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**How the Globalization of Video Games Is Changing the Way Militaries
Operate**

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**How the Globalization of Video Games Is Changing the Way Militaries
Operate**

by

Cole Martin Story

Report

Presented to the Faculty of the Graduate School of

The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

Master of Science in Kinesiology

The University of Texas at Austin

May 2018

Abstract

How the Globalization of Video Games Is Changing the Way Militaries Operate

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Today more than ever video games are reaching a global audience. In the past the military facilitated the growth of video games, but that dynamic may be changing. Military use of video games to build and operate their army's is increasing. The first part of this report will look at how video games have grown into a \$100 billion industry and where the industry is heading. The second part of this report will focus in on how the military has utilized video game technology as a recruiting and training tool. Then move into how different components of technology in video games is being used in modern warfare. In the end this report will show how the globalization of video games is changing the way the military operates.

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Introduction

Media Historian Friedrich Kittler believed that war is the father of all media. This idea is more evident than ever because of the growth of the video game industry. The earliest example of a video game had the military as the focal point. The game was called the Cathode Ray Tube Amusement Device and was developed in 1947. The game was created by Thomas T GoldSmith Jr. and Estle Ray Mann and was patented in December 1948. The game had a very simple design that consisted of a radar screen, like what you would have found in a submarine at that time. On the radar screen was a vector drawn dot that the player could control. The device allowed players to simulate missiles being fired at targets that are drawn on the screen. The video game and military ties wouldn't end there. In 1962 graduate students at MIT developed the first true video game. *Spacewar!* would be the first multiplayer game, pitting two people against each other. The objective was both players would fly rockets and shoot at one another while trying to avoid a collapsing star. Because the students were working on computers that the government had purchased, *Spacewar!* was technically funded by the Department of Defense.

As time has gone on, the video games have gone global and the military has found new applications for them. This paper will cover how video games have reached a global audience by looking at the current landscape, how the industry got to where it is, what's causing the current industry boom, and where growth can still occur. Then we will transition into how militaries are using video games to build their armies, how they are utilizing video game technology, and how VR is changing the way we treat PTSD. This

information will illustrate how the globalization of video games is changing how
militaries assemble and operate.

Part 1: Globalization of Video Games

Today video games encompass the entire world. Video games have moved away from targeting a small group of people. Now, video games are marketing to a vast audience. Video games, as a media, generate more than many other forms of media. As of 2018, Grand Theft Auto V became the most profitable media title of all time. Since being released in 2013 it has sold over 90 million copies and brought in \$6 billion. Per Andy McDonald (2018), “Guinness World Records says that “Gone With the Wind,” when adjusted for inflation, is the highest grossing film of all time at \$3.4 billion” (McDonald 2018). If you add in sales over the years there might be another \$1 billion or so, which still doesn’t come close to the sales of Grand Theft Auto V. As video game popularity around the world grows, so will profits. Part 1 will cover the globalization of video games and how it has grown into the behemoth industry it is today.

Section 1: Current Landscape of the Video Game Industry

The global market for video games continues to trend upward. Before we discuss the myriad of influencers on the globalization of video games, we must first look at where the market stands today. It is important to understand what the current landscape of the video game market looks like so that we can see how the industry is growing globally. The following numbers and statistics help to create a general picture of where the industry stands today and where it is heading.

According to Newzoo’s 2017 Games Market Report, the video game industry was worth \$108.9 Billion last year. This is an increase of \$7.8 billion from the previous year. It’s not just the past year that has seen significant growth. In the last five years revenues

have grown 56%. The industry continues to grow and shows no signs of slowing down. If the current trend continues, then by 2020 the global market for video games will be worth almost \$130 billion. This may be a conservative outlook depending on what study you look at. This revenue trend can be seen in Table 1 (Newzoo 2017).

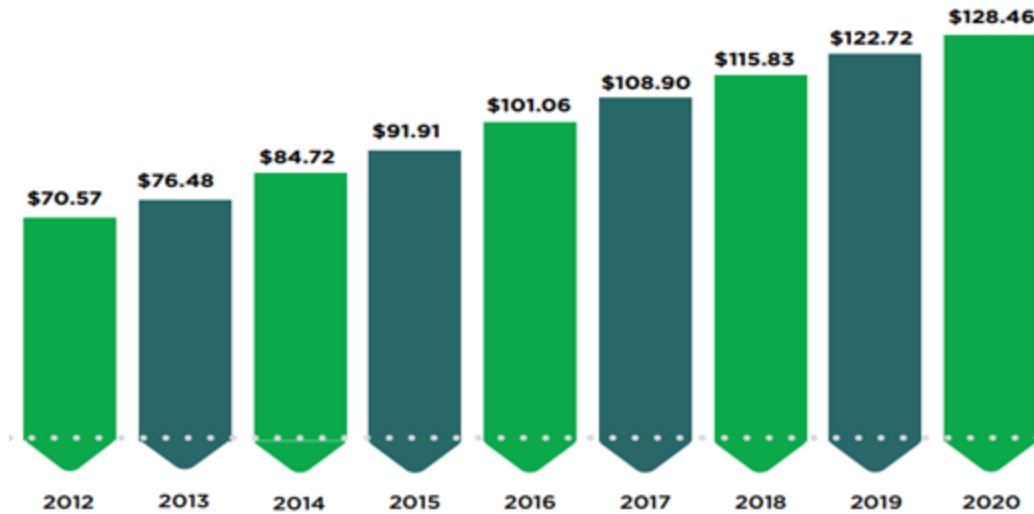


Table 1

Source: ©Newzoo | Q2 2017 Update | Global Games Market Report: newzoo.com/globalgamesreport

The continued increase shows just how popular video game are becoming around the world. There are over 2.2 billion people in the world playing video games today. With over a quarter of the world’s population playing video games, it has become clear that video games are being played more today than ever before. In America, over 150 million people play video games. The average player is 38 years old. This represents a surprising statistic to most considering who video games have been traditionally marketed to. Another surprising statistic to some may be that 49% of American adults play video games regularly. Over 65% of households own a device used to play video games. Statistics also show that only 32% of the population playing video games is under 18

years old. These statistics push against the notion that video games are just for kids. As video game popularity continues to grow globally, so too will the knowledge of the demographics associated with the industry.

Section 2: How has the Industry Gotten to Where it is Today?

As the numbers in the previous section show, there has been a significant increase in gaming participation around the globe. There are several reasons for this increase. The reasons include a recent console ban being lifted in China, online gaming, localization, ever increasing ways to play video games, streaming, and eSports. These topics will be covered in the following sections.

Ways to Play

With the industry continuing to grow globally, there are many devices that video games have been consumed through. It's because of this that the global games market has seen a fair share of different companies attempt to carve out their spot in the industry. The \$108.9 Billion made in 2017 is spread across three main devices PC, Console, and Mobile. The breakdown of what each device made can be seen in Table 2 (Newzoo, 2017). Because there are more systems and ways to play, there is more accessibility for gamers than ever before. This has led to a healthy competition in the market place and allowed more growth than before. We will discuss how each platform has helped grow the industry and the significance each plays in today's world. We are going to focus mainly on the top platforms being played today. These include PC, current consoles, and mobile gaming.

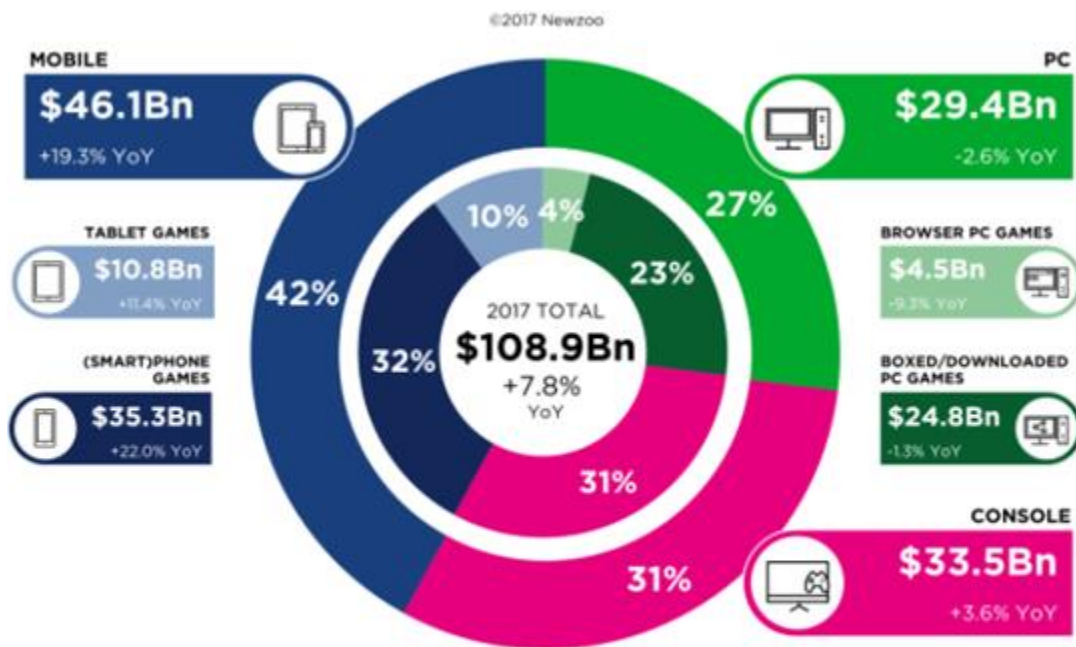


Table 2

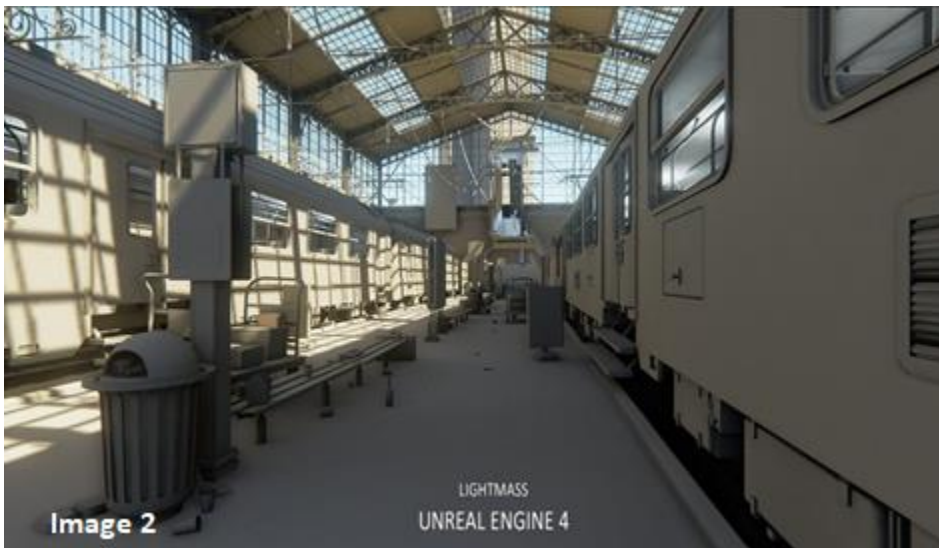
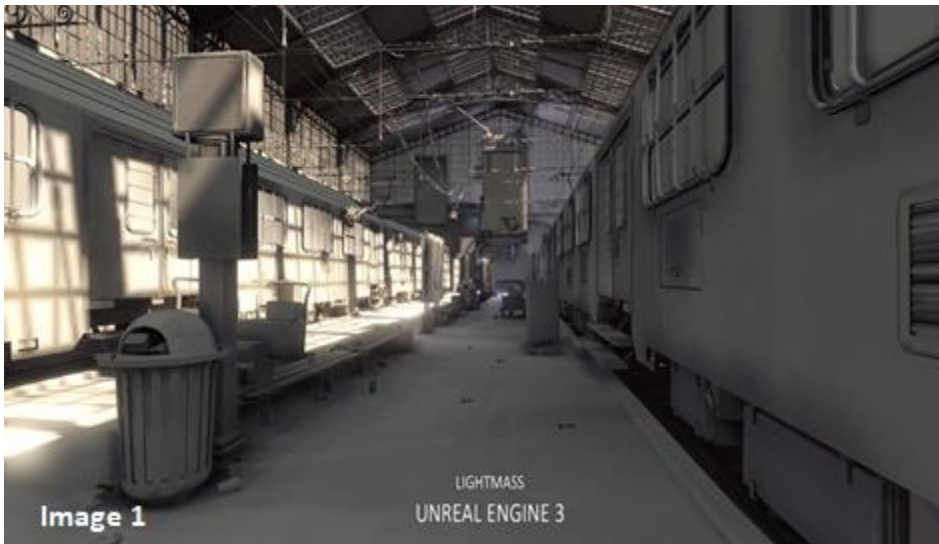
Source: ©Newzoo | Q2 2017 Update | Global Games Market Report
newzoo.com/globalgamesreport

Personal Computers

Personal Computers (PC) have been around since the mid-sixties when Hewlett-Packard (HP) released the first home computer. HP's release of the PC would be the first step toward growing a behemoth video game industry. Developers would begin to create video games to be played on the PC. Games such as Ultima I, Kings Quest, Island of Kesmai, and Wolfenstein 3D and Doom would be influential in creating the game genres we play today. The first flight simulator was also released during this time and will be discussed further in the government implementation of video games.

Since HP created the PC, there have been massive technological leaps allowing for the customization of PCs. It is because of these improvements that PCs offer gamers

the latest technology and allow them to modify their existing computers. PCs offer top of the line graphics and accessibility. Because PCs offer top end processing power which allows for better graphics, developers can use this to their benefit. They are now able to design games that look life due to software such as Unreal Engine 4. This allowed developers to make games go from looking like the first image to the second image.



Although developers also use this software when making games on console the capabilities are much more evident. It's evident because of a better GPU which allows for more detailed graphics rendering, or more graphics to be rendered at once. As new computer engines are developed and improved, game developers can work on designing games with more detailed visions. Aspects such as lighting and texture can be used to guide players along their journeys instead of the previous alternative called way points. The old way of guiding players with large immersion breaking way points has become outdated. Using the upgraded lighting creates more immersive and engaging game play for players to enjoy.

The adaptability of PCs allows gamers to create a PC that suits what they want to play. If you play a lot of first person shooter games, you may want a PC with a high-end video card and CPU. If you play more strategy-based games, you may want more of a balance between graphics and CPU performance. Being able to modify a PC to cater your needs makes PCs desirable in comparison to some other devices. This modification availability is especially great when you consider you can change any of these parts on the fly. Because there is so much adaptability, the range of games that can be played is immense. The necessity for a professional online marketplace and community, called Steam, made it much easier to buy games online.

Steam was introduced in 2003 by Valve Corporation. Since being introduced Steam has grown into a massive online market place and community. In 2017 Steam had 67 million monthly users and 10,000 games available to play. As of 2018, Steam has 150 million registered accounts accounting for \$4.3 billion in sales. That represents almost

20% of PC gaming's total sales. As of 2017 Steam reported that almost 50% of their user base was fluent in Chinese showing the global presence they have created. Steam, along with the adaptability and power that PCs hold, has made them a mainstay in the video game industry. Although there has been higher engagement in recent years it does appear that revenues are decreasing for PC games. There was a 9% dip in 2017, and this has caused significant changes in estimated future revenues. The reason for these changes maybe be a result of the increased spending on console and mobile gaming.

Console Gaming

Like PCs, home consoles have been a major part of the spread of video games throughout the world. Also, like the first PCs home consoles have been around since the mid-sixties, though it was just a prototype. The Brown Box was a prototype in 1967 and was a cumbersome rectangular box, hence the name. It was invented by Ralph H Baer who became known as "The Father of Video Games". He designed it to be played on any TV, making it more accessible to those that already owned TVs. This simple idea would spawn what today is a \$33.5 billion-dollar industry. The current landscape of gaming consoles looks markedly different than back then. Today three companies are at the top: Xbox, PlayStation, and Nintendo.

The Japanese company Nintendo is the oldest and most storied company. Their first significant console came out in 1985 and was called the Nintendo Entertainment System (NES). The company was successful in creating characters that have become iconic in the video games world. These include Mario, Donkey Kong, Link, Kirby, and Samus to name a few. Since the release of the NES, Nintendo has grown into the most

successful video game company in the world. Nintendo has released six more consoles since the NES, along with several hand-held consoles, all being financial successes. The newest console released by Nintendo combines both a home console and a hand-held. The Switch was released in 2017 and is marketed on their website as being able to, “go wherever you do, transforming from home console to portable system in a snap. So, you get more time to play the games you love, however you like” (Nintendo 2018). In less than one year, the Switch sold 14.86 million units. This broke the PlayStation 2’s (soon to be talked about) record for first year’s sales, as well as becoming the fastest selling console in the U.S. If not for a supply chain error, they could have sold even more units. Globally, Nintendo is still a big player in the industry.

The second of the big players is another Japanese based company who is involved with a great deal more than just video games: Sony. Sony released the PlayStation in 1994. This marked its entrance into the video game world. The PlayStation was the first home console to sell 100 million units, although it took nine years to accomplish that feat. Originally Sony sought to collaborate with Nintendo to develop a CD-ROM console for Nintendo. Nintendo however decided to pull out. Instead of scrapping the project Sony finished what would be the first PlayStation. Sony’s second version of the PlayStation, the PS2, holds the record for most units sold worldwide with 157.68 million units sold. Fast forward to today and Sony is now on its 4th iteration of the PlayStation. The PlayStation 4 was released in 2013 and has since been updated with better hardware in the form of the PlayStation 4 Pro. As technology increases exponentially, the video game industry has begun to turn out upgraded versions of each console. Xbox has used a

similar blueprint. While the PlayStation 4 has reached the sales numbers that the PS2 did, it has still sold over 77 million units since being introduced in 2013. Those numbers mean that the PlayStation 4 is this current generation of consoles best seller.

Computer mega giant Microsoft decided in 2001 that it wanted in on the growing video game industry and introduced the Xbox. The Xbox is the youngest of the three console brands and has been a strong competitor since its conception. The name comes from a contraction of DirectX Box which was reference to Microsoft's graphics API DirectX. One year after the release of the Xbox, Microsoft released the subscription-based service Xbox Live. Xbox Live is an online multiplayer gaming service that allows players the ability to play online with or without a broadband connection. Xbox Live had superior servers as compared to the PlayStation 2's free online service. These features included things like buddy list that made it easier to connect with friends, and exclusive games like Halo 2 that highlighted the services online features. Online multiplayer gameplay has been one of the biggest factors in the globalization of video games and will be discussed in one of the following sections. Since its release of the Xbox Microsoft has released two more consoles, the Xbox 360 and the Xbox One. The Xbox One is the most current console from Microsoft and was released in 2013, which is the same year as the PlayStation 4. The Xbox One has sold 36 million units since 2013. With the Xbox One having only sold half as many units as the PlayStation 4, it's reasonable to wonder why this is. Some have pointed to a poor release and initial marketing which pushed more players to choose PlayStation 4. There is also the possibility that because Microsoft is an American brand maybe it doesn't resonate as globally as Sony, especially to the Asiatic

market. Microsoft released the Xbox One X in 2017. This is like PlayStation's release of the PS4 Pro as an upgraded version of the same console. The Xbox One X is the most sophisticated and powerful console on the market. With the release of the Xbox One X maybe Microsoft now has the console to start to catch back up with PlayStation.

Mobile Gaming

PC and console sales may not come close to Mobile gaming if it continues the path that it is currently on. As you can see in Figure 2, mobile gaming made up 42% of the global games market, bringing in \$46.1 billion. Mobile gaming is by far the newest medium that players can consume video games through. Mobile gaming is a video game played on a mobile phone or tablet. The first mobile game was played Hagenuk MT-2000 and was a variation of the popular game Tetris. In 1997 Nokia programmed Snake into their mobile phones and since then Snake can be found on over 350 million devices worldwide. Before 2002 players were subject to whatever game or games the phone company wanted to program on the phone. As the technology improved phones were given the ability to download games and start charging money for said games. This created a new revenue stream for video games. The games were simple games that didn't require much time, unlike PC and console games. The relatively brief time it took to play these games meant more casual gamers could pick it up between what they were doing. As the authors of Mobile gaming: Industry challenges and policy implications put it, "This casual gaming style had the positive effect of widening the demographics of players, with the important consequence of including women as regular gamers" (Feijoo,

Gomez-Barroso, Aguado, & Ramos, 2012). The female demographic is one that is still growing and will be discussed in detail later.

In 2010 Apple released the iPad. Though it wasn't the first tablet, it did revolutionize the commercial market. Since then other companies have produced similar devices. Tablets make up nearly a quarter of the mobile gaming market today. Both smartphones and tablets utilize app store's like Apple App Store and Android Play Store to download games. According to media firm Zenith, nearly two thirds of the worlds adults will own smartphones in 2018. Strategy Analytics wireless smartphones strategies service found that 44% of the world owns smartphones and will grow by 58% by 2022. The purchases in most app stores are being made on mobile games. According to Hindy (2017), "about 90% of Google Play's revenue came from games" (Hindy, 2017). As more people around the world begin to own smartphones and tablets, the video game industry will continue to benefit from the increased game sales.

Section 3: Factors Responsible for the Current Video Game Boom

Video games are bigger today than ever before. Games have become more than just a person playing by themselves at home. The landscape is evolving and integrating into other industries. Many factors have contributed to this, but none more than online gaming, video game streaming, and the rise of eSports.

Online gaming and Streaming

As PC, console and mobile technology grew, so has online gaming. Online gaming has been around since computers started being made. It didn't take long for people to start connecting computers via Local Area Network or LAN for short. Local

Area Networks were mainly used in libraries and universities. As the internet began to grow in the early 1990's people began to develop software that would allow gamers to use LAN protocols over the internet. As capabilities increased, so did the possibility of game play. It didn't take long for people to realize that games alone are fun but would be a lot more fun with friends. PC gaming allowed friends to play games from different areas of the world using the internet. Dr. Scott Rigby founded Immersyve to find out why video games are so appealing to us based on our basic human needs. He found three main reasons. The first reason is that we can achieve competence, the need to feel like we have the ability to achieve mastery of something. Video games allow us to achieve this through attainable goals like leveling up or building your character. The second reason we play games is we have autonomy, the ability to have control over ourselves. In video games we are often able to have complete control of a character and facilitate this need. The third reason is the most important in regard to online gaming. This need is relatedness. Games satisfy this need by providing us with opportunities to communicate and play with other players. In a study Rigby was a part of, they described today's online gaming landscape by saying, "Only recently, however, have popular games provided players opportunities to interact and connect within large shared virtual worlds while at the same time occupying geographically remote real-world locations" (Przybylski, Ryan, & Rigby, 2010). Having the feeling that you are close to someone in the virtual world makes us feel like we are close with them in the real world, even if they are a thousand miles away. Online gaming allows us to connect with people that we otherwise might

never connect with. The same study continued by speaking on the group dynamic that online games implements. Using World of Warcraft as an example they explained that:

Modern incarnations of multiplayer games, such as World of Warcraft, give players connected to the Internet access to a central virtual world that provides opportunities for both competitive and cooperative group play. These games allow players to band together in short-term groups to accomplish missions in a single gaming session and form longer term groups, known as guilds, factions, or clans, that persist over time (Przybylski et al., 2010).

Forming guilds, factions and clans allows gamers to feel like they are a part of a community and feel like they are contributing to something bigger than themselves.

Developers fostered these groups by creating chat and online forums for players to use.

Around the time that Xbox live was introduced online gaming became much more prevalent. Having the ability to hook up to the internet and play competitive multiplayer games like Halo (first person shooter) or Madden (sport game) provided console gamers with an entire world of people to compete with. Now days it is standard for consoles to come with some type of headset so that players can communicate with ease online. The more competitive gamers often buy more advanced headsets that allow them to control both game volume and chat volume to make the experience more immersive. One of these headsets can be seen in image below.



Today's online multiplayer games have transformed into much larger communities than ever before. Massive multiplayer online games (MMO) allow for hundreds to thousands of players to play the same game together on the same servers. MMOs can be played on PCs, consoles and smartphones which means that people can connect online anywhere. This has meant that a person from America can be playing with someone from China, another person from India, and another person from France who is already grouped up with someone from Russia. Communicating with people from different backgrounds and cultures has made online gaming special because in the game we are all from the same place.

A growing number of gamers are streaming themselves playing games online live. A streamer is someone that live streams themselves playing video games as a hobby, or a profession. Streaming became popular in the mid-2010s through the use of Twitch and YouTube. Both Twitch and YouTube allow people to create accounts and stream online

through those accounts. People then watch the broadcasters and are able to follow or subscribe to them. Subscriptions cost money and allow both companies to make money. The broadcaster makes a portion of the subscription. Some of the most popular streamers can make huge sums of money from streaming. In an interview with Forbes popular twitch streamer Tyler “Ninja” Blevins verified that he makes over \$500,000 a month from streaming the game Fortnite. In an interview with Tae Kim (2018) Blevins explained why he believes people watch him by saying:

I think that I offer a combination of high-tier game play that they really can't get with a lot of other content creators. It's very difficult to be one of the very best at a video game. I'm very goofy; if you ever watched any of my streams or YouTube videos, I do impressions and stuff like that all the time and just crazy shenanigans. I think the combination of that [game skill and entertainment] is really fun to watch.

People watch streamers because they get to see someone playing a game, but also get to be entertained by the streamer. People don't just watch streamers from where they are from either. People can watch streamers from across the world and be entertained. Twitch is the leader in social video service and community for gamers. It has over 100 million monthly users and 2.2 million broadcasters. Twitch's chat feature allows viewers to talk with other viewers and the broadcaster. Having this chat feature has been instrumental in building the community aspect of streaming. The interactions in chat bring different voices and perspectives from all over the world. Streaming has created a new platform for video games to spread globally to a more casual audience that is looking for a

different type of entertainment from games. It will be interesting to see how streaming and online play continue to evolve in the coming years. What is clear is that both have brought people from around the world closer and given video games a larger platform to be seen globally.

The Rise of eSports

As games go global they have begun to integrate into other aspects of lives. The most obvious example of this is eSports. ESports are multiplayer video games played by a group of professional players. ESports is a catchall word and encompasses several different genres of games. For instance, most of the competitive games being played are in only a few genres. Those genres include first person shooters (FPS), fighting games, and multiplayer online battle arena's (MOBA's). MOBA's represent the largest attraction in exports. MOBA's are a distinct sub-genre of multiplayer where characters have specific rolls and must complete a team-based objective. uses a character to fight against an enemy team. The goal is to destroy the opposing team's structure using abilities unique to your character as well as utilizing weaker minions that spawn throughout the match. MOBA games require a mix of skill, strategy, and teamwork to beat the competition. The top games include DOTA 2, League of Legends, and Smite. Like most other sports, eSports have seasons and tournaments to decide who will be victorious. Unlike other sports, eSports have multiple seasons each year creating an even greater chance for financial success.

While one may assume that eSports is just a fad or will be going away soon you may want reconsider According to Holden, Kaburakis, and Rodenberg (2017) it was

estimated that, “eSports would generate global revenues of \$500 million in 2016, increasing by 25% in ensuing years. Projections extending to 2019 forecast direct exports revenue surpassing the \$1 billion mark” (p. 46). With the way that technology continues to expand there is no reason to think that video game popularity will slow anytime soon, making eSports a growth market. Major companies have noticed this trend and thrown their hat into the eSports arena. ESPN is currently broadcasting eSports on ESPN 2. This is giving eSports a major platform to be seen by an ever-expanding audience. ESPN isn’t the only place to watch eSports though, it’s not even the number one place to watch eSports. eSports are mostly played and watched online due to being easily accessible to a worldwide audience. One of the largest and most accessible ways to watch eSports is through the streaming service, Twitch. Per Kane and Spradley (2017), “June 2011, Twitch.tv started broadcasting video games and created a social platform for gamers on the internet. The platform has 9.7 million active users, who watch an average of 106 minutes a day, with over 2 million people streaming “(para. 27). Since being created Twitch has extended into more than just video games. They now host people cooking, painting and even podcasts. Twitch gives people the ability to view from anywhere in the world. Kane and Spradley (2017) also stated, “The ability to watch eSports competitions is not limited to having to go to a stadium. People can look at a team compete anywhere in the world” (para. 27). That’s not to say that it’s impossible to get fans into stadiums. In fact, eSports have had success around the world with this. According to Kane and Spradley (2017), “People are not only interested in viewing the competitions online, but also visit arenas and stadiums to observe. The League of Legends World Championship

in 2013 sold out the Staples Center in Los Angeles in one hour” (para. 27). A year later as stated by Hollist (2015), “On October 19, 2014, 40,000 fans crowded into the sold-out World Cup Stadium in Seoul, South Korea' to watch the final match of a world championship series” (p. 3). These numbers are comparable to most MLB stadium’s capacities. The 2016 World Series even had less than 40,000 in attendance in several of the games. The attendance along with online viewership show why eSports should be taken seriously as an up and comer in the global market place.

What the numbers don’t show is how unstructured the current system is, and how much more room they have to grow. Currently the organizations who own and run the leagues are the developers who created the games. For instance, all the tournaments held by League of Legends are owned and run by Riot games, who is the developer for the game. Riot oversees setting up, funding, and controlling anything involving League of Legends. Other games/leagues are set up in a similar fashion to League of Legends. A major problem in each league is broadcasting revenue. Just as Holden, Kaburakis, and Rodenberg (2017) stated,

“There is no sharing of broadcast revenues among teams, and teams are largely reliant on sponsorships to provide for their players. With the advent of more diverse revenue sources, consistent revenue and gaming markets’ growth, and more outlets for professional players and teams to engage in this fledgling industry” (p. 48).

This problem is easily fixable with a more structured approach to running each league. There is also the possibility of tapping into money gamers can earn from streaming a

game individually. Hollist (2015) highlighted this fact by saying, “In fact, professional League of Legends player Wei Han-Dong retired in August of 2014 from professional gaming to livestream full-time because livestreaming brings a much better salary-over \$800,000 a year” (p. 8). Another roadblock to eSports rise is its global scale. Unlike many other traditional sports, eSports online play allows players access to competition all over the world. While there are competitions held nationally the larger competitions are held between teams from around the world. Although, the international play isn’t currently structured to facilitate running the sport smoothly. There is no international governing organization that oversees the seasons and tournaments taking place in the different countries. There are also few governing bodies in the individual countries, and this is mainly because countries have been slow to recognize eSports as a real sport. Thankfully, these views have been changing over the past few years. Per Kane (2017):

“In the United States, professional gamers can obtain P-1 visas, which are given to athletes. In 2013, professional gamer Danny "Shiptur" Le was the first to receive a P-1 visa for eSports. In South Korea, the Korea eSports Association (KeSPA) is recognized by the Korean Sport & Olympic Committee. KeSPA regulates athlete's amateur and professional status” (para. 8).

Some countries have even fully recognized eSports as an official sport. In November 2015, the French Ministry of Culture recognized eSports at the state level. The French Senate then approved the bill unanimously. The French government now recognizes eSport as an official sport. As video games become more globalized more countries will begin to recognize eSports as a sport allowing video games to move into

other aspects of our daily lives. This is a perfect example of how quickly the gaming industry is growing and how quickly we must change to keep up.

Section 4: Areas Where There Can Still be Growth

In the last section it was clear that eSports is a large influencer in the present growth of the global gaming market, but still has room for growth and improvement. As fast as the video game industry is growing globally there are many areas that still have growth potential. Bringing in the other two thirds of the world will be difficult but aiming at the female audience, continuing to localize games, and taking advantage of the lifted console ban in China, are places to start. If the industry wants to continue to globalize and grow, then it should look to these three areas to improve upon.

Continued Growth in Capturing a Female Audience

The traditional view of “only little boys play video games” has gone the way of the dinosaur. The next step is bringing in a more female demographic and creating games that better reach that demographic. Being able to reach a female demographic will be important to the military, which will be discussed later. As previously mention the average age of someone who plays video games is 30 years old. It’s not just males playing video games either. The breakdown of who is playing games is more diverse than ever. Yee (2017) reports, “42% of gamers are female in the U.S. according to a yearly ESA report.”

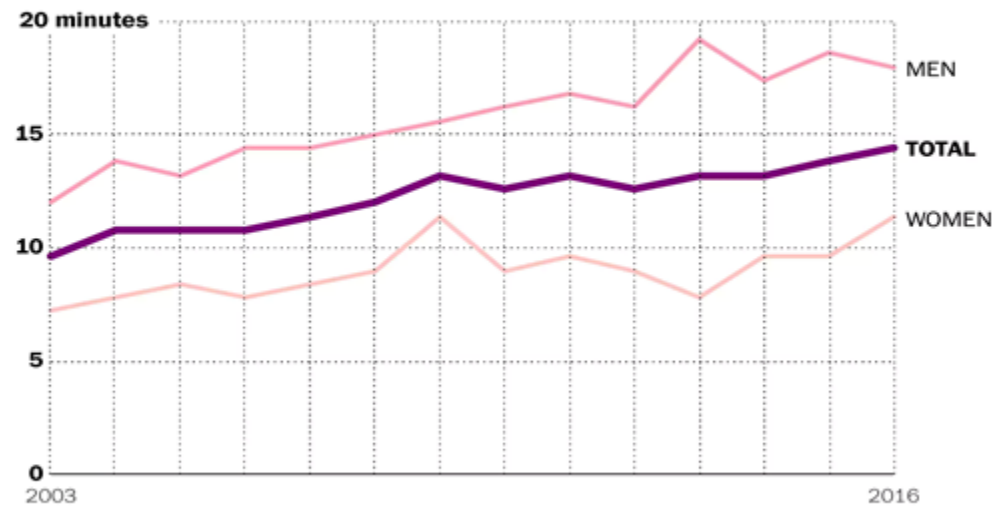
The amount of time that women spend playing games is also increasing. Ingraham (2017) reports:

According to The Bureau of Labor Statistics the amount of leisurely time Americans spend playing Video games has risen 50% in the last 15 years. Time spent playing video games has increased by 58% among female video game players. In that same time span time spent increased 50% by male gamers (Ingraham 2017).

The graph below illustrates how gaming time has risen in accordance to males and females.

Gaming time rises by 50 percent

Average time spent playing video or board games on an average day by an average American



WAPO.ST/WONKBLOG

Source: American Time Use Survey, US Census Bureau

Table 3

The video game industry has done a much better job in recent years tapping into a female demographic that had been ignored. In the past games have used female characters as accessories to male characters. Female characters had been cast as the damsel in distress or eye candy for male players to gawk at. While there have been a few female protagonists that are video game legends like Lara Croft or Samus Aran, they

were still known for their looks. While there is still not a gender balance to protagonists in video games it feels like the industry is on the right track. We can look at 2017 and see games with authentic female leads being praised not just for having female leads but because they are amazing games. Games like Horizon Zero Dawn, Hellblade: Senua's Sacrifice, and NieR: Automata all had multidimensional female characters.

While this is a step in the right direction, the industry as a whole needs to continue to hire more female game designers and female employees in general. A recent study done by the International Game Developer Association (2018) found that, "of the 963 participants, 74% identify as male, with only 21% identifying as female, 3% as transgender and 2% as other" (International Game Developer Association [IGDA], 2018). More female game designers mean that female characters will be written from a female's point of view. This will make the female character more well-rounded and relatable to women. Having more well-rounded female characters is a necessity for female gamers. A survey titled the Gamer Motivation Profile was taken by over 250,000 gamers worldwide and showed that the top two motivating factors for women are Completion and Fantasy. Having a character that you can relate to allows the fantasy to be more immersive and in turn will pull in more female gamers. As the industry shifts in this direction it will continue to become more globalized, reaching a broader audience than it currently has.

Localization: Going Global While Aiming Local

To reach larger audiences video game developers began changing the original language or adding subtitles to games. As time went on it became clear that game developers would need to change content and settings in games to make them more

immersive for different audiences. This latter idea is known as culturalization of video games, which is where you adjust the game so that the intended audience has its cultural beliefs, history, and politics reinforced. Being sensitive to a country's culture helps to make sure that your game can be sold in said country. For example, in Germany they have very strict rules about violence in video games. Blood and gore must be toned down. The game also can't have people blowing up or getting shot up. To localize a game to Germany developers, change humans into robots. This allows people to still play the games while allowing to the policies Germany has in place. Some examples of this are in the pictures below.





As can be seen in this one small example localization is a difficult and laborious task that is only getting harder. Ryszard Chojnowski a localization expert in video games for the past 20 years wrote a paper titled *The Practical Aspects of Video Game Localization* highlighting some of these issues. Chojnowski (2016) notes that, “video games are getting more voluminous, often reaching a million words. In comparison, J.R.R. Tolkien's famous novel – *The Lord of the Rings* – is "only" 470,000 words long” (p. 72). This process takes time making it difficult to translate a game to the local language at a reasonable cost. Finding a way to do this more cost effectively will no doubt help in the globalization of the industry.

In the past localization would be performed before the game was ever released and was already finished. In today’s industry it is completely different as Chojnowski (2016) put it:

Nowadays, access to an early version of a game in development is nearly impossible. That is the case mainly for security reasons – the developers do not wish to share any information concerning the game for fear of data leakage, which may have extremely negative commercial results (p. 76).

Not having all the relevant information of what the game is about makes it difficult to correctly translate what a character is saying. Think of it like trying to read a book where the only words are what each character is saying. You would lose all context of what the story is about. Chojnowski (2016) likened it to, “reading the subtitles for a movie without actually watching it” (p. 76). Getting the context wrong can have a negative effect on how the game is seen

If not translated correctly a quality game made in one country can become a joke in another. This was apparent when the old shooter game *The Zero Wing* was released in America. It was originally a Japanese made game from 1989 that was then translated poorly to English. One line in particular stood out for its poor translation. The line is, “All your base are belong to us.” They obviously meant for it to say something along the lines of, “We are now in control of all your bases.” Having the wrong translation can change the entire meaning of the game and what was originally intended. This could be disastrous if something were to be misconstrued as offensive.

Localizing games, the right way is going to be an important piece of the puzzle for the globalization of the video game industry. With new areas of the world becoming interested in video games, it’s going to take more effort than ever before to make sure these areas are represented correctly when localizing games. If games are translated to

just the top 10 most popular languages, they have a chance to reach over 160 countries. Its apparent that localization is a more integral part of making video games than ever before and must be thought of at all stages of releasing a game. Putting an emphasis on this part of game development will be important for the continued success of the globalization of games.

Awakening a Sleeping Giant

Until 2015 the United States was the leader in the global gaming market bringing in \$21.3 billion in 2014, compared to China bringing in \$18 billion that same year. The U.S. generated that revenue with a population of only 318.6 million people in 2014. China's population dwarfs the U.S. with 1.364 billion people in 2014. The reason that the U.S. brought in more money with a quarter of the population size was because China instituted a console ban in 2000.

As video games began to grow into the global business they are today, China's government felt that video games may have harmful effects on youth because of the violence in some games. The notion that kids would become violent because they play violent video games has been highly debated over the years but has never been proven. In fact, a study by Christopher J. Ferguson and John Colwell (2016) found that, "70.1 % of psychologists disagree or strongly disagree with the notion that violent video games make people violent" (Ferguson & Colwell, 2016). Per Lai (13) the Bill that was passed by the Chinese government stated,

As of the day this report is released, the manufacturing and selling of any electronic gaming equipment plus its parts and accessories headed to China are

stopped immediately. No company or individual can partake in the manufacturing and selling of electronic gaming equipment plus its parts and accessories headed to China. With the exception of processing trade, the import of electronic game equipment plus its parts and accessories through other forms of trade is strictly limited (Lai 2013).

The ban however didn't stop people from playing video games. The use of computers was still available to people who wanted to play games. Because of this, the Chinese gaming landscape became heavily dependent on PC gaming. This didn't mean that console games couldn't be found. Because of the government's use of the term "strictly limited" citizens were still able to find consoles. The PS2 was sold in China in 2004 albeit on a limited release. Nintendo worked with a Chinese company and released knock off versions of the N64 along with several of their handheld devices. Because they were difficult to get they didn't sell very well. PC gaming had already taken its place as the popular means of gaming.

The console ban was partially lifted in 2014 and then fully lifted in 2015. The ban being lifted maybe a sign that video games are becoming more accepted as a leisurely activity in China. Since the ban was lifted the gaming market in China has skyrocketed. This can be seen in Table 4 below.

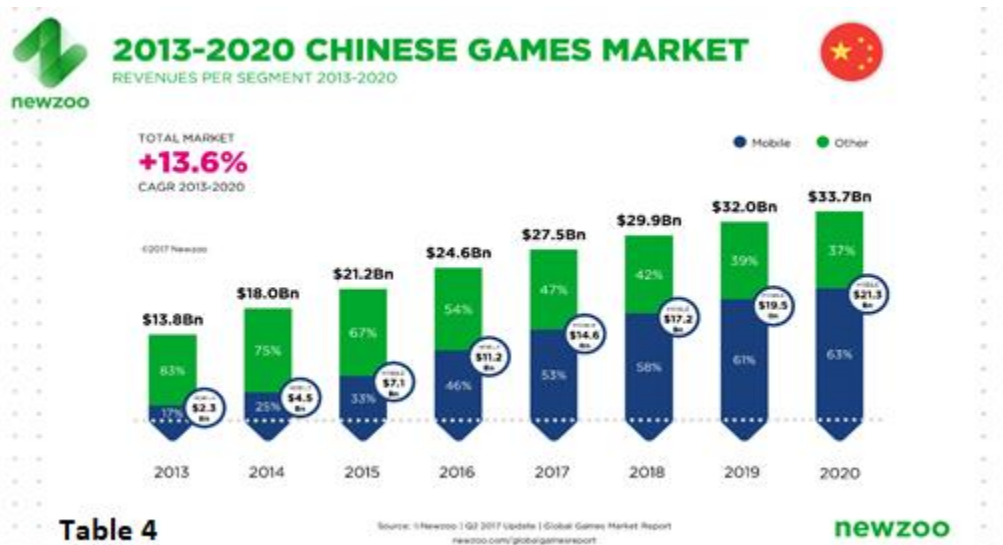


Table 4

The percentage of gamers playing across different platforms has climbed to 46%. Since 2015 the market has grown by \$8.7 billion and continues to be one of the fastest growing markets at an increase of 9.2% year on year. As the stigma around video games changes the current number of 565 million gamers in China will increase. China represents the market with the most growth potential and an example of the change in attitude toward video games in the past 10-20 years.

Part 2: Military Utilization of Video Games

Military has always been a driving force behind modern technology, and video games have always been entwined. But as video games become more advanced and reach a larger global audience this dynamic has started to shift. Militaries around the world have begun incorporating video games into all aspects of their organizations. From recruiting and training soldiers using games designed by the government, to video game technology being utilized in military applications, and even using virtual reality to heal soldiers with post-traumatic stress disorder. The following represent some of the ways that the game industry is having a profound effect on the military.

Section 5: Designing Video Games to Build an Army

America has been at the for front when it comes to integrating video game applications into military use. As one of the most advanced militaries in the world it's no surprise that in 2015 the U.S. spent \$598 billion on it's military. Most of the \$598 billion was spent on equipment and daily operations cost. To continue to be the best military in the world the U.S. has begun integrating video games into the recruitment and training of soldiers.

Military Recruitment

Most of us have seen the advertisements that different military branches have used to try to recruit new members. The Marines use the few the proud the Marines. The Navy uses a global force for good. The Army has used Go Army for years now. All have been successful ad campaigns that many of us can even here the jingle for each one. In the early 2000s The U.S. Army took notice of how it was being recognized and decided it

needed to rebrand. The recruiting tools that were being used on previous generations were becoming antiquated. The army realized that using video games as a recruitment tool could be a useful way to capture the younger generations.

In 1999 the US army funded the University of Southern California's Institute for Creative Technologies, or ICT. The Defense Department funded the program with a \$45 million grant. ICT's about page on its website claims, "ICT brings film and game industry artists together with computer and social scientists to study and develop immersive media for military training, health therapies, education and more." The focus would be centered around military training, a topic we will discuss later. In the same year as ICT was established, the U.S. Army provided \$12 million in funding to make America's Army. According to John Derby (2016), "one aspect of the Army's "Transformation," a long-term transition of organizational, technological, and conceptual changes in how the Army functions as well as its public image as a brand." The game would be a free to play game so that it could reach the broadest audience. America's Army was released on July 4, 2002 which happened to be the first July 4th since 9/11. The first version of the game was titled America's Army: Recon and would be followed by 41 more versions. The latest version is America's Army: Proving Grounds. Since its original release, America's Army has been downloaded hundreds of millions of times and at one point held the Guinness World Record for most downloaded game. It was apparent that America's Army had become one of the Army's best recruiting tools ever.

America's Army is a multiplayer first-person shooter that allows players to virtually explore the Army. It is set up so that the player must go through military

training by learning from a virtual drill sergeant. Like real life basic training, the idea is to indoctrinate players with real army values. The entire basic training portion of the game is solo gameplay. It's not until you graduate basic training that you are able to unlock the multiplayer online function of the game. At this point you are able to join up with other players to form squads of 2-16 players. You then compete against another squad of players in combat. The game is played with two teams of players fighting one another. Like in most first-person shooters, one team attacks and the other team defends. The interesting thing about America's Army is that you never play as anything, but an American soldier. In Robertson Allen's (2010) study The Unreal Enemy of America's Army describes the function that make this possible as a, "swapping paradigm" he explains that it, "means that two players on different teams appear to themselves as U.S. soldiers but to one another as enemies" (Allen 2010). This game function means that you at no point are to fire at a U.S. Soldier, this point is reinforced in the punishment for friendly fire in the game too. The punishment for friendly fire is the loss of prestige points in the game which effect a player's level in the game.

The game has been condemned by some because of its lack of realistic death. In the game when a player dies their character's body falls to the ground with no blood or any type of agony. Because of the lack of a realistic depiction of death it could be claimed that the game doesn't properly show what it is truly like to be in a military battlefield. Though this may be the view of some, the low cost and success of America's Army as a recruiting tool are unmatched by any of the Army's previous recruiting tools. America's Army is now playable on console, mobile devices, and even as an arcade

game. This goes to show just how effective video games can be as a recruiting tool for the military. Other countries may begin to follow the Army's lead and begin to develop video games as recruitment tools of their own.

Military training

When the Department of Defense funded the ICT program at Southern California they didn't plan to use it solely to make video game recruiting tools. In addition to the recruiting they wanted to design games that would help training active military personnel. As they worked on America's Army they also began developing Full Spectrum Warrior Command as a method to train soldiers in a simulated environment. Full Spectrum Command would then be converted into Full Spectrum Warrior (FSW) and released as the first military training application for home console. The gameplay of FSW is different than most first person shooter games. To properly play the game you can't run around and destroys everything. You must think like a true soldier. In FSW you control two squads of soldiers using the buttons on your controller. You are also able to call for support, read a GPS, and communicate with other units. Everything in the game is there to create an immersive environment to get soldiers to think in terms of real military strategy. In the opening paragraph of the manual (2004) it states, "Everything about your squad – from its soldiers to its equipment to its tactics – is the result of careful planning and years of experience on the battlefield. Respect that experience, soldier, since it's what will keep your soldiers alive" (p. 2). The goal of the game is to move your squad or squads through a warzone, killing Al-Qaeda and Taliban terrorist. Each soldier in your squad has specific training that can be utilized on the battlefield. It is not the players role

to control each soldier but instead to command when to hold position or fire on a location. Understanding when to move one squad while another lays down suppressing fire is a key concept in the game. FSW is viewed as a great training tool for understanding basic combat movement techniques. In the study Video games and the Future of Learning by David Williamson Shaffer, Kurt R. Squire, Richard Halverson, James P. Gee (2005) they highlighted FSW as a learning tool by saying, “Such epistemic games let players participate in valued communities of practice to develop a new epistemic frame or to develop a better and more richly elaborated version of an already mastered epistemic frame” (Shaffer, Squire, Halverson, & Gee, 2005). As video games reach a more global audience their use as a learning tool will become more evident.

After the financial success of FSW from its release to a commercial audience the military realized how beneficial video games could be in training soldiers. ICT was commissioned to find a way to train soldiers in learning a foreign language using video games. After invading Iraq, it became apparent that the U.S. military lacked enough Arabic speakers. ICT began working on Tactical Iraqi to solve this issue. Tactical Iraqi was part of a bigger training program that sought to provide “just-in-time” training to soldiers. This type of training was needed to get soldiers prepared as quickly as possibly using game simulations as the key component. Tactical Iraqi is a computer-based tutorial that trains soldiers in Iraqi gestures, culture, and language. The game is played using a keyboard, mouse, and headset. You play as a Sergeant John Smith who oversees building a girl’s school. Unlike America’s Army there are no weapons or fighting. The only way to complete the objectives is with spoken words and gestures. To learn how to converse

with the local's trainees must use the skill builder function of the game. Here you practice vocabulary and proper pronunciation of words with a virtual tutor. An example of the training can be seen in Image 6 below.



Once you have completed the skill builder training you are placed in active duty. Here you are put in different social settings and can practice everything you have learned.

Conversing and interacting with the public allows you to progress through the game. If you don't communicate properly you can be mocked or barred access from certain areas.

As Elizabeth Losh (2006) wrote, "Paralinguistic learning is an important aspect of the Mission Game, because the cultural meaning of particular gestures has consequences for speech acts" (Losh 2006). Making it important to learn the subtle nuances required when speaking with people from other cultures. Once trainees have completed the expert level they complete the game. The entire process takes about 80 hours and has been very successful in the field.

America isn't the only country to use video games as training tools for their soldiers. As video game technology has spread globally other countries have become

savvier to modifying games to be used for their own message. This was exactly what the Al-Qaeda did when they modified an American game named Quest for Saddam to Quest for Bush in 2006. The game featured Al-Qaeda members fighting American forces through six levels to eventually reach and kill President George W. Bush. The game was released by the Global Islamic Media Front to both recruit and train new members, similar to America's Army. Other countries have followed America and begun designing their own video games to use for training. China released Glorious Mission in 2011 after spending 32 months to develop it. It is the first online military game released by the People's Liberation Army. The game is like other military first person shooter games. There are two different versions of the game. The public version is free to anyone with a Chinese Resident Identity Card and is an online multiplayer game. The military version is a single player campaign game that features eight different missions. IN the military version soldiers go through basic training, individual soldier tasks, and squad confrontation. The game was very successful with over 300 million online users.

These are just a few of the examples of how video games are being used as training tools for military use. As graphics and realism in video games continues to mimic real life they will be implemented much more frequently. It bares to note that the recent rise in Virtual Reality (VR) software will create more immersive training simulators than ever before. We will discuss later how VR is being used to help soldiers who have post partem stress disorder after returning home from war. As video games become global we will see more countries looking for ways to use them for recruiting and training soldiers.

Section 6: Utilizing Gaming Technology in the Military

Video Games can be used for much more than just recruitment and training soldiers. Different pieces of technology we use in video games has been repurposed for military use in recent years. These include using Xbox controllers as a means to control different systems, the interface soldiers use to fly drones and even linking 2000 PS3's to form a super computer. As militaries around the world realize that they can use existing technology from the consumer market instead of developing it themselves, more video game technology will be used for military application.

Drones

Currently unmanned aerial vehicle's (UAV) also known as drones are becoming increasingly easier to develop around the world. Drones are aircrafts that don't have humans onboard to pilot them. Instead they are linked to a pilot who uses a ground-based controller to fly them. The idea for a drone was thought of as early as the late 1800's it wasn't until the late 1980's early 1990's that technology had advanced enough that military application made sense economically. The first real military use of drones happened in 1991 during the gulf war. Drones were used in situations that were too dangerous, dirty, or dull for human pilots. These drones were mainly used for surveillance and scouting. As time went on the military realized they could be used for more. The MQ-1 Predator drone was developed and in late 2001 after September 11th was used to drop Hellfire missiles on Pakistan and Uzbekistan. This would be the first use of a drone to attempt to kill a high value target. The U.S. military recognized the value of

UAV's and continued to mass produce them. As of 2012 the U.S. Airforce manned nearly 7,500 drones which accounted for nearly one third of all aircrafts.

With the massive increase in drones being commissioned the military needed soldiers to pilot them. As traditional military pilots were being trained to make the switch to UAV's they realized they needed to look at a larger talent pool. They looked no further than the people who practice flying drones as a hobby, video game players. In many of the first-person shooter war games it is common to have to pilot a UAV at one point or another to drop a package ore bomb the enemy. This mechanic in the game made the military take notice and consider if video gamers would make good drone pilots in real life. A 2017 study titled Unmanned aerial systems (UAS) operators' accuracy and confidence of decisions: Professional pilots or video game players sought to find out if video gamers would be able to pilot drones as well as traditional pilots (Wheatcroft, Jump, Breckell, & Adams-White, 2017). The study tested private pilots, professional pilots, and video game players. A flight simulator was set up to place the participants into as real of a life like situation as possible. The simulator featured what would usually be seen by UAV pilots and can be seen in the picture below (Wheatcroft, Jump, Breckell, & Adams-White, 2017).



The experiment had a participant go through a short flight and make decisions along the way then provide how confident they felt in this decision. At the end of the experiment it was found that video game players should certainly be considered to fly UAV's. They found that gamers exhibited strong decision-making skills while not becoming too overconfident in their decisions. This shouldn't be a shocking outcome as video game players must be decisive and be adept at decision making skills. It's been found that video games strengthen a person's ability to make quick decisions with no loss of precision, a skill known as probabilistic inference. Utilization of this skill can be easily seen in fasted paced shooter games where a player must take in their surroundings and make a strategic decision in a matter of seconds. Probabilistic inference is a highly translatable skill to piloting a UAV because the user interface and controls are becoming

increasingly closer to a video game. Even going as far as using Xbox controllers to pilot them, which will be discussed in the next section.

The U.S. isn't the only government producing drones to be used in warfare. America was once the only country building drones but as technology increased and the cost came down other countries began building drones too. China has grown into America's biggest competitor for drone production. Currently China exports drones to countries like Pakistan, Saudi Arabia, United Arab Emirates, and Iraq. While the U.S. only exports to the United Kingdom and Italy. There has been a movement to keep these drones out of the wrong hands. America has instituted more stringent requirements when exporting drones. As the technology grows and production becomes cheaper more countries will soon follow in building their own drones which comes with the possibility of more gamers being recruited to fly them.

Military utilization of the Xbox controller

Every branch of the U.S. military has been quick to adopt video game controllers for use in a myriad of different ways. The Army was the first to implement an Xbox 360 controller. In 2003 the Army developed the future combat systems initiative. They touted the program as being the biggest leap in modernizing the Army since World War II. The program looked to use modern high-tech items like drones, sensors, and robots to help troops on the battlefield. The 360 controller is used to pilot small unmanned robots that are built to perform jobs such as scouting or bomb defusal. This can be seen in the picture below (Arendt, 2017).



The reason they use the Xbox 360 controllers to pilot these robots is because they have joysticks that make it easy to maneuver. The controllers have six buttons and four triggers that can all be programmed independently to facilitate any needs that might arise. The Xbox 360 controller plugs in using a USB port which is prevalent in most computers and works Windows, Linux, OS X. All of which are common software in most technology. The biggest reason they have implemented the Xbox controller could be that many soldiers were already comfortable with using the 360 controllers because they had at the very least played a game in passing. Because of the versatility and comfortability Xbox 360 controllers began to be implemented into other branches of the military.

As mentioned in the previous section the Air Force uses Xbox 360 controllers to pilot their drones. The number of hours that the controllers are being used to pilot drones means that they must be able to stand up to a good amount of wear and tear. The 360 controllers had shown that they were capable of being used for hours on end with no

problems. Millions of gamers had already used the controllers, so the military could rest assured that they had been thoroughly tested. Best of all is that the military wouldn't have to spend money on designing and developing new technology because they could use what already existed. As more countries develop and acquire drones the U.S. Military needed a way to combat enemy UAV's. The military's answer to fighting drones was to design the High Energy Laser Mobile Demonstrator or HEL MD. The energy laser is mounted on the back of a large truck and uses a 10-60 kw laser depending on the circumstances. The laser can track and destroy objects traveling upwards of a thousand miles per hour by shooting a dime sized beam at the target. The operating control for this high-tech piece of machinery is the exact same as the one flying the drones, a 360 controller. In a video released by Boeing, the company that designed the HEL MD, a representative claimed that they used the controllers because, "it's something they can pick up and it feels natural to them" (Boeing directed energy 2014).

The most recent military application of a video game controller is the Navy's use of the Xbox 360 controller in submarines. In 2017 the Navy announced that the USS Colorado would be the first Virginia Class attack submarine to use an Xbox 360 controller to control the pair of photonics masts. The photonic mast replaces the old periscopes. Instead of one-person peering into the scope it is now shown on monitors. The photonic mast can see 360 degrees using high resolution cameras. Originally the photonic mast was operated using a helicopter style stick system. The reason for the change came after the Navy sought to find out what they could do better. Per Brock

Vergakis (2017) Lt. j.g. Kyle Leonard, the USS John Warner's assistant weapons officer, claimed,

The Navy got together and they asked a bunch of J.O.s and junior guys, 'What can we do to make your life better? And one of the things that came out is the controls for the scope. It's kind of clunky in your hand; it's real heavy (Vergakis, 2017). It also didn't hurt that the 360 controllers cost \$20 opposed to the \$3800 price tag of the original joy stick controls that couldn't be used for anything other than the original purpose. If the joy stick controls were to break they would have to figure out a way to get a new one to a submarine that could be across the world. John Warner's assistant navigator, Senior Chief Mark Eichenlaub, put it, "I can go to any video game store and procure an Xbox controller anywhere in the world, so it makes a very easy replacement" (Vergakis, 2017). As the military continues to work to lower cost the idea of using a 20\$ controller will look more appealing. This matched with the comfort that the current and future generations have using game controllers will only drive the military further into the video game market place.

Air Force PS3 Supercomputer

To most liberal use of video game technology may show just how powerful it really is. In the early 2000's tyrannical dictator Saddam Hussein bought a reported 4000 PlayStation 2 consoles in hopes of daisy chaining them together to create a super computer. Daisy chaining is the process of connecting several devices together in a linear system. The daisy chained PS2's would allow him to design nukes and models for long range missiles. The graphics capabilities of a PS2 were better than a desktop PC at the

time. It was never confirmed if Saddam was able to build a supercomputer using PS2's or if he was able to create any weapons with it.

When the PlayStation 3 was released the U.S. Airforce recognized that there might be a financial benefit to daisy chaining consoles together. They originally bought 336 PS3's to be put together to form a super computer. The Air Force used these PS3's to run Linux which is a free open source operating system. The cost of building this type of supercomputer compared to more traditional super computers developed by IBM, is said to be one tenth as much. Jon Stokes (2009) from Ars Technica found in a Justification Review by the Department of Defense,

“With respect to cell processors, a single 1U server configured with two 3.2GHz cell processors can cost up to \$8K while two Sony PS3s cost approximately \$600. Though a single 3.2 GHz cell processor can deliver over 200 GFLOPS, whereas the Sony PS3 configuration delivers approximately 150 GFLOPS, the approximately tenfold cost difference per GFLOP makes the Sony PS3 the only viable technology for HPC applications” (Stokes 2009).

The Air Force used the daisy chained PS3's to research the design of high definition imaging systems that could be used for radar. It was so cost effective that the Air Force decided to buy 2200 more PS3's to be connected to the existing 336. In the end, 1760 PS3's was connected to form the world's 33rd largest computer and the fastest computer in the Department of Defense. Now days the PS3's technology is outdated and would need to be replaced with the current generation of consoles. This would more than likely be the Xbox One X. It will be interesting to see if the trend of combining video game

consoles together continues and if other countries will begin creating their own super computers using similar concepts. As other countries realize the advantage of using video game technology to build a better military, warfare as we know it could be forever changed.

Section 7: Militaries Use of VR to Treat PTSD

Virtual reality (VR) comes in many different forms, but the most used type of VR utilizes a head mounted display (HMD). Virtual reality was thought of in the 1950's but didn't become a full-fledged working device until the 60's when Morton Heilig created the Sensorama. This device used an HMD but had users sit in a chair that produced odor and moved to create a realistic sensation. The first VR had players riding a bike through Brooklyn and gave the players somewhat of a realistic experience. Since, Sensorama VR has made massive strides, especially in the past few years. In 2016 the Oculus Rift, HTC Vive and PlayStation VR were all released along with several other home VR products. A PC is needed to run most of these VR setups while others require a PlayStation or a specific type of smart phone. The two most popular HMD VR's are the Oculus Rift and HTC Vive. Both devices utilize a head mount that looks like goggles and plugs into the PC. Both also have tracking sensors around the room to create a fully immersive environment. The military has used this technology in several different ways. The most prominent use has been to help soldiers with post-traumatic stress disorder.

Post-traumatic stress disorder (PTSD) is a condition of persistent mental and emotional stress that usually results from some type of injury or severe psychological trauma. This usually causes people to have trouble sleeping, a lack of emotions

concerning others, and/or constantly reliving the experience. Examples of ways that one can become afflicted by PTSD include being attacked, being in a car accident, or being in warfare. PTSD can occur in people that also witness others who are involved in these situations. Because of the violence and carnage many soldiers witness in warfare, it's not surprising that many have PTSD. The United States Office of Veteran Affairs reports that, "about 11-20 out of every 100 Veterans (or between 11-20%) who served in OIF or OEF have PTSD in a given year" United States Office of Veteran Affairs. Operations Iraqi Freedom (OIF) and Enduring Freedom (OEF) represent the most current wars that America is fighting in, but veterans of other wars have also been diagnosed with PTSD. It is estimated that Veterans suffering with PTSD from the Gulf War and Vietnam range from 12% to 15% respectively. Soldiers returning from war who suffer with PTSD have a hard time maintaining their marriages, holding down jobs, and substance abuse. These numbers only include the soldiers who have come forward and been diagnosed. This is not always the case. Current soldiers in Iraq feel that visiting a psychiatrist would cost you the respect of other soldiers.

As the cost VR has become more reasonable for consumers, and it has been used more broadly in its application. One of the ways that VR has been used is to help soldiers with their PTSD. Because VR is seen as a video game to many soldiers feel more comfortable using it to overcome issues rather than going to a shrink. U.S. Marine veteran dubbed "Travis Boyd" stated,

I didn't want to have it on my military record that I was crazy. [...] Infantry is supposed to be the toughest of the tough. Even though there was no punishment

for going to therapy, it was looked down upon and seen as weak. But V.R. sounded pretty cool. They hook you up to a machine and you play around like a video game (Halpern, 2008, para. 13).

VR uses exposure therapy to treat PTSD. Exposure therapy exposes the patient to whatever anxiety or fear they have in a controlled environment where they can overcome it. It is believed that PTSD is a result of a fear-based stimulus and with exposure therapy that fear can be modified by incorporating a safe structure that retains the fear while introducing a safe environment. This allows soldiers to relive the traumatic experiences in a safe environment and overcome the fear associated with them. Virtual Iraq is a VR exposure therapy program being utilized to help soldiers with PTSD.

In 1997 a group of researchers created Virtual Vietnam; a VR simulator that would be used to help those that suffer PTSD from the Vietnam war. A case study conducted in 1999 showed that the VR treatment had worked (Rothbaum et al., 1999). The study was conducted using a Vietnam War veteran that had not been successful in any other setting. The VR program placed the veteran in two different virtual environments. The first was in a helicopter flying over the jungle, and the second was on the ground in the jungle. Putting the veteran in these two types of environments triggered the memories of the traumatic experience he went through and in doing so made him relive that experience. As he participated in the VR exposure therapy he increasingly got better. It was reported that by the end of the study, “The patient experienced a 34% decrease on clinician-rated PTSD and a 45% decrease on self-rated PTSD” (Rothbaum et al., 1999).

A Doctor who worked on Virtual Vietnam and at ICT who developed Full Spectrum Warrior had the idea of combining the two to help soldiers returning from Iraq. Dr. Albert “Skip” Rizzo working with Jarrel Pair, another scientist who worked on Virtual Vietnam, had a prototype ready by 2004. They called the prototype Virtual Iraq. Like Virtual Vietnam, Virtual Iraq uses virtual reality to fully submerge soldiers into Iraq. They achieve this with the use of Head Mounted Displays (HUD), sounds, sensations, and smells to mimic the environment of an Iraqi warzone. They used Full Spectrum Warrior as the setting and place the patient in the game in a first-person point of view. The patients are given an M-16 replica rifle that is weighted so that they feel fully immersed in the VR environment. Doctor’s use Virtual Iraq over the course of thirteen weeks to help patients overcome their PTSD. The repetition of going through the traumatic event causes it to become trivial. One marine that went through the treatment claimed that, “You go over the story over and over again. I got so bored with my own story that it no longer elicited a reaction” (Parkin,2017). This is the reason that use of exposure therapy through VR has been so successful. As the stigma around PTSD changes and more soldiers come forward, VR can be the instrument to help them. With VR becoming more readily available it may one day be common for bases to use VR to treat soldiers as soon as the traumatic experience happens.

Conclusion

The military and video game industry look markedly different today than even 20 years ago. As the technology used to make video games continues to progress so will the market for video games around the world. The military will continue to utilize this technology and as different governments realize the capabilities of video games that utilization will spread. This is just the beginning of militaries using video games in new and exciting ways. As governments' perceptions of what video games are change from how they were perceived in the past it will be interesting to see what the next step in this relationship is. The globalization of video games isn't slowing down anytime soon and with eSports and VR on the rise it's only going to spread faster. With commercial VR being relatively new, as of the last few years, the military should look to how it can weave VR into everyday use. One thing is for certain, video games will continue to change the way that militaries operate.

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