

# **Uncovering the Gaming Industry's Hidden Gems: A Comprehensive Analysis of Video Game Sales**

# **Milestone 1: Define problem/problem understanding**

## **Activity 1: Specify the business problem**

Video game sales analysis is the process of collecting and analysing data about the sales of video games in order to understand market trends and consumer behaviour . This type of analysis can be useful for a variety of purposes, including identifying the most popular games and genres, predicting future sales, and developing marketing strategies. Video game sales analysis typically involves collecting data from Kaggle sources. It was generated by a scrape of vgchartz.com. This data may include information about the number of units sold, the retail price, and the platforms on which the games are played. Once the data has been collected, it is typically analysed using tableau. The results of the analysis can be used to identify trends and patterns in the market, and to make informed decisions about the development and marketing of video games. Video game sales analysis may be conducted by game developers, publishers, retailers, and other industry professionals. It is an important part of the video game industry, as it helps to understand the needs and preferences of consumers and to identify opportunities for growth and innovation. Analysing sales data from more than 16,500 games. This dataset contains a list of video games with sales greater than 100,000 copies .It was generated by a scrape of vgchartz.com.

## Activity 2: Business requirements

### List of best-selling video games

This is a list of video games that have sold the highest number of software units worldwide. The best-selling video game to date is *Minecraft*, a sandbox game released by Mojang in May 2009 for a wide range of pc, mobile and console platforms, selling more than 238 million copies across all platforms. *Grand Theft Auto V* and EA's *Teris* are the only other known video games to have sold over 100 million copies. The best-selling game on a single platform is *Wii Sports*, with nearly 83 million sales for the wii console.

Among the top 50 best-selling video games on this list, over half were developed or published by Nintendo, including four of the top ten; four Nintendo titles were published with their affiliate, The Pokemon Company. Other publishers with multiple entries in the top 50 include Activision and Rockstar Games with five games each, Electronic Arts and Namco Bandai with two games. Nintendo EAD is the developer with the most games in the top 50, with thirteen titles on the list, followed by Game Freak with six Pokemon games. The oldest game in the top 50 is *Pac-Man*, released in May 1980, while the most recent is *Animal Crossing – New Horizons*, released in March 2020.

Games reported on by player count instead of official sales figures, such as registered accounts, subscriptions, or free to play ownership, are included on the list of the most played video games by player count instead. For the best-selling video game franchises, see the list of best selling games from franchise. Games reported on by gross revenue are included on list of highest grossing games

### List

Title	Sales	Series	Platform(s)	Initial release date	Developer(s) <sup>[a]</sup>	Publisher(s) <sup>[a]</sup>	Ref
<i>Animal Crossing: New Horizons</i>	41,590,000	<i>Animal Crossing</i>	Nintendo Switch	March 20, 2020	Nintendo EPD	Nintendo	<sup>[12]</sup>
<i>Borderlands 2</i>	27,000,000	<i>Borderlands</i>	Multi-platform	September 18, 2012	Gearbox Software	2K Games	<sup>[45]</sup>

Title	Sales	Series	Platform(s)	Initial release date	Developer(s) <sup>[a]</sup>	Publisher(s) <sup>[a]</sup>	Ref
<i>Call of Duty: Black Ops</i>	26,200,000	<i>Call of Duty</i>	Multi-platform	November 9, 2010	Treyarch	Activision	[44]
<i>Call of Duty: Black Ops II</i>	24,200,000	<i>Call of Duty</i>	Multi-platform	November 12, 2012	Treyarch	Activision	[44]
<i>Call of Duty: Modern Warfare</i>	30,000,000	<i>Call of Duty</i>	Multi-platform	October 25, 2019	Infinity Ward	Activision	[36]
<i>Call of Duty: Modern Warfare 3</i>	26,500,000	<i>Call of Duty</i>	Multi-platform	November 8, 2011	Infinity Ward / Sledgehammer	Activision	[44]
<i>Diablo III / Reaper of Souls</i>	30,000,000	<i>Diablo</i>	Multi-platform	May 16, 2012	Blizzard Entertainment	Blizzard Entertainment	[37]
<i>Duck Hunt</i>	28,300,000	None	NES	April 21, 1984	Nintendo R&D1	Nintendo	[40]
<i>FIFA 18</i>	24,000,000	<i>FIFA</i>	Multi-platform	September 29, 2017	EA Vancouver	EA Sports	[50]
<i>God of War</i>	23,000,000	<i>God of War</i>	PlayStation 4 / Windows	April 20, 2018	Santa Monica Studio	Sony Interactive Entertainment	[59]
<i>Grand Theft Auto IV</i>	25,000,000	<i>Grand Theft Auto</i>	Multi-platform	April 29, 2008	Rockstar North	Rockstar Games	[47]

Title	Sales	Series	Platform(s)	Initial release date	Developer(s) <sup>[a]</sup>	Publisher(s) <sup>[a]</sup>	Ref
<i>Grand Theft Auto V</i>	175,000,000	<i>Grand Theft Auto</i>	Multi-platform	September 17, 2013	Rockstar North	Rockstar Games	[6]
<i>Grand Theft Auto: San Andreas</i>	27,500,000	<i>Grand Theft Auto</i>	Multi-platform	October 26, 2004	Rockstar North	Rockstar Games	[42]
<i>Human: Fall Flat</i>	40,000,000	None	Multi-platform	July 22, 2016	No Brakes Games	Curve Digital	[32]
<i>Kinect Adventures!</i>	24,000,000	None	Xbox 360	November 4, 2010	Good Science Studio	Xbox Game Studios	[51]
<i>Mario Kart 8 / Deluxe</i>	60,460,000	<i>Mario Kart</i>	Wii U / Switch	May 29, 2014	Nintendo EAD	Nintendo	[e]
<i>Mario Kart DS</i>	23,600,000	<i>Mario Kart</i>	Nintendo DS	November 14, 2005	Nintendo EAD	Nintendo	[34]
<i>Mario Kart Wii</i>	37,380,000	<i>Mario Kart</i>	Wii	April 10, 2008	Nintendo EAD	Nintendo	[9]
<i>Minecraft</i>	238,000,000 <sup>[b]</sup>	<i>Minecraft</i>	Multi-platform <sup>[c]</sup>	November 18, 2011 <sup>[d]</sup>	Mojang Studios	Xbox Game Studios	[4][5]
<i>New Super Mario Bros.</i>	30,800,000	<i>Super Mario</i>	Nintendo DS	May 15, 2006	Nintendo EAD	Nintendo	[34]

Title	Sales	Series	Platform(s)	Initial release date	Developer(s) <sup>[a]</sup>	Publisher(s) <sup>[a]</sup>	Ref
<i>New Super Mario Bros. U / Luigi U / Deluxe</i>	23,640,000	<i>Super Mario</i>	Wii U / Switch	November 18, 2012	Nintendo EAD	Nintendo	<sup>[56]</sup> <sup>[57]</sup>
<i>New Super Mario Bros. Wii</i>	30,320,000	<i>Super Mario</i>	Wii	November 11, 2009	Nintendo EAD	Nintendo	<sup>[9]</sup>
<i>Nintendogs</i>	23,960,000	None	Nintendo DS	April 21, 2005	Nintendo EAD	Nintendo	<sup>[34]</sup>
<i>Pac-Man</i>	42,071,635	<i>Pac-Man</i>	Multi-platform <sup>[c]</sup>	May 22, 1980	Namco	Namco	<sup>[k]</sup>
<i>Pokémon Diamond / Pearl / Platinum</i>	24,730,000	<i>Pokémon</i>	Nintendo DS	September 28, 2006	Game Freak	Nintendo / The Pokémon Company	<sup>[p]</sup>
<i>Pokémon Gold / Silver / Crystal</i>	29,490,000	<i>Pokémon</i>	Game Boy Color	November 21, 1999	Game Freak	Nintendo	<sup>[m]</sup>
<i>Pokémon Red / Green / Blue / Yellow</i>	47,520,000	<i>Pokémon</i>	Multi-platform	February 27, 1996	Game Freak	Nintendo	<sup>[h]</sup>
<i>Pokémon Ruby / Sapphire / Emerald</i>	23,280,000	<i>Pokémon</i>	Game Boy Advance	November 21, 2002	Game Freak	Nintendo / The Pokémon Company	<sup>[58]</sup>

Title	Sales	Series	Platform(s)	Initial release date	Developer(s) <sup>[a]</sup>	Publisher(s) <sup>[a]</sup>	Ref
<i>Pokémon Sun / Moon / Ultra Sun / Ultra Moon</i>	25,410,000	<i>Pokémon</i>	Nintendo 3DS	November 18, 2016	Game Freak	Nintendo / The Pokémon Company	<sup>[o]</sup>
<i>Pokémon Sword / Shield</i>	25,680,000	<i>Pokémon</i>	Nintendo Switch	November 15, 2019	Game Freak	Nintendo / The Pokémon Company	<sup>[12]</sup>
<i>PUBG: Battlegrounds</i>	75,000,000	<i>PUBG Universe</i>	Multi-platform	December 20, 2017	PUBG Corporation	PUBG Corporation	<sup>[10]</sup>
<i>Red Dead Redemption</i>	23,000,000	<i>Red Dead</i>	PS3 / Xbox 360	May 18, 2010	Rockstar San Diego	Rockstar Games	<sup>[60]</sup>
<i>Red Dead Redemption 2</i>	50,000,000	<i>Red Dead</i>	Multi-platform	October 26, 2018	Rockstar Studios	Rockstar Games	<sup>[6]</sup>
<i>Sonic the Hedgehog</i>	23,982,960	<i>Sonic the Hedgehog</i>	Multi-platform <sup>[c]</sup>	June 23, 1991	Sonic Team	Sega	<sup>[r]</sup>
<i>Super Mario Bros.</i>	58,000,000	<i>Super Mario</i>	Multi-platform <sup>[f]</sup>	September 13, 1985	Nintendo R&D4	Nintendo	<sup>[g]</sup>
<i>Super Mario Bros. 3</i>	24,430,000	<i>Super Mario</i>	Multi-platform	October 23, 1988	Nintendo EAD	Nintendo	<sup>[q]</sup>

Title	Sales	Series	Platform(s)	Initial release date	Developer(s) <sup>[a]</sup>	Publisher(s) <sup>[a]</sup>	Ref
<i>Super Mario Odyssey</i>	25,120,000	<i>Super Mario</i>	Nintendo Switch	October 27, 2017	Nintendo EPD	Nintendo	<sup>[12]</sup>
<i>Super Mario World</i>	26,662,500	<i>Super Mario</i>	Multi-platform	November 21, 1990	Nintendo EAD	Nintendo	<sup>[n]</sup>
<i>Super Smash Bros. Ultimate</i>	30,440,000	<i>Super Smash Bros.</i>	Nintendo Switch	December 7, 2018	Bandai Namco Studios / Sora Ltd.	Nintendo	<sup>[12]</sup>
<i>Terraria</i>	44,500,000	None	Multi-platform <sup>[c]</sup>	May 16, 2011	Re-Logic	Re-Logic / 505 Games	<sup>[19]</sup>
<i>Tetris</i> (1989) <sup>[i]</sup>	43,000,000	<i>Tetris</i>	Game Boy / NES	June 14, 1989	Nintendo R&D1	Nintendo	<sup>[i]</sup>
<i>Tetris</i> (EA)	100,000,000	<i>Tetris</i>	Multi-platform <sup>[c]</sup>	September 12, 2006	EA Mobile	Electronic Arts	<sup>[7][8]</sup> <sup>[j]</sup>
<i>The Elder Scrolls V: Skyrim</i>	30,000,000	<i>The Elder Scrolls</i>	Multi-platform	November 11, 2011	Bethesda Game Studios	Bethesda Softworks	<sup>[38]</sup>
<i>The Legend of Zelda: Breath of the Wild</i>	30,700,000	<i>The Legend of Zelda</i>	Wii U / Switch	March 3, 2017	Nintendo EPD	Nintendo	<sup>[i]</sup>
<i>The Walking Dead</i>	28,000,000	<i>The Walking Dead</i>	Multi-platform	April 24, 2012	Telltale Games	Telltale Games	<sup>[41]</sup>



Title	Sales	Series	Platform(s)	Initial release date	Developer(s) <sup>[a]</sup>	Publisher(s) <sup>[a]</sup>	Ref
<i>The Witcher 3 / Hearts of Stone / Blood and Wine</i>	40,000,000	<i>The Witcher</i>	Multi-platform	May 19, 2015	CD Projekt Red	CD Projekt	[33]
<i>Wii Fit / Plus</i>	43,800,000	<i>Wii</i>	Wii	December 1, 2007	Nintendo EAD	Nintendo	[9]
<i>Wii Play</i>	28,020,000	<i>Wii</i>	Wii	December 2, 2006	Nintendo EAD	Nintendo	[9]
<i>Wii Sports</i>	82,900,000	<i>Wii</i>	Wii	November 19, 2006	Nintendo EAD	Nintendo	[9]
<i>Wii Sports Resort</i>	33,140,000	<i>Wii</i>	Wii	June 25, 2009	Nintendo EAD	Nintendo	[9]

## How the Video Game Industry Is Changing

Video games have been around for decades, providing entertainment for children and adults alike. They have evolved significantly from the early days of computer games and the first versions of Nintendo and Atari. The days of pixelated screens and limited sounds are a distant memory as video games have become more lifelike than ever. As technology continues to improve, so do video games.

Video game creation has become increasingly complex, and the cost of creating a game to run on one of the major consoles has risen with this

greater complexity. It was once unthinkable to sink millions into development costs, but games today can cost tens and even hundreds of millions. This has pushed game development into Hollywood movie territory in terms of production and marketing costs. The video game sector is immensely large. In fact, it is larger than the movie and music industries combined, and it is only growing. Though it doesn't get the same attention that the movie and music industry does, there are over two billion gamers across the world. That is 26% of the world's population. It's no surprise that companies want a piece of the pie. In 2020, the gaming industry generated \$155 billion in revenue, By 2025, analysts predict the industry will generate more than \$260 billion in revenue. As such, tech companies are looking to get involved in this revenue stream. Tech giants such as Google , Meta , formerly Facebook, and Apple , have all made plans to enter the video game industry.

## **Streaming and the Involvement of Tech Companies**

Nontraditional gaming companies, like Meta, Apple, and Google, are getting into the industry. The tech industry is looking for ways to make video game streaming as natural as streaming a song on Spotify or a movie on Netflix. Microsoft has already been in the gaming industry through its popular Xbox console. In 2019, the company introduced Project xCloud, a video game streaming service that allows users to stream Microsoft's Xbox games to PCs or other devices. The service became fully functional in September 2020 and can be accessed by subscribers to Xbox Game Pass Ultimate. In 2016, Meta began developing a gaming platform with Unity Technologies, which makes a game development framework for people to make video games. Google launched its program, Stadia, which is Google's cloud gaming service, that allows users to play streaming video games with extremely high quality. It is available through Google's browser, phones, tablets, and desktop computers.

The key goal for all of these companies is to allow players to stream video games without the need for a computer or a video game console. As this trend continues, purchasing physical video games in the form of cartridges or discs is becoming increasingly rare. Subscription streaming services are the future and will be beneficial to video game companies, like Ubisoft and Electronic Arts, as manufacturing , shipping, and storage costs will all disappear. Subscription services have also allowed for revenue generation to occur throughout the year, whereas traditionally, games were bought during holidays and other big occasion events.

## **Technical Innovations**

Virtual reality is here. Oculus VR, a subsidiary of Meta, is working hard on improving the quality of the virtual reality headsets it has already released.

Oculus VR was purchased by Meta in 2014 for \$2 billion. The Oculus Quest 2 is Meta's latest offering of the product.

Video games have already surpassed many other forms of entertainment as far as immersion goes, and virtual reality will add yet another layer. There will also be further experimentation with controls, such as adding voice, touchscreens, and gestures to game mechanics when consoles add peripherals to take in those inputs. Apple is also targeting the release of a virtual reality headset in 2021 or 2022.

## **Merchandising**

Like Hollywood, the video game industry needs to spin more revenue off of its intellectual property because the product costs a lot to make. merchandising is already around, with t-shirts, figures, hats, mugs, and more. The *Halo* series on Microsoft's Xbox has spread to other forms of content through novels and comic books in addition to an upcoming television series and a long-rumored movie. This may become the approach for all successful video game series to follow.

In fact, the popular video game, *Assassin's Creed*, a game developed by Ubisoft, was made into a movie in 2016 with prominent actors. Sega's popular *Sonic the Hedgehog* game was made into a successful movie in 2020, starring well-known actors, and set the record for the biggest opening weekend for a video game-based movie.

## **Market Demographics Are Expanding**

Another trend in the video game industry is the expansion of the market as far as demographics go. People are playing games both earlier and later in life, and the gender mix is nearing par. The top-level gamers competing in eSports leagues have gained enough recognition that they can apply for the professional athlete visa when entering the U.S. Gaming has a wide appeal, and it is still growing.

Video games have become so popular on a mass scale that certain players stream videos of themselves playing video games at home and make hundreds and thousands of dollars by doing so. This has become another revenue generation sector of the video game markets .

## **Vintage Video Games**

As the world becomes nostalgic and we see reboots and remakes of loved films and shows from decades ago, the same is happening for video games. Vintage video games from the early days of the industry are in high demand and have become extremely popular, not only with older players who experienced the games first-hand but also with a new

generation of players. Many companies have taken advantage of this nostalgia and released updated versions of their consoles. Nintendo , more than any other company, has successfully taken advantage of this interest in retro video games by releasing Nintendo Classic Mini and Nintendo Switch, two consoles that allow for playing classic Nintendo video games. This has become a solid revenue stream for companies that were around at the early stages of the industry.

## **The Bottom Line**

The video game industry has always been about innovation. New technology, new controls, and new experiences are to be expected. As the world moves more and more to time spent on mobile phones, streaming services, and mobile phone game playing will become an important arena for revenues, and large tech companies will look to leverage their current framework to get involved. Perhaps the most interesting change in the video game industry is the expanding demographics of gamers. With more people playing games, creating demand for more immersive entertainment, and looking for easier ways to access games, the future of the video game industry looks bright.

## Activity 3: Literature survey (student will write)

### **Literature Review on the impact of Violent Video Games on adolescents**

The growing popularity of video games expected to reach 73.5 billion dollars globally by 2014 (PWC, 2009, Procon.org) and attracted a controversial debate between policy makers, parents, researchers and video game producers about the effects being both harmful and beneficial, especially as 90% of children and teens reportedly play them in the US (Anderson, Prot, McDonald & Gentile, 2012) and six of the top ten include violent content (Entertainment Software Association website, 2008). This literature review examines several highly impacting empirical studies in the field of violent video game effects on adolescents and theories of media consumption, making way for a research proposal to test if a person's empathy level impacts their choice of video game.

This research is expected to benefit the field because the need for testing for "third" variables such as cognitive awareness in sample groups has been consistently highlighted by researchers (McLean & Griffiths, 2013, Ferguson & Kilburn, 2008, Markey & Markey, 2010), as violent video games only affect some individuals who have a pre-existing disposition such as low agreeableness (little concern for others or their feelings, cold etc.), making them susceptible to violent media (Markey & Markey, 2010).

The reason there are more violent games than nonviolent is ambiguous due to the number of theoretical possibilities used by media producers to justify producing violent content (Weaver, 2011). Findings from a Meta analyses by Weaver (2011) on the enjoyment of violent media found that people who have more aggressive personalities are more likely to prefer violent media. These theories include; - Gratifications and uses model, the most significant theory used by media producers proposes individual personal needs are fulfilled, such as identification and relating styles, through consuming violent media - Excitation transfer model proposing violence is physiologically arousing and can

transfer to heightened enjoyment of other emotions and experiences - Forbidden fruit theory being the increased attractiveness of something that has been restricted in some way because it intrudes on freedom of one's consumption - Gender socialisation theory that more men are attracted to violent media than women due to the shaping of identity in their upbringing and social rewards (Weaver, 2011, McLean & Griffiths, 2013). Effects of these games are largely considered harmful by

researchers as they are very effective teachers and effect players in multiple domains (Anderson et al, 2012), including correlations to reduced P300 amplitudes in the brain which is the desensitisation of to violence and increased aggressive behaviour (Bartholow, Bushman & Sestir, 2005), bullying (Dinkes, Kemp, Baum & Snyder, 2008) and violence to women and rape (American Psychological Association website, 2008).

In fact they are used to train military personal and defence force for the battlefield (Susca, 2012). Research has currently focused on correlations between violent games and aggression to test if the game exposure is carried into reality. One highly controversial meta analyses done in this field is that of Anderson et al (2010) who according to Huesman (2010), took great pains in proving beyond a reasonable doubt that exposure to video game violence

increases the risk the user will act more aggressively and violently in future. This study aimed to provide a comprehensive overview of positive and negative effects of video games and included 136 longitudinal, correlational and experimental studies over 10 years with 130,000 participants from Eastern and Western cultures. Results were analysed from two groups, one of the full sample and another for best practice samples which had high-quality sampling strategy and analysis techniques. Results showed a causal risk factor for increased aggressive behaviour, cognition and affect, reduced empathy and prosocial behaviour for both short and long terms and proposed it could lead to the development of an aggressive personality over time (Anderson et al, 2010).

One of the conflicting issues about this research is the fact that unpublished studies were used which according to Ferguson & Kilburn (2010), were biased, excludes crime rate as an impacting variable and measure on aggression was not standardised. Furthermore, Ferguson & Kilburn (2010) request that more control is required for third variables such as predisposed genetic tendencies, family history and other psychological properties. In fact Ferguson, Ramos, Failing & Romero-Ramirez (2013) provide a quantitative study that concludes historical family violence and genetic predispositions lead to future violent behaviours and that violent media is not a moderator. They disagree with Anderson et al (2010) Meta analyses study being based on the social cognitive view which proposes aggressive scripts are learned, and instead believe the cause is a genetic and environment predisposition burden (Ferguson et al, 2010).

This study by Ferguson et al (2010), proved their hypothesis that media violence does not desensitise viewers. They randomly tested 238 mostly Hispanic students of an average age of 22 years from their University who were given a course credit who were provided with questionnaires after viewing two media clips of which were randomly violent or nonviolent TV shows and then either fictional or real life violent clips. They found no difference between empathising and desire to help those in the violent clips.

Possible problems with this study are: 1. The sample was 170 females which is not a representative sample of the typical market for violent media which are mostly males

according to McLean & Griffiths (2013) whose research reported 80% of women had never played a video game over the year of the study. 2. Sample TV shows would be classified as very low level violence, unlike the graphic violent teaching properties of video games 3. The University where Ferguson et al (2010) work is in partnership with a television station which sells videos A number of theories and variables affect the choices and attraction of a person to consume violent media (Weaver, 2011) which explains why so many people play violent video games and only a small amount carry out violent behaviours as a result.

These theories appear to be the cause of conflict between two popular researchers in the field arguing that adolescents either learn from the games how to be violent and that causes them to behave, think and feel more aggressively or that the games have no impact on a person and aggression or violence is caused by an existing predisposition that can be related to either or both family history and genetic personality traits (McLean & Griffiths, 2013, Ferguson & Kilburn, 2008, Markey & Markey, 2010). According to current research personality predisposition including ability to empathise with others would be important for future research which is currently in demand, as it may show significant differences when controlling for these variables in sample groups.

## **Activity 4: Social or Business Impact.**

### **Social and Cultural Impacts of Video Games,**

### **How Are We Affected by Video Games?**

This paper is devoted to the research of the social and cultural impacts of video games. Video games are represented as the product of digital culture that substantially affects a modern person, alters traditional social practices, and transforms cultural space. Reviewing scientific researches related to video games influence on people we have educed positive and negative outcomes. The bottom line is that modern studies of video games have turned to researching positive effects of gaming technology and its potential in other cultural fields' development. We have shown that video games and gaming industry strongly influence economy and society playing an important role in social changes.

We have come to the conclusion that the gaming industry is creative and has solid potential, it is changing the space of modern culture forming new artistic images, new cultural identities, new forms of art, new cultural phenomena. Information and communication digital technology has changed all spheres of a modern person's life. has drastically changed the environment, specifically, the way we get, store and transfer information, the way we communicate and present ourselves, our financial institutions and government, our traditional management practices, marketing,

labor, cooperation, etc. A modern person interacts with virtual objects, number and nature of which are constantly changing [Shaev, 2015]. Digital technology transforms the space of modern culture in such a way that today it is not just modern culture, but it is digital culture we're talking about [Gere, 2002].

Technology development has become the key factor of social and cultural space transformation or the technological process was triggered by realization of certain cultural settings – this is a matter of scientific discussions now. However, the fact that the culture of XX-XXI centuries has dramatically changed is out of question. New media (Internet services, social media), new interactive teaching technologies (simulators, virtual classes and laboratories, MOOCs, serious games), new trends and forms of art (digital art, virtual museums), new kinds entertainment (multimedia, video games, virtual reality, interactive movies) are appearing. One of the most rapidly developing phenomena of digital culture is video games.

Video games are a complex and multisided phenomenon that has become an object of research in various sciences: philosophy, culture studies, media and literary studies, semiotics, anthropology, ethics, aesthetics, history, sociology, psychology, neuroscience, economics, computer science, etc. All that illustrates the significance of video games in different spheres of our life. Video games are popular not only with kids and youth, but also with representatives of all ages and social strata. The industry itself is quite young; however, it is rapidly developing. It is becoming the driver of the entertainment business on the whole being ahead of cinematography in terms of sales. Moreover, the gaming industry is going beyond the borders of its initial entertaining purposes.

According to A. Shaw, “video game permeate education, mobile technologies, museum displays, social functions, family interactions, and workplaces“ [Shaw, 2010]. Indeed, video games and gaming technologies are actively applied in education, business trainings, science, medicine, military, management and marketing, art, museums, architecture, sports, etc. As R. Smith notes, “however, the current explosion in both Innovation Management and Education Excellence through Vision 2020 2282 computer and game technologies has allowed them to move so swiftly into so many different industries, that it appears that game are taking over all industries” [Smith, 2017]. Once being just toys for kids video games and gaming technology have turned into a powerful force, a serious means of affecting mass consciousness, society and culture. The potential of video games is enormous, as well as their impact on the environment of a modern person. The purpose of this paper is to find out, how they influence culture, society, and us.

## **Video Games and Personality**

Video games penetrate the world that is traditionally studied by social psychology; it is the world of a person and its communication with other people.

The issue of video games influence on human psychological and physical health and psycho-emotional state, brain activity, communication skills as soon is rather frequently mentioned in scientific researches. Video games influence on children and young people is of the most concern, for games are an important factor of forming personality and socialization. According to P.J.C. Adachi and T. Willoughby, most of the studies of video games impact on youth are focused on negative outcomes



(aggression, risky behavior, video game addiction), a positive outcomes of video game play have rarely been a subject of research [Adachi & Willoughby, 2012]. However, today we are facing a certain increase of attempts to investigate positive effects of video games [Granic, et al., 2014].

## Negative Effects of Video Games

Video games are frequently blamed for provoking violence. It is stated that video games with violent content may teach kids how to be violent, aggressive, hostile, unsympathetic, and tolerant to breaking social norms. Video games may teach false norms of behavior that are demonstrated by individuals in the course of play online. No doubt, the cases of aggressive behavior among gamers are real and well known. Though, scientists failed to verify that video games with violent content (such as *Mortal Combat*, *GTA*) increase gamers' aggressiveness. For instance, C.J. Ferguson and C.K. Olson didn't find such impact even in the case of mentally vulnerable children: "our results suggest that the association between violent video games and aggression related outcomes in children, even those with clinically elevated mental health symptoms, may be minimal" [Ferguson & Olson, 2014]. The results of the research carried out by J.M. Jerabeck and C.J. Ferguson have shown that "violent content in video games had no influence on prosocial behavior, aggressive behavior, or self-perceptions of empathy" [Jerabeck & Ferguson, 2013]. So, no research has found that video games are a primary factor of youth aggression [Jenkins].

A widely spread misconception is that video games contribute to getting away from reality, escapism, psychological and social isolation of an individual. Video games lead to the situation when an individual prefers virtual worlds to reality and spends all the free time in them becoming socially isolated. However, at the same time we see that most video games imply multiplayer (with friends, family, etc.). Moreover, popularity of MMORPG gets bigger ever year. Those bring gamers social contacts and interaction, and outside the virtual world, too. It is stated that video games, as well as using a computer on the whole, negatively affect human health. For example, they can cause physical inactivity and obesity, musculoskeletal disorders.

As the researches show, using a computer for more than two hours a day increases the risk for pain at most anatomic sites [Hakala, et al., 2012]. Such negative effect of video games for the most part has to do with using a computer for longer periods. If we are talking about active video games (Wii games, exergames, fitness games), the impact will be quite the opposite [Biddiss & Irwin, 2010]. Such video games involve physical activity, can help to replace sedentary screen-time activities improving overall physical state [Krause & Benavidez, 2014].

Innovation Management and Education Excellence through Vision 2020 2283 It is traditionally considered that video games cause problems with eyesight because of the strain and focus they imply. However the studies have shown that video games increase human abilities to differentiate colors and "action video game playing also enhanced contrast sensitivity, providing a complementary route to eyesight improvement" [Li, et al., 2009]. In many cases negative impacts of video games on

people is connected with various factors, such as personal psychic peculiarities, age, physical and social activity, social environment, relationships with the family, etc.

## **Positive Effects of Video Games**

In accordance with the research by M. Palaus et al., “video games use has an effect in a variety of brain functions and, ultimately, in behavioral changes and in cognitive performance” [Palaus, et al., 2017]. Video games positively affect cognitive abilities: they improve memory, concentration, visuospatial skills, etc. Action games improve such cognitive abilities as visual focus, short-term memory, reaction speed, learnability. According to the studies of D. Bavelier et al., “action video game play may actually foster brain plasticity and learning” [Bavelier, et al., 2012]. Today such video games are recommended to people of all ages for brain training. Besides, such aggressive teach players how to keep their emotions under control. Negative emotions in video games teach how to cope with them in real life.

However, video games affect human hippocampus differently. It is a part of the brain responsible for information consolidation for the further transfer from short-term memory to the long-term one, for storing and processing the space-related information. The results of study by L. West et al. show that “video games can be beneficial or detrimental to the hippocampal system depending on the navigation strategy that a person employs and the genre of the game” [West, et al., 2017]. So, video games can both increase and decrease the amount of grey matter in the hippocampus of different people depending on what kind of space orientation an individual uses.

We can distinguish between the following positive effect of video games: improve focus, observancy, ability to make quick decisions, develop memory, logical thinking, encourage problem solving skills and learning new skills, develop the ability to process big arrays of information, improve visual-spatial skills, increase motor skills, hand-eye coordination, better reading comprehension and inductive reasoning, etc. What is more, according to P.J.C. Adachi and T. Willoughby, positive effect of video games can relate to well-being. Playing video games can satisfy basic psychological needs (needs of competence, autonomy and relatedness), which in turn leads to intrinsic motivation and well-being [Adachi & Willoughby, 2017]. When we play, we do it not because of the pressure of the world around, but for experiencing intrinsic motivation. It is based on three basic psychological needs, satisfying which we move towards psychological well-being. Those needs are satisfied through playing video games.

The competence need is satisfied when a person feels the ability to deal with game's challenges. As a rule, a videogame gives an opportunity to try to solve a problem more than one time only, which leads to the competence increase without experiencing fatal mistakes. The need in autonomy is satisfied if a person is free to make independent decisions. And relatedness need satisfaction is provided by the tight interconnection with other players, it is expressed in collective actions, cooperation, communication, etc. So, if video games contribute to satisfying basic psychological needs, they also contribute to the following: firstly, understanding personal abilities, teach how to overcome challenges and difficulties, to try over and over again, to be proactive, they stimulate the ambition for competition, struggle and victory, they teach to see new opportunities, to improve skills and abilities; secondly,

they contribute to understanding responsibility, they teach to make decisions and solve complex problems, develop strategic thinking; thirdly, they teach how to cooperate, how to work in a team, they contribute to developing social skills and prosocial behaviour. If we look at video games as a means of communication, we will see that they imply communication. Innovation Management and Education Excellence through Vision between developers and players (open communication space in which players and developers interact); between players (video games give an opportunity to communicate building relationships, joining in teams and communities). Lots of MMORPGs allow the players interact being in different parts of the globe. From that point of view, video games can be seen as a means of intercultural communication, for the crowd here is global, international. Cooperation and social interconnection of players from all over the world may lead to leveling national prejudices and stereotypes and, consequently, to more efficient communication between representatives of different cultures and ethnic groups. Thus, as we see it, along with the negative effects of video games there is a great potential of positive influence that can be socially useful with the help of game designers, teachers, doctors, and researchers working together.

## **Video Games and Society**

So, we have reviewed how video games influence people. Now, we will try to reveal their influence on changes in society. Video games have really become a part of our lives, they change patterns of behavior, social communication and leisure entertainment. Presently, when the flow of information and experience is constantly growing, video games are becoming an essential element of that flow, a subject for discussion and social interaction. Besides, video games are a huge industry that has become a significant part of modern economy throughout the last decades. It has brought vast changes to our society: new markets, new companies and corporations, new business models, new workplaces, new software technology (3D Engine, networking, Artificial Intelligence), etc. Let's take a look at the social transformations that modern information and communication technology and video games are bringing to life. Many video games broadcast and strengthen the values of capitalism in minds of people. In fact, virtual worlds of video games are prototypes for the real world with its system of capitalistic economical relationships and property inequality. In our society we see the organic bond between real and virtual worlds. Virtual worlds help achieve the goals of capitalism (profit maximization, propaganda beneficial for the ruling class), the real world contributes to the development of the gaming industry [Dyer- Witheford & Peuter, 2009]. In the virtual worlds of video games the new economic relationships are being formed. They are based on not material virtual benefits. Those simulative economic relationships based on the distribution of virtual resources, producing and consuming virtual benefits are becoming a part of our real social and economic system. Video games encourage producers and consumers of virtual goods that are purchased by players for real money. And vice versa, players have an opportunity to convert their income, earned in electronic money into real currency. Virtual spaces are becoming interesting for real business, big companies and corporations involved in promoting real goods and services in them. Thus, we see that video games and gaming industry are developing modern capitalistic system not only in reality, but in virtual spaces, too. If we take a look at video games as a sort of medium, we will be able to see their influence on society that is related to other means of communication and mass media. As I.

Bogost notes, books, cinematography, art, theater, music, video games are media that influence and change us [Bogost, 2007]. However, from his point of view, video games are a unique medium that has its own persuasive power. The message conveyed by an author is passed not only through verbal and visual means, but also through procedures: game mechanics, gameplay, rules. He called that capability of video games “procedural rhetoric”. I. Bogost calls us to recognize the persuasive and expressive power of procedurality and to look at video games as a serious means of affecting us and society on the whole. So, video games have been influencing economic relationships and social norms of several generations.

Today they are able to affect us quite strongly, persuade us, uphold the existing order and play an important role in future social transformations. Innovation Management and Education Excellence through Vision 2020 2285 Some game designers don't see video games as entertainment at all, they treat them as a powerful tool for social changes. With the technology at hand (VR, AR) we can alter the public perception of many social issues. For example, the video game Blue Cat forms empathy to mentally ill people. We Are Chicago touches upon the problems of gang violence, economic insecurity, immigration, etc. [Conditt, 2016].

## **Video Games and Culture**

No doubt, video games are strongly affecting modern culture. Its contribution was studied by T. Donovan. He described the history of video games as the history of human creativity supported by technological development [Donovan, 2010]. The gaming industry is creative, it has strong potential, it

changes the cultural space. Video games create their own images (e.g., Pokémon, Mario, Sonic) and the whole universes (World of Warcraft, The Witcher, The Elder Scrolls, Assassin's Creed) that become cultural phenomena known by the whole generation (not gamers only). Video games also have to do with new forms of art, such as digital art, chiptune, pixel-art, glitch-art. They create new phenomena of modern culture (fanfiction, fandom, role-playing games, cosplay, etc.) [Samoylova, 2014]. As a commercial entertainment product video games influence various spheres of culture: cinematography, television, literature, media, comics, music, etc. Visual images, names, stories and ideas of commercially successful projects (Spiderman, Marvel characters) appear in movies, comics and video games forming one entertainment product that affects the mass consciousness and culture dramatically. According to J. Raessens, video games, as well as television and music, have become the phenomena of great cultural importance. We need to see them as aesthetic, social and cultural phenomenon. In the culture of postmodern various types of video games being media change the structure of personal and cultural identities [Raessens, 2006].

Video games belong to the system of mass cultural production, they are a phenomenon of popular culture, and as a part of culture video games are a mechanism of socialization and adoption of cultural norms. They contain rich cultural material (values, history, images, symbols, myths, art forms, etc.) consuming

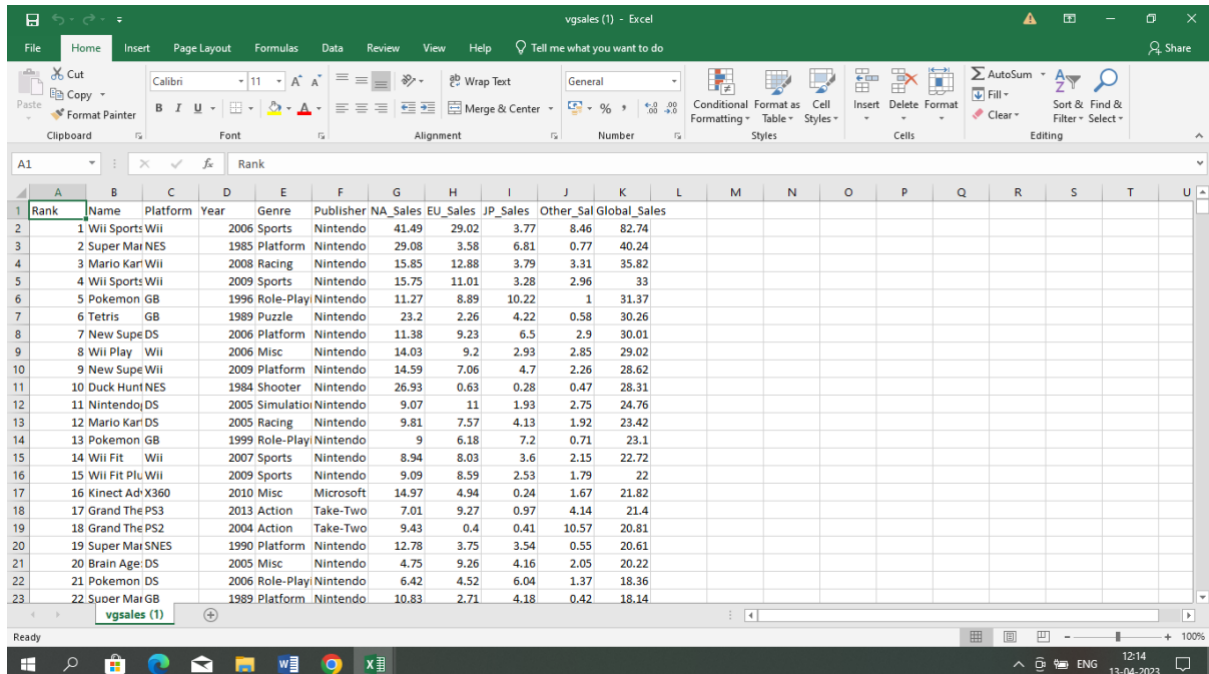
which we adopt cultural norms and values. Video games are unthinkable without cultural content. They create certain images of reality, but a player can see all the virtual conventions, too. That world needs to be meaningful to a player, it should be filled with values, have artistic content and represent cultural experience in order to capture the mind, grasp it, to make a person believe in it. So, video games influence modern culture producing new cultural phenomena that are a representation of modern culture values. Video games and the gaming industry are changing us, our technologies, economy, art, education, etc. They affect the way we feel ourselves in the world, how we communicate, how we play in the framework of post-non-classical culture. Video games are the technological, economic, social and cultural force that is worth considering, because, as J. McGonigal notes, those who understand the power and the potential of video games, will be the people who invent our future [McGonigal, 2011].

## **Milestone 2:Data collection &Extraction from Database**

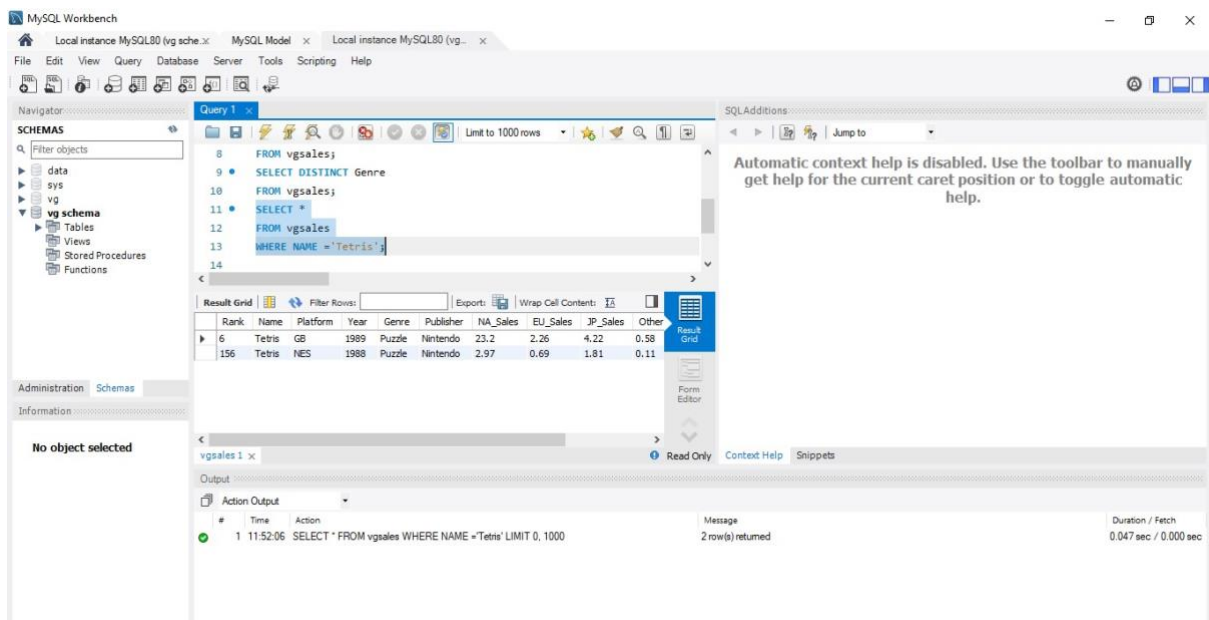
Data collection is the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypotheses, and evaluate outcomes and generate insights from the data.

## Activity 1: Collect the dataset

Please use the link to download the dataset: [here](#)



Rank	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Other_Sales	Global_Sales
1	Wii Sports	Wii	2006	Sports	Nintendo	41.49	29.02	3.77	8.46	82.74
2	Super Mario Bros	NES	1985	Platform	Nintendo	29.08	3.58	6.81	0.77	40.24
3	Mario Kart	Wii	2008	Racing	Nintendo	15.85	12.88	3.79	3.31	35.82
4	Wii Sports	Wii	2009	Sports	Nintendo	15.75	11.01	3.28	2.96	33
5	Pokemon GB	GB	1996	Role-Play	Nintendo	11.27	8.89	10.22	1	31.37
6	Tetris	GB	1989	Puzzle	Nintendo	23.2	2.26	4.22	0.58	30.26
7	New Super Mario Bros	Wii	2006	Platform	Nintendo	11.38	9.23	6.5	2.9	30.01
8	Wii Play	Wii	2006	Misc	Nintendo	14.03	9.2	2.93	2.85	29.02
9	New Super Mario Bros	Wii	2009	Platform	Nintendo	14.59	7.06	4.7	2.26	28.62
10	Duck Hunt	NES	1984	Shooter	Nintendo	26.93	0.63	0.28	0.47	28.31
11	Nintendo DS	DS	2005	Simulation	Nintendo	9.07	11	1.93	2.75	24.76
12	Mario Kart	DS	2005	Racing	Nintendo	9.81	7.57	4.13	1.92	23.42
13	Pokemon GB	GB	1999	Role-Play	Nintendo	9	6.18	7.2	0.71	23.1
14	Wii Fit	Wii	2007	Sports	Nintendo	8.94	8.03	3.6	2.15	22.72
15	Wii Fit	Wii	2009	Sports	Nintendo	9.09	8.59	2.53	1.79	22
16	Kinect Adventure	X360	2010	Misc	Microsoft	14.97	4.94	0.24	1.67	21.82
17	Grand Theft Auto	PS3	2013	Action	Take-Two	7.01	9.27	0.97	4.14	21.4
18	Grand Theft Auto	PS2	2004	Action	Take-Two	9.43	0.4	0.41	10.57	20.81
19	Super Mario Bros	SNES	1990	Platform	Nintendo	12.78	3.75	3.54	0.55	20.61
20	Brain Age	DS	2005	Misc	Nintendo	4.75	9.26	4.16	2.05	20.22
21	Pokemon DS	DS	2006	Role-Play	Nintendo	6.42	4.52	6.04	1.37	18.36
22	Super Mario Bros	GB	1989	Platform	Nintendo	10.83	2.71	4.18	0.42	18.14



```
8 FROM vgsales;
9 SELECT DISTINCT Genre
10 FROM vgsales;
11 SELECT *
12 FROM vgsales
13 WHERE NAME = 'Tetris';
14
```

Rank	Name	Platform	Year	Genre	Publisher	NA_Sales	EU_Sales	JP_Sales	Other
6	Tetris	GB	1989	Puzzle	Nintendo	23.2	2.26	4.22	0.58
156	Tetris	NES	1988	Puzzle	Nintendo	2.97	0.69	1.81	0.11

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

Output

#	Time	Action	Message	Duration / Fetch
1	11:52:06	SELECT * FROM vgsales WHERE NAME = 'Tetris' LIMIT 0, 1000	2 row(s) returned	0.047 sec / 0.000 sec

# Milestone 3: Data Preparation

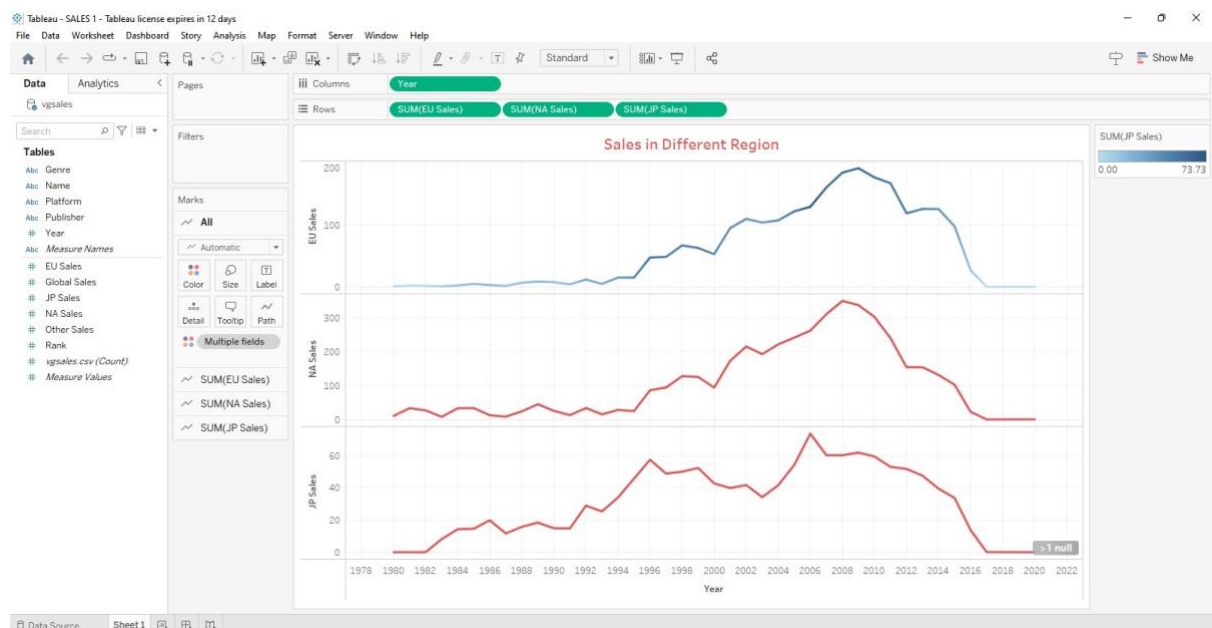
## Activity 1: Prepare the Data for Visualization

Preparing the data for visualization involves cleaning the data to remove irrelevant or missing data, transforming the data into a format that can be easily visualized, exploring the data to identify patterns and trends, filtering the data to focus on specific subsets of data, preparing the data for visualization software, and ensuring the data is accurate and complete. This process helps to make the data easily understandable and ready for creating visualizations to gain insights into the performance and efficiency.

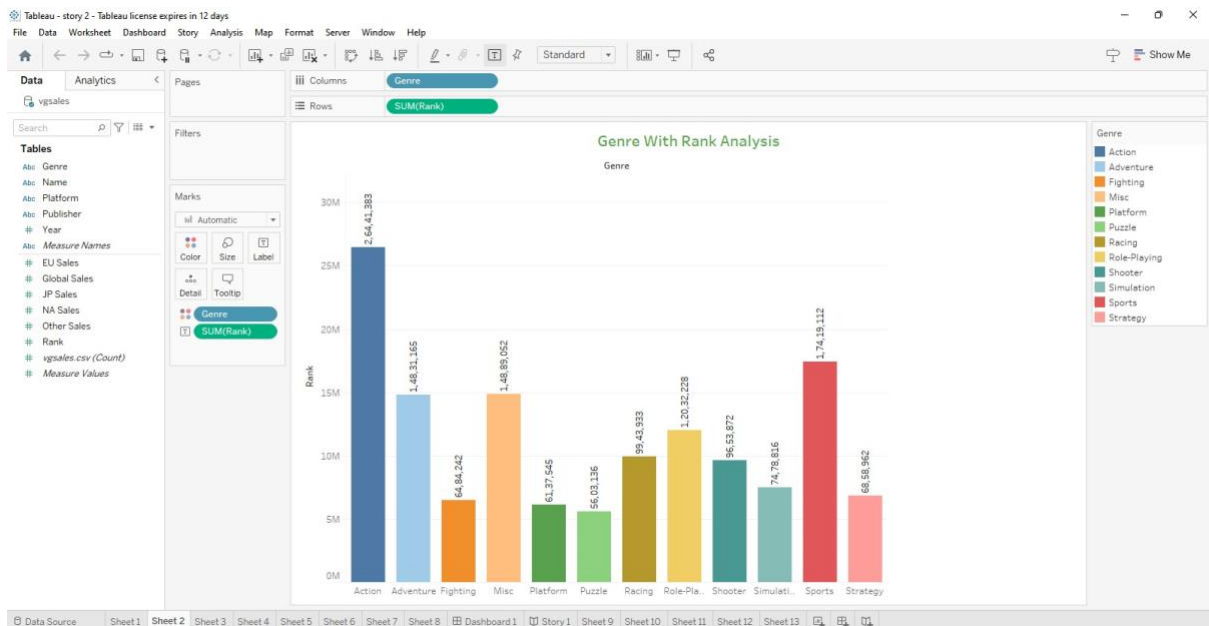
# Milestone 4: Data Visualization

Data visualization is the process of creating graphical representations of data in order to help people understand and explore the information. The goal of data visualization is to make complex data sets more accessible, intuitive, and easier to interpret. By using visual elements such as charts, graphs, and maps, data visualizations can help people quickly identify patterns, trend and outlier in the data

## Activity 1.1: Sales in different region Analysis



## Activity 1.2: Genre with rank Analysis

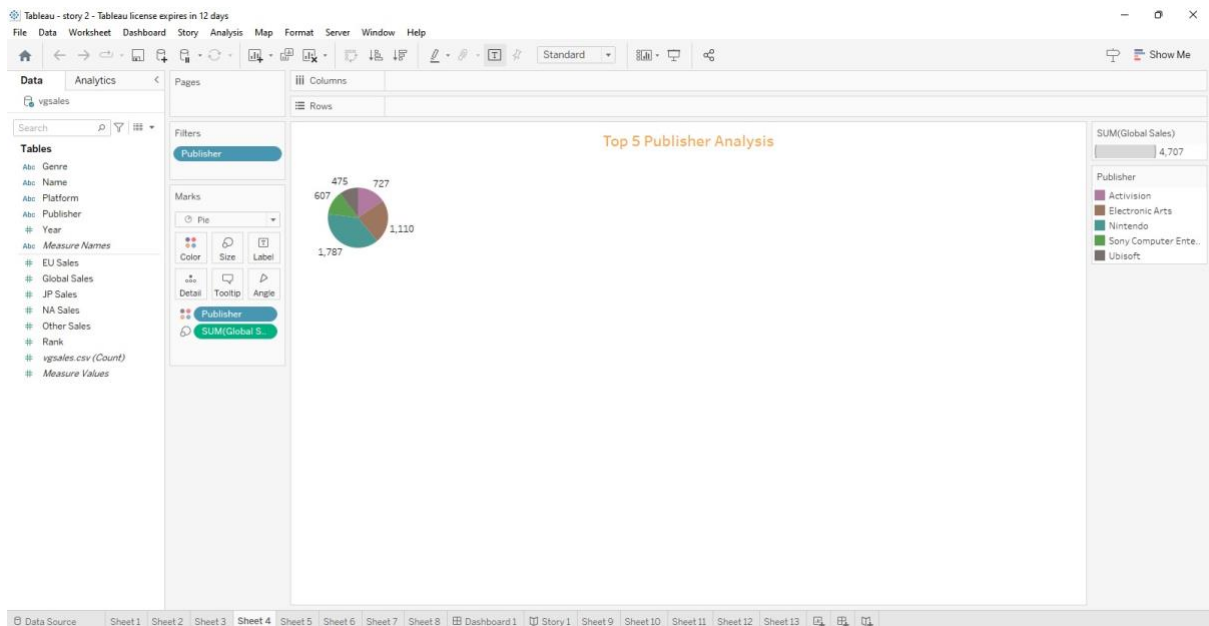


## Activity 1.3: Total Sales Analysis

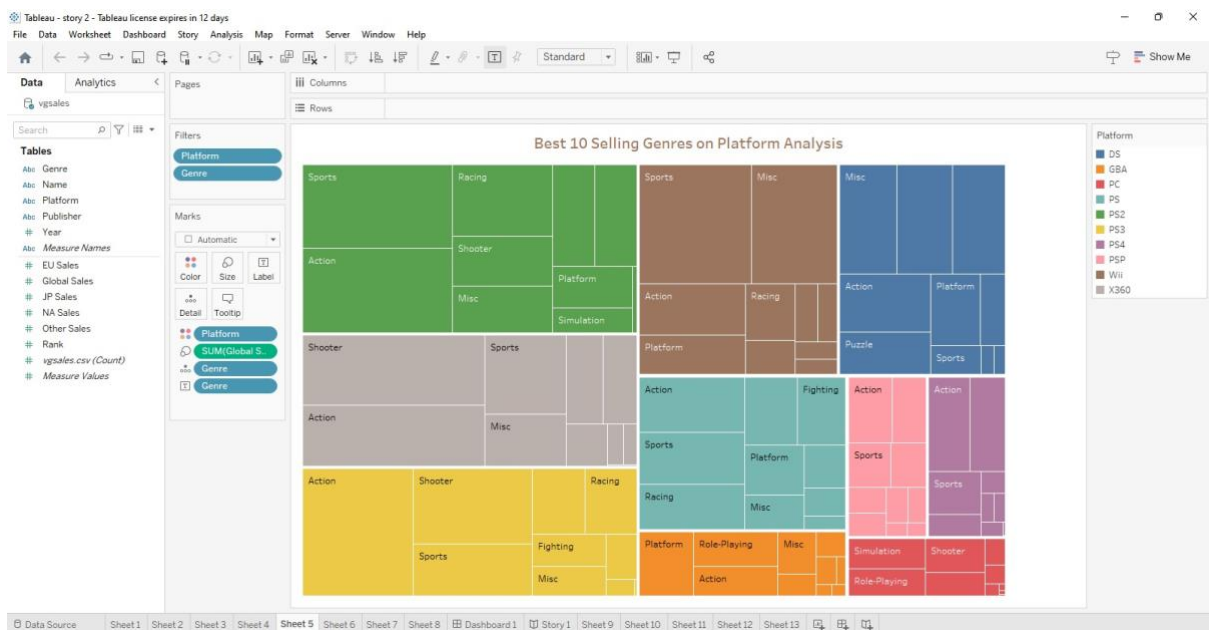


## Activity 1.4: Top 5 publishers Analysis

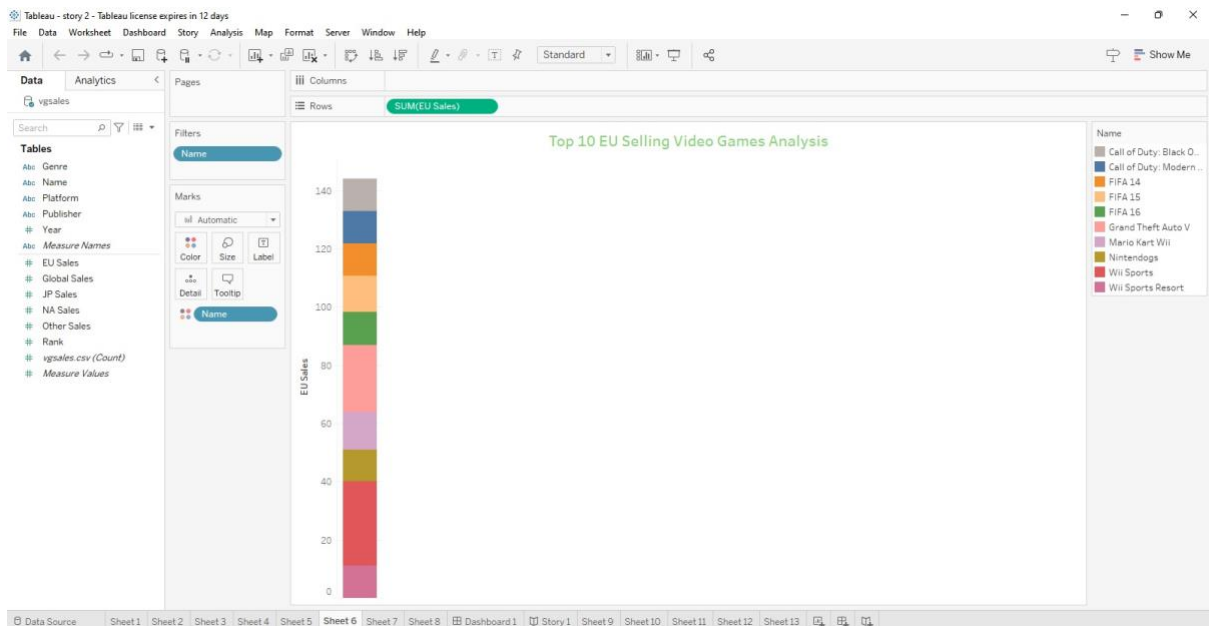




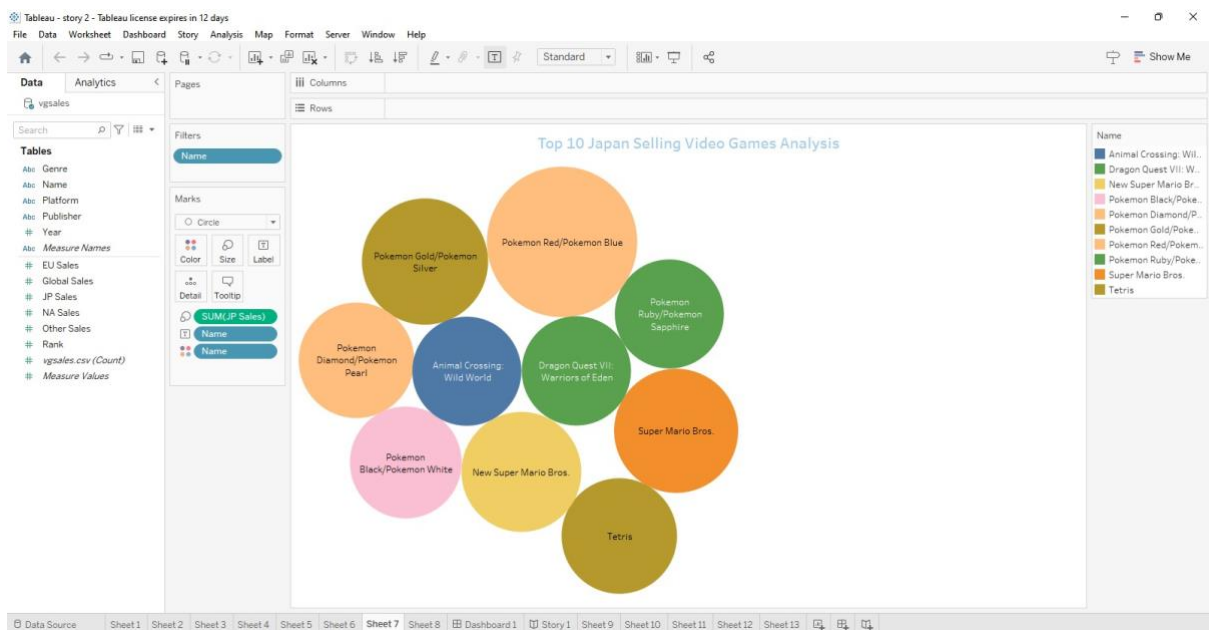
## Activity 1.5 Best 10 selling genres on platform Analysis



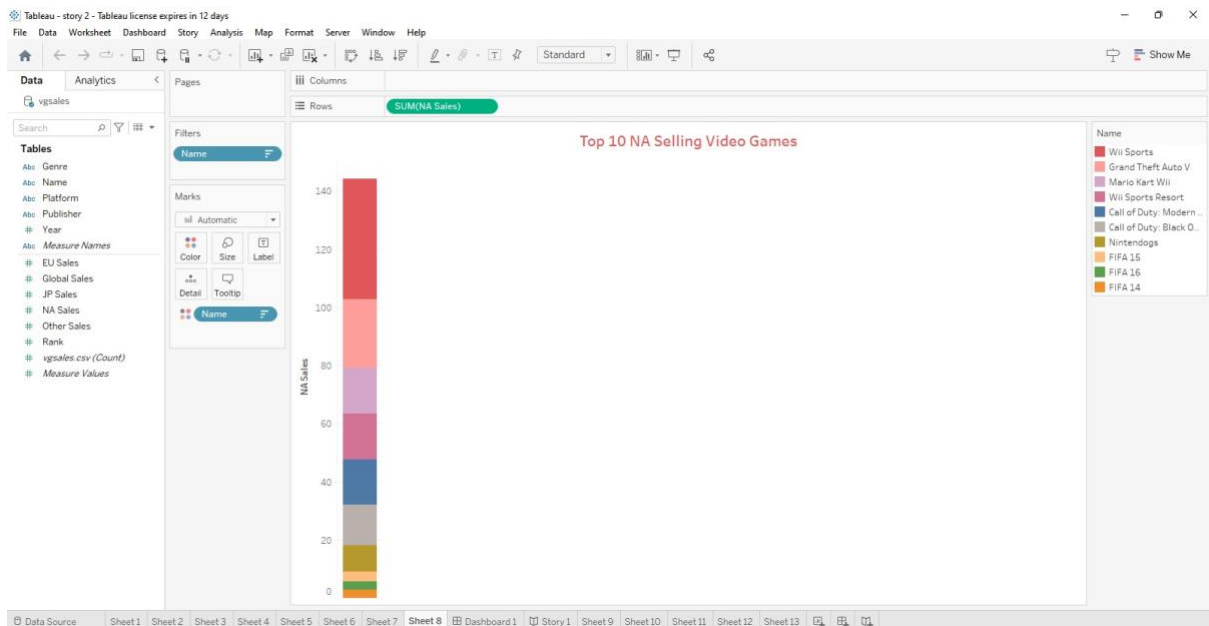
## Activity 1.6: Top 10 EU selling video games Analysis



## Activity 1.7 Top 10 Japan selling video games Analysis



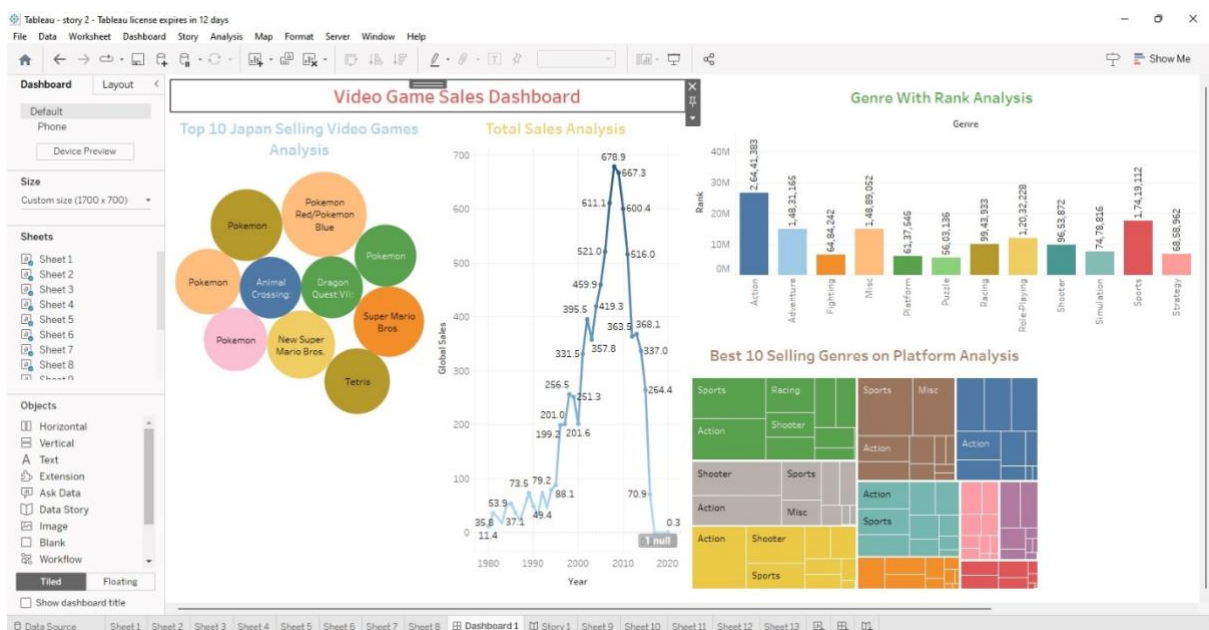
## Activity 1.8: Top 10 NA selling video games

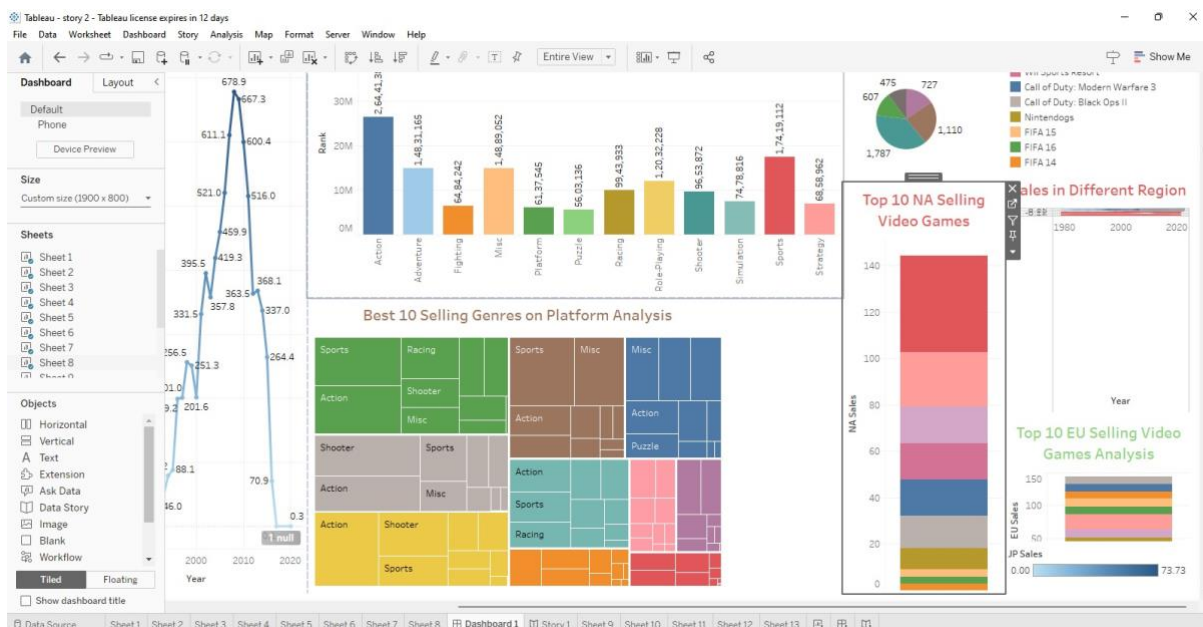
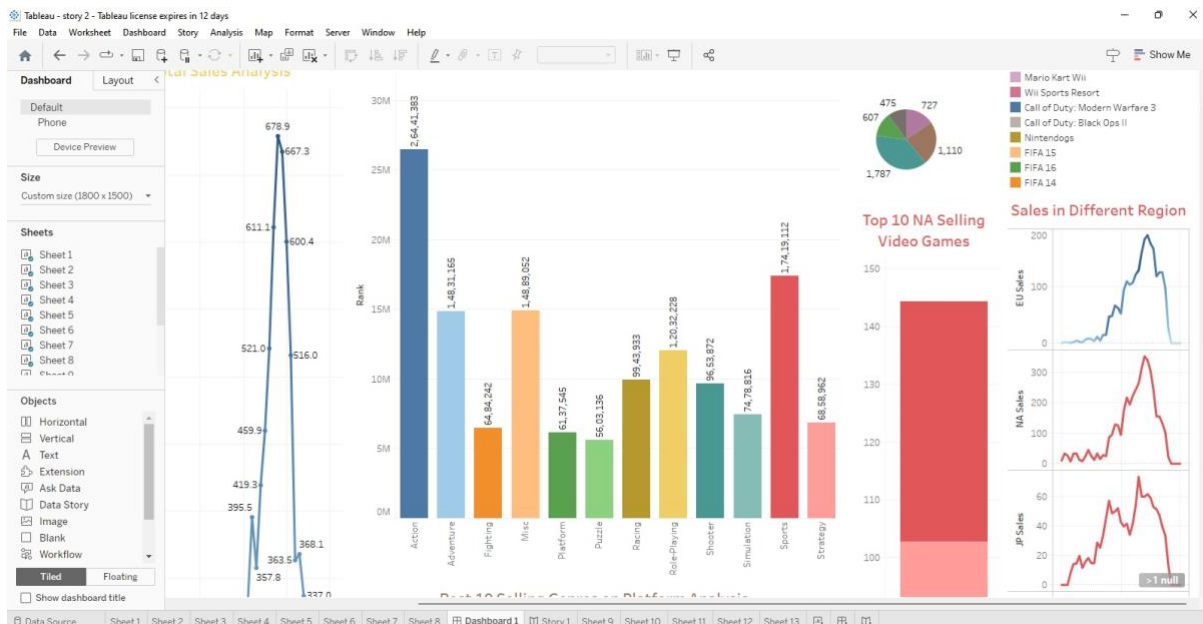


## Milestone 5: Dashboard

A dashboard is a graphical user interface (GUI) that displays information and data in an organized, easy-to-read format. Dashboards are often used to provide real-time monitoring and analysis of data, and are typically designed for a specific purpose or use case. Dashboards can be used in a variety of settings, such as business, finance, manufacturing, healthcare, and many other industries. They can be used to track key performance indicators (KPIs), monitor performance metrics, and display data in the form of charts, graphs, and tables.

### Activity :1- Responsive and Design of Dashboard

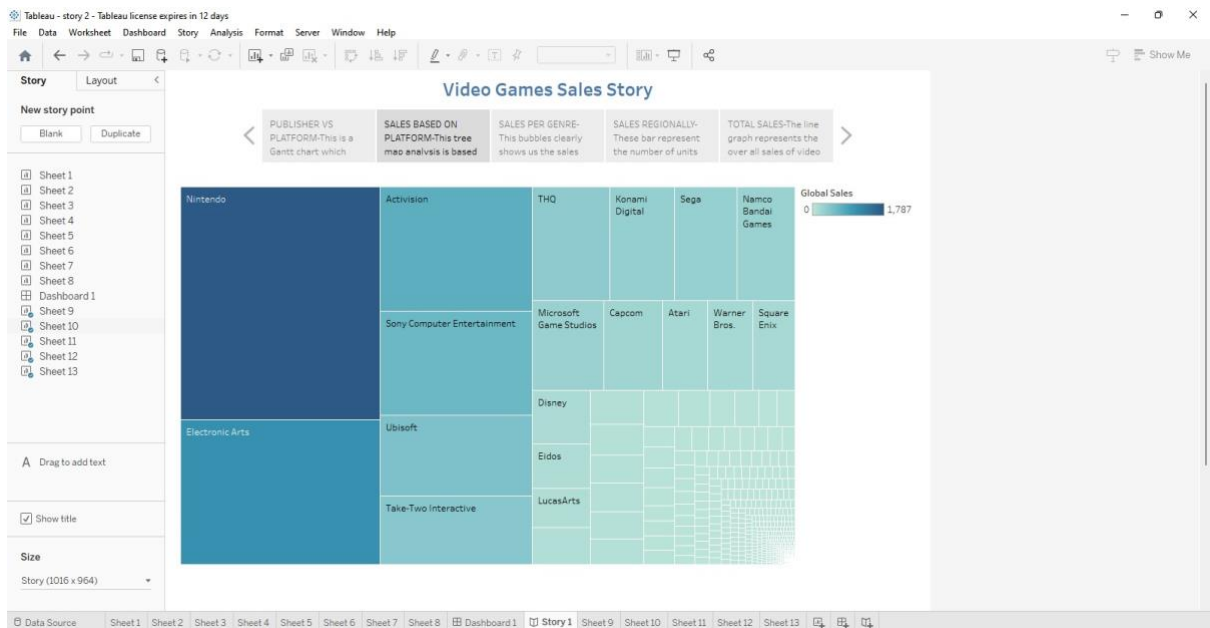
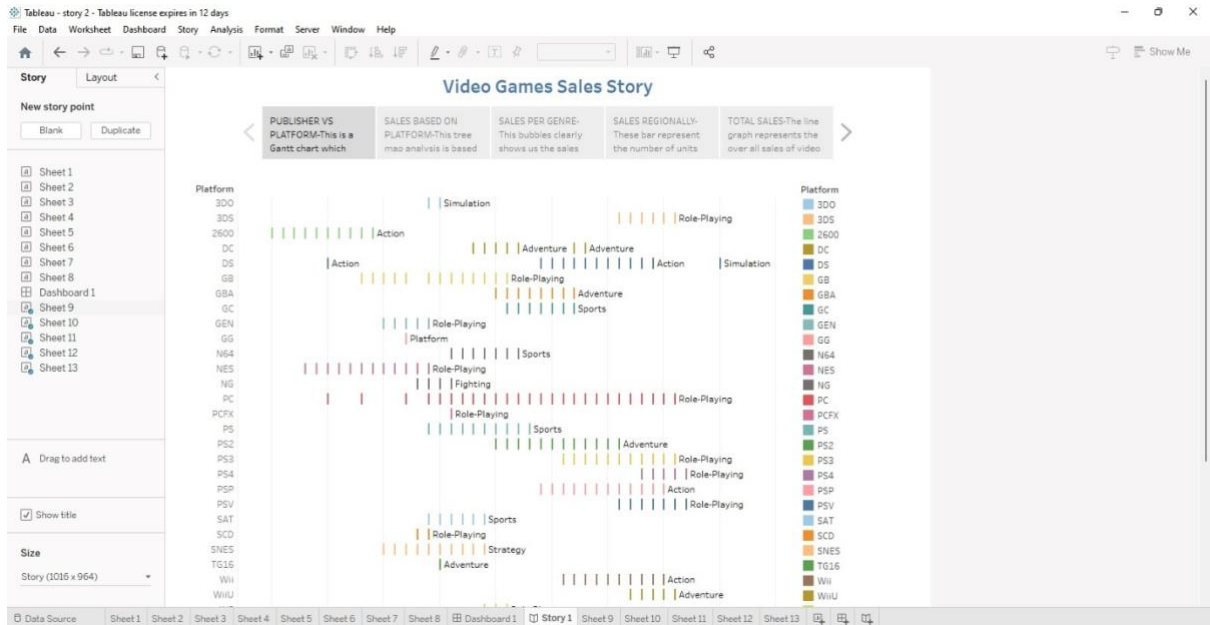


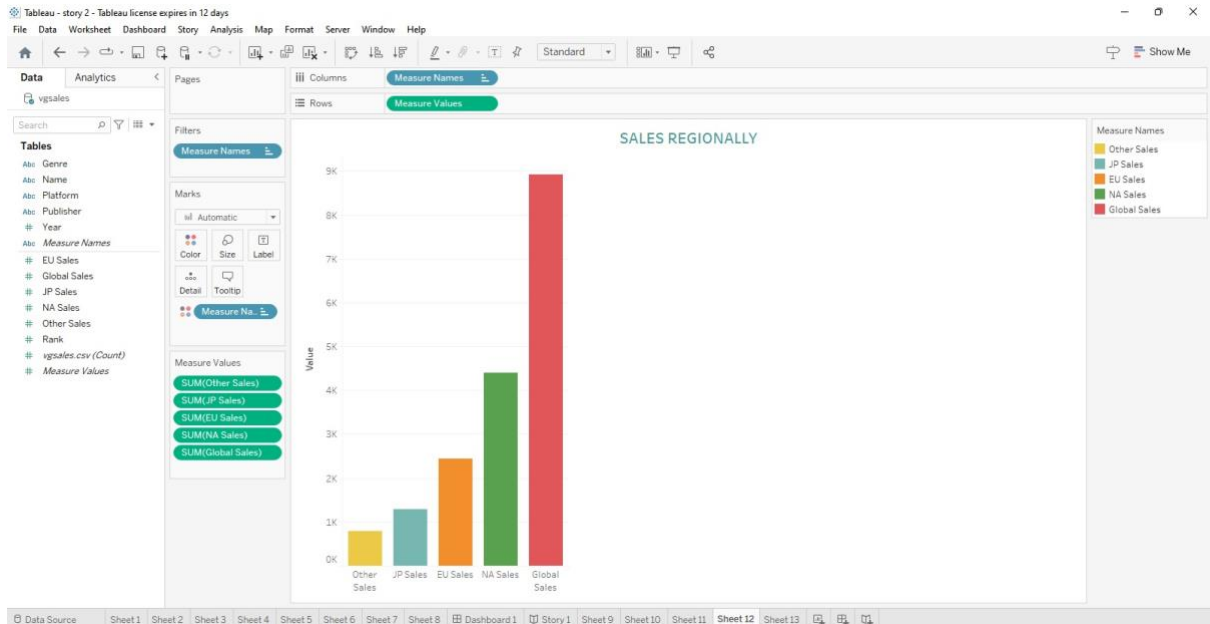
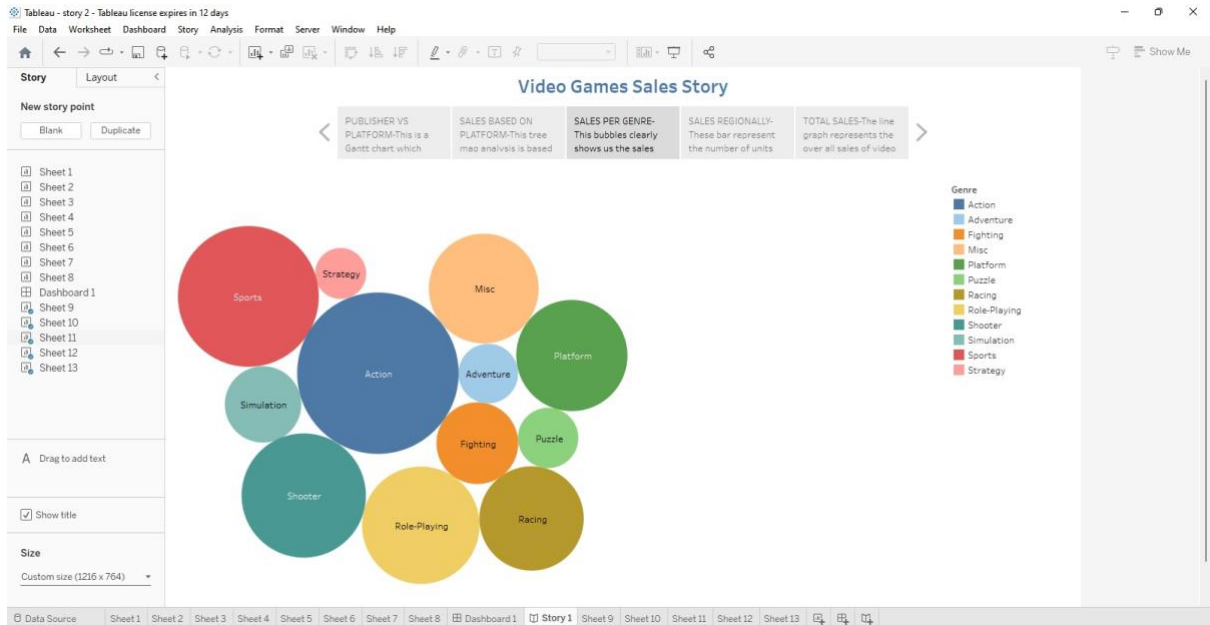


## Milestone 6: Story

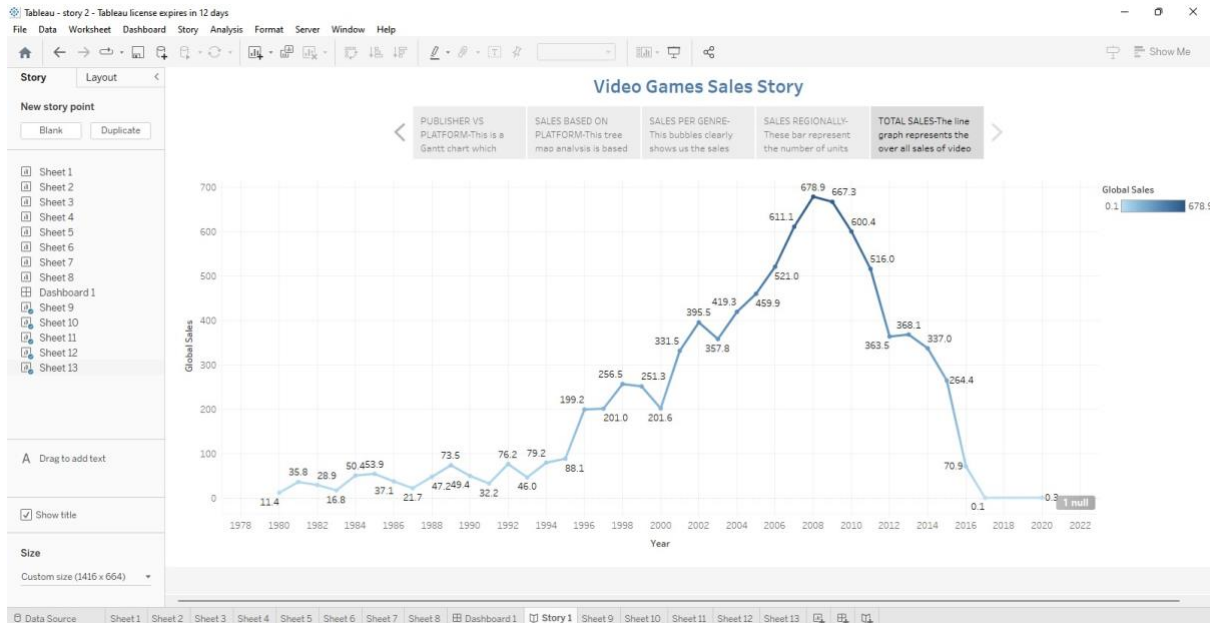
A data story is a way of presenting data and analysis in a narrative format, with the goal of making the information more engaging and easier to understand. A data story typically includes a clear introduction that sets the stage and explains the context for the data, a body that presents the data and analysis in a logical and systematic way, and a conclusion that summarizes the key findings and highlights their implications. Data stories can be told using a variety of mediums, such as reports, presentations, interactive visualizations, and videos.

## Activity:1- No of Scenes of Story



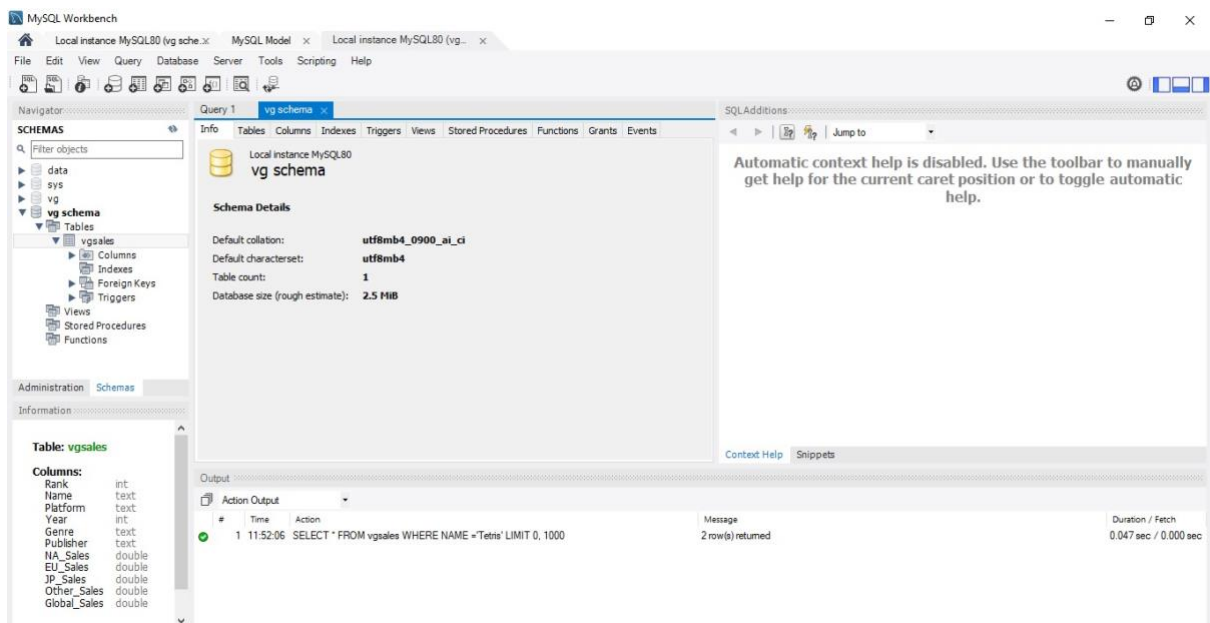


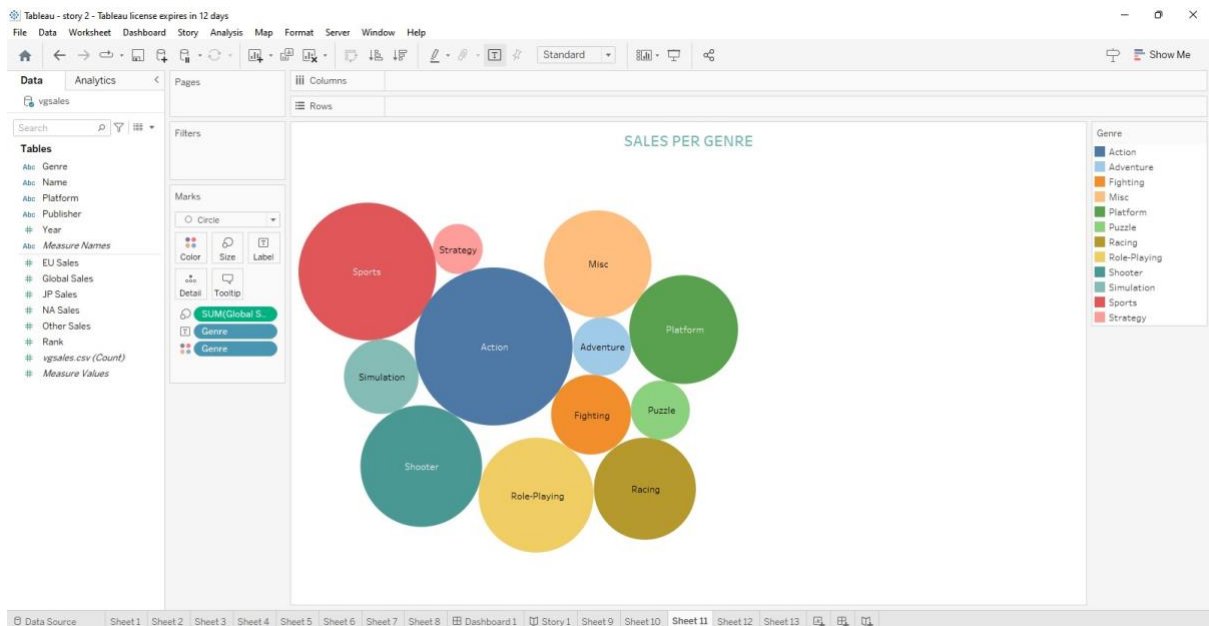




# Milestone 7: Performance

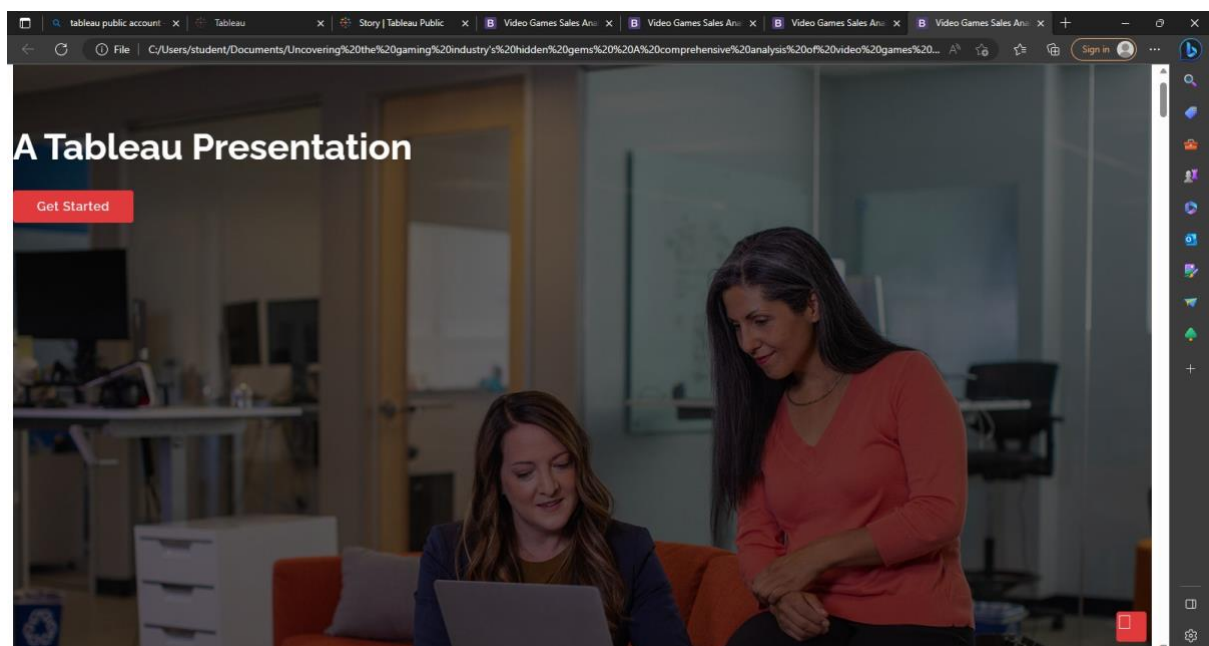
## Activity 1: Amount of Data Rendered to DB



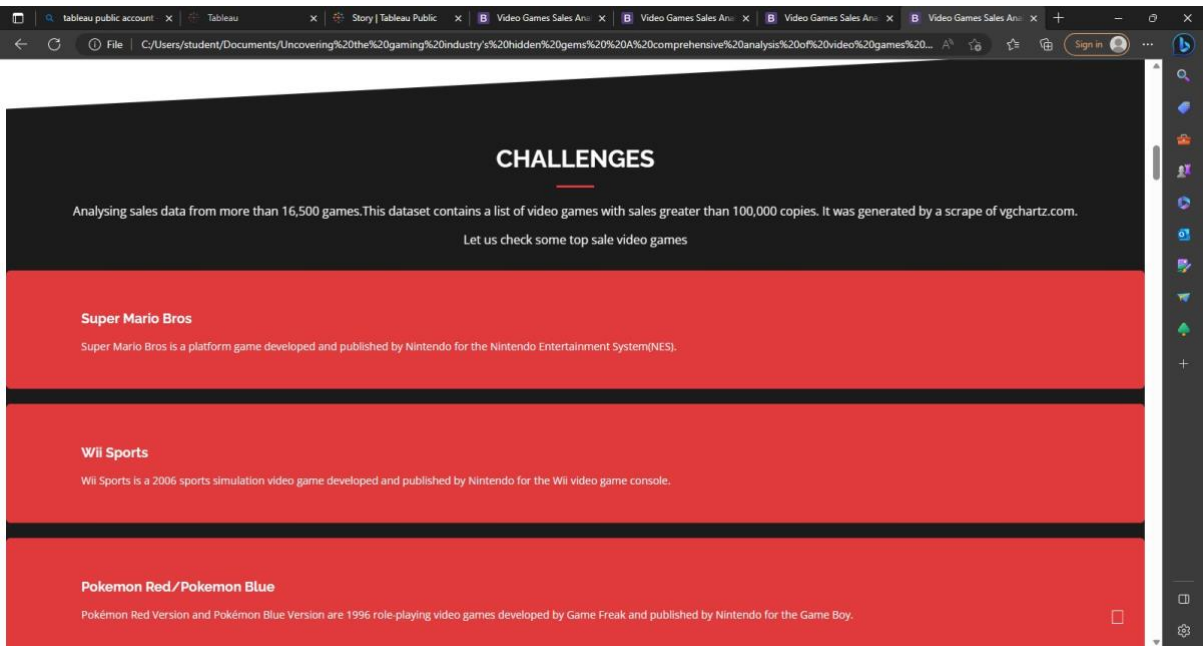
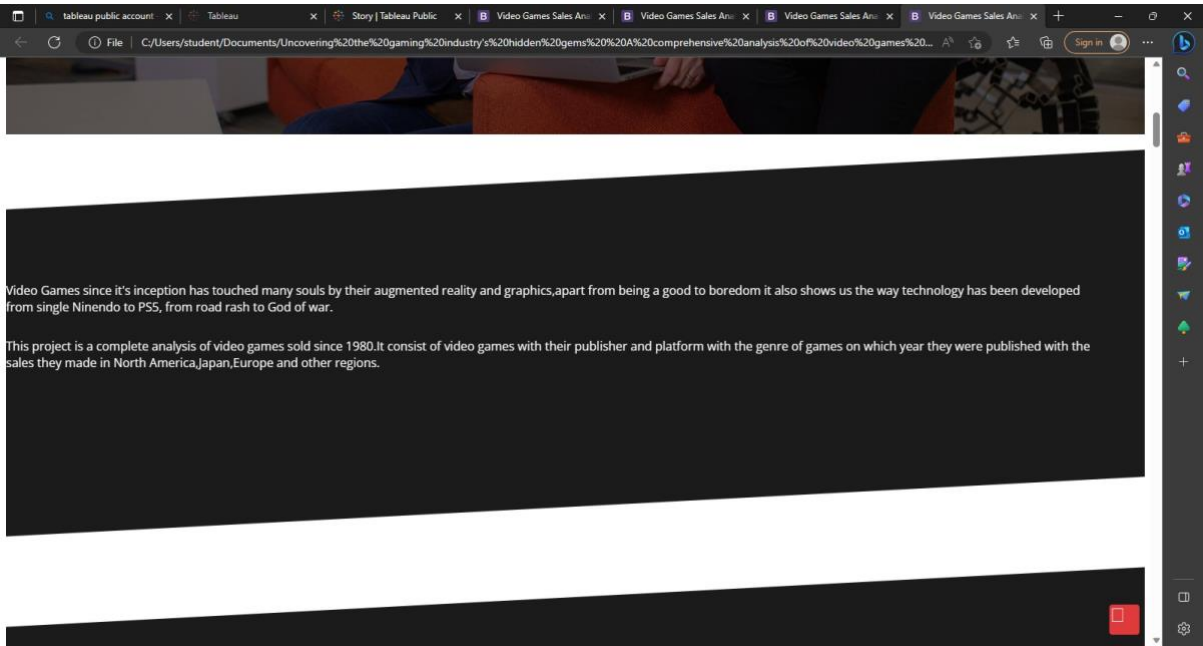


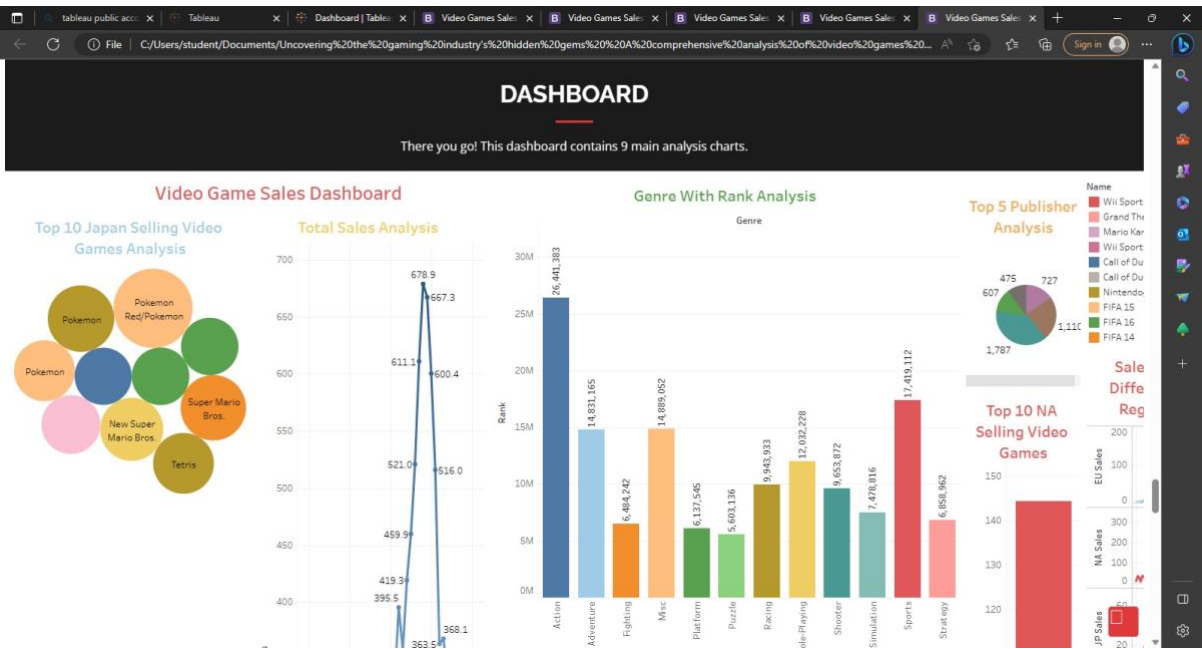
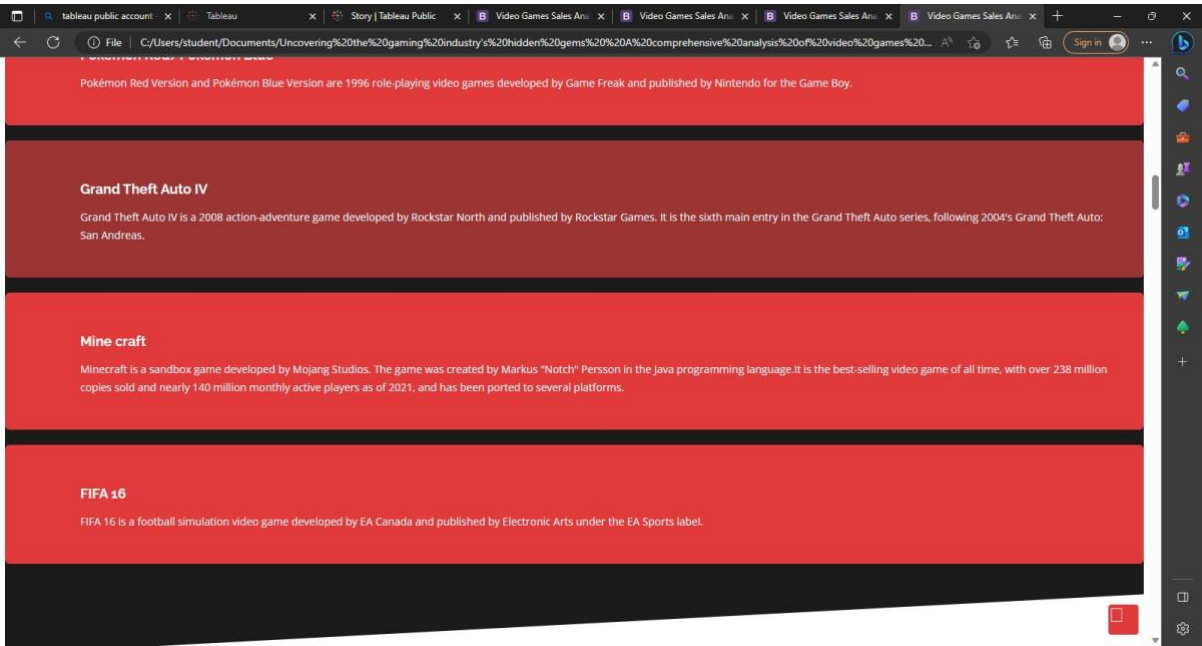
## Milestone 8: Web Integration

### Activity 1: Dashboard and story embed with UI with flask









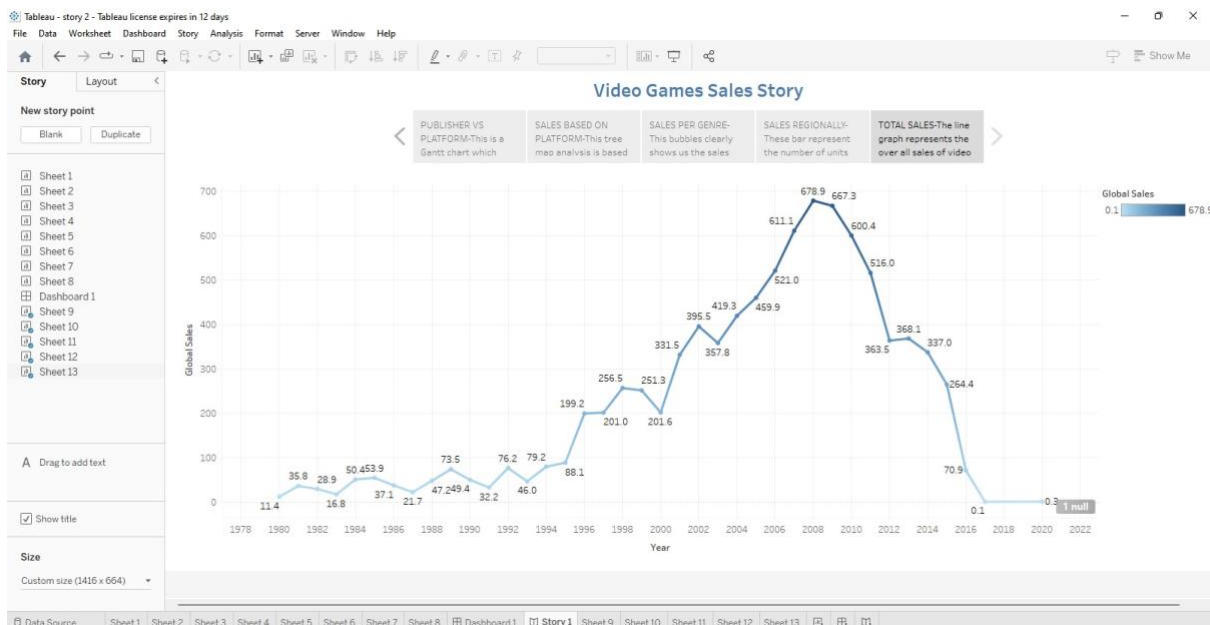
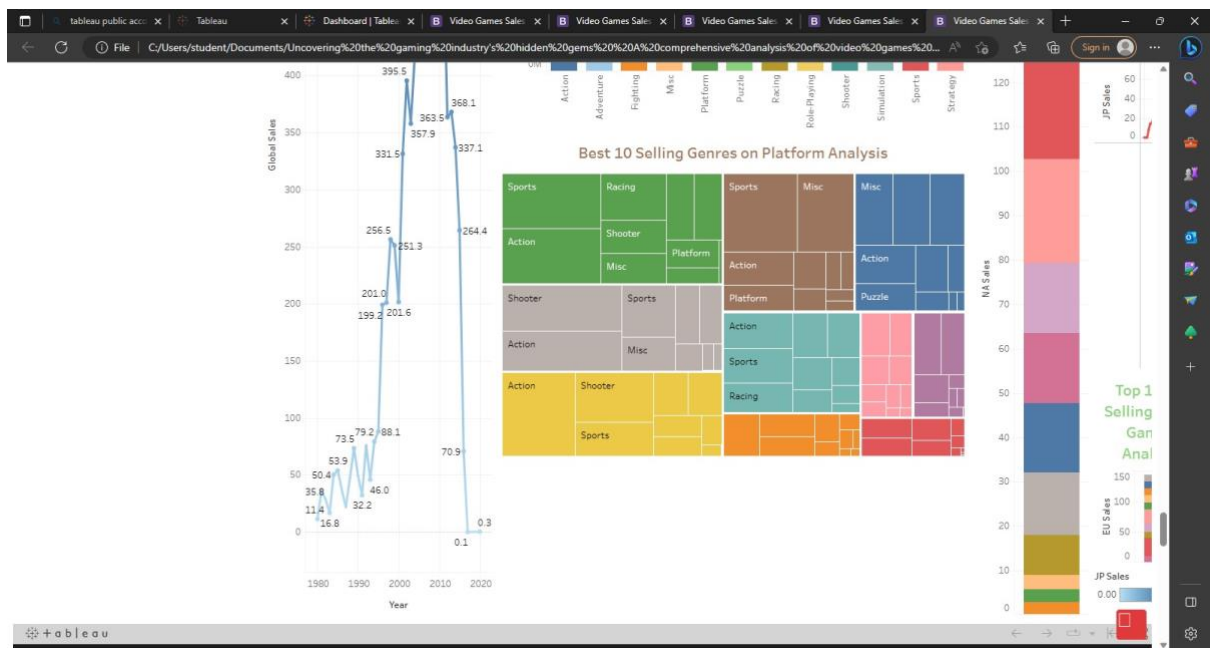


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## CONCLUSION

- **Conclusion 1**  
It is best opt for the games releasing in PC and also if you are looking for action games look for the publisher "Nintendo" as they have sold the highest number of games.
- **Conclusion 2**  
The love for the video games was increasing exponentially till 2008 but it is gradually decreasing since then, this is due to the lack of creativity, awareness or interest. This is the reason why most of the games are sold in North America as compared to the other part of the world.
- **Conclusion 3**  
Well, there are lots of efforts going into creating a single game and due to modern era mobile games other platforms are getting deprived of the attention which had created a lot of awesome experiences for gamers from 1980-2010.

