

**Museum or Emulation?:
Exploring Preservation Strategies of Video Games**

In a 2003 article from *Wired News*, an online news source about the Classic Gaming Expo held every May in Los Angeles, Jason Della Rocca stated that “The history of the industry is disappearing before our feet, and that’s not cool.”¹ This quote is significant when discussing the preservation and archiving of video and computer games. On the one hand it speaks to the growing awareness about the increasing need to preserve these artifacts. On the other hand, however, it also speaks to the underlying informality that exists on the websites that are devoted to such an action. This is not to say in any way, shape or form that these websites take the archiving of their beloved games (primarily arcade and console) lightly. Rather that the extension of the gaming culture has influenced many of these sites.

Other than Tetris, a hazy memory of playing either Mario Bros.TM Super Mario Bros.TM once when I babysat in junior high, and occasionally playing a driving arcade game in the game room of a pizza restaurant while growing up, I have not had much experience with video games. Whether it was an extension of the “no cartoon” rule in our household or just a general lack of interest, I am not at all savvy when it comes to either the history, culture or preservation strategies involving video games. This paper, then, was a chance to learn about such matters. Finally, it will provide not only a description of emulation as a preservation strategy for video

¹ Suneel Ratan, “Arcade Addicts Joust With Past,” *Wired News*, 8 August 2003. Available at <http://www.wired.com/news/culture/0,1284,59948,00.html>. Accessed 12/1/2004.

games, but analyze the way in which several websites both address video game archiving, but also the way in which emulation is used by them.

One of the earliest issues involving video games that I quickly encountered was the difficulty in understanding the terminology. Being so completely removed from the gaming world, it was often difficult for me to grasp some of the more salient details discussed in either forums on various websites, or even in online and published articles. Matthew Sakey argues that part of the reason words or phrases such as “anisotropic filtering suddenly means something when married to a technology white paper.”² However, such phrases are applied to more of the technological side of what is more often than not seen as entertainment. Sakey goes on to remark that because “the creative portion of game design lacks a complete language of its own, the press is quite simply unable to quantify it...”³ Even something as simple as defining what video games are can be difficult. And not everyone is as clear as Steven Poole in his book Trigger Happy: Videogames and the Entertainment Revolution when he informs readers that he is “using the term ‘videogames’ to encompass arcade games, home-console games, and computer games.”⁴ There were, however, at one time additionally video games on CD-ROMS, laser discs, on hand-held components and now even on cell phones. Even the term video games appears in literature as two separate words and as videogames.⁵ To

² Matthew Sakey, “There Are No Words (Yet): The Desperately Incomplete Language of Gaming,” [Online] International Game Developers Association (IGDA) website.

http://www.igda.org/articles/msakey_language.php. Accessed 12/4/2004.

³ Ibid.

⁴ Steven Poole, Trigger Happy: Videogames and the Entertainment Revolution (New York: Arcade Publishing, 2000), 21.

⁵ Sakey, for instance uses “videogames” in his article whereas others such as Henry Lowood uses “video games.” Henry Lowood, “Shall We Play a Game: Thoughts on the Computer Game Archive of the Future,”

avoid confusion then, I have chosen (for no particular reason) to use it as two words and while this paper will discuss video games in general – in all its connotations, the majority of its focus is on arcade games, particularly efforts being done to preserve them. However, before discussing preservation of arcade video games, it is first necessary to discuss the broader area of digital preservation efforts.

In terms of the three most common suggested strategies of digital preservation: refreshing, migration and emulation, it is the latter that has been utilized in full force and to its maximum effect by video game archivists. Before delving further into emulation, it would be beneficial to bring in another approach to digital preservation that Jeff Rothenberg discusses in his report, Avoiding Technological Quicksand: Finding a Variable Technical Foundation for Digital Preservation. In this report to the Council on Library and Information Resources, Rothenberg analyzes (and ultimately rejects) the idea of relying on computer museums to aid in the preservation of digital data. In arguing against this idea of establishing “computer museums...where old machines would run original software to access obsolete documents,” Rothenberg states that while this approach “exudes a certain technological bravado, it is flawed in a number of fundamental ways.”⁶ His three main arguments against such an approach include limited access to the originals to few sites in the world, mounting costs at maintaining the ever increasing aging machines and lastly that this approach “ignores the fact that old digital

Online paper. Stanford University, October 2002. Available at: http://www.stanford.edu/class/sts145/shall_game.rtf. Accessed 11/21/2004.

⁶ Jeff Rothenberg, Avoiding Technological Quicksand: Finding a Variable Technical Foundation for Digital Preservation (Washington, D.C.: Council on Library and Information Resources, 1999). 12.

documents (and the original software needed to access them) will rarely survive on their original digital media.”⁷

While Rothenberg points are all completely valid, and he is naturally discussing digital data and most definitely not video games, the notion of a computer museum, nevertheless can be applied to video games. For example, many older arcade games are not merely being preserved on the Internet through emulation, but are being preserved, along with their physical components at least one museum, the American Museum of the Moving Image in Queens. In Joystick Nation: How Videogames Ate Our Quarters, Won Our Hearts, and Rewired Our Minds, author J.C. Herz describes at length an exhibit held at AMMI around arcade cabinets. Marveling at the exhibit, Herz states that:

The exhibit is designed to illustrate how America’s best-loved digital entertainment has evolved over the last twenty-five years. It is arranged in chronological order with scholarly blurbs mounted on the walls next to the hulking artifacts they describe. But the barriers that typically label museum objects as significant – the velvet ropes, the vitrines, the Plexiglas barricades – are conspicuously absent. And so the whole space is unsettlingly poised between a museum gallery (and the restrained, churchy behavior that implies) and a playground, where you’re supposed to run around, make noise, and jump on things....And this is when you realize, for the first time, that these cabinets, apart from containing your favorite videogames, are really just goddamn beautiful.⁸

Herz was worth quoting to such an extent because it illustrates two main points.

The first is that there are collecting institutions that have acquiring, exhibiting and preserving these physical artifacts. While AMMI is the most prevalent, reference to the British Film Institute, the Bibliotheque Nationale de France, and the National

⁷ Rothenberg, 12.

⁸ J.C. Herz, Joystick Nation: How Videogames Ate Our Quarters, Won Our Hearts, and Rewired Our Minds (Boston: Little, Brown and Company, 1997), 61-62.

Museum of American History Archives at the Smithsonian have been made as also being institutions that have, at least in the recent past, acquired video games.⁹

Returning to Rothenberg for a moment, again, while his argument is well founded that such an endeavor for a computer museum would be fraught with problems and is best not to be undertaken, the fact that these institutions have taken on the challenges serves as both an encouraging sign and a caution sign for these and other institutions as to problems they will undoubtedly face.

The second aspect of Herz' narrative on experiencing the arcade console exhibit at AMMI that is worth noticing is the last sentence where he describes such artifacts as "goddamn beautiful." This points to the sentiment that arcade games especially have with gamers. Nostalgia for these arcade games that an older generation of gamers played as children and teenagers is one of the reasons that preserving such games through emulation has taken such a strong hold. When discussing the space of video games, particularly the switch from public arcades to private home console games, Raiford Guins begins his article much in the same way that this paper began, by remembering the past. However, for Guins, he clearly remembers three particular instances which revolved around experiences at various arcades that he frequented. In "'Intruder Alert! Intruder Alert!' Video Games in Space," Guins also quotes Raina Lee, another lifelong gamer who remembers her childhood and the importance that videogames had. Her parents would occasionally take Lee "to an arcade on the Redondo Beach Pier called "Fun Factory." Anyway, I spent many hours playing, and still deeply associate the start up music of

⁹ Admittedly this reference was made on the AMIA listserv and I have, as of yet, been unable to confirm this report. AMIA L-serv. "Video Game Preservation - findings," Accessed at <http://palimpsest.stanford.edu/byform/mailling-lists/amia-1/2001/05/msg00030.html>.

Pac Man with my childhood....”¹⁰ Again, this association with childhood creates a sense of nostalgia in certain gamers, particularly around arcade games. While a new generation of video game enthusiasts may never have logged in as many hours at an arcade, they do still exist in malls for instance. For this generation as well, Herz believes that “NES [Nintendo Entertainment Systems] will be just as collectible as 2600’s are now. Do you know why? All those generation X’ers will be feeling nostalgic for the system of their youth and they will pay outrageous prices for obsolete junk.”¹¹ While the idea of collecting as preservation is certainly a valid one, the point here again, is that nostalgia drives much of the preservation of video games.

However, Herz is also quick to point out that just because gamers might be nostalgic, does not mean that they are gullible or stupid. In the mid-90s, according to Herz, there was a spurt of re-creating “versions of the original games – *SuperPong* for Windows ’95, say, or *Indenture*, Craig Pell’s rendition of *Adventure* for DOS.”¹² While these “home-brewed versions” as he calls them were initially well received, upon closer inspection,

Microsoft’s approach to translating these games is less like transporting a castle stone by stone than making a plaster cast of the entire structure and reproducing it in polyurethane foam. Rather than base the translations on the original programs, Microsoft filmed the games being played and then wrote code that approximated the footage....Microsoft never used the original game code itself. They merely simulated it. The end result was a set of experiences that’s almost indistinguishable from the originals. But not quite....the Microsoft programmers missed one subtle but important element, buried

¹⁰ Raiford Guins, “‘Intruder Alert! Intruder Alert!’ Video Games in Space,” *Journal of Visual Culture*, 3 (2004): 205.

¹¹ Herz, 72.

¹² Herz, 72.

deep in the original code – the watermark of authenticity. The bugs. They left out the bugs.¹³

According to Herz, players spotted the problem (as they saw it), and turned up their noses at these faux games, “Visually, they’re doppelgangers of the original games, and they behave a lot like them as well. But they lack the essence (and, some would argue, the ineffable magic) of the original code. Can they really be called the same games?”¹⁴

Before trying to answer this complex question that Herz has formulated, I would like to return for a brief moment to the idea of video games as collectibles, and the business side of this. Herz mentions that in the mid-90s it did not take long for the “wave of classic cartridge nostalgia” to catch the eye of videogame companies which then issued compilations of such games on CD-ROM. Two companies that he mentions are Microsoft (of course) and the second is Activision, which released a package of “fifteen vintage Atari games remastered for PC and Macintosh.”¹⁵ What struck me as the most telling aspect of this capitalizing on nostalgia is that Activision is still active in releasing such compilations. In fact, when I posted general queries on a game site forum, asking what people thought about video games archiving, nostalgia and emulation, one of the replies mentioned three specific companies that release such features: Activision Anthology, Midway Arcade Treasures and Intellivision Lives, which is the most recent. This latter company, in the blurb about this “retrogaming company,” which offers its classic

¹³ Herz, 74.

¹⁴ Herz, 75.

¹⁵ Herz, 73.

games to new platforms including PC & MAC, Playstation and Xbox, direct to TV, cell phones, handhelds and even the original console.¹⁶

This type of preservation, through a business that continually releases older games for new platforms is certainly *a* type of video game preservation. However, it is only as effective as long as such a business releases these games on a CD-ROM for instance. Once such an option is no longer financially viable, losing the game altogether is a concern. In addition, the compilation of games on CD-ROM poses its own set of problems depending on the software and hardware required to successfully run the games.

Returning finally to Rothenberg and his argument for emulation in the preservation of digital data, he first makes an argument against migration. He goes into considerable detail as to why migration has been thought of as successful in the past, but how it is actually quite tricky. One of his points is that since it is nigh impossible to determine when a new format will emerge, it is difficult to estimate when migration will need to take place. Also, migration can be quite “labor-intensive and highly dependent on the particular characteristics of individual document formats and paradigms.”¹⁷

One aspect of the “ideal solution”, in Rothenberg’s view is that it retains the “original functionality, look, and feel of each original document, while minimizing translation so as to minimize both labor and the potential for loss via corruption.”¹⁸ He sees emulation as providing the best possible way to satisfy this and other criteria needed for the “ideal solution.” While his discussion of encapsulating a

¹⁶ Intellivision Lives website. Available at: <http://www.intellivisionlives.com/>.

¹⁷ Rothenberg, 15.

¹⁸ Rothenberg, 16.

digital document does not really apply to video games, his notion of emulation as fitting closest to the ideal solution has clearly seconded by those in the archival gaming community.

What follows now is a synopsis of the various types of websites geared towards archiving video games. While this is certainly not all-inclusive, it should be taken as a thorough, though general overview of video game preservation websites available. It should be mentioned though, that there are two general purposes of the websites that offer emulated video games. The first is to document the code that comprises a particular game. The second is to offer an emulator that will allow someone to play that particular game. "Emulation refers to the process of mimicking, in software, a piece of hardware or software so that other processes think their familiar environment is still available in its original form. Consequently, digital documents can be kept without being altered, thus maintaining the integrity and its original look-and-feel."¹⁹ As should be made clear by now, particularly through Herz, this original look-and-feel is very important to gamers, particularly those who did actually play the original.

Roughly speaking, there are three types of websites that involve archiving video games. The first is a website like www.halfbakery.com, where video game preservation is just one of the interests shared by its users. For instance, this site has a Video Game Preservation Society link²⁰ where users can post messages about what they think is the importance of the preserving video games, but not much is actually

¹⁹ Andreas Rauber and Andreas Aschenbrenner, "Part of Our Culture is Born Digital – On Efforts to Preserve it for Future Generations." Website. Available at: <http://www.ifs.ltuwien.ac.at/~aola/publications/trans10.html>. Accessed 12/12/2004.

²⁰ www.halfbakery.com/idea/Video_20Game_20Preservation_20/Society

done in either organizing to encourage archiving of games or offering an emulator. What is done is offering other sites that can be linked to that have game emulators. Another similar group is the International Coalition for the Preservation of Digital Games (ICPDG), which has written a call-to-action of sorts that lays out steps that need to be taken including: “Networking together the various initiatives that have already begun independently....Raising consciousness, particularly among game developers and publishers, of the need and value of game preservation and access” and the “[d]evelopment of strategies for working with developers and publishers on licensing and intellectual property issues.”²¹

The second type of website is decidedly organized and is determined to encourage and foster the discussion and development of preserving video games. More of an academic-minded website, sites such as the Digital Game Archive at www.digitalgamearchive.org, unlike www.halfbakery.com does offer emulators itself. In addition it also offers a list of links to emulators, forums and reference websites devoted to game emulation. Moreover, it also offers other resources in the way of archival and education websites as well. DIGA describes themselves as “an archive to grant free access on a global plane to people who want legal downloads of computer and video games regardless of their original platform or their age. What distinguishes our approach from traditional Abandonwaresites is that all games provided by us for download have been explicitly released by their legal owners for

²¹ Andreas Lange, “International Coalition for the Preservation of Digital Games (ICPDG),” website. Available at: http://www.digitalgamearchive.org/works/InternationalCoalitionforPreservingDigitalGames_1.rtf. Accessed 12/3/2004.

private and scientific use.”²² Another similar site is the International Game Developers Association (IGDA) at www.igda.org. The focus of this website, however

And lastly, the third type of website is the full-on emulator site. One of the most popular and well regarded is the MAME website. In this case, it is not Rosalind Russell playing Auntie Mame, but rather the Multiple Arcade Machine Emulator (www.mame.net). MAME is likely the most popular of any of these types of sites. While it has a substantial FAQ section, the majority of the site is devoted to acting as the “hardware” for the over 4,600 total classic arcade video games. The basic PC system that will play about half of the 4,600 games offered by the site includes an “Intel Celron/AMD Duron 700 Mhz; 64-128 MB RAM; a varying amount of hard drive space...; DirectX compatible card; any sound card that works in Windows.”²³ Any G3-based machine should run most games in MacMAME on Macs. And additionally there is a DOS version as well. MAME, like DIGA is cautiously risk-averse when it comes to the legalities of using ROM, an arcade game’s data files in different platforms. According to the FAQ, “MAME has been ported to the PlayStation 2 and Xbox consoles, but these ports are not...available because of development system restrictions.”²⁴

However, despite that MAME claims that their “games are NOT simulations, but the actual, original games that appeared in arcades,” they also admit that control devices, such as steering wheels and pedals and normal light guns are not supported

²² DIGA. Who we are. Website. Available at: <http://www.digitalgamearchive.org/>. Accessed 12/3/2004.

²³ “MAME FAQ,” Website. Available at: <http://www.mame.net/mamefaq.html>.

²⁴ Ibid.

by MAME.²⁵ Further, due to encryption reasons, often the sound emulation does not work on various games. The comments that I received to my question about having any problems or frustrations with emulators cites that missing of control devices that are clearly an important aspect of playing the game.

This leads us to the crux of the problem involving preservation of video games. Playing them is how they are accessed. Otherwise they are simply codes – and not just code, but as Herz points out, “video games were always just copies of codes.” The original, which is normally considered of supreme importance, is not even mentioned in any of these websites devoted to preserving them. Instead importance is placed on the copy of the code. Henry Lowood points to this same duality in his paper “Shall We Play a Game: Thoughts on the Computer Game Archive of the Future,” when he reduces the preservation of games to either fixed objects or “experiences generated by a framework of rules, codes or stories and expressed through interaction, competition, or play.”²⁶ Certainly in terms of emulation, while, the final intended result is to have a game that looks and feels like the original, since the emulation can only emulate the code, it is only preserving the code, and not really the game.

It should be clear by now then, that both preservation strategies discussed in this paper are necessary to preserving video games. While the focus and determination of such websites as MAME are necessary, it is also necessary to continue preserving not only arcade cabinets, but existing hardware, documentation, data and metadata in the variety of formats in which they exist. Lowood also points

²⁵ Ibid.

²⁶ Lowood, http://www.stanford.edu/class/sts145/Library/shall_game.rtf.

to a third strategy which is for more cooperation, not only between digital repositories such as the Digital Game Archive, but also with industry groups such as the International Game Developers Associations to help smooth over any legal issues that can hinder building a safe and complete collection of games.²⁷ By developing such cooperative practices between the industry, academic institutions and museums as well as the online emulation community, it can only further the ultimate goal of preserving video games.

²⁷ Ibid.

Bibliography

Classic Amiga Preservation Society. Website. <http://www.caps-project.org/info.shtml>
Accessed 12/4/2004.

Computer History Museum. Website. <http://www.computerhistory.org/>. Accessed
12/4/2004.

Digital Game Archive. Website. <http://www.diga.org>. Accessed 11/28/2004.

Games Forum. *Bombunists*. Website. <http://bombunists.com/forum/games>.
Accessed 12/12/2004.

Halfbakery: Video Game Preservation Society. Website.
http://www.halfbakery.com/idea/Video_20Game_20Preservation_20Society
[y](http://www.halfbakery.com/idea/Video_20Game_20Preservation_20Society). Accessed 12/3/2004.

Herz, J.C. Joystick Nation: How Videogames Ate Our Quarters, Won Our Hearts,
and Rewired Our Minds. Boston: Little, Brown and Company, 1997.

Intellivision. Website. <http://www.intellivisionlives.com/>. Accessed 12/13/2004.

International Coalition for the Preservation of Digital Games. Webpage.
[http://www.digitalgamearchive.org/works/InternationalCoalitionforPreser](http://www.digitalgamearchive.org/works/InternationalCoalitionforPreservation)
[vin](http://www.digitalgamearchive.org/works/InternationalCoalitionforPreservation)
[gDigitalGames_1.rtf](http://www.digitalgamearchive.org/works/InternationalCoalitionforPreservation).

International Game Developers Association. Website. <http://www.igda.org/>. Accessed
12/4/2004.

Jones, Steven. "Cybersociety: Computer-Mediated Communication and Community

Juul, Jesper. "Just what is it that makes computer games so different, so
appealing?"

IGDA Website.
http://www.igda.org/columns/ivorytower/ivory_Apr03.php.
Accessed 12/4/2004.

King, Brad and John Borland. Dungeons and Dreamers: The Rise of Computer
Game
Culture From Geek to Chic. New York: McGraw-Hill, 2003.

Kushner, David. Masters of DOOM: How Two Guys Created an Empire and
Transformed Pop Culture. New York: Random House, 2003.

Lowood, Henry. "Shall We Play a Game: Thoughts on the Computer Game Archive

- of the Future.” Website.
http://www.stanford.edu/class/sts145/Library/shall_game.rtf. Accessed 11/21/2004.
- Lyman, Peter and Hal R. Varian. “How Much Information?” *Journal of Electronic Publishing* 6, no. 2 (2000). <http://www.press.umich.edu/jep/06-02/lyman.html>.
- Multiple Arcade Machine Emulator*. Website. <http://www.mame.net>. Accessed 11/27/2004.
- Poole, Steven. *Trigger Happy: Videogames and the Entertainment Revolution*. New York: Arcade Publishing, 2000.
- Poulsen, Kevin. “The Arcade Underground,” *SecurityFocus*, 10 July 2000.
<http://www.securityfocus.com/printable/news/57>. Accessed 12/12/2004.
- Rauber, Andreas and Andras Aschenbrenner. “Part of Our Culture is Born Digital – On Efforts to Preserve it for Future Generations.”
<http://www.ifs.tuwien.ac.at/~aola/publications/trans10.html>. Accessed 12/3/2004.
- Rothenberg, Jeff. “Avoiding Technological Quicksand: Finding a Viable Technical Foundation for Digital Preservation.” Report to the Council on Library and Information Resources. Washington, D.C.: Council on Library and Information Resources, 1999.
- Sakey, Matthew. “There Are No Words (Yet): The Desperately Incomplete Language of Gaming.” [Online]. IGDA Website.
http://www.igda.org/articles/msakey_language.php. Accessed 12/4/2004.
- Thibodeau, Kenneth. “Overview of Technological Approaches to Digital Preservation And Challenges in Coming Years.” [Online].
<http://www.clir.org/pubs/reports/pub107/thibodeau.html>. Accessed 11/28/2004.