

1. INTRODUCTION

Gaming consoles are one of the best digital entertainment media now available. Gaming consoles were designed for the sole purpose of playing electronic games. A gaming console is a highly specialised piece of hardware that has rapidly evolved since its inception incorporating all the latest advancements in processor technology, memory, graphics, and sound among others to give the gamer the ultimate gaming experience.

A console is a command line interface where the personal computer game's settings and variables can be edited while the game is running. But a Gaming Console is an interactive entertainment computer or electronic device that produces a video display signal which can be used with a display device to display a video game. The term "*video game console*" is used to distinguish a machine designed for consumers to buy and use solely for playing video games from a personal computer, which has many other functions, or arcade machines, which are designed for businesses that buy and then charge others to play.

1.1. Why are games so popular?

The answer to this question is to be found in real life. Essentially, most people spend much of their time playing games of some kind or another like making it through traffic lights before they turn red, attempting to catch the train or bus before it leaves, completing the crossword, or answering the questions correctly on Who Wants To Be A Millionaire before the contestants. Office politics forms a continuous, real-life strategy game which many people play, whether they want to or not, with player-definable goals such as "increase salary to next level", "become the boss", "score points off a rival colleague and beat them to that promotion" or "get a better job elsewhere". Gaming philosophers who frequent some of the many game-related online forums periodically compare aspects of gaming to real life-with the key difference being that when "Game Over" is reached in real life, there is no restart option.

2. HISTORY

The origin of video games lies in early cathode ray tube-based missile defense systems in the late 1940s. These programs were later adapted into other simple games during the 1950s. By the late 1950s and through the 1960s, more computer games were developed (mostly on mainframe computers), gradually increasing in sophistication and complexity. Following this period, video games diverged into different platforms: arcade, mainframe, console, personal computer and later handheld games.

The first commercially viable video game was *Computer Space* in 1971, which laid the foundation for a new entertainment industry in the late 1970s within the United States, Japan, and Europe. The first major crash in 1977 occurred when companies were forced to sell their older obsolete systems flooding the market. Six years later a second, greater crash occurred. This crash—brought on largely by a flood of poor quality video games coming to the market—resulted in a total collapse of the console gaming industry in the United States, ultimately shifting dominance of the market from North America to Japan. While the crash killed the console gaming market, the computer gaming market was largely unaffected. Subsequent generations of console video games would continue to be dominated by Japanese corporations. The handheld gaming market has followed a similar path with several unsuccessful attempts made by American companies all of which failed outside some limited successes in the handheld electronic games early on. Currently only Japanese companies have any major successful handheld gaming consoles, although in recent years handheld games have come to devices like cell phones and PDAs as technology continues to converge.

A device called the *Cathode-Ray Tube Amusement Device* was patented in the United States by Thomas T. Goldsmith, Jr. and Estle Ray Mann. The patent was filed on January 25, 1947, and issued on December 14, 1948. It is described using eight vacuum tubes to simulate a missile firing at a target and contains knobs to adjust the curve and speed of the missile. Because computer graphics could not be drawn electronically at the time, small targets were drawn on a simple overlay and placed on the screen.

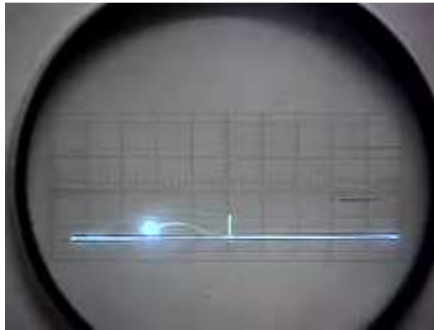


Figure2.1. Tennis for Two

In 1949–1950, Charley Adama created a "Bouncing Ball" program for MIT's Whirlwind computer. While the program was not yet interactive, it was a precursor to games soon to come. In February 1951, Christopher Strachey tried to run a draughts program he had written for the NPL Pilot ACE. The program exceeded the memory capacity of the machine and Strachey recoded his program for a machine at Manchester with a larger memory capacity by October. Also in 1951, while developing television technologies for New York based electronics company Loral, inventor Ralph Baer came up with the idea of using the lights and patterns he used in his work as more than just calibration equipment. He realized that by giving an audience the ability to manipulate what was projected on their television sets, their role changed from passive observing to interactive manipulation. When he took this idea to his supervisor, it was quickly squashed because the company was already behind schedule.

OXO, a graphical version tic-tac-toe, was created by A.S. Douglas in 1952 at the University of Cambridge, in order to demonstrate his thesis on human-computer interaction. It was developed on the EDSAC computer, which uses a cathode ray tube as a visual display to display memory contents. The player competes against the computer. In 1958 William Higinbotham created a game using an oscilloscope and analog computer. Titled *Tennis for Two*, it was used to entertain visitors of the Brookhaven National Laboratory in New York. *Tennis for Two* showed a simplified tennis court from the side, featuring a gravity-controlled ball that needed to be played over the "net," unlike its successor—Pong. The game was played with two box-shaped controllers, both equipped with a knob for trajectory and a button for hitting the ball. *Tennis for Two* was exhibited for two seasons before its dismantlement in 1959.

3. GENERATION

3.1. First Generation Consoles (1972–1977)

The first home 'console' system was developed by Ralph Baer and his associates. Development began in 1966 and a working prototype was completed by 1968 (called the "Brown Box") for demonstration to various potential licensees, including GE, Sylvania, RCA, Philco, and Sears, with Magnavox eventually licensing the technology to produce the world's first home video game console. The system was released in the USA in 1972 by Magnavox, called the Magnavox Odyssey.

The Odyssey used cartridges that mainly consisted of jumpers that enabled/disabled various switches inside the unit, altering the circuit logic (as opposed to later video game systems that used programmable cartridges). This provided the ability to play several different games using the same system, along with plastic sheet overlays taped to the television that added color, play-fields, and various graphics to 'interact' with using the electronic images generated by the system.^[13] A major marketing push, featuring TV ads starring Frank Sinatra, helped Magnavox sell about 100,000 Odysseys that first year.

Philips bought Magnavox and released a different game in Europe using the Odyssey brand in 1974 and an evolved game that Magnavox had been developing for the US market. Over its production span, the Odyssey system achieved sales of 2 million units.

3.2. Second Generation Consoles (1977–1983)

In the earliest consoles, the computer code for one or more games was hardcoded into microchips using discrete logic, and no additional games could ever be added. By the mid-1970s video games were found on cartridges, starting in 1976 with the release of the Fairchild 'Video Entertainment System (VES). Programs were burned onto ROM chips that were mounted inside plastic cartridge casings that could be plugged into slots on the console. When the cartridges were plugged in, the general-purpose microprocessors in the consoles read the cartridge memory and executed whatever program was stored there. Rather than being confined to a small selection of games included in the game system, consumers could now amass libraries of game cartridges. However video game production was still a niche skill. Warren Robinett,

the famous programmer of the game Adventure, spoke on developing games "In those old far-off days, each game for the 2600 was done entirely by one person, the programmer, who conceived the game concept, wrote the program, did the graphics—drawn first on graph paper and converted by hand to hexadecimal—and did the sounds."

3.3. Third Generation Consoles (1983–1995)



Figure3.3.1. the Nintendo Entertainment System or NES.

In 1985, the North American video game console market was revived with Nintendo's release of its 8-bit console, the Famicom, known outside Asia as Nintendo Entertainment System (NES). It was bundled with *Super Mario Bros.* and instantly became a success. The NES dominated the North American and the Japanese market until the rise of the next generation of consoles in the early 1990s. Other markets were not as heavily dominated, allowing other consoles to find an audience like the Sega Master System in Europe, Australia and Brazil (though it was sold in North America as well).

In the new consoles, the gamepad or joy pad, took over joysticks, paddles, and keypads as the default game controller included with the system. The gamepad design of an 8 direction Directional-pad (or D-pad for short) with 2 or more action buttons became the standard.

The *Legend of Zelda* series made its debut in 1986 with *The Legend of Zelda*. In the same year, the *Dragon Quest* series debuted with *Dragon Quest*, and has created a phenomenon in Japanese culture ever since.

4. HARDWARE & SOFTWARE COMPATIBILITY

PlayStation 2 software is distributed on CD-ROM (blue/purple polycarbonate) and DVD-ROM (clear polycarbonate with six "PlayStation" logos). In addition the console can play audio CDs and DVD movies, and is backward compatible with PlayStation games. The PS2 also supports PlayStation memory cards and controllers, although the memory cards only work with PS1 games and the controllers may not support all functions (such as analog buttons) for PS2 games.



Figure4.1. PS2dvd

The PS2's Dual Shock 2 controller is essentially an upgraded PlayStation Dual Shock; analog face, shoulder and D-pad buttons replaced the digital buttons of the original. Like its predecessor, the Dual Shock 2 controller has force feedback, which is commonly called the "vibration" function.



Figure4.2. 8 MB PlayStation 2 memory card

The standard PlayStation2 memory card has an 8MB capacity and uses Sony's Magic Gate encryption. This requirement prevented the production of memory cards by third parties who did not purchase a license for the Magic Gate encryption. Memory cards without encryption can be used to store PlayStation game saves, but PlayStation games would be unable to read from or write to the card- such a card could only be used as a backup. There are a variety of non-Sony manufactured memory cards available for the PlayStation2, allowing for a larger memory capacity than the standard 8MB. However their use is unsupported and compatibility is not guaranteed.

The console also features USB and IEEE 1394 expansion ports. Compatibility with USB and IEEE 1394 devices is dependent on the software supporting the device. For example, the PS2 BIOS will not boot an ISO image from a USB flash drive or operate a USB printer, as the machine's operating system does not include this functionality. By contrast, *Gran Turismo 4* is programmed to save screenshots to a USB mass storage device and print images on certain USB printers. A PlayStation 2 HDD can be installed in an expansion bay on the back of the console, and was required to play certain games, notably the popular *Final Fantasy XI*. This was only available on certain models

5. MEDIA

5.1. Cartridges

Game cartridges consist of a printed circuit board housed inside of a plastic casing, with a connector allowing the device to interface with the console. The circuit board can contain a wide variety of components. All cartridge games contain at the minimum, read only memory with the software written on it. Many cartridges also carry components that increase the original console's power, such as extra RAM or a coprocessor. Components can also be added to extend the original hardware's functionality (such as gyroscopes, rumble packs, tilt-sensors, light sensors, etc.); this is more common on handheld consoles where the user does not interact with the game through a separate video game controller.



Figure5.1.1. Standard game cartridges

Standard game cartridges used for several popular consoles. From front to back: Game Boy Color, Sega Genesis, and Atari 2600. Cartridges were the first external media to be used with home consoles and remained the most common until 1995 continued improvements in capacity (Nintendo 64 being the last mainstream game console to use cartridges). Nevertheless, the relatively high manufacturing costs saw them completely replaced by optical media for home consoles by the early 21st century, although they are still in use in some handheld video game consoles.

Due to the aforementioned capabilities of cartridges such as more memory and coprocessors, those factors make it harder to reverse engineer consoles to be used on emulators.

5.2. Cards

Several consoles such as the Sega Master System and the TurboGrafx-16 have used different types of smart cards as an external medium. These cards function similar to simple cartridges. Information is stored on a chip that is housed in plastic. Cards are more compact and simpler than cartridges, though. This makes them cheaper to produce and smaller, but limits what can be done with them. Cards cannot hold extra components, and common cartridge techniques like bank switching (a technique used to create very large games) were impossible to miniaturize into a card in the late 1980s.

Compact Discs reduced much of the need for cards. Optical Discs can hold more information than cards, and are cheaper to produce. The Nintendo GameCube and the PlayStation 2 use memory cards for storage, but the Nintendo DS is the only modern system to use cards for game distribution. Nintendo has long used cartridges with their Game Boy line of hand held consoles because of their durability, small size, stability (not shaking and vibrating the handheld when it is in use), and low battery consumption. Nintendo switched to cards for the DS, because advances in memory technology made putting extra memory on the cartridge unnecessary.

5.3 Magnetic Media

Home computers have long used magnetic storage devices. Both tape drives and floppy disk drives were common on early microcomputers. Their popularity is in large part because a tape drive or disk drive can write to any material it can read. However, magnetic media is volatile and can be more easily damaged than game cartridges or optical discs.



Figure5.3.1. Two common forms of magnetic media

Among the first consoles to use magnetic media were the Bally Astrocade and APF-M1000, both of which could use cassette tapes through expansions. In Bally's case, this allowed the console to see new game development even after Bally dropped support for it. While magnetic media remained limited in use as a primary form of distribution, two popular subsequent consoles also had expansions available to allow them to use this format. The Star path Supercharger can load Atari 2600 games from audio cassettes; Star path used it to cheaply distribute their own games from 1982 to 1984 and today it is used by many programmers to test, distribute, and play homebrew software. The Family Computer Disk System was released by Nintendo in 1985 for the Japanese market. Nintendo sold the disks cheaply and sold vending machines where customers could have new games written to their disks up to 500 times.

5.4 Optical Media



Figure5.4.1. CD-ROM (left) and optical disc

In the mid-1990s, various manufacturers shifted to optical media, specifically CD-ROM, for games. Although they were slower at loading game data than the cartridges available at that time, they were significantly cheaper to manufacture and had a larger capacity than the existing cartridge technology. Commodore International released the first CD-disc based Amiga CD32 in September 1993, which was also the first 32-bit game console. By the early 21st century, all of the major home consoles used optical media, usually DVD-ROM or similar disks, which are widely replacing CD-ROM for data storage. The PlayStation 3 system uses even higher-capacity Blu-ray optical discs for games and movies while the Xbox 360 formerly used HD DVDs in the form of an external USB player add-on for movies, before it was discontinued.

6. TOP BRANDS

The lists of 8 important brands are mentioned below:

RANK	BRAND	BV 09 (\$m)	BC	BM	BV CHANGE(%)
1.	NINTENDO DS	9,659	2	3	N/A
2.	NINTENDO Wii	8,256	3	5	N/A
3.	MICROSOFT XBOX 2	4,581	3	8	N/A
4.	SONY PLAY STATION 3	341	2	4	N/A
5.	MICROSOFT XBOX	313	1	6	N/A
6.	NINTENDO GAME CUBE	222	1	3	N/A
7.	SONY PSP	144	2	3	N/A
8.	SONY PLAYSTATION 2	119	1	2	N/A

6.1. Nintendo DS



Figure6.1.1. Nintendo DS

The Nintendo DS family of portable game systems revolutionizes handheld game play. With two ultra bright screens, 3D graphics capability, touch-screen technology

and wireless communication, you can challenge yourself or your friends anywhere, anytime. A great library featuring hundreds of games means there's something for everyone. Nintendo DS brings together a host of features to deliver cutting-edge interactive experiences for fans of every genre.

6.2. Nintendo Wii



Figure6.2.1 Nintendo Wii

The Wii is a home video game console released by Nintendo. A distinguishing feature of the console is its wireless controller, the Wii Remote, which can be used as a handheld pointing device and detect movement in three dimensions. Another distinctive feature of the console is WiiConnect24, which enables it to receive messages and updates over the Internet while in standby mode.

A distinguishing feature of the console is its wireless controller, the Wii Remote, which can be used as a handheld pointing device and can detect acceleration in three dimensions. The Wii includes four ports for controllers and two slots for memory cards. Library Uses: Because of its use of infrared technology and widespread use, library staff should know about it. Many libraries offer after school open sessions, or videogame tournament weekends for various age groups.

6.3. Microsoft Xbox



6.3.1. Microsoft Xbox

The console is a black box with a large “X” imprinted into the top. On paper, Xbox has more brute power and speed than any game console on the market. It took only five years between the invention of the *microprocessor*, and its presence in homes around the world as the basis of the *video game console*. Even with dozens of choices for personal computers with more processing and graphics capabilities, game consoles are still a popular choice: they are smaller, less expensive and easier to set up than a computer, and the games they run are easier to install and play. GAMES Like PS2, the Xbox uses proprietary 4.7-GB DVD games. One of the most impressive qualities of the Xbox is its realistic environments.

6.2. Microsoft Xbox 2



Figure6.2.1. Microsoft Xbox2

The CPU for the Xbox 2 has the ability to decode and execute instructions in Microsoft Intermediate Language (MSIL). MICROSOFT XBOX 360 Supports High Definition (HD) Graphics.

6.3. The Nintendo Game cube



6.3.1 Nintendo Game cube

The Nintendo GameCube, officially abbreviated as GCN, is Nintendo's fourth home video game console and is part of the sixth generation console era. It is the successor to the Nintendo 64 and predecessor to the Nintendo Wii. The Nintendo GameCube is the first Nintendo console to use optical discs as its primary storage medium, after several aborted projects from Nintendo and its partners to utilize optical-based storage media. In contrast with the GameCube's contemporary competitors, the Sony PlayStation 2 and Microsoft Xbox, the GameCube uses miniDVD-based discs instead of full-size DVDs. Partially as a result of this, it does not have the DVD-Video playback functionality of these systems, nor the audio CD playback ability of other consoles that use full-size optical discs.

The GameCube is the first Nintendo console not to use game cartridges. Instead, the GameCube uses 1.5-GB proprietary optical disks with a diameter of 8 cm (3.14 inches). Nintendo's main strategy has been to launch exclusive games based on well known established characters. For example, Mario, Star Fox and Metroid's Samus. Super Mario Sunshine. One thing the GameCube does have over the competition is its ability to interact with the Game Boy Advance (GBA), Nintendo's handheld system. The GBA plugs directly into the GameCube's controller port to allow the two systems to communicate with select games.

6.4. The Sony Play Station



6.4.1. Sony Play Station

In 1988, Sony entered into an agreement with Nintendo to develop a CD-ROM attachment, known as the Super Disc, for the soon-to-be released Super Nintendo. The

original PlayStation read these Super Discs, special interactive CDs based on technology developed by Sony and Phillips called CD-ROM/XA. This extension of the CD-ROM format allowed audio, video and computer data to be accessed simultaneously by the processor.

6.4.1. CONTROLLER

The Sony PlayStation X was the first in the line of modern day gaming consoles with revolutionary features like Force Feedback. It was so successful that Sony estimated that one in every five US households had a PlayStation.

6.5. The Sony PlayStation 2



6.5.1. Sony Play station 2

Launched in Japan in December of 1994 and in the United States and Europe in September of 1995, the PlayStation quickly became the most popular system available.

6.5.1. CONTROLLER

The controller is the primary user interface for the PlayStation 2. The standard PS2 controller has 15 buttons. GAMES 4.7-GB DVD drive gives PlayStation 2 games a larger capacity than original PlayStation games. The CDs are just as susceptible to scratches and intense heat as regular audio CDs—even more so in fact, since a scratch on a game CD can make it totally unusable.

6.6. Sony Play Station 3



Figure6.6.1. Play Station 3

The 'Cell' is the microprocessor that will power the play station 3. The PS3 will also make use of Grid Computing. Many libraries offer after school open sessions, or videogame tournament weekends for various age groups.

6.7. Future

A newly formed US technology company, Infinium Labs Corporation, announced that they will develop and market a new games console called 'Phantom'. SONY PLAYSTATION 4 for the next-generation PlayStation 4 Sony Computer Entertainment Inc. plans to use more affordable components.

7. CONNECTION

7.1 Making the Connections

A video game console typically needs only one peripheral device: a video monitor with one or two internal speakers, to see and hear the game. Most modern game consoles can accommodate three different ways of connecting a monitor:

7.1.1. Composite Video – the same sort of video connection found in a videocassette recorder.

7.1.2. S-Video – “Separated Video” uses two wires in a shielded cable to deliver video. One for the color signal (“chrominance”) and one for the brightness signal (“luminance”). S-Video has the same picture detail as composite video, but with better color quality.

7.1.3. Component Video – Three shielded cables send separate analogue signals to the monitor, where they are decoded and displayed. Component video has better. Picture detail and color quality than either composite or S-Video, and can drive widescreen, high-definition monitors. Audio is typically connected with two cables, just like those from a tape deck to a home stereo system.

7.2 Connecting the Players

The “human interface” on any game console is its *game controller*. A modern game controller will usually have two thumb-operated stick controllers, and from eight to twelve game buttons. As a game program is loaded into a console, the sticks and buttons assume various functions: moving a character, looking around, picking up and manipulating objects within the game. Part of the skill a player develops in playing a console game, is learning how to use the controller’s sticks and buttons quickly. Steering vehicles, selecting and firing weapons or interacting with game characters are all handled through the controllers.

7.3 On-Line Gaming

Two of the major game-console manufacturers, Microsoft and Sony, have set up resources on the Internet, from which console game players can join *massive multiplayer environments*. Instead of playing games alone, or with two or four players, large numbers of players can team up, or compete with one another, within a common game “environment”. Some game programs are written especially for online use, with “environments” so large that hundreds of players can participate in the same game, at the same time. In other on-line games, a “session” is set up, and joined by a small group of players. Each group of players can interact with one another within their “session”, while the central “game server” system manages hundreds of “sessions” at a time.



Figure7.3.1. Online Console

8. Portable Game Devices

Just as there is a choice between a personal computer and a game console, there is also a choice between a *handheld computer* and a *portable game device*. While a handheld computer can run a variety of programs, including games, their user controls do not lend themselves well to the type of “human interface” to which game-console users are accustomed. Two game-console manufacturers, Nintendo and Sony, produce handheld game devices with built-in screens, and controller buttons almost identical to their desktop-console counterparts. Since handheld game devices are meant to be held and played in two hands, they typically have an array of game buttons on both sides of a central display screen.



Figure 8.1 Console

A read-only memory cartridge slot, or a small removable disc drive, loads the game program, while a small bank of “non-volatile memory” stores player scores, game settings and other related data. Borrowing from their handheld-computer “siblings”, modern portable game devices are often equipped with *wireless network adapters*. They can let the player browse Web sites (within the scope of their display size) when the user is within range of a wireless host network. In addition, players with the same handheld game device can *link them wirelessly*, allowing cooperative or competitive play of the same game.

8.1 Dual Screen or Wide Screen

Nintendo and Sony followed different strategies in designing the displays on their portable game devices. In the *Nintendo DS* and *DS Lite*, two screens (around the size of a cellular telephone's display) work together. The upper screen displays the actual game action, while the lower screen accepts user input through a touch-sensitive surface and a stylus. Other game information, such as score and progress, is also sent to the lower screen, leaving more of the upper screen free to show real-time game graphics.



Figure8.1.1. Dual Screen Console

The Sony *Play station Portable* has only one screen, but it is larger than on the Nintendo device and it has a “9×16” *wide screen format*. Commercial movies and game programs have a more realistic appearance on the larger display, and more Website content can be seen without “scrolling”.

9. IN-ADS GAME

A new dimension in marketing specifically aimed at reaching the 18-34 male demographic. In-Game Advertising campaigns have become the ultimate opportunity to reach gaming consumers effectively and efficiently because gamers are operating at a much higher concentration level than someone who is passively watching television, glancing at a subway poster or flipping past a magazine advertisement.

Reaction to in-game advertising is positive.

1. 70% of gamers say that ads inside games improve game realism.

This new evolution is gaining momentum.

1. \$56 million spent on in-game advertising in 2005
2. Expectations of \$400 million in 2007
3. Expected to grow to \$1.8 billion by 2010.

Major corporations taking action to seize opportunities within the new medium.

1. Microsoft's Massive Inc. is the current industry leader.
2. Media giant Google is also getting in on the act with Ads cape.

Examples:

- a. **Splinter Cell series** – Nivea skin care products for men, Philips Norelco shaving products, and Sony Ericsson cell phones.



Figure9.1. Splinter Cell Series

- b. **Need for Speed Underground** – Cingular cell phone service, Burger King, Best Buy.



Figure9.2. Best Buy

- c. **Doom 3** – McDonald's and Coke.



Figure 9.3 McDonald's and Coke

10. CONCLUSION

On the whole, Gaming Consoles are the better option in the long run. They are designed for gaming. This has helped the industry understand the basic requirements of 3D and multimedia applications. Without a doubt, this will affect the designs of PCs in the future and make them gamer friendly. Gaming is indeed heading in the direction of becoming a mainstream form of entertainment. Gaming experience drives technology requirements and in turn contributes to the growth of the IT industry.

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