

**Video Games:
The Benefits and Practical Applications**

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Abstract

It's a normally lazy afternoon, as you wonder down the road you fail to pay attention to the Ogre sneaking up on you; one of the problems with moving on to the next level of a video game you don't know what to expect. One-minute your mindlessly-moving through uncharted territory and in the next move – you're dead.

AS much fun as playing video games is, they can be a pain in the neck. Unfamiliar controllers, keyboards, rules, and physics; plus whatever else they decided to put through at you. Sometimes you think you are getting a head and you really your not.

But what is the truly a benefit of playing video games; they are super puzzles to be conquered.

Introduction

During the last couple of decades, video games have changed our lives. Before there were console games children only had television to watch, radio's to listen to or reading books, or even hanging out with friends. Today the world is smaller place to play, with the main video game consoles manufactured by Microsoft – Xbox®, Sony – PlayStation II®, Nintendo – Game Cube®, and few others that are slowly receding into the shadows. These systems bring the best that there is to be found in the console arena. Top of the line graphics, sound and controllers make for a more realistic gaming environment.

Not be out done of course is the gaming community that plays on personnel computers (PC), these systems have gone through the roof. Current state-of-the-art systems use either the Pentium – 4 Processor or the AMD Athlon 64-bit Processor. Even these systems will soon be out distanced by “Cell” Processor, technological spec's can be found in the Technology Section of this article on all current systems, in the near future as Quantum Computers begin to get a foot hold, gaming systems will take a major leap forward yet again.

Current Trends

According to the “Kaiser Family Foundation,” Even the youngest children in America are growing up immersed in media, spending hours a day watching TV and videos, using computers and playing video games (Graham & Hess, 2003). This presents an interesting point; years ago TV only provided a few channels to watch, approximately 12-25 stations. Video games we not even thought about. And if you did have one, they were rather unsophisticated. With the American population being the wealthiest nations on earth, televisions are one item that is in just about every room of the home, most homes are three bedrooms and family communal area, which amounts to about 4 TV's per home; one or more being watched for 4-6 hours a day – everyday. Most children have some sort of musical device for which to listen to music, whether it is broadcast (AM/FM), music CD's, even portable video devices. Everything from cassette tape, to mp3 players are the rage now days.

Video games are now as accessible as your television, meaning that most children may have a TV, but it isn't used for watching sitcoms. It is tied to a PlayStation® or Xbox® or Game Cube®. Children are no longer the culprits that are getting involved with the gaming community, many young adults and even older adults are playing games. With titles such as Halo® and Halo 2®, Grand Theft Auto®, and many more titles that can be listed here, there is a never ending stream to purchase and play. With the ability to purchase video games online or Target/Wal-Mart, plus the many specialty shops that are dedicated to the pursuit of video game playing, there is a never ending line of players waiting to play.

Age Groups

The age groups for playing video games is no longer just subjugated to children in there teens, you have children as young as one-year olds playing. Computers and video games go hand-in-hand, from the first consoles to video arcades to in-home consoles and PC's. Where will it stop? The sky is the limit. With many game vendors and educational vendors looking to capture the younger children, the gaming consoles can be used not only to play games, but also to learn different skills. With the ability to increase the detail of the gaming experience by the advent of hi-speed computer processors, advanced graphic, surround sound with environment elements, gaming is about being immersed in the environment, plus the use of broadband. With the marketing that is put together to entice children to purchase clothes, music, video's and games. Whether or not they are board games or video games, marketing is an important element, as is the ages that it is marketed against.

Technology

In the early days (pre-1970) of video gaming you had the college wiz kids that where cutting their teeth on mainframes (intellivisionlive.com, 1995). These systems were archaic by today standards, but to them it was a way to practice programming skills. In 1972 Magnavox introduces the Odyssey, first home video game system, to moderate success. In the same year Atari entered the market with its new game "Pong" the game was a hit and becomes a cultural phenomenon (intellivisionlive.com, 1995).

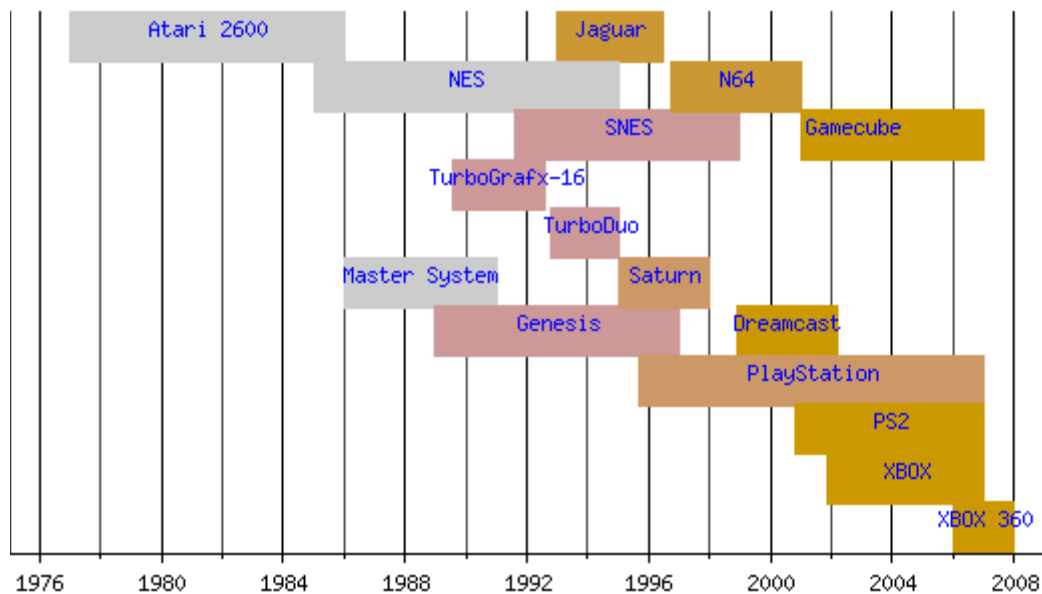


Figure 1: This is an **abridged** timeline of North American video game consoles.

Old School vs. New School

Old School

In the discussion of old school we have the beginning, a time when simplistic was a rather complicated idea. In the Dawning Era of Video Game Systems the following system types were available:

Sega Master System (1986) 8-bit	Atari 2600 (1979)
Nintendo Entertainment System (1985) 8-bit	Magnavox Odyssey2 (1978)
SG-1000 (1983) Atari Era	Bally Astrocade (1977)
Arcadia 2001 (1982)	RCA Studio 2 (1976)
Atari 5200 (1982)	Magnavox Odyssey (1972)
Colecovision (1982)	Coleco Telstar (1975)
Intellivision (1980) 8-bit/16-bit	Pong-based Units (1970s)

New School

In the current scheme of ideas, video games are breaking into new territory; no longer will the systems be thought of as simple easy to operate systems. Now you start getting in to the land of high tech. The following group is comprised of the last few years of gaming consoles.

Nintendo – Project Revolution (expected in 2006) HD Era (Q4 2005 – present)	Dreamcast (1999)
Sony – PlayStation 3 (expected in 2006)	Nintendo 64 (1996) (64-bit) 32/64-bit era
Microsoft – Xbox (November 2005 release)	PlayStation (1995)
Nintendo iQue (64-bit) (2002) (128-bit era)	Sega Saturn (1995)
Game Cube (2001)	Atari Jaguar (1993 64-bit)
PlayStation 2 (2000)	Commodore Amiga CD32 (1993)
Xbox (2001)	3DO (1993)

Data retrieved from: Figure 2: [Lists of Game Consoles and System Types](#)

PC's vs. Consoles

Here comes one of the most hotly contested questions between PC gamers and Console gamers, which system is better? PC's have the most power, best video and best sound, and best all round picture; though that is about to change with the latest technology that will soon be coming out. According to the gamers on both sides of the fence will be battling it out to maintain their edge, the biggest problem with console systems is the inability to interface with high-end video monitors. There are a few manufacturers designing monitors for video games, but they haven't yet reached mainstream usage.

Here is an example of current and future console systems:



Figure 3: Xbox Console



Figure 4: Xbox 360 Console w/ Wireless Controller



Figure 5: PlayStation 2 w/ Controller



Figure 6: PlayStation 3 w/ Controller

In the next section we will look at the current generation of PC based gaming systems and some of the hardware that is available. One of the problems that are associated with using PC based systems that hardware changes so quickly that it is difficult to keep up with the newest hardware.

PC Gaming Systems

One of the top manufactures of PC-based gaming systems is Alienware (www.alienware.com), they are considered the top-end of the gaming community, and they manufacture gaming systems that are built with current state-of-the-art hardware. Where hi-end console based systems may cost a few hundred dollars, Alienware systems can run as high as \$6,000.00 or more. The comment of not sparing the expense is in play here. Here are a few examples of there wares:



Aurora:

Star Wars Edition's



Figure 8: The Dark Side

Figure 7: The Light Side

Technology is only going to improve the richness of the gaming environment, both PC's and Gaming Consoles are getting ready to see a major shift in the technology, one that will transform the way computing, whether engineering or game playing has ever imaged. The next level of technology will be using the "Cell" Processor. Created by a team of engineering giants:

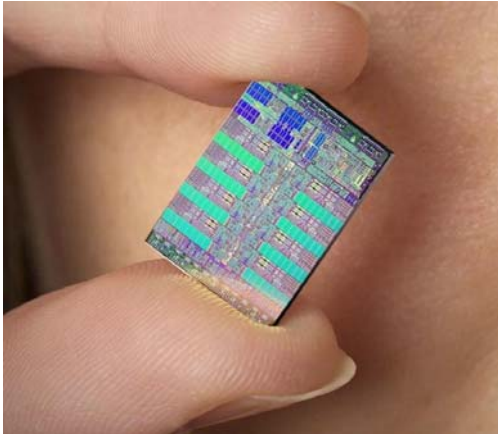
IBM, Sony, Sony Computer Entertainment Inc. and Toshiba Unveil Cell Processor

The Cell is a multicore chip comprising a 64-bit Power processor core and multiple synergistic processor cores capable of massive floating point processing. Cell is optimized for compute-intensive workloads and broadband rich media applications, including computer entertainment, movies and other forms of digital content (www.toshiba.com , 2004).

Other highlights of the Cell processor design include:

- Multi-thread, multicore architecture.
- Supports multiple operating systems at the same time.
- Substantial bus bandwidth to/from main memory, as well as companion chips.
- Flexible on-chip I/O (input/output) interface.
- Real-time resource management system for real-time applications.
- On-chip hardware in support of security system for intellectual property protection.

- Implemented in 90 nanometer (nm) silicon-on-insulator (SOI) technology.



Currently this processor is going to be used in the next generation video game console manufactured by Sony. This system will be the PlayStation 3.

Figure 9: The “Cell Processor”

Health

Negative Benefits

Besides the problems stated with creating aggression, many children have suffered from the following problems:

Repetitive-Motion injuries: non-technical terms are “Nintendo Thumb” or “Nintendentis”, these problems are associated with playing video games. Too much video game playing can lead to repetitive stress injuries that can cause swelling at the base of the thumb. Continued stress on tendons, nerves, and ligaments in children’s hands and arms can lead to long-term ailments such as lateral epicondylitis; also known as “tennis elbow”, tendonitis; bursitis; and carpal tunnel syndrome (Thompson, Dennis. 2005).

Positive Benefits

Here is an excerpt from an article describing one of the benefits of playing videogames:

The other claim to fame of Tetris, is its use as an education tool. Mental rotation (MR) is the ability to imagine what two and three dimensional objects would look like after being rotated. This ability, termed spatial visualisation, is required in occupations involving engineering and conceptual tasks. Research completed by Dorval and Pepin (1986) suggests that students with spatial visualisation abilities are generally high achievers and excel in subjects like maths and science. Tetris was also used in a study by Okagaki and Frensch (1994). They found that spatial visualisation abilities were improved in college students after 6 hours of playing. Similarly, research done by De Lisi and Cammarano (1996), showed that students playing a game called Block Out, also improved their mental rotational skills (Kearney, 2003).

Political and Social

Current National and World Opinion

Many of the problems that are seen in the venue of playing video games is based on a select view from a group of individuals that seek to control everything that everyone does. There have been studies done over the past thirty years that do not find conclusive evidence that video games warp the minds of children that play them. While many studies have been seen as method of extracting data that may show a trend linking violence and video game play, there haven't been any examples that correlate that information. Many researchers liken any study performed against the video game industry as those that were performed against the motion picture and television industry. While others try to point out that wrestling and pro football also breeds violence. No proof is forth coming. Although there have been a few survey or experimental studies of game players (see Malone, 1981; Cordova & Lepper, 1996) (Squire, 2002).

Short Term vs. Long Term

With the current amount of data that has been generated by many groups that are both trying to undermine and/or build up the structure that has slowly been created around the use of video games whether they are PC based or console based, remains to be seen. Politicians and clergy, house wives and educators all seem to have the same problem, why are my children happier in there room playing video games then playing outside in the fresh air?

An opinion that hasn't been approached is the idea that violence is usually implemented into either a group of people or individual, because as a group – deindividuation model – view that aggression is more likely in a group because of a loss of individuality (Culkin & Perrotto, 1993) (connexions, 2003). So if this description is one of the methods that could be viewed a root-cause to violence, then the idea that the child or children are staying home and playing video games is better then playing in a group related activity. Simply because playing in groups allows you to predicate a violent act simply by being present, and since you are not considered an individual, but a member of the group; it is easier to get away with a violent act. Video games don't breed violence, you play a game that is made up of complicated puzzles where you get to shoot things or blow them up, and no one gets hurt. Its much like watching cartoons, While watching the Road Runner and Wiley Coyote, or Tom and Jerry or worst case The Three Stooges; these three different programs are considered much more violent then most video games produced today.

Currently there is legislation that is being in acted that will require all manufactures of video games to have a Game Rating & Description Guide, so both parents and vendors will be able to stop the sell of violent, sexually explicit content from being sold or rented by under-aged minors (www.ESRB.org , 2005).

Here is an interesting article dealing with the current topic:

Little evidence of a link between video games and aggressive youth: Here's an interesting statistic: While the video game industry was exploding between 1994 and 2000, juvenile (ages 15-17) violent crime arrests dropped by 44% and young adult (ages 18-24) arrests dropped by 24% according to the [U.S. Department of Justice Office of Juvenile Justice and Delinquency Prevention](#). While that does not necessarily rule out any relationship between video games and youth violence, it certainly should make policymakers pause before rushing to legislate. Incredibly, the Washington State law was enacted despite a report by the state's own Department of Health saying "it may be concluded that the research evidence is not supportive of a major public concern that violent video games lead to real-life violence." Further, a [major study on youth violence](#) by the U.S. Surgeon General's office in 2001 also confirmed that youth violence has declined significantly nationwide and noted that academic research had not shown any significant correlation between video games and youth violence. And a 1999 [Australian government study](#) entitled "Computer Games and Australians Today" noted, "There is little evidence to support fears that playing computer games contributes substantially to aggression in the community." Other scholars have stressed the potential benefits of video games for children. A [recent study](#) in *Nature* suggested that playing action video games actually improves mental attentiveness and visual skills. And University of Wisconsin linguistics expert James Paul Gee, author of *Power Up: What Video Games Have to Teach Us About Learning and Literacy*, argues that video games aid in the cognitive development of children by challenging them to solve complex puzzles. Finally, in overturning the Indianapolis law, Judge Richard Posner of the 7th Circuit Court of Appeals [powerfully argued](#) that, "People are unlikely to become well-functioning, independent-minded adults and responsible citizens if they are raised in an intellectual bubble. To shield children right up to the age of 18 from exposure to violent descriptions and images would not only be quixotic, but deforming; it would leave them unequipped to cope with the world as we know it" (Thierer, 2003).

Benefits

Educational Benefits

With the many disenchanted members of the population set aside, we can now look at the many wonderful benefits of video games. According to James Gee, Ph.D., Video games are a very good learning tool, saying this because they teach you skills that you aren't really aware of. Besides the normally understood venues of hand-eye coordination, you have the different memory aspects of playing a game. You are constantly learning each time you play a game, each new level you have many complicated events that you have to work and think your way through. If you didn't learn you wouldn't make it through that level.

James Gee mentions in doing research, when we watch kids play games, they don't just play the game. If they go play a game like [Age of Mythology](#), they go get books on mythology, they go to websites that are way over their heads, but they still read the site anyways trying to learn the material (<http://wistechology.com> , Johnson, 2003).

After school, kids are devouring new information, concepts, and skills every day, and like it or not, they are doing it controller in hand, plastered to the TV (Gee, 2003). One of the ways we learn is by doing, not to many of us can sit down and read a book and understand everything it is telling us. The same is true with many video games, you need to surf the Internet, chat with friends, and download information that can assist you in solving the sometimes very complex situations or problems. Many of the video games that are coming out now are setup in ways that teach you about history, science, or complex social interactions. The average age of video game players is 24 years old. While many households have younger teenagers and even younger children present, it is the older age groups that are actually taking up most of the time playing the games.

After playing many different styles of video games, it is easy to see where many parents and politicians have problems with the violence and other aspects that are creating the problems, but they are also blinded from the many useful aspects of the games. The games in and of themselves are actually complex puzzles, each level is progressively harder, combining many different skill sets together to complete that level. It can take as much as 50 – 100 hours to play a video game. That is a lot of effort. That may be only a few days to some kids, but to others it may be many weeks or even months to complete a complex game like [Half-Life 2](#), or [Deus Ex](#).

Social Problems

The information in the following chart tries to show the relationship in playing non-violent video games versus violent video games:

Playing Violent Video Games Makes a Difference

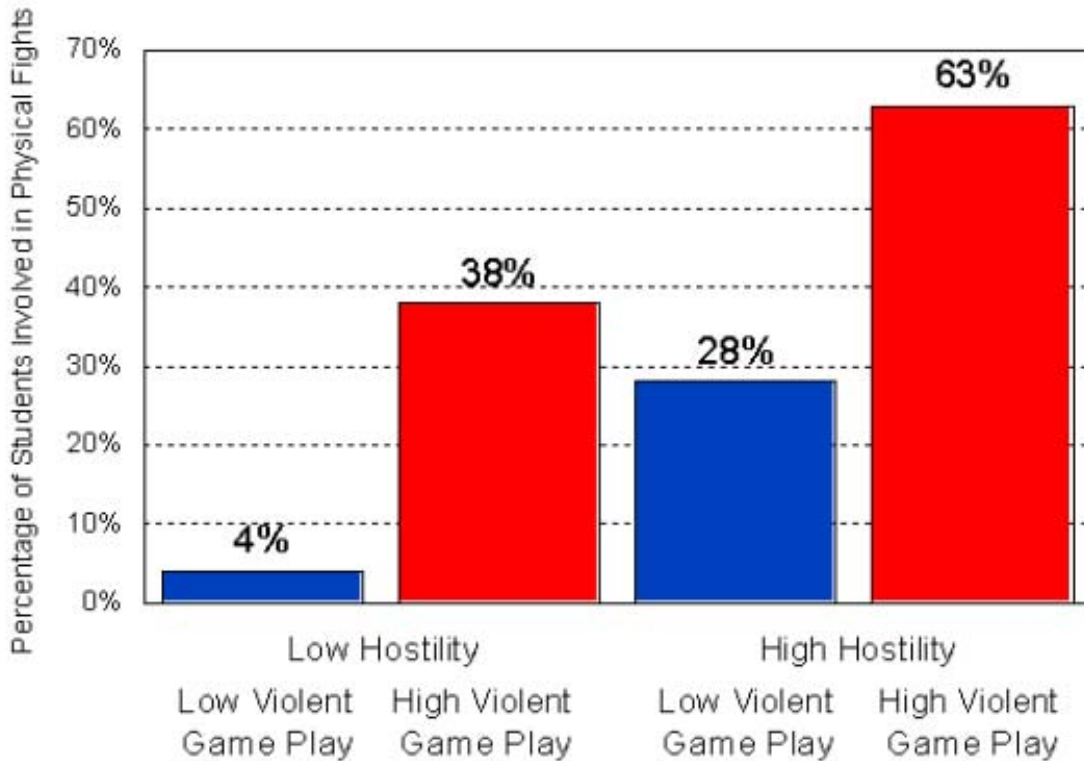


Figure 10: Non-Violence vs. Violent behavior contributed to aggressive behavior

Where as violence can be contribute to most major sporting events, i.e. Professional Football, Soccer Matches in Europe and South America; and even watching violent television programming can lead to violence among children. All of this can be attributed to the interference of government by not allowing the families to rule over the household members.

Future

Some of the most rewarding aspects of video game technology are the ability of the gaming systems to be used in the medical field to retrain and help disabled citizens. Whether or not a person was injured in a motor vehicle accident or on the job, or was born with a disability. Video games are useful tools.

Here are some examples of their uses:

- Toddlers who use a computer develop better learning skills than toddlers that do not. This information is based upon a study where researchers studied 122 children, aged 3-5 years (Medical News Today, 2004).
<http://www.medicalnewstoday.com/medicalnews.php?newsid=9233>
- Researchers in rehabilitation science and technology at the [University of Pittsburgh](#) have developed an interactive video game system that improves the physical fitness of persons who require wheelchairs for mobility (Uhl, Jocelyn, 2000).
<http://newsbureau.upmc.com/medsurg2/GameWheels.htm>
- Virtual Reality Medical Center: uses virtual reality exposure therapy (3-dimensional computer simulation) in combination with physiological monitoring and feedback to treat panic and [anxiety disorders](#). These conditions include specific phobias such as [fear of flying](#), [fear of driving](#), [fear of heights](#), [fear of public speaking](#), [fear of thunderstorms](#), [claustrophobia](#), [agoraphobia](#), [social phobia](#), [panic disorder](#), and [posttraumatic stress disorder due to motor vehicle accidents](#). General stress management and relaxation skills are taught for stress-related disorders (VRMC, 2005).
<http://www.vrphobia.com/index.htm>

Video Games to treat ADD?

NASA research has found a method of using video games to treat ADD (Attention Deficit Disorder) a problem that causes child not to be able to sit still and concentrate in school work or other home tasks. But by using bio-feed back children and teach themselves to control there mind.

“The biofeedback video game concept (patented by NASA in 1994) evolved from a physiologically-adaptive simulator system that was developed in NASA flight deck research. With this system, brainwaves controlled the level of automation in a simulator flight deck. This "closed-loop" testing setup was used to determine what level of automation kept pilots engaged best in the flight task. It was soon realized that, given enough practice, pilots could probably turn the testing system into a training system; that is, they would learn to control their brainwaves to set the level of automation where they wanted. This becomes essentially a brainwave biofeedback training situation. It differs from conventional brainwave biofeedback in that the feedback and reward are not explicit on a display, but implicit in the subject's control of the task's difficulty with his brainwaves. If the flight simulator is replaced with a video game, as it was in the spin-off technology, the system becomes an entertaining way to deliver brainwave biofeedback training. NASA scientists are encouraged to look for these kinds of spin-offs from their core aerospace research (Pope & Pallson, 2000)” (Holmes, Leonard. 2005).

Conclusion

While the judges are still out on whether video games are disruptive enough to be considered a problem that needs to be regulated by a governing agency, this is a question that will have to be determined as time progresses.

While the evidence shows that there are both good points and bad points in the use of video games. We need to regulate what our children watch on television, what video games they play and also who they hang out with.

To much government regulation goes a long way, its up to the parents and retail industry to make sure we watch out for our children. As educational material is developed, we will see more positive benefits developed for video game systems.

AS marketing is schemes are developed to invest more capital to design better systems, we will see more applications developed by the educational system, medical community and the government.

It's a still a very young market, technology is growing in leaps and bounds, it will take a few years for everyone to get on the bandwagon, so we need to press-on using baby steps. Progress always has growing pains involved with any technological event.

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Unit 3: Outline and Annotated Reference List

Paper Topic:

The Benefits and Practical Applications of Video Games

Purpose of Paper:

The purpose of this paper is to inform society of the benefits and practical applications of video games in teaching our children Math, Science, English, and other associated skills and abilities that they may require as they grow-up.

Additional benefits that have been discovered are the use of video games in the rehabilitation of patients that have been in car accidents and/or suffered brain injuries. Children as well as adults that suffer from ADD (Attention Deficient Disorder) as well as Dyslexia have been treated with video game therapy.

As research progresses, we may one day see video games that not only appear to be just eye-candy, but are used to teach our children, required skills and abilities that we will need as we progress towards exploring our universe.

Audience of the Paper:

As we progress in to different fields of study, we each have seen the benefits of using a computer system. We look at the benefits, we are often asked what the difference between the computers and the benefits of video games are, and they are not considered by some to be an educational resource.

So we need to educate anyone that has input in to what we as citizens have access to in regards to computer systems or console game systems. AS technology changes we see vastly more powerful gaming systems that we be able to do many more operations besides play video games. Technology is pushing or more and more interactive compatibility. The largest audience to this paper will be everyone, both the technical and non-technical, politicians, educators and of course parents.

Outline:

1. Introduction
 - a. Current trends
 - b. Age groups
2. Technology
 - a. Old school vs. New School
 - b. PC's vs. Consoles
3. Health
 - a. Negative Effects
 - b. Positive Effects
4. Political and Social
 - a. Current national and world opinion
 - b. Short Term vs. Long Term

5. Benefits
 - a. Educational benefits vs. Social problems
 - b. Violence, corruption, sex, drugs, etc.
6. Future
 - a. What does the future hold

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Unit 6: Proposal

Date: 07 June 2005
To: Kimberly Anthony
From: Ronald Dean Guthrie
Subject: The Benefits and Practical Applications of Video Games

Introduction

The purpose of this paper is to inform the public of the beneficial aspects of video games, both PC and Console-based. “In the beginning the first video games were design to run on mainframe computer systems. The first commercially available video game system was the Odyssey by Magnavox 1970.” (<http://www.intellivisionlives.com/bluesky/home.shtml>)

This simple device soon advanced to more complex and rewarding console devices. Over the years may have cursed the invention of video games, stating that they are rotting the minds of our youth. Where as they are actually teaching our children how to think, solve problems and in some case solve problems that medical science can't treat through conventional medical means. Thru the next level of technology, science will bring advances in video game that will surpass current PC technology. This will allow for more advanced educational programming. With the added benefits of virtual reality headsets and sensory suits, the sky is the limit.

Audience

- Society – anyone that has or has not been influenced by video games
- Teachers – if teacher's were to better understand the benefits of using video games in the classroom environment they might get better home work participation
- Parents – Understanding why young Johnny or young Suzy would rather play video games then play football or play with there friends
- Medical Community – there are numerous benefits in the use of video games that came be used to treat many diseases, medical conditions, Mental Illnesses, and problems associated with accidents

Solution

Through examples and instruction, brought about by this paper, it is hoped that anyone that reads this paper will understand that there are both positive and negative benefits to the use of video games in educating society. Video games have the ability to provide benefits of institutionalized

education, combined with ultra-hi-tech. With knowledge comes the ability to control ones destiny.

Some of the problems that will need to be over come in the video game arena are the problems and stigmatism that have flourished during recent years. The ability of programmers to had surrealistic environments and designing characters that are life like, have brought many complaints from parents and congressional leaders. Video games are labeled like many movies with a parental guidance scale that states whether they are suited for what age. This is going to change the way video games are sold and interpreted.

Conclusion

It is hoped that as society gains some incite and education concerning video games, they will understand that there are benefits to be gained through their use. As we our society continues to grow further apart, and technology gains a deeper foothold with in the makeup of our communities; video games will be an outlet, that can be used by all to gain a better understand of what life has to teach us. That is so long as everyone understands the benefits out weigh the disadvantages of video games.