Evidence Based Library and Information Practice

Research Article

Video Game Equipment Loss and Durability in a Circulating Academic Collection

Diane Robson
Games and Education Librarian
University of North Texas Libraries
Denton, Texas, United States of America
Email: diane.robson@unt.edu

Sarah Bryant
Reference and Instruction Librarian
Western Wyoming Community College
Rock Springs, Wyoming, United States of America
Email: sbryant@westernwyoming.edu

Catherine Sassen
Principal Catalogue Librarian
University of North Texas Libraries
Denton, Texas, United States of America
Email: catherine.sassen@unt.edu

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Abstract

Objective – This article reviewed twelve years of circulation data related to loss and damage of video game equipment, specifically consoles, game controllers, and gaming peripherals such as steering wheels, virtual reality headsets, and joysticks in an academic library collection.

Methods – The authors analyzed data gathered from game equipment bibliographic and item

records. Only data related to the console system, game controllers, and peripherals such as steering wheels, virtual reality headsets, and joysticks were evaluated for rate of circulation, loss, and damage. Cables and bags were not evaluated because the replacement cost for these items is negligible when considering long-term budgeting and maintenance of a game collection.

Results – The majority of video game equipment can be circulated without unsustainable loss or damage. The library has been able to continue circulating video game equipment without undue replacement costs or loss of access for its patrons.

Conclusion – Although equipment will occasionally break or be lost, libraries should not let this unduly affect consideration when starting a video game collection.

Introduction

Although some academic libraries are starting to add video game collections to support research and recreation, there still seems to be a reluctance to collect items outside the norm. These items do require different skill sets to manage but libraries already deal with materials and software that require some specialization. Although loss and damage for these items should be a concern, the costs related to collecting game equipment are no more exorbitant than other library technology.

Video games are a big part of our culture with 66% of Americans playing video games weekly; 83% of players begin new relationships and develop friendships through play (Entertainment Software Association, 2022). In addition to recreation, these collections serve scholars in their study and creation of games. Libraries should not let concerns about loss, damage, and other difficulties related to these materials hinder adding a collection that can supplement recreation, engagement, innovation, and scholarship in the library.

The University of North Texas (UNT) Media Library has been circulating a growing video game collection for over ten years. This article provides details about the game equipment in this collection. Game consoles and controllers are some of the biggest costs for a collection. This research will examine the durability, lifespan, loss, management, and maintenance of these items. This evidence will be useful to libraries considering the viability and costs of establishing, expanding, or managing a collection in their own library.

Given the limited life span of video game equipment and the expense of replacement components, managers of video game collections stand to benefit from detailed research on equipment durability in a circulating collection. However, none of the studies found in the literature review presented such research. The present article is designed to fill this research gap.

Literature Review

Administering an academic library video game collection involves a variety of challenges ranging from changes in game design, game technology, and purchasing arrangements to evolving opportunities in support of educational and recreational needs on campus. As Robson et al. (2020) noted, “Managing

challenges related to content, access, equipment, space, and outreach, with the goal of effectively supporting students, staff, and faculty can be exasperating but is also exciting and rewarding" (p. 3).

Although most of these challenges have been covered extensively in the literature, libraries should devote more attention to equipment, considering its crucial role in the successful operation of a video game collection. The scope of this literature review is limited to the maintenance and durability of video game equipment in libraries. This review draws on research reports, feature articles, and publications providing guidance on library video game collection management. For more information about academic library video game collections in the contexts of collection development, library instruction, outreach, cataloguing, assessment, gaming spaces, and virtual and augmented reality, see Robson et al. (2020).

Equipment Durability and Longevity

Video game components inevitably wear out with continued use. A library may decide to purchase extra components as backups to save time in locating them when replacements are needed (Williams & Chimato, 2008). Other options may include repairing equipment and using 3D printing to create replacement parts (Panuncial, 2019).

Equipment compatibility is a concern in video game collections because games that can be played on older consoles may not necessarily be played on newer consoles (Cross et al., 2015). A library may collect legacy consoles to mitigate this situation. It is possible to find older equipment on eBay or in pawn shops (Robbins, 2016); however, the library should prohibit the circulation of these consoles, considering the historic importance of equipment that is no longer in production (Robbins, 2016). The library also may restrict access to games on cartridges because of preservation concerns. A strategy to provide access to older games while preserving legacy consoles would be to use video game emulators (Cross et al., 2015).

Care and Handling

The condition of a video game is influenced by the environment in which it is housed and the way it is handled (Byers, 2003; Leblanc, 2021). Environmental conditions include temperature, humidity, moisture, solvents, light exposure, dust, debris, and smoke. Handling effects include scratches, smudges, marking, labels, and wear. Byers (2003) and McDonough et al. (2010) provide guidance on mitigating these factors.

Circulation policies and practices affect the integrity of video game collections (Buller, 2017; Goodridge & Rohweder, 2021). Libraries should develop policies covering lending and use issues as well as replacement fees to document expectations for users. After each circulation, staff should ensure that all equipment components have been returned. They should check discs for damage and clean them. Other post-circulation tasks may include verifying that consoles function properly and removing any data left by players. Circulating collections must have appropriate physical processing to protect the items and facilitate the check-in process (Robson et al., 2017).

Aims

In this article, we discuss the durability and loss of video game consoles, controllers, and peripherals in an academic video game collection over twelve years, as well as management and maintenance decisions

needed to sustain equipment and increase its longevity. Can an academic library sustain a video game collection, or will loss and damage be unsustainable?

Durability is a consideration for all purchases but is particularly important for non-consumable items. Video game equipment will be set up and taken down, held for hours in sometimes sweaty hands, and dropped. There is no standard metric for game equipment durability in a library setting. Use determines longevity and use varies greatly between the user and the game played. The ability to repair wear and tear is also a consideration. There is no easy answer and often budgets will determine each library's ability to sustain this type of collection.

Loss, defined as items missing or not returned, is another question entirely. Academic libraries conducting inventory projects have reported a variety of loss rates. For example, an inventory conducted at the University of Mississippi Libraries found losses ranging from 9% to 16%; this library set its acceptable loss rate at 4% (Greenwood, 2013). A library inventory at Seton Hall University in the 1990s estimated a 14% missing rate for their collection with no desired loss rate stated (Loesch, 2011).

The acceptable rate of loss is specific to each collection, its size, and user needs. Each library will need to determine if their loss rate hinders research, instruction, and play, and if their budget can sustain a game collection through such losses. This research does not intend to determine a universal rate of loss for libraries with game collections but will examine current loss rates at the UNT Media Library.

Methods

We limited the scope of data to consoles, controllers, and game peripherals such as Wii pads and steering wheels. This research study focused on this equipment because the replacement costs of a console, controller, or peripheral are much higher than plugs, cables, or headphones. The durability of these materials is important when considering the long-term costs of maintaining a game collection.

We collected data from bibliographic and circulation records for 497 consoles, controllers, and peripherals. These data included circulation statistics generated automatically and notes about loss and damage from December 1, 2009, through the data capture on February 1, 2022. Information in library item records included the item *create date, last check-in (return date), total checkout, renewals*, and *status*. The lifespan was calculated from the item record *create date* and *last check-in* date for lost/paid/damaged items. The available lifespan was calculated with the item record *create date* and the data capture date (February 1, 2022). The total circulation was the sum of the *total checkout* and *renewals* values. The *status* included available, lost and paid, lost, billed, on search, missing, and discarded. The statuses for lost and paid, lost, billed, on search, and missing were all bundled into Billed/Lost/Paid because these items were not returned to the library. Discarded items were either those returned with either general wear and tear or consoles damaged by patrons. Notes included content added to the bibliographic records for non-consumable items, documenting purchases and any loss or damage that happened over an item's lifetime in the library, as well as the circulation count at the time of discard. Legacy collection items were not included in the durability values for this review. The Legacy collection consists of older equipment that is considered obsolete or difficult to replace.

Overview

The UNT Media Library is one of four libraries that serve the educational and research needs of about 48,600 faculty, staff, and students across two campuses in Denton, Texas. The Media Library houses non-

print, audiovisual, tabletop, and video game collections. The video game collection began in 2009 with a small grant and has grown to include services and collections to support student recreation, research, and coursework. This collection is used for student and staff programming, coursework, and university game-related initiatives such as esports and a game studies and design degree.

The Media Library is a collaborative space that encourages engagement around play. In 2018–2019[1] the Media Library served 104,890 patrons at its circulation desk and in its spaces. There were 12,427 PC reservations and 10,456 game station reservations. Game-related equipment was checked out 7,427 times. Before 2009, this space was primarily a quiet space for viewing audiovisual reserves. As audiovisual collections moved online, viewing carrels were no longer needed so their space needs decreased. This allowed the game space to increase to include in-house reservable space with 10 console stations, 22 PCs, virtual reality devices, and tables for gaming and play. Most of the collection circulates out to faculty, staff, and students with a few exceptions for older, costly, or larger devices.

In late 2009, the video game and console collection consisted of modern consoles. It included a Nintendo Wii, a PlayStation 3, an Xbox 360, controllers for each console, and a few peripherals such as guitars, a keyboard, and a steering wheel. Today the collection includes modern consoles such as the Xbox Series X and PlayStation 5, as well as older legacy consoles and equipment such as the Wii, PlayStation 3, and Xbox 360.

Obsolescence is a concern with library collections. New consoles are released about every three to five years which brings obsolescence into consideration much earlier than some other library materials.

The Media Library embraced this cycle of renewal with its film collection and decided to do the same with the game collection. Not only have library staff developed procedures to keep our collection of seventh-generation consoles (Wii, Xbox 360, PS3) in the collection; we have reached even further into the past to develop a legacy collection of older equipment to support research and instruction. The game collection now houses equipment that spans the second console generation (1976–1992; Gallagher & Park, 2002) to modern devices in the ninth console generation (2020–present).

The equipment in this collection is curated to meet the needs of faculty, staff, and students. Several different budgets are used to purchase and maintain the collection. All video game content, i.e., discs and cartridges, is purchased with the general materials budget. A yearly game equipment budget is used to purchase new equipment and legacy items. The library accepts gifts that have helped a collection of older content and consoles grow without additional costs. Smaller items, such as batteries, bags, and cleaners, needed to maintain the longevity of the collection are purchased through a supply budget.

The library's definition of a non-consumable durable item vs. a consumable item has shifted as staff learned how to manage this type of collection, with the budget reflecting the need to purchase some items yearly because of wear and tear. Consumables such as batteries, bags, cables, and headphones degrade much quicker than non-consumable items such as console systems, controllers, and peripherals. Each year new purchases, replacements, and maintenance are considered when determining purchases.

A video game collection, like any new collection, does cost money, and library staff had fears about unsustainable loss. Early procedures played to these fears by requiring patrons to sign extra

[1] Pre-COVID-19 data were used to provide a more accurate picture of library usage.

documentation reiterating their responsibilities at each checkout. These additional procedures added time to check out and did not minimize loss, so these procedures were relaxed to a simple checkout/check-in in the library system in 2014. Details in the circulation record are sufficient to note responsibility for materials.

Damage is another consideration, but a video game collection is much like any other collection. There will be damage and parts will break. This means understanding that some parts do break and the library will need to expand the idea of what a consumable is to include additional easily replaced items like cables and headphones. The library's long-term goal is to mitigate unsustainable loss and damage with proper procedures and maintenance.

Collection

The UNT Media Library includes a collection of circulating content, consoles, and peripherals that circulate outside the library to faculty, staff, and students. The reserve collection circulates in-house and supports play in library game spaces. The Legacy Collection, which includes older consoles from generations two through six, is used in-house for research and instruction only. The game collection continues to grow across generations with consoles from the eighth generation, specifically the Nintendo Switch and PlayStation 4, still in high demand.

This collection circulates like most other physical items in a library. Students can check out three items for 3 days. Faculty and staff can check out 10 items for 7 days. Circulating equipment may be placed on hold. Faculty, staff, and official student groups are allowed to book materials. A booking holds the item for a specific date and ensures items are available for class or group events.

Consoles

The overall data displayed in Figure 1 show that the circulating console collection has not suffered unsustainable loss or breakage. Over the life of this collection, 6% of consoles were discarded because of damage. None of this damage was intentional; it was merely wear and tear. No specific console system suffered more damage than another.

Analysis shows 10% of consoles were lost, paid, or billed. Although this loss rate is fairly high, it has not hindered the library's ability to provide equipment to access content. Seen another way, the library only lost one copy out of the four available for the Nintendo 3DS.

Unlike a book on an open shelf, these items are held more securely when not checked out, so loss is often tied to a specific patron and the library has a chance of recovering the cost of the item. Most losses are due to students withdrawing from school while an item is in their possession. Sudden closures from COVID-19 increased the recent loss rate, as students who had items did not return to university or re-enroll.

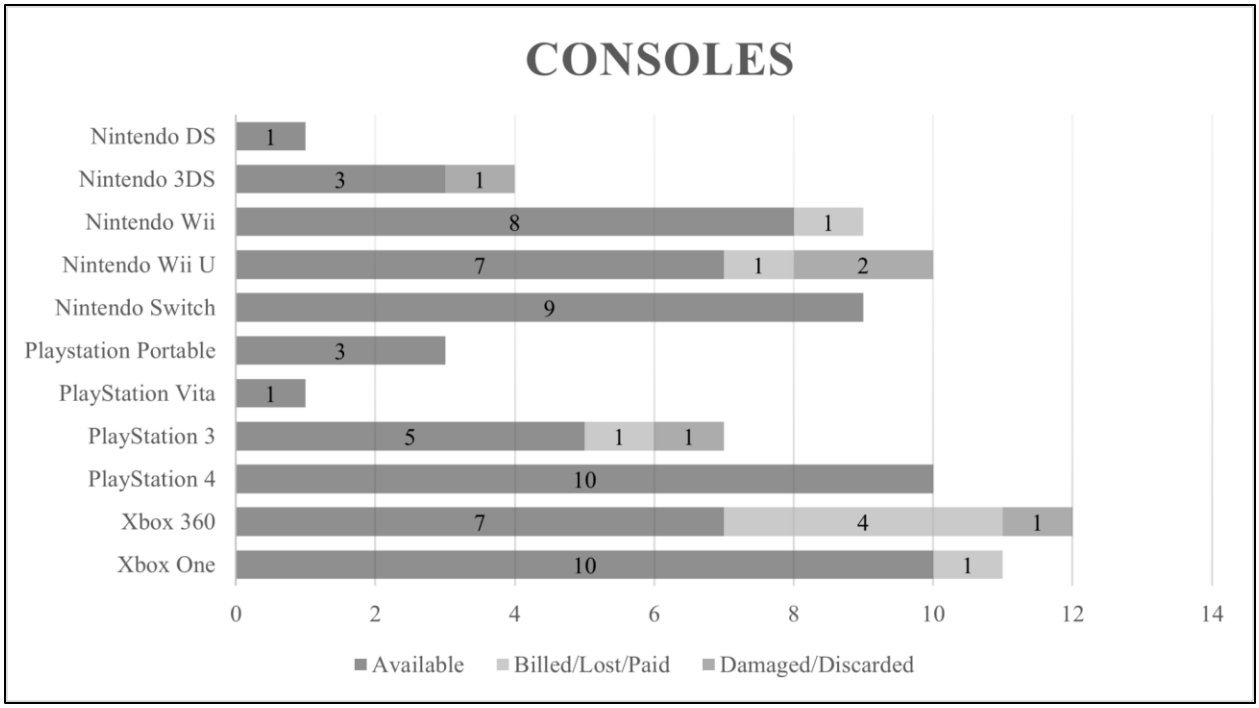

Figure 1

Cumulative total for consoles from 2010–2022 (available, billed/lost/paid, damaged/discarded). There is a slight degree of uncertainty in data related to the difference in notes added to the bibliographic records related to loss and damage.

Table 1
Median Values and Statistics for Consoles (2010–2022)

Consoles							
	Median Lifespan/ Years	Median Circulation	Oldest Console/ Years	Highest Circulation	Loss	Damage	Total Consoles
Nintendo							
3DS	3	78	6	184	0	1	4
DS	10	237	10	237	0	0	2
Switch	3	59	4	576	0	0	9
Wii	4	46	11	230	1	0	9
Wii U	4	24	7	223	1	2	10
PlayStation							
PlayStation Vita	6	101	6	101	0	0	1
PlayStation Portable	6	43	9	122	0	0	3
PlayStation 3	6	233	11	364	1	1	7
PlayStation 4	5	45	6	293	0	0	10
Xbox							
Xbox 360	3	61	10	305	4	1	12
Xbox One	6	162	6	278	1	0	11

A closer look at the data for circulating consoles, as illustrated in Table 1, shows how durable some systems have been over this time period, with some consoles circulating hundreds of times outside the library. Game console system durability exceeded early expectations. The median age of the circulating console collection is five years. This median age reflects the addition of newer generations of consoles, but also new-to-the-library older consoles. The median circulation total across the circulating console collection is 61.

Console system cases have been sturdy with little actual physical breakage. Most of the items discarded as damaged had software or system failures.

Game Controllers

Game controllers are also more durable than first predicted, with a breakage rate of 14% and a loss rate of 5%, as illustrated in Figure 2. These data are skewed because four off-brand GameCube controllers, which were purchased when budgets were tight, broke almost immediately. The library has learned that breakage is often very early in the controller's life and paying the price up front for a name-brand controller is the best option for longevity.

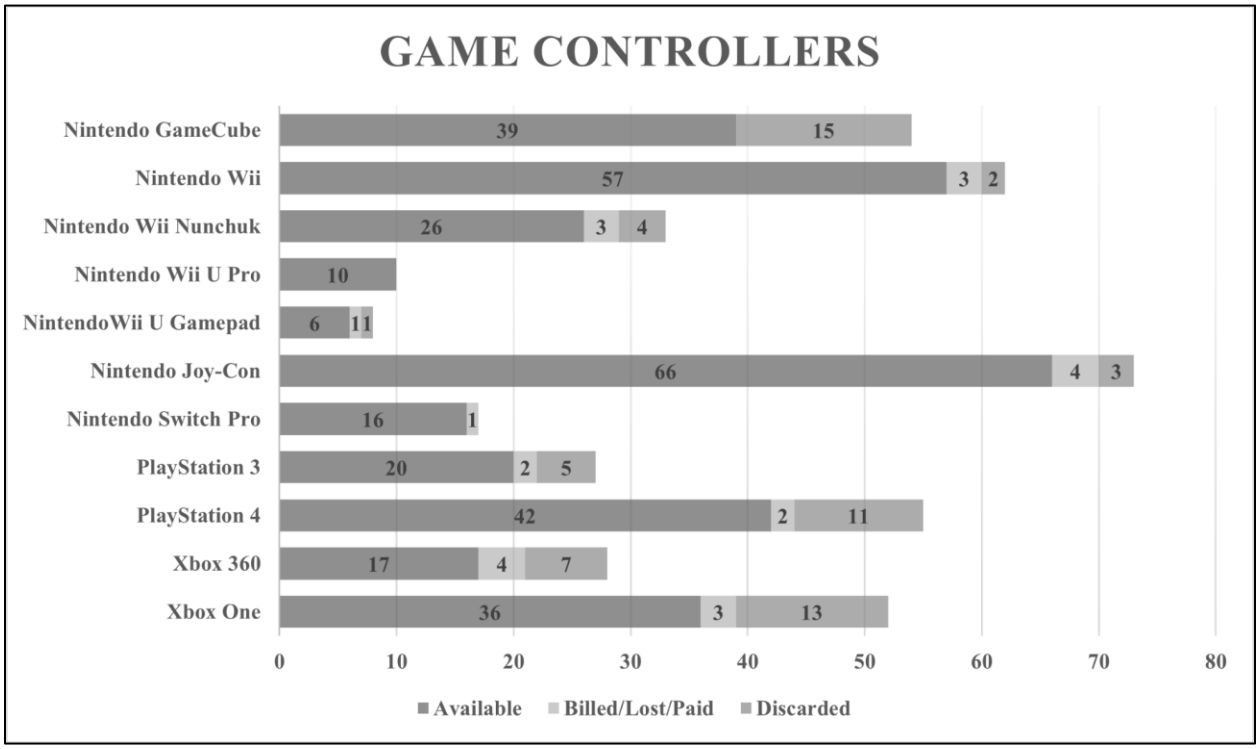

Figure 2
Cumulative total for controllers from 2010–2022 (available, billed/lost/paid, damaged/discarded). There is a slight degree of uncertainty in data related to the difference in notes added to the bibliographic records related to loss and damage.

Each console circulates with two game controllers in the console bag. Additional controllers are available in their own bags. A closer look at circulating controllers and video game peripherals, as illustrated in Table 2, shows how durable some of these items have been with several controllers circulating over 1,000 times. Damage is higher for modern controllers, specifically the Joy-Con, PS4, and Xbox One.

Table 2
Median Values and Statistics for Controllers (2010–2022)

Game Controllers							
	Median Lifespan/ Years	Median Circulation	Oldest	Highest Circulation	Loss	Damage	Total Controllers
Nintendo							
GameCube	3	225	9	1,030	0	15	54
Wii	4	129	12	1,148	3	2	62
Wii Nunchuk	6	70	11	267	3	4	33
Wii U Pro	4	140	4	205	0	0	10
Wii U Gamepad	5	394	7	963	1	1	8
Joy-Con	1	13	4	248	4	3	73
Switch Pro	1	7	3	211	1	0	17
PlayStation							
PlayStation 3	6	77	11	1,130	2	5	27
PlayStation 4	4	177	6	580	2	11	55
Xbox							
Xbox 360	6	183	11	1,232	4	7	28
Xbox One	4	110	6	329	2	11	52

Peripherals

The library also circulates peripherals. Most of the peripherals listed in Table 3 circulate inside and outside of the library. Virtual reality headsets are in-house checkouts for use within the library. The Guitar Hero and Rockband sets and their accessories were the one peripheral type pulled from circulation outside of the library because of damage. These sets are still used during special events but are no longer available for regular use.

Table 3
Median Values and Statistics for Video Game Peripherals (2010–2022)

Video Game Peripherals						
	Median Lifespan/ Years	Median Circulation	Oldest	Highest Circulation	Loss	Damage
Peripherals						
Wii Wheel	11	65	11	77	0	0
Wii Perfect Shot	5	1	6	2	0	0
Wii Balance Board	6	32	9	59	0	0
Wii Dance Pad	9	36	11	55	0	0
Nintendo Zapper	3	5	3	7	0	0
Switch Ring Fit	1	4	1	4	0	0
PS3 Move camera	10	29	10	57	0	0
PS4 VR headset	4	151	4	249	0	0
HTC Vive Pro	4	290	4	290	0	0
PS3 Rockband	7	59	7	65	0	1
PS3 Guitar Hero	7	10	7	32	0	0
Xbox 360 Guitar Hero	8	13	8	45	0	1
Xbox 360 Rockband	8	13	8	13	0	1
Wii Guitar Hero	1	14	1	14	0	1

Legacy Equipment

One way that the library has ensured equipment is available for older content is by developing a Legacy Collection. Over the past 4 years this collection has been curated to support research and instruction as shown in Table 4. In the future when production of a console system ceases, two copies will be pulled from circulation and added to the Legacy Collection, which is housed in media cabinets. Consoles are also purchased to supplement this collection to support play of historical formats.

Table 4
List of Legacy Consoles

Atari 2600	Sony PlayStation 2
Sega Master System	Nintendo GameCube
Nintendo Entertainment System	Microsoft Xbox
Sega Genesis	Sony PlayStation 3
Super Nintendo Entertainment System	Microsoft Xbox 360
Sega Saturn	Nintendo Wii
Sony PlayStation	Nintendo Wii U
Nintendo 64	Sony PlayStation 4
Sega Dreamcast	Microsoft Xbox One

Consoles in the Legacy Collection do not circulate outside of the library. Therefore, when circulating items enter this collection, the metrics for durability change. Once an item makes it into this collection, circulation count is no longer a metric for determining usage. Usage is determined by tracking class attendance for those using the collections to supplement coursework and individual research reservations.

Durability is no longer a leading factor for items in the Legacy Collection. The goal shifts to maintenance to increase longevity. As this collection is only 4 years old, processes and procedures related to its management and maintenance are still evolving. At this time, one console, a Sega Master System, suffered an electronic failure, and another, a Nintendo Entertainment System, no longer produces sound. These failures are a bigger concern for this collection, but time will tell if it is sustainable as an educational resource.

Management and Maintenance

The statistics above show that a game collection can be circulated without unsustainable loss or breakage. One of the biggest hurdles related to beginning this type of collection is overcoming undue fears about equipment loss in relation to other library collections. Developing a management and maintenance plan to mitigate loss and breakage can help positively persuade those making decisions related to these types of collection. Over the past ten years the Media Library has modified its management, cleaning, and maintenance plans to increase the longevity of this collection.

Collection Management

Circulating video game equipment and its peripherals are housed in closed stacks or behind the circulation desk on reserve. All of the equipment in the Media Library is catalogued for an accurate inventory, but not all of it is visible to patrons. Consoles are processed with an item record for each included item (e.g., HDMI cables, power cables, controllers). Equipment is circulated in a barcoded bag. The bag item record is what displays to the patron in the library system and is used to place holds, bookings, and manage the equipment as a whole. Each console circulates with two controllers and batteries. Individual controllers and other game-related peripherals are also available for checkout in their own processed bags.

At checkout, all item barcodes are scanned to the patron's account. At check-in, items are checked in and the service desk staff ensures that equipment is cleaned and organized neatly in the bag. Batteries circulate in their own barcoded box and are removed from controllers and bags at check-in. The Media Library uses rechargeable batteries.

In-house non-circulating equipment and controllers are also catalogued. In-house materials include consoles, controllers, virtual reality devices, and gaming peripherals such as joysticks, steering wheels, and drum kits. In-house items are on reserve behind the front desk. They are checked in and out like outside circulating items but are not bagged.

These in-house items are used in our gaming space. This space includes 10 game stations and 22 gaming PCs. All of these stations are reservable using Springshare's LibCal for up to 4 hours a day. Entire spaces can be reserved by faculty, staff, and student groups for classes and engagement.

Each reservable game station includes at least two cable-locked consoles with access to the internet and online game platforms such as PlayStation Network, Xbox Game Pass, and Nintendo. Internet access is locked to each console's MAC address. Each station includes a high-definition television with a switch selector for input control. Students can play their own digital content or library-owned physical content. Play must be saved to the cloud both to mitigate loss, as anyone can delete content on these stations, and to ease console content space issues. Patrons are allowed to bring in their own consoles, controllers, and peripherals but cannot access the internet through ethernet on all outside devices besides the Switch console.

Cleaning and Maintenance

As the continuous use of gaming equipment grew, so did the need for cleaning and maintenance. Consoles, controllers, peripherals, and headphones are examined at check-in and cleaned. Items are wiped down and any microphone covers are changed out. A deeper clean is done each month. Student staff retrieve each console, wipe it down and check it for damage, and check the circulation bag for damage or debris.

Circulating remotes are deep cleaned. Deep cleaning involves using a soft pick to clean out any dirt in the crevices and a cotton swab to clean around toggles and buttons with an alcohol solution. Any peeling barcodes or labels are replaced at this time. Cables are wiped down and managed with rubber bands.

During the first months of the COVID-19 pandemic, all equipment was quarantined for a 3-day period between checkouts until the library bought a sanitizing light station.

Broken items or devices with software issues are checked out to a *Media Library Problem Items* patron record. Student staff record the problem onto a problem item paper slip, attach the slip to the item, and place it into a tray. Each item is double-checked by student staff for the noted issue and resolved as needed. Problems might include consoles that need formatting or updates, broken cables, controllers that do not respond or have drift, a part that is missing, or an item record issue.

The addition of high-use GameCube controllers led to library repair procedures for controllers. Repairs began simply with new joystick toggle caps but now include replacing joysticks in the Joy-Con to mitigate drift and replacing broken power jacks in handheld consoles. Many of the components in modern consoles are easily replaceable. The library purchases kits and screwdrivers to clean and repair most of our controllers. Select working parts from broken controllers are kept to make other repairs. These parts include the rubber button pads, triggers, toggles, and springs.

Proper maintenance is important. Not only does it help keep equipment clean and working, but it also allows staff to take a closer look at equipment to find problems before they become a bigger issue. Cleaning equipment and performing simple repairs increases the longevity of circulating controllers.

Legacy Collection Maintenance

New equipment in Generation 7 and beyond, such as the Wii, PlayStation 3, and Xbox 360, are maintained like the non-Legacy circulating collections. Older equipment can require more maintenance. Equipment should be cleaned, but consideration should be taken before applying any chemical processes to brighten or renew the look. For example, a console that has changed color because of smoke might look better if restored or whitened but this may make the plastic brittle. A careful review of renewal processes should be done to ensure that it will not decrease lifespan.

Older consoles, and the cartridge games that are played in them, have pins that need care and cleaning. Metal pins corrode over time but are easily cleaned with an alcohol solution and very fine grit sandpaper. The library uses the 1UPcard cleaners on content cartridges and console pins before use. If a warm breath is used to get a cartridge to play, cleaning with a cotton swab and alcohol should be done before storing the item. Although older consoles are very sturdy, maintenance should be done with care.

There are repair kits with more modern boards available for older consoles. Care should be taken when repairing these older items. An old console case with all new parts is more like an emulator than the original device. Emulators mimic a console and can play old content but are generally not using technology specific to the original, so play would differ. Each library's needs can dictate what types of repairs are acceptable for its equipment. If an older console is not something a library wishes to support, there are emulators for purchase that will play most older game cartridges as well as some preloaded with retro games.

Conclusion

This study examined the sustainability of the consoles, controllers, and peripherals in a video game collection in an academic library. Prior to incorporating video games and their associated equipment into the collection, there were concerns that such a collection could pose problems for collection management;

these issues included increased staff procedures needed for circulation, the expense of replacing lost equipment, dealing with damage, and obsolescence. Library staff continue to develop procedures to efficiently manage, clean, and maintain these collections to decrease wear and tear in the hopes that it increases longevity and reduces replacement costs. Over the survey period of 12 years, there was indeed equipment loss and damage; however, the library was still able to meet the needs of students, faculty, and researchers and the cost of replacing or repairing the items was negligible. In conclusion, the researchers believe that including circulating consoles in a video game collection is a valued addition to a library that can supplement programming, boost innovation, and support burgeoning scholarship without being unsustainable.

Author Contributions

Diane Robson: Conceptualization, Data curation, Formal analysis, Visualization, Writing – original draft (lead) **Sarah Bryant:** Data curation, Formal analysis, Visualization, Writing – review & editing **Catherine Sassen:** Writing – original draft (supporting), Writing – review & editing

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