Teamwork in video games: Evolution of teamwork in video games and the effects on player experience

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ABSTRACT

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Teamwork in video games: Evolution of teamwork in video games and the effects on player experience

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Multiplayer video games were first introduced less than 50 years ago. During this period video gaming has evolved from simplistic command line-based games to intricate real-time online worlds.

How has this development affected teamwork in games? What is teamwork's meaning for video gaming experience? This thesis aims to provide an answer for these questions through inspecting the evolution of teamwork in online games through systematic literature analysis. Furthermore, it is reviewed whether increased in-game communication has improved or impaired player experience.

The results show that online gaming has become increasingly social as advances in technology have brought new features to the virtual worlds. Although chat abuse is a serious problem, increased in-game communication adds to immersion and enhances player experience. Removing communication features impairs player experience.

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Ensimmäiset moninpeliä tukevat videopelit julkaistiin noin 50 vuotta sitten. Tässä ajassa videopelaaminen on kehittynyt yksinkertaisista komentorivipeleistä monitasoisiin ja reaaliaikaisiin online-maailmoihin.

Kuinka tiimipelaaminen on muuttunut? Mikä on tiimipelaamisen merkitys videopelaamiselle? Tämä kandidaatin tutkielma pyrkii vastaamaan näihin kysymyksiin tarkastelemalla tiimipelaamisen kehitystä online-peleissä systemaattisen kirjallisuusanalyysin kautta. Tämän lisäksi tarkastellaan, kuinka pelinsisäinen kommunikaatio on vaikuttanut pelaajakokemukseen.

Tulokset osoittavat, että onlinepelaamisesta on tullut enenevissä määrin sosiallista uusien pelinsisäisten ominaisuuksien kehittyessä. Vaikkakin väärinkäyttöä tapahtuu, lisääntynyt pelinsisäinen kommunikaatio lisää immersiota ja parantaa pelaajakokemusta. Pelinsisäisen vuorovaikutuksen rajoittaminen vaikuttaa pelaajakokemukseen negatiivisesti.

SYMBOLS AND ABBREVIATIONS

AOL	American Online. Online service provider.
Clan	Group of players who regularly play together in multiplayer games.
FPS	First-Person-Shooter (e.g., Counter Strike Global Offensive).
HUD	Heads-up display. An element of a game's user interface that visually informs the player. E.g., chat and health bar.
IRC	Internet Relay Chat. Text based internet-messaging platform.
MMO	Massively multiplayer online [games]; multiplayer online game with a large number of players.
MMORPG	Massively multiplayer online role-playing games; a type of video game combining elements of RPGs with the gameplay of multiplayer online gaming. E.g., Runescape.
NPC	Non-player character. A character that is scripted in the game and is not controlled by a real player.
PC	Personal Computer, individual player's end device.
RPG	A role-playing game: each player assumes the role of a specific in-game character. E.g., Zelda.
VoIP	Voice over internet protocol.

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1 Introduction

In 1958, American physicist William Higinbotham created what is widely seen as the first video game. Higinbotham's game, *Tennis for Two*, was extremely simplistic and in many ways like the classic 1970s title *Pong*. (Felicie, 2012).

Exactly two decades later, inspired by the iconic tabletop roleplaying game *Dungeons & Dragons*, Richard Bartle and Roy Trubshaw created the first video game to support multiple users, called *MUD1* (1978) which allowed player communication through a chatroom (Toft-Nielsen, 2014). MUD is an abbreviation for 'multi-user dungeon' and the name would ossify itself to describe the entire genre of video games.

In 1985, a MUD titled *Island of Kesmai*, the first commercial online RPG and a considerable antecedent for games later to be known as MMORPGs was published (Raj, Gupta et al., 2020). Whereas *MUD1* was completely text-based, *Island of Kesmai* had a simple 2D graphical design. Player communication was possible in lobby chatrooms before entering the game's virtual world, but players would often converse and strategize asynchronously due to the high costs of online access at the time. *Island of Kesmai* could handle 100 simultaneous players, and it could process one user command every ten seconds. (Olivetti, 2012).

In modern online games, servers can host thousands of simultaneous users and graphical design is important. The players can communicate in real-time by using built-in pings and voice lines in addition to text and voice chat. Depending on the type of the game it is even possible to use virtual reality devices such as Oculus Rift to transmit the player's actual physical movement into the virtual world.

This thesis analyses the evolution of teamwork in online games by examining the development of video games and the emergence of different in-game communication methods. Additionally, it is reviewed how player experience has changed through this evolution and whether curbing in-game communication would enhance player experience.

1.1 Background

From the first Multi-User-Dungeon *MUD1* (1978), where players could communicate in chatrooms before sessions, to the first MMORPGs like *Neverwinter Nights*, and onward to the first titles utilizing VoIP, playing online games has become an increasingly social past time.

The evolution of in-game teamwork is tied to the evolution of in-game communication. Notable milestones are the initial emergence of online multiplayer games, lobby chatrooms, more accessible network connections, increased game server capacity, the emergence of VoIP, and voice chat being implemented in games.

According to studies, text and voice chat play a fundamental role in getting players to return to the game as social interaction has been shown to add additional enjoyment to the gaming experience, turning players into gamers (Itech, 2021).

Text chat was revolutionary for video games, but arguably voice chat was even more so. Introducing in-game voice chat has had a tremendous effect on the entire gaming experience as it enables real-life instantaneous communication. A notable change in online team gaming happened in 2002, when Microsoft seized the opportunity of combining the internet with its games. This was done by introducing Xbox-Live, which included online voice chat. This took place around the same time as the launch of Microsoft's massively popular-to-be shooter game *Halo* (Loguidice&Barton, 2014) laying the foundations for the idea of voice chat as an essential in-game feature.

Once games started offering voice chat, the social aspect of gaming evolved enormously, for better and for worse. Team communication became faster with voice chat, but some players would abuse this feature by engaging in toxic rants and harassment, such as sexism or racism. Curbing this phenomenon has been and continues to be, a major issue for game companies. (Loguidice&Barton, 2014).

The advent of voice chat affected the role of gender in playing video games. As voice chat reveals the gender of the user, female players have been experiencing more sexist harassment. An independent university study into the role of gender identity and harassment found that female voices received 300% more harassment compared to male voices after

saying the same exact phrase on voice chat. This resulted in female players opting not to use voice chat in order to not give away their gender and incite abuse. (Nordlander, 2018).

Today, diverse and instantaneous communication is the norm in video games, and the conversation has shifted to the downsides of free communication among players. In certain gaming communities, toxicity, harassment, and bullying have become such widespread problems that players have lost interest in playing the titles altogether. Naturally, this is a massive problem for game developers. Major companies, such as Riot Games, have gone as far as recently removing /All Chat and never implementing team voice chat in their most famous game, *League of Legends* (EarlyGame, 2021).

1.2 Research purpose

As current conversation tends to revolve around the downsides of in-game communication, it is often overlooked how vital these features are and have been for shaping the entire experience of being a gamer.

Much can be said about the correlation between in-game bullying and in-game communication, as increased interaction has made it easier for players to engage, or abuse, one another. Convenience is undoubtedly a factor in online harassment, but slander as a phenomenon is inherently human and has happened throughout the ages in different forms. Abusive behaviour ensues when certain types are given the protective layer of anonymity, whether it be on a newspaper's opinion forum, an IRC-room, or a video game lobby. Limiting access may not be the solution to the abuse as these platforms have numerous positive sides as well.

The purpose of this thesis is to analyse how team play has developed, with a special focus of the emergence on versatile in-game communication, and how this has morphed video games into a social phenomenon. Additional analysis is done on the correlation between negative player experience and increased in-game communication and whether it is beneficial for the game developers to curb in-game communication.

1.3 Research question

This thesis aims to answer the following questions:

Q1: How have the types of teamwork evolved in games?

Q2: How has this development affected the players and gaming?

Q3: Would curbing in-game communication enhance the overall player experience?

2 Related work

This chapter entails the history of video games, the evolution of player interaction, a brief overview of cyberbullying, and related previous research.

The results will show that increased interaction has been, and still is, a consistent trend in the evolution of video games. Increased interaction also goes hand in hand with improved player interaction. This is examined in more detail in the later chapters.

2.1 History of video games

After little to no commercial development in video gaming field for nearly two decades since the release of *Tennis for Two*, the video game industry was seemingly born overnight and took the world by storm in the 1970s. Rapid advances in technology enabled progress in huge leaps.

To better illustrate this development, below is a timeline of some monumental releases and developments based heavily on the research of Hadzinsky., (2014)

1958: The first video game, *Tennis for Two* by William Higinbotham.

1972: The first commercial home video game console, Magnavox Odyssey by Ralph Baer.

1972: The first coin-operated arcade game, *PONG* by Atari with simple 2D-graphics.

1978: "Golden Age" of video game industry begins after the launch of *Space Invaders* by Toshihiro Nishikao.

1978: The first multiplayer game and first Multi-User-Dungeon, *MUD*, by Richard Bartle and Roy Trubshaw.

1980: The first commercial game to use simple 3D graphics, *Battlezone* by Atari.

1981: Nintendo makes a name for itself through the release of *Donkey Kong*

1982: The arcade market peaks generating more revenue than Hollywood and pop music industry combined.

1982: The first home computer, Commodore 64 is launched.

1983: The first 8-bit console, Family Computer (Famicom) by Nintendo is launched in Japan.

1985: The first commercial online multiplayer game, *Island of Kesmai*, is published by CompuServe.

1989: The first 16-bit handheld game console, Game Boy by Nintendo.

1993: 3D-era of video game consoles begins. (University of Michigan Library, 2022).

1995: VoIP is developed by VocalTec. (Intrado, 2017).

1996: The first home console with built-in internet connection, Apple Pippin, is launched by Apple. (Villas-Boas, 2017).

1996: History's most popular home video game system, Nintendo 64, and the first Mario game with 3D gameplay, *Mario 64* by Nintendo are released.

1997: Popularisation of mobile games begins with *Snake* on Nokia phones. (Proreviewsapp, 2020).

2000: Valve releases first *Counter-Strike* which is considered today as one of the most important FPS games in the history, especially for eSports. (Henningson, 2020).

2001: Digital distribution in game industry gains footing through titles such as *Stardock Central* by Stardock. (Höglund, 2014).

2002: Xbox-Live by Xbox. True online console gaming advances.

2003: Major video game digital distributor, Steam, is launched. (Sayer&Wilde, 2022)

2003: Skype is released. Online voice and video calling is brought to the masses. (Cowling, 2016).

2008: App Store by Apple on iPhone. Mobile gaming advances. (Silver, 2018).

2010: Oculus Rift by Palmer Luckey. First prototype of virtual reality device. (Dormehl, 2017).

2017: Virtual reality devices become mainstream. Practically every company aspires to have their own iteration. (Dormehl, 2017).

The videogame industry took off with an explosive start in the 1970s with arcade games. The industry grew from nothing to a multibillion-dollar market in just a few years before suffering a temporary crash in the mid-1980s due to the video game market being oversaturated with low quality titles (Hadzinsky., 2014). After regaining its footing, the industry began to grow even faster, and new platforms and technologies were introduced at a rapid pace. There were only six years between the launches of the first 8-bit console and the first 16-bit console.

As of 2018, the largest gaming platforms are console, PC, and mobile, with VR increasing its popularity. Handheld consoles and arcade games are all but extinct. (Figure 1).

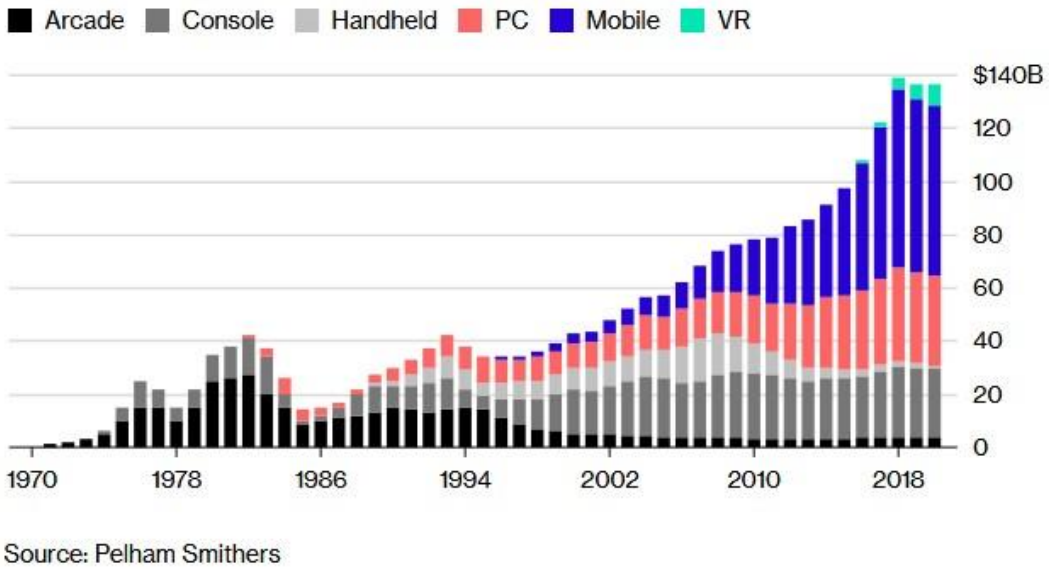


Figure 1. A complete, year-by-year, sector-by-sector breakdown of global gaming industry revenue, from 1971 to present. (Bloomsberg, 2019)

Consoles were a more popular gaming platform than PC before 2010 because consoles were perceived as a better investment due to rapidly evolving technology that quickly rendered brand new home computers obsolete. Console players could trust new games to be made for the new iteration for several years after its launch.

2.2 Evolution of player interaction

In the early days of video games, from the 1970s until the mid-1980s, arcade games were the norm. Player interaction happened in the physical arcades, where players would meet or try

to score high enough points to get their names on the game's scoreboard for other players to see.

The first multi-user dungeon games were developed during the peak of the arcade gaming era. These first online multiplayer games were extremely simplistic, both visually and gameplaywise (Figure 2). Players would type in their commands through their computer keyboard and receive unformatted text as feedback on their display (Faiola&Voiskounsky, p.324). Although MUDs gained popularity fast, most non-arcade games tended to be single-player or local co-op games, as online access was not widespread enough to sustain large scale remote play.

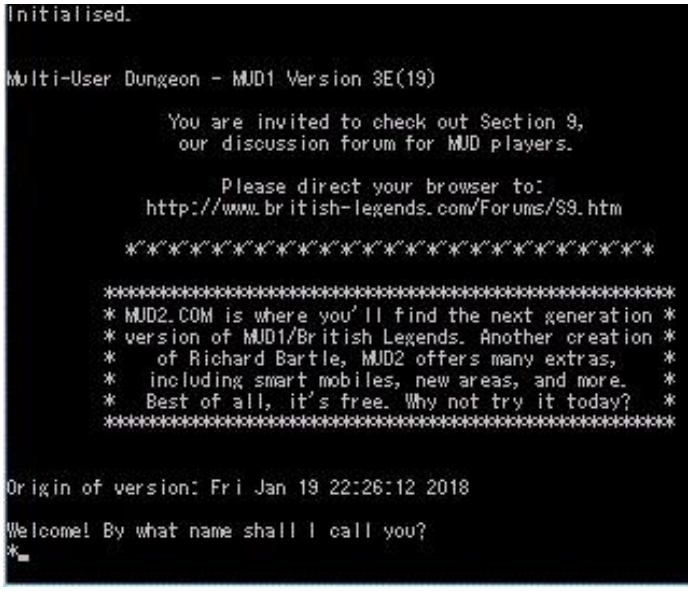


Figure 2. MUD1 (Wikiwand, 2022)

MUDs supported hundreds of simultaneous players, and strong human ties were formed regardless of the visual simplicity. Friendly relations within the MUD communities were beneficial, as some in-game goals related to interaction patterns with other players. Additionally, competitive players favoured intense text chats with each other. (Faiola&Voiskounsky, 2007). The first commercial online game, *Island of Kesmai* (1985), was also a MUD with simplistic graphics (Figure 3).

Figure 3. Island of Kesmai (Engadget, 2022)

The importance of third-party platforms such as IRC-clients and different chat forums for player interaction was heightened when physical arcades were replaced by fully virtual environments in the late 1980s. Most multiplayer video games at that time would offer synchronous chat, but online access remained expensive, so players would prefer asynchronous communication. For example, in 1991, when the first graphical MMORPG *Neverwinter Nights* launched, the players could communicate via text chat and the servers could support a maximum of 500 concurrent users, but players would often strategize offline and log in to quickly execute their plan before logging off again as online access cost $10/hour. Additionally, queue times to *Neverwinter Nights* servers were extremely long because more than 100 000 players had characters in the game, even though the servers could manage only a fraction of that. (The CRPG Addict, 2017).

As online connection became more accessible, player communication moved on to being truly synchronous. In 2002, just five years after the original *Neverwinter Nights* servers were shut down, BioWare continued the series by developing its first 3D action game of the same name (usually referred to as NWN). Similarly to its original namesake, NWN was in many ways a modern online game. Instead of having to reload a save at death as was in traditional RPGs, the player would be fined for some amount of in-game currency, and they would respawn in a neutral area (TVtropes, 2022). Players could communicate by typing messages to a text channel of their choosing via chat bar in the bottom of the screen, 3D-design gave the game a modern look, and the in-game HUD resembled that of modern MMORPGs (Figure 4). Entered messages had a limit of 295 characters (NWNWiki, 2022).

Figure 4. Neverwinter Nights 2002. (The CRPG Addict, 2017)

VoIP was first introduced in 1995 by an Israeli company called VocalTec, and the first game to include the option for voice chat was Activision's *MechWarrior 2: 31st Century Combat* (Nordlander, 2018). There have been multiple stages in establishing voice chat's position as a fundamental in-game feature. A few key moments were Microsoft launching Xbox Live with the voice chat feature in 2002 and Nintendo releasing *Metroid Prime Hunters* in 2006, which allowed voice chatting through the Nintendo DS console's microphone.

In modern games such as *World of Warcraft Classic* (2019*), League of Legends* (2009), *Overwatch* (2016), and *Counter Strike Global Offensive* (2012), team communication is a mixture of text and voice chat in addition to pre-scripted pings and voice commands, making the in-game teamwork flexible. Traditionally, in team games, the voice chat feature is reserved only for team communication, and a separate all-chat can be toggled on or off by each individual player depending on whether they wish to receive communication from the enemy team. Different implementations vary based on the nature of the game. For example, in currently popular battle royale games such as Player Unknown's Battlegrounds or Fortnite, party voice chat is often private, and global voice chat works as proximity chat.

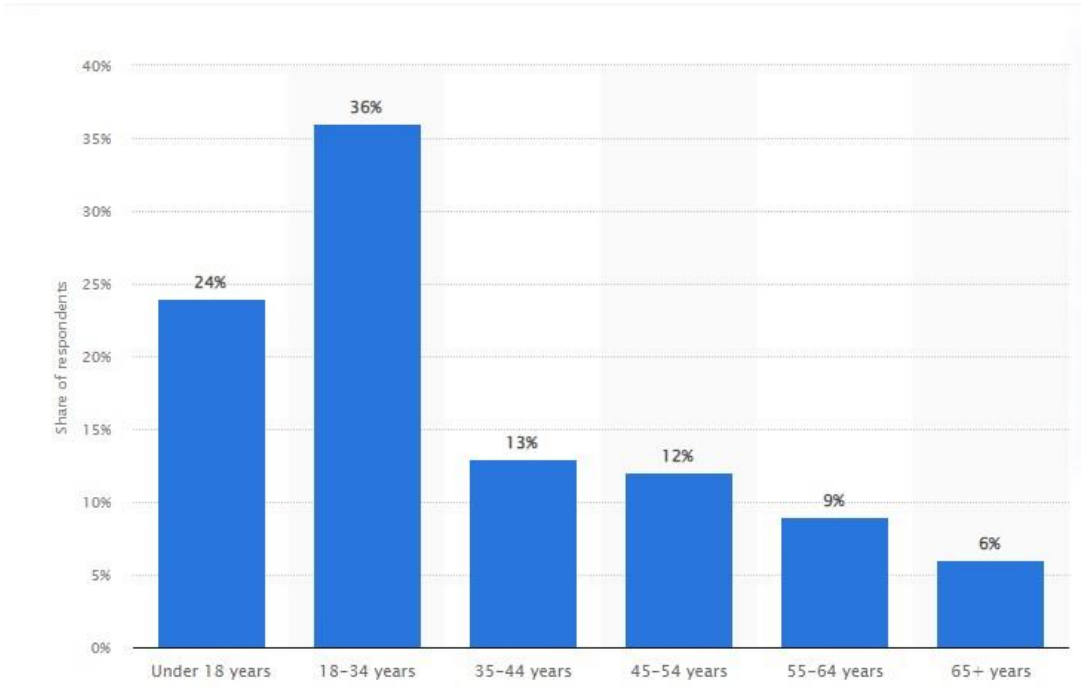
2.3 Briefly on cyberbullying

Cyberbullying is defined by Merriam-Webster as "*electronic posting of mean-spirited messages about a person often done anonymously*" (Merriam-Webster, 2022). The term

itself has not been around for very long; in fact, a literacy review of 2010 publications shows that there has been no reference to the term ‘cyberbullying’ before 2004 (Peebles, 2014).

Cyberbullying is extremely topical in modern conversation, especially regarding youth. In this conversation, video games are often brought up, and this can be explained partially by a 2022 survey, which shows that 50% of video gamers are younger than 35 years of age (Table 1).

Distribution of video games in the United States in 2022, by age group



(Table 1. “Distribution of video gamers in the United States in 2022, by age group.” Statista, 2022.)

Another survey conducted in the United States as of September 2020 on the most common types of online harassment experienced by age groups shows that the most dominant form of abuse experienced by 18- to 29-year-olds is predominately online harassment (Table 2).

Most common types of online harassment personally experienced by internet users in the United States as of September 2020, by age group

Characteristic	U.S. adults	18-29	30-49	50+
Any online harassment	41%	64%	49%	26%
Offensive name-calling	31%	51%	37%	18%
Purposeful embarrassment	26%	40%	33%	16%
Physical threat	14%	29%	18%	5%
Stalking	11%	21%	16%	4%
Sustained harassment	11%	20%	13%	5%
Sexual harassment	11%	25%	14%	4%

(Table 2. "The most common types of online harassment personally experienced by internet users in the United States as of September 2020, by age group." Statista. 2022.)

All types of in-game harassment affect the player experience negatively. The key question regarding game developers' role in preventing in-game bullying is how this can be accomplished without negatively impacting the game. Text chats be censored with relative ease by applying filters that prevent users from sending certain words, but voice chat is more complex.

Riot Games, the company responsible for *League of Legends*, a game often cited as one of the most toxic in the world (Stummreiter, 2022), went so far as to not include voice chat in *League of Legends* (Nordlander, 2018). This decision was due to research conducted by Riot Games, which showed that

> "The actual text chat in the game became up to 126% more toxic, and the voice chat players received up to 50% more reports even though the other players did not necessarily know the players were in voice." (Mickunas, 2017).

An independent study into the role of gender identity and harassment cited by Riot Games additionally found that female voices received 300% more harassment than male voices after saying the same exact phrase on voice chat (Nordlander, 2018).

In another study on revealing female gender identity on voice chat, female gamers were interviewed about their experiences with harassment, and the results concurred with the study cited by Riot Games.

> "Almost every female participant experienced sexual harassment at some point and persisted to play online games despite the potential to be sexually harassed by a male online gamer." (Itech, 2021).

The women who were interviewed for the study did, however, experience voice chat as a beneficial in-game feature regardless of the harassment.

> "… [voice chat] it's better for communication especially when playing with other players due to strategic plans when raiding or when doing dungeons." (Itech, 2021).

As a conclusion, although game chats can be proven to increase in-game harassment, there are benefits to these features, and just deleting them might end up doing the player experience more harm than good.

2.4 Related previous research

Direct previous research on the evolution of teamwork in video games could not be found, but other related research on topics such as the evolution of video games in general, the evolution of player interaction in specific titles, and the effect of in-game communication methods on player experience could be found.

Erb et al., (2021) researched player-character research and game satisfaction in narrative games, stating that player characters, or avatars are the key element in engaging players in the game and getting the player invested in the title.

Scott & Porter., (2013) studied the impact of MMORPGs upon the psychosocial well-being of adolescents and young adults. Raith et al., (2021) conducted a systematic literature review

on MMORPGs, and well-being. Luukkainen., (2018) inspected player dedication in MMORPGs focusing on the social elements and gamer loyalty. The research on online games and online gaming tends to focus on MMORPGs, as they are the most popular type of online game.

Faiola & Voiskounsky., (2007) wrote about the flow experience of MUD players investigating multi-user dimension (dungeon) gamers from the USA. They discuss interaction patterns and forming meaningful in-game relationships in simplistic and largely text-based MUD genre games.

Itech., (2021) reviewed gender's role in interactions among online gamers through voice chat and studied the players' preferences for voice chat or text chat.

Barr & Copeland-Stewart., (2021) did a study on playing video games during the COVID-19 pandemic and what effects it had on player well-being, shedding light on the social aspects of video games and the player experience in emulating virtual environments in real life.

Persson & Medin., (2009) reviewed different generations of gaming and video games, giving examples of important game titles in each gaming generation. The paper focuses on home video games, but the research is applicable to online games in general.

Arsenault., (2009) studied video game genre, evolution, and innovation, which are widely applicable to the topic of this thesis.

Raj et al., (2020) examined the role of clouds in the evolution of gaming, going over the history of video games and important titles, similarly as Hadzinsky., (2014), in his investigation into the industry of past, present, and future video games.

Christians., (2018) wrote on the origins and future of gamification, where he researched what made gaming enjoyable and fun for the players. Adjacent to this, Elliott et al., (2012) researched the contribution of game genre and other use patterns to problem video game play among adult video gamers, discussing typical game design mechanics such as reward schedules and player perspective in shaping player experience.

As a conclusion, the video gaming industry has evolved in huge leaps in its relatively short history, and abundant previous research has been conducted on different causalities relating to video games, such as player wellbeing and the role of communication methods for the in-game experience. Increased layers of sociability in virtual worlds have shaped online gaming

to be what it is today, and voice chat is largely agreed to be one of the single most impactful features for online video gaming, for better and for worse.

3 Research method

For this thesis to achieve its goal of providing an answer to the research questions, first a systematic literature review is conducted in order to gain insight into the development and evolution of gaming. In reviewing the material, special attention is paid to the crucial developments that may have disrupted the gaming field and allowed new playstyles and genres to emerge, e.g., the implementation of voice chat. After this, the results are categorized and solutions for each of the research questions are suggested.

To best answer the first research question (Q1), a taxonomy on the evolution of teamwork types is built. Research questions Q2 and Q3 are answered based on the findings of the systematic literature review.

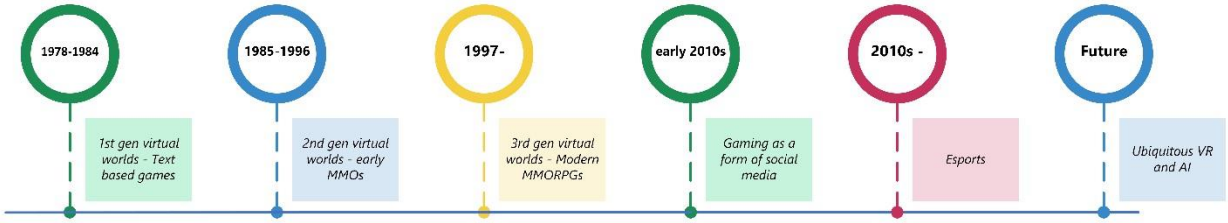
3.1 Taxonomy design

The taxonomy is constructed following the principles of Kluge., (2000); the goal is to categorize the object field into multiple types, which must have clear differences, and then each type relates to elements that match the type's properties. When constructing a taxonomy on the evolution of teamwork styles, the disruptive phenomena that defined online gaming eras must be recognized. In this thesis, Downey's., (2014) classification of virtual world generations is used as a starting point:

- The first generation (1978-1984): unformatted text line games often developed by hobbyists inspired by MUD1 (1978).
- The second generation (1985-1996): an increasingly commercial approach where players' preferences and playing styles are systematically analysed when developing virtual worlds.

- The third generation (1997-): highly commercial development of titles of increasingly better production value. Virtual worlds are tailored for defined user segments.

Additionally, to Downey's classification, results from the systematic literature review are combined to further shape the taxonomy. The following figure (Figure 5) maps out a timeline of online team gaming trends.



(Figure 5: Timeline of dominating online gaming styles)

The years used in the figure after 1997 are estimates, as the exact time for the emergence of each disruptive playing style cannot be determined. The eras mapped out in the timeframe will be used as the types in the resulting taxonomy. These types (eras) were chosen because each era's team gaming has distinct characteristics, and the eras can be clearly separated from each other.

4 Results

The results of this thesis will be represented as a taxonomy. When forming the taxonomy, it must be considered what differentiates the different evolutionary stages of team play in video games.

The classification of each distinct evolutionary stage of online video gaming in this thesis is based on some disruptive phenomenon, such as increased player interaction. The first stage was early text-based online games such as *MUD1*, where the virtual worlds were extremely

simplistic. In games like these, the players would input command line inputs and get unformatted command line responses. These early multiplayer games were extremely simplistic and could be accessed on private or commercial networks, which were usually rather costly for the user.

In early titles such as MUD1, player interaction happened asynchronously, but this was disrupted by early commercial graphical titles such as *Neverwinter Nights*, in which clan gaming could be detected. Clan gaming disrupted the asynchronous online gaming style as players would form social circles solely for video games. Later, titles such as *Meridian 59* made virtual worlds more accessible as the game was available via the Internet rather than an expensive private network.

As technology advanced, virtual worlds could sustain an increasing number of simultaneous players, and this laid the foundation for modern true-3D online worlds. An example of this being titles such as *EverQuest* and first titles implementing VoIP like *MechWarrior 2: 31st Century Combat*.

At this stage, virtual worlds could sustain a large number of simultaneous players, and the Internet made online gaming accessible. Online environments were increasingly social, and this created an entirely new type of video gaming, social gaming. Video gaming was not just about completing in-game goals anymore, and the target audience became wider. Massive online games such as *World of Warcraft* could sustain hundreds of thousands of simultaneous users, and social platforms like Facebook would take advantage of titles such as *FarmVille*, which were designed to be easy-to-learn video games where social interaction with friends made completing in-game goals faster.

The potential of video gaming was harnessed in a new way when Esports gained notable popularity. Competitive games such as *CS:GO* and *League of Legends* were, and still are, major titles in the Esports sphere.

From the user's point of view, cross-platform gaming was an important development. It did not matter what end-device the player was using anymore, as games such as *Rocket League* and *Fortnite* began supporting matchmaking regardless of device.

Following the past trend, video games are becoming more interactive, and virtual reality gains increasingly more footing. Artificial intelligence is getting more sophisticated, and this will no doubt be imminent in the future of video games.

The resulting taxonomy combines the characteristics of each video gaming era specified in the aforementioned timeline (Figure 5) with the virtual world styles typical to each era. Example titles are also given for each subcategory. The taxonomy shows that one key factor that separates each video gaming era from the previous one is increased interaction (Figure 6).

1. Text-based Early Multiplayer Games (1978-1984)
I. Unformatted Command line Games
  a. MUD1
II. Command Line Games with Simple Graphics
  a. Island of Kesmai

2. Graphical Early Multiplayer Games (1985 - 1996)
  I. 2D and Early 3D Online Worlds
    a. British Legends
    b. TinyMUD
  II. Clan Gaming
    a. Neverwinter Nights
  III. Internet Gaming
  a. Meridian 59

3. Emergence of Modern Online Worlds (1997 -)
  I. True-3D Online Worlds
    a. EverQuest
    b. Ultima Online
  II. VoIP Games
    a. Activision's MechWarrior 2: 31st Century Combat
    b. Xbox-Live Games

4. Emergence of Social Gaming (early 2010s)
  I. Advanced MMOs
    a. Runescape
    b. World of Warcraft
  II. Casual Gaming
    a. Online arcades
    b. Facebook games
    c. Mobile Games

5. Esports (2010s -)
  I. Competitive Online Games
    I.I Battle-Royale Games
      a. Player Unknown Battlegrounds
  I.II. Team-Based Games
      a. League of Legends
      b. Counter Strike Global Offensive

6. True Cross Platform Gaming (late 2010s)
  I. Console-To-Rival-Console Multiplayer Support
   a. Rocket League
  II. Cross-Device Multiplayer Support
   a. Fortnite

7. VR & AI (Future)
  I. True Virtual Reality Games
    a. VR-MMORPGs
    b. VR-FPS
  II. Truly Intelligent AI
    a. Self-learning AI opponents and team mates
  III. Neural Link Games
    a. Connecting the human mind directly to online worlds

(Figure 6: Taxonomy on evolution of online gaming teamwork)

Each virtual world generation emulated real life better than the previous one; text-line games evolved into 2D games and then 3D games with VoIP. Early multiplayer gaming eras (1980s-2000s) got disrupted when purely social gaming gained popularity. Facebook games were hugely popular and worked as a part of social media. Online arcades or gaming centers such as Finnish Aapeli.com were massively popular in the early 2010s (Wikipedia, 2023) and were used as social media, especially by the youth. The social gaming boom got disrupted when Esports emerged and took the evolution in a completely different direction, although social gaming remains popular. The current trend in development is creating increasingly advanced artificial intelligence and immersive technologies, such as VR or Neural Link. These developments will undoubtedly shape the future of online gaming and online teamwork.

As virtual worlds have gotten more complex and lifelike, the player experience has improved. Gaming has become immersive, and getting invested in a title is increasingly easy. Increased server capacities result in shorter queue times, and expensive commercial networks have been replaced by the Internet making online gaming more accessible and cost-effective.

The conducted literacy review suggests that increasingly social online gaming correlates with improved player experience, and the consensus is that abundant in-game communication is beneficial for games and gaming. As stated earlier, the harassment and other abuse experienced by players does not necessarily lead to players not using in-game communication features, but it still has a negative overall impact on the player experience. Repetitive abuse can result in players not returning to the title, and bad reputation can deter potential new players. This is a noteworthy issue for game developers.

5 Discussion

This chapter will discuss the evolution of online gaming from each of the research questions' perspective. Since *MUD1* (1978) was the first video game to support multiple remote users, it is sensible to begin the discussion from this point in time onward.

5.1 On evolution of in-game teamwork

Downey., (2014) divides virtual worlds into three generations. The first generation (1978-1984) includes unformatted text line games often developed by hobbyists inspired by *MUD1* (1978). The second generation (1985-1996) of virtual worlds was more commercial, and players' preferences and playing styles were analysed. The third generation (1997-) virtual worlds are highly commercial and of better production value.

5.1.1 Teamwork in first generation virtual worlds (1978-1984)

The first generation of virtual worlds saw titles resembling 1978's *MUD1*. The virtual worlds were unformatted text line games where the player would input commands and receive plain text from the server as a response. The players could inhabit the same virtual space, interact, and cooperate in order to achieve the common goal, and the virtual world could be accessed only on private networks or commercial ones such as AOL (Luukkainen, 2018).

MUD1 could support 36 concurrent users, and it could be accessed only from Essex University computers and later AOL (Freegame Tips, 2022).

In MUDs, the players could send text messages to each other, but network access was costly, which often led to players communicating asynchronously via email or IRC-clients due to it being more cost-effective. Additionally, queue times for games' virtual worlds could take hours due to limited server capacities. Regardless of these limitations, early online gaming was increasingly social.

Player interaction in early MUDs was beneficial, as cooperation made it faster to achieve in-game goals. Faiola & Voiskounsky., (2007) state in their research paper on United States MUDders that strong and friendly human ties were common within the MUD communities, and especially competitive players relied on intense communication.

5.1.2 Teamwork in second generation virtual worlds (1985-1996)

The second-generation virtual worlds started to take a more commercial direction when compared to the first generation's hobbyist approach. Game developers started analysing the players' preferences and playing styles. (Luukkainen, 2018).

Text chat remained a common in-game communication feature, and it was utilised similarly to the first generation's titles, but network access remained costly. Access to the 1987 *British Legends*' virtual world costs $12.50/h (MUD Wiki, 2022).

As video games got more commercial, online access providers began vigorous marketing to tempt more people to their service.

> "I remember AOL quite clearly: it was my first online experience. For a period in the 1990s, you couldn't walk 10 feet without tripping over one of the disks that they mailed to everyone, everywhere." (The CRPG Addict, 2017).

The first graphical MMORPG, *Neverwinter Nights* (1991), resided on AOL servers, and access to the online world was a steep $10/h during peak hours. Regardless of the hourly rates, *Neverwinter Nights* was hugely popular, with over 100,000 players having a character in the game. Server capacities could not meet the demand, and the servers could handle only 500 simultaneous players, which resulted in massive queue times (The CRPG Addict, 2017). *Neverwinter Nights* was nevertheless hugely popular, and it is one of the first titles to see players playing in clans (CS 201, 2022). The role of interpersonal relations in video games grew when team play became increasingly personal as clan members were not just random players.

In 1989, after the release of *Tiny*MUD, the virtual worlds were separated into two main types; battle oriented worlds and social worlds (Downey, 2014). In *Tiny*MUD, the players could create their own virtual objects within the game, and social interaction was important (Luukkainen, 2018).

As technology and game design advanced, in-game team interaction became more accessible. HUDs were introduced in games, server capacities grew, and playing games got more affordable. All these developments affected online teamwork. HUDs incorporated features such as chat bars that were easier to navigate than plain command line inputs, larger

server capacities decreased queue times, and more affordable internet access lowered the threshold for playing online.

The second generation of virtual worlds saw the dawn of voice chat, arguably one of the most prevalent team communication features. VoIP was invented by VocalTec in 1995 and first appeared in a video game titled *Activision's MechWarrior 2: 31st Century Combat* that same year (Nordlander, 2014).

The second generation of virtual worlds is seen as ending with the launch of *Meridian 59* (1996), which combined 3D graphics with modern day playstyles. In addition, it worked over the public internet instead of a private commercial network. (Luukkainen, 2018). To get access to *Meridian 59*, the players paid a fixed monthly subscription fee instead of an hourly rate. The gameplay consisted of traveling the world and fighting monsters and other characters. (CS 201, 2022).

5.1.3 Teamwork in third generation virtual worlds (1997-)

Downey., (2014) sees *Ultima Online* (1997) as the first third-generation virtual world because it was graphically and mechanically advanced and included more opportunities for the player to interact with the surrounding world down to the details.

As the third-generation virtual worlds are extremely commercial, game development is systematic, and projects can have an enormous budget. The developers wanted their titles to be accessible to people new to the video gaming sphere so that the titles would attract a larger player base. *EverQuest* (1999) was the predominant virtual world on the market when measured by the number of users until 2005 because learning the game and surviving in the virtual world were easier. *EverQuest* was designed to be played as a multiplayer game, which gave players an incentive to get their friends to play. (Downey, 2014; Luukkainen, 2018). Simplistic games, which required next to no previous video game background, would later become a significant part of social media platforms such as Facebook, where titles like FarmVille had a peak gamer base of 82 million users (New York Times, 2020).

The single most substantial in-game feature from Teamwork perspective is voice chat. As mentioned before, VoIP was invented in 1995 and implemented in a video game the same year, but it was not until 2002 that its popularity truly soared.

Xbox started offering VoIP with its Xbox-Live subscription in 2002, which made it possible for Xbox users to use voice chat in all Xbox titles (Loguidice&Barton, 2014). During this time, Xbox launched *Halo,* which is one of the all-time most notorious FPS games. *Halo* became a massive success, but the rivalry between gaming platforms was heated, and Xbox did not allow *Halo* to be adapted on other platforms. At this time, cross-platform play was not yet possible, and players were heavily divided between their preferred platforms, with the most juxtaposition being between the PlayStation, Xbox, and PC.

Skype's launch in 2003 brought VoIP to a large public and revolutionised team play on PC. MMORPGs at the time did not have built-in VoIP, but players could use Skype, TeamSpeak, or other VoIP software as a third-party platform to incorporate voice chat in titles such as World of Warcraft. The first MMORPG with built-in voice chat was *Dungeons and Dragons Online* (2005) (Carter&Wadley, 2014).

Voice chat has revolutionised in-game teamwork. Communicating via voice chat is faster, and different nuances, such as tone of voice, that affect the meaning of the message are difficult to express in text. Additionally, voice chat makes the gaming experience more immersive, as players do not need to stop to type. In fast-paced FPS games, text chat is not truly an option to begin with. This is supported by research conducted by Nordlander., (2014) where 90% of the test subjects preferred voice over text in online games because it is faster and easier to communicate through voice chat.

> "Without VoIP programs or built-in voice chat features, forming successful task-oriented groups in online games would be drawn out, difficult processes (Itech, 2021)."

Currently, an increasing number of video games support virtual reality devices such as Oculus Rift, which captures the user's physical movements and transmits them in the virtual world, adding yet another layer of real-life emulation and immersion to the virtual worlds.

5.2 On evolution of player experience

The player experience is affected by a multitude of factors, such as how well the game runs, how good the story is, how interactive the experience is, and how good the game looks.

First generation virtual worlds such as that of *MUD1* were completely text-based, and a very limited number of simultaneous users could cohabit the same virtual space (Downey, 2014). Regardless of simplicity and limitations, according to research, MUD players often form meaningful and versatile relationships with other players in the virtual world. MUDders engage in the games for different reasons, such as role playing, progressing in the game, or meeting with partners in the virtual world. Additionally, MUD players experienced flow while MUDding. Flow is described as a positive experience that includes sensations such as temporary loss of time, satisfaction, and high concentration on the task at hand. (Faiola&Voiskounsky, 2007). The concept of flow is described by its inventor, Csikszentmihalyi, as follows:

> "…flowing from one moment to the next, in which he is in control of his actions, and in which there is a little distinction between self and environment, between stimulus and response, between past, present, and future" (Csikszentmihalyi, 2000).

The first-generation virtual worlds were limited by the technology of their time, and online video games were still gaining their footing, which led to game titles being developed mainly by independent people or hobbyists (Downey, 2014). Network access was costly and typically charged by the hour, which led to players keeping sessions short to save on expenses. Queue times were also long due to the high number of players and limited server capacities. (The CRPG Addict, 2017).

The video game industry suffered a temporary crash in the early 1980s, which was due to the market being oversaturated with games of poor quality, leading to consumers losing their interest in new titles (Hadzinsky, 2014). Rapid advances in technology also made consumers wary of buying new hardware as it would often become obsolete in a matter of months. The first massively successful home computer, the Commodore 64, did not launch until 1982, which was on the tail of the first generation of virtual worlds (Hadzinsky, 2014).

1984-1996: During the second generation of virtual worlds, game development shifted and became increasingly commercial. As commercial development became more systematic than

independent development and more capital could be invested in the titles, video games became more technologically ambitious. (Luukkainen, 2018). This meant, among other things, increased server capacities, in-game audio, and 2D graphic design being implemented in virtual worlds. Graphical design plays a key role in the player experience because it adds to immersion when the users can experience the virtual worlds audio-visually instead of reading plain rows of text. Graphical elements such as in-game HUDs made the game's features more accessible and easier to navigate. For example, the modern implementation of chat overlay has made communication more fluid.

Game companies would lure new players to their games, and online access providers such as AOL would campaign just as vigorously to bring an increasing number of users online. Video gaming became more mainstream, and playing got more social. The first graphical MMORPG *Neverwinter Nights* (1991), already saw players forming clans (CS 201, 2022).

In the first generation of virtual worlds, different player types would inhabit the same world because there might not be an alternative. This changed in the early 1990s when virtual worlds began to diverge into two separate types; battle oriented worlds and social worlds after the release of *Tiny*MUD (1989) (Downey, 2014). Due to this divergence, player bases for specific titles could become more distinct as the virtual worlds were developed to conform to the interests of specific player types. *Tiny*MUD introduced an additional layer of player control with the mechanic of users being able to create their own virtual object within the game (Luukkainen, 2018).

Increased customizability and player control enhanced the player experience. VoIP was invented and implemented for the first time in a video game in 1995 (Nordlander, 2014). Virtual worlds started implementing 3D graphics by 1996, and technological advances allowed hourly access fees to be replaced by a fixed monthly subscription. Both improved the player experience. Various commercial networks got surpassed by the Internet, and an increasing number of people were brought online enabling virtual worlds to become truly MMOs.

In the early 2000s, online gaming reached its modern shape when voice chat became popular and video game digital distribution started to gain popularity through services such as Steam. Digital distribution made it easier for users to purchase new titles because they could buy games from their home computers at any time without having to adhere to the open hours of

a physical video game store. Digital keys are additionally less expensive than physical discs bought from stores. This lowers the consumer's threshold for buying a new game.

In the early 2000s, PCs were not yet the most popular gaming platforms. Even though cross-platform gaming was introduced as early as 2002 (Guinness World Records, 2022), gamers remained largely brand loyal to their chosen platform. Competition between different consoles and platforms divided players, and each platform had its own exclusive titles, such as *Halo* for Xbox and *Horizon* for PlayStation. Juxtaposition and exclusivity had negative effects on the player experience, and when some titles were later released for platforms other than the main one of the title, optimization was not always well done. An example of this being *Minecraft,* which launched in 2011 for PC, but when it was brought to Xbox and PlayStation in 2013 and 2014, respectively, the implementation of the game mechanics received mixed opinions among users, and PC remains to this day as the preferred platform.

Online gaming changed inherently when voice chat became mainstream. This happened for Xbox-Live subscribers in 2002 and PC players from 2003 onward with the release of Skype. The consensus among various research studies on voice chat is that its importance for player experience is tremendous, for better or for worse (Itech, 2021; Barr & Copeland-Stewart, 2021; Nordlander, 2014; Wadley et al., 2014). The following quote from Wadley et al., (2014) summarises this well:

> "…voice radically transforms the experience of online gaming, making virtual spaces more intensely social but turning them into maelstroms of impression management, identity play, and ambiguity over what is being transmitted to whom."

Voice chat enables truly instantaneous communication and deepens the player's immersion in the virtual world, but the feature is often abused, which has a negative affect on the player experience.

There is currently a lot of discussion about the abuse that players face in online games. The discussion is specifically focused on experienced harassment, which relates to factors such as the race and gender of players. Various research conducted on online video game abuse agree that abuse on voice chat is more likely to happen to those users whose voices convey certain distinguishable characteristics, such as an accent or female gender (Itech, 2021;

Wadley et al. 2014). A study on the abuse experience by female voices compared to male voices found that female voices received three times more harassment than male voices (Kuznekoff & Rose 2013).

To summarize this chapter, player experience has drastically improved due to the technological advances in game development that have enabled more ambitious and complex virtual worlds. Graphical design, in-game audio, fast and affordable online access, systematic game development targeting specific segments of players, cross-platform support, and voice chat have had a tremendous impact on video gaming. However, online anonymity combined with free in-game communication has a negative impact on player experience.

5.3 On curbing in-game communication

The reason for curbing in-game communication would naturally be the abuse of in-game communication features. Research comparing text chat to voice chat conducted by Nordlander., (2018), resulted in the conclusion that text chat causes mostly negative emotional effects and actions but is perceived as a necessary feature for a team game, while voice chat is the exact opposite.

According to gender and in-game abuse research, female voices are three times more abused than male voices (Kuznekoff & Rose 2013). Regardless of the gender-based abuse, female players also find voice chat useful. This is shown in research conducted by Itech., (2021) where online players were interviewed on in-game abuse. Although practically every female interviewee had experienced abuse, especially on voice chat, they still used in-game voice chat and found it to be an important in-game feature.

Game developers have taken different approaches to what types of in-game communication methods they implement in their titles. Most games have different text chats for everyone, the team, and the private party. This is usually applicable for voice chat as well, but voice chat for everyone in a competitive game is not common as it would serve no purpose. Currently popular battle royale and open world games often offer proximity voice chat in addition to text chat rooms and party voice chat.

To tackle in-game bullying, games usually offer a system where players can report abusive players, and they will be penalized usually with a temporary ban or a cooldown. Chat filters are also implemented to prevent certain words from being sent. Additionally, each player

can toggle certain communication methods on or off at their will. Some developers, such as Riot Games, have made the executive decision to not implement team voice chat at all due to the downsides discussed before. Riot Games has also removed all chat in their title *League of Legends* to curb in-game toxicity.

Although in-game bullying has a negative effect on the player experience, removing features often does more harm than good. As discussed at the beginning of this chapter, players who experience abuse in games still think those communication channels are important for the game. Online abuse and anonymous slander are as well an extremely human phenomenon that can hardly be solved by removing in-game voice chat. It should also be noted that even though some features are removed from the game, some third-party vendors offer them, and players will start using them instead. Removing a feature such as voice chat additionally forces those players who want to use the feature for its intended purpose to go the extra mile of using a third-party platform, which has a negative affect on their player experience.

To summarise this chapter, although in-game abuse is an extremely real problem that should not be ignored, removing in-game communication features almost definitely affects the player experience negatively.

6 Conclusions

To conclude the findings of this thesis, in-game communication and teamwork have gotten more multi-layered and real-life-emulating as technology has advanced. The more control the player has in the virtual world, the better their experience tends to be. This applies to in-game communication as well. Even though abuse occurs, removing features almost definitely affects the general player experience negatively.

When developing an online game, it is arguably more important to focus on understanding in what situations abuse occurs so that features such as spam prevention can be applied and default settings can be used to offer a “safer” in-game environment for new players. The user should still be able to change the default settings as they wish because as stated before, the more control the player has, the better their experience is.

The resulting taxonomy of this thesis divides the object field, the history of online games, into distinct eras and elements typical to those eras. This classification differs from the

normal approach of analysing player experience or playstyle in specific titles or genres rather than attempting to generate a more general description of the evolution.

Although this thesis succeeds in providing a general timeline and typification of the evolution of teamwork and player experience, more profound research could be conducted in the future, and in this case, it might be beneficial to inspect a specific genre rather than the entire evolution of teamwork. If we hope to conduct an analysis on the actual development of playing a video game, the scope should be more defined since it is completely different to compare the teamwork in a tactical shooter to a MMORPG. However, it is still beneficial to conduct macro-level research, from which the scope can be then narrowed.

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Figures

Figure 1 A complete, year-by-year, sector-by-sector breakdown of global gaming industry revenue, from 1971 to present. Bloomsberg. 2019. Available at: https://www.bloomberg.com/news/arti...me-top-analyst-sees-industry-slumping-in-2019

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Tables

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