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Introduction to Moving Image Archival and Preservation

Final Report

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Fact Finding in the World of Video Game Archival

The preservation of video games is a relatively new field compared to that of film or art preservation, with many different aspects of the practice to consider. When preserving the game, do you keep the associated manuals and cases? Since they are made of different materials, do you keep them separate or together? How do you preserve games as the systems and televisions they were played on become obsolete? To get insight into these questions, I reached out to three professionals in the field for interviews to see any overlaps they might have in preservation techniques, as well as ways they might differ in either methods or priorities.

In this report, I will first introduce the three specialists, their associated institutions, and an overview of their collections. Next, I will cover three different areas of preservation, detailing each response before delving into the next one. First, I will talk about the acquisition process, noting where and how they get their games and any associated material, as well as how they might set priorities for acquiring new items. After that, I will cover the actual storage and preservation techniques they employ for these items. Finally, games as a medium are made to be interactive, so I will cover how these institutions balance the idea of preservation versus play, since any use of the material can speed up its deterioration.

I will then gather any loose observations or problems that had arisen during our conversations that might not have fit in the first three categories for the end. Hopefully, their insight and my conclusion in this paper can help serve any institutions hoping to start a video game collection.

The Institutions:

I first spoke to Jon-Paul Dyson at The Strong Museum of Play, specifically their International Center for the History of Electronic Games, at which, he is the Director and Vice President for Exhibits. Located in Rochester, NY, The Strong was founded in 1969, but they opened their International Center for the History of Electronic Games in 2009. Their website states, "The Strong owns and cares for the world's most comprehensive collection of toys, dolls, board games, video games, other electronic games, books, documents, and other historical materials related to play," with the mission to "provide a unique blend of artifacts and interactivity, and its collections provide unparalleled resources for study."[1]

Their collection consists of about 60,000 video games, including 300 arcade and pinball machines, 7000 Japanese console games, as well as a born digital video game collection. In addition to the games themselves, they have hundreds of thousands of archival materials, from memorabilia to strategy guides.

Next, I spoke to Dave Gibson, a Library Technician at the Library of Congress in their Motion Picture, Broadcast and Recorded Sound Division. Located in Culpeper, VA, "The Library of Congress is the largest library in the world, with millions of books, recordings, photographs, newspapers, maps and manuscripts in its collections. The Library is the main research arm of the U.S. Congress and the home of the U.S. Copyright Office. The Library preserves and provides access to a rich, diverse and enduring source of knowledge to inform, inspire and engage you in your intellectual and creative endeavors."[2]

Their current collection consists of about 7000 video game titles, 2000 of which are CD-ROMs for the PC, 5000 console titles, and about 100 magnetic media (floppy disc) games. In addition to their

[1] "Mission."https://www.museumofplay.org/about/mission (accessed Dec 1, 2020).
[2] "About the Library | Library of Congress."https://www.loc.gov/about/ (accessed Nov 30, 2020).

games, they have associated documents with 3000 strategy guides, 1100 periodicals, 30 gaming platforms, advertising materials, and source code.

Finally, I spoke with John Hardie who is the Director and one of the Founders of the National Videogame Museum in Frisco, TX. While the museum officially opened in 2016, it had started off as a travelling archive known as the Classic Gaming Expo Museum, showing exhibits for years at conventions such as E3 and the Game Developers Conference. Their mission is "to preserve the history of the videogame industry by archiving not only the physical artifacts, but also the information and stories behind its creation," and "present the information and as many of the physical artifacts as possible to the public in an entertaining and informative way. Videogames are meant to be played and that is the underlying thought behind each and every exhibit in the museum. This means that we will do everything in our power to allow museum patrons the opportunity to actually PLAY as many games as possible during their visit to the National Videogame Museum."[3]

Their collection consists of about 75-100 thousand items, including hardware, software, and various affiliated documentation and paperwork. This too includes source code, press kits, internal documents from companies, magazines, strategy guides, and various forms of memorabilia collected from gaming conventions.

Acquisition:

In my interviews, I asked a few questions pertaining to the acquisition of games and other items into their collection, notably, what their normal process is (donation vs. purchases), what and how do they prioritize acquiring new material, and what state do the games normally come in (loose cartridge, complete in box, etc.).

[3] "Our Mission."http://www.nvmusa.org/our-mission (accessed 12/2/20,

Jon-Paul Dyson at The Strong:

The Strong's overall ethos to collecting and preserving the history of video games, as Jon-Paul put it, is to "[preserve] materials that show you how the games are made, how the games are marketed, how the games were sold in retail environments, how players experience the games, how communities rose around different games." Jon-Paul shared with me a document detailing this processing, called "Concentric Circles: A Lens for Exploring the History of Electronic Games." This focuses firstly on the games as a text in the center, surrounded by those creating these games, notably the companies and producers, then the players making up the communities, and then finally the actual play itself.[4] Using this mindset, they are able to build a collection focusing on what materials can help tell this story and educate people.

In terms of what priorities The Strong has currently set in acquisition, they have five specific areas they are currently maintaining or bolstering. First, they are home to the World Video Game Hall of Fame, so as Jon-Paul stated, any "materials that document those games, and those games are then conducted based on criteria of icon status, influence geographical region longevity." Next, they have a Women in Games Initiative, for which they are seeking out contributions that women have made to the field to showcase them. They also have an international focus to make sure they are representing gaming worldwide, which is not just Japan, but underrepresented regions such as Northern Europe. Their next focus is the world of Indie Games, since so much has come out they want to make sure they are as well documented as possible. Finally, they focus on "Game Changers" which is a catch all for "key individuals or companies that really document the history." While these are their main focuses right now, they are always looking for new opportunities to showcase diversity in the field. They recently had received a collection of games from the LGBTQ community, as well as a Jerry Lawson collection, who

[4] Jon-Paul Dyson, *International Center for the History of Electronic Games (ICHEG)*, Vol. 1, 2012), 329-330.

was a predominant black game developer. In short, their goal is to “preserve the overall history” of gaming, making sure no stone is left unturned.

Acquisition comes in the form of both purchases and donations for The Strong. An Example Jon-Paul gave for purchases was the traveling arcade exhibit known as Videotopia. The opportunity to purchase their 114 arcade game collection presented itself, and, deciding it would help bolster their collection, they acquired it.

That is not to say donations are not important as well. According to Jon-Paul, “donations are a key part of what we have, oftentimes people will come and say, ‘I have 300 games in my collection.’ And we'll say, ‘Can you give us an inventory so we can compare what we have already?’ And so we may or may not take duplicates, depending on what the format is. And that way we can sort of be more selective, but again, you always need to be open to opportunities as they present themselves.”

As with the Videotopia collection, sometimes opportunities present themselves, and so they can collect through serendipity, which comes through networking within the industry and establishing a relationship with collectors. However, sometimes building their collection requires a lot of digging to fill these gaps they might have, like with their aforementioned women or people of color in the gaming industry initiative. Jon-Paul described it as “a lot of sleuthing going through publications and saying, Hey, here's this individual,” and trying to incorporate their work into the museum. Collections do not always fall in your lap, it takes effort.

When working with these collectors to acquire their materials, The Strong wants to bring long term stability to collecting, and so they work with individuals and groups to acquire collections they may be unable to retain. As Jon-Paul puts it, “we're more the Met than a private gallery, or a small gallery that's featuring the latest hot artists.” They are an institution that wants to provide long term solutions for these gaming collections.

Dave Gibson at the Library of Congress:

Because the Library of Congress is a government entity, their way of operating is beholden to Congress and the Copyright Office deposit in terms of what they normally collect. Their collection starts around the mid-90s when Congress took interest in videogames, funnily enough, to study any harmful effects. In terms of what they take in, Dave stated that right now "game companies are trying to fulfill what is written down to satisfy a copyright deposit." Because of this, their game collection is not as extensive as the other institutions. The Library of Congress does not require the actual game, as they just need video representation of gameplay, normally about 15 minutes, on a DVD, with some older games recorded on VHS. Along with the game or footage, sometimes unique or proprietary code is included, which is normally printed out.

However, since 2008, the Library has requested that the Copyright office send the actual games, as they want to prioritize that intake to bolster their archive. As Dave described, which I will cover later in this paper, the Library is trying to emphasize digital archival, but lack the means to do so since Copyright does not have the infrastructure to intake and distribute these games to the Library, hence the current emphasis on physical games.

Because the Copyright office is a US government entity, the games the Library receives are usually the US version; however, sometimes a Japanese or other regioned version will be acquired if that is the only available in physical form, since some games are only released digitally in the US. Many of the consoles and CD-ROMs games come with the associated box, guides, and any associated advertisements to preserve as much information about the games as possible.

John Hardie at the NVM:

Like The Strong, the National Video Game Museum prioritizes all things related to gaming culture. The collect hardware, software, and any associated documentation or memorabilia. As John put it, they will collect pretty much whatever they can get ahold of, but their collection is primarily from the US in terms of regions. He states, “for a US organization, unless you specifically purchase a large collection of stuff from overseas. It's kind of hard to get any kind of quantity of that stuff.” So, while purchases are an avenue for their collection, they get more donations than anything, normally from people in industry. He states, “purchases are usually reserved more for a specific item that might be missing from our collection. Or maybe a large collection that helps bolster our archives,” such as the large handheld collection they acquired from a collector, which contained 1000s of units in that collection. In terms of what state the games come in, such as complete with manual or a loose cartridge, the NVM will not discriminate if it is an item that they do not currently have; however, they would seek an upgrade if a better, economically viable option comes along, but that is normally on a case by case basis.

An interesting note on their acquisition is through their contacts within the gaming industry. Having established relationships with these companies and individuals, sometimes the archival material they acquire contains sensitive documents. Along with these donations comes an understanding or stipulations that the museum will not make these private documents public.

Finally, since the museum has acquired so much, and because they are a relatively new institution, they stage their material in their storage facilities as it comes in and are now starting to getting most of their collection into their database, stating that a big problem many institutions encounter is having the time and resources to catalogue their collection.

Storage and Preservation:

Next in my interviews, I asked how each institution handles the preservation and storage of their materials, noting that in the long term, a paper insert might deteriorate at a different rate than a optical disc. Accompanying this question, I asked how they maintain and track their collections since their items vary in what they are and are numbered in the thousands.

Jon-Paul Dyson at The Strong:

Although the field of video game preservation is a relatively new field, Jon-Paul remarks that "principles of preserving video games are not different than the principles of caring for a different anything cultural artifact." They prioritize stable climate-controlled storage areas and have a conservation team monitors the units. I did ask that given the materials associated with a single video game are multimedia, e.g., the paper manual, plastic jewel case, and optical media in a PlayStation game, do they keep these items separate since they are known to have different deterioration rates. Jon-Paul said that while they have considered it, like with any institution, when separating these materials, you run the risk of losing something along the way, stating the reality that "you're never gonna have enough staff or staff time or our money or storage to do care perfectly for every item."

They have set a system to prioritize their conservation efforts though. It is called the RAVE standard, which works as an act of triage. The four pillars of RAVE are: Rarity, At Risk, Value, and Engagement. For Rarity they determine how unique the object is. While Pacman on the Atari is very important as a milestone for gaming, there are plenty of cartridges out there, versus a limited release of a game never released outside of Japan. When looking at At Risk items, they determine what sort of medium is it on? They will set different priorities for source code on paper versus an old 80s game on a ¼ floppy which has deteriorating magnetic media. Value is not strictly monetary, but more its value to the history of video games, like the aforementioned Pacman cartridge. Finally, they determine how Engaging the

material is to bring both scholars and general public to the museum by figuring out its interactive and research purposes. While this method of preservation is internally used, they do seek outside help as well, notably from gaming community involvement. Jon-Paul says The Strong “respects those communities, because oftentimes, they're key in preserving the history of materials around there. And they often have whether it's on knowledge of the game itself, whether that's associated materials related to the game, or the community, or some of the technical know how they've developed to try to keep these games alive.”

Because many of these games are nothing without a console to play it on, to help this preservation effort, The Strong employs technicians knowledgeable in repair, such as their arcade tech, who handles any problems, mechanical or electrical with their cabinets and pinball machines. If the games pose to be highly at risk, they at times resort to migrating data with software such as Kryoflux or Applesauce. With new technology, however, new problems arise, and keeping a game in its original form is just not feasible. Jon-Paul states, “the hardware is going to change…[you have to] realize an RPG or MMO is relying on a server that the company may shut down at some point. And so what does it mean? And so oftentimes, what that means for us is, it may be downloading as much as you can about the game, maybe recording video capture…And so you're preserving at least a written record of that.” As he puts it, “[You] have to get comfortable with loss.”

Finally, when considering this idea of original form and authenticity, many of these games were experienced on television sets no longer in production. When asked if they prefer keeping CRTs to HDTVs, Jon-Paul says, “convenience trumps authenticity,” so while they do keep some, they are okay with the fact that sometimes they have to play them on the resources available, noting that if scholars came emulate online from home, the benefits outweigh going into the museum and playing on original hardware.

With a collection so large, a robust system must be in place to maintain their records, and The Strong utilizes three different cataloging systems, with the nature of the object determining which catalog is used.

For the games themselves, they use the Argus database, which is a three-dimensional artifact database, used for games like Sega Genesis cartridges or PlayStation discs. It works utilizing a hierarchy of nomenclature, in this instance Household Object encompasses Toys and Games, which then houses Video Games. This is necessary since The Strong houses not only video games, but other forms of play such as boardgames and dolls, so this flexible system is needed. Once it is cataloged as a video games, other meta data fields concerning manufacturer, genre, and subject are used.

The other two pieces of software they use are a library catalog, which helps track their game guides, as well as an archival catalog, for any other documentation related to video games, both of which use a finding aid to help track down these items. To make sure these databases are up to date, they run a census twice a year, for which, their computer system selects 100 random objects to find, tasking their staff to locate them.

Dave Gibson at the Library of Congress:

The Library keeps its PC CD-ROM games separate from its console games in terms of organization, and from there they have organized by publisher, studio, and at times, subject matter, like chess games or educational games. Like The Strong, they keep all the associated materials together with Dave emphasizing, “let's keep all this other contextual information with it as much as we can.” Some games need rehousing as well, such as the PC games, so they fold up CD-ROM box and put all associated materials in a box made from archival specific paper. Along with the games, they keep associated gaming platforms with them to make sure they games are playable.

While the Library acknowledges the benefit of keeping these materials in a temperature and humidity-controlled environment, at this time they do not; however, Dave has emphasized their priority in digital intake of these materials instead, saying, “The only real way we're gonna be able to provide access to this stuff down the road is through emulation,” and when posed with the question of authenticity, for Dave, “[the] content matters more than the medium,” and so the Library is searching for innovative ways to save this material.

When looking towards the future they want to concentrate on digital access, by making a copy and keeping it safe. Some of these games might need a touch screen on an iPhone or a hard to find peripheral, which poses many preservation concerns, so Dave asks the question, “we might not be able to save this thing as it was intended to be experienced. So what do we save?”

For this long-term digital solution, they have turned to a system called FRED, which can created a Forensic Disc Image of a CD-ROM. What this means, that along with the game data, they can include scans of all accompanying media, such as the manual, any guides, and a photo of the CDs itself. All this material is wrapped in a BagIt storage convention. This file then can be ingested into a digital repository. What the library is looking to do is make sure they have a bit for bit copy of what is on the disc. Currently, they are prioritizing the most at risk games in their collection for this process, which at this moment their PC CD-ROM collection.

In terms of cataloging software, the Library of Congress is presently switching systems, from Mavis to AXIELL. This software is able to create a parent directory, notably the name of the game, and then child directories which store everything associated with it, like the aforementioned data, manuals, and images. By having all this ingested into one system, they can track movement of items and keep tabs on their workflow. This all helps their movement towards digitization of their materials.

While this is their backend of cataloging their software, they also use Voyager, which is the Library's catalog at large, located at catalog.loc.gov. This is normally where game records are kept, and so their hope is to have information about their digital materials available to the public through these means.

John Hardie at the NVM:

The National Video Game Museums approach to organization resembles The Strong's. They choose to organize their materials by system and have opted to keep all their game components together, as separating them would be quite an undertaking. With regards to the loose games they sometimes acquire, they rehouse them using archival quality containers or boxes that will not interact with or damage the item. At this moment, they are not worried about damage or degradation in original container as the media has held up quite well. This is due in part to the temperature and humidity-controlled environment in which they are stored.

While their games are organized by system, the consoles themselves are in their own staging area. Many items in this collection are redundant consoles, which are ready to go for display in the museum or taken to a convention. This practice dates back to their roots as traveling expo, as they wanted to be ready to grab something off the shelf to bring to a conference and have it available to play.

In terms of the television sets they utilize to play these games on, over time they have had less emphasis on CRTs over the years, the fact being that they are too large and heavy to manage. The CRTs they have in stock are normally 13-19", as they are easier to move around, and from an authenticity standpoint, many kids growing up in the 80s and 90s would have had these smaller sets in their rooms, which is replicated in their 80s bedroom exhibit. In terms of more modern sets, they have TVs that can utilize coax and RCA, as opposed to something you can buy at Best Buy in 2020.

Finally, in terms of cataloging software, the museum utilizes PastPerfect, which, according to the software's website, is used in over 11,000 museums and other collecting institutions.[5]

Preservation vs Play:

Video games as a medium are meant to be interacted with. A console hooked up to a TV will just cycle through a main menu screen, and its through play that one can really understand and acquire context for the game. Unfortunately, unlike film which is much more passive and can be handled by trained conservators, videogames require much more interaction, especially with the general public, and so this could lead to much more rapid deterioration in the medium. In my interviews, I asked each institution how they balance this idea of preserving the games, while also allowing the way these games were meant to be played.

Jon-Paul Dyson at The Strong:

For The Strong, interaction with these games can be divided into scholarly research and their museum exhibits.

Scholars and researchers arriving to The Strong normally spend much time with the associated materials they have in their collection, going through documents, periodicals, and guides. Jon-Paul broke down their time as "90% in the archives, but they may reserve some time to play it in its original [form] to see what it's like," but said there was not as much of an emphasis playing the games on the original hardware, referring back to the idea of convenience versus authenticity. That is not to say there is no merit when handling the original devices and games. Jon-Paul says, "there is something about handling the physical block…something that's communicated by that object, to me, that informs my

[5] "About PastPerfect Software, Inc."https://museumsoftware.com/about.html (accessed Dec 6, 2020).

understanding of the past. And I would say the same thing holds true for video games, you can play an 1980s computer game online, but it's not gonna make quite the same experience as playing with the original keyboard that's mapped differently and playing and filling the load times."

So, from a research perspective, there does not seem to be as much concern with he deterioration of the objects since they are not in danger of overuse, and they appreciate, from an academic standpoint, how important it is to get these objects into the hands of scholars.

From an exhibition standpoint, The Strong emphasizes play, and makes a large amount of their collection available for their guests to interact with. With 600 thousand guests in 2019, however, they must closely monitor anything that might be at risk from overuse. Should a game or console be deemed at risk, it is put in their restricted collection and marked off as such. This is done to help prevent any further breakage or deterioration.

Dave Gibson at the Library on Congress:

In terms of in person access to play their games, the Library is currently unable to provide this opportunity for any scholarly research, however, they can provide access to the physical media such as the game box and any associated guides or manuals. This restriction is mostly due to their current digitization project, as their long-term goals are to provide access digitally, and so right now they are focused on preservation.

The idea is to have their collection stored on a server in their digital system, and then people will be able to access this content through a browser to negate any hardware dependencies. Dave likens it to how they handle their film collection saying, "[it is] no different than a researcher coming to our reading room and watching a film or videotape that we've digitized, you know, and send [it up] to the Hill, fiber optically, which is what we do. Hardly ever do we send physical media up to Capitol Hill for somebody to watch, we just stream it from our server at Culpepper."

To take these plans into action Dave says, “we are keeping a very close eye on [emulation as a service] because I think it's going to be like, ultimately what we end up having to use for access.” Emulation as a service is a burgeoning technology which would allow these disc images they have saved to be played via browser. A major roadblock in this development though are security concerns and the Library’s affiliation with the Copyright office, as the ripping and limited distribution of these games enters some murky copyright territory.

John Hardie at the NVM:

The collection at the National Videogame Museum is fully interactive game, focusing on patrons’ ability to read, learn, and play. Since their exhibits to experience so much handling, when asked how they monitor this, John stated that it has not been a huge issue as of yet stating, “[the] majority of our consoles are the same consoles that we put out day one, still running, still working.” However, the durability of the consoles can vary noting, “Dreamcast? I've probably gone through 10.” Not only do they have to worry about the consoles, but the controllers as well, as that is what the patrons would be using. John says that the try not to put original controllers if possible, seeking replicas to try and keep the original experience intact.

In terms of deciding what parts of their collection they want to exhibit, they take patron feedback heavily into account. John says, “We're hardcore gamers, right? So, if it was up to me, I'd say ‘let's put out all this cool prototypes,’ and all this stuff that people [like us] would want to see…[but] the general public, which is probably 80% of your audience, if not more, that comes in, they just want to remember their old Nintendo and their old Atari and things like that.”

Currently, their main focus is on their exhibitions as they have no academic integration as of yet. John considers this to be “Museum 1.0”, which is a stripped-down version to provide a proof of concept for city of Frisco. Luckily, they have seen great success since opening the museum and have plans for

"Museum 2.0", hoping to create a research library for in person studies. In addition to this physical expansion, they want to bring their collection online and make that as accessible as possible, publishing their archives and creating OCR documentation for easy research.

Conclusions:

I think the most prominent differences in preservation priorities and practices stem mainly from the nature of the institution. We see that The Strong and National Videogame Museum are much more similar when compared to the Library of Congress. Because the museums are much more exhibition based, there is a greater emphasis on interactivity, which requires them to maintain a larger collection of physical assets. The Library of Congress, on the other hand, is much more focused on keeping the content that is ingested from the Copyright deposit, and so their resources are focused more on the material rather than the format on which it exists.

It seems like a common thread that with so much content getting produced at such a rapid pace, finding the staff, time, and resources can prove to be difficult. Whether it is staging the material in a separate area waiting for it to be cataloged, or finding new ways to ingest the material digitally, many institutions must focus on not only growing their collection, but making sure it is well documented for access and exhibition. Therefore, each institution must use a robust cataloging software that fits their individual needs.

In terms of access, convenience tends to be a driving factor. Digitization provides remote opportunities for academic research, keeping all the associated materials provides ease of access as well as mitigates loss, and having exhibits boxed and ready for transportation keeps an operation fluid, ready to take something to another institution, trade show, or convention. However, this convenience can encroach on the idea of authenticity. CRT sets are cumbersome and hard to come by, controllers break, and original hardware is sometimes unavailable to play a game. A philosophical question kept popping

up, “if we can’t save the game as a whole, what do we save?” Context seems to be key, by saving associated periodicals, memorabilia, and recreating old gaming environments like a childhood 80s bedroom, institutions can help provide an experience that resembles what it was like to play a game, even if the game itself is unavailable. While recordings of gameplay as well as maintaining original source code can prove to be useful, in the end, after pooling as many resources into saving the game as possible, the idea of loss is something institutions must also accept. Whether it is the physical disc that has deteriorated, or a Massively Multiplayer Online game’s server shutting down, it can be hard to capture exactly what it was like to play the game, so concessions must be made.

However, the involvement of the video game community outside of these institutions has been an invaluable resource in mitigating this loss, both from the professional environment which provides internal documents and code, but also amateur collectors and enthusiasts. Looking towards them for advice with emulation, preservation techniques, and questions about gaming culture has proved to be extremely helpful. After all, it is this community as well as the general public these institutions are looking to serve. The Strong’s Concentric Circle philosophy is a solid foundation to build any video game collection upon, and we can see elements of this practice in the other institutions as well as they find out what it means to save the history of gaming and gaming culture.

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