Time to Make a Switch?
Consumer Behavior regarding Physical versus Digital Video Game Distribution

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ABSTRACT

The two different distribution methods for video games can affect the overall environmental impact of the video game industry, whether it be through electronic waste or downloading costs. Thus, understanding how consumers select a method and how the products are used would help determine the current state of the waste generated. Using a survey, I found that there was no clear preference for either distribution method out of 37 respondents. There were some differences in purchasing considerations for physical and digital copies, specifically convenience and secondhand considerations. The most common important consideration for purchases was price, followed by ownership and convenience. Participation within the secondhand market for video games was low, and most people chose to keep their products or give them away before considering selling. Garbage disposal and recycling programs were not utilized at all for video games. Secondary purchases such as gaming peripherals and merchandise followed similar trends in disposal methods, and a lack of digital storage space was a common concern. Most people began playing around the same age and were currently at the same age, making no significant impact ($p = 0.440$). Neither did habit nor competitiveness. Nintendo was the most common gaming platform out of the 30 respondents (90%), with PC gaming being the next most common platform (83%). There is support for having both distribution methods for video games, though digital games are rapidly rising in popularity. Consequently, more research into the environmental impact of digital copies is needed.

KEYWORDS

digital storage space, e-waste, e-waste disposal methods, Nintendo, survey

INTRODUCTION

Electronic waste, shortened as e-waste, is a rapidly expanding problem that is concurrent with the rapid development of technology. Also known as waste electrical and electronic equipment, e-waste is one of the fastest growing streams of waste and has global extent (Reddy 2016). Beyond simply a problem of storage, e-waste can result in widespread, lasting pollution through heavy metal toxicity that can have serious consequences on public health when discarded in the environment (Dimitrakakis et al. 2009). Besides issues regarding the excessive amounts of e-waste generated, the current practices of e-waste management is known for a substantial amount of improper disposal that results in persistent toxic leaching within the surrounding environment and a loss of valuable resources (Ahirwar and Tripathi 2021). Consumer behavior plays an important role as to when and how an electronic becomes e-waste through factors such as consumption, storage, and disposal (Islam et al. 2021). Preventing the further generation of e-waste generation is an important component towards proper management, though this often conflicts with the general goals of most electronics industries.

The video game industry contributes heavily towards the problem of e-waste, being an example of how electronics companies encourage and produce planned obsolescence where products become 'outdated' in hopes of encouraging consumers to buy newer versions. The industry is known to generate vast amounts of products through the consoles, accessories, and video games that generate massive amounts of plastic and disc waste (Wibowo et al. 2019). The industry experiences rapid growth, often leading to hardware obsolescence as different companies try to create the next best-selling hit (Moore 2009). However, the creation of new video games can conflict with the inherent value that older video games retain as viable products, meaning that demand can exist regardless of age (Kretschmer and Claussen 2016). The lack of diminished value with age combined with how many gamers will attempt to prolong their consumption of owned video games shows the longevity of video games as a product (Moore 2009). Thus, as the video game industry remains a large contributor to e-waste, there must be efforts to mitigate the harm generated within the industry itself.

The advent of digital distribution combined with traditional physical distribution for video games provides different costs and benefits for the environment and consumers alike. For physical video games, the benefits lie within the extant product. Physical copies allow people to lend, give

away, or even collect video games. Additionally, consumers can even re-sell their products rather than dispose of it as e-waste because of the strong secondhand market for video games (Kim et al. 2021). Producing physical copies still results in the generation of e-waste and transport costs (Moore 2009). These costs are avoided when purchasing digital copies because the consumer merely downloads the video game before playing. However, this is not devoid of environmental costs such as energy consumption resulting from downloading video games (Wibowo et al. 2019). Finally, digital copies cannot be easily shared and cannot be resold, reducing the consumer benefit that physical copies represent in secondhand markets (Moore 2009). Though the physical versus digital distribution for video games provides consumers with different costs and benefits, the overall effect on environmental consequences is largely unknown.

Consequently, the central question of this paper is: How does physical distribution and digital distribution influence purchasing behavior in the video game industry? To answer this, I ask: (1) What factors contribute to the final purchasing decision between physical or digital copies? I hypothesize that there are specific but different reasons that compel a person to buy either a physical or digital copy of a video game, including categories such as monetary or convenience. Thus, data must be collected on how consumers rank the importance of different reasons in addition to their preference of either digital or physical copies. Next, I ask: (2) What factors of video games post-production can influence the overall purchasing behavior? Beyond the production of a video game, I expect that physical video games may reduce the overall environmental impact due to the presence of secondhand markets, collectability, and replayability. Finally, I ask: (3) To what extent does history or habit have an effect on how people make their final purchasing decision? People with established behaviors regarding video games may have ingrained preferences when it comes to purchases and might be difficult to change in terms of purchasing preference. Ergo, I expect that data on how much people identify as gamers and their history with video games alongside their final purchasing decisions must be gathered to find if a relationship exists. Combining the answers found to these questions will hopefully provide more explanation on how decisions between physical versus digital distribution methods are made.

RESEARCH FRAMEWORK

Environmental impact of video games

The distribution method of video games affects the environmental impact despite the identical end products given to consumers. Physical video games consist of the video game itself stored within a CD or game cartridge that is delivered within a jewel case with labels and associated packaging (Nintendo Worker, personal communication). After this physical product is created, the video games must then be transported from the manufacturing facilities to retailers. Digital copies of video games consist of merely the game file and can be downloaded directly onto the system, avoiding both the generation of the physical product and the transport costs (Moore 2009). However, digital copies are not devoid of environmental costs such as the increased energy consumption associated with downloading large files (Wibowo et al. 2019). This could become problematic as video games begin to bloat in file size, with many newer releases having inflated file sizes that require hours to download. The game console stores the downloaded digital copies within the disk space. When disk space runs out, the purchase of additional hardware such as SD cards can increase available storage when inserted into the back of the device (Nintendo of Europe 2024). Thus, both physical video games and digital video games share an environmental cost of physical storage for games in varying amounts, though physical video games have additional packaging and transport costs as opposed to the energy burden required to transmit digital video games. Due to the environmental costs associated with each distribution method, the industry is concerned over how consumer behavior decides which version to purchase and the overall effect on profits.

Consumer behavior: secondhand markets and collecting behavior

Consumer behaviors such as the existence of secondhand markets and collection behavior could explain the benefits of corporations continuing to provide both physical and digital distribution methods for consumers despite the uneven environmental costs. The secondhand market for video games is strong and encourages the resale of video games rather than disposing it as e-waste (Kim et al. 2021). Though many industries discourage secondhand markets, plenty of research shows that reselling provides benefits for companies and consumers as it preserves the value of older games and thus older consoles (Kim et al. 2021). The preserved value allows for consumers to circulate the goods on secondhand markets and share social welfare while allowing companies to reap benefits derived from nostalgia-based products. However, the allowance of a

secondhand video game market is limited to physical copies as companies often prevent the lending or resale of digital copies, reducing the consumer benefit for digital copies (Moore 2009). The presence of secondhand markets additionally allow older video games and consoles to retain a level of monetary value due to each game containing implicit value, such as the idea of "superstar" games that could strongly influence purchases (Allen et al. 2022) . For example, the backwards compatibility that video games provide allows older video games to maintain demand even for newer systems (Kretschmer and Claussen 2016). Many people do consider resale value when purchasing physical video games (Ishihara and Ching 2019). The secondhand market is not the singular benefit from purchasing physical copies as the accompanying packaging can be collected and displayed. For example, companies can utilize "limited special editions" to create incentives for consumers to purchase (Tena-Monferrer and Fandos-Roig 2022). Since there are multiple reasons as to why people would make a specific video game purchase, many factors can contribute to purchasing decisions.

Consumer behavior: history and appeal of brands

The background of consumers within the gaming industry can influence purchasing decisions, such as an individual's history of gaming and the strength of brands. A person's typical habits can play a large role in purchasing decisions, especially if a person has a long history with a specific version of products. There are several leading brands within the gaming industry that have their own share of loyal users, with one such company being Nintendo (Lin et al. 2022). Nintendo has many best-sellers that are exclusive to their consoles alone and has historically used the physical distribution method for video games (Tena-Monferrer and Fandos-Roig 2022). Nintendo has increased their user base beyond historical players through their expanded digital distribution methods, encouraged by events such as the COVID-19 pandemic during 2020 attracting new players that bought digital copies (Zhu 2021). Though this increase in digital sales could be attributed to the pandemic preventing people from leaving the house in order to purchase digital copies, the franchises that Nintendo owns such as *Animal Crossing: New Horizons* held a broad, social appeal that could not be understated during an isolating time (Zhu 2021). This is one such example of a 'superstar' game that could induce consumers to adopt Nintendo as a platform as they "bought a Nintendo Switch console to gain access to it, [meaning that] the consumers likely bought other Switch games" (Allen et al. 2022) Therefore, having a strong brand can inspire loyalty

within customers and even attract new consumers, meaning that old brands such as Nintendo can have heavy influence in what people to choose to purchase.

Background

History of Nintendo

One of the biggest gaming companies worldwide and being a mainstay in households for decades, the video game company of Nintendo is the main focus of my study. Manufacturing games in Japan since 1963, Nintendo has created many video game franchises that are household names worldwide (Nintendo of Europe 2016). As a gaming company, Nintendo has developed a strong reputation for being family-friendly and accessible, providing plenty of parental support through tools such as parental controls (Play Nintendo 2022). With a long history of wide-appealing video games, Nintendo has achieved strong name recognition as even people unacquainted with gaming in general would be able to recognize Nintendo and several of their brands. Nintendo's most recent console, the Nintendo Switch, emphasizes their widespread appeal by providing a handheld mode, allowing owners to bring the console on the go while still being able to play on the console (Lin et al. 2022). As a result, Nintendo is a historic company within the gaming industry that commands a large portion of sales, with games such as *Mario Kart 8 Deluxe* selling 45.33 million cumulative units and *Animal Crossing: New Horizons* selling cumulative sales of 38.64 million units as of the fiscal year of 2022 (Nintendo 2022). Thus, understanding how Nintendo operates is important to know due to their immense influence on the video game industry.

How Nintendo publishes games

As a major video game company, how Nintendo publishes their games will have a large impact on how video games are being bought and sold. Nintendo is known for their physical distribution of video games within boxes, with their current console, the Nintendo Switch, using SSD cards rather than CDs (Nintendo of Europe 2024). Digital distribution is primarily conducted using the Nintendo eShop, with many games being published purely as digital copies without the option of a physical release (Nintendo Worker, personal communication). How many distribution methods a video game uses depends on the developer of the video game, with many independent

developers being limited to the cheaper digital distribution method (Nintendo Worker, personal communication). Stores can carry both distribution methods: physical video games are sold in boxes, and digital video games can appear as digital cards that are redeemable on the Nintendo eShop (Nintendo Worker, personal communication). However, the COVID-19 pandemic led to massive increases within Nintendo's digital sales, especially as physical copies tended to run out due to supply chain issues (Tena-Monferrer and Fandos-Roig 2022). Ergo, the Nintendo Switch is important to understand due to the increase of Nintendo's utilization of digital markets associated with the console.

The Nintendo Switch's demographics

The Nintendo Switch is of particular interest due to its consistent mass-market appeal and being the most digital of all Nintendo consoles to date. The Nintendo Switch has around half of game purchases being digital, most likely due to the COVID-19 pandemic preventing people from obtaining physical releases (Nintendo Worker, personal communication). This increased focus on digital sales can additionally be observed within Nintendo annual reports which note how digital sales are improving, as "sales were strong for Nintendo Switch downloadable versions of packaged software[,] add-on content[, and] download-only titles and sales related to Nintendo Switch Online" (Nintendo 2022). Besides increasing the usage of digital copies, the demographics of the Nintendo Switch are different than prior Nintendo consoles. Typically, Nintendo consoles have a reduction in players among teenagers, but the Nintendo Switch does not follow this trend (Nintendo Worker, personal communication). Besides maintaining teenager player bases, the demographics of the Nintendo Switch has rising female proportions (Nintendo Worker, personal communication). Therefore, the Nintendo Switch has broad, widespread appeal regardless of age or gender. Consequently, the Nintendo Switch represents transforming distribution methods for video games and shifting demographics for the company of Nintendo.

Study population

The population I am focusing on within this study is university students, namely current UC Berkeley students. This cohort of college-aged students has grown up during an era where digital games are becoming more normalized due to digital distribution platforms such as Steam (Moore 2009). Additionally, the current cohort of students have experienced the COVID-19

pandemic, likely affecting their attitude on digital purchases (Nintendo Worker, personal communication). Thus, the age of current UC Berkeley students would allow for unique opinions on video game distribution methods. Thus, using UC Berkeley students as a study population would hopefully lead to interesting perspectives on video game distribution methods from people with gaming experience.

METHODS

Study context

In order to study the sample population of UC Berkeley students who own or have easy access to a Nintendo Switch, I used Discord as the sole platform for getting respondents. As "an online text/voice chat system gamers use", Discord connected to a population of gamers within UC Berkeley, including the official esports program (Cal Esports 2024). Additionally, there were multiple campus-affiliated Discord servers outside of esports, as UC Berkeley had an associated Discord server for students to join and a hub of associated student servers (Berkeley Life 2024). Many of these associated servers centered on video games, so I sent my survey to the following servers: The UC Berkeley Official Server, Berkeley STEM, Berkeley CNR, Data Science Hub, Game Design and Development at Berkeley, Cal Animage Alpha, Digital Illustration and Concept Art at Berkeley, and Outlet.

Survey instrument

In order to gather data, I used a survey to gather information on physical versus digital purchasing preferences, purchasing priorities, secondhand market and secondary market interactions, and gaming habits and background. I hosted the survey on both Google Forms and Qualtrics. The questions were primarily multiple choice and Likert Scale response questions, with two ranking questions and optional free response for all questions. Respondents could skip all questions.

I sent the survey to all aforementioned Discord servers on March 6, 2024. In order to incentivize answers, all respondents could enter a raffle for a digital $50 gift card. The survey

ended on April 6, 2024. I received 37 responses: 13 people filled the survey out to completion and 24 partially filled out the survey to varying degrees. I compiled the results from both platforms using Excel and then exported the results to Google Sheets. I used Google Sheets for quick exploratory data analysis and created the tables. I exported the data into RStudio to perform statistical tests and to create graphs using the ggplot2 package.

RESULTS

Physical versus digital preference

There was no overt preference in terms of distribution methods, though a preference was common (Table 1). 25 people further elaborated on their preferences, and most people described feelings regarding both distribution methods within their answers regardless of overall preference (Table 2).

Table 1. Video game distribution preferences.

Preference	Count
Physical Copies	13
Digital Copies	14
No Preference	9

Table 2. Common themes within video game distribution preferences.

Distribution	Common Themes
Physical Copies	Permanent access (digital ownership concerns), collection, lending, low digital storage space
Digital Copies	Ease of purchase and access, physical burden (must carry, can lose), lower price

Purchasing priorities

I received 33 rankings of video game purchasing priorities. Each participant had roughly similar priorities when purchasing either a physical or digital video game (Table 3). The most common considerations when purchasing were monetary reasons such as price and convenience. Physical purchases overall ranked price the highest, whereas digital purchases favored convenience instead (Table 3). Secondhand considerations, environmental concern, and collectability were the least considered priorities when purchasing video games (Table 3). I conducted paired Wilcoxon signed-rank tests to determine whether the mean rank of purchasing considerations differed based on the distribution method. I found that there were significant differences in rank ($p < 0.05$) between physical purchases and digital purchases in the convenience category and secondhand considerations category, and convenience was barely insignificant (Table 4).

Table 3. Mean ranking of purchasing considerations for each distribution method. Each respondent was asked to rank purchases on a rating scale of Most Important (1) to Least Important (7). Though ranking all considerations was not required, repeating ratings was not allowed. Mean ranking was rounded to three decimal places.

Purchasing consideration	Physical purchases	Digital purchases	Overall purchases
Monetary	2.645	2.1	2.373
Convenience	3.433	2	2.705
Ownership	3.6	4.345	3.972
Secondhand Considerations	4.267	5.733	5.012
Habit	3.844	3.857	3.850
Environmental Concern	5	4.4	4.7
Collectability	4.688	5.310	4.989

Table 4. Paired Wilcoxon signed-rank test for mean purchasing consideration rank between physical and digital purchases. P-value was rounded to three places.

Purchasing Consideration	Wilcoxon signed-rank test (p-value)
Monetary	0.133
Convenience	0.001

Ownership	0.051
Secondhand Considerations	0.004
Habit	0.836
Environmental Concern	0.119
Collectability	0.18

I received 13 elaborations on purchasing priorities for both distribution methods, and these reinforced the explanations described in Table 2. However, I found that responses mentioning environmental concerns were interesting due to people either mentioning not thinking about the implications at all or specifically stating that they choose to purchase digital copies to avoid environmental costs.

Secondhand market and secondary market interactions

The most popular disposal method was keeping video games, and giving away video games to known individuals was more popular than participating in secondhand markets (Table 5). Notably, no person participated in recycling programs or threw away video games (Table 5). These trends were additionally applicable to both video game peripherals and merchandise, though throwing away and using recycling programs did receive responses (Table 5).

Table 5. Disposal Methods for Video Games.

Disposal Method	Video Games	Video Game Peripherals	Merchandise
I don't/keep them	24	21	22
I sell them	8	3	6
I give them away to known people	11	7	5
I donate them	6	4	7
Recycling Programs	0	1	1
Throw Away	0	1	1
Total Respondents	30	29	29

I received 18 text responses regarding whether a person identified as a collector of video games, and I found that all responses refused the label due to only owning games in order to play them. Regarding digital storage space, more people were likely to have digital storage space as a concern when purchasing video games (Table 6). Additionally, running out of digital storage space and needing to delete games was frequent (Table 6). The 12 comments on digital storage space contained common themes regarding the necessity of extra storage and how prevalent the issue is with digital copies.

Table 6. Digital storage space concerns and limits. Respondents were presented the following statements and asked their level of agreement.

Statement	Strongly Agree	Agree	Slightly Agree	Neither Agree nor Disagree	Slightly Disagree	Disagree	Strongly Disagree	Total
Digital storage space is a concern I have when purchasing games.	5	9	3	2	3	3	2	27
I have ran out of digital storage space and have needed to delete games.	8	8	5	1	0	3	1	26

Gaming background

17 out of 30 respondents considered themselves gamers, and there was no effect on purchasing preference. In terms of age, most of my 27 respondents were between the ages of 19 and 23, with only a few outliers (Figure 1). The age range at which people began playing games was around 6 to 8, though those who preferred physical copies generally tended to have started playing earlier (Figure 2). However, I conducted a Wilcoxon rank sum test on preference and the age that people began playing video games that showed that this difference was not significant (p

= 0.440). I conducted Fisher's exact test of independence on preferring either physical or digital distribution methods and gaming habit, which resulted in no significance (p = 0.901) (Table 7).

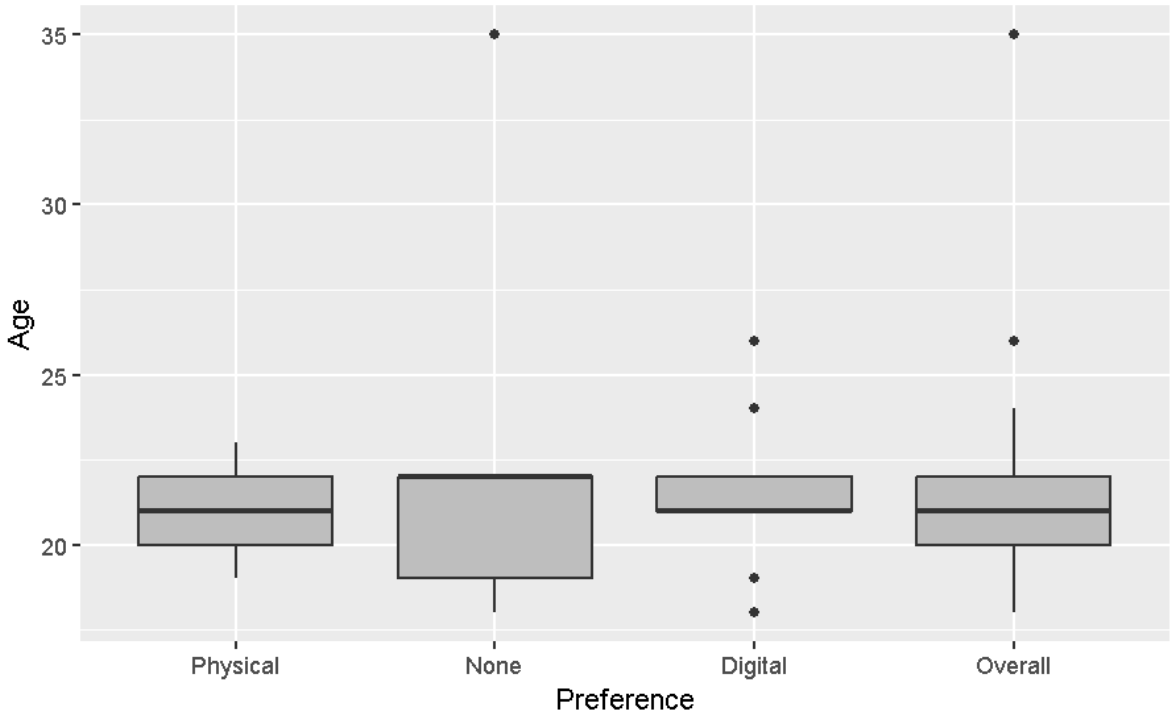

Figure 1. Age of respondents according to purchasing preferences.

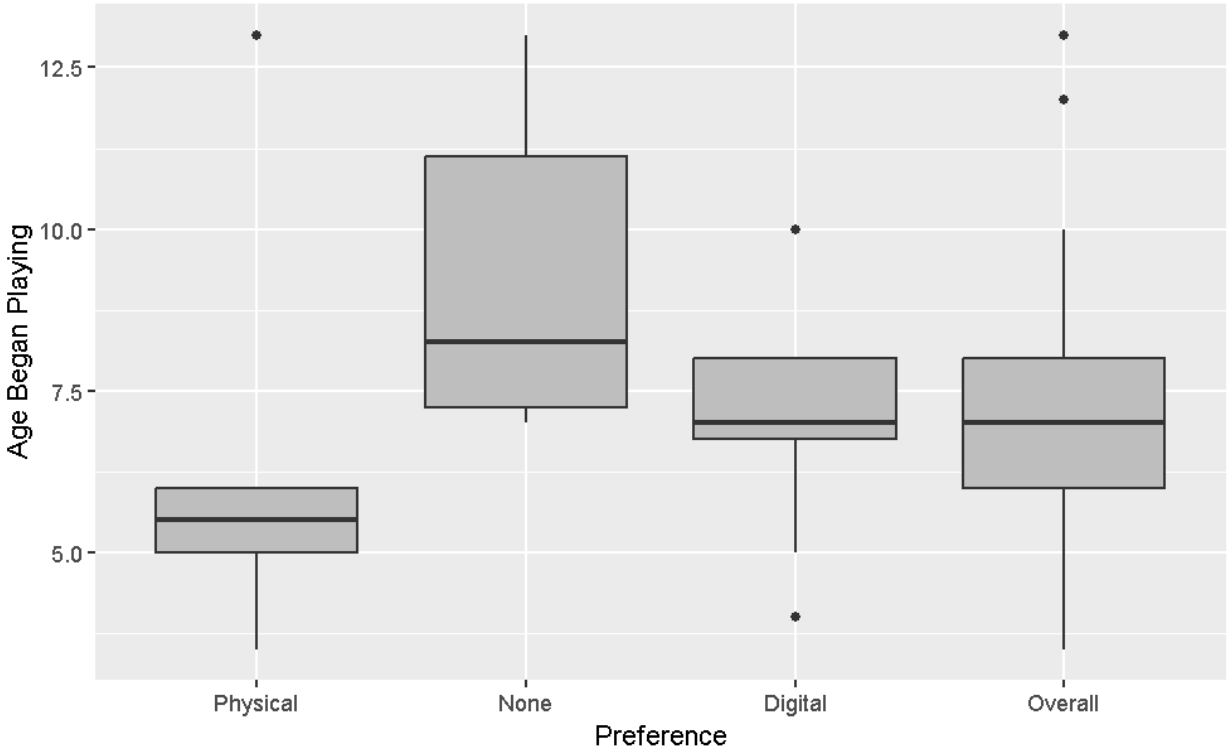

Figure 2. Age at which respondents began playing video games according to purchasing preferences.

Table 7. Gaming habits sorted by preference.

Preference	Daily	Weekly	Monthly	A few times a month	A few times a year	Total
Physical Copies	4	3	1	4	0	12
Digital Copies	3	5	1	3	1	13
No preference	2	1	0	1	1	1

Nintendo was the most common gaming platform out of the 30 respondents (90%), with PC gaming being the next most common platform (83%) (Table 8). Mobile gaming is additionally becoming a popular platform as well (70%) (Table 8).

Table 8. Total users for each gaming platform. The question allowed multiple selections. 30 people in total placed at least one response.

Platform	**Players**
Nintendo	27
Playstation	9
XBox	5
Steam	10
PC	25
Mobile	21

DISCUSSION

Physical and digital distribution methods within the video game industry do have influence on purchasing behavior. Purchasing priorities were more varied within physical copies but focused primarily on convenience for digital copies. Price and ownership were overall the most important concerns for both distribution methods. Secondhand and secondary markets for video games had little impact on purchasing decisions, but digital storage space is a known concern. Additionally, habit and history have no relationship with purchasing preference. Nintendo remains a popular console choice, however it is closely followed by two entirely digital platforms, PC and mobile games. Overall, the preferences for either platform and levels of ownership are slightly biased towards digital copies, but there are several concerns that prevent it from becoming the sole choice.

Purchasing priorities

Factors that contribute to the final purchasing decision between physical or digital copies only slightly differed when concerned with either physical or digital purchases, with price being a shared important factor between the two. With "the numerous sales provided by digital distribution platforms", there is no wonder that there are inclinations towards digital purchases (Johnson and Luo 2019). The lack of sales available for physical games represents a more active form of costs beyond the environmental costs that people can often ignore. Thus, price can serve as a strong incentive for consumers to choose digital copies. Ownership was a key secondary concern for physical purchases, with physical copies feeling more secure unlike digital copies. The presence of digital rights management means that buying digital copies could prevent outright owning the

game (Moore 2009). Therefore, it is apparent that true ownership is a key barrier to people purchasing digital copies, though this problem is related to digital rights management in general. This fear of losing access to digital copies extended to older Nintendo consoles such as the WiiU and Nintendo 3DS due to shop closures, though this similarly is related to operational costs of maintaining digital stores (Nintendo Worker, personal communication). Regarding digital copies, convenience was the most important consideration for digital, whether it be regarding easily accessing the games or easily purchasing the game. Digital copies are far easier to purchase as going to the store is no longer required and consumers can instead safely download from the comfort of their homes (Zhu 2021). This priority demonstrates that many consumers are inclined to digital distribution due the mere convenience of owning a digital copy, following the globalizing trend of digitization of products such as watching movies through subscription models rather than using CDs. Therefore, being easily able to access video games is important to ultimately buying a game. However, the concept of ownership was not limited to favoring physical copies. The hardware obsolescence that video games utilize can often lead to degradation of the games themselves in addition to the hardware used to play them (Moore 2009). Therefore, ownership of the products is important to guarantee, making both physical and digital copies flawed and in need of improvement: physical games can physically wear down and get corrupted, whereas digital rights management and store shutdowns can prevent access to digital games.

In terms of both distribution methods having flaws, the existence of both distribution methods is justified due to the lack of consensus on distribution preferences. Despite the support for physical copies, there was surprisingly little consideration of secondhand markets among physical purchases despite the popularity of secondhand game markets (Kim et al. 2021). The environment additionally was a factor unlike I predicted, with there being some people who explicitly stated it as a concern encouraging them to purchase digital copies. As digital copies are not subject to manufacturing and transportation costs, many people perceived it as more environmentally friendly (Moore 2009). However, the environmental consequences of digital games are often hidden within the costs of digitization such as downloading and large file sizes (Wibowo et al. 2019). Another extension relating to unseen environmental costs would be the increasing incorporation of non-fungible tokens into specific video games, which are known to "consume considerable power" (Fowler and Pirker 2021). Though most companies have not inserted blockchain technologies into their games, there would be massive consequences in energy

use and emissions if this trend were to extend, though thankfully this use is often made explicit so far. Ergo, purchasing digital copies may have lower explicit environmental costs than physical copies but there can potentially be great costs in energy consumption.

Secondhand markets and secondary market interactions

Beyond the initial production of video games, factors such as secondhand markets and secondary purchases have a little influence on purchasing behavior. The spread of digital distribution may relate to this, as switching entirely to digital distribution would "shut down the used video game market" (Ishihara and Ching 2019). Besides preventing used games from being created, digital distribution platforms are known for having frequent discounts and sales (Johnson and Luo 2019). Thus, digital distribution has effectively overrode the previous niche that secondhand video game markets had of allowing cheaper video game acquisitions. Secondhand video games may even be more expensive than necessary due to in-demand games being out of production, further decreasing participation within these markets because of inflated prices. However, the lack of secondhand sales is not an indication of video games lacking perceived value; respondents preferred keeping their games rather than selling them due to seeing value. This desire to keep games is supported by giving away games to family and friends being the second most popular disposal method, as maintaining those relationships would preserve access to the games being shared in turn. However, throwing away video games did not happen, showing that physical copies are not entirely waste products ending up in the landfill. In addition to secondhand markets, secondary purchases such as peripherals and merchandise had no clear pattern in regards to distribution preferences, meaning that collecting games does not extend to the secondary market. Unlike secondhand markets, digital storage space was noted to be a concern with digital copies, leading to the necessity to either buy more digital storage space or delete games. Some people preferred buying a physical copy to reduce this burden. The growing file sizes of video games is seen in both the newest releases and the additional files necessary for localizing a video game (Wibowo et al. 2019). Downloading video games requires energy costs, leading to environmental consequences (Buonocore 2016). Limited digital storage space restrains consumers from freely purchasing digital copies and could lead to multiplied energy costs as people subsequently uninstall and reinstall digital copies. Therefore, the growing popularity of digital distribution has

superseded the secondhand game market for physical copies, but the dangers of digital game sizes and storage requirements are becoming more apparent.

Gaming background

History had an insignificant effect on how people made purchasing decisions, though there was a slight inclination towards physical copies the earlier a person began playing video games. Of the gaming platforms I offered as a choice, Nintendo was the most selected, and Nintendo Switch ownership was common. As Nintendo is one of the oldest companies with universal appeal, this result is not surprising (Nintendo of Europe 2024). Having a variety of franchises and a long history of consoles means that some familiarity with Nintendo would be expected. More notable is how the PC was the second most popular platform, with mobile games slightly behind. PC platforms such as Steam have been expanding in user bases, supporting the growing popularity and demand for digital games (Moore 2009). The increased popularity of purely digital platforms such as PC and mobile devices reinforces the aforementioned problems relating to digital storage space. Besides the growing popularity of digital distribution platforms, the idea of collecting video games was not as popular, and for some people this was tied into being labeled as a gamer. Most people mentioned buying only games they were interested in, supporting how specific games can serve as important motivators (Kretschmer and Claussen 2016). As people were only attached to a few genres of games, they were reluctant to spend money on games they knew they would not be able to purchase. This defies the concept of "backlog purchasing," where people buy games they are unlikely to ever play when discounts are available (Johnson and Luo 2019). Playing and enjoying the games bought was far more important than trying out new ones, ensuring that consumers gain the most value for their purchases. Prior enjoyment of games means that games with franchises or famous companies would receive more purchases such as Nintendo, reinforcing their influence on purchasing behavior. Additionally, this focus on enjoying a bought product is supported by digital distribution allowing for downloadable game demos, though this continues the problem of growing energy costs relating to downloads. Thus, though gaming background often has no overt impact on purchasing preferences, popular platforms have increased influence over consumers and those exclusively digital are becoming widespread.

Limitations and future directions

Limitations involved with my study primarily involved my survey methods. I distributed my survey among UC Berkeley students, and it was limited to Discord, a social media platform designed for interactions regarding digital games, possibly biasing results towards digital distribution. Though I chose to focus on college students because they experienced the expansion of digital distribution when young and before opinions could solidify, the results overwhelmingly focused on price being a barrier to purchasing games. Thus, having responses from slightly older demographics with more money available would hopefully provide more insight into purchasing considerations because price would be less relevant. Additionally, the longer length of my survey could have served as a deterrent for more people to complete fully, seeing as the amount of responses I received varied depending on the question and where within the survey it was located. Overall, I think that an improved survey and wider distribution network could have led to more insights.

Future directions would be to expand the collection of consumer data relating to video games and to expand research on digital distribution methods. Introducing the survey to a broader audience would provide more insight, especially as the label of gamer was ambiguous for many of my respondents. Removing the barrier of respondents being gamers to people who have played at least one game would possibly encourage more insight, especially as people can pick up games such as *Animal Crossing: New Horizons* without prior gaming experience at all (Zhu 2021). Besides the expanded survey, the popularity of digital games and the limits of digital storage space were shown to be increasing. There is little research currently existing regarding download costs of digital games, with the single paper I found being written prior to the Nintendo Switch's release (Buonocore 2016). However, it is clear that deleting and re-downloading games due to running out of digital storage space is becoming a notable issue that could lead to inflated energy costs. As a result, more research into the cost of downloading would be necessary to discover the true environmental impact of digital games.

Broader implications

Consequently, the lack of consensus on video game distribution preference signifies that both methods have benefits and consequences. However, the expansion of digital distribution platforms cannot be ignored as more people begin to partake in digital-only platforms. This increase in digital purchases makes the lack of research regarding the environmental impacts more concerning, seeing as there are already complaints regarding large file sizes and decreased digital storage that requires consumers to purchase additional storage hardware. Analyzing how the process of updating and re-downloading games can influence energy costs is necessary to ensure that the environmental costs of digital copies do not exceed the environmental costs of physical copies.

Besides the potential expansion of environmental costs for digital copies, understanding the reasons for choosing to purchase or not purchase specific distribution methods in determining how games are purchased in the future. Companies can gain insight on how to increase purchases by avoiding what people dislike or improving what consumers like. Public outcry could hopefully lead to beneficial changes within the industry as well, whether it be through policy or compelling companies. Overall, understanding consumer preferences and concerns emphasizes and provides avenues for improvement within the gaming industry.

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