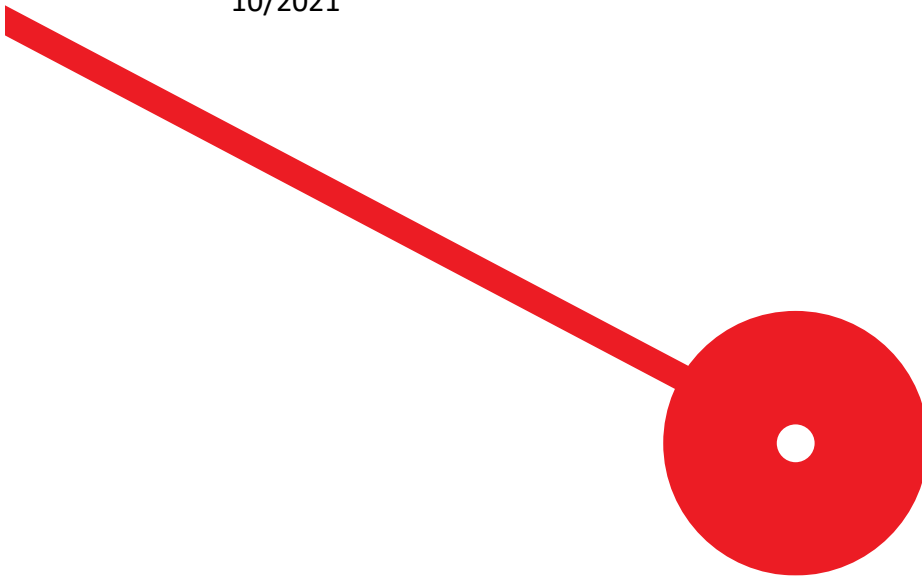




Analysing the modern video game industry and *Assassin's Creed Origins* case analysis: Learning with video games

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Resumo

Com o recente crescimento da indústria dos videojogos, este tipo de meio de entretenimento está cada vez mais presente na nossa cultura. Hoje em dia, é quase impossível olhar para as indústrias emergentes e não considerar a indústria dos videojogos como um dos principais concorrentes no sector do entretenimento, devido ao seu rápido crescimento na última década. Esta dissertação pretende fornecer uma visão geral deste crescimento e, ao mesmo tempo, acrescentar importantes contextos à indústria, à sua evolução e aos principais intervenientes. Por outro lado, irei também demonstrar algumas representações comuns dos videojogos, os seus benefícios, e o seu impacto na cultura moderna.

Seguidamente, apresento também uma análise de caso com um videojogo único de uma franchise popular (*Assassin's Creed Origins*) que utiliza um dos seus modos de jogo como uma ferramenta de educação. Vou também explorar exemplos de gamificação e outros benefícios relacionados com videojogos que poderão revelar-se cruciais num futuro próximo. Para além disso, esta tese centrar-se-á também no futuro dos videojogos e na forma como o seu sucesso lançou novas e excitantes carreiras na indústria. Finalmente, abordarei o impacto da pandemia da COVID-19 no sector do entretenimento, e mais precisamente na indústria dos videojogos.

Palavras-chave: videojogos, educação, gamificação, setor de entretenimento, pandemia

Abstract

With a recent rise of the video game industry, this type of entertainment medium is ever-more present in our culture. Nowadays, it is almost impossible to look at emerging industries and not consider the video game industry as one of the top contenders in the entertainment sector, due to its rapid growth in the last decade. This dissertation aims at providing an overview of this growth and, at the same time, add important context to the industry, its evolution and major players. On the other hand, I will also demonstrate some common representations of video games, their benefits, and their impact on modern culture.

In addition to that, I provide a case analysis with a unique video game from a popular franchise (*Assassin's Creed Origins*) that uses one of its game modes as a tool for education. I will also explore examples of gamification and other video games' related benefits that could prove crucial in the near future. Furthermore, this thesis will also focus on the future of video games and how their success has launched new and exciting careers in the industry. Finally, I will address the impact of the COVID-19 pandemic on the entertainment sector, and more precisely on the video game industry.

Key words: video games, education, gamification, entertainment sector, pandemic.

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Abbreviation Index

CPU - Central Processing unit

CS: GO – Counter Strike: Global Offensive

FPS – First person shooter

GPU – Graphics processing unit

GTA – Grand Theft Auto

MSRP - Manufacturer's suggested retail price

PC – Personal Computer

PUBG – Player Unknown's Battlegrounds

RDR2 – Red Dead Redemption 2

RPG – Role playing game

Introduction

Since their inception, video games have always sparked interest and curiosity. When *Pong* was released by Atari it was a massive but hard to define success, due to the novelty of this new entertainment medium. Then arcades were developed due to growing demand, and home consoles followed shortly after. Nonetheless, this proved to be just the beginning of an industry that would go hand in hand with technology in the years to come. International companies such as Nintendo, Sony and later Microsoft would rise to meet the public's demand for better, more compact and portable consoles so that people could enjoy video games everywhere.

However, the real game changer was still to come. With the creation of the internet, arcades and other similar consoles were now a thing of the past. Technology had finally caught up with the dream of playing video games with players all around the world, a true sign of the era of globalization. After this revolution, companies started to pay more attention to the video game phenomenon and both publishers and video game studios were spreading throughout the globe to meet demand. In the 2000's, video games were already infused with popular culture, and the video game industry was growing exponentially, year after year. (Wallach, 2020)

Nowadays, technology has allowed video games to reach unforeseen heights, and more than 3 billion people around the world are video game players, due in part to mobile gaming. (J.Clement, 2021). Furthermore, video game technology is present everywhere, from the automotive industry (Alba, 2020) to modern architecture. (Staes-Polet, 2021). In fact, due to 3D scanning technology used for *Assassin's Creed Unity*, a video game could help rebuild the Notre-Dame Cathedral. This happened because the developers of the video game spent over 5000 hours researching and analysing the cathedral for their recreation of 18th century France. (Gilbert, 2019). This and other intercultural characteristics are possible due to the symbiotic relationship between video games and technology, and this is part of the reason that led to my choice of analysing the video game industry.

My aim with this thesis is to perform an analysis on the video game industry of today, coupled with a case analysis of *Assassin's Creed Origins*, to help me understand the different ways to engage with video games in nowadays intercultural and global economy.

In the first chapter of my thesis, I will discuss the beginnings of the video game industry together with its slow but steady rise into the culture mainstream. I will also mention and give a brief introduction to the top leading companies in the video game industry and how their influence is shaping the future of the industry. In addition to this, I will provide context of today's video games cultural landscape and which game systems are used, together with their market share in the video game industry. I will also mention the required professionals involved in the creation of a modern video game, and how indie games differ from AAA games in a general sense. Moreover, I will challenge the common representations of video games in mainstream media, with the support of recent studies and articles.

In my second chapter, I will delve into the video game *Assassin's Creed Origins* and also perform a case analysis with a focus on its *Discovery Tour* mode. With this mode, the player enters the game world and is free to explore it within a museum style narration, giving interesting and curious facts about Ancient Egypt (the game's setting). Together with the necessary context of gamification and other examples of video games in education, I will draw some interesting conclusions in regards to the cultural benefits and advantages that games can provide us nowadays.

In my third chapter, taking into account the recent COVID-19 pandemic, I will analyse its effects on the entertainment sector, more precisely on the video game industry. This will help establish a clearer picture on how the video game industry thrived amidst a global pandemic, while other industries in the entertainment sector (cinema and music) struggled. Furthermore, I will explore the future of the video game industry and how it has changed entertainment as we know it, due to the rise of video game streaming platforms such as Twitch. These and other aspects will help me draw conclusions and help me in my goal of analysing one of the most emerging and exciting industries of modern times, the video game industry.

1. The Video Game Industry

Throughout the years, the video game industry has been evolving into this great juggernaut that we know today. It has far surpassed the music and cinema industry, both in revenue and in popularity. It has steadily grown each year, making it one of the best and most emerging industries of modern times. (Witkowski, 2021)

With this enormous growth came a vast cultural presence that can be witnessed all over media, in tv shows, movies and books. Video games are an all-encompassing art form. They can be perceived as distractions, or as one of the most complete forms of entertainment, incorporating music, cinema and literature into a single art form.

Nowadays, no longer do we associate games with children or teenagers and mindless occupations for the uneducated. Video games are now considered an art form and are globally praised for their technological advancements and innovations in entertainment. (Melissinos, 2015)

Due to these innovations, they allow the player to have personalized experiences with unprecedented control, thus their appeal has grown immensely in recent years. Technology has turned video games into the next big sensation, overshadowing many other competitors in the entertainment sector, and they are now enjoyed by over 3 billion people all over the world. (J.Clement, 2021)

Furthermore, with the growth of the video game industry, tech companies have realized the potential inherent to video games and are now creating subsidiaries with intent of entering this new exciting market. Companies such as Apple and Microsoft are now preparing the release of new appealing products, like subscription service models, that have kept gamers all over the world eagerly waiting. (Gurman, 2021)

However, video games are not easy to develop. In this initial part of my thesis, in addition to exploring the notions mentioned above, I will analyse what constitutes a development crew and the manpower behind a video game, and how that affects the end product. Moreover, I will also discuss their cultural impact in recent years, in the form of common representations, and how the media have affected the way we now perceive video games.

1.1. Evolution Through the Years

The video game industry has had an incredible evolution throughout the years. It all began in the 1970's with Atari's release of *Pong*. The American brand developed a game simulating the sport of table tennis or ping pong, and it turned out to be a massive hit, introducing one of the first video games to the world. Furthermore, Atari were also the first to create a home video games console to support their games, and they had the first ever console to reach 1 million units sold. (Wallach, 2020). From then on out, a series of arcade games would captivate millions of players worldwide, such as *Space Invaders*, *Donkey Kong* and *Pac-Man*. With these games came the famous arcade machines, that by the year 1982 were making more money than the music industry, a clear sign of the bright future of the video game industry. (Wallach, 2020)

The 1980's saw the introduction of the famous NES (Nintendo Entertainment System), which completely dominated the gaming market for years. The Japanese company had an effective marketing campaign and high-quality video games to back it up, such as the now worldwide famous *Super Mario Bros*. Nintendo also released the famous hand-held console *Gameboy*, which saw enormous commercial success. However, other major players were beginning to keep up with Nintendo, such as Sega with their *Sega Mega Drive*, and Sony with the first iteration of the *PlayStation*, that came out in 1994. The latter, was a complete game changer due to the fact that it used CD-ROM's instead of the standard game cartridges. This new technology greatly enhanced storage capacity for games, and it made the *PlayStation* the first console to reach 100 million units sold. (Wallach, 2020)

However, it was in the new millennium that video games really achieved their potential. With the rise of technology and the creation of the Internet, video games could now be played online with other players from across the globe, which unlocked almost limitless possibilities to game developing companies. Microsoft was one of the first, with their Xbox Live gaming platform, which they used with their console Xbox and also with Windows PC. This platform allowed players to voice chat while gaming and offered stable connections in online multiplayer modes, quickly setting the standard for other subscription type services. Nowadays, these types of subscriptions are standard and the video games market is dominated by three game systems: PC (Personal Computer), Consoles and Mobile Gaming.

1.2. Industry Leading Companies and Studios

Nowadays, given the current growth of the video game industry, there is no surprise when we look at the public companies that are making the most profit with them. Companies like Tencent, Sony, Apple and Microsoft are giants in their own fields, but they owe a large part of their portfolio to video games. Represented in the image below, these were the 10 companies making the most money from video games, in 2017. (Armstrong, 2019)

This chart shows us that, in 2017, several public companies obtained a great deal of rev-

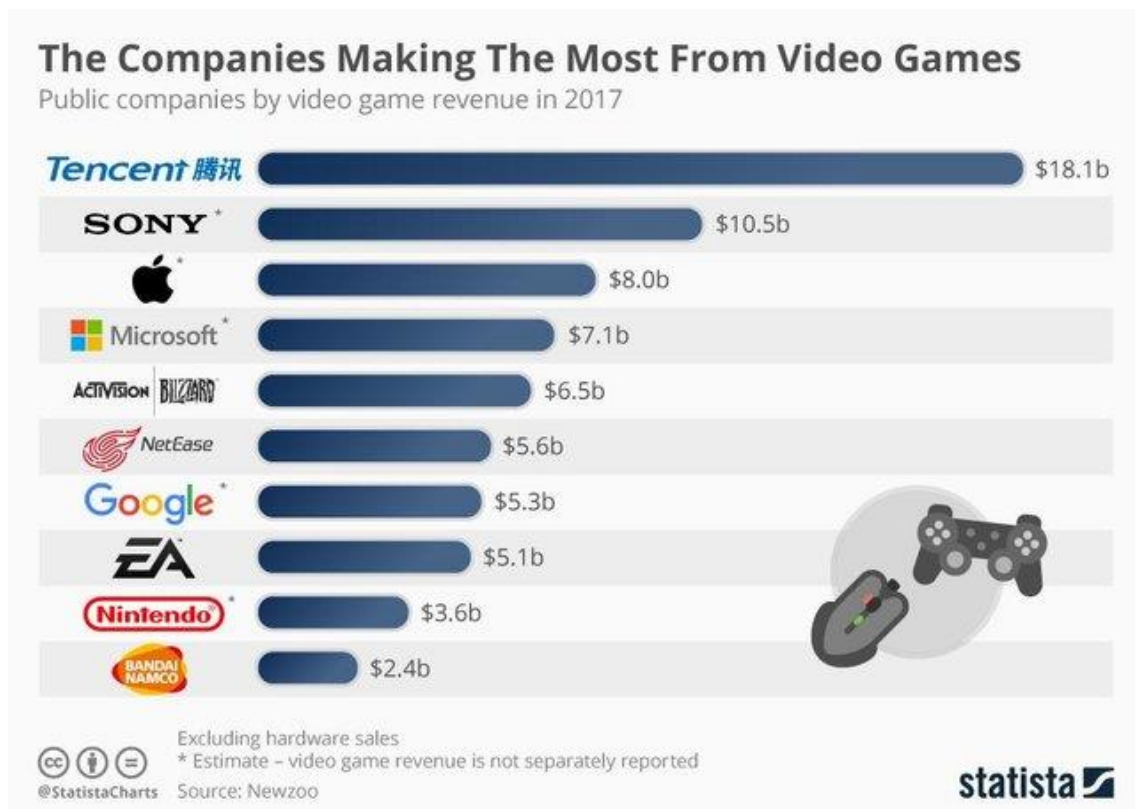


Figure 2: The Companies Making the Most from Video Games

Retrieved from: <https://www.statista.com/chart/8870/tencent-is-top-of-the-game-revenues-leaderboard/>

enue from video games. Firstly, the Chinese tech giant Tencent with \$18.1billion, followed by Sony with \$10.5billion, Apple with \$8.0billion and Microsoft with \$7.1billion. These companies have a huge and diverse portfolio of investments, however their gains with the video game industry show that, what was once a million-dollar market, is now a billion-dollar gold mine.

- **Tencent**

The Chinese megacorporation Tencent is considered to be the biggest video games company in the world. Currently occupying the #197 position of the Fortune 500 rank, Tencent has a varied portfolio, ranging from telecommunications to internet service provider, being one of the biggest companies in China. (Zhang, 2020). Its presence in the video game industry is clear and undisputable due to games like *Fortnite* (Epic Games) and *League of Legends* (Riot Games), whose developing companies fall under the Tencent Holdings umbrella.

- **Sony Interactive Entertainment**

Another giant of the industry, Sony is not only responsible for the best-selling video games console on the market (PlayStation), but also for a wide range of games studios. Among them, the most notable are Naughty Dog, creators of the critically acclaimed *Last of Us* and *Uncharted Series*, and Insomniac Games, who are behind the recent *Spider-Man* adaptations into video games. With a tremendous presence in various markets such as TV's, consumer electronics and the cell phone market, Sony is a very well recognized brand around the world.

- **Apple**

“With a market capitalization of 2.25 trillion U.S. dollars as of April 2021, Apple was the world’s largest company in 2021” (Szmigiera, 2021) The company behind the iPhone, iMac and iPad, Apple is one of the world’s most recognizable brands. They also have invested a considerable amount into video games (\$500 million) (Webb, 2019), having created their own gaming service, the Apple Arcade, which I will elaborate more in the Subscription Models in Gaming part of this chapter.

- **Microsoft and Xbox Game Studios**

It is impossible to mention Sony Interactive Entertainment without mentioning Xbox Games Studios. Owned by the parent company and tech giant Microsoft, they are also the makers of Sony’s rival console Xbox. Microsoft’s game studios are responsible for two of the most famous gaming franchises, *Gears of War* (The Coalition) and *Halo* (343 Industries). They also have one of the most popular gaming subscription services in the industry, *Xbox Game Pass*, that benefits both Xbox and PC players.

1.3. Video Game Systems of Today

As we have seen in the first part of this chapter, video games systems have changed a lot, since the early iterations such as arcades and handheld systems used in the 1970's and 1980's. However, nowadays the market is dominated by PC, consoles and mobile gaming.

- **PC Gaming**

A multiple purpose machine with a long story behind it, the PC is an unrelinquishable tool of our modern society. Akin to the cell phone in that regard, we have created a symbiose around the modern computer that allows us to be faster, more efficient and enjoy a world inter connected. However, since the early 90's, the personal computer has been establishing itself as one of the main systems for gaming. One large advantage it possesses over other gaming systems, is the capacity for constant upgrades of single components in the PC. This allows the user to stay up to date with recent and more demanding games, that require more graphic and technologically advanced components, providing one of the best gaming experiences, currently. Be that as it may, a "gaming" computer is much more expensive than a normal PC. As I have mentioned, its components must be of current generation and the price tag that comes along with that its very steep indeed. For reference, the MSRP of the main components of a gaming PC (CPU and GPU) can range from 150 euros on the low end versus 1500 euros on the high end, and that is just for a single component. This and other reasons can make more gamers opt for the more traditional way of simply buying a current generation console that, although fairly expensive, does not come close to the prices mentioned above.

- **Console Gaming**

On the other hand, there are the gaming consoles. Where the PC is able to tackle multiple tasks, including gaming, it is mainly used for work and productivity purposes. Modern consoles however, serve only the purpose of gaming.

The main gaming consoles of today are: The PlayStation. Xbox and Nintendo Switch. Being the more recent of the "big three", Nintendo Switch is a portable console released by Nintendo in March of 2017. It launched to critical acclaim and praise, and it's the fastest selling portable gaming device, shattering records as recent as last year.

The other two, however, stand on a league of their own. Coming a long way from their 1994 and 2001 releases, The PlayStation and Xbox have dominated the console market

ever since, establishing a dual competition that has divided gamers ever since. Manufacture companies Sony and Microsoft (PlayStation and Xbox, respectively) have invested millions upon millions to ensure their product comes on top of the other, with each iteration of console generation. As of today, we find ourselves at a changing of the guard between the eight and ninth generation of consoles, with the more recent ones coming out just 2 months ago (November 2020): the PlayStation 5 and the Xbox Series X. (Williams A. , 2021)

- **Mobile Gaming**

With the rise of smartphones everywhere in the world, came an untapped market for video game developers and the video game industry. Each and every year, hundreds if not thousands of smartphones are released to the public, each better than last year's model and with evermore powerful processors. It was only a matter of time until the video game industry started prioritizing our most trusted companions with a myriad of games ready to focus our attention span for hours at a time.

“By the end of 2019, the global gaming market is estimated to be worth \$152 billion, with 45% of that, \$68.5 billion, coming directly from mobile games.” (Kaplan, 2019) It's no surprise then, that almost half of the gaming market belongs to mobile gaming. Nowadays, almost everyone has access to mobile phones, making them the primary platform for gaming in the world right now. When compared to gaming consoles or PC, which can be quite expensive and are hardly portable, smartphones offer the perfect balance between usability and leisure. Add to this, the microtransactions factor (which I will elaborate further in this thesis), and the ad revenue from advertisements with the game, you have a recipe for success.

However, in 2020, due to the pandemic and subsequent obligatory confinement all over the world, the mobile gaming market rose to new heights. According to a report from the State of Mobile Gaming 2021, (Billing, 2021):

- In 2020, 36% of all mobile app's downloads were games, which translates to 80 billion downloads out of 218 billion total;
- An increase of 35% in hours spent gaming on smartphones was also observed, from 2019 to 2020.

1.4. Subscription Models in Gaming

With the rise of streaming services such as Netflix, HBO and Amazon Prime, the television market quickly changed, and users started to replace regular cable television for these new forms of entertainment. Recently, the video game industry has taken cues from these streaming giants, and companies like Microsoft, Sony and Apple have implemented similar tactics. Nowadays, gaming subscription services are very common and have attracted both console and PC gamers.

- **Xbox Game Pass**

One of the most successful gaming services, Xbox Game Pass, is available for both Xbox and PC players. For \$9.99 a month (prices vary between region), the player gets access to more than 100 games, from various genres and studios. It also offers the ability to buy games with discounts, and this gives players the chance to play Xbox exclusive games on the same day they are released. With Microsoft's latest acquisition of game studios, they now hold 23 first party gaming studios, whose games have become available on their game service. These acquisitions by the tech giant have transformed Xbox Game Pass into a very attractive and sustainable business model. (Fernandez, 2021)

- **PlayStation Now**

Sony's response to Xbox Game Pass is PlayStation's gaming service, PlayStation Now. It also starts at \$9.99 per month and works with both PlayStation and PC. It offers a wide array of games from both previous and current console generations, with some exclusive games to Sony's platform. In addition to this, PlayStation Now offers players the option to download games and play them on the console. (Fernandez, 2021)

- **Apple Arcade**

A gaming service designed purposefully for Apple users, Apple Arcade can be used with an iPhone, iMac, iPad and with Apple TV devices. For \$5 per month, it features a large number of games from industry leading studios such as Ubisoft, Square Enix and Bandai Namco, and allows users both a mobile and console experience through this gaming service. New updates and games are added every week, and due to the high number of Apple users, this gaming service has been deemed a success. (Brown S. , 2020)

1.5. Highest Grossing Games of the last 10 years

The last decade has been very important for gaming due to many advances in technology and also to the rise of the video game industry as a whole. The highest grossing games of the last 10 years represent a small sample of all games released in that period but, at the same time, they represent the pinnacle of the industry. Many of these games have immersed themselves into our culture and are considered examples to follow for other video game studios. According to (Benoit, 2021), these are the highest grossing games of the last decade:

- *The Witcher 3: Wild Hunt*, developed by CD Projekt Red, it has been a massive success for the Polish studio. It sold over 30 million copies and its success inspired a Netflix show that premiered in 2019 to critical acclaim;
- *Diablo 3*, the third instalment in the *Diablo* series, this game was a massive success for Blizzard Entertainment. It sold over 30 million copies, and a new game in the franchise is expected to release in 2022;
- *The Elder Scrolls V: Skyrim*, developed by Bethesda, is an RPG centred around the *Elder Scrolls* universe. It sold over 30 million copies across all platforms, and it is deeply immersed in popular culture due to its success;
- *Animal Crossing: New Horizons* is a social simulation game with an animated design from developer Nintendo. It has sold 32.5 million copies, in a space of one year. It was one of the games that benefited from the pandemic;
- *Terraria*, firstly released on PC but due to massive success and demand, was later released on other major gaming platforms. Developed by Re-Logic, this 2D sandbox game revolves around crafting and building, and it has sold over 35 million units;
- *Red Dead Redemption 2*, is the sequel to the already very successful *Red Dead Redemption* developed by Rockstar Games. The game is considered to be a masterpiece, both in game design and in storytelling, having sold 37 million units. This game is an RPG set in the 1890's North America;
- *Mario Kart 8*, is one of the crown jewels of Nintendo and was one of the first titles of their new console Nintendo Switch. It's a racing game with all of the characters of the *Super Mario* universe, and it sold over 44 million copies;

- *Player Unknown's Battlegrounds*, one of the games that popularized the *battle royale* genre, garnered tremendous success because of it. Developed by the PUBG Corporation, its success also comes from mobile platforms having sold a total of 70 million units;
- *Grand Theft Auto V*, or *GTA: V* is a cultural sensation and one of the best-selling games of all time. It has been heavily criticized by the media, but that hasn't halted its success, having sold more than 145 million units. It is estimated that the Rockstar developed game has garnered more than \$6 billion since its 2013 release;
- *Minecraft* is a cultural phenomenon with a current 100 million concurrent players (number of players that play the game every day). Its art style, crafting oriented gameplay and limitless possibilities have captivated players around the world to become the highest grossing game of all time. Developed by Mojang, this game has sold over 200 million units since its 2011 launch, and that number is likely to keep growing due to the game's popularity in modern culture.

1.6. The Workforce behind a Video Game

Nowadays, video games are intricate pieces of technology that require large amounts of man hours to complete. With the growth of the video game industry, the demands of video game players and consumers rise, which in turn keeps raising the standard of what is considered a "good video game". The team of workers behind a single video game can sometimes reach hundreds of people, depending on the studio and the type of game they are making.

Behind every video game there are a set of specific roles that need highly qualified workers to provide the public with a well-crafted end product. According to (Bay, 2015), the essential roles for the creation of a video game are:

- **Video Game Designer**

A video game designer acts as the spear head in video game development. They must have a deep understanding of video game logic and a singular vision to help direct their team of workers in the direction the studio requires. This position is often subdivided in Level Designer, Quest Designer and Combat Designer, depending on the scale and type of game at hand. A good Video Game Designer can make or break a video game, depending on their skills and talent.

- **Video Game QA Tester**

A sometimes-overlooked position in video game development, QA Testers play the game in the development phase tirelessly, in search of bugs (errors in the video game that constitute a threat to the original vision of developers), and new ways to improve gameplay. They play a very important role in the creation of any video game because they help secure the final product and help the game meet industry standards.

- **Video Game Programmer**

This position is often regarded as the most technical and also the most well paid in game development. This is due to the absolute necessity of programmers, because without them there is no game in the first place. They use computing languages such as C#, C++ and Java to create the game out of nothing. They also receive reports from QA Testers, and fix the bugs in order to preserve the gameplay of the game. This position often requires a degree in computer science and a great amount of dexterity when it comes to writing code.

- **Video Game Artist/Animator**

Video Game Artists or Animators are in charge of working out the models for the game characters and also animate the world according to the vision of the Game Designer. They are highly skilled artists, and many video games stand out due to their art style, which in turn is the responsibility of the art team. They also design the various menus within the game and have to be knowledgeable of various software tools such as Maya and Adobe Photoshop.

- **Video Game Audio Engineer**

Audio Engineers, in video games, record all sounds and music score the player hears from the start of the game until the end credits. They record various effects, create landscape audio and the overall soundtrack to the video game. They are often accomplished musicians that have mastered more than one instrument and can also use various sound related software.

- **Video Game Producer**

This professional acts as a manager during the whole process of creating a video game. They are in charge of organising meetings to discuss various aspects of game develop-

ment, daily planning and handle communication with other departments, such as marketing and publishing. They often have a management background but also a great insight of the video game industry.

These are just the core roles and professions required to the making of a video game. However, games vary in size and scope and some games can range from 10 workers to 500.

In today's industry, a video game from a well-established studio, with a budget similar to Hollywood blockbusters (upwards of \$100 million), is called a AAA video game. Studios such as Ubisoft, Sony and Microsoft release these types of games on a regular basis. Their development teams are often over 100 workers, with multiple studios working together on large projects. However, video games built on a large scale can sometimes go wrong due to lack of communication and studio management issues.

On the other hand, there are the so called "indie" games, from independent developers. These types of games come from smaller studios with teams ranging from 5 to 10 workers. Studios like Supergiant Games, Team Cherry and Iron Gate AB have released successful video games with a fraction of the budget of bigger studios. This aligns with the fact that they enjoy more creative freedom and better communication throughout the creation process. (Stewart, What Is A Triple-A Game (AAA)?, 2020)

2. Cultural Impact of Video Games

The cultural impact of video games in our society, nowadays, is undeniable. More and more, we see movies, shows and books originating from the video game space, due to its growing popularity. Video games are now one of the most popular entertainment mediums of modern culture, far surpassing television and music. There is even a term "Gaming Culture" that defines the subculture of people immersed in all things related to video games. (Teicholz, 2020)

However, video games popularity in our culture has turned the media spotlight on them, meaning that they have come under scrutiny more than ever. Video games with violent

content, such as *GTA: V* or *Call of Duty*, have been deemed too violent, and anger inducing for players by the media. (Tamblyn, 2018). This and other related campaigns against video games have created a plethora of representations around the medium, that has instigated the scientific community to determine its authenticity through studies and trials. In this next section of my thesis, I will go over some of the most common representations and how they compare against scientific studies.

2.1. Common Representations about Video Games

With the rise of gaming in recent years, certain representations and myths have arisen that try to depict video games in a negative manner. Be it by popular belief or through the media, these representations have propagated throughout society and have damaged the public's perception on video games in general.

According to an article in *The Guardian* written by Pete Etchells, author of the book *Lost in a Good Game: Why we play video games and what they can do for us*, the most common representations about video games are (Etchells, 2019):

- **Video Games lead to Violence**

One popular representation of modern video games such as *Call of Duty* and *Fortnite* is that they can instigate and cause feelings of violence on their players. These types of representations are common due to the game's content but there are studies that refute this. Recent research literature on video games with violent content revealed that the relation between playing them and acting violent is actually very weak. According to the article:

In a recent study published in *Molecular Psychiatry* participants were asked to play a violent game (*Grand Theft Auto V*), a non-violent game (*The Sims 3*) or no game at all, every day for a period of two months. Using an array of questionnaires and behavioural measures to test aggression, sexist attitudes and mental health issues, the study's authors found that playing the violent video game had no significant negative effects on any of these measures. (Etchells, 2019)

In addition to this, the article also mentions that, in 2019, another study corroborated that same point on the topic of adolescent aggressive behaviour in the United Kingdom. According to the article:

In a similar vein, research published this year in Royal Society Open Science showed that in a survey of more than 2,000 teenagers and carers in the UK, there was no evidence that playing violent games caused the teens to either become more aggressive or less social. (Etchells, 2019)

However, with video games being a quite recent phenomenon, more and more studies are being conducted to determine their effects on both adults and teenagers in regard to topics such as aggression, anxiety and stress.

- **Video Games lead to Social Isolation**

Another common representation that is frequently mentioned in the media, is that video games can and will cause long term social isolation, which may have been originated by the public's general perception of gamers as isolated teenagers. This could not be further from the truth, seen as that many of the popular video games of today rely heavily on a multiplayer component that thrives on bringing players together and promotes cooperation. Two of the top played video games in the world right now, *League of Legends* and *CS:GO* (Staff, 2021), are both squad based games. In these types of games, players must work together to reach an objective and/or eliminate the other team. This type of gameplay relies greatly on cooperation, and frequently results in long lasting friendships, on and offline.

- **Video Games are a form of Addiction**

As I have previously mentioned, with more and more studies being conducted on the possible harmful effects of video games, video game addiction is front and centre in this discussion. In 2018, the World Health Organization deemed in their *International Classification of Diseases*, the formal diagnosis of "gaming disorder" for the first time. (Etchells, 2019) This was a very divisive measure and shocked both the scientific community and the gaming community. On the one hand, there have been cases that suggest that gaming disorder is a real medical disorder that can affect gamers from all ages. On the other hand, there is a big part of the scientific community that believes that there is a lack of studies to corroborate such a diagnosis. According to the article:

Part of the problem lies in the checklists used to determine whether a disorder exists. Historically, the criteria for gaming addiction were derived from those used for other sorts of addiction. While that might be a reasonable place to start, it might not tell us the whole story about what the unique aspects of gaming addiction look like. For example, one of

the standard criteria is that people become preoccupied with games, or start playing them exclusively, instead of engaging in other hobbies. However, these don't sit very well as a benchmark for what you might consider to be "harmful" engagement, because games themselves (unlike abused drugs, say) are not inherently harmful. (Etchells, 2019)

This divisive measure of the World Health Organization will no doubt accelerate the research and studies related to gaming adverse effects, so that the scientific community can reach a consensus. Despite this, there are also known benefits from playing video games in a balanced manner, as I will demonstrate further.

2.2. Benefits of Video Games

Despite their potential for some harmful effects if abused, video games can also have their benefits if used in a balanced and controlled manner. For years now, there have been numerous reports that indicate that video games can improve children's creativity, motor skills and help with stress relief. (Bowen, 2014).

However, according to an article from the *American Psychological Association*, a study was conducted on violence in video games and reached interesting findings. As reported by the study, video games such as FPS can help players enhance certain skills like spatial awareness and problem-solving skills. According to the article:

A 2013 meta-analysis found that playing shooter video games improved a player's capacity to think about objects in three dimensions just as well as academic courses designed to enhance these same skills, according to the study. (Bowen, 2014)

The authors of that study also connected video games with emotional and mental resilience, in addition to promoting relaxation and happiness. According to the article:

Simple games that are easy to access and can be played quickly, such as "Angry Birds," can improve players' moods, promote relaxation and ward off anxiety, the study said. "If playing video games simply makes people happier, this seems to be a fundamental emotional benefit to consider," said Granic. The authors also highlighted the possibility that video games are effective tools for learning resilience in the face of failure. By learning to cope with ongoing failures in games, the authors suggest that children build emotional resilience they can rely upon in their everyday lives. (Bowen, 2014)

Furthermore, this article also mentions one representation that I have already discussed in the "Common Representations about Video Games" part of my work. That common representation is that players are socially isolated due to gaming, which I have already

concluded to be a common representation popularized by the media. According to the article:

Another stereotype the research challenges is the socially isolated gamer. More than 70 percent of gamers play with a friend, and millions of people worldwide participate in massive virtual worlds through video games such as "Farmville" and "World of Warcraft," the article noted. Multiplayer games become virtual social communities, where decisions need to be made quickly about whom to trust or reject and how to lead a group, the authors said. People who play video games, even if they are violent, that encourage cooperation are more likely to be helpful to others while gaming than those who play the same games competitively, a 2011 study found. (Bowen, 2014)

This article sheds a new light on previously assured representations of video games, in the matter that video games nowadays create an online social space, where bonds of friendship are created and where emotional ties and connections can arise. However, there will always be exceptions to the rule and singular cases of online abuse/toxic behaviour, though video games generally promote an interconnected experience with the intent of benefiting the players.

1. A Brief History of Ubisoft

One of the largest gaming companies of today, Ubisoft, has been at the forefront of game developing since the mid 90's. A family-owned company, Ubisoft was founded in France in 1986, by brothers Christian, Claude, Gérard, Michel and current CEO Yves Guillemot. (Bertz, 2011)

The French company first achieved success in the gaming industry, with the launch of their first hit *Rayman*:

In the ensuing years, *Rayman*, *Rayman 2 The Great Escape*, and *Rayman 3: Hoodlum Havoc* combined to sell over 20 million copies, making Michel Ancel's creation the first legitimate hit series in Ubisoft history. The success empowered the company to go public in 1996 to raise more capital for its internal development endeavours. (Bertz, 2011)

By going public, Ubisoft was able to secure enough investment to open studios throughout Europe, Canada and China. (Bertz, 2011) These studios would be the foundation for future genre defining games published by Ubisoft, giving them the necessary workforce to constantly produce high quality video games in a short time span.

Some of Ubisoft's more successful games, according to (Radic, 2021) include:

- Tom Clancy's *Ghost Recon Wildlands*, with 10 million copies sold;
- Tom Clancy's *Rainbow Six Siege*, with more than 10 million copies sold;
- *Watch Dogs 2*, with more than 10 million copies sold;
- Tom Clancy's *The Division*, with more than 20 million copies sold;
- *Far Cry 5*, with more than 25 million copies sold.

Throughout the 2000's, Ubisoft's growth as a games company was noticed by industry juggernaut EA (Electronic Arts), who attempted an hostile takeover in order to reduce the competition on the gaming market. (Feldman, 2004) However, the takeover would not come to pass: "After six years of owning the stock, EA quietly sold its shares in 2010, freeing Ubisoft from the threat of hostile takeover." (Bertz, 2011) and Ubisoft remained in the hands of the Guillemot family.

On the other hand, in 2015, French media conglomerate Vivendi (Universal Music Group, Dailymotion) were looking into the videogames market and set their crosshairs on Ubisoft. (Mathieu Rosemain, 2017). Having survived a takeover from EA, Ubisoft's CEO

Yves Guillemot gathered the support from his shareholders and was able to put up a fight, despite the fact that Vivendi held enough shares (25%) to pose a real threat to the company's leadership. (Takahashi, 2017) However, after a 3-year battle, Ubisoft was able to reach an agreement with Vivendi (who sold all the stock they had on Ubisoft) with the help of Chinese conglomerate Tencent, who bought a 5% stake on the French video game company. (Morris, 2018). These events have solidified the trust shareholders have, not just in their CEO, but also in the direction the Guillemot family is taking the company and their plans for the future.

Ubisoft have recently expanded into cinema and TV with Ubisoft Film & Television, with their film adaptation of the popular game *Assassin's Creed*. (Nguyen, 2012). In the television department, they produce the series *Mythic Quest: Raven's Banquet*, that airs exclusively on Apple TV+, and have several more shows in development for other streaming services. (Maguid, 2020)

In terms of sales and overall growth of the company, Ubisoft has been steadily rising since 2010. According to (Wray, 2019):

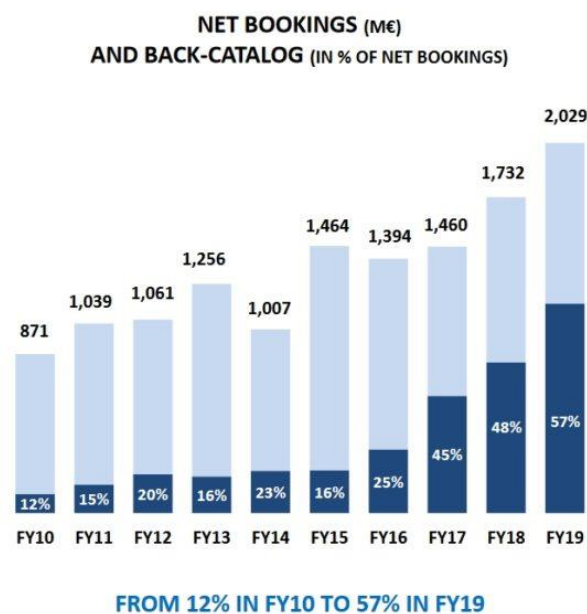


Figure 3: Net Bookings and Back-Catalog
Retrieved from: "<https://wccftech.com/ubisoft-sees-record-profits/>"

As we can see from the graph above, between fiscal year 2010 and fiscal year 2019, there was a 1,158 million euros rise in net bookings and a 45% increase in time spent in back-catalogue Ubisoft games. This proves that the direction chosen by CEO Yves Guillemot has been tremendously successful for the company and its investors.

2. Context of the *Assassin's Creed* Franchise

Celebrated as one of the best and most recognizable franchises in gaming, the *Assassin's Creed* franchise has carried Ubisoft to new heights. Since its inception in 2007 with the first *Assassin's Creed* game, the franchise has sold over 155 million units with 12 titles and many spin offs added overtime. (Ivab, 2021) The main selling point of this franchise is the fact that every game explores a different location and time period with some historic precision. Famously historic characters - such as Leonardo Da Vinci, Cleopatra, and Socrates - are depicted within the game and frequently interact with the player. In addition to this, this franchise features an open world environment dedicated to the time-period of each game, adding to the immersion and overall experience. The main titles and locations featured in the games, according to (Stewart, *Assassin's Creed Games In Order*, 2021), are:

- *Assassin's Creed* (2007) located in Jerusalem, 1191 AD;
- *Assassin's Creed II* (2009) located in Italy during the Renaissance;
- *Assassin's Creed Brotherhood* (2010) located in Italy during the Renaissance;
- *Assassin's Creed Revelations* (2011) located in Constantinople, 1511 AD;
- *Assassin's Creed III* (2012) located in America during the Revolutionary War;
- *Assassin's Creed Black Flag* (2013) located in The Caribbean, during the Age of Piracy;
- *Assassin's Creed Rogue* (2014) located in America, 18th century;
- *Assassin's Creed Unity* (2014) located in France, during the French Revolution;
- *Assassin's Creed Syndicate* (2015) located in England, during the Victorian Era;
- *Assassin's Creed Origins* (2017) located in Egypt, during the Ptolemaic era in 49 BC;
- *Assassin's Creed Odyssey* (2018) located in Ancient Greece, during the Peloponnesian War in 431 BC;
- *Assassin's Creed Valhalla* (2020) located in Britain during the dark ages in the 9th century.

On the other hand, the *Assassin's Creed* franchise has also expanded into other media, such as books and graphic novels. This helps the series reach larger audiences and expands the universe of *Assassin's Creed* in ways its games would hardly be able to. (Rocheffort, *The Art of Assassin's Creed Origins*, 2017)

As of July 2021, the *Assassin's Creed* book series consists of 10 novels, under the publisher Penguin Random House (Matulef, 2014):

- *Renaissance* (2009);
- *Brotherhood* (2010);
- *The Secret Crusade* (2011);
- *Revelations* (2011);
- *Forsaken* (2012);
- *Black Flag* (2013);
- *Unity* (2014);
- *Underworld* (2015);
- *Desert Oath* (2017);
- *Odyssey* (2018);

These novels provide further context into the characters players meet in each entry of the *Assassin's Creed* video games franchise and, at the same time, introduce new and compelling characters that have since become fan favourites. Furthermore, the book series has employed the services of veteran fiction writers such as Oliver Bowden, Christie Golden, Matthey Kirby and Gordon Doherty to great success. In 2014, the novels based on the *Assassin's Creed* franchise had already sold 3 million copies. (Matulef, 2014)

In addition to this, the *Assassin's Creed* brand has already made its way onto the silver screen with the 2016 movie *Assassin's Creed*. The movie, despite having a stellar cast with names such as Michael Fassbender, Marion Cotillard and Jeremy Irons, received mixed reviews and had a poor performance at the box office. (Nunneley, 2017) However, Ubisoft are also in talks with Netflix to produce a series based on the popular franchise, with a possible 2022 release date. (Moore, 2021)

3. Gamification: Definition and Examples

Nowadays, gamification is an ever more present concept both in business and in education. According to Karl Kapp, “Simply, gamification is an emergent approach to instruction. It facilitates learning and encourages motivation using game elements, mechanics and game-based thinking.”(Kapp, n.d.). Gamification aims to boost productivity and task engagement by introducing video game mechanics, such as leader boards and point based systems. Using these gaming mechanisms, the approach often leads workers/students to be more motivated and interested in the task at hand, due to its similarities with video games.

Although instances of gamification can be traced as far as the early 1900’s with the Boy Scout badge system in America (Christians, n.d.), the term itself is fairly recent. In 2002, English game designer Nick Pelling first coined the term gamification, but it would only be commonly used by the 2010’s, with companies such as Foursquare, whose business models were developed around it.(Kamasheva et al., 2015).

Gamification, today, branches out to various different sectors, such as health, marketing, social media and education, due to its versatility. Here are a few examples of gamification across the sectors I have mentioned:

- Health, with Nike and Headspace.

Both very good examples of gamification, Nike and Headspace each use video game aspects in their apps to boost user engagement and motivation. Nike’s app (Nike+), tracks the user running time and progress and it even offers the ability to compare one’s progress with friends. (Kuo, 2015). On the other hand, Headspace which is a meditation dedicated app, uses storytelling and game inspired design to entice their users. In addition to this, they also provide rewards when the user reaches certain milestones, such as medals and animations for their guided meditations (Haisfield, 2018).

- Social Media, with Reddit.

Reddit is one of the most popular websites on the Internet. It acts as a forum that hosts an immense number of communities dedicated to a large variety of subjects, from the likes of gardening, to sports and news. Having said that, Reddit is also a social media app that

heavily employs gamification with awards and badges given to the “best” comments, and avatars that represent the users of the social platform. (Hern, 2021).

- Marketing, with Tesla and PUBG.

Gamification also makes an appearance in marketing campaigns and adds. A great example of this was a marketing campaign by Tesla to feature their cars in the popular video game *Player Unknown’s Battlegrounds*. This was a partnership with Tencent (the publishers of the game) to promote the car within their mobile game, making it the perfect marriage between gamification and marketing. (Lambert, 2020).

- Education, with Kahoot, *Minecraft*, *Red Dead Redemption* and *This War of Mine*.

Education is perhaps one of the best places where gamification can really shine. Nowadays, our society is evermore immersed in technology and the students of today carry their smartphone anywhere. This device, although very beneficial and literally irreplaceable, also acts as one of the worst sources of distraction in a classroom. In addition to this, much of the curriculum used in schools nowadays has been taught in the same manner for over 20 years, save for some exceptions. There is a need to evolve and recapture the already too low attention span of students. As Kevin Donovan from *The Guardian* puts it:

By maintaining a system of exams that favours mere memorisation and the ability to regurgitate more suavely than others along any current bell curve, they have squeezed the creativity, spontaneity and joy from teaching and learning. (Donovan, 2021).

Gamification in education attempts to solve these problems with new and more interesting approaches. Kahoot is a clear example of this, a free online tool that is amazing for both business and classroom use. With this tool, teachers can create quizzes and questionnaires about a specific subject and students have a time limit to choose the appropriate answer. It is as dynamic as it is fun and, at the end, it presents a leader board with students’ results, stimulating competition and entertainment. (Gkogkidis, 2017).

On the other hand, the popular video game *Minecraft* has also experimented quite successfully with gamification. The game itself, which consists in an almost limitless sandbox creative experience, was already designed to stimulate creativity, but with the *Minecraft: Education Edition*, the game has reached its full education potential. In this edition,

that was specifically designed for schools and museums, the player can learn about programming, math, chemistry, architecture and agriculture. This turns what was already an incredible video game into an educational tool that is certain to capture the attention of students. (Endicott, 2021).

Red Dead Redemption 2 is widely known as one of the best games of all times. From its intense story to its generation defining graphics, the game is considered a visual marvel. Perhaps, it is due to those reasons that this game is being used to teach a university history course at the University of Tennessee. (Cryer, 2021). I chose to mention this example because it resembles the case analysis I will focus later on in this thesis. *RDR2* gamification potential is immense due to its visual and technical representation of 19th century America, which reflects the extensive research the developers poured into the video game. This and other factors make it the perfect medium on which to base a class on 19th century American history.

Finally, the last example of gamification in education I want to focus on is the Polish game *This War of Mine*. This indie video game came out in 2014 and was a success, selling over 4.5 million copies across all platforms. (Fogel, 2019). Being a survival game, it focusses on the survival of one's playable characters that are living through a war scenario. The player's main goal is to keep them fed, hydrated and above all, sane. The game throws very uncomfortable situations at the player, in an attempt to simulate the chaos and unpredictability of war. According to an article on [Educraft.tech](http://educraft.tech):

The player is called upon to develop his / her ability to make decisions in the light of the ethical issues that arise. Thus, behavioural templates are created by interacting with the environment of the game, leading the player to learn through one's own actions by remodelling one's choices according to the mistakes made" (Karageorgakis, 2017)

The gamification aspect comes with the fact that Poland has decided to recommend the game as study material in high school, for students aged 18 and above. (Hetfeld, 2020). The video game is aimed at subjects such as Ethics, Philosophy, and History.

4. *Assassin's Creed Origins* Case Analysis

Having sold more than 10 million copies (Parijat, 2020), *Assassin's Creed Origins* is one of Ubisoft's most successful games of the last generation. Future *Assassin's Creed* games would follow *Origin's* approach to game design and built upon its foundation in new and interesting ways. This game marked the shift in the franchise's genre, from an action-oriented game to a more open world style RPG. This change was very welcomed by fans, as the next instalments in the franchise, *Assassin's Creed Odyssey* and *Assassin's Creed Valhalla*, would also follow the same route.

In this section of my thesis, my aim is to analyse the video game *Assassin's Creed Origins* and its potential for education through gamification. To do this, I chose to analyse the game and its individual parts, with a heavier focus on the *Discovery Tour Mode* aspect of the game. Firstly, I will talk about the reason for choosing this case analysis and what motivated me to choose this game over many others. Secondly, I will go over the setting, plot and historical characters, because I believe it is important to understand the case analysis as a whole. Thirdly, I will focus on the *Discovery Tour, Assassin's Creed Origins* version of a "Museum Tour" around its beautifully crafted open world. Finally, I will focus on the gamification potential of the afore mentioned *Discovery Tour* and how it represents a new and interesting way of learning about Egyptian culture and history through a gaming experience.

4.1. Reason of Choice

I have been playing games for as long as I can remember. Since a very early age, I was always drawn to video games due to their ability to tell stories in new and immersive ways. It is no surprise, then, that I played the first *Assassin's Creed* that was released in 2007 and became an instant fan of the franchise. I had never played a video game that combined a deep and engaging narrative with an historical setting, carefully and beautifully built to simulate the great cities of Ancient History.

Since then, I have played almost every game in the series and have "digitally" visited places I would never get the chance to visit in person - such as Italy in the Renaissance Period, the Golden Age of Piracy in The Caribbean, and France during the 1789 Revolution. These games have taught me almost as much historical facts and trivia as high school history classes. This concept, coupled with great stories, fun gameplay and an overarching

captivating narrative, has turned the *Assassin's Creed* series into a multi-million-dollar franchise and made Ubisoft into a household name in the video game industry.

However, among all of the series video games, I chose *Assassin's Creed Origins* due its new game mode – the *Discovery Tour* – which takes advantage of all the research made by developers in the creation of the game's setting. This mode was highly liked by fans of the series and has, since then, been featured in the next two instalments - *Assassin's Creed Odyssey* in Ancient Greece, and *Assassin's Creed Valhalla* in Old England. My interest in the *Assassin's Creed* series and the gamification potential of *Assassin's Creed Origins* made it the ideal candidate to perform a case analysis on.

4.2. Setting: Egypt in the Ptolemaic Era

The game is set in Ancient Egypt, during a time when Egypt had already existed for 3,000 years. The game takes place in the year 59 BC, during the rule of the Ptolemaic dynasty, more specifically, Cleopatra VII and Ptolemy XIII. During this period in history, there was already a strong Roman presence and influence in the region of Egypt and the game illustrates that very well, with the city of Alexandria and other examples of Roman construction. To better understand the timeline of Egypt's history, I will use the following image from the game:



Figure 4: Timeline of Ancient Egypt

The game's temples, cities and landmarks have been historically depicted with the help of French architect and archaeologist Jean-Claude Golvin, whose paintings served as guidelines to help develop game design and the overall geography of the game world. The game's director, Ashraf Ismail, believed that the key for *Assassin's Creed Origins*'s success was due to the immersion factor, which directly connects with historical accuracy. In an interview with *The Guardian*, he said:

We had Egyptologists on the team, and we have historians embedded with us on the floor. Sometimes it's researching online, finding the people who know the time-period well and just contacting them, asking them to join us or help feed us information. A lot of the time it's actually spent securing deals with universities. We try to grab as much information as possible. (Nielsen, 2017)



Figure 5: The Giza Pyramids in *Assassin's Creed Origins*
Retrieved from: <https://www.forbes.com/sites/erik-kain/2017/11/04/assassins-creed-origins-predicted-the-great-pyramid-of-giza-discovery/?sh=5954974c493c>

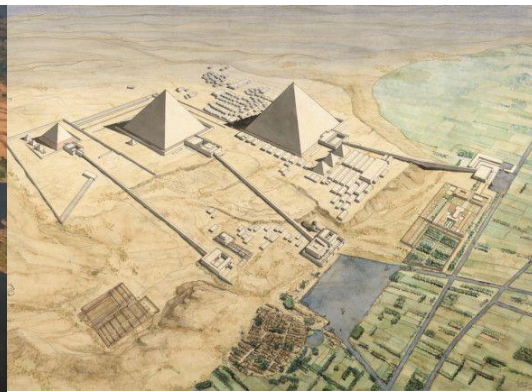


Figure 6: The Giza Pyramids
Retrieved from: https://jeanclaudegolvin.com/giza/?fbclid=IwAR3SLpiM3lRIJDjbFU_Z72Qs34ZTpzHaCK-KAUyYq5cRWbZgXlqBBSvsvkGc

On the other hand, Ubisoft also employed historians to assure historical accuracy in their video game. One of these was Evelyn Ferron, a professor of Ancient History at Sherbrooke University, in Quebec. In an interview with *CBC*, she talked about the challenges during the 4-year development process of the game. She said:

What were the environment, the climate, the animals like? What was the lifestyle? What was the difference between the Greek and Egyptian cities and the countryside? What did the farming look like? What were the trade routes and roads across the desert, as an example? So, it was a really big picture," (Ore, 2017)

In addition to this, *Assassin's Creed Origins* has been reviewed and critiqued by Egyptologists, and their feedback was very positive. According to an article on *Vice*, Harvard

Egyptologist Peter Der Manuelian deemed the video games depiction of Ancient Egypt very accurate. (Gault, 2018)

4.3. Historical Characters and Plot Synopsis

As previously discussed in this thesis, the *Assassin's Creed* franchise is known to utilise famously historical characters to advance the game's narrative and also to provide historical context. In *Assassin's Creed Origins* that is no exception. (Fuchs, 2017)

The game takes place during a tumultuous time in Ancient Egypt, due to the growing Roman influence in the region. The game's developers chose this time period so that they could present to the player the various historical characters that played a vital role in Egypt's history around that time. The main historical characters with whom the player interacts are:

- Ptolemy XIII Theos Philopator, a Pharaoh of Egypt who was the brother, husband, and co-ruler of the country with Cleopatra. The last male Pharaoh of Egypt, his life was marked by his joint rule with his sister and his role in the Battle of the Nile, where he fought the Roman general Julius Caesar. He drowned, fleeing the forces of the victorious Roman army. (Cox, 2017)
- Cleopatra VII, last Pharaoh of Egypt, sister and wife to Ptolemy XIII was an iconic ruler often described as a charming diplomat. While in exile, she conspired with Julius Caesar and had an affair with the Roman general, with hopes of regaining her place as Pharaoh of Egypt. (J.Mark, 2018)
- Julius Caesar was one of the most famous dictators in history. As ruthless as he was wise, the Roman general is considered to have been a master tactician and a great speaker. In 47 BCE, he defeated Ptolemy XIII at the Battle of the Nile and helped Cleopatra regain her throne. His affair with the Egyptian Pharaoh was well documented and they had a son, Caesarion. (Mark, 2011)

In the game, the player takes control of Bayek of Siwa, one of the last Medjay (protectors of the Pharaoh), and his wife Aya, on a quest to avenge the death of their son. In their quest, they discover that the group behind their son's death – the Order of Ancients - is an ancient organization that seeks to control Egypt through their puppet, the Pharaoh Ptolemy XIII. Bayek then joins forces with Cleopatra, who also seeks to overthrow the Pharaoh, and both of them gather allies to prepare for the coming war. One of these allies

is Julius Caesar, a prominent Roman general who offers the full support of Rome to Cleopatra's campaign. An epic battle ensues, with an outcome favourable to Cleopatra and Caesar, which then decide to betray Bayek and join with the Order of Ancients. These events lead to the creation of the Hidden Ones, the origin of the Assassin's Brotherhood, by Bayek and Aya, who vow to protect the world from the shadows.

4.4. Discovery Tour Mode

In this section of my thesis, my aim is to discuss and analyse the *Discovery Tour* mode present in *Assassin's Creed Origins*. This game mode was designed by the game's developers as an educational tool, where they could deposit all the research amassed by them, during the game's development. Upon choosing this game mode, the player is presented with the following message:

With content curated by Egyptologists and hundreds of images sourced from museums and libraries around the world, we hope to share with you the passion that inhabited us for the four years it took to develop *Assassin's Creed Origins*. (Webster, 2018)

This game mode was added to the game 4 months after the release, at no additional cost to players who had previously bought the game. However, it was also made available as a stand-alone experience to gamers who only wished to buy this game mode, instead of the full game. (Rochefort, *Assassin's Creed Origins' Discovery Tour*, 2018)

In total, there are 75 tours available in the game. (Rochefort, *Assassin's Creed Origins' Discovery Tour*, 2018) These tours vary in length and in scope. For example, the *Temple of Zeus* tour has only 2 minutes in length and takes place in a temple; while *The Siege of Alexandria* tour has 20 minutes, where the player takes Julius Caesar viewpoint during this legendary battle.

In this game mode, the player embarks on a "virtual tour" of different aspects present in Ancient Egypt. Before choosing a tour, the player can first select a character present in the base game. It can be an historically depicted character, such as Julius Cesar or Cleopatra, or the main game protagonists, such as Bayek and Aya. This chosen character will act as the playable character during the tour and its choice doesn't affect the tour itself.



Figure 7: Cleopatra as a playable character in the Discovery Tour

After this, upon selecting a tour, the player enters the chosen place of the tour and follows a series of prompts that will guide them through the experience. Throughout the whole tour, there is a voice narrating historical facts and interesting trivia coupled with imagery from museums and art, depicting Egypt's Ancient History. The experience ends when the player reaches the final prompt, where they are offered a choice of continuing the tour or exit the game mode.

There are 5 main sections in *Discovery Tour* mode, which in turn, hold various tours:

- Egypt, which holds 20 tours, including *The City of Memphis*, *The Faiyum and Bringer of Life*, *The River Nile*.

This section of the *Discovery Tour Mode* takes the player into the main cities of Egypt and it also gives an historical overview of the geography of the location. It serves as an introduction to the game world and the mode itself.

- Pyramids, which holds 16 tours, including *The Origin of the Pyramid*, *The Step Pyramid Complex of Djoser* and *An Overview of The Giza Necropolis*.

This section gives an historical background of the great pyramids of Egypt and invites the player to journey inside these great structures, while offering curious bits of information about the Pharaohs and the most well-known pyramids of Ancient Egypt.

- Alexandria, which holds 14 tours, including *The Greek Pharaohs*, *Cleopatra, Queen of Egypt* and *Introduction to Alexandria*.

By choosing this part of the *Discovery Tour*, the player visits the city of Alexandria and learns of its creation and historical background. This includes visiting the library of Alexandria and also its famous lighthouse, one of the tallest buildings of the ancient world.

- Daily life, which holds 20 tours, including *Osiris*, *The First Mummy*, *Amulets & Rituals* and *Temples & Priests*.

In here, the player can roam the streets of Egypt, visiting temples and learn about the customs and daily lives of Egyptian citizens in the ancient world. It is also the perfect tour to illustrate Egyptian rituals and their religion, through faithful recreations in game.

- Romans, which holds 5 tours, including *Roman Forts*, *Roman Aqueducts* and *Roman Military Equipment*.

In addition to Egyptian culture and history, the *Discovery Tour* mode also goes into some depth in regard to Roman culture. The game presents a period of the history of Egypt with Roman influence and, in this section of the *Discovery Tour*, we can observe parts of Egypt heavily influenced by Roman culture such as Roman customs and attire, military equipment and construction.

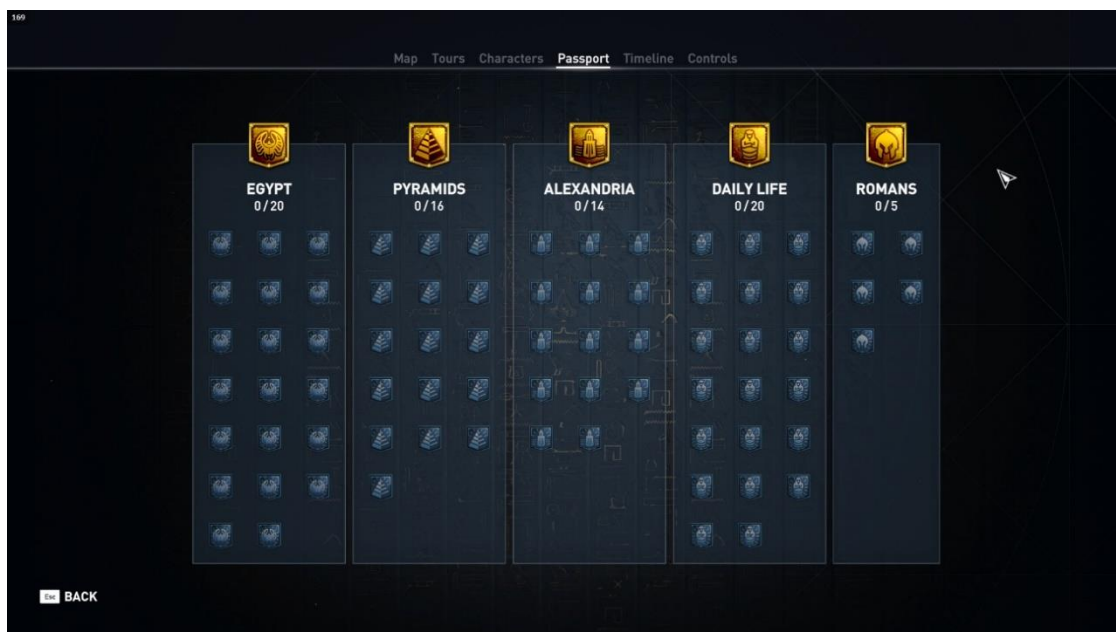


Figure 8: Passport feature in the *Discovery Tour*

On the other hand, there is also the Passport feature in the *Discovery Tour* mode, which allows the player to keep track of which tours they have yet to complete. This is a great feature because it helps the player navigate through this game mode and, at the same time, it provides a sense of accomplishment.

The *Discovery Tour* mode in *Assassin's Creed Origins* serves as the perfect way to explore a digitally recreated landscape simulating Ancient Egypt. The developers behind the game struck gold, when they decided to turn their open world game into a detailed and inspiring learning experience. The purpose of this mode is simply to learn by gaming, which was one of the deciding factors that lead me to analyse it:

In Discovery Tour, players have the same sprawling world of Assassin's Creed Origins to freely explore, just as with the base game, whether you're into climbing pyramids or walking through the NPC-filled streets. Only now, the only thing leading the way is your own intellectual curiosity (McCarthy, 2018)

4.5. A New Way to Experience History

Assassin's Creed Origins' Discovery Tour was a success in many ways. In a commercial sense, it was viable enough to be featured in the next instalments of the franchise, due to high demand from fans of the video game series. (S.Good, 2021). On the other hand, this innovative game mode also received high praises from the academic community for its historical and cultural accuracy, with some professors giving it their public approval.

This was the case with Edyeli Marku, a middle-school teacher from the United States, who experimented with her students by using this game mode as a teaching tool. In an interview with the *New York Times*, she said:

(...) there could be tremendous value in it, for both students and educators — particularly for students who might test as primarily visual, auditory or kinaesthetic learners. For those students, she added, “exposing them to a different learning vehicle is always beneficial. (Porter, 2018)

In addition to this, another professor sought to experiment with *Assassin's Creed* in an academic setting. Marc-André Éthier, professor at the University of Montreal, performed a study to compare the effectiveness of the *Discovery Tour* versus a normal lecture about the same subject. According to an interview with the *New York Times*:

Mr. Éthier said he approached Ubisoft with an idea for what eventually became a study of some 330 students, 12 to 16 years old, in nine schools in Montreal. Students were divided into groups of 40. First, all the students were given a test. Then half of each group took the Library of Alexandria tour, and the other had a lesson with a teacher. Afterward, they took a second quiz. Mr. Éthier said the students working with a teacher did better on the test than the ones who had only taken the tour. Though the test scores of the students who took the tour still showed improvement, of 22 percent to 44 percent. (Porter, 2018)

This study reveals that, although students that attended the regular lecture fared better than the other group, *Assassin's Creed Origins' Discovery Tour* works in an academic setting and could be viable for use in the classroom in the future. Professor Éthier also said that: "The teacher could do things with the game they cannot do without it". (Carmichael, 2018) This adds to the fact that video games, and gamification in general, can be used in an educational setting, and they can also be powerful tools to help teachers who struggle to connect with evermore demanding students.

1. Video game industry of Today

Nowadays, video games are at the height of their fame and recognition. Their influence and presence on our modern-day society can be both felt and seen throughout social media and popular culture, where they are discussed everyday by news media and fans of the digital medium.

As previously discussed in this thesis, the video game industry is now a colossal billion-dollar industry that overshadows both the cinema and music industry, and that gap grows wider with each passing year. One of the main reasons behind this fact can be attributed to the emerging eSports scene, whose viewership numbers are beginning to compete with other popular sports such as the NFL (National Football League).

Like many other great industries before it, the video game industry's growth has spawn new and interesting professions, that were unimaginable just ten years ago. These professions are still very recent, and like with everything new, comes a certain degree of scepticism from society. Despite that, these are very profitable professions, as I will demonstrate, and they are becoming more and more mainstream with time.

On the other hand, advancements in modern games have created technologies that are considered multipurposed tools, due to their range of utilization. These technologies are now being used in other fields of work, such as cinema, design, and architecture. A clear example of one of these technologies is the Unreal Engine, developed by Epic Games, which I will touch upon further in this work.

As of 2021, our world is still recovering from the COVID-19 pandemic which has led society into lockdown in early 2020. These events completely stagnated the world's economy, leading many prosperous businesses to shut down. However, one of the industries that has actually benefited from the pandemic, was the video game industry. It not only survived the pandemic, but thrived and it's now stronger than ever. I will touch upon these topics, as I attempt to look upon the current and future state of the modern-day video game industry.

1.1. The Origin of eSports Revolution

Shattering records every day, eSports are one of latest trends that has come with the growth of the video game industry. This new type of sports refers to sports engaged in an electronic system environment, more commonly a PC or a console. There is a certain array of games that have competitive modes, which (depending on the game's popularity and marketability) can draw a huge audience. When this happens, tournaments and leagues are created in order to generate a regulated and monetized scene, in which teams of players compete against each other, for a monetary prize ranging from a thousand to millions of dollars. These competitions are then televised and broadcasted through dedicated media and streaming platforms.

To understand properly the phenomenon that is eSports, we must track the sport's origin and inception. It is widely accepted that the first eSports event occurred in 1972, at Stanford University. The game in question was 1962's *Spacewar!* and the prize was a full year subscription for the popular American magazine *Rolling Stone* (Gaming, 2018).

Going into the 1980's, at the very epicentre of the arcade era, the first official eSports tournament was held in America. Organized by Atari, one of the major players in the video game industry at the time, the tournament was called The National Space Invaders Championship. The game in question, *Space Invaders*, was a very popular game at the time and attracted more than 10,000 competitors from all over the country (Klim, 2019).

In the 1990's, came a defining moment for eSports. The invention of the internet was literally "game changing" because it allowed games to be played online, which would redefine the meaning of multiplayer games. All over the world, gaming tournaments were arising and gaining greater notoriety due to thousand dollars' prizes and flagship games like *Tetris*, *Super Mario Bros* and *Rad Racer*. The professional gamer concept was on the rise, and with PC's getting more affordable each year, the notion of eSports gained greater traction going in the 2000's (Larch, 2019).

At the dawn of the new millennium, games like *Doom*, *StarCraft*, and *Counter Strike* (which are still played in tournaments to this day) took eSports to new heights. In 2000, KeSPA (Korean eSports Association) was formed in South Korea, which resulted in mass media and big corporations noticing evermore the growing eSports market and the potential it had for the future.

This paved the way for the first WCG (World Cyber Games) in South Korea and the Electronic Sports World Cup (ESWC) in France, which were massive events at the time, dedicated solely to competition in video games (Larch, 2019).

Fast-forward to the present day, and eSports are a crucial part of our society's entertainment preferences, with sports media like ESPN covering them on a regular basis, dedicating whole segments to this new sport. In addition to this, eSports teams now have huge companies sponsoring them, as is the case of G2, which is one of the biggest eSports teams, participating in different games, from *Counter Strike* to *Rainbow Six Siege*, which bolster BMW, Lenovo and Red Bull as their main sponsors (Sillis, 2020).

On the other hand, eSports are beginning to reach viewership numbers that rival or even surpass those of international sports competitions, like the NFL's Superbowl. One of the most popular online games nowadays, *League of Legends* by publisher Riot Games, did just that. According to an article on NBC:

Over 10,000 "League of Legends" fans descended upon St. Louis, Missouri this weekend for one of the biggest annual esports events in North America: The North American League of Legends Championship Series Spring Split Finals. Go back to November, and viewership numbers from the "League of Legends" World Championship finals — held in South Korea and also hosted by the game's publisher, Riot Games — showed that almost 100 million unique viewers tuned in to the event online. For comparison, last year's Super Bowl had just over 98 million viewers, the smallest viewership number for the event since 2008. This was after viewership for 2017's Super Bowl LI had dipped to 103 million from just over 111 million the year prior. (Pei, 2019)

As the graph below illustrates, there has been a steady rise both in occasional viewers and in eSports enthusiasts from 2014 to 2019. On the other hand, when it comes to global revenue growth, there was an accentuated rise between 2016 and 2019, translating into a 609-million-dollar increase, explained by the mainstream success of eSports.

The global esports market

Audience and revenue projections 2014-2019

CNN

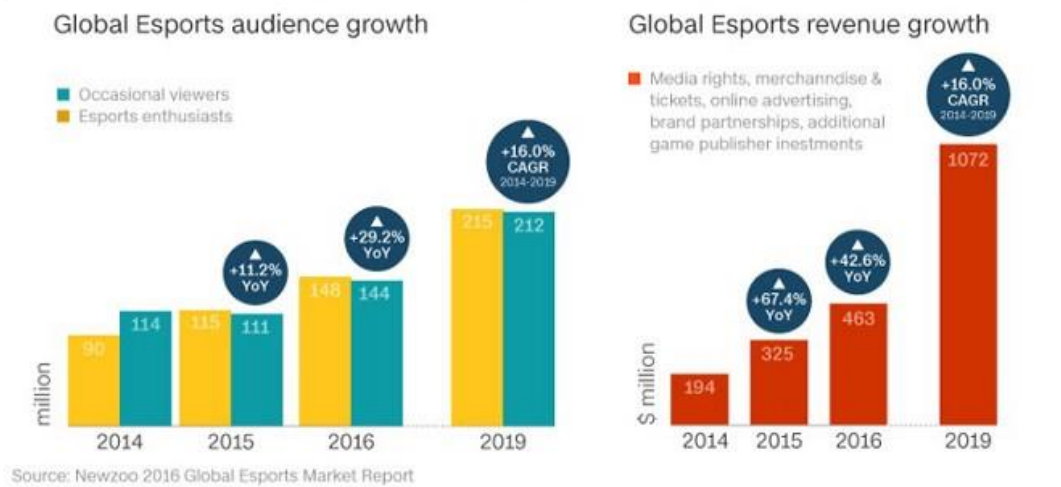


Figure 9: The global esports market
Retrieved from: <https://medium.com/@liudanny97/the-life-of-a-game-e88f75ed490f>

This type of viewership numbers stems largely from the streaming platforms dedicated to the streaming of videogames, that have grown massively in the past decade. Platforms like Twitch, Mixer, YouTube Gaming and even Facebook, make it very easy to stream games and for streamers to interact with their viewers through instant chat, making it an incredible experience for both fans and streamers alike. For many fans of both eSports and video games in general, these streaming platforms have completely substituted regular forms of media such as television and standard broadcast networks (Arkenberg, 2019).

1.2. Streaming Platforms behind the success of eSports

One of the greatest driving forces behind success of eSports were the various streaming platforms created in the past decade. They allowed fans and streamers alike to create and watch video game related content, in a single and centralized space, which in turn created a business model that is still growing nowadays. One of the first platforms to show break out success was Twitch.tv.

1.2.1. Twitch.tv

By far the most dominant streaming platform when it comes to videogames, Twitch.Tv has come a long way. The first incarnation of the streaming giant, named Justin.tv after its creator Justin Kan, was a website with various dedicated categories, ranging from reality tv or “lifecasting” to gaming related content, created in 2007 (Musil, 2014). The

gaming channel of the website, called Twitch, grew immensely and, by 2012, had already garnered 15 million dollars in venture capital. By 2013, the monthly viewership had skyrocketed to 45 million viewers, turning Twitch into a massive success. Just a year later, the company was bought by Amazon for 970 million dollars and Justin.tv officially shut-down to give way to its more successful creation (Epstein, 2021).

Nowadays, Twitch.tv is the king of all streaming platforms and the official home of eSports. Just last year (2020), the streaming platform registered 17 billion hours watched, an insane increase when you compare it with 2019's 9 billion hours watched (Stephen, 2021).

Twitch.tv's biggest streamers are at the core of the platform's success. They are responsible for pulling massive numbers, which can be attributed to their following and subscriber count. As of March 2021, and according to (Iqbal, 2021), Twitch biggest streamers are:

- Ninja with 17 million followers
- Tfue with 10 million followers
- Shroud with 9.17 million followers
- Rubius with 8.55 million followers

On the other hand, Twitch.tv isn't the only streaming platform available for video game live streaming. YouTube Gaming, a live stream tool connected to YouTube, is one of the strongest competitors of Twitch, and also saw a dramatic rise in streams in the past year. (Statt, 2020). In addition to that, Facebook Gaming, a subdivision of the social media giant that solely focus on gaming and video live streaming, has also been on the rise and is worthy of mention. Between 2018 and 2019, Facebook Gaming saw an astounding 210% growth, which puts it on the radar as a serious live streaming platform capable of rivalling both YouTube Gaming and Twitch in upcoming years (Grubb, 2020).

1.2.2. eSports Impact on modern entertainment

In order to provide a concrete example of the role and impact of eSports on modern media, I chose to focus on Formula 1, because of its relation with eSports and the events set in motion by the COVID-19 pandemic, which caused a world-wide lockdown, preventing motorsports like Formula 1 to take place, at an early stage of the pandemic.

One of the most famous and prestigious racing sports in world, Formula 1 was, like all major sports in 2020, severely affected by the COVID-19 pandemic. Various races from the 2020 circuit line-up were cancelled due to pandemic restrictions, which left fans of the motorsport heartbroken. However, through the popular streaming platform Twitch, Virtual Grand Prix were held in the F1 official game, published by Codemasters (Thukral, 2020). According to PC Gamer magazine:

Widespread sickness may have cancelled Formula 1 racing this year, but the racing association has taken their Grand Prix series online. F1 intends to hold every cancelled GP online, starting with today's virtual Grand Prix Bahrain. Today's Grand Prix Bahrain was a 25% length race—14 laps—on PC in F1 2019. The driver line-up for the race was a mix of real-life drivers and racing game streamers, plus chat favourite Lando Norris, who is both—Norris is a racer for McLaren who commonly streams both iRacing and PUBG. (Bolding, 2020)

The eSports F1 program began in 2017, as a response to the growing demand of viewers and fans of the sport. As the market for eSports grew, F1 saw an opportunity to capitalize on their brand and align itself with their official video game, to create the virtual championship. A clearly well thought out decision, F1 now has a growing eSports scene which will eventually result in more people tuning in to the motorsport, allowing the F1 brand to capitalize on two different markets. According to *The Guardian*:

The interest in and return from eSports has been growing exponentially in recent years. A survey by Nielsen revealed that 14% of Americans over the age of 13 are fans of professional gaming. The series will be held on the new F1 video game, published by Codemasters due for release on the PlayStation 4, Xbox One and PC platforms on Friday. A qualification period will be held in September and from it the 40 fastest drivers will attend the semi-finals to be held at the Gfinity London Arena in October. The top 20 drivers from the semi-finals will reach the finals, a three-race event to be held at F1's season finale in Abu Dhabi in November. (Richards, 2017)

1.3. New professions connected to the industry

As I have mentioned early on in this work, the growth and expansion of the video game industry has led to the creation of various new professions, that were previously non-existent or only existed outside the mainstream. My aim is to understand how the rise in popularity of video games created the need for these professions and how are they perceived nowadays.

1.3.1. Gaming Journalism

Journalism is a very broad field of work that encompasses various subjects and matters. From human rights to politics, sports and tabloids, journalism is a very common profession in our society. However, with the growth of the video game industry, the so called “gaming journalists” are now more present and relevant than ever. Journalism with a focus on gaming, or video games journalism, are journalists who focus on all aspects of the industry of video games.

As previously discussed, since their inception, video games have been branded as both works of art and mind-numbing activities by the media. Many of these polarizing views came from early gaming journalism, who did not fully understand the rising entertainment medium and were too hasty or too ignorant to brand them as such (Perreault & Vos, 2020). However, when the internet came along, more people had access to a large variety of magazines and blogs, many of them unbiased and with no personal agenda, which resulted in a slow and steady shift in video game’s general opinion. A 2004 essay by Kieron Gillen, “*The New Games Journalism*”, helped carry the notion that gaming journalism should look past basic criteria and “*instead consider that the value of gaming was in the player experience*” (Jeffries, 2009).

Throughout the years, there have been magazines dedicated to gaming and all things involved with the video game industry, but with the rise of the internet, many made the digital transition to online only magazines. One example of this, is the American magazine PC Gamer: “As the last surviving U.S. game magazine devoted exclusively to computer games, PC Gamer is marketed to and perceived by its fans as a “hardcore” publication, written by and for lifelong gamers” (Tennant, 2009). Nowadays, however, the majority of gamers get their gaming related news from popular YouTube channels like IGN and GameSpot, which have garnered millions of subscribers throughout the years. These channels focus on reviews of games, developer interviews and sneak peaks to upcoming games.

In addition to this, there are internet blogs and websites that focus on investigative journalism like Kotaku, that specializes on leaks for future games and reports on malpractice within the video game industry.

1.3.2. Professional online streamer/Content Creator

Nowadays, we are currently living in the golden age of streaming. Platforms like Twitch and YouTube allow many to stream their games to millions of people around the world, a new and inventive way of generating content. Those “streamers”, who amass a great following on their specific channels, are known as professional online streamers and make a living streaming content to their subscribers, through live online streaming platforms.

First of all, we have to establish the differences between the streaming services and streaming platforms. According to authors Spilker & Colbjørnsen (2020), a distinction should be made between professional and user-generated streaming. Professional produced content is more commonly connected to streaming services such as Netflix, Amazon Prime and HBO, where we find movies and tv shows produced by movie studios.

On the other hand, user-generated streaming consists in the platforms I have previously mentioned, such as YouTube and Twitch. These platforms offer the means necessary for users to create their own content, and through analytics like viewership and subscriber counts, provide an income to the creators behind the content on the platform (Spilker & Colbjørnsen, 2020).

The most famous of these creators, is arguably Felix “PewDiePie” Kjellberg. This YouTube juggernaut rose to fame in the early 2010’s by live streaming games and through his infectious personality. He is currently the second most subscribed channel on YouTube with over 100 million subscribers and billions of views. Being one of the first to attain such a high status on the platform, his success as served has inspiration to countless other youtubers and content creators on the platform.

On the other hand, the world’s most famous professional online streamer is Richard “Ninja” Tyler, who currently streams on Twitch. As of December 2020, he had over 17 million followers on the streaming platform and half a billion total views. He broke several records in that platform, and grew to popularity streaming the popular game Fortnite (Bellanger, 2021).

1.3.3. eSports Player

“Playing games for a living in a competitive setting” is a job description unimaginable just a decade ago, but nowadays it is beginning to be ever more common. As the name itself describes, with the launch of eSports competitions came the title of professional

video game player. These “pro gamers”, as they are often referred, get to experience every gamer’s dream, that is playing games and being paid for it.

Firstly, contrarily to popular opinion, it is not easy to be an eSports player. It is not enough to simply be good at video games, or to have been playing games for a long time. Only the best of the best stand a chance at succeeding and integrating an actual eSports team. The mental skills required to do so are akin to a professional athlete competing at the highest level: “To achieve optimal performance, it was claimed that players should be able to adapt their opponents, communicate properly with their teammates, and trust their skills” (Bányai et al., 2019). In addition to this, these players are required to have intense practice sessions, that can reach to up to 10 plus hours each and every day. They are also advised to practice their skills against other top players before major tournaments, to hone their skills and simulate competitive situations (Henson, 2019).

Moreover, the majority of eSports players believe that good physical fitness is also a very important factor that contributes to their success, when playing at a high level, which is another similarity when compared to a more common definition of regular sports (Rudolf et al., 2020).

On the other hand, once at the top, these players compete for huge prize pools and with big crowds in attendance. One example of this was the *League of Legends Mid-Season Invitational* in 2018. This event’s prize pool yielded more than 1 million dollars for the winning team, had 7,000 fans in live attendance and more than 60 million fans watching online (Navarre, 2020). Nowadays, according to Hore (Hore, 2020) the most popular games that dominate the eSports scene and bring the biggest prize pools are:

- CS:GO with 12 million dollars prize pool;
- League of Legends with 7.8 million dollars prize pool;
- Dota 2 with 8.2 million dollar prize pool;
- Call of Duty: Modern Warfare with 6 million dollars prize pool;
- Rainbow Six Siege with 4 million dollars prize pool;

1.4. Video game technology in other markets

The video game industry is under constant evolution, because of its need to be in the forefront of technology. There is no denying that games have improved with the advancements in technology, but what about technology specific to video games? There have

been cases where proprietary game technology has been used in other markets, such as the automotive, house design and movie industries.

The technology in question is the Unreal Engine, a game design tool, developed by Epic Games, that has evolved into a multipurpose tool used for rendering and real time visualization:

The Unreal Engine is the Cary-based company's 3D suite of tools including rendering, cinematic editing, physics simulations, networking, animation, landscape and terrain tool. It can be incorporated across industries, from video game creation and film production to architectural development and modelling. (Miller, Epic Games Unreal Engine takes movie production to the next level, 2020)

1.4.1. Unreal Engine in the Film Industry

Movies nowadays use more technology than ever. One of the great assets technology has provided to the movie industry is CGI (Computer Generated Imagery). This form of computer animation is ever more present in movies due to the ability to create entire sets and characters digitally. However, one of the many software's used by VFX artists in the movie industry is Unreal Engine. This software allows the artists to create digital landscapes for movies, very much in the same way a game developer designs a level for a video game:

It's been used to render real-time sets on Disney's "The Mandalorian," animates The Weather Channel's mixed-reality storm segments and was used to create the NFL 100 tribute that aired during this week's Super Bowl pregame show. The technology was first used in film production for Steven Spielberg's "Artificial Intelligence" in 2001, to help visualize the Rogue City. It has since been used for movies such as "Rogue One: A Star Wars Story," "War of the Planet of the Apes," "Ford v Ferrari," "Star Wars: The Rise of Skywalker," and will be used in "The Batman," which is currently in production. (Miller, Epic Games Unreal Engine takes movie production to the next level, 2020)

1.4.2. Unreal Engine in Architecture

Another industry which has benefited from the advancements in computer technology and of the multipurpose capabilities of Unreal Engine is architecture and home design.

The ability to render entire levels with incredible amounts of detail is one of the hallmarks of Unreal Engine, and of its use in modern games. It is precisely through these capabilities

that architects and designers use the gaming software to illustrate their ideas and plans to customers nowadays. This software allows an unprecedented level of interactivity with building space, and the 3D modelling aspect of Unreal Engine empowers architects and designers to truly materialize their vision in a virtual setting:

The stunning visualisation that real-time technology offers helps clients understand design concepts much better than a flat blueprint, or a static render. Moreover, game engines allow users to select the specific materials and make specific changes in real-time, allowing potential customers the opportunity to experience what it could feel like to “live” in a building before they set foot in the door. (Staes-Polet, 2021)

Another advantage Unreal Engine brings to architecture is the ability to integrate with VR software, and create a VR experience for both the client and the designer. These assets result in a virtual world, where the client can perceive and interact with the architect’s vision, in the same way they would in a video game:

On top of this, Unreal Engine can be combined with virtual reality tools to present an immersive experience that allows the client and our design teams to experience the space in a way that isn’t as unlike a video game as one might think. Instead of a character running through a level, the client could see a first-person view of a hospital, a school, or a civic building. We’re even able to include triggers and actions that allow the user to open doors, turn on lights, and interact with the environment. (Architecture and Video Game Design Tools, 2019)

1.4.3. Unreal Engine in the Automotive Industry

Lastly, I want to focus on another industry in which Unreal Engine plays a crucial part, that being the Automotive Industry. As one of the top 10 biggest industries in the world (Novicio, 2021), the automotive industry is responsible for many advancements in our means of transportation. This industry requires constant technological research and development, in order to constantly optimize their means of production and secure innovation. Having said this, it is to be expected that they would use digital tools like Unreal Engine and relish in its 3D and real-time visualization capabilities, in both their marketing and car development. According to Michael Alba, from engineering.com:

The automotive industry was driven to Unreal Engine by a desire for the highest-quality visuals. Cars can be truly beautiful with the right render, and automotive designers were

initially impressed with Unreal Engine's ability to produce high-quality real-time images (Alba, 2020).

Cars represented on Unreal Engine can give investors and potential clients a more concrete idea of what the product will look like in the late stages of production. This results in a better understanding of the production process and can eliminate mistakes and avoid unforeseen costs. Alba continues:

For example, automaker Audi used Unreal Engine to develop a digital showroom for customers to configure vehicles with high-fidelity visuals. Visualization firm AltSpace used Unreal Engine to create an interactive presentation for Robocar, the world's first purpose-built autonomous race car. Automaker BMW uses Unreal Engine to facilitate mixed reality design collaboration and better understand the real-world feel of its cars. (Alba, 2020)

As illustrated from the citations above, the automotive industry can benefit from this software and its flexibility in various and different ways. From high-quality visuals to accurate simulations, this industry is taking full advantage of the gaming software, both in creating and promoting their products.

Another important aspect to mention is that, like all software's, there can be upgrades and updates to their functionalities, and Unreal Engine is no exception. As the car industry slowly makes its way to electric only powered vehicles for both efficiency and climate reasons (Winton, 2021), our needs for high-quality software will skyrocket in a very near future. Some car brands, like American GMC, plan to make Unreal Engine a crucial part of their new Hummer line-up. Thanks to the versatility of the software, it will allow for:

[...] videos and imagery from the reveal of the vehicle show off what the screens would display like when going off-road. By using various sensors and camera feeds, the screen may show the terrain around the Hummer while using an external perspective of the vehicle. It's like using a third-person view in a video game. (Haj-Assaad, 2020)

This blend between real time visualization and automotive technologies is one of the many advantages Unreal Engine provides, as we make the shift towards more technology assisted vehicles.

2. The Coronavirus effect on the video game industry

The recent pandemic of coronavirus has had a dramatic effect in the world, rampaging across every sector of the economy and leaving millions out of a job worldwide. With every major country deciding on a house bound quarantine, people started paying more attention to video games. Contrary to the majority of sectors of entertainment, the video game industry not only survived, but thrived during this coronavirus pandemic. According to Wallace Witkowski on Market Watch:

Videogames have grown to resemble competition-based, interactive movies, and the COVID-19 pandemic has propelled the industry to make more money than movies and North American sports combined. Global videogame revenue is expected to surge 20% to \$179.7 billion in 2020, according to IDC data, making the videogame industry a bigger money-maker than the global movie and North American sports industries combined. (Witkowski, 2021)

This citation perfectly illustrates the economic situation during the pandemic, and the advantageous position the video game industry held against other industries in the entertainment segment of the market.

As a worldwide quarantine was issued, people around the world were forced into their homes, in order to prevent further spread of the new coronavirus, now commonly referred as COVID-19 (Sample, 2020). Moreover, during quarantine, people had to get used to a new lifestyle with the addition of travel restrictions imposed by governments during this period. This resulted in a “work from home” system, in which people turned their homes into their work offices, with the exception of essential professionals such as health and delivery workers (Anthony, 2020).

With quarantine in full effect and most citizens prevented from leaving the confines of their own homes, a large percentage turned to video games as their entertainment of choice. As I will explain further, this was one of the decisive factors that turned a disastrous year for many industries into a record year for the video game industry.

Firstly, as we look to the affected sectors of entertainment ravaged by the pandemic, the music industry has to be pointed out. One of the main aspects of this industry are the concerts and live shows. However, due to the quarantine, 2020 was a year with a great

absence of concerts to prevent contagion among fans of live music. This resulted in massive losses to the industry and to musicians, who dedicate their lives and depend on this craft to survive. Industry specialists estimate “industry losses around \$9 billion” (Brown A. , 2020) which was a catastrophic blow to such a prolific industry of the entertainment sector. In addition to that, concerts and live shows also play a huge part in the local economy in which they are held, bringing unforeseen consequences to major festival cities like Austin, Texas, who struggled very much in the early stages of the pandemic (John F.Delaney, 2020).

Moreover, this situation also resulted in an unprecedented response from the musician’s community with concerts online being the norm during the pandemic, allowing music fans around the world to rejoice (Gotrich, 2020).

However, this absence of live shows has resulted in a shift within the music industry and turned its focus, even more, into streaming, which may result in significant changes to the future of this industry (Hall, 2020).

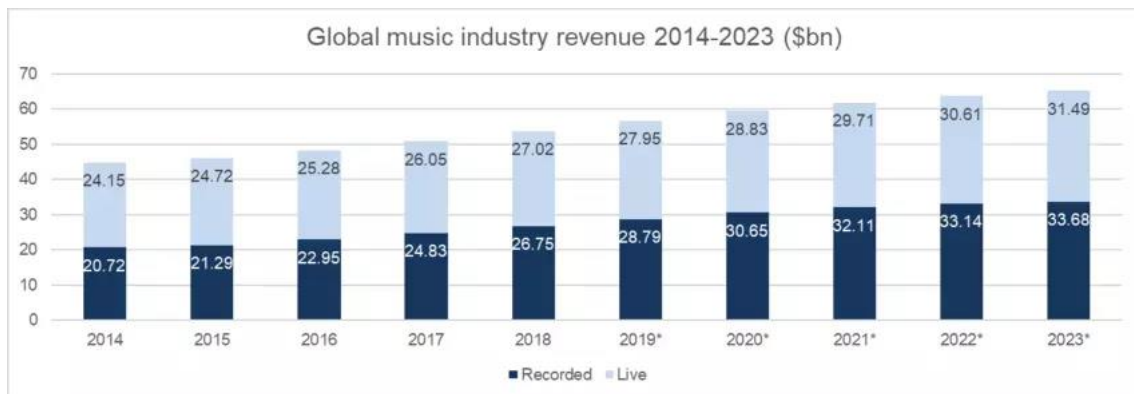


Figure 10: Global music industry revenue 2014-2023
 Retrieved from: “<https://www.weforum.org/agenda/2020/05/this-is-how-covid-19-is-affecting-the-music-industry/>”

As the graph indicates, the recorded part of the global music industry revenue, which encapsulates streaming, is expected to rise in the upcoming years. By contrast, the gap between live and recorded music revenue will widen, as live music will bring less and less income.

On the other hand, another key component in the entertainment sector, whose industry came under immense pressure, is the film industry. Like the music industry, cinemas around the world were forced to shut down, driving ticket sales to zero and forcing many cinemas to lay off their workers. In addition to this, production on current and future films

and tv shows were also terminated due to the rising coronavirus cases among staff, dealing a tremendous blow to the industry (Hipes, 2020).

As we can see from the graph below, last year, the film industry registered annual box office earnings close to 6 billion dollars, something that had not happened since 1997.

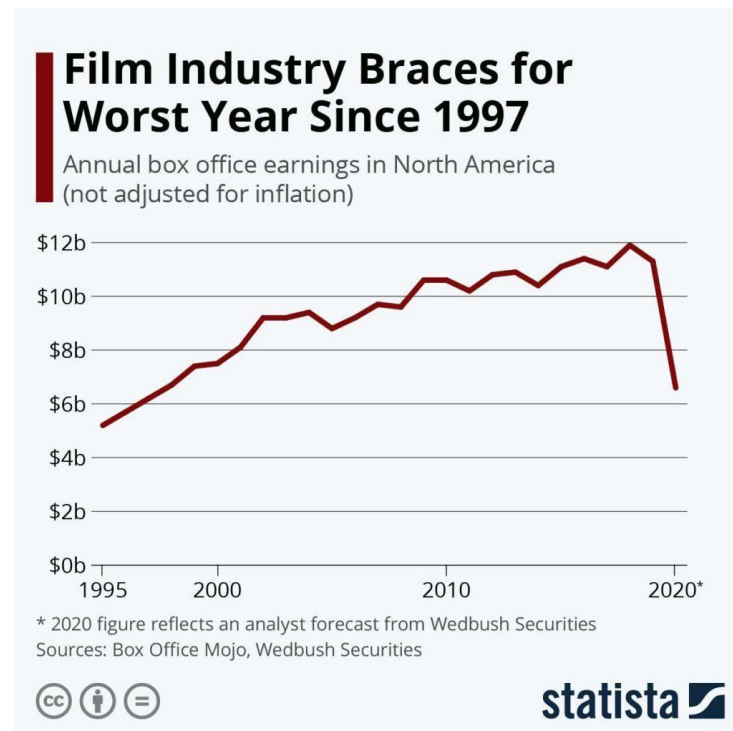


Figure 11: Annual box office earnings in North America
Retrieved from: "<https://www.brinknews.com/tv-film-production-lockdown-covid-streaming-production-insurance/>"

In contrast, streaming services like Netflix, Amazon Prime and HBO saw their subscription numbers soar, as people were forced into quarantine, and chose to stream their shows and movies (Popper, 2020). This shift from cinema to streaming is likely to continue even as the pandemic lessens its effect, “ultimately, more people will end up watching movies on Netflix at home because we have gotten used to that” (Downey, 2021). This will eventually require a strong adaption from the movie industry, to remain relevant and profitable.

Lastly, the one sector of entertainment which actually thrived during the pandemic was the video game industry, due to the fact that the majority of the population was confined to their homes. According to Nielsen, in the early days of quarantine, there was a huge spike in people playing video games:

The results showed that gaming has seen a spike amid the quarantine, as over the week of March 23-29 each country reported an increase in time playing video games. The U.S. saw the most pronounced spike, 45 percent, with France (38 percent), the U.K. (29 percent) and Germany (20 percent) rounding out the list. (Shanley, 2020)

Moreover, games such as Doom Eternal and Animal Crossing, which were launched in March, saw incredible sales figures due the pandemic (Phillips, 2020). In addition to that, streaming giant Twitch saw, between the last quarter of 2019 and the first quarter of 2020, an excess of 3 billion hours watched, for the first time ever, resulting in an all-time record (May, 2020).

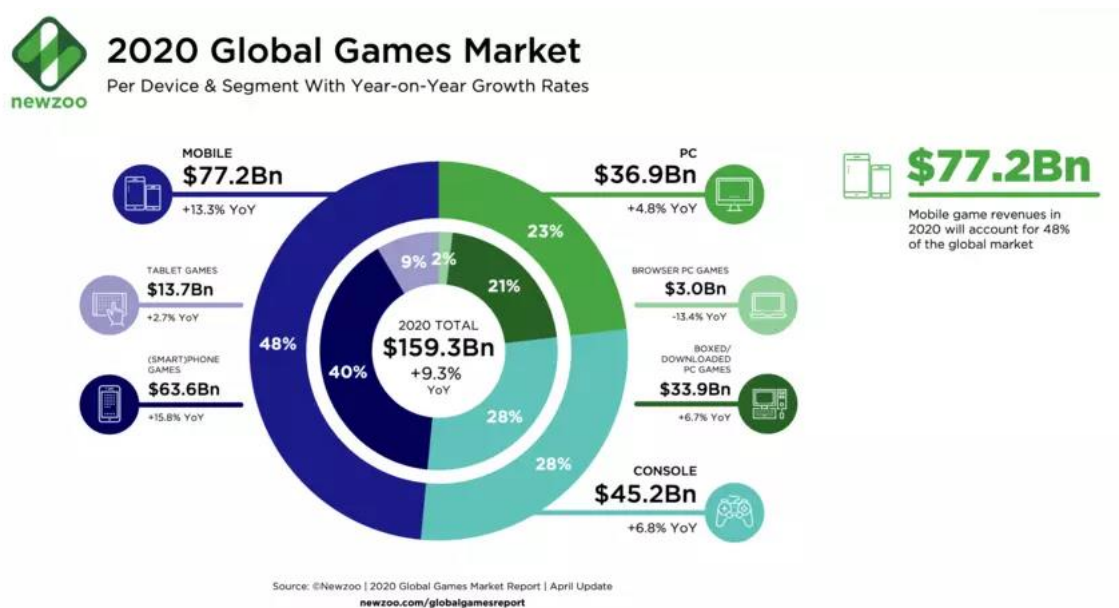


Figure 12: 2020 Global Games Market
Retrieved from: " <https://www.weforum.org/agenda/2020/05/covid-19-taking-gaming-and-esports-next-level/>"

As we can perceive by the graph displayed above, every platform in the games market has had some YoY (year on year) increase, relative to the year before. This resulted in an overall 9,3% increase from the year before, culminating in a 159.3-billion-dollar industry as of April, 2020.

3. Transformation and Evolution: Video games as a social medium

Like many industries at the time, the video game industry was forced to adapt to the pandemic. With the majority of the workforce on a work from home system, the industry quickly evolved in order to meet the high demands of the market. However, this transition

was not easy due to both logistics and human resources adversities. Some video games studios reported “a decline in productivity of around 20% because of the difficulty involved in getting remote teams to work effectively” (Broughton, 2020), which decreased the overall efficacy and resulted in some delays to video games. Another consequence derived from the pandemic was the lack of finance, which smaller studios depend on to survive:

Access to finance is difficult with a recession looming and smaller businesses are vulnerable to a fall in demand, orders and projects. Those dependent on advertising revenues are also finding themselves hit as advertisers cut back on their expenditure. Small studios are struggling to access government support. (Broughton, 2020)

Moreover, the pandemic also affected supply chains around the world (Nagumo, 2020) and caused recent computer chip shortages (Gartenberg, 2021), which eventually resulted in the lack of stock of both Xbox Series X and PlayStation 5, the newer generation consoles eagerly awaited by gamers all over the world.

Furthermore, the most popular games convention E3 was cancelled due to coronavirus restrictions, which led organizers and video game publishers to opt for online presentations instead (Romano, 2020). One advantage of this choice is the lack of costs involved in the convention itself, and the ability to secure audiences simply by streaming the whole event.

Video games (especially those with an online component) have always been a social medium, and that was very evident during the pandemic. People of all ages, turned to gaming during the pandemic, not just because of the entertainment factor, but also to coexist with other like-minded individuals. According to Rosen Sharma, CEO of Game.tv: “With much of the world under lockdown, online and mobile games are the new social square, and more people than ever are turning to gaming to create those social experiences and come together as a community, even if they’re apart “ (Broughton, 2020). The importance of relationships born from gaming, during the pandemic, cannot be overstated because it helped many to get through their own struggles and, at same time, provided a digital platform to relax and simply spend time with friends.

Conclusion

This thesis aimed at providing an overview of the current video game industry and its evolution throughout the years, and how it has turned into a billion-dollar industry, loved and regarded by many as one of the most exciting and emerging industries of the last decade. Technology and globalization have set the stage for the video game industry to rise above all other industries in the entertainment sector, and billions of people around the world enjoy video games every single day, through numerous game systems.

Moreover, in this dissertation I aimed to explain how video games can be engaged in various different manners to all sorts of purposes, such as education, therapy and relaxation. Their versatility makes them one of our society's preferred means of entertainment, and we are just now discovering their full potential.

Having discussed its inception in my first chapter, the video game industry began rather slowly, and it has gained momentum through the years until the point where it plays a leading role in entertainment, in our modern society. The major companies atop the video game industry nowadays are tech giants responsible for many other products we use on a day-to-day basis. Their investment in this market shows the sheer marketability and importance video games have in our entertainment culture. Companies such as Tencent, Apple and Microsoft are leading the charge in the videogames industry and they are some of the most influential big tech firms in the world.

Furthermore, video games, in the present day, are starting to pull away from previous common representations attached to them by the media. Representations such as video games inducing violence, aggression and isolation are being tackled by professionals and scholars who seek to truly understand the advantages and disadvantages of one of the world's top hobbies. Video games, contrary to popular belief, are more and more used as a social space and promote intercultural cooperation and companionship. They combine film, music and literature, in order to create immersion beyond compare, which is one of the reasons for their tremendous success.

In my second chapter, I chose to analyse a video game from a very well-known franchise in gaming, *Assassin's Creed*. The *Assassin's Creed* franchise is known for its cultural and historical accuracy and for immersing the player in historical events throughout human history. With one of their recent games, *Assassin's Creed Origins*, they went a step further

and included a game mode that allows the player to go on virtual tours of ancient Egypt with content curated by professional Egyptologists. The case analysis I performed on *Assassin's Creed Origins* has given me valuable insights, together with other research for this thesis and has led me to strongly believe video games will play a major role in the future of education. Gamification in education is not a recent development, but it has not reached a mainstream level either. However, as more and more generations grow and develop in our digital age, education methods must evolve and adapt. I am of the opinion that video games and gamification seem to be the next step in learning.

In addition to gamification, the rise of the video game industry has resulted in the creation of new and exciting ways of entertainment, that were unimaginable just 15 years ago. In the third and final chapter of my thesis, I addressed the origins of eSports and how they are changing the way we perceive sports in general. This new type of sport is attracting many fans from around the world, and is in direct competition with established traditional sports, such as basketball and the NHL. (Jones, 2019). While their budget and viewing numbers still differ, the future of eSports is directly connected with the rise of the gaming industry, which in turn, rises year after year.

Furthermore, the video game industry has also provided valuable technology such as the Unreal Engine, that is actively changing other industries like the automotive and construction industries. In addition to this, the film industry has also benefited from this technology, which has helped with overall efficacy and cost reduction. (Miller, Epic Games Unreal Engine takes movie production to the next level, 2020).

Lastly, the COVID-19 pandemic has struck a huge blow against many industries in the global economy, among them the entertainment sector that encapsulates the film, music and video game industry. However, contrary to other industries in this sector, the video game industry actually thrived amidst a global pandemic. Record numbers were observed in the sales of games during the first months of the pandemic (Phillips, 2020), largely due to obligatory confinement that led people to choose video games as their preferred means of entertainment. In addition to this, video game streaming also rose to new heights and eSports saw record viewing numbers, both of which are expected to continue their rise in upcoming years. Overall, the videogames industry has now cemented itself as the largest industry in the entertainment sector, far surpassing the music and film industries, and the gap between them is expected to widen in the future. (Shawn, 2021)

Ultimately, the video game industry has become the leading industry in entertainment today and its growth and development go hand in hand with the evolution of technology. This unprecedented growth has turned it into an international and intercultural industry that employs millions around the world, embracing people with passion for video games from all walks of life. Furthermore, the applications this industry has had on other industries, from education to car manufacturing, are immensely valuable. Even in the face of a global pandemic, the video game industry managed to survive and adapt to harsh and unpredictable circumstances, and develop into a modern example of business in the entertainment sector.

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