatics is the importance of preemptive action, to not wait for systems to fail in order to find solutions. At least two of the collectors likewise consider that preservation needs to happen now, before more hardware fails and copyright makes access impossible. As such the Canadian collector’s view of fan-driven ROM websites is meant to create communities and tools that will outlast corporate apathy or hostility (Appendix 3) and the Portuguese collector has a solution that is beyond the technological or socio-technical, they instead suggest the need for a proactive legal infrastructure solution, offering a possible example of a law that would allow “any software that is 40 years or older” to be hosted online and users can access it for free as long as there is proof “they purchased or owned it at some point” (Appendix 2).

Reflexive Practice as it pertains to this project

Considering the two types of groups put forth by Tomlinson et al. (2013) described in the Theory section, it should become apparent how these two groups aren't necessarily mutually exclusive, meaning there can be some overlapping areas where the two converge. This project is located in such a place of convergence. Where the "purposefully marginal" and the "technofuturists" converge for a common reason. Retro gaming collectors and enthusiasts are somewhere on this convergence spectrum. They are not necessarily purposefully marginal, in the sense described by Tomlinson et al. (2013) but they are clearly not aligned with the wider gaming mainstream. This does not mean they do not partake in modern gaming either, only that they tend to either prefer the retro experiences or simply dedicate most of their spare time engaging with their retro-aligned interests. That said, they can be considered marginal through their simple existence but as opposed to vanguarding what they hope will become a mainstream practice as Tomlinson et al. (2013) describe, they are protecting and caretaking what used to be mainstream practices.The essence is the same but the directions are opposite. Interestingly enough, despite their passion and interest towards older technology and media, a good portion of retro gaming collectors are also technofuturists, though again, in a slightly different meaning from that proposed by Tomlinson et al. (2013). The collapse scenarios they have lived through are not societal as much as technological, in this case I am referring to being witness to, and participants in many waves or 'generations', of gaming technology and media, that came and went during their lifetimes. Further, the technological artifacts that retro gaming 'technofuturists' have developed range from things like software emulation

(Pinchbeck et al., 2009) to creating pieces of hardware meant to prolong the life of older gaming technologies or adapting them to modern hardware. The simplest example being devices that convert analog signals from retro consoles to digital HDMI outputs (RetroArcadeCrafts, 2025), followed by upscalers (Pixel FX, 2016) to actual hardware emulation (RetroRGB, n.d.).

Retro gaming collectors do not fit neatly in either of the two categories, instead they feature characteristics from both (Eremia, 2025), hency why I consider them to be situated in the overlap area, and also that the overlap area itself is not homogenous either, being more of a spectrum in terms of practice. They do function as a type of a ‘reflexive public’, identifying and acting on threats for cultural survival, though more on publics is discussed in the following section.

When discussing the Practice as Design aspect, and how it pertains to this project, the concept of continuity of purpose comes to mind. Tomlinson et al. (2013) make clear the importance of keeping track of what you are doing, why and how you are doing it, as well as what has to change in order for what you are doing to happen. Part of the design has to imply the continuous updating, upgrading and iterating on the design itself and of your practices. As such, when dealing with a field that is subject to several external influences – technological, social, legal – this aspect should be fundamental to any sort of framework-type solution. The Danish collector’s focus on the importance of indexing and being able to easily find and access the information within databases echoes this aspect from two perspectives. On the one hand, indexing in itself implies updating things, both in a nominal way but it also talks about updating the entire structure to make the most optimal use of its resources.

Publics, attachments and infrastructuring

While a community is not necessarily a public, nor is a public necessarily a community, there is some overlap in between the two concepts. This overlap is present when it comes to retro tech collector communities, regardless of their medium or format of choice. In the case of the dedicated communities mentioned earlier, in relation to audio playback technology, these communities themselves feature a spectrum of different publics within. The spectrum of publics is made of the various attachments each of the publics has in relation to the issue at hand. Much like the community present in the second example from Le Dantec and DiSalvo (2013), the retrogaming collector community overall, while it is aware of its existence as a vague and loose concept, it relatively rarely coalesces into tighter-knit publics, instead usually preferring a scattered and fragmented approach of using various social media platforms as their casual and occasional gathering place. This project engages in one form of infrastructuring since it brings together different individuals from within the overall retro gaming collector community and forms them into a sort of public focused on looking for problems and solutions related to preserving PC video games. Likewise, the techno-social framework solution developed as a result of the public's attachments as well as my own interest and research is part of the infrastructuring at play here. The fact that infrastructuring solutions need not only work with existing resources and possibilities but also take into account future participants, I interpret as taking into account future uncertainty. Thus allowing for a more organic and fluid type of design,

that is meant to shift through time, and adapt onto new circumstances as they arise. This is a crucial aspect to mention because of the usual reputation of PD, mentioned earlier, and to likewise acknowledge how when it comes to a public's attachments, those are almost inherently at least somewhat politically-charged. Both this design for continuity and the political leaning have to be impressed upon the end design of the solution.

The Danish collector in particular conceptualizes preservation efforts as a layered activity, including the physical and digital realm, considering indexing and emulation (Appendix 1). This approach resembles infrastructuring because it also implies the continued maintenance and adaptation of preservation, it is not a static product or endeavor, it is not a one and done sort of thing, it is a living and evolving infrastructure which enables continued and ongoing participation and reinterpretation. The formation of publics nowadays is often a result of needing to contest some form of authority and in the case of video game preservation, this would be the authority of companies who actively resist video game preservation through one means or another. The focus and importance the collectors invest in the fan and enthusiast communities, a variety of publics in this case, is an echo of the bottom-up type of participatory strategies that infrastructuring touts. It deserves further mention how these video game preservation publics tend to be mobilized more by tangible shared concerns such as media rot or copyright laws as opposed to ideology.

Ethics, Morals and Legality

Addressing Emulation

When talking about the preservation of any type of video game, the practice of emulation has to be addressed in varying degrees of detail. The reason is that, despite our best efforts to preserve the original format medium and associated hardware for as long as possible, the immutable passage of time will eventually render down all the physical components to their base material make-up. The plastics will degrade, snap and crumble, the metals will eventually rust or melt away, the integrated chips will ultimately turn back into the sand that they came from in the first place. While the materiality of video games is part and parcel of the videogame experience, or at least it was and still is for many retro gaming enthusiasts, at the end of the day what we are left with is the information, the data (Eremia, 2025). In this case, I am referring to the video game code in particular, although there are adjacent things, like game manuals, maps or gaming magazines, that can be turned into digital data so as to preserve them further. Since “it is not feasible to keep original hardware permanently functioning” what we can do instead is to reproduce “the functionality of the original rendering environment” via software, on much more powerful future computers (Borghoff et al., 2007). Thankfully, these ‘future computers’ are already our current-day computers in relation to video games released more than twenty years ago, but not limited to them.

Emulation within the European Union

The legality aspect of emulation is not clear within the European Union. According to the Software ‘Directive 2209/24/EC’ (2009), the right of IPR holders would be infringed through the reproduction and/or adaptation of the computer program, both of these being necessary for emulators. At the same time, the Directive allows persons to observe, study and test a computer program in its decompiled state if said state is needed to achieve interoperability with other programs. Furthermore, a lawful acquirer of a copy of a computer program cannot be prevented from creating a back-up copy and a person with the right to use a computer program “should not be prevented from performing acts necessary to observe, study or test the functioning of the program” obviously, only when said acts do not infringe the copyright.

My interpretation of this Directive could be condensed into something along the lines of: as long as you own a legal copy of a video game, you, as a private individual, as a citizen of the European Union, are allowed to do anything to and with said legal copy in order for you to observe, study, test, or indeed play, the game, as long as you do not infringe the copyright, meaning as long as you do not sell copies of your copy, or likewise distribute it. This poses a problem when, say, one cannot acquire a legal copy of a video game. Either because legal copies are simply not available in their corner of the world, the games are stored in a format they cannot use, or indeed are prohibitively expensive on the second-hand market. What is one to do in such a situation, once all possible and available avenues of acquiring said title are expended?

The Morals and Ethics of Software Piracy

This is when the specter of software piracy must be discussed. A quick distillation of the two polar opposite perspectives on video game piracy describes on the one hand the video game publishers who consider every pirated copy to be a full loss of sale as described by Lasar (2010) and on the other side is Orland (2017) saying that most pirates would not consider paying for the games they pirate anyway and if anything, pirating games can work as something of a word-of-mouth marketing tool. Most likely the reality is somewhere in between those two, however we now have a recent study from Volckmann (2024) looking precisely at PC video games through the lens of the Denuvo DRM tool. While this latest study is only one such study, its findings seem to echo the idea that software piracy is neither as big of a problem as the IP holders would have you believe nor is it not a problem. The study shows that using Denuvo leads to protecting a mean of 15% of total revenue and a median of 20%. Interestingly enough it also showed that those percentages are highest when the DRM is cracked early after release. When it survives for at least 12 weeks then piracy does not result in any noticeable losses. One limitation of this study is that not all game publishers utilize the Denuvo DRM, and some do not use DRM at all, hence why estimating the real world impact of video game piracy is notoriously difficult to pin down. Another limitation is that this recent study, applied to recent PC video games, and when we are talking about preservation, while recent video games are very much important and in need of preservation, it is usually older video games that are not in the mainstream gamer's eye any longer that require more attention.

The collectors have a much more nuanced view of video game piracy, as evidenced by their responses as part of this project. Piracy is framed as cultural preservation and archival activism by the Canadian collector, for instance, while the Portuguese collector does not see piracy as the most moral approach, instead considering it a pragmatic response to the failure of the legal system. The Danish collector on the other hand, maintaining the technical leaning considers that users should be able to run the software they own even when this implies breaking some technical obstacles placed there by publishers or developers. This collector's view is that piracy should never be the goal of preservation; however, they tolerate it as a byproduct of preservation activities. Even though their tones vary from defiant and activist, into morally neutral but technically focused to reformist and pragmatic, what has to be noted is how nuanced these perspectives actually are.

Conclusion

The report illuminates the tensions and possibilities at the intersection of video game preservation, piracy and socio-technical participation. Based on the academic research as well as the empirical data offered by the specialist participants, it becomes clear that video game preservation is not just a question of technical capability, but that the political, ethical and cultural aspects cannot be overlooked.

There is no ‘one size fits all’ solution to the problem of PC video game preservation, instead there are many possible solutions. The problem has to be approached in a layered manner, addressing the physical, digital, economic and political obstacles. These obstacles can be tackled in a variety of ways and indeed, should be addressed from a variety of perspectives.

The implications are twofold. First, game preservation cannot succeed if it is constrained by conventional IP regimes that prioritize corporate profit over public memory. Second, collectors, hackers, and fans are not marginal actors but essential agents of infrastructural sustainability. Their insights demand inclusion in broader discussions around cultural policy, digital rights, and platform governance.

Ultimately, the “collapse” envisioned by Tomlinson et al. (2013) is meant to be both a framing device and a metaphor relating to the issue of video game preservation – consider the possibility of an epistemological collapse. The collectors’ practices offer a microcosm of how publics might endure in the cases of such collapses – not through institutional continuity, but through adaptive reuse, creative defiance, and a shared commitment to remembering what might otherwise be forgotten.

Discussion

PC video game preservation, and game preservation overall, is not just a technical concern. It has equally valid and important cultural, ethical and political components. The responses from the participants reveal how publics can act both as agents and artifacts of larger socio-technical constructs while at the same time illustrating how infrastructure can lead to ideology, for better or worse. While the technical aspects have been overcome in some cases and can be overcome in the future as technology continues to develop, the major obstacles identified by the collector specialists relate to physical decay, the financial incentives behind the gaming industry overall and legislative limitations. The need for some form of political framework that supports preservation efforts at the EU level is clear, however the way in which this could be achieved is less clear. Enthusiasts and the communities they form do the best they can to preserve what they consider to be art, culture and digital heritage, even when copyright holders consider what they are doing to be piracy. Despite this unstable and confusing state of things, the field of PC retro game collecting is continually pursued by these enthusiasts, both individually as well as in loose groups and online communities.

Reflection

In the grander scheme of things, video game preservation may not sound like the most pressing endeavor out there. When faced with multiple world crises at the same time, focusing one's time, attention and resources into preserving knowledge about artifacts which in some cases the artifacts' creators did not consider worth documenting, seems to be missguided. However, video games have been part of many peoples lives for the past two generations or so. Arguably, they have been an increasingly larger part of people's lives from the 1970s into the present. Studying the ways in which collector enthusiast communities, and individuals, have been doing the process of preservation in a grassroots, underground sort of way can open a window unto how video games, and software and in general, should be approached so as to make the recording and archiving of their existence easier. These communities are also worth studying to see how the preservation activity could be enhanced by sharing ideas, concepts and skills from the various disciplines its members are proficient in, and then maybe taking things a step further and organising a particular public into some type of organized movement. Because enacting changes at a political level will require large numbers of individuals, in organizations that can focus and funnel their energies and resources into more singular purposes. These insights can then be transferred into other fields of digital development and preservation. As a final coda to my report I leave you with this.

The passage of time is immutable. The degradation of the material is unstoppable. The preservation of knowledge is essential.

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Appendix

External Appendices

No.1 Danish collector response

No. 2 Portuguese collector response

No. 3 Canadian collector response

No. 4 SPAW