

Expanding the Video Game Archive at Gordon Library

An Interactive Qualifying Project
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Professor Dean O'Donnell, Worcester Polytechnic Institute

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Abstract

This project attempts to expand Gordon Library's video game archive and make it more accessible to the WPI community, as well as research the history surrounding items in the archive. We created an effective resource for IMGD majors to learn from, allowing them to interact directly with video games and hardware from an earlier era.

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Introduction

This particular IQP project was launched by Professors Dean O'Donnell and David Finkel back in the mid-2000s, which was around the time that IMGD became a major at WPI. The earliest projects were both done in 2006. These projects are what provided the bulk of the existing items in the game archive, and by relying on external donations as well as some of their own, the archive has collected a wide range of games, consoles, and memorabilia. We have included the guides that were given to us toward the beginning of our project, which describe what is in the archives. Library Fellow Rachel Burton did inform us that these documents may not be completely accurate, as the archives are currently reorganizing and re-documenting the game materials. It does show that the archive possesses several different consoles, pc games, and other game materials, with about 200 different games, spanning 13 different consoles.

This brings us to the most recent rendition of this project, carried out by the student Sean Welch in the 2016-2017 school year. His project mainly focused on restructuring a specific section of the archive, that of the Atari 2600. Since this project took place last year, we performed a similar model of project, but with more focus on making the games available to the student populace. Since Welch focused his study on a single influential console, we followed suit and also focused our research on a single influential console. In our case, we chose the SEGA Genesis, because the Genesis made a huge dent in the development of the video game industry as we know it today. Before its launch, Nintendo had about 90 percent of the home video game market share, and after the Genesis, SEGA managed to get 55 percent of the market share.¹

¹ (Horowitz, 2016)

Literature Review

Over the course of this project, we reviewed a number of historical articles and projects from previous IMGD students. This included what the archive had already accessioned, as well as documents pertaining to the history of the Atari 2600 and the SEGA Genesis. A table of these documents, and their contributions to this particular project are shown below.

Table 1 Literature Review

Resource	Usage/Description
“Establishing A Collection Of Video Game Ephemera” ²	The project that kicked off Gordon Library’s video game collection, which we modeled this project off of
“The Game Archives Projects” ³	A project done in conjunction with the previously mentioned project, which we also modeled this project off of
“Revised Atari Collection and Maintenance Policies of the WPI Gordon Library” ⁴	Sean Welch’s project from last year where he focused on restructuring the existing Atari collection and acquisition policy
“Library Game Suite Proposal” ⁵	IQP done in 2008 which proposed a different approach to creating games accessibility on campus
“Establishing a Video Game Study Area” ⁶	IQP done in 2010 which built on the ideas from the Game Suite Proposal project
“An exhibit on the history of story in games” ⁷	IQP done before the game archives projects, and as a result, only tangentially related to this project
<i>Console Wars</i> ⁸	An expository style book that documents SEGA and Nintendo’s battle through the Genesis/NES era, essentially, it is a compilation of interviews and data from the era

² (Perry, Benecke, Arnold, & Finkel, 2006)

³ (Sutman, Germain, Foertsch, & O'Donnell, 2006)

⁴ (Welch & O'Donnell, 2017)

⁵ (Stasik et al., 2008)

⁶ (Chipman, Chung, Fanara, & Finkel, 2010)

⁷ (Leonardo, Hickman, Girouard, Bonatsakis, & Finkel, 2005)

⁸ (Harris, 2015)

<i>Playing at the Next Level: A History of American SEGA Games</i> ⁹	A historical account of SEGA and how their games and consoles were made/ the trade deals and development surrounding them, specifically focusing on SEGA of America
<i>IGN Presents the History of SEGA</i> ¹⁰	A summary of SEGA's history
"Museum Archive Guidelines" ¹¹	An up-to-date guide on standard archival, used to model our intake rules with
"Copyright Issues Relevant to the Creation of Digital Archives" ¹²	Document on the difficulties of creating a digital archive, especially when those materials are copyrighted. We used this document when considering to make the archive digitized
<i>Archives and Manuscripts: Appraisals and Accessioning</i> ¹³	A much older resource covering how to form a method of appraising archival materials, which gave us a vague idea on how to structure our intake rules
"(Not) Playing Games: Player-Produced Walkthroughs as Archival Documents" ¹⁴	Document on how other types of game documentation can be useful, showing the importance of design documents and walkthroughs as a means of experiencing games another way.
"Computer and Video Game Archive" ¹⁵	Documentation of other universities running similar projects to this one.
"Supreme Court Sees Video Games as Art" ¹⁶	News article showing the importance of video games as a media format
<i>Atari Inc. Business is Fun</i> ¹⁷	A more business oriented look on the history of Atari and how they established video games
<i>The Ultimate History of Video Games</i> ¹⁸	A very broad resource outlining the histories of several video game companies and the market overall

⁹ (Horowitz, 2016)

¹⁰ (Fahs, 2009)

¹¹ (Society_of_American_Archivists, 2017)

¹² (Besek, 2003)

¹³ (Brichford, 1977)

¹⁴ (Newman, 2011)

¹⁵ (University_of_Michigan, 2015)

¹⁶ (Sutter, 2011)

¹⁷ (Goldberg, 2012)

¹⁸ (Kent, 2001)

In addition to the above documents, we also looked to prior game archives by other universities, particularly those seeking preservation of games (rather than only more recent games mainly for use in education). Stanford University's Cabrinety-NIST Project seeks to digitize the copies of the games and other media, and preserve the digital data in a more secure format.¹⁹ The University of Calgary has a fairly new archive, which is intended to be available to students through the library catalog.²⁰ Stony Brook University focuses on games as pop culture, and also collects related texts and ephemera.²¹ University of Texas at Austin kicks this up a notch by collecting promotional material, business records, and more artifacts related to games.²² University of Chicago's system is probably most similar to ours, in that there are a series of consoles kept in the library, where users can borrow games for use.²³

Importance of Archives

Why are archives important? This is not a question many people consider in their day to day lives. This IQP is about attempting to preserve an integral part of recent history, the technological revolution, specifically, computing history, the development of video games, and their influence on modern culture. One cannot learn from history without having that history accessible, so this project will build on the existing endeavors of similar projects to make old games and memorabilia available for future generations of scholars at WPI.

¹⁹ (Stanford_University_Libraries, 2018)

²⁰ (Murray, 2017)

²¹ (Nyitray, 2016)

²² (Briscoe_Center_for_American_History, 2014)

²³ (The_University_of_Chicago_Library, 2017)

All information is subject to deterioration over time, and old technology is no exception to this rule. Obsolescence, damage (intentional or unintentional), and even rotting away, are all issues that old consoles and games face. One particular example is bit rot, which is the deterioration of data over time. For instance, many magnetic storage systems such as cassette tapes or the older style of floppy disks lose magnetic charge over time, and as a result, the data on those memory devices become corrupted.²⁴ As a result, having backups is imperative to keep data from being lost forever.²⁵

This type of damage continues to happen as we speak, so finding media such as cartridges, cassettes, floppies, and even CD-ROMs, and then taking care to keep them functional, will make them last a lot longer. Backups also help prevent the data being lost simply due to hardware obsolescence. Granted, this is a much longer term issue, but is still important to keep in mind, because sometimes older hardware is tricky to find, so having the data become usable on new hardware is also very important.

In a broader sense, archives help keep history as unbiased as possible. Professor Joanna Bourke, a historian at Birkbeck, University of London, said “Without archives, we’d only have the stories of the winners in history.”²⁶ This idea certainly resonates in an industry (video games) where the losers of a seemingly endless culture and advertising war often end up being lost to history. Sometimes the losers even try to erase themselves from the history books, as was the case with the game E.T. on the Atari 2600. The game was such a colossal failure that all of

²⁴ (Brown, 2008)

²⁵ (Salter, 2014)

²⁶ (Iconic_Productions, 2013)

the unsold and recalled copies were buried in a huge desert pit.²⁷ We cannot expect future game creators to learn from the mistakes of their predecessors without having the history surrounding those games available.

Indeed, for thousands of years, archives have been important targets of destruction by warring nations in an attempt to erase the cultures and technological developments of their enemies, the most prominent of course being the burning of the library of Alexandria. That in itself is a testament to the importance of archives, as they play an important role in building the foundations of future technological development and social progress. We have come to the conclusion that games are something that should be preserved and made available to scholars at WPI. This is a sentiment held by many, and even the Supreme Court ruled video games were a form of art.²⁸ As such, we believe that games and their history should be documented.

Since the IMGD program at WPI is relatively new, there are not as many resources available to these majors to study and learn from. By maintaining an archive, we can make design documentation, old games, and hardware available to these students, aiding them in both research and overall learning. We worked with Professor Moriarty, to incorporate the use of this station into one of his history classes. Essentially, we created a trial “test station” to gauge how interested students and professors would be in such a resource.

²⁷ (Associated_Press, 2015)

²⁸ (Sutter, 2011)

Methodology

In order to proceed with this project, we would need to form some intake rules, and ways to acquire new materials. We considered the possibility of digital archival, but it wasn't really feasible given this project's small scope.²⁹ This year in particular, we were more focused on a single console, as that was what was done the year before us, and was suggested to us by Professor O'Donnell. Since we were focusing on a console, we wanted to use the original hardware, as it adds to the experience of using a particular console (for example, how finicky an Atari 2600 paddle controller is). We didn't even have a dedicated budget to start with, and we had to rely on the IMGD Program's professional development budget, and Professor O'Donnell's donations. Our rules were based on Sean Welch's project, and collaboration with Rachel Burton. We also took into account how other types of archives structure their accessioning and archival strategies.³⁰ A particularly useful resource was a template by the Association of Academic Museums and Galleries.³¹ Part of our mandate was to write accessioning rules to be followed by future archivists who may not specialize in video game history. These rules are listed below and available as a separate document in Appendix A.

²⁹ (Besek, 2003)

³⁰ (Brichford, 1977) (Society_of_American_Archivists, 2017)

³¹ (Association_of_Academic_Museums_and_Galleries, 2015)

Acquisition

In order for this project to be sustainable, we need a way to acquire new games and consoles. This year, we mainly bought new materials with the help of the Allison Darling of the IMGD program. We would buy materials online and get reimbursed under the IMGD department's professional development budget. We can't rely on that resource alone however, especially as this project grows. As a result, we did some advertising using the flyer shown below:



Figure 1 Project Advertising(Samih, 2018a)

We would bring these flyers to game related events, such as Worcester Game Pile, the Made in MA at PAX East party run by MassDiGI, and PAX itself to drum up support and find donors. We have yet to receive any emails yet, however, and we believe this is due to the young age of many of the event-goers, since they wouldn't have been around for this era of gaming. As far as getting donations in the future, we would recommend looking to additional game development professors, used game stores (for excess/broken but repairable stock), and local retro gaming enthusiast forums. Perhaps more widespread advertising/ internet posting would also be a good idea.

Atari 2600 Station

A picture of our Atari 2600 game station running the game Breakout is shown below:



Figure 2 Atari 2600 Station (Samih, 2018b)

History of Atari and the 2600

Prior to being the major game company it is known for, Atari was founded by Nolan Bushnell and Ted Dabney under the name Syzygy Engineering. Bushnell and Dabney met in 1969, where they bonded over talk of animatronics at pizza parlors and the Chinese board game *GO*. During one of his visits to the Stanford Artificial Intelligence Laboratory (SAIL) and witnessing the first computer game *Spacewar!*, Bushnell got the idea for a coin-operated

machine (coin-op) to run a similar game,³² dubbed *Computer Space*, and is believed to be the first arcade cabinet and widely released commercial game.



Figure 3 *Computer Space* Arcade Cabinet(flippers.com)

Though it was not as popular as they had hoped due to its encyclopedic instructions and gameplay complexities turning away players,³³ their next release *PONG* was wildly popular, spawning the urban legend that they received an angry call about the test machine breaking down, and it turned out it was because the coin box was full with quarters.³⁴ Though *Pong* was originally given to intern Al Alcorn as a learning exercise, Alcorn had added various enhancements to the game, from simplifying the circuits to improving gameplay. His results surprised Bushnell and Dabney, in part due to its simplicity that would allow everyday people to understand it, as opposed to the encyclopedic instruction manual required for *Computer Space*.³⁵

³² (Goldberg, 2012, pp. 20-25)

³³ (Kent, 2001, pp. 33-34)

³⁴ (Goldberg, 2012, pp. 72-75)

³⁵ (Kent, 2001, pp. 41-42)

As they set out to produce the game in bulk, Bushnell and Dabney found the name Syzygy was already in use, and decided to name their company Atari, after an attacking move in *GO*.³⁶

Unfortunately for Atari, an electronic ping-pong game was already created, and patented, by Magnavox, who claimed Bushnell got the idea from examining a Magnavox Odyssey, which featured said game. While taking the case to court would have cost upwards of \$1.5 million, more than Atari could afford, Magnavox offered Bushnell a settlement of \$700,000 for a paid license as the sole licensee. When other companies had started making similar games, they would have to pay royalties to Magnavox, effectively removing Atari's competitors.³⁷

In its early days, Atari had trouble finding funding and manpower for their new game systems. Coin-operated entertainments like pinball or slot machines were associated with gangs, and banks wanted nothing to do with them.³⁸ So much so that pinball was banned for 40 years until 1976, when pinball player Roger Sharpe testified to a court and demonstrated that pinball was a game of skill, not chance. After two games to acquaint himself with the machine, he demonstrated that even the plunger took skill to use, by successfully landing the ball in a pre-chosen location.³⁹ Eventually Atari received a sum of \$50,000 from Wells Fargo, much less than they had hoped for.⁴⁰ As up until now Atari had been run by only three people (Bushnell, Dabney, and Alcorn) they needed more people to satisfy the growing demand. With their low budget, they began hiring almost everyone they could find at around \$1.75/hr. plus benefits, only slightly above minimum wage. However, the workers they attracted – described as “bikers,

³⁶ (Kent, 2001, p. 35)

³⁷ (Kent, 2001, pp. 45-47)

³⁸ (Kent, 2001, pp. 50-51)

³⁹ (Kent, 2001, pp. 90-91)

⁴⁰ (Kent, 2001, pp. 89-90)

junkies, and hippies” – resulted in widespread drug use and theft of electronic parts, which would not be remedied until later.⁴¹

Eventually, the visions of Nolan Bushnell conflicted with the small-scale mindset of Dabney, but eventually Dabney sold his stock in the company for around a million dollars. Bushnell assembled a group of like-minded individuals, including Alcorn, who led research and development, Steve Bristow, who became vice president of engineering, Bill White, chief financial officer, Gil Williams, head of manufacturing, Gene Lipkins, vice president of sales, and Joe Keenan, who would later become president of Atari and Kee Games.⁴²

As Atari had begun to face competition from imitations of Pong, Atari decided to replace the competition with a new competitor: by having Joe Keenan run a new startup “Kee Games”, which Atari would secretly own 90%.⁴³ This would allow Atari to sell their games to their primary distributors, while Kee Games could sell games to their competitors. Atari had unsuccessfully tried to exit the niche of computer ping-pong, but Kee Games created an innovative game called *Tank*, which became wildly successful. Rather than replacing Atari with Kee Games, Bushnell decided it was time to bring Kee Games back into Atari, and put Keenan as president.⁴⁴

Not long after the merging of Atari and Kee Games in 1974, Alcorn hired Steve Jobs. Steve Jobs was not the successful businessman he became later, and was described as “filthy”, “obnoxious”, and “doesn’t know electronics”.⁴⁵ But when Atari was developing a new pong-like

⁴¹ (Kent, 2001, pp. 50-52)

⁴² (Kent, 2001, pp. 55-56)

⁴³ (Goldberg, 2012, p. 128)

⁴⁴ (Kent, 2001, pp. 67-68)

⁴⁵ (Goldberg, 2012, p. 151)

game *Breakout* and needed to cut down on the amount of chips used, Steve Jobs volunteered. During the development Jobs turned to his friend Steve Wozniak for the circuit design, offering him half of the earnings. When Wozniak had made a design that cut the number of circuits so significantly that no one besides him could figure out how, Jobs had pocketed the bonus, and had given Wozniak far less than half.⁴⁶

At a similar time, Alcorn contracted Harold Lee to condense Pong onto a single chip. Upon getting a working prototype, they presented to and secured a partnership with Sears, under the condition of shipping the Sears-branded products first, as well as that the Atari logo be somewhere on the product, which had never before been done on a Sears product. The Sears partnership brought a multitude of benefits to Atari, including money from a bank (which they owned at the time), manufacturing capacity and quality control.⁴⁷



Figure 4 The Original Sears Home Pong(Amos, 2012)

⁴⁶ (Kent, 2001, pp. 71-73)

⁴⁷ (Goldberg, 2012, pp. 151-159)

As the game market shifted from hard-wired games to game cartridges, Atari had begun development of a new console, the Video Computer System (VCS, which would later be called the Atari 2600). But eventually the games industry started to sag, as the public lost interest in the novelty of games on a television. A lack of funds resulted in the sale of Atari to Warner Communications, then owned by Steve Ross, for \$28 million in 1976.⁴⁸ Believing that Atari's prior success was in part due to its leadership, the executive board was kept intact. The sales of the VCS remained low throughout 1978, so Warner hired consultant Ray Kassar to turn the company around. Kassar's strict personality did not work well with Bushnell's laid back attitude, which eventually led to Bushnell's dismissal, with Kassar replacing Bushnell as CEO of Atari.⁴⁹

Kassar, who did not have previous experience in the electronics industry, would offend a great number of Atari's former staff, and soon Joe Keenan, Gil Williams, Gene Lipkin, and Al Alcorn would soon follow Bushnell. But Atari and the VCS would make a resurgence following the widespread success of *Space Invaders*, as the public realized the potential of games outside of Pong.⁵⁰ But outside of the VCS, Kassar made no move to develop other kinds of games, and would halt home entertainment projects that might compete with the VCS.⁵¹ A rift formed between the coin-op division and Kassar, as Kassar's focus on the home entertainment would result in giving more praise to those who adapted the games than the ones who designed them.⁵² The designers also became upset with his prevention of designers from demonstrating any kind of ownership of games. Despite this, a number of innovative arcade games were released in the following years, including vector-graphics *Asteroids*, *Missile Command*, and *Pac-Man*, each of

⁴⁸ (Kent, 2001, pp. 103-105)

⁴⁹ (Kent, 2001, pp. 107-113)

⁵⁰ (Kent, 2001, pp. 124-127)

⁵¹ (Goldberg, 2012, p. 270)

⁵² (Kent, 2001, pp. 131-133)

which were also ported to the VCS. *Space Invaders* became the first arcade game licensed for home use.

A lack of innovation at Atari resulted in the imitators catching up, something that Nolan Bushnell had tried to avoid. Mattel would release the Intellivision console in 1980, and would follow up with a series of handheld games which used LEDs as “screens”. In 1982 Coleco would develop the ColecoVision, which would even be able to play games from the VCS (though with the same quality at a higher price). When Atari finally released the next console, the 5200, it had a graphics quality worse than the ColecoVision, and joysticks which did not auto-center.⁵³ Despite some of the games like Pac-Man’s 2600 port (as they referred to the VCS after the release of the 5200) performing poorly, Steve Ross secured a deal in July 1982 for the release of the game *E.T.* on Christmas the same year, which was a commercial disaster due to unrealistic deadline and expectations. Warner Communications sold the company the following year.⁵⁴

Over the years, the Atari name has been bought and sold several times, but in recent years has found itself once again producing game consoles, which they have once again called the VCS. But following the games market crash, the former game giant Atari had been replaced with two competitors, Sega and Nintendo.

⁵³ (Kent, 2001, pp. 229-230)

⁵⁴ (Kent, 2001, pp. 236-240)

Atari Equipment Currently in the Archive

Table 2 List of Atari Equipment in Archive

Type	Name	Condition (2x3 means two copies of condition 3)	Notes
C	ET the Extra Terrestrial	4	
C	Missile command	3	
C	Ms. Pac man	3	
C	Human cannonball	3	
C	Super football	3	
C	Golf	3	
C	Maze craze	3	
C	Star raiders	3	
C	Math Gran prix	3	Small Label with title fell off
C	Pitfall!	3	
C	Night Driver	3	
C	Pacman	3	
C	Homerun	3	
C	Super Breakout	3	
C	Video Pinball	3	
C	Qbert	3	
C	Street Racer	4	
C	Space invaders	3	
C	Tennis	3	
C	Frogger	3	
C	Superman	3	
C	Asteroids	3	
C	Blackjack	3	
C	Circus Atari	3	
C	Midnight Magic	4	
M	Sears Video Arcade Rev. B	?	
M	Other Atari 2600 consoles	2x?	
H	Power Adapter	?	
J	Atari Paddles (Pair)	3 (both sides)	
J	Video Touch Pad (Star Raiders J)	3	
J	Pro-line joystick	3	Atari7800 controller, compatible with 2600, only works as joystick, not paddle
J	Pro-line joystick	3	Atari7800 controller, compatible with 2600, only works as joystick, not paddle
J	Competition Pro	3	

SEGA Genesis Station

A picture of our SEGA Genesis game station running the game Sonic the Hedgehog 2 is shown below:



Figure 5 Sega Genesis Station(Samih, 2018c)

History of SEGA and the Genesis

The start:

SEGA is a software company that, for a short time in the past, was a major contender with the ubiquitous games giant, Nintendo. SEGA originally consisted of two separate companies at its inception, Service Games, and Rosen Enterprises.⁵⁵ Service Games primarily created coin-op machines such as slot machines, as a form of entertainment for servicemen stationed in Hawaii during the Vietnam War.

⁵⁵ (Fahs, 2009, pp. 1-2)



Figure 6 Image of a Periscope Machine (*flippers.com*)

Rosen Enterprises was founded by David Rosen, an American serviceman stationed in Japan during the Korean War. This company primarily created coin-op photo booths and other general entertainment machines. Both companies merged in 1964 as SEGA (an abbreviation of service games).⁵⁶

Prior to creating any consoles, SEGA had a booming arcade machine business, which, despite continuously dwindling, is still around to this day. Leading up to the release of the SEGA Master System in North America, SEGA had launched three consoles in Japan, the SG-1000, SG-1000 II (sometimes called the Mk. 2), and the Mark III.⁵⁷ The SG-1000 was released on the same day as the Nintendo Famicom in Japan in 1983. While the console market was still doing quite well for itself, it was a much different story in North America. The video game crash of 1983 was likely due to the large amounts of shovel ware (games produced as cheaply as possible) for the

⁵⁶ (Fahs, 2009)

⁵⁷ (Horowitz, 2016)

existing consoles in the States, such as the Atari 2600 and 5200. These companies had very little quality control for the games published on their machines, allowing random game developers to pump out cheap software for a quick buck. Consumers quickly tired of this and dismissed the game market as a fad, rather than an emerging art form.

The resurgence of the games market in the US is largely attributed to Nintendo, due to its release of the Nintendo Entertainment System in 1985. This console was a rebranded Famicom, which was released in Japan two years earlier. In order to prevent another crash, Nintendo started buying up game developers as fast as they could, with the added stipulation that the developers would only be allowed to publish games on their consoles.⁵⁸ Additionally, Nintendo adopted an advertising strategy which aggressively pushed their product as a children's toy rather than a hardcore piece of computing equipment. A particularly memorable example is the R.O.B. add-on, shown below, which would spin a top and receive commands from flashes on the screen.



Figure 7 Nintendo's R.O.B. Add-On(The_Strong_Museum_of_Play, 2018)

⁵⁸ (Harris, 2015, pp. 15-16)

In response, SEGA partnered up with the toy company Tonka and rebranded their Mark III and released it a year later. It did not fare particularly well in comparison to the NES, partially due to the fact that SEGA had much fewer developers to work with, and partially due to its later release date.⁵⁹

The Golden Age for SEGA:

Over the next few years, Nintendo would become the frontrunner of the video game market, with the rest of the market being clawed at by SEGA, Hudson, NEC, and Atari. SEGA had to come up with a strategy if they had any hope of competing with this newly gargantuan company. This is where SEGA of America truly made its debut (despite already having been established to localize the Master System to the US). What sparked this shift was the hiring of Michael Katz, who was previously the president of Atari's game division.⁶⁰ The major strategy at this point, then, would be to develop games aimed at western audiences, as opposed to translating and localizing existing Japanese games, something Nintendo had been relying on. Luckily for SEGA, the Japanese branch managed to strike a deal with Michael Jackson to make a game for their upcoming console. This would prove a very useful tool for SEGA of America, with Moonwalker being one of their first games for the Genesis/Master System, and notably, the first video game to feature an African-American protagonist.^{61&62}

The Genesis was launched in the American market a month before Katz became president, so the initial sales were rather shaky. Katz was determined to find a head of development that he could rely on to get proper development teams together. He decided on Ken

⁵⁹ (Horowitz, 2016, pp. 18-23)

⁶⁰ (Horowitz, 2016, pp. 15-17)

⁶¹ (Horowitz, 2016)

⁶² (Fahs, 2009)

Balthaser, who also used to work for Atari. He decided to hire other development studios that hadn't been bought out by Nintendo, which bought time for Katz to get additional licensing for their future game releases, the most important of which was Joe Montana, an extremely famous football player of the time.^{63&64} This would allow SEGA to create a number of football titles for the machine, and all they had to do to sell units was brand anything and everything.

An additional factor that contributed to the Genesis' success was its extremely aggressive and iconic marketing campaign. This was actually extremely frowned upon by SEGA of Japan, because it simply wasn't a part of the corporate culture of the country at the time. Anyone around during the early 90s would likely remember SEGA's rallying cry "SEGA does what Ninendon't." which surprisingly, wasn't particularly far from the truth.⁶⁵ SEGA of America pushed for the console to have as many American and European made games as possible to appeal to a western audience. This included: sports games, virtual board games, war and superhero games, and of course, action and celebrity focused games. Additionally, SEGA of America began partnering with PC game manufacturers to allow them to port their games on to the Genesis. SEGA of Japan on the other hand, continued making arcade, RPG, and character driven games, which were still quite popular with the East Asian market.

All of this aggressive marketing and external partnership allowed SEGA to truly have a comprehensive repertoire of games. If you could name it, the Genesis likely had it: action, shooters, sports, music, simulation, rogue-like, real time strategy (a first for consoles, the game Herzog Zwei)⁶⁶, as well as huge library of PC and arcade ports from external development teams

⁶³ (Horowitz, 2016)

⁶⁴ (Harris, 2015)

⁶⁵ (Horowitz, 2016)

⁶⁶ (McFerran, 2005)

and the company itself. A particularly technically impressive example was the game “Sports Talk Football”, a game that also used Joe Montana’s license.⁶⁷ The game could generate real time, context-sensitive commentary on the game using combinations of recorded speech, setting it apart from Electronic Arts’ Madden Series.

Many of the Genesis’ games that still hold up well today came from the SEGA Technical Institute. Founded by a former SEGA of Japan worker Mark Cerny, this was a group of programmers and designers that worked closely with SEGA, but were given a large budget and autonomy to design the games they wanted. New programmers would find themselves itching to work there as it allowed for abundant creativity and the ability to work with experienced Japanese game designers. Eventually the Institute was moved to the US, and would proceed to create SEGA’s most iconic mascot and game: Sonic the Hedgehog. This game quickly became a smash hit, especially in the US, as the character was essentially viewed as the “hip and edgy” version of Mario. The Institute is also known for titles such as Kid Chameleon and Comix Zone.

Overall, the Genesis was SEGA’s major triumph over Nintendo, with SEGA managing to collect up to 55% of the video game market share over the course of the console’s lifetime.⁶⁸ It was SEGA’s most successful and iconic console, beginning a number of franchises that are still played to this day. This success could not last forever, though, and would be slowly chipped away through a number of commercial failures and harsh competition from the mid-90s to early 2000s.

⁶⁷ (Horowitz, 2016, pp. 53-56)

⁶⁸ (Harris, 2015, p. 500)

The Fall:

The rest of SEGA's console history could be essentially described as a lack of organization and communication between its two branches. After Nintendo's SNES was released, SEGA decided to release a memory expansion called the 32x, which would allow it to play much more complex games. This was not commercially successful, as the gaming market wanted something new.⁶⁹ In order to retaliate, SEGA would create their first 3d console, the SEGA Saturn. While this console would show some marginal success in Japan, SEGA Technical Institute was losing developers to better prospects in different hardware and software companies.⁷⁰ Combine this with the extreme success of the Nintendo 64 and Sony Playstation (which ironically, both SEGA and Nintendo passed up hardware partnerships with), SEGA was barreling toward the verge of obscurity.⁷¹

SEGA would release its final console, the Dreamcast in 1999, and while this console was considered very ahead of its time, with online networking capability and a unique memory cartridge (that doubled as an MP3 player) it just couldn't hold a candle to the Sony Playstation 2 or Nintendo's GameCube. SEGA was selling the console at a heavy loss, expecting to make up for the loss with its software. However, SEGA was already in debt due to the failed Saturn console and after the release of the PlayStation2, SEGA couldn't bounce back. A number of other factors reduced their profits, including piracy (due to an easy CD exploit), market segmentation (because of the CD and 32x on the Genesis), and heavy advertising budgets, and as a result, the console was discontinued only two years later in 2001.^{72&73}

⁶⁹ (Harris, 2015, pp. 519-520)

⁷⁰ (Horowitz, 2016)

⁷¹ (Buchanan, 2009)

⁷² (Fahs, 2009, p. 11)

⁷³ (Whitehead, 2009)

The same year, SEGA even released a launch title for Nintendo's GameCube, Super Monkey Ball, which was a port of one of their existing arcade games.^{74&75} SEGA is but a shell of its former self nowadays. The company is really only a publisher and holding company at this point, buying other game companies and intellectual properties, and distributing them, with their main focus being the digital market. Having merged with the company Sammy, they also own Pachinko/Pachislot machines, and a number of Japanese game developers. SEGA owns the company ATLUS for example, which recently released the worldwide hit, Persona 5.^{76&77} You wouldn't be able to tell from playing though, as ATLUS still publishes under their own name, so it is more of a subsidiary in that regard.

⁷⁴ (Fahs, 2009, p. 11)

⁷⁵ (SEGA, 2002)

⁷⁶ (SEGA/Sammy, 2017)

⁷⁷ (O'Connor, 2017)

Genesis Equipment Currently in the Archive

Table 3 List of Genesis Equipment in Archive

Type	Name	Quality	Notes
M	Genesis Console Model 2	3	
M	Genesis Console Model 1 non-HD	4	Games don't boot
M	Genesis Console Model 1 HD	3	Broken headphone volume slider
H	Power Supply Model 1602-1	3	
H	Power Supply Model Mk-2103	3	
H	Power Supply Model Mk-2103	3	
H	Auto RF switcher	4	
H	Auto-RF switcher	4	
H	RF unit	3	
H	AC Adapter	3	
H	9V 1.2A adapter for SEGA CD	3	
H	AV output for newer Genesis	3	
H	Audio output	3	
H	EA 4-Player adapter	3	
H	Genesis Console 32X Expansion Pack	3	
H	Genesis Console 32X Expansion Pack	3	
H	SEGA CD	4	Doesn't turn on
J	Six-Button control pad	3	
J	Three-Button control pad	4	
J	Batter-up bat	n/a	
J	Batter-up bat	n/a	
J	Numbered 3-button controller	3	
J	Numbered 3-button controller	3	
J	Numbered 3-button controller	3	
J	Numbered 3-button controller	3	
J	Unnumbered 3-button controller	3	
J	Unnumbered 3-button controller	4	Rattles and doesn't function
J	Unnumbered 3-button controller	4	Frayed wire
J	Arcade Power Stick	3	

J	Asciipad SG-6	3	
J	Asciipad SG	3	
C	John Madden Football '93	3	
C	Road Rash 3	3	
C	Super HangOn	3	
C	Road Blasters	3	
C	Ghouls'n Ghosts	3	
C	Air Diver	3	
C	Road Rash	3	
C	Road Rash II	3	
C	Street Fighter II	3	
C	General Chaos	3	
D	Night Trap	n/a	
C	Contra Hard Corps	3	
C	Altered Beast	3	
C	Tommy Lasorda Baseball	3	
C	Chuck Rock	4	Doesn't boot
C	Eternal Champions	3	
C	World Cup USA 94	3	
C	The Lost Vikings	3	
C	Ecco The Dolphin	3	
C	Sonic 3D Blast	3	
C	Sonic 2	3	
C	NBA Jam	4	Doesn't get past loading screen
C	Shining Force II	3	
C	Tyrants	3	
C	Comix Zone	3	
D	Ecco The Dolphin	n/a	
D	After Burner III	n/a	
D	Sonic CD	n/a	
D	Jeopardy	n/a	

Future Goals/Suggestions

Other Video Game Related Materials:

Since the school is also in possession of a number of game development documents, they should be organized accordingly. We should only be taking design related documents: papers, documents, schedules, concept art, files, both physical and digital. Not fandom related things like trinkets, statues, lanyards, etc.

Digitization of games for archival purposes:

Libraries possess a special exception in copyright law, in that they are allowed to make up to 3 copies of a game for posterity purposes. These digital archives, however, are not allowed to be accessible on the internet, due to the likelihood of piracy.

If there were to be such an archive, the games could be played on a hardware emulator, which is basically software that pretends to be console hardware, making the games playable. This may also help make the games more accessible, as older games can be played on emulators from original copies, they just have to be on an internet-disabled machine, to prevent illegal distribution. This particular project focused on playing games on the original hardware, however, PC games have the same hardware for everything, a keyboard and mouse. Since the archive has a particularly large amount of old PC games, making these copies would be a great idea for upcoming students working on this project.

Use Guidelines:

We plan on allowing WPI scholars access games for research purposes, so handling guidelines are in order. Use guidelines help whoever is managing the station understand what to do and what the users can interact with. Additionally, the archival collections differ from general circulation because nothing is allowed to leave the library in order to prevent theft/damage. Also, the archival collections and general circulation portions of the library are significantly different,

with their own budgets/standards. The archival collection is more focused on keeping the materials safe, which is important when working with things like collectors' items, since they are much more likely to be stolen.

A list of general guidelines to use are shown below:

- We can only loan things we have a second version of archived.
- There should be someone from the archive staff watching over the game use station, as there is a high likelihood of theft otherwise (as shown by previous projects on campus similar to this one).
- The archive staff watching over the game station should be the person who handles the games, visitors can only use the controllers and manuals provided
- Nothing leaves the archive area, stations are set up as space and need becomes available.
- Failure to follow these guidelines should result in usage being revoked from the user:
 - Theft
 - Intentional Damage

Accession Recommendations:

As stated earlier in the accessioning section, we strongly recommend the next archival group expand their donation gathering advertisements to larger groups of retro game enthusiasts, including other game development colleges and museums, such as the Strong Museum of Play. Their archive is incredibly extensive, and will even allow rentals. We definitely think our current system is functional, gathering games as we find them online for cheap, and later being reimbursed, but getting a proper budget from somewhere would be a huge step in the right direction, to increase the speed of accessioning.

Overall Project Structure Recommendations:

We have also stated previously that the archive has an extensive PC game collection. Future renditions of the project do not necessarily have to be about a single console or console station. Perhaps making digital copies of these PC games would be a good idea, and then running them on some sort of open source software like DOSBox. Additionally, perhaps other project groups could focus on a broader view of collecting and making games accessible, rather than focusing on one console in depth.

Conclusions

Archiving games is an important task to undertake due to the short-lived nature of electronic hardware, and their relevance to understanding the culture of the era. Through this project, we successfully accomplished our goal of creating a playable game console station that would function as a proof-of-concept for future game archives projects. We set up the groundwork for a Sega Genesis station, as well as guidelines for intake and use of game resources in the archive.

It is our hope that this project can continue and become a more relevant resource for WPI's IMGD majors. After this project is completed, it is planned that the next IQP group will research another console. We also hope that they look toward finding more donations, and potentially acquiring a small dedicated budget from either the IMGD department, or Gordon Library. Hopefully this will blossom into a much larger resource for the IMGD program as a whole. Contacting more professors in the IMGD, CS, and ECE departments could help, if the interest from Professor Moriarty and his class are anything to go by.

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Appendix A

Intake Rules:

This guide will primarily focus on the accessioning of video game equipment, since that is what will be used by relevant WPI scholars (such as the IMGD department). Each of these criteria should be noted for the purposes of archiving acquisitioned materials. This guide will cover the standard WPI collection guides format.

Condition

Each piece of hardware should be organized by its condition and the type of hardware it is. The description of each type of condition is shown below:

1 - Mint condition, object is unopened, in box, typically shrink wrapped for newer types of hardware.

2 - New, has manual and box, but it's opened. (Shrink-wrap is typically bad for boxes since it squishes it)

3 - Functional, object is verified to be working properly

4 -Broken, object is not functional

If possible, one can attempt to repair broken materials, as their value to this particular archive has severely diminished. The main purpose of this archive is to make the games in the archive playable and accessible to WPI scholars

Ideally, the archive would have one mint, or close to mint copy of hardware that would remain in the archive, and one functional copy to be lent out to WPI's populace.

Hardware Types

M - Main unit, Console, the actual computing unit that the games are played on, in the case of home consoles, just the main unit itself, not the display used for it

D - A disk/CD-ROM, typically what home console games between the late 90s to mid-2010s were stored on.

C - Cartridge, a type of game distribution format used from the late 80s to late 90s, a plastic case with a circuit board inside, typically with external metal contacts, not to be confused with a flash memory card, a recent type of hardware format that is much smaller ($\sim 2\text{cm}^2$ or smaller)

F - Flash memory, which can include memory cards for consoles, which is used to store game progress, or SD cards which have both been used for data storage and very recently (in the case of the Nintendo switch) as a game distribution format

J - Joysticks or controllers, the main interface devices that are connected to consoles so they can be used, or certain games can be played.

H - Miscellaneous hardware, this includes various types of interface devices besides joysticks and controllers, such as mice and keyboards, attachable toys, displays, and other peripherals.