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Abstract

English

How can game mechanics help encourage teamwork and positive behavior among strangers in team-based multiplayer games? This thesis aims to research how game mechanics can influence collaboration among players in online multiplayer games, and what obstacles get in the way of collaboration. Argumentation and conclusion will be based on research in the field of psychology, analysis of existing games, and an evaluation of a survey about the most popular team-based multiplayer games. Requirements for collaboration are examined through defining what characteristics players need to display in order to successfully collaborate and by breaking down collaborative tasks within games into different categories according to Steiner's Taxonomy of Tasks to better understand what kinds of tasks hold the highest potential for encouraging teamwork. In addition, commonly occurring negative behavior in multiplayer games is explained to provide a better understanding of how it can be detrimental to collaboration. Lastly, games from the survey are examined according to the interdependent team mechanics they offer, how they are related to certain task types, and how the different design choices for these mechanics affect teamwork. Based on the results, the designs for game mechanics that encourage teamwork are identified and applied to the prototype game: *Elementar*.

German

Inwiefern können Spielmechaniken dazu beitragen die Kollaboration und das positive Verhalten unter Spielern innerhalb von teambasierten Multiplayer-Spielen zu fördern? Die Intention der vorliegenden Arbeit liegt darin zu erforschen, inwieweit bestimmte Spielmechaniken die Zusammenarbeit zwischen Spielern in Online-Multiplayer-Spielen beeinflussen und welche Hindernisse sich dabei für etwaige Kollaborationsformen in den Weg stellen können. Argumentation und Schlussfolgerungen basieren auf Forschungsdiskursen aus dem Feld der Psychologie, einer Analyse bestehender Spiele und der Auswertung einer Umfrage über die beliebtesten teambasierten Multiplayer-Spiele. Anlehnend an Steiners «Taxonomy of Tasks» werden – in Form eines Herunterbrechens diverser Spielaufgaben in verschiedene Kategorien – Voraussetzungen für erfolgreiche Kollaborationsformen definiert, um ein besseres Verständnis dafür zu entwickeln, welchen Aufgabenformen das grösste Potenzial innewohnt, um Teamarbeit zu fördern. Des Weiteren werden häufig auftretende negative Verhaltensmuster innerhalb von Multiplayer-Spielen detailliert dargestellt, um zu veranschaulichen, inwiefern Kollaborationen davon beeinträchtigt werden können. Schliesslich werden die in der Studie/Umfrage behandelten Spiele auf ihre ineinandergreifenden Teammechaniken hin untersucht und erforscht, inwieweit diese mit bestimmten Aufgabentypen zusammenhängen und sich deren verschiedene Gestaltungsmöglichkeiten auf teambasiertes Spielen auswirken können. Auf Grundlage der daraus resultierenden Ergebnisse werden kollaborationsfördernde Spielmechaniken identifiziert und auf den Spielprototypen «*Elementar*» angewendet.

Catchphrases

team mechanics, interdependency, collaboration, negative behavior, teamplay, group tasks

Definition of Terms

Bots - As in, a bot match in a MOBA, or a non-player character

Buff - A (temporary) increase of one or more character attributes.

Carry - A player-controlled character that scales in power over time by gathering resources.

Clans/Guilds - Organized gaming communities that play one or more multiplayer games regularly together.

Cooldown - The time that needs to pass after a player ability has been activated before the same ability can be used again.

Crowd Control - Specific abilities that restrict the movability of opponent players.

Debuff - A (temporary) deterioration of one or more character attributes.

Healer - A player controlled character that can heal other team members, primarily the tank.

Hero - A player-controlled character with special abilities.

In-Game - The environment in the game world in which the player is able to control the character.

Lane - One of multiple paths of a MOBA level that connects two team bases.

Mana - A player resource that is consumed in order to cast special abilities.

Map - The level or arena the players play against each other.

Matchmaking - The process of connecting players together to play a match online together or/and against each other.

Mid Lane - The lane that provides the biggest potential to gather resources, like gold and experience points.

MOBA - Multiplayer Online Battle Arena, a game genre in which players battle each other in an arena like level.

Out of Range - The distance at which an ability can not be activated.

Public Matches - Multiplayer matches that are played with other players online and can be accessed by everyone.

PvE - "Player versus Environment"

PvP - "Player versus Player"

Ranked - Competitive public matches that can increase a virtual rank of a player when achieving a victory.

RTS - "Real Time Strategy", a game genre played in real-time in contrary to turned based strategy games.

Skill - Depending on the context, a special player ability that can affect other players or the expertise level of the player.

Support - A player-controlled hero character with the task of protecting the carry in the early phase of a match.

Tank - A player-controlled character that can absorb a relatively high amount of damage to protect team members.

Unranked - Public matches that do not affect the virtual rank of a player.

VoIP - Voice over IP, a communication method that transmits a recorded voice over the Internet in almost real-time.

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1. Introduction

1.1 The Lack of Collaboration in Public Multiplayer Games

Team-based multiplayer games pose a particular challenge: they usually demand that players rely on communication and collaboration among team members to unfold their full potential. Competitive multiplayer games are often played by clans, guilds and other player communities which have an established communicative and trust-based relationship within them. However, this is usually not the case when it comes to playing with unknown players in public matches. This thesis considers game mechanics for players who tend to rely on public matchmaking and playing with unknown players.

A questionnaire was conducted by the author of this work to evaluate player satisfaction regarding teamwork and communication in team-based games. The survey reveals that a vast majority of players are willing to participate in teamplay, still their rating of their teamplay remains average and their perceived amount of helpful communication tends to be low.

The objectives of team-based online games rely on collaboration among the players, however, these games often lack the mechanics that actively encourage and reward teamwork behavior within the game. For example, MOBA games like *Dota 2* and *League of Legends* provide the necessary mechanics and make it possible for players to communicate and collaborate, but leave the responsibility of actually using these mechanics entirely to the players. This is a good method to give each team the potential to outperform the other team by playing efficiently through communication. This scenario works ideally for every willing player with a positive attitude, but fails with players who lack the will to communicate with their team, often leading to frustration and disappointment for the entire team.

This thesis will discuss what potential game mechanics and task types need to be considered to encourage good teamplay behavior.

“Mechanics are the various actions, behaviors and control mechanisms afforded to the player within a game context. Together with the game’s content (levels, assets and so on) the mechanics support overall gameplay dynamics.”¹

Player behavior and attitude patterns, existing literature on collaboration, and existing game mechanics will be examined to see which mechanics are the best candidates for facilitating teamwork in online multiplayer games.

1.2 Why Encourage Online Teamwork among Players?

Players who play with friends usually connect with them via a private communication channel of their choice to discuss tactics and strategies. These players have an advantage while playing collaborative multiplayer games because these games rely on good communication for efficient gameplay. However, many players rely on public matchmaking and playing with strangers, therefore it is equally important to foster communication and collaboration between random players who don’t know each other. To build up the satisfaction with teamplay within online game communities and reduce instances of negative player behavior, intuitive game mechanics that positively influence the collaboration among players in online multiplayer games are needed.

1.3 How to Address this Subject and Choice of Research Methods

Questions and Literature: The thesis deals with the research and development of game mechanics that encourage teamwork. This requires asking questions concerning cooperation and collaboration in the field of psychology as well as game design with the focus on common multiplayer mechanics. To gain knowledge in the field of collaboration it is necessary to understand what kind of behavior should be encouraged or discouraged in order to promote teamwork. It is also important to examine examples of existing teamwork mechanics by comparing and categorizing them into certain group task types.

¹ Hunicke, LeBlanc, Zubek, 2004, *MDA: A Formal Approach to Game Design and Game Research*, p.3

Survey: Despite numerous gaming forums complaining about the issue and a general awareness of this within gaming communities, no scientifically documented evidence could be found on the subject of the lack of collaboration in public multiplayer games. Therefore, a survey was conducted by the author of this work to evaluate player satisfaction with teamplay and to give an understanding of the perception of collaboration within gaming communities. The participants of the survey mostly came from gaming Discord communities that focus on various competitive multiplayer games. Arguments are drawn based on the results of this survey.

Measuring the Interdependence Potential Among Team Players: According to multiple studies, interdependent game mechanics are responsible for encouraging teamwork among players. Prevalent interdependent game mechanics are listed, categorized and assigned to collaborative group task types. These mechanics originate from the top 10 games that have been rated with the best team play experience from the survey respondents. The statement of this thesis claims that games with the highest interdependence potential hold game mechanics that encourage teamwork.

Example of Integrated Game Mechanic that Encourage teamwork: There is also a need to integrate interdependent game mechanics into a self-developed prototype - *Elementar*. The game mechanics aim to encourage players to work together by making them stronger when they choose to be interdependent. It is expected that these game mechanics will reward considerate and cooperative players and increase the instances of collaborative player behavior. However, *Elementar* is not a game which was developed with the intent of being a scientifically significant testing environment for this thesis. Instead, it will be used as an example of a game that will attempt to implement some of these game mechanics intuitively to be tested by several players. Whether or not these game mechanics successfully influence teamwork, still needs to be determined by implementing them into an isolated testing environment to draw unbiased conclusions.

Furthermore, the goal is to encourage a long-term result which aims to have a positive social influence on the multiplayer scene. The hope is to inspire game developers to head in a direction that encourages teamwork.

2. Understanding the Perception of Collaboration within Gaming Communities

2.1 Definition of Collaboration

Before the lack of teamwork in online games can be examined, it is important to understand how collaboration is defined in general and how this definition can be applied to teamwork in online games.

„Collaboration is the process of two or more people or organizations working together to complete a task or achieve a goal.”²

This means, when translated and applied to a collaborative scenario in multiplayer games, that two or more players help their team to win a match, finish a level, or achieve any other common goal by working together.

Specifically, *working together, teamplay, collaboration or cooperation* in regard to games means that two or more players hold an attitude which allows them to communicate with their team members. These players also see themselves as a part of a team instead of trying to solve every problem on their own. They use specific in-game features or external communication tools which allow them to benefit their team and bring them closer to their common goal. For every game mechanic to work in a team there has to be potential for an action-response exchange between players. An example of this would be the re-engagement of a player being healed by another teammate. Such a re-engagement could be a change of mind of the player who receives the healing and reacting with an action the player wouldn't have done without the healing. If there is no reaction in any form from the receiving player, the attempted teamplay is only one sided and cannot be considered as a play move made by a team. Teamplay in games is different from real world teamwork scenarios such as workplace relations, family relations, or laws and order in public space. Real world collaboration often comes with consequences that directly affect the person's life in a noticeable way, often forcing them into behaviors they

² Ignacio J. Martinez-Moyano, 2006, *Exploring the Dynamics of Collaboration in Interorganizational Settings*, p.83

would normally not be motivated to perform. In games, collaboration is voluntary and action-benefit in nature, with no serious real-life consequences if a player is not willing to follow through. Game-based collaboration is therefore difficult to implement as teamwork in games is not blatantly mandatory. There is no obvious or severe punishment or reward that comes with the actions that will affect the life of the player. Instead, the player needs an initial sense of motivation to collaborate in the first place. Some games implement teamwork mechanics well. For example, it is obvious for every experienced player in *World of Warcraft* to collaborate with a tank or a healer in order to complete specific objectives. The result of not having either one of these is that every player character in the group or the player alone would eventually die and lose progress before the objective can be completed - with no collaboration, a winning scenario is simply not possible no matter how good individual players may be.

In MOBAs, it is more subtle because someone has to win or lose due to the competitive PvP focus and the overall design of this genre - there is no winning formula like in *World of Warcraft*. For example, professional players in *Dota 2* and *League of Legends* have exceptionally efficient teamplay among each other, but after every match there is always one team that still loses.



Fig. 1: Scenes of Valve's documentary about the *Dota 2* world championship *True Sight: The International 2019 Finals*. E-Sport clan *OG* (top) after winning the finals and *Team Liquid* placed second (bottom).

2.2 Types of Collaborative Tasks

“When individuals join together to work in groups their performance depends on each individual’s resources plus the interpersonal processes that determine how these resources are combined. A group may have all the resources it needs to reach its objectives, but if it fails to coordinate its efforts and activities it may perform poorly [...] Steiner (1972) traced problems in coordination back to one key source: the type of task the group is performing. [...] Steiner called the combination processes dictated by the problem or group activity the task demands and suggested that they vary depending on the divisibility of the task (Component), the type of output desired (Quantity versus Quality), and the combination rules required to complete the task (Interdependence)”³

Steiner broke down the types of group tasks into categories. This section will focus on exploring Steiner’s task types and especially his “interdependence” category and putting it into the context of multiplayer games.

For Steiner, interdependence refers to the different ways individual inputs can be combined to yield a group product, and the kinds of strategies required by the task they are facing. For this thesis, interdependence describes how players within a team in multiplayer games are connected and the different ways they can strategize to achieve a common goal. Each of the following task types present examples of how they can be applied to an in-game scenario. All interdependent tasks by Steiner also list their corresponding effects.

Divisible and Unitary (Component): *“Divisible tasks can be broken down into subtasks that can be assigned to different members and then integrated together. This allows each member to work on elements of the task that match their strengths.”⁴* Unitary tasks do not have subcomponents and cannot be divided up among group members. For unitary tasks, either the

3 Forsyth, 2009, *Group Dynamics - Fifth Edition*, p.298 - 300, 304

4 Spacey, 2017, *6 Types of Collaboration*

URL: <https://simplicable.com/new/collaboration>

URL Time Date: 29th of January 2020

whole group has to work together on one task at the same time, or only one person can work on the task while the rest of the group waits.

In-game Example: Two players want to craft a piece of equipment that requires wood and iron. In order to craft the item efficiently, they divide the task into sub-tasks by having one player gather wood and the other player gather iron in the meantime. The gathering process is a divisible task. If only one player has the ability to craft the needed item, then the crafting process becomes unitary - one player makes the item while the other one waits.

Maximizing and Optimizing (Quantity versus Quality): *"Some tasks call for a high rate of production (maximization), whereas others require a high-quality, correct outcome (optimization)."*⁵

In-game Example: A player in a real-time strategy game produces the most units possible to maximize the damage output on the front of an enemy fortress. Another player approaches this problem in the *optimizing* way, by infiltrating saboteurs into the enemy's fortress in order to defeat the enemy in the most resource-efficient way.

Interdependence: *"How are individual inputs combined to yield a group product?"*⁵

Additive: *"Tasks that allow each member of the team to work independently, with their individual results adding up towards a common goal."*⁶

Effect: *"Better than the best: Because it all adds up, the final group result exceeds the performance of even the best individual member."*⁵

In-game Examples: Each player deposits resources into a pot which is shared by the whole team to purchase or craft an item. Players are able to destroy an enemy building faster as a team than any individual player could have done alone.

Advantage: Lone wolves are more likely to participate in additive teamwork tasks,

5 Forsyth, 2009, *Group Dynamics - Fifth Edition*, p.299, 300, 304

6 Spacey, 2017, *6 Types of Collaboration*

URL: <https://simplicable.com/new/collaboration>

URL Time Date: 29th of January 2020

since they allow players to work independently from each other but still contribute to a common goal. Additive tasks also allow players to maximize any measurable inputs without necessarily debating over strategies, ideas or taking part in any other form of intricate communication.

Drawback: With a high numbers of players working on additive tasks and without proper monitoring, social loafers (chapter 3) become impossible to spot, because everything gets measured as the summoned input of all group members and not of the individual.

Compensatory: *"Tasks that allow for different viewpoints to be combined by having the members of the group make a decision that averages together individual suggestions."*⁷

Effect: *"Better than most: The group exceeds the performance of a substantial number of the individual members."*⁷

In-game Example: Players average in the different strategy suggestions and decide on a move that fits somewhere in the middle. For example, players give their input on what they think the enemy team's cooldown and resource situation is to guess the risk of attacking the enemy's base and decide to attack the base only for a short time before backing down instead of committing to a full assault just in case the more risky estimates were correct.

Advantage: *"The group members make their judgments independently of others, conformity pressures do not influence their responses."*⁷ With a lot of players, averaging a solution to a problem is more likely to turn out helpful for the team since everyone gets to express their opinion freely before a decision is made. The final decision will also be a middle ground between the worst suggestions and the best suggestions, so the overall performance will not be as bad as it potentially could be - it will always be better than the worst but never as good as the best.

Drawback: *"The method does not work so well, however, if members are uninterested in the issue and they have so little information that they are merely guessing [...] The method also requires a large enough number of judgments to compensate for the*

⁷ Forsyth, 2009, *Group Dynamics - Fifth Edition*, p.301, 304

*extreme judgments.*⁸ If an average solution is picked in a team where most players are inexperienced and only some are experienced, the selected solution is never as optimal as it could be.

Disjunctive: *"Tasks that are completed by choosing one person's work, one solution, or one product from a pool of the group members' contributions. This potentially allows a mediocre team with one strong member to outperform teams that are generally stronger."*⁸

Effect: *"Better than average and sometimes equal to the best: The group performs best if it accepts the most capable member's input as the group solution; groups rarely perform better than the best member."*⁹

In-game Example: Players suggest different strategies and then decide on the strongest or most experienced player's suggestion. The strongest player leads the way while others follow.

Advantage: *"In general, groups perform disjunctive tasks better than most of the individual members."*⁹ The judgment of the most capable player can lead a team of beginners to victory, while also being an example at the same time for the beginners of how to approach and manage challenges.

Drawback: *"Disjunctive tasks often require discussion and decision."*⁹ Without a team leader, captain, or moderator, discussions can evolve into a discord, especially with the involvement of time pressure or the team's disagreement over the team leader's judgment. A large group of players will also have difficulty agreeing on one particular solution, since having someone who disagrees and creates more arguments and possible disputes is more likely to happen the more people are involved in the discussion.

Conjunctive: *"Tasks that require everyone to finish together or to contribute unique pieces to a puzzle - e.g. through specialized roles. Conjunctive tasks only succeed when all members succeed."*⁹

⁸ Spacey, 2017, *6 Types of Collaboration*

URL: <https://simplicable.com/new/collaboration>

URL Time Date: 29th of January 2020

⁹ Forsyth, 2009, *Group Dynamics - Fifth Edition*, p.301, 302, 304

Effect: *“Better than the worst or equal to the worst: Performance will be superior if subtasks are matched to members’ capabilities, or, the group’s performance will be determined by the weakest member’s results.”¹⁰*

In-game Example: Players are grouping up in order to conquer a point of interest that requires all members of the team to stand together at a specific spot. Or in order for a team to complete a difficult task, each player with a specialized role (e.g. healer, tank, damage dealer) has to succeed in their specific sub-task. If one fails or performs poorly, the rest will be dragged down with them.

Advantage: *“If the conjunctive tasks are divisible, then the group can assign group members to the subcomponents that best match their skill levels. If the least competent member is matched with the easiest task, a more satisfying level of performance may be obtainable.”¹⁰* If matched with caring players, the least experienced player will be protected and looked after to make sure they succeed in their task.

Drawback: *“If the least competent member is matched with a difficult subtask, group performance will decline.”¹⁰* If matched with toxic players (chapter 3), the weakest player can be easily identified and targeted. Conjunctive tasks have a natural disadvantage, the weakest group member determines the overall performance of the group and has the potential to drag the group down.

Discretionary: *“The group decides how individual inputs relate to the group product. The task doesn’t require a specific team dynamic and the group members are free to choose whatever method for combining individual inputs they want.”¹⁰* *“The tasks that are self-organized by the group. They might decide to choose the strongest member’s work. Alternatively, they may collaborate on additive, compensatory, conjunctive and divisible tasks to build something together.”¹¹*

Effect: *“Variable: Performance depends on the combination rules adopted by the group.”¹⁰*

¹⁰ Forsyth, 2009, *Group Dynamics - Fifth Edition*, p.302, 304

¹¹ Spacey, 2017, *6 Types of Collaboration*

URL: <https://simplicable.com/new/collaboration>

URL Time Date: 29th of January 2020

In-game Example: Players adapt their strategy on the go, based on the situation, without the game demanding any specific team dynamic. For example, in a MOBA game, players might vote for a captain to pick heroes and a strategy during the drafting phase if they see that a more experienced player is part of the team. Players might also decide to pick their own heroes individually based on their own judgment. They could also all make hero suggestions together and pick their heroes based on that recommended hero pool. Any of these approaches are viable.

Advantage: Discretionary tasks allow the members to be flexible, they are able to determine which interdependent method fits the most to solve an issue.

Drawback: If group members can not decide on a method, the situation can evolve into chaos.

2.3 Evaluation of the Issues in Teamplay Experiences

This chapter presents some of the most important results of the survey mentioned in the introduction. This evaluation will help to give an understanding of the current characteristics of player experiences in team-based multiplayer games. The survey in its entirety can be found in the **Personal Research** section at the end of this paper. This survey was conducted to reveal the lack of teamplay in current online multiplayer games and to collect more data which will help to define the necessary game mechanics at the end of this thesis. 366 valid responses have been collected after filtering out all the submissions that had been answered in under 30 seconds (the average survey completion time was 2 minutes). The majority of the respondents were players from various Discord gaming communities, playing diverse kinds of multiplayer games.

The survey asked the participants to put themselves in the scenario of playing their multiplayer game of choice in a public match while answering the questions. There is a weakness in this survey that needs to be mentioned. To ensure a reliable evaluation, the survey in this chapter required participants with a broad range of willingness to collaborate - from strong to no will. However, answering a survey on a voluntary basis is already a type of collaboration, meaning mostly people who are willing to collaborate tend to help out by participating in such a survey. Possible respondents who have a low will to collaborate tend to ignore such surveys. Therefore it is assumed that questions like Q8 (question 8) might have biased results. But there is no clear

evidence to prove this claim. According to the survey, a vast majority of respondents rate their teamplay experience in Q3 as average.

Q3: How would you rate your overall teamplay experience in your chosen game when you play in public with random players? (Skip this question if you only play with friends)

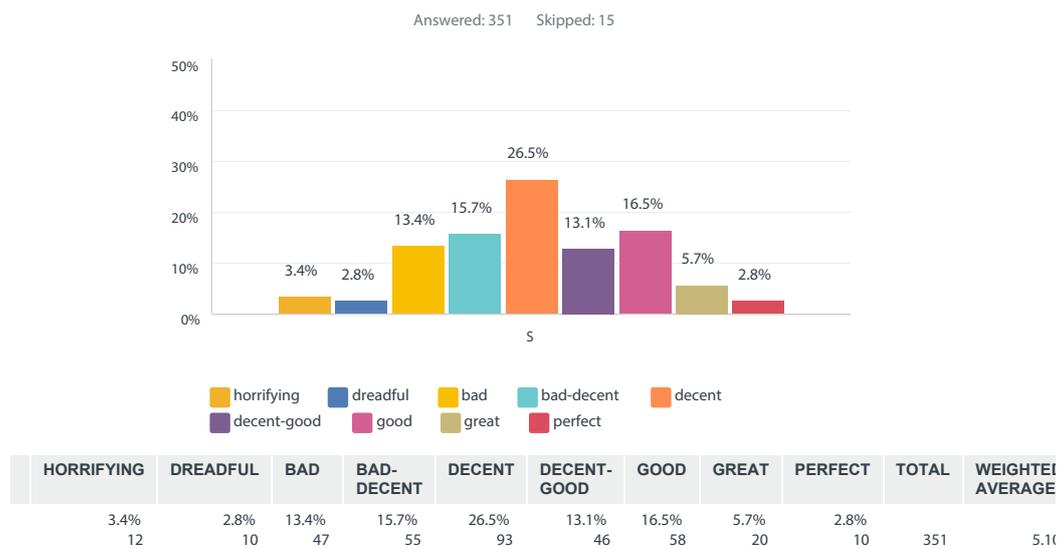
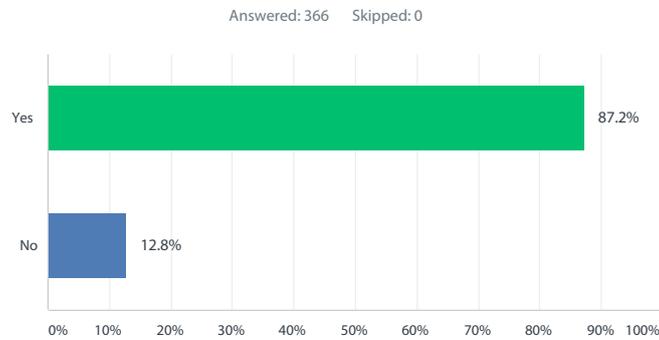


Fig. 2: Survey - Communication and Teamplay Experiences in Team Based Multiplayer Games Q3

However, Q8 reveals 87% of all respondents seem to be willing to participate in teamplay even at the cost of compromising themselves to help someone else in their team in order to increase the chance of winning a match. This shows that there is already an existing strong will to collaborate within the players but something seems to limit and block this collaborative potential from happening.

Q8: Would you be willing to give away hard earned resources to another player on your team in order to increase your chances of winning a match? (e.g. gold or items)

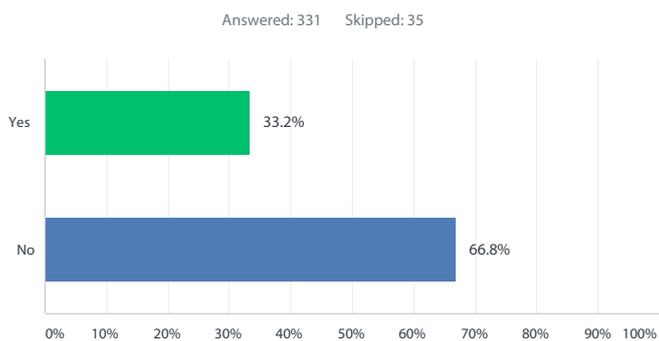


ANSWER CHOICES	RESPONSES	
Yes	87.2%	319
No	12.8%	47
TOTAL		366

Fig. 3: Survey - Communication and Teamply Experiences in Team Based Multiplayer Games, Q8

Question 5 reveals that 66% of all participants think there is not enough helpful communication going on.

Q5: Do you think there is enough helpful communication going on when you play public matches? (Skip if you only play with friends).



ANSWER CHOICES	RESPONSES	
Yes	33.2%	110
No	66.8%	221
TOTAL		331

Fig. 4: Survey - Communication and Teamply Experiences in Team Based Multiplayer Games, Q5

It is possible that Q5 and Q3 are interlinked, because communication can have a strong impact in teamply experiences. There is no clear proof that game mechanics alone are the reason for the blocked collaborative potential. However, if they are, then it might be possible to improve and adjust them to increase the amount of positive teamply scenarios.

3. Impact of Negative Behavior on Collaboration

Negative human behavior can be detrimental to collaboration, the person's environment, and to themselves. This impact is either intentional or unintentional.

„In the workplace, people's moods tremendously impact decision making, problem solving, attention/focus, interpersonal interactions, performance, productivity, and the whole organizational culture“¹²

This statement can be translated into an in-game scenario in which the *workplace* represents the game world or level where players interact with each other. Both, in a workplace and in a multiplayer game, tasks need to be solved, often together. Therefore the moods and the decision making of players (which are represented in their behavior) will also have an impact on all the quoted attributes by Lipkin.

3.1 Potential Reasons for Negative Behavior & Toxicity

For the purposes of this thesis, the assumed definition of negative behavior is anything the player does, whether intentionally or not, that disrupts the game, takes away from the enjoyment of the game for other players, deteriorates the team's willingness to collaborate, and often creates a hostile environment among the players. Before individual reasons for negative behavior are explained in detail, it is important to understand "toxicity", which can evolve from one or more of the individual reasons listed in the sub-chapters that will follow.

12 Nicole Lipkin, 2013, *What Keeps Leaders Up at Night: Recognizing and Resolving Your Most Troubling Management Issues*

Certain types of negative player behaviors in games are often referred to as “toxicity,” however, there are many ways negative behavior can manifest itself within a game without falling into the category of being toxic - such as unintentionally playing poorly due to lack of skill. With that in mind, toxic players exploit game mechanics to undermine their own team, agitate team members through abusive communication, distract their team through spamming, disengage from the game, and generally jeopardize the integrity of the match by refusing to cooperate and intentionally giving the enemy team an advantage. This kind of negative player behavior can be found in most of the popular multiplayer games today.

Toxicity is especially noticeable in online games with a low number of players per team (e.g. up to 5 players per team) in which an individual player usually holds more responsibility and their actions can have a greater impact on the process of a match. Small team size means that if one player makes a mistake, another player in the same team is more likely to feel the consequences of this mistake on themselves and the group. Mistakes made by an individual player are also more noticeable by their team members, due to the fact that it is easier to observe a lower number of individuals than a group of more than 10 people. If a player reacts poorly to another player’s mistakes and actions, a toxic chain reaction is more likely to evolve and be noticed by the team. Toxicity also appears in games with a higher number of people per team, but it is harder to recognize and is usually taken less personally. For example, the Battlefield series provides servers with slots for 64 players. There are even more extreme cases, like Planetside 2, “*[...] which allows thousands of players to hit the battlefield on the same server.*”¹³ The amount of communication going on and the difficulty of overlooking all events happening in a level with this amount of players, makes it more difficult to pay attention to the impact of individual players and to a toxic player’s behavior.

The ways toxic behavior can be recognized also depends on many other factors, which include but are not limited to user interface (UI) design, game genre, overall complexity and the scope of the game mechanics. The following sub-chapters attempt to categorize the possible reasons

13 Planetside 2 FAQ, Q: *How many players are on a single server?*

URL: <https://www.planetside2.com/faq>

URL Time Date: 28th of December 2019

and origins of negative behavior in online games and present an in-game for each category. Toxicity is considered to be something that emerges from one or more of these negative behavior categories. Whether or not some of these categories are intentional or not depends on the individual and the situation. Negative behavior is seen as intentional as soon as the individual is aware of their actions and has reflected on them having a negative impact on others and still chooses to perform the negative behavior.

3.1.1 Network Code, Unstable Connection, and Latency

Most matchmaking systems assign players to certain dedicated server locations to ensure a stable and fast connection among all players during a match.

“Particularly, in multiplayer online games, players seek to cluster themselves so that those in the same session have low latency to each other.”¹⁴

These clusters are managed by the corresponding matchmaking system and causes players from certain countries to get matched with players from a range of other countries. These countries need to be within a certain range of distance to each other, so that the latency stays within a playable spectrum. Before games had matchmaking systems like this, every player needed to search for servers with a relatively low latency. However there are players who have different ideas of connection qualities. Some players do not see playing with a latency of 150-200 milliseconds as a problem. Other players who are more serious about their connection usually play with a latency of 10-50 milliseconds. Players who take latency more seriously, can visually observe the relatively bad connection of players with a higher latency. This can generate misleading situations, such as the illusion of a player being visually represented in one place while their hit detection box is in a different location. This can lead to negative behavior as players fight over what actually took place (e.g. a fired shot being accurate, player positioning) since they are seeing different things on their screens. The latency problem can also be caused by a poorly made net-code that fails to sufficiently support the game.

¹⁴ Agarwal, S., & Lorch, J. R., 2009, *Matchmaking for online games and other latency-sensitive P2P systems*. In ACM SIGCOMM Computer Communication Review (Vol. 39, No. 4, pp. 315-326). ACM.

A frequent occurrence of these situations deteriorates the gameplay experience, especially in fast-paced games where manual player-controlled hit detection plays an important role. This deterioration of the experience is a problem on its own, but it can also potentially cause players to become annoyed and angry - especially those who do not understand the technical issues behind an unstable connection or high latency.

3.1.2 Incompatibility and Distortion of Player Expertise

Player expertise is a player's overall experience in the game and their potential to make skillful and intentional moves. Team-based multiplayer games usually define player expertise with a ranking system. Each game has a unique way ranks are assigned to players. In an optimal scenario, the game's matchmaking system matches players automatically with other players of approximately the same rank to ensure a fair and exciting match. A way to disrupt the enjoyment of a match is to distort this expertise composition of a team. This is done either intentionally or unintentionally. Examples for intentional distortions of the team's expertise are as follows:

Smurfing: Gaming accounts, that are calibrated by the game system to get matched with players of a relatively low expertise, are used by players with a relatively high expertise to increase their chance to defeat their opponents.

"The term "Smurf" or "smurfing" originally derived from two highly skilled players of Warcraft II: Tides of Darkness, who created new accounts named PapaSmurf and Smurfette [...]. They acted like newbies leading their enemies to believe that it's just two regular players [...]. Smurfing is about using personal skills and experience discrepancy to gain an advantage, where every player is given the same resources or possibilities. Nowadays, whichever game has a rank system based on win rate, it'll have smurfs. They hide behind the low-stat account to "smurf" on newbies and weaker players in general. You will find smurfs in FPS shooters like CS:GO, battle royales like Fortnite, PUBG, and MOBAs like League of Legends, StarCraft, and Dota 2."¹⁵

15 Bartosh, 2019, *What is Smurfing in Gaming - League of Legends and More*

URL: <https://mmoauctions.com/news/what-is-smurfing-in-gaming-league-of-legends-and-more>

URL Time Date: 28th of December 2019

Boosting and Using Boosted Accounts: The term *boosting* refers to multiple definitions in the computer and gaming scene.¹⁶ Here is important to understand that boosting can be the opposite of, and the same as smurfing. It is the same, as described in the smurfing section above, when a relatively highly skilled player increases the rank of a gaming account that would get matched with relatively lower skilled players. The purpose of this is to sell these boosted accounts to players whose accounts got banned or who are prevented from accessing their account for other reasons - these players often have no choice but to create a new account and level up their rank again. In order to skip this time intensive process, boosted accounts can be bought on various websites. Both smurfing and boosting lead to unfair scenarios by disrupting the level of player expertise during a match. A smurf who is busy boosting an account for sale will usually play in a way that disrupts the game for the lower ranked players by taking advantage of the differences in skill and knowledge of the game mechanics - they will often go on killing sprees for the sake of winning and not give the lower ranked players a fair chance to learn and play the game how it was meant to be played.

Boosted accounts are also bought by players who perceive themselves as playing better than what their normal rank would represent, and strive to play with higher ranked players. This often has negative consequences for these higher ranked players who subsequently have to deal with players who overestimate their own level of play and who cannot keep up with the pace and strategic complexity of the higher ranked matches. This can lead to negative behavior evolving within the match as both the higher ranked players and the players using boosted accounts start expressing their frustration. Another side effect that can take toll on the higher ranked players is the potential loss of rank as they lose matches due to having a lower skilled player on their team for the enemy team to take advantage of, which in turn throws the game's matchmaking system off balance.

¹⁶ Computer Hope, 2018, *Boosting*

URL: <https://www.computerhope.com/jargon/b/boosting.htm>

URL Time Date: 4th of January 2020

The composition of player expertise within a team can also be disrupted unintentionally when beginners join a group of more experienced players. This is a similar scenario as explained with the boosted accounts above, with the difference being that these beginners were often genuinely not aware of their situation and the impact they had on the balance of the match. This often occurred in the early days of multiplayer games when there was no rank matchmaking system to take care of the player expertise balance and players would just join a game from a server list without having any reference for the expertise level of the players within that match. Without a matchmaking system in place, players would also often end up on a server labeled with tags that indicated the server being at approximately their skill level but encounter players much higher or lower in skill than them.

Another challenge that comes up with balancing player expertise is when a more experienced player wants to introduce a friend to the game. The usual ways the matchmaking system tries to compensate for this expertise difference is to synchronize different ranks on both teams to try to balance the match, often failing to do so when the game contains specialized character roles that cannot be changed during the match. For example, in a MOBA game like *Dota 2*, the carry role (a character that is supposed to use the most resources to push the team to victory) has more weight to it than other roles and when the new player goes into the match as a carry against a more experienced carry, the match will be highly imbalanced with no way for the rest of the team to compensate for the shortcomings of the new player. Higher ranked players who want to introduce a new player into a game will often resort to making a smurf account in hopes of getting more balanced matchmaking for the new player.

All these scenarios are especially noticeable when game mechanics offer the kind of depth and complexity that hold the potential for players to invest thousands of hours to become better at the game. In these kinds of games, there is usually a distinct difference in performance between players who invest a large amount of time into the game and those who do not.

Cheating: A player can cheat by using different methods to alter game mechanics to gain an advantage over opponents and the initial gameplay balance. Certain cheats, like “aim bots” (auto aiming on targets) or “wall hacks” (seeing the player bounding boxes through walls) disrupt the gameplay experience by giving the cheating player an unnatural advantage.

Various game hacks are generally against the rules of the game and will get the player banned if they get caught. Boosting and smurfing are considered cheating in a lot of games that rely on a rank matchmaking system for balancing the game.

Griefing: Griefing is an intentional behavior of players who exploit game mechanics or communication methods to harass other players. Griefing can be a player trolling to provoke other players for their own amusement, or a player being disruptive in the game out of spite and a mean attitude.

"Intentional harassment of other players is called "griefing," which utilizes aspects of the game structure or physics in unintended ways to cause distress for other players."¹⁷

Griefing methods are different for each game, depending on the corresponding game mechanics. For example a griefer could troll by purposefully positioning their character to block the movement of someone else's character. Another way a player could grief their team is by purposefully exposing themselves to the enemy team as an easy target to make their own team lose points (feeding) out of spite. The actions done by a griefer do not break the rules of the game system and will therefore rarely get them banned in a game, but they are still harmful to their team members' performance.

3.1.3 Anonymity as a Shield for Consequences

Anonymity in games can make certain behavioral differences in players compared to how they would normally act in the real world:

"Computer Mediated Communication users can exercise aggression against other real humans, with little risk of being identified or held accountable for their actions."¹⁸

17 Warner, Dorothy; Raiter, Mike, 2005, *Social Context in Massively-Multiplayer Online Games (MMOGs): Ethical Questions in Shared Space*, p.47

18 Hardaker, Claire, 2010, *Trolling in asynchronous computer-mediated communication: From user discussions to academic definitions* p.25

The “magic-circle”¹⁹ a boundary between the real world and a space that holds special rules, such as a virtual game world. Steinkuehler and Williams see this magic circle as a possible safe haven which allows players to behave in certain ways without suffering any of the severe consequences that would occur in the real world:

“In online worlds, interaction is mediated by the virtual avatars of the individuals who inhabit them. These avatars bear no discernable relationship to one’s offline identity, unless one chooses to render one’s own character so identifiable, for example, by using one’s given name instead of a pseudonym (a rare practice) or sharing personal information about one’s offline personae with others within the game. This anonymity provides a safe haven beyond the reach of work and home that allows individuals to engage with others socially without entangling obligations and repercussions; it is the so-called “magic circle” of the game (Huizinga, 1949)”²⁰

For example, some gaming accounts allow players to change their name, if that is not possible they create a new account or buy a boosted account to clear their reputation without facing any consequences.

3.1.4 Individual Value of Time

Each player values the amount of time they spend on a match differently. For some players, especially those who have a limited amount of time dedicated for gaming, putting one hour of effort into a multiplayer match is very time intensive, while other players see one hour as a small part of a regular day filled with many hours of gaming.

Whatever the time spent on a multiplayer match may be, whenever it is filled with bad experiences, the player who perceives the used up time as more valuable tends to react more sensitively about it. This reaction can manifest as pushy or even aggressive communication with other players, which can evolve into a toxic environment within the game.

19 Huizinga, 1955, *Homo Ludens: A Study of the Play-Element in Culture*, p.10

20 Steinkuehler, Williams, 2006, *Where Everybody Knows Your (Screen) Name: Online Games as “Third Places”*, p.7

3.1.5 Social Loafing

As described by Karau and Williams, social loafing is the decrease of a sense of responsibility and effort put into a subject when an individual works in a group:

“Social loafing is the tendency for individuals to expend less effort [and be less motivated] when working collectively than when working individually. [...] Social loafing occurs because individuals expect their effort to be less likely to lead to valued outcomes. [...] Individuals are more likely to engage in social loafing when their individual outputs cannot be evaluated collectively, when working on tasks that are perceived as low in meaningfulness or personal involvement, when a group-level comparison standard is not available, when working with strangers, when they expect their co-workers to perform well, and when their inputs to the collective outcome are redundant with those of other group members.”²¹

Social loafing in multiplayer games is connected to the player’s awareness of the actions of team members in the group, as well as their awareness of their own impact in the group. Less awareness leads to more social loafing. Things like group size, game complexity, player perspective, UI elements, game feedback, and in-game communication tools affect the player’s ability to keep track of their team members as well as their own progress and contribution in the game. Groups with a relatively large amount of players, limited player perspective, and minimal UI feedback about team members, are more likely to host social loafers because they are less likely to be revealed and pointed out by other players. In addition, within a large group and without the game’s UI giving direct measurements and feedback about their own performance compared to the team, a player is less likely to feel the impact of their own actions, which can reduce their sense of responsibility to contribute the most they can to the match, increasing the likelihood of social loafing occurring.

In relatively smaller groups social loafing can still occur, but is usually quickly detected and met with harsh criticism from the rest of the team. Social loafing itself is already a negative behavior, but it can also lead to more instances of negative behavior, depending how an exposed social loafer and the team they’re in respond to the situation.

²¹ Karau, Williams, 1993, *Social Loafing: A Meta-Analytic Review and Theoretical Integration* p.1, 20

3.1.6 Egocentrism

An egocentric individual has little to no regard for interests, beliefs, or attitudes other than their own. They view themselves as the center of all things.²² Egocentric individuals have a hard time taking on other people's perspective and inferring what the other person is thinking, feeling, or seeing²³.

Egocentrism becomes more of a problem in online games where people look at one another through in-game avatars and do not have direct contact with the player on the other side to be able to read their facial expressions, tone of voice, emotions, body language, and other important social cues that normally play a role in recognizing another person's situation.

Players who play alone with anonymous strangers online can only focus on their own experiences and perceptions and have no point of reference for what the people they're playing with are like, making it harder for them to be empathetic and understanding of the other player's situation. This can lead to egocentric thinking and behavior in the players, even if they are normally not egocentric individuals. For example, when strangers play together and are not all connected with VoIP for immediate feedback, they will often lash out on one another for not using certain skills or moves to help out, even though the suggested moves might not have been possible because the players may have been out of range, out of mana, the skills were on cooldown, or that they were focusing on something else at that moment. Egocentric tendencies fuel a player's lack of awareness by hindering their ability to see the situation from the other player's perspective, and then, a lack of awareness fuels egocentrism by making the player think their teammates are incompetent in comparison to themselves.

Egocentric players will also hold themselves and their strategy in higher regard than their team's suggestions and will often respond negatively if things don't go their way. For example, in MOBA games, if more than one player wants to play in the middle lane position (mid), they will often roll for a randomly generated number in the game's chat. If an egocentric player

²² Dictionary.com, *Egocentricism*,

URL: <https://www.dictionary.com/browse/egocentrism>

URL Time Date: 6th of March 2020

²³ Anderman, *Psychology of Classroom Learning*, p.355

loses the roll and doesn't get their way, they will criticize every mistake the mid player makes, complain in chat that the game is lost because they should have played mid instead of the other player, or even go as far as sabotage the game by giving the enemy points and resources on purpose (feeding) - this behavior is so prevalent in MOBA games that the phrase "mid or feed" is widely understood by players.

3.1.7 Insufficient Intrinsic Motivation

Intrinsic motivation is a person's internal interest in performing a task or behaving a certain way. The person is inherently interested in the task and does not require any external pressures or rewards to feel motivated to do it. Extrinsic motivation is the opposite – the person has to be motivated by an external reward in order to perform the task or act a certain way, otherwise the person will have no interest in it.

Voluntarily participating in communication, putting effort into being aware of the surroundings, and participating in any other team-oriented action that is not explicitly rewarded or punished directly by the game requires intrinsic motivation.

Many team-based multiplayer games highly support the idea of communicating, synergizing, and bonding with team members to play more effectively. However, for certain players, these ideas hold no significant intrinsic value. For example, a player might be solely interested in the extrinsic rewards a game offers, such as ranking up and unlocking new characters, and have no interest in interacting with other players through VoIP or being responsive to their attempts at communication. They might not attribute good communication and a friendly atmosphere to their overall enjoyment of the match – as long as a match is won and an extrinsic reward is gained through the victory, they don't care if the team was friendly or toxic. Likewise, they might give no regard to a fun and friendly team if the match results in a loss and no extrinsic reward is given by the game.

Helpful and friendly communication and coordinating with the team can be difficult for players who heavily rely on extrinsic motivation to guide their actions within a game, since games rarely explicitly reward players for engaging in communication and in coordinating efficiently with their team. The connection between the extrinsic rewards of potentially winning more matches

and ranking up quicker, and the contribution of efficient communication and good teamwork in achieving these rewards has to be noticed by the player. Without intrinsic motivation prompting these helpful behaviors, the player has to see these interactions as beneficial to them within the game in order to attempt to adjust their behavior to facilitate them.

Another issue players might experience is the decrease of enjoyment for a particular game over time. One reason for this might be the player's own mental health and attitude towards the game. Some players initially play a game because they found it intrinsically rewarding and enjoyable, or because it provided stress relief in the moment, but over time the game lost appeal to them. The players then continue to play the game out of habit, even if they no longer enjoy the game. Some players also experience external pressures to keep playing a particular game – E-Sport contracts, streamers, content creators, friends who want to keep playing, etc. Gameplay becomes stale and frustrating and the player then loses the intrinsic motivation that helped them avoid negative behaviors in the past.

3.1.8 Chaos & Disorganization

Both chaos and disorganization can lead to the suppression of the team's expertise potential. Chaos can lead to disorder and confusion. For example, beginner players who join a multiplayer match of a complex game without learning the game through a tutorial can experience confusion, because they are not able to follow and understand certain game events and therefore become more of an obstacle than a help for the team members.

Another example is unclear or distracting communication. Whether the communication method is VoIP, text chat, or a pinging system, as soon as these communication methods are abused (e.g. spamming), poorly timed, confusing, or misleading to other team members through being distorted in quality or by a language barrier, they contribute to the development of chaos.

Disorganization is caused by a poor gaming environment, which includes anything that makes it hard to focus and perform. This could be a loud or uncomfortable environment, bad equipment such as a faulty mouse that doesn't properly register clicks, a broken microphone, insufficient hardware that decreases the frame rates, or an unstable Internet connection,

that causes bad timing and a lack of a comprehensive view over the course of the match. One player's disorganized gaming environment can affect the entire team. In the end, a player's inability to perform at their full potential and the impact of the obstacles that player is experiencing depends on how interdependent the players within the team are.

3.2 Conclusion

Negative behaviors affect players not just actively in the moment they occur, but also passively by providing negative models of how to behave in a game and what behavior is expected and acceptable within a particular game. Players who are affected by negative behavior can also lash out in frustration as a response, repeating and learning the bad behavior, and further fuelling the cycle.

Many multiplayer games offer features to report players in order to prevent most cases of negative behavior, such as social loafing, griefing, smurfing and toxicity in general. It is likely not possible to "cure" all these negative behaviors with game mechanics, but as a game designer it is important be aware of these potential behaviors in order to try to at least reduce the instances of them occurring within games.

4. Player Requirements for Collaboration in Online Games

This chapter discusses the different attributes that the players themselves must possess in order to successfully collaborate with one another. These characteristics must be present within the players and cannot be fully enabled in them by game mechanics alone. However, certain game mechanics can encourage these attributes to appear in the players.

4.1 Basic Understanding of the Game

Without a basic understanding of how the game works, it is impossible for one or more players to successfully collaborate. This means that the game needs to be designed to be approachable and understandable by most of the intended player target group. The game needs to make it possible for the players to learn it by themselves or, if the game mechanics are too complex, from a tutorial.

Many complex games make it very challenging for new players to start playing the game. This is especially noticeable in fast-paced MOBAs where there is no slow character progression that allows the player to slowly get used to new abilities and items as they unlock over time with each level. Instead, new players get thrown right into the action of the game and face a huge variety of items, a large hero pool, complex hero abilities, a complicated UI, and get frustrated by all the micro mechanics that exist in the game but are not immediately obvious to someone just beginning to play the game. New players lose matches and have no idea what they did wrong or what they did right, and get put down by teammates who are more experienced and take their knowledge of the game for granted.

This lack of shared and common knowledge among players could be avoided by more in-depth tutorials in games, better tooltips, structured example matches with bots, and a slower introduction to the game. For example, a complex MOBA could cut down the available game mechanics (e.g. amount of items, number of heroes) in a new player's first few matches to help them get into the game without getting overwhelmed, and unlock more mechanics as the player gets more experienced.

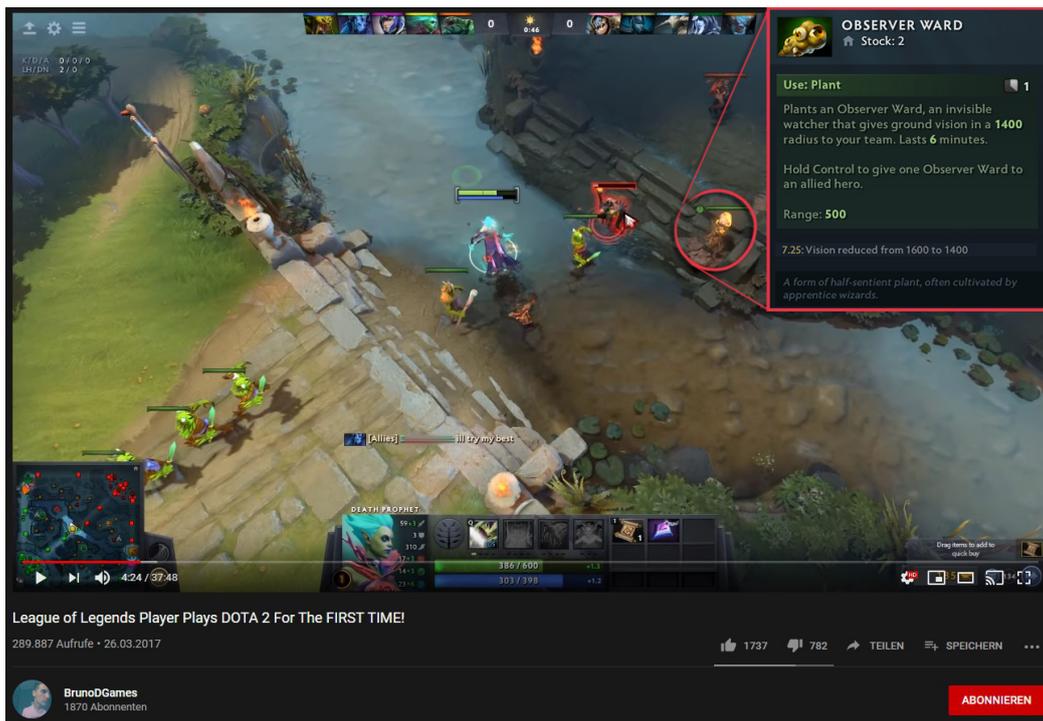


Fig. 5: YouTube Channel *BrunoDGames*, 2017, “*League of Legends Player Plays Dota 2 For The FIRST TIME!*”

For example, in Fig. 5 a player who already has experience in the MOBA genre is unaware of the unique mechanics of the MOBA game *Dota 2*, where the fog of war and vision function in a direct relationship with what the game defines as high or low ground relative to the player’s position. The observer ward item the player placed is described as a vision giving item with a certain range, but lacks a tooltip that would let the player know that it is affected by the concept of high and low ground and obstructions such as trees.

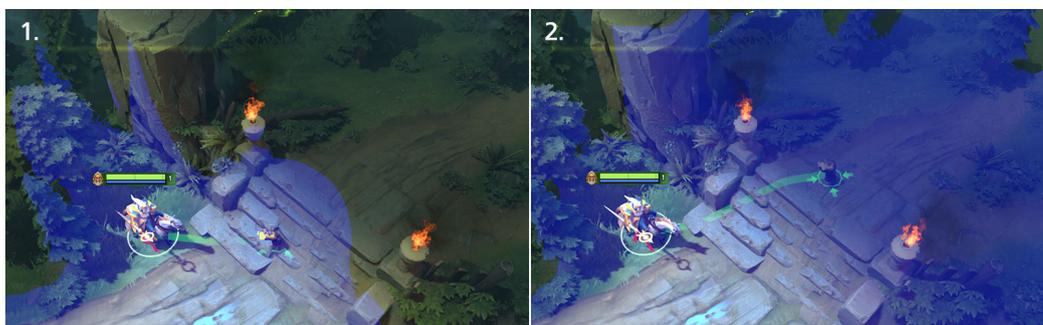


Fig. 6: *Dota 2*, Item: *Observer Ward* - Blue Overlay Guideline on Low (1) and High (2) Ground and relationship with trees.

As can be seen in Fig. 6, even though the item’s description doesn’t mention it, the item does

have a guiding blue overlay that serves as a preview to let the player know how the field of vision changes depending on the placement. However, properly analyzing the item and its context-based behavior takes time, and in this game, the new player was able to jump right into a fast-paced public match without the game forcing him to learn the basics first.

4.2 Building Consensus and Sharing the Same Goal

Without a shared goal, players won't be able to find their initial motivation to work with each other. A shared goal, whether short-term or long-term, brings players together to collaborate. In order to agree on a shared goal, a group needs to build consensus about prioritizing a given problem, agree on a suggested solution, and the execution time of this solution.

For example a player calls out to the group that a specific opponent became highly dangerous over the course of a match. The group agrees on this issue as well as on trying to focus the damage output on this specific opponent as a group. Game mechanics can facilitate this attempt at collaboration by giving the players good communication tools to use and assuring that goals within the game are clear and understood. For example, as seen in Fig. 7, in *Dota 2* a player can easily and quickly alert team members of the enemy's items, level, and their desire to come attack that enemy at a specific location. By using the context sensitive pinging system it is easier to quickly get a message across to the team and to make collaborative decisions based on the given information.



Fig. 7: *Dota 2*, Alerting team members with context sensitive pinging.

However, for the team to follow through and collaborate with the pinged initiation, they need to understand the game and why it is important to pursue that specific goal. All the members of the team need to put in individual effort and time in order to understand the objectives and requirements in the game to be able to share goals in the first place.

Some games make their goals unclear and leave it up to the players to decide what they want to achieve, which can lead to conflict and disorganization as the players' goals don't align. For example, if one player sees capturing bases as fast as possible as the main objective of the game, then their primary goal will be capturing the bases. Meanwhile another player's goals might be getting the most kills possible and they treat capturing the bases as a secondary goal and play the game in a more risky way that bothers the other player. Ultimately it is up to the individual players whether or not they care about and put value into the same goals and objectives or what it is they desire to get out of a game, however, if the game doesn't have a clear goal in place, players might struggle to reach a consensus on what tactics they should employ and what goals to compromise on.

4.3 Awareness, Motivation and Responsiveness

Motivation and awareness are interconnected. In order for a player to be motivated to collaborate with other players, they have to be aware of potential collaborative scenarios, and feel that they are valuable parts of their gaming experience. However, being aware and responsive in a situation within a game requires the motivation to pay attention and properly learn the game in the first place. If players are aware and motivated to communicate and be responsive to one another and turn a potential collaborative scenario into a successful one, they will perform all necessary actions that are within their capability range and make the most out of what the game has to offer.

This section focuses on group awareness, which is an ability that helps people see potential collaborative scenarios. Teams in team-based multiplayer games consist of player groups with two or more players, therefore it is necessary to address the players' awareness of the group. This is especially important in games with a high interdependency rate among the group members.

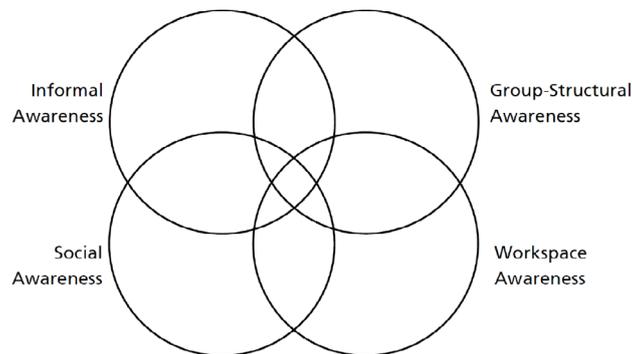


Fig. 8: Gutwin, 1996, *Workspace Awareness in Real-Time Distributed Groupware: Framework, Widgets, and Evaluation* p.6

Group awareness consists of different kinds of knowledge within a collaborative environment. These awareness types are intersected during group work as presented in the Venn diagram (Fig. 8). According to Gutwin and Röcker, group awareness is a combination of the following attributes:

Informal Awareness:

*"Most authors define informal awareness as a general sense of the presence, availability, and activities of others in a shared environment."*²⁴ Applied to multiplayer games, informal awareness could be a player's awareness about which player is dead or alive (*availability*), or nearby a player's character being in range (*presence*), and what they are currently doing (*activities*). This is also the players ability to recognize each others characters as a player controlled characters rather than bots. A well-made and easy to read user interface can greatly aid in the informal awareness of players within a team. Recognizable and unique visual and auditory feedback that signal certain actions within the game, like a special effect for a team member dying versus an enemy dying, can also help foster informal awareness.

Group-Structural Awareness:

*"Group-structural awareness involves knowledge about things such as people's roles and responsibilities, their positions on an issue, their status, and group processes."*²⁴

²⁴ Carsten Röcker, 2012, *Informal Communication and Awareness in Virtual Teams*, p.4

Within games, group-structural awareness is a player's knowledge of which players have which specific roles and what special tasks need to be performed in accordance to the team composition (*people's roles and responsibilities*), the team's attitude and mindset about the current objective or shared sub-goals (*positions on an issue*), the opportunities the team members have in the moment (*status*) and their tactical approach to the objective as a part of the team (*group processes*).

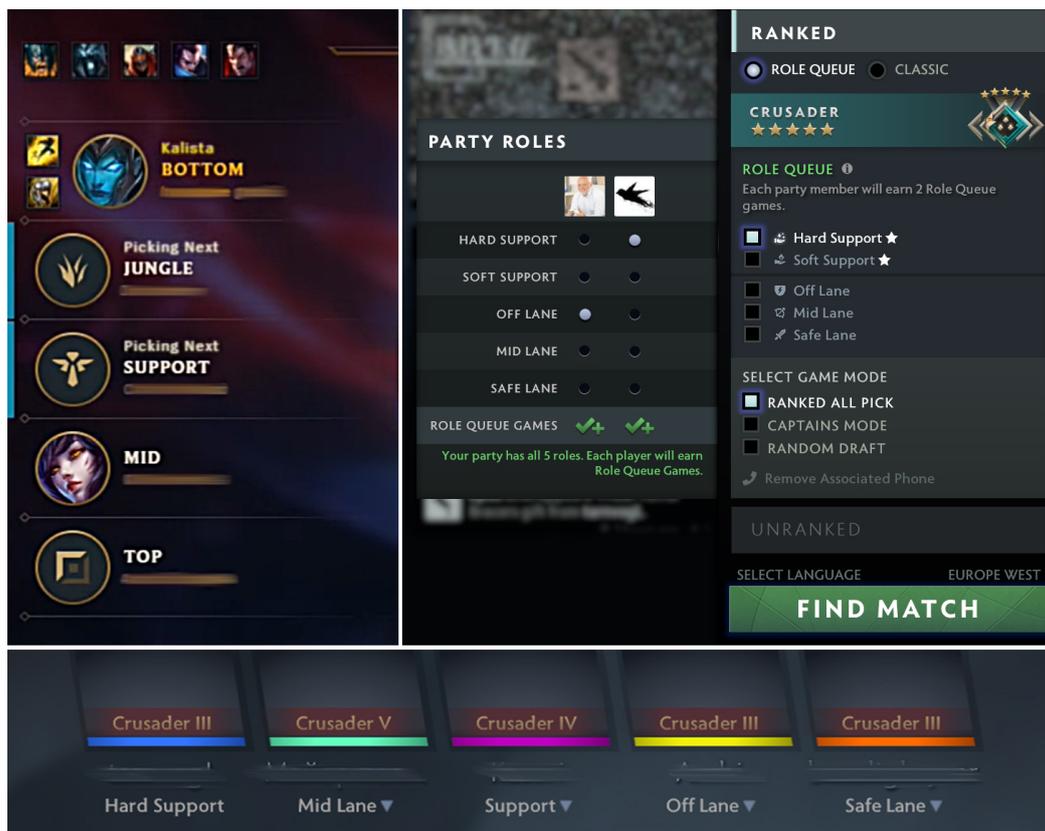


Fig. 9: Players select their desired role in the matchmaking process. *League of Legends* (left), *Dota 2* with the role assignment before finding a match (right) and the role assignment after the matchmaking (bottom).

Clear and distinct role assignment within a game can help build group-structural awareness. For example, allowing the players to select their desired role in the matchmaking process (Fig.9), having an assigned captain to distribute roles, or the game having innate roles built into the player's character (tank, healer, etc.) can all help reduce role confusion. Players need to be able to understand each role and be able to recognize through the UI or other visuals which player fills what role and what their status and position are.

Social Awareness:

“Social awareness is the knowledge about the status and activities of the other people in the surroundings. It includes information like whether another person is paying attention, their emotional state, or their level of interest.”²⁵

Social awareness focuses on recognizing the level of awareness of other team members (*paying attention*), the team’s current condition and how they handle certain issues emotionally (*emotional state*), and their level of engagement in performing collaborative actions (*level of interest*). Social awareness can be tricky to achieve through game mechanics as it is up to the players to express themselves emotionally. Generally, any communication tool that allows for the expression of mood and emotions can help. For example, engaging emoticons, unique character animations that can be used to convey a mood, a good VoIP system, ability to display a note or status message on their profile, can help players be aware of their team’s emotional state. A confirmation system, such as a ready check, or a message reply system (for example, being able to ping a response to a specific message, confirm/decline a suggestion), can help players detect whether team members are paying attention and if they are sufficiently engaged in the game. Some games choose to give the players feedback when a team member has been inactive for too long.



Fig. 10: Ready Check of *Dota 2* (left) and *World of Warcraft* (right).

An example of an already integrated ready check can be seen in *Dota 2* and *World of Warcraft*. The ready check in *Dota 2* can be started by a player before searching a match for the group. The random dungeon finder matchmaking system in *World of Warcraft* automatically asks all players if they are ready to get matched with other players for a dungeon as soon as the matchmaking system has found all required roles (tank, healer, and three damage dealers).

²⁵ Carsten Röcker, 2012, *Informal Communication and Awareness in Virtual Teams*, p.4

Workspace Awareness:

“Workspace awareness involves knowledge about how others interact with a shared workspace and includes information about the other participants’ locations, their present and past actions, and their intentions and possible future actions. In this context, the term workspace denotes a system designed to support collaborative work, rather than the physical location or workplace where that system is used.”²⁶

In multiplayer games, this can be understood as the player’s awareness of how other players interact with the game world (*interacting with a shared workspace*), for example, a player being aware of the different abilities the team member’s hero has and how these abilities alter their shared game environment.

This is also the player’s knowledge of the team members’ current positioning (*participants’ locations*), the performed actions within the team, for example, the use of certain abilities that are now unavailable for a specific time period (*present and past actions*), and the opportunities that follow these performed actions that require an adjustment of strategy (*intentions and possible future actions*). It is also the player’s ability to estimate another player’s expertise to be able to better predict that player’s possible actions and the level of interaction and engagement that player will have in the shared game world.

To help with workspace awareness, game mechanics need to make predicting player behavior within a team easier. This can be done through giving team members the mechanics that enable them to share their status quickly and efficiently - for example, to let the team know when a certain item or hero level has been acquired, being able to ping their health and mana status and other vital information.

26 Carsten Röcker, 2012, *Informal Communication and Awareness in Virtual Teams*, p.4



Fig. 11: *Dota 2*, Sharing the status of available abilities, items, health and mana through pings to other team members.

Another essential way players can predict each other's actions is through understanding what expertise levels are involved in the team. A visible ranking system can help players guess what strategies their teammates and enemies will be capable of and what level of play to expect from each player. Integrated and game-specific friend lists also allow players to match themselves with players whose play style they are familiar with. Any other means to recognize players, such as by having consistent in-game names, player profiles, unique customization of hero appearance, being able to attach a tag/note to a player, can help players be more aware of who they are sharing their game with at the moment. For players to be aware how other players can interact with their shared game world, they must be familiar with the heroes and items their team members and enemies play with. A well made demo world within a game can greatly help with that by allowing players to test out heroes and items without having to play them in a public match if they don't want to. A demo world also allows players to learn how the different skills look and sound like and what effects they have on the game world, allies, and enemies, so they can later recognize them in the game, increasing their workspace awareness.

5. Attributes Conducive to Collaboration in Online Games

The chapter before listed requirements of player characteristics for successful collaboration. Yet, there are many other player characteristics which are not required, but still conducive to collaboration in online games. Each following sub-chapter explains why the listed attributes are not a necessary requirement for collaboration, but still beneficial when present.

5.1 Emotional Literacy

“Emotional Literacy is the ability to understand ourselves and other people, and in particular to be aware of, understand, and use information about the emotional states of ourselves and others with competence. It includes the ability to understand, express and manage our own emotions, and respond to the emotions of others, in ways that are helpful to ourselves and others.”²⁷

Social awareness (chapter 4) is more likely to happen when involved players are emotionally literate. Being able to recognize the emotions going on within the team can help players adjust their behavior and strategy to stay in control of the situation instead of letting emotions run the team into chaos. This applies to both negative and positive emotions as both can cause players to lose focus and start playing below their usual skill level. For example, having a team get too excited and overeager that they're going to win can cause them to underestimate the enemy team's ability to make a comeback, leading them to be more arrogant and careless in their play style.

Maintaining emotional composure and a friendly atmosphere are very important to keeping the team together. Many multiplayer games require a large number of people to coordinate with each other for an extensive amount of time in order to meet the objective. For example, certain 25 player raid groups in World of Warcraft require all the players to work together to complete the raid. If the raid is not going well and players make mistakes or if the players are inexperienced, the raid might end up taking a few hours to complete and can get repetitive, exhausting, and frustrating. Having emotionally literate players in the raid team can save

²⁷ Weare, 2003, *Developing the Emotionally Literate School*, p.2

the team from falling apart and quitting. These players will recognize growing tensions and will try to help the situation by calming others down, keeping the communication friendly, adding humor to the situation, and suggesting well-timed breaks. Emotionally literate players are also more likely to recognize which players on the team are emotionally draining to the team morale and suggest replacing them before they end up doing too much damage to the team. Emotionally literate players will recognize their own frustration and take steps to calm themselves down, will take a break from playing to not let their negative emotions ruin the game for other people, and will be quick to take preventative measures to stop themselves from getting frustrated in the first place (for example, by recognizing that toxic behavior in chat agitates them, and quickly muting/blocking toxic players before they have an impact on their mood). Emotionally literate players will also recognize what aspects of the game are the most enjoyable and rewarding for them, and will adjust their gameplay to reflect it, rather than forcing themselves to play more conventionally. For example, a player being aware that they have more fun playing quick and experimental turbo matches (a fast paced game mode) and playing those instead of the more popular ranked matches - this player will be in a better mood than the player who stubbornly insists on playing a certain game mode even though they don't enjoy it. Being aware of and understanding their own emotional state can help players regulate and adjust themselves when something in the game puts them on edge or when something is rewarding.

On the other hand, players with low emotional literacy tend to have the opposite impact on the team and themselves. These players don't recognize how their actions impact others. They don't think about other people's moods and emotions. They don't realize that if they start to behave in a toxic manner (chapter 3), that they will have a negative impact on the rest of the team and their overall performance. They also don't tune in to their own emotional experiences and admit to themselves when certain games, game modes, or people are frustrating to them. They don't allow themselves to play less popular games and game modes that might be more enjoyable to them because they're emotionally stuck to the status quo rather than what their actual preferences are. They don't recognize it when they are going into a game in a bad mood which makes every little mistake in the game agitating and will refuse to take a break from playing to prevent tilting.

Why is emotional literacy not a requirement?

Toxic teams are still able to perform collaborative actions within the game. Having the whole team be toxic prevents players from playing at their peak performance and is not enjoyable, but collaboration is still possible at a basic level (even though it is highly unlikely). If the players are motivated enough to win a match for egoistic reasons but completely disregard the enjoyment of the actual match, they can still collaborate just enough to meet the objectives of the game. This kind of forced collaboration is difficult and frustrating and will hinder the player's ability to perform their best, since they will be stuck trying to figure out how to collaborate within an antisocial team.

Having a team composed of emotionally literate players can greatly improve the quality of collaboration and boost the players' enjoyment of the game. It makes more difficult cooperative tasks possible as each player on the team is prepared to get along and to pay attention to others and regulates their own emotions to get through challenging tasks and inevitable mistakes. Unfortunately, there are not many ways game mechanics can improve emotional literacy in players. Emotional literacy is a life skill that has to be developed by the individual. Game mechanics can help encourage people to develop this skill is by allowing players to anonymously give behavioral feedback to one another after matches through some sort of report and praise system. Poorly behaved players can be reported for toxicity or communication abuse while friendly and fun teammates can be rated positively to encourage them. The game can provide the feedback others give, however, reflecting on their ratings and drawing helpful conclusions from them is still up to the individual player. Although implementing a robust report/praise system usually does lead to an improved community (discussed in chapter 7), there is no way to tell if the feedback from the behavior scores and report system caused the players to actually undergo a change of character. It is unclear if the players developed more emotional literacy, or if they're simply holding back toxic behavior to avoid the negative consequences that come with being rated poorly.

5.2 Helpful Communication, Interpersonal Trust, and Respect

Helpful communication in multiplayer games is considered to be a two way communication method for each member on the team. This is also known as interpersonal communication, which allows two or more players to exchange information. This exchange of information can

be communicated in different ways, which can involve VoIP, pings (chapter 6.2) and text chat. The communicating team member requires group awareness (chapter 4.3) in order to communicate helpful information. "Helpful" means that a player provides information that can benefit one or more team member to improve their current or upcoming situation within the game. Anything that does not fall under helpful communication is considered silence, any kind of negative behavior that involves communication, and distracting information. Helpful communication needs to be neutral or positive in tone to have the intended effect. Helpful information that is communicated in a negative or aggressive manner carries with it the risk of provoking fights and resentment within the team. A player who communicates useful information in a toxic manner also risks being muted and their messages not being delivered to their team.

One in-game example of helpful communication is a precise and direct description of the opponent players' current location, which can result in the survival of team members if they respond to this information accordingly by adjusting their positioning. Another example is the communication of a low health state of a certain player character to all team members. This can result in the cancellation of a planned initiation of a team fight, because the low health member is less likely to survive that fight. Helpful communication helps players coordinate and plan in a fast-paced manner. It raises the team's general awareness within the game and within the team. It helps the team focus better on their individual roles and their own performance and opportunities since each player is no longer forced to pay attention to everything going on in the game by themselves and can instead rely on updates from their team members. Certain scenarios in complex games require such intricate coordination that they are nearly impossible for a group of players to perform without efficient and helpful communication. In order to communicate in a positive manner, it is necessary for players to keep up a certain level of trust for one another. Interpersonal trust requires players to step away from trying to solve everything on their own and start trusting other players on their team to be responsible for certain tasks.

„Interpersonal trust is the confidence a person or group of people has in relying on another person or group. The degree to which a person can depend on others to do what they say they will.“²⁸

„Defined as the willingness of a party to be vulnerable to the actions of another based on assessments about the characteristics of the trustee such as ability, benevolence and integrity“²⁹

There are players who are not able to treat their team members respectfully or even trust them to do basic tasks, subsequently ordering around their team members which can result in frustration for everyone involved. On the other hand, when players trust that their team members are just as capable as they are, everyone will be free to perform their specific role within the game in peace and players will be able to focus. For example, if the carry can trust the support to do their job well, the carry can focus on farming, conquering objectives, and initiating team fights instead of being needlessly reluctant and cautious and trying to do both roles at the same time by buying their own support items and slowing down their own progress as a carry to compensate. One of the sources of trust in games is the reliability of the matchmaking system. If players believe that the ranks within the matchmaking system reliably reflect player ability, they are more likely to trust that their teammates are comparably capable and share their level of knowledge of the game.

A basic level of trust and respect can also make communication easier as players trust each other to be responsive. If players think their teammates are unreliable and untrustworthy and believe that they will not react unless they are yelled at or degraded, then they have no incentive to communicate in a helpful and respectful manner.

²⁸ N., Pam M.S. 2013, *Interpersonal Trust*

URL: <https://psychologydictionary.org/interpersonal-trust/>

URL Time Date: 29th of January 2020

²⁹ Paravastu, Ramanujan, Ratnasingam, *Role of Trust in E-commerce: A Comprehensive Model of Interpersonal and Technology Trust Construct*

URL: <https://www.igi-global.com/chapter/role-of-trust-in-ecommerce/149074>

URL Time Date: 29th of January 2020

Why are respect, helpful communication and interpersonal trust not a requirement?

In some instances players are able to blend out their emotions and focus on their tasks and objectives, no matter in which ways they are communicated. Sometimes players get involved in arguments that evolve into insulting verbal behavior and loss of trust, but still continue to collaborate within the game. A possible reason for this continuing collaboration is an extrinsic reward for winning the match, which has a higher priority for the player than getting along with their team members. Highly skilled players who have a very deep knowledge of the game being played can also perform with minimal, if any, communication. Their positioning and coordination in the game is based on good intuition and understanding the game to the point where player movements and actions become reliably predictable. A skilled player can perform well and collaborate despite not trusting the skill level of their team members. Their expertise lets them passively adjust their actions to any situation without the need for communication.

5.3 Group Identity and Sense of Ownership and Participation

“One insight from social identity theory is that the groups to which people belong mean something to them. Once a person sees themselves as a part of a group, they derive self-esteem from that group membership.”³⁰

„As an individual can potentially identify with many different groups, an important concept within Social Identity Theory is group saliency. When group membership is more salient to the individual, they will likely identify more strongly with that group [...] Building on social identity theory, we can further recommend that cooperative game mechanics should be designed with group identification in mind. Designs could maximize group saliency by emphasizing group identity. In-group identification can be enhanced by pitting the in-group against an outside force, such as a challenging system or another group.”³¹

Examples of in-group identities within games are factions like “Horde” and “Alliance” in games like World of Warcraft. These factions are contractive and players get incited towards a particular faction through the game’s lore and its PvP or PvE system. Being part of a general

³⁰ Chen, Xin Li, 2009, *Group Identity and Social Preferences*, p.432

³¹ Depping, Mandryk, 2017, *Cooperation and Interdependence: How Multiplayer Games Increase Social Closeness*, p.8-9

group, such as a faction, helps players feel more related to the members of the same group. If the players are sufficiently immersed into the group identity their faction offers, the faction's goals and ideals become a shared goal and a shared atmosphere for its members. This can give the players a feeling of purpose and participation, which can boost their motivation to collaborate and help others within their faction.

Another important aspect of group identity in games is the building of communities around specific games. The more involved players feel within a certain community, the more likely they are to care about the atmosphere within it. If players feel a sense of ownership and participation within the game and its respective community, they are more likely to contribute positively to it. For example, the World of Warcraft: Classic (2019) community put a lot of effort into recreating the same atmosphere the game had back when the original version of World of Warcraft was released in 2004. This resulted in a vibrant community of players who willingly help one another and care about maintaining a positive atmosphere within the game itself.

Players are more likely to moderate themselves and one another without the need for assistance from game mechanics, simply because they care about the health of the game's community and keeping the game alive and running even through its re-release.³²

The game mechanics in World of Warcraft also help build a healthier community by making contacting the game development team possible directly through the game. The developers are deeply involved in the game and it is possible to talk to them about another player's negative conduct. They will give the player feedback on how they handled the issue the player brought up to them. Since the players are responsible for submitting reports for bad behavior, seeing the results of their actions helps the players feel a sense of participation in maintaining the health of the community, and motivates them to keep active in reporting bad behavior.

32 Alex Avar, *World of Warcraft: Classic already has one of the nicest communities in gaming*

URL: <https://www.gamesradar.com/world-of-warcraft-classic-already-has-one-of-the-nicest-communities-in-gaming/>

URL Time Date: 2nd of May 2020

This can also be reversed. If players feel like the community around a particular game revolves around negative behavior and that their attempts at trying to report negative behavior get ignored by the game developers, they will likely give up on the game or will adapt their behavior to fit into the toxic atmosphere. The behavior of the community builds the player's expectations for what is acceptable behavior within the game.

There are many ways of helping foster a sense of ownership and participation for players. An involved and responsive game development team helps the game's community grow. Holding events for the players and making it possible for them to add and modify the content for the game strengthens the players' sense of involvement in the game. Allowing the creation of custom game modes, being open to players submitting custom character skin/appearance suggestions, allowing players to deeply customize and personalize their profile and in-game appearance, keeping an active forum for discussion of the game mechanics and balancing, being positively responsive to the player's concerns and reports, and holding tournaments and contests are all examples of how game developers can foster a sense of ownership and participation in the players and make them care more about maintaining a healthy community around their game.

Why are group identity and a sense of ownership and participation not a requirement?

In multiplayer games, there are players who do not care about their group identity and can tune out all the negative behavior going on around them and only focus on the pragmatic way of playing and performing well in their team in order to achieve their personal goals. These players have their own reasons for caring about teamwork and do not need other incentives or a sense of involvement in a community to perform well in teamwork scenarios. Group identity and a sense of ownership and participation can be helpful in maintaining a good community around a game and in encouraging teamwork and positive behavior within the factions that players identify with, but are not a requirement for collaboration in the first place.

5.4 Interdependency

As discussed in chapter 2.2, interdependency is a characteristic that makes players work together. If player characters are designed to be interdependent, players will be encouraged or even forced to help each other, depending on their level of interdependency.

A study by Depping and Mandryk examined how a combination of interdependent/independent game mechanics and cooperative/competitive game mechanics among two players affect their social closeness. Interdependency and independency are crucial characteristics for evaluating game mechanics in a multiplayer match:

“Interdependence is a term from psychological frameworks on social and group interactions and is commonly defined as the ‘degree to which group members must rely on one another to perform their task effectively. [...], Interdependence is likely to affect social bonds due to the increase in interaction and communication between the agents involved. Our ANOVA results support the idea that interdependence increases trust development between the players. Theory suggests that this relationship facilitation can be explained by the degree of interaction between the players during the game.” [...] “Cooperation can also induce tension and pressure; however, only when the game is also interdependent. When players’ actions do not affect each other (low interdependence), cooperating decreases the perceived tension.” [...] “Our findings support the notion that cooperating and being dependent on the other player are two separate mechanics that do not interact, but instead each provide their own influence on how players experience the game and each other. Our results indicate that both individual effects are additive, leaving the cooperation plus interdependence condition to be the most effective at facilitating social closeness [...] Interestingly the assumption that interdependence in competitive settings would diminish social closeness was not confirmed in our study. Our results suggest that even in competition, interdependence increases relatedness, enjoyment, and interpersonal trust.”³³

33 Depping, Mandryk, 2017, *Cooperation and Interdependence: How Multiplayer Games Increase Social Closeness*, p.7

Depping and Mandryk describe cooperation and interdependence as the most effective requirements to facilitate social closeness and interpersonal trust - which can be contributing factors to successful collaboration. The importance of facilitating the feeling of interdependency among players is also supported by a study about behaviors in a multiplayer game:

*"According to social interdependence theory, competition or cooperation arises when people experience interdependence in relation to their goals or tasks. People experience interdependence when a change in the state of one causes a change in the state of other(s). Thus, to design strong teamwork experiences in games, we need to look for game elements that increase the feeling of interdependence and direct teams towards bargaining or problem solving strategies."*³⁴

Why is interdependency not a requirement?

Observations can be made in games like World of Warcraft, where players group up in order to finish shared quests together much faster than by playing alone. These players are not necessarily dependent on each other - they would still be able to finish these quests on their own. The game does not demand collaboration for a winning scenario to happen, but players still choose to collaborate to play more efficiently or for the sake of company.

There are games that highly benefit from players collaborating and the character and skill design suggest interdependence, but true interdependence is not implemented. For example, games like *Dota 2* and *League of Legends* are best played when team members collaborate and act like they are interdependent, however, players not collaborating can still lead to a winning scenario. This makes interdependency as a requirement for collaboration situational within these games. Technically, each player in the team could work independently from one another and create a winning scenario without ever collaborating. Nonetheless, players choose to collaborate and act as if they are interdependent, for the sake of being efficient within the match, or for other personal reasons.

³⁴ Vegt, Visch, Vermeeren, Ridder, 2016, *Player Experiences and Behaviors in a Multiplayer Game: Designing Game Rules to Change Interdependent Behavior*, p.2

6. Interdependency as a Measurement for Collaborative Potential

For the measurement of interdependency, it is assumed, that the team members in each team-based multiplayer game can hold a certain scope of interdependence among one another, which is enabled and limited by the corresponding game mechanics. It is also assumed that all interactive mechanics among team members are cooperative and not competitive. If the game mechanics tend to be interdependent and cooperative, as explained by Depping and Mandryk (chapter 5.4), and the teamplay experience for that specific game tends to be rated positive, it is expected that this game holds certain game mechanics that successfully promote teamwork among players. The top nine most played games in the survey conducted for this thesis that were rated between good and perfect in Q3 (Fig.12) are examined to find out which of these games hold the highest interdependency level among team members.

Applied filter of respondents in Q3 that rated their teamplay **Good - Perfect** and **Bad - Horrifying**:
Q1: Please pick one of these team based multiplayer games that you play or have played on a regular basis and adjust your answers accordingly.

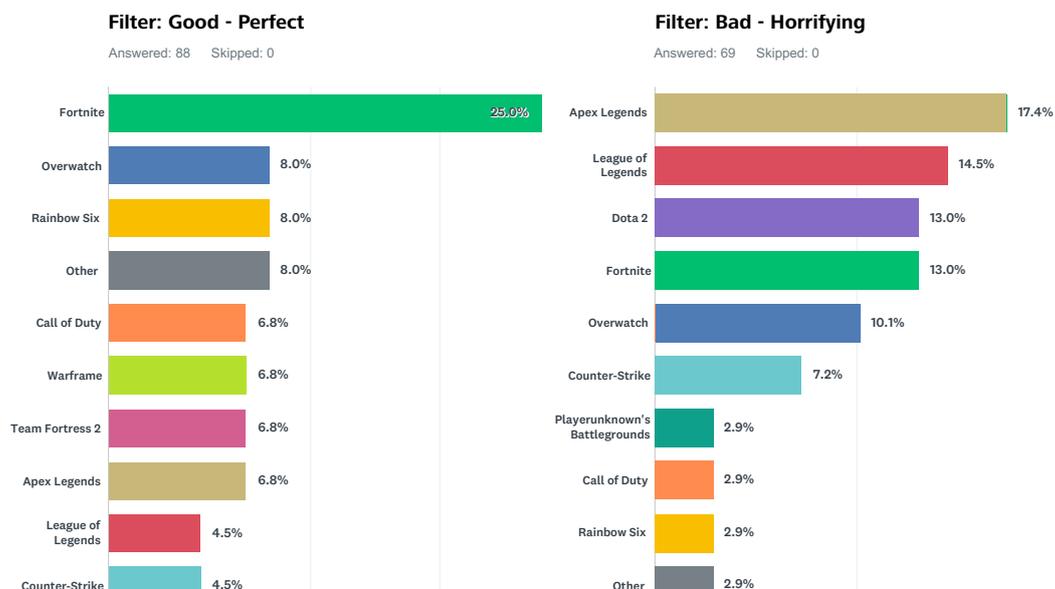


Fig. 12: Survey - Comparison of respondents in Q3 that rated their teamplay **Good - Perfect** and **Bad - Horrifying** - *Communication and Teamplay Experiences in Team Based Multiplayer Games*

6.1 Evaluation of the Interdependent Potential Among Team Members

Interdependency is measured by the extend of how one individual player can progress or reach goals within the game with or without the help of one or more team members. The table below (Fig. 13) measures interdependence through a list of prevalent multiplayer team mechanics that appear within the best rated games in the survey.

Prevalent Player Interdependent Team Mechanics	Fortnite	Apex Legends	League of Legends	Call of Duty: MW (2019)	Warframe	Team Fortress 2	Rainbow Six Siege	Overwatch	Counter-Strike:GO
A Table to Measure the Potential Interdependence Among Team Players									
All Responses for Positive Teampay (no "decent" rating)	71%	33.40%	28.50%	75%	100%	85.70%	77.80%	50%	44%
All Responses for Negative Teampay (no "decent" rating)	29%	66.60%	71.50%	25%	0%	14.30%	22.20%	50%	56%
Number of Total Responses	31	18	14	8	6	7	9	14	9
Positive Rating in Teampay Ratio yes/no	yes	no	no	yes	yes	yes	yes	-	no
Light Interdependent Team Mechanics (1pt) Mechanics that do not Require Team Players to Perform or to be Active									
Consistent Display of Team Status Ingame	1	1	1			1	1		1
Consistent Display of Minimap with Team Member Location	1	1	1	1	1				1
mandatory, meaningful, shared sub goals			1	1		1	1	1	
max. Team Size < 5	1	1			1				
max. Team Size < 10	1	1	1	1	1	1	1	1	1
Context Sensitive Ping System	1	1	1						
Exclusive Specialized Roles and Characters within the Team		1	1			1	1	1	
Heavy Interdependent Team Mechanics (2pt) Mechanics that Require Team Players to Perform or to be Active									
Sharing Loot/Items Ingame	2	2							2
Healing Team Members	2	2	2		2	2	2	2	
Reviving Team Members	2	2					2		
Buffing Team Members			2		2	2	2	2	
Ability Synergies among Team Members		2	2			2	2	2	
Protecting Team Members	2	2	2			2	2	2	2
Mechanics with Self Benefit (-1pt) Pick Ups or Active Mechanics that do not Require Team Players to Perform									
Self Healing	-1	-1	-1	-1	-1	-1	-1	-1	
Self Buffing	-1	-1	-1		-1	-1	-1	-1	
Self-Protection	-1	-1	-1		-1	-1	-1	-1	-1
Interdependency Score and Teampay Rating	10	13	11	2	4	8	11	7	5

Fig. 13: Prevalent Player Interdependent Team Mechanics - A Table to Measure the Potential Interdependence Among Team Players

Team mechanics are game mechanics that focus on the interaction between two or more team members. These team mechanics are categorized into light interdependent and heavy interdependent, depending on whether or not they need players to actively perform an action together or if they are passively present in the game to encourage teamwork. A third category, mechanics with self-benefit, is added to consider if there are any mechanics that downplay interdependence.

The games in the table in Fig.13 receive a rating of their potential for interdependence among team members through a point system, which adds or subtracts points based on whether or not certain mechanics are present within these games. One point is added for light interdependent team mechanics which do not require team members to perform an action together in order for the mechanic to be activated. Two points are added for heavy interdependent team mechanics, which require at least two team members to perform an action together. One point gets subtracted for each mechanic that is self-beneficial to the player. These mechanics are not collaborative and reduce the importance of one of the heavy interdependent team mechanics. For more reliable predictions, it is assumed that a group of players play these games rationally, with a similar expertise level among each other, and that they will not experience any kind of luck that would put them in an exceptionally advantageous condition.

The purpose of the table of prevalent player interdependent team mechanics (Fig. 13) is to find out which of these mechanics are shared between the highest scoring interdependent team-based multiplayer games. All games were examined with their latest version in May 2020. The three games with the highest interdependence score; *League of Legends*, *Rainbow Six: Siege* (both 11 points), and *Apex: Legends* (13 points), distinguish themselves in their genre - MOBA, tactical-shooter, and battle royale. This indicates that the choice of team-based multiplayer genre does not predetermine the level of interdependency, and respectively, the collaborative potential among players.

For this thesis, light interdependent team mechanics are seen as an origin for discretionary tasks (chapter 2), because the tasks evolving from light interdependent team mechanics hold too many different situational challenges and reactions from a group of players to assign every light interdependent team mechanic to an individual task type. Discretionary tasks do not require a

specific team dynamic, therefore the team members are free to choose whatever method for combining individual inputs they want, depending on the given situation. Light interdependent game mechanics make it easier for players to coordinate. Heavy interdependent team mechanics are always conjunctive task types since they always involve two or more players who need to finish the task together in order to complete heavy interdependent mechanics successfully. The table holds seven light, and six heavy interdependent team mechanics, corresponding to 7 discretionary tasks and 6 conjunctive tasks.

The following sections explain the different interdependent game mechanics from the table in Fig. 13 in detail. All shared interdependent team mechanics among the three highest scoring games in Fig. 13 will be evaluated in chapter 7.

6.2 Light Interdependent Team Mechanics

“Consistent Display of Team Status In-game”

The status of the team is a HUD (Head-up-Display) or UI element that consistently shows, without any interruptions, if each individual team member is alive or dead. In some games this status provides more information for each individual team member, such as their current health, mana, and which buffs or debuffs are active. This raises the team’s group awareness and gives the players the opportunity to adjust their strategy depending on the current status of their team members.

Example: A group of players find themselves in a fight with the enemy team. The members of this group notice that their health bars drain quickly through the high amount of damage the enemy team is dealing. Most of the group members therefore conclude that the fight will be lost if they try to continue fighting the enemy team and decide together to back up and retreat.

“Consistent Display of Minimap with Team Member Location”

“A minimap, also sometimes called a radar screen, displays a miniature version of the game world, or a portion of it, from a top-down perspective. The minimap shows an area larger than that shown by the main view, so the players can orient themselves with respect to the rest of the world.”³⁵

In most team-based multiplayer games team members are dependent on each other’s character positioning (or location) in the world. The consistent display of a minimap with the real-time location of all team members allows them to quickly observe their positioning and adjust their own positioning if necessary.

Example: A player sees on the minimap all other team members grouping up at a specific location, far away from them. This situation tells the player to be careful, since all other team members are too far away to be at their location in time if they get surprise attacked by the opponents. Therefore, the player moves closer to the group of team members to guarantee a safer positioning.

“Exclusive Specialized Roles and Characters within the Team”

Each team consists of distinctive player characters which cannot appear more than once within the same team. These characters or roles usually have their own unique abilities, some of which the team can benefit from.

Example: A common composition of such a team consists of a tank, a healer and a damage dealer. This team composition makes the players dependent on one another in order to solve tasks that require every player with their distinctive role contributing their part with their unique abilities.

In some cases and depending on the game, exclusive specialized roles and characters do not necessarily mean that every team member needs to succeed in their role in order for the team to accomplish a task. For example in *Dota 2* and *League of Legends*, the snowballing of certain character role progressions during a match creates an unnatural power spike relative to the team members and opponents power.

35 Adams, 2006, *Fundamentals of Game Design Third Edition*, p.284

“Mandatory, Meaningful, Shared Sub-goals”

Besides winning the match, games may assign mandatory sub-goals which are necessary to accomplish in order to progress towards winning a round. Mandatory, meaningful, shared sub-goals are tasks that need to be solved before players can progress to the main task, that guarantees the victory of a match. Shared sub-goals are usually designed to be accomplished as a team, rather than as individuals, but it's not completely impossible to achieve these goals alone. This encourages, but does not force, team members to be dependent on collaborating with each other.

Example: Common examples of such sub-goals are the destruction of towers in MOBA games or the preparation of defenses in *Rainbow Six: Siege*. Each of these tasks are different depending on the game and the current situation within it, which requires the team members to decide how to approach the problem.

“Max. Team Size < 5” and “Max. Team Size < 10”

Most team-based multiplayer games have teams with less than 10 players per team, sometimes less than 5 per team. The team size plays an important role in how much of an impact one individual player can have on the course of a match. The performance of each individual player in a team of three players, impacts the team members more than in a team of five. A simple example is the comparison of manpower, assumed all players in the team are equally powerful. If one player dies in a team of three, 33% manpower is lost. If a player dies in a team of five, only 20% of the original manpower is lost. Therefore players with a lower number of team members become more dependent on each other's individual performance. Depending on the amount of players, team composition, and tasks that need to be solved as a team, it is up to the players to determine what kind of approach is the most suitable for their situation.

Example: In a 10 vs 10 match, if three team members die, the remaining players are less likely to notice, react, and change strategy than in a 5 vs 5 match.

“Context Sensitive Ping System”

Ping systems are an essential communication tool to share information quickly within the team: *“The ping system is a tool that allows [players] to share specific types of information with [their team] with the push of a button. [...] Pings put down by both [the player and their team] will be visible on-screen. This will allow for a quick and clear exchange of information for the whole team.”*³⁶

“Context sensitive” in regard to a ping system means, that each ping can provide different information, depending on which location, item, or player has been targeted and pinged by the cursor of the player and that player’s intent. This specific immediate information gives the team members the opportunity to react or adjust their strategies accordingly.

Non-context sensitive pings only show a marker in the game world without any further descriptions of what has been marked and why. A pinging system is context sensitive as soon as there is a descriptive text or an auditive speech that provides more details about the marked location, object, or player. Since pings are usually useful for the team (as long as they are not spammed), players are dependent on one another to provide information to their team. Furthermore, ping systems can be a language-independent communication tool, because the ping system works though icons and numbers without text and auditive speech announcements, or the text and audio is automatically translated into the corresponding language of the receiving player’s game.

Example 1) Most RTS, MOBA and tactical-shooter games provide a basic ping system that can tell other team members “attack now,” “go back,” or which position the player’s character or troops are currently moving to. This kind of communication is necessary to synchronize an initiation into a fight, retreat from a dangerous situation or to meet up at a certain position in the game world. For these synchronized actions to succeed, all players need to be aware of the pings being put out and respond accordingly.

Example 2) Another example is the averaging of the location of an opponents’ current position. Most ping systems allow each player to mark any possible individual location

36 GameWith, 2018, *How To Use The Ping System - Guide & Summary*,

URL: <https://gamewith.net/apex-legends/article/show/783>

URL Time Date: 17th of January 2020

of an enemy in the game world or on the minimap. This mark is visible for all team members. If two or more team members mark such hints in different locations at the same time, the other team members can use these to estimate the location of this opponent.

6.3 Heavy Interdependent Team Mechanics

“Sharing Loot/Items In-game”

Some games encourage players to search for hidden items, chests, and other sorts of objects that can be stored in their inventory (loot). This can be extended by allowing the players to share this loot or items with each other, which then encourages interaction among team members. Both members involved in the sharing and trading of loot have to succeed in their temporary role as a giver and receiver of the corresponding item in order for the interaction to be considered successful.

Example: If a heavy weapon is found by a mage, but would be more useful on the warrior on the same team, the warrior is dependent on the mage to cooperate and interact by sharing this weapon with him. It is also required of the warrior to be aware of the mage’s intention to share in order to either accept the trade of the weapon, or, if the trade is processed automatically, to be aware of the weapon’s availability in his inventory.

“Healing Team Members”, “Reviving Team Members”, “Protecting Team Members” and “Buffing Team Members”

Healing (an ability to increase the health of oneself or of another team member), **reviving** (an ability that brings a dead team member back to life), **protecting** (an ability targeted on a team member that absorbs incoming enemy damage) and **buffing** (an ability that increases one or more character attributes of oneself or of another team member) are supportive character abilities that usually appear in games with “Exclusive Specialized Roles and Characters within the Team”, but not necessarily. It requires at least two players to perform one of these abilities, one player performing and one player receiving the effect of the ability. This makes the performing player dependent on the receiving player to be present, while the receiving

player is dependent on the awareness and willingness of the performing player to activate the corresponding ability.

Example: Certain character roles (e.g. supports) are able to perform one or more of these abilities, while other characters (e.g. carries) rely on these supports and their abilities to protect them. For example a carry with a low health status requires the healing ability of a support. The support needs to be aware of the low health status of the carry in need. Since most abilities have a maximum range in which the effect can be activated on another target, both players need to position themselves accordingly, so the supporting character is in range to activate the healing spell.

“Ability Synergies Among Team Members”

“Synergy occurs whenever the combined effect of two or more discrete systems is greater than the effect of these systems when they operate independently.”³⁷

An ability synergy is the combination of two or more abilities, resulting in a more beneficial output than if they would have been used independently. Depending on the game, these synergies go hand in hand to accomplish certain goals in an effective way. Teamwork-oriented multiplayer games design and distribute these abilities so that each player has the potential to time their abilities with another player in order to accomplish a goal, which either could not have been achieved alone or would take more time and resources without the ability synergy. For an ability synergy to be successfully executed, all involved players need to be aware of each other’s positioning, intent, and status, and coordinate the timing of their synergetic abilities.

Example: An example for an effective ability synergy among two team members is one player giving mana to a healer who in return heals the mana giving player. A more complex example would be the combination of a buff given by a support to a carry that prevents the carry from dying for a few seconds, regardless of the damage dealt to the carry. Meanwhile, the carry’s passive ability allows an increase in their damage output based on the health that the carry is missing. The more health the carry is missing, the more damage the carry deals. The support’s buff allows the carry to temporarily stay in a fight with low health without taking any further damage from incoming enemy attacks.

37 Forsyth, 2009, *Group Dynamics - Fifth Edition*, p.303

The ability synergy allows the carry to deal strong damage over a longer period of time. In both cases, all included team members need to be aware of all activated abilities and respond accordingly in order to successfully create a synergy.

6.4 Mechanics with Self-Benefit

“Self Healing”, “Self Buffing” and “Self Protection”

Mechanics with a self-benefit are considered features that can partly replace heavy interdependent team mechanics. For example items like consumables that can be picked up by anyone in a level or abilities that can be activated on a player’s own character in order to heal, buff, or protect themselves without requiring another team member to activate certain abilities. As soon as a game provides mechanics with such exclusive self-beneficial features, players can support themselves through these pickups or abilities and become less dependent on team members with supportive heavy interdependent abilities. The supportive impact of these pickups or abilities ultimately depends on the balancing of the game and therefore it varies how much they reduce the interdependency among team members.

6.5 The Contradiction of High Interdependence with Bad Teamplay Experience

The table in Fig. 13 shows that *Apex: Legends*, *League of Legends*, and *Rainbow Six: Siege* have the highest interdependency level among team members from all the examined games. However, the majority of the respondents to the survey who picked *Apex: Legends* and *League of Legends* rated these games with a bad teamplay experience (Fig. 12). This means that these games still hold a high potential for interdependence among team members and might contribute to positive teamplay scenarios when professional E-Sport teams or a group of friends play them, but seem to fail to contribute to positive teamplay experiences when it comes to matchmaking with random players.

The teamplay experience rating results of the survey seem to suggest that interdependent game mechanics alone are not enough to encourage teamwork. One of the differences between these three games is that *Apex: Legends* and *League of Legends* both have an average match duration of 30+ minutes of uninterrupted high-intensity gameplay, while *Rainbow Six: Siege* is composed of many short 3-4 minute burst rounds that reset the game and allows the teams a fresh start each time. A possible reason why the teamplay was rated so bad could be the

impact of the individual value of time on the players (Chapter 3.1.4). A long-lasting match time implies high investment for the player's time and effort, and the player knows they are stuck if the match goes poorly. Meanwhile, when a game offers the opportunity to get a fresh start with each short, low-investment round, the player is less likely to be aware of the overall time the game actually consumes.

League of Legends and *Apex: Legends* are also both free to play, while *Rainbow Six: Siege* needs to be bought once before players are able to play the game. Further studies could look into a comparison of free to play and pay to play gaming community behaviors. Another possible reason why *Rainbow Six: Siege* stands out could be the difference in the intended target groups and the ways these groups naturally approach collaboration.

There are also other multiplayer games that have a similar game design and mechanics as these three games, but were not rated in the survey as games with good teamplay experiences. For example, *League of Legends* and *Dota 2* are similar games, but *Dota 2* does not appear in the good-perfect teamplay experience bracket at all, even though it holds the same interdependent team mechanics that *League of Legends* does. This might be due to things like the mood and behavior of the corresponding game community, game complexity, or unbalanced execution of game features.

As a result, *Rainbow Six: Siege*, *Apex: Legends* and *League of Legends* are the best candidates for closer examination. All three games hold the highest interdependency score, but *Rainbow Six: Siege* stands out with a significantly higher positive teamplay rating (Fig. 13). The next chapter compares the team mechanics of *League of Legends* and *Apex: Legends* with those of *Rainbow Six: Siege*, to take a closer look at the similarities and differences in these games in order to better understand what could be causing the contrast in positive teamplay ratings.

7. Game Mechanics That Encourage Teamwork

It is important to know that the compositions of the following game mechanics are not meant to be the only way to encourage teamwork, because there are many ways to achieve that goal. These are simply examples of how the games with the highest interdependency rating handle the design of these mechanics. These design decisions are examined in this chapter to see how the requirements for collaboration discussed in this thesis are processed into game mechanics in these existing games. The game design differences and similarities among these three individual games are analyzed to get an idea of how they possibly affect the teamplay styles and teamplay ratings that result from these design decisions. This analysis leads back to the initial research question of how can game mechanics encourage teamwork among strangers in public matches in team-based multiplayer games?

7.1 Shared Interdependent Team Mechanics

The table “Prevalent Player Interdependent Multiplayer Mechanics” in Fig. 13, chapter 6, evaluated which games hold the highest potential for interdependence: *Apex: Legends*, a battle royale, *League of Legends*, a MOBA game, and *Rainbow Six: Siege*, a tactical-shooter. The following sections will examine the interdependent team mechanics that all three of these games have in common, and compare them to try and understand why *Rainbow Six: Siege* received a higher positive teamplay rating than the other two games, despite of all three scoring similarly in interdependence ratings.

7.1.1 Consistent Display of Team Status In-game and max. Team Size < 10

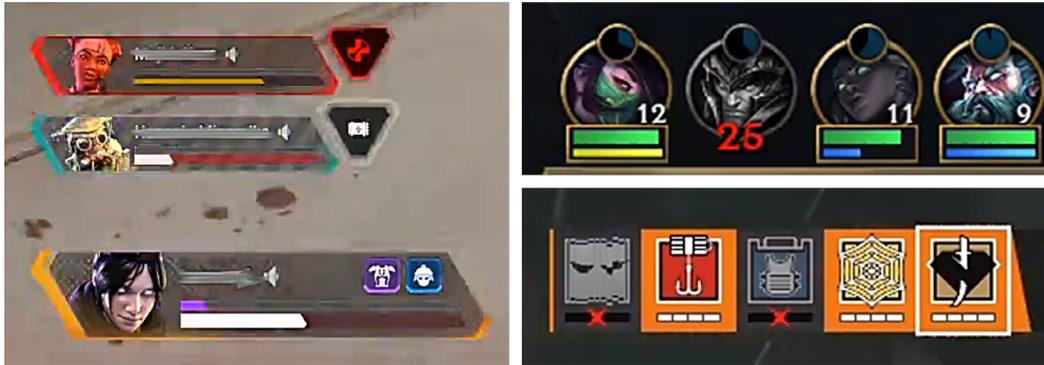


Fig. 14: Consistent Display of Team Status In-game, *League of Legends* (top-right), *Apex: Legends* (left), *Rainbow Six: Siege* (bottom-right)

Fig.14 shows the UI elements that consistently display the team status in-game, as well as the maximum player amount which are all below ten players per team. *Apex: Legends* holds three members per team, while *League of Legends* and *Rainbow Six: Siege* each hold five players per team.

Unlike the other two games, it is noticeable that *League of Legends* does not display the information of the player's own character next to the other team members' icons or portraits. In the overall UI within *League of Legends*, the team status icons are small, far away from the player's own status display, and in an unusual spot on the UI compared to other games.

The team UI elements are not as noticeable as in the other two games, and their scale and positioning on the screen give no visual emphasis about the team to the player. The team status UI elements in *League of Legends* are treated as a secondary, or even tertiary part of the overall UI within the game. *League of Legends* team status icons also do not display what role each player holds, but rather relies on the players to know enough about the game to be able to tell what roles these specific characters usually hold, or to remember which character was picked for what role during the initial drafting phase before the match.

All three games have a UI that shows a health indicator, a character portrait or icon, and whether a team member has been knocked out or died. Additionally, *League of Legends* shows the energy/mana bar and *Apex: Legends* displays a shield indicator for each team

member, as well as if the character is currently reviving another team member or if the corresponding character is performing a self healing/self-buffing ability.

There is no significant difference from the approach of *Rainbow Six: Siege* compared to the other two games, except that the team members are represented with a relatively abstract icon that corresponds to their unique role within the game, compared to the detailed and illustrated portraits of *League of Legends* and *Apex: Legends*.

7.1.2 Exclusive Specialized Roles and Characters within the Team

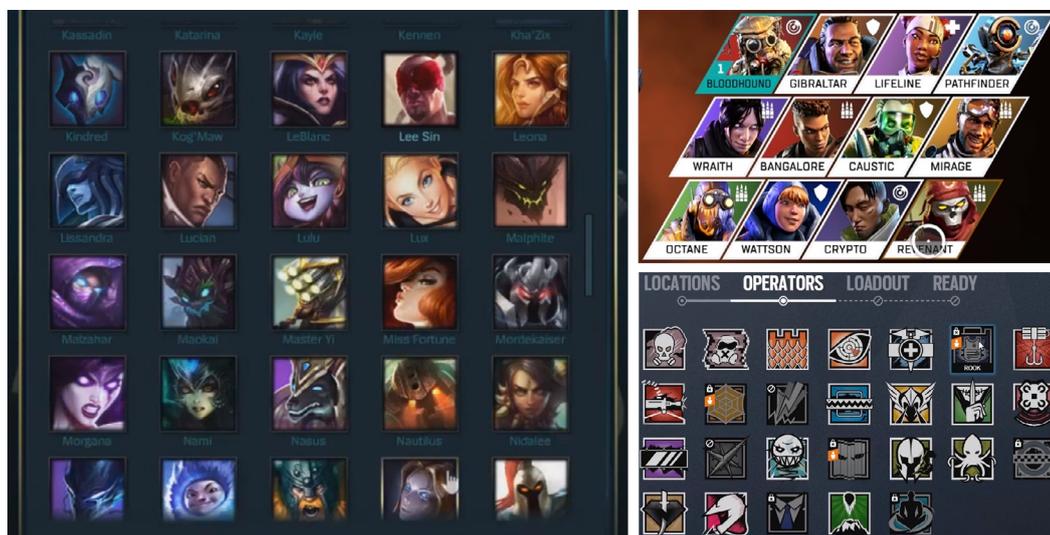


Fig. 15: Exclusive Specialized Roles and Characters within the Team *League of Legends* (left), *Apex: Legends* (top-right), *Rainbow Six: Siege* (bottom-right)

Fig. 15 presents the character selection screens, which all represent the exclusive specialized roles and characters the games offer. The UI for *League of Legends* only shows a small crop of the playable characters and they player needs to scroll through a small window to see more.

League of Legends has 148 playable characters, *Apex: Legends* 12, and *Rainbow Six: Siege* 54. In comparison to *League of Legends* and *Apex: Legends*, *Rainbow Six: Siege* stands out by representing each playable role with an abstract icon instead of a character portrait.

League of Legends and *Rainbow Six: Siege* allow only one unique character within a team and within a match, while *Apex: Legends* allows only unique characters within a team, but not

within the match itself. This means that it is possible to encounter an opposing team in *Apex: Legends* that holds the same character as the player's own character.

The number of available characters in *League of Legends* that can be played for free on a given day is always 15. These 15 free characters are chosen randomly by the system and rotate every 7 days. A character needs to be purchased in order to make it available at any given time. This is not optimal for the players who want to learn and train a specific character over a longer period of time for free. It also makes it more difficult for players to learn and familiarize themselves with all of the 148 characters. All players who do not purchase characters end up picking a character they either rarely play or one they haven't played before. This stands in contrast to players who actually purchase a character in order to invest more time in getting better at it. If these two kinds of players get matched with each other, their expectations for a certain expertise level in their played characters might clash and could cause conflict.

The playable characters in *Rainbow Six: Siege* are called *Operators*. Depending which one of the four versions of *Rainbow Six: Siege* have been bought, certain operators are already available to the player. Operators that are not available to the player can be bought individually with in-game currency. This in-game currency can be earned by playing the game or can be bought with real money. There is also the possibility to purchase a pack of Operators by buying a season pass which includes all operators that were assigned to that specific season pass.

In *League of Legends*, characters find their roles as a *ADC (Attack Damage Carry)*, *Top*, *Mid*, *Jungler*, and *Support*. Each character in *League of Legends* is assigned to a specific role during the drafting phase of the match. These roles focus on different tasks and priorities.

Apex: Legends offers free characters, but some characters can only be unlocked by spending an in-game currency which can be bought with real money or earned through gameplay. Each game assigns different kinds of roles to each of these characters. These characters can be broken down into different role categories: *Defender*, *Attacker*, *Medic* and *Tactician*. While certain characters only fulfill one specific role, other characters can blend between roles. For example, *Revenant*, focuses on stealth and assassination, which is a mix of *attacker* and *tactician*.

Rainbow Six: Siege assigns all characters to the roles of *Attacker* or *Defender*. These two main role categories split again into different sub-roles. Some of these sub-roles, such as *Support* or *Roamers*, are known to the tactical shooter scene. Partly due to the destructible environment in *Rainbow Six: Siege*, there are many other roles, which are rather new to the tactical shooter genre, such as *Breach Denial*, *Anti-Intel*, *Area Denial*, *Intel Gathering*, *Trappers*, *Dedicated Roamers*, *Support* and *Disruptors*.

All three games share the idea of holding roles that focus on dealing damage, protecting team members and healing team members. Every character in all three games holds special abilities that help them fulfill their role. Some abilities emphasize the priorities of a specific role better than others. In *Rainbow Six: Siege*, it is assumed that assigning every character to such specific roles emphasizes the focus on specific tasks that were specifically intended for this role. Therefore, the player has a better idea of what to focus on.

A good example of a game with unspecific role assignments is *Dota 2*. The game gives players in ranked matches the option to queue for the roles of *Support*, *Hard Support*, *Offlane*, *Midlane* and *Safelane*. The design of *Dota 2* characters and their progression system allows them to be played in nearly every kind of role, depending on how the player decides to develop the character over the course of the match. For example, a character with mainly supportive abilities can still progress into a character with high burst damage, depending what kind of items the player buys and equips. Depending on the equipped item, the character gains improved attributes and new abilities. This type of game design encourages the player to experiment with different characters and item combinations. However, this freedom and versatility also has a high chance of leading to chaos, since most of the item-character compositions are not viable solutions for defeating an opponent or for synergizing with other team members' abilities. Situations like this can result in players blaming and trying to command each other over what to focus on or how a player should play their character. Meanwhile with specific roles and character abilities, there is a lower chance for the player to do something wrong, which decreases the chance of players not focusing on their assigned tasks.

7.1.3 Healing Team Members

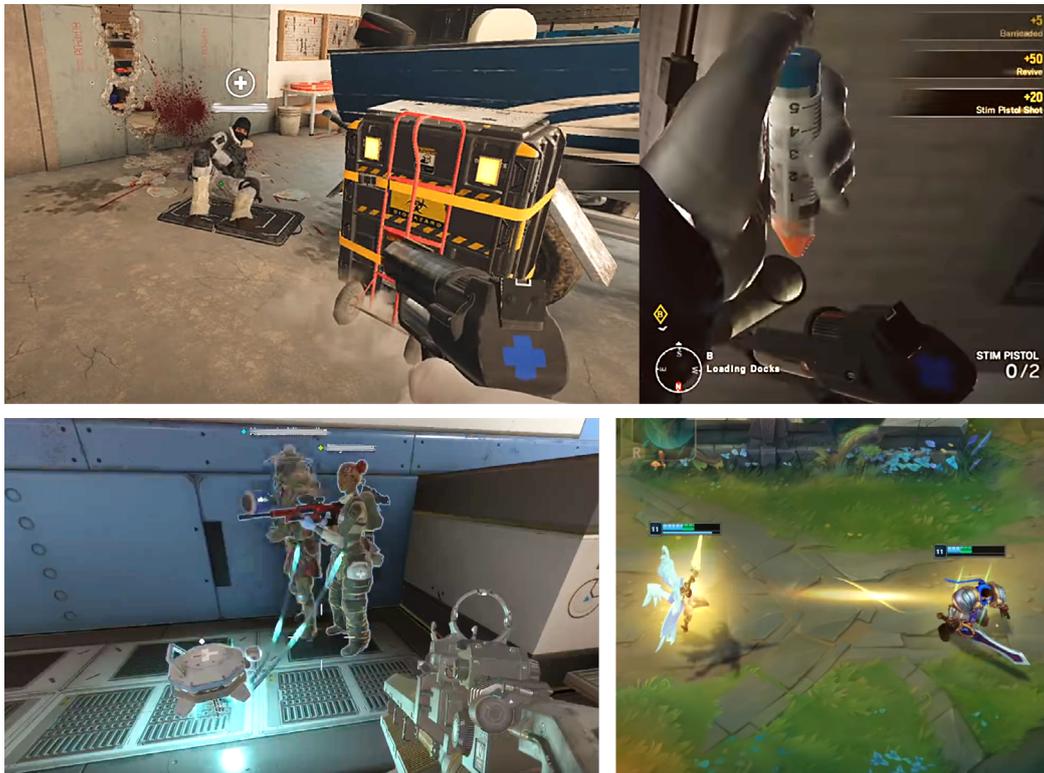


Fig. 16: *Rainbow Six: Siege*: Operator Doc shooting a stimulation pistol to heal or revive a team member, and then reloading the pistol (top). *Apex: Legends*: Lifeline's drone healing nearby team members (bottom left). *League of Legends*: The champion Kayle is able to heal another team member and herself (bottom right).

Another game mechanic these games have in common is the ability for a player to heal others within their team. Fig. 16 shows examples of in which ways players can heal their team members.

Rainbow Six: Siege has two healing operators to choose from, however their availability depends on which operators the player has unlocked or purchased. In *Rainbow Six: Siege*, the operators and their abilities are more specialized and specific than in the other two games – each operator gets one unique ability that defines them. It is reasonable for the team members to assume that each of them will focus on and perform the task that their specific operator is good at since they all have only one special ability that they can use. A healing operator is expected to use their one unique healing ability as their contribution to the match.

In *Apex: Legends* players can play as a combat medic named *Lifeline*, who is able to deploy a healing drone, which automatically heals team members when they are standing next to it (Fig. 16). *Lifeline* is the only character out of 12 available characters in *Apex: Legends* who is able to provide healing for the team. However, healing the team is not the only task that *Lifeline* focuses on within the match – the main focus still lies on collecting items and fighting opponents, and *Lifeline* has other abilities that she can use that are just as impactful as healing in the game. In addition, every player in *Apex: Legends* can pick up healing items within the match, decreasing the importance of *Lifeline* using her healing abilities.

In *League of Legends*, there isn't a dedicated "healer" role, but rather, healing is integrated into the abilities of certain support characters. Out of the 148 champions in *League of Legends* there are 14 that have at least one healing ability. The availability of these healing champions depends on the rotation of free-to-play champions within the game, and unless players interested in playing these champions purchase them with real money, they might not be available at all for a given match.

In addition to this, simply picking any champion with a healing ability might not give the player the desired results. In *League of Legends*, champions can be strategically counter-picked to make them less effective in the match. If the healing support champion gets counter-picked, their healing will be less effective and performing their role properly will be significantly more difficult. Since there are many unique healing characters to choose from and many counter-picking possibilities to consider, it requires a lot of memory and effort for the player to know what champion will perform well in a specific team composition.

League of Legends also features global healing items and abilities that can be equipped by every player within the match. Players are not likely to identify themselves as having the role of a dedicated healer in *League of Legends*, and due to the multitasking nature of supports in MOBA games, it is possible for the team to assume that the supporting champion that has healing abilities is performing a different role rather than just healing. Players can have different expectations of what the healing champion should be focusing on within the match, and this can potentially lead to chaos and disorganization within the team, especially if group awareness and communication are low.

In all three games, the healing game mechanic is considered a somewhat secondary focus for the healing character. All three games emphasize combat, positioning, and conquering objectives for all involved players, and the supporting healing characters have more than one role within the game.

None of these games make a healing character easily distinguishable within them – there are no special visuals, design aesthetics, icons, or other indicators that make them drastically stand out from the rest of the team. Instead, players are expected to have enough background knowledge memorized about these games to be able to tell if a healing character is present and what their focus within a specific match might be.

Due to the limited way of playing a healing character in *Rainbow Six: Siege*, it is easier for the team to assume that the healing character will focus on healing more than in the other two games. *Apex: Legends* prioritizes contributing to fast-paced combat and collecting loot over using specialized spells. In *League of Legends*, the role of a support is more vague and the support characters have many other tasks and spells they are expected to use, making it harder for the team to predict what the healing character will focus on.

7.1.4 Protecting Team Members



Fig. 17: Protecting Team Members - Dome of Protection, *Apex: Legends*

Apex: Legends, *League of Legends*, and *Rainbow Six: Siege*, also share the idea of players using game mechanics to protect one another within the match.

In *Apex: Legends*, *Gibraltar* and *Wattson* are the only out of 12 available characters with protective abilities. *Gibraltar* uses his ability "Dome of Protection"³⁸ to place a device on the ground which emits a shield that covers an area which protects everyone standing under it from incoming enemy projectiles (Fig. 17).

³⁸ *Apex: Legends*, *Gibraltar*

URL: <https://apexlegends.gamepedia.com/Gibraltar>

URL Time Date: 20th of March 2020



Fig. 18: Protecting Team Members - The Shield of Braum, *League of Legends*

In *League of Legends* 42 out of 148 playable characters possess the ability to shield themselves and/or allies to reduce incoming damage. For example, "Braum can raise his shield in the target direction, creating a barrier that intercepts incoming non-turret enemy projectiles and reduces the damage he and his allies take through the shield."³⁹

As with healing, the same issues occur for the supporting players in *League of Legends* and *Apex: Legends* - their roles are more vague and are dependent on multitasking than in *Rainbow Six: Siege*.

³⁹ *League of Legends* Wiki, Braum

URL: <https://leagueoflegends.fandom.com/wiki/Braum>

URL Time Date: 20th of March 2020



Fig. 19: Protecting Team Members - Ballistic Shield (top) and "RHINO" Armor (bottom-left and bottom-right),
Rainbow Six: Siege

In *Rainbow Six: Siege*, there are two methods of protecting team members. The operator "Rook" is capable of protecting himself and his team mates through his unique ability: R1N "RHINO" Armor,"⁴⁰ which places a bag of armor on the ground. The team members need to be aware of the provided extra armor and need to pick up it up (Fig.18, bottom). In addition 5 out of 54 operators are able to carry a ballistic shield (Fig. 18 top). This shield negates all incoming enemy projectile damage and protects all team members behind it, including the operator carrying the

⁴⁰ Ubisoft - *Rainbow Six: Siege*, ROOK

URL: <https://www.ubisoft.com/en-us/game/rainbow-six/siege/game-info/operators/rook>

URL Time Date: 21st of March 2020

shield. The operator carrying the ballistic shield moves much slower and is only able to use a pistol while having the shield equipped.

These constraints give the player carrying the shield a much clearer primary task of protecting the team while having the shield equipped than the more situational protective abilities in *Apex: Legends* and *League of Legends*. The characters in *League of Legends* and *Apex: Legends* that have protective abilities might also focus on healing, dealing damage, or applying crowd control effects on opponent players. Similarly to “Healing Team Members”, the characters that are able to protect other team members are not entirely dedicated in doing so.

7.1.5 Ability Synergies Among Team Members

In most cases, ability synergies are situational and are not effective in every given situation. Not every character’s ability combined with another character’s ability works out successfully. Team members also need to recognize each other’s intention to start a specific ability synergy and time their abilities in the right moment in order to make a synergy successful.

Players need to have at least a fundamental understanding of the game (Basic Understanding of the Game, chapter 4.1) to perform these synergies. They also need to share the same sentiment about the importance of the potential synergy in a specific situation (Building Consensus and Sharing the Same Goal, chapter 4.2). Furthermore, all included players need to have the necessary awareness and motivation, and respond accordingly to time their abilities in the right moment in order to have the desired combined effect (Awareness, Motivation and Responsiveness, chapter 4.3).

Sometimes, potential moments for ability synergies can occur within the blink of an eye, without giving the players enough time to communicate about the potential moment. In such cases, players need to rely on each other’s intuition and knowledge of the game, and respond without any communicated agreement to perform the ability synergy successfully. The following figures present some of the potential synergy scenarios in *Apex: Legends*, *League of Legends*, and *Rainbow Six: Siege*.



Fig. 20: Ability Synergies Among Team Members - Gibraltar Shield and Jump Pad, *Apex: Legends*

In *Apex: Legends*, one of the playable characters, “Gibraltar”, can hold his shield up (1) while the character “Octane,” attaches his deployable jump pad on the shield of Gibraltar (2). The shield of Gibraltar always faces the same direction the player is looking at, which means that the attached jump pad on the shield is following this direction as well (3). When facing down to the ground, the attached jump pad recognizes the ground and activates itself. This pushes Gibraltar with the attached jump pad away from the ground (4), letting him fly through the air over a long distance (5).



Fig. 21: Ability Synergies Among Team Members - Blitzcrank’s Rocket Grab and Leona’s Shield of Daybreak, *League of Legends*

In *League of Legends*, a potential for synergy can occur when the champion *Blitzcrank* (yellow character), uses the ranged ability *Rocket Grab* to grab on to an opponent (1). The grabbed opponent is pulled close to his position (2). This enables the champion *Leona* to use her melee ability *Shield of Daybreak* (3) to knock out the grabbed opponent (4) without walking too far

away from *Blitzcrank*, who can continue to activate more abilities on the grabbed opponent. This can also enable other team members to attack the knocked out opponent who barely has a chance to escape from this ability synergy.

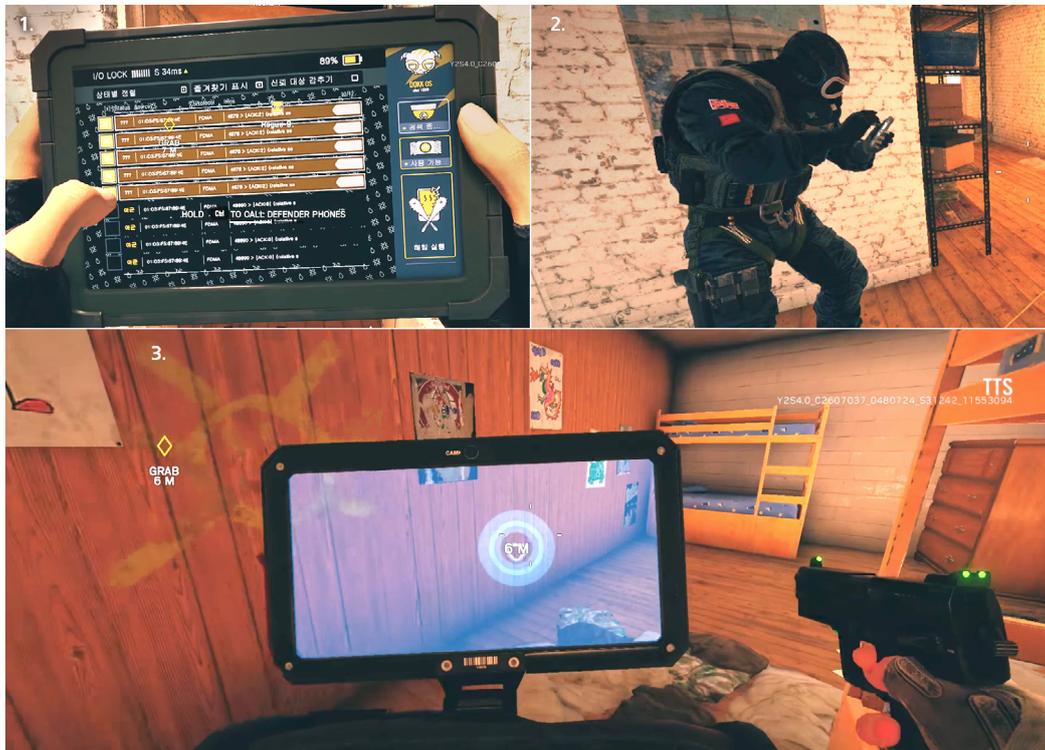


Fig. 22: Ability Synergies Among Team Members - *Dokkaebi's* Phone Hack and *IQ's* Electronic Detection, *Rainbow Six: Siege*

In *Rainbow Six: Siege*, the operator *Dokkaebi* has the special ability to use a tablet to hack the phones of the opponents (1) to make them emit a vibration noise which can be heard by everyone in proximity range. The opponents have to manually turn off this noise by using their phones for a short period of time (2). This gives the operator *IQ* the opportunity to use her special electronics detector to view active electronic devices through walls (3) and see the position of the opponents. Phones are not considered as an active electronic device when they are just stored in the inventory. As soon as a player equips the phone to interact with it, they are considered as an active electronic device. By synchronizing their special abilities, *Dokkaebi* and *IQ* can lead their team to the opponent's position for an ambush.

Some ability synergies are very specific and only work with two particular characters – as with *Gibraltar* and *Octane* in *Apex: Legends*, and *Dokkaebi* and *IQ* in *Rainbow Six: Siege*. However, there are also synergies that work with a range of characters – in *League of Legends* the *Rocket Grab* from *Blitzcrank* can work with any character that focuses on fighting within a close range. In some games, the amount of possible ability synergy combinations between the different characters can be very extensive.

Ability synergies among team members can go hand in hand with the tasks and roles different characters within a team have. If the players know exactly what they are supposed to do (as described in **Exclusive Specialized Roles and Characters within the Team**, chapter 7.1.2) successful synergies are more likely to happen. The more complex a game is and the wider the range of tasks the different roles in the game are responsible for, the more challenging it becomes for players to synergize their abilities in an efficient way. This becomes especially difficult in games where strangers play together through matchmaking.

If a game is complex and the player takes the time to learn a wide range of characters and roles within one game, and familiarizes themselves with the different abilities, strengths, weaknesses, and the different tasks each character is responsible for, the player will be able to recognize more moments that allow for efficient ability synergies with other characters, increasing the chances of successful teamwork happening.

However, if there is a limited way of playing a role, an ability synergy is likely to happen unintentionally. If there is a limited way of playing a role, the player most likely has only a limited range of abilities to use. There is less room for error and each player has only a few options for what abilities they can use in a given situation, so even players who are not aware of a potential moment for ability synergy have a higher chance of performing a synergy nonetheless, simply due to the lack of other possibilities.

This can make a game easier to learn and play, but can also result in a decrease of the positive emotional value that could have been derived from the performed synergy. This means the players might not fully appreciate the teamwork, since initially there were not as many possibilities to choose from to make the synergy happen. If there is a lot of freedom given to

the players about how they can approach playing their role, the players can recognize whether there was a clear intention behind a successful or even unsuccessful attempt for an ability synergy. The recognition and appreciation of this intention can be satisfying and hold a positive emotional value for the players.

In the survey, Fortnite was rated as having one of the best teamplay experiences, but did not receive an interdependency score that was high enough for it to be examined in further detail as with the top three most interdependent games. One could assume that a lower interdependency level actually encourages teamwork since two out of the three games with the highest interdependency score were rated with more bad teamplay experiences than good, while Fortnite has a lower score for interdependency and more positive than negative teamplay ratings (chapter 6.1). However, *Rainbow Six: Siege* scores higher on interdependency than Fortnite, while also maintaining a high positive teamplay rating. At the same time, *Rainbow Six: Siege* differentiates itself from *League of Legends* and *Apex: Legends* by having versatile roles that have a clear focus on a limited range of tasks.

Therefore, game designers should not aim to simplify their game mechanics to the level of Fortnite (which has a much younger target audience), but also should not go for another extreme like *Dota 2* or *League of Legends* where the large amount of responsibilities and possibilities can lead to difficulties in coordinating teamplay.

7.2 Overview of Shared Interdependent Team Mechanics

		Apex: Legends	League of Legends	Rainbow Six: Siege
Teampay Rating Ratio		negative	negative	positive
Interdependency Score		13	11	11
Discretionary (50%)	Consistent Display of Team Status In-game	UI Position: Bottom left corner	UI Position: Bottom right corner	UI Position: Top
	Max. Team Size < 10	Team Members: 3	Team members: 5	Team Members: 5
	Exclusive Specialized Roles and Characters	Characters: 12 Character Roles: 4 Roles: Defender, Attacker, Medic, Tactician	Characters: 148 Character Roles: 5 Roles: ADC, Top, Mid, Jungler, Support	Characters: 54 Character Roles: 13 Attacking Roles: Hard Breach, Hard Breach Support, Soft Breach, Entry Fragger, Disruptor, Angle Watch Defensive Roles: Breach Denial, Anti-Intel, Area Denial, Intel Gathering, Trappers, Support Dedicated Roamers,
Conjunctive (50%)	Healing Team Members	1 out of 12 characters can heal their team members with one special ability. Example: <i>Lifeline</i> can deploy a healing drone, which automatically heals team members when they are standing nearby.	14 out of 148 champions have at least one healing ability. Example: The champion <i>Kayle</i> is able to heal another team member and herself as long as the team member is in range of her ability.	2 out of 54 operators can heal their team members with their special abilities. Example: Operator <i>DOC</i> uses his stimulation pistol that can be shot at team members to heal or revive them as long as they are in range.
	Protecting Team Member	2 out of 12 characters have protective abilities. Example: <i>Gibraltar</i> uses his ability "Dome of Protection" to activate a shield that covers an area which protects everyone standing under it from incoming enemy projectiles.	42 out of 148 champions can shield themselves and/or their team members. Example: The champion <i>Braum</i> uses his shield to protect himself and his team members who stand behind the shield.	4 out of 54 operators can protect their team members with their special abilities. Example: Operator <i>Blitz</i> carries a Ballistic Shield that protects team members who position themselves behind him.
	Ability Synergies Among Team Members	Example: <i>Octane</i> attaches his deployable jump pad on the portable shield of <i>Gibraltar</i> , turning it into a portable trampoline, which increases the mobility speed of <i>Gibraltar</i> .	Example: The ability <i>Rocket Grab</i> pulls the grabbed opponent close to <i>Blitzcranks</i> position. Leona is now able to use her melee ability <i>Shield of Daybreak</i> on the grabbed opponent without walking too far away from <i>Blitzcrank</i> .	Example: Synergy between <i>Dokkaebi</i> and <i>IQ</i> : The combination of their special abilities allows them to hack, activate, and see the phones of their opponents through the wall, and correspondingly the opponent's position.

Fig. 23: Overview of Shared Interdependent Team Mechanics of *Apex: Legends*, *League of Legends* and *Rainbow Six: Siege*.

7.3 Suggested Collaborative Task Types that Encourage Teamwork

Discretionary and conjunctive collaboration tasks defined by Steiner (chapter 2.2) were assigned to light and heavy interdependent game mechanic categories (chapter 6.1). The amount of group task categories in *League of Legends*, *Apex: Legends* and *Rainbow Six: Siege* are counted and presented in Fig. 24.

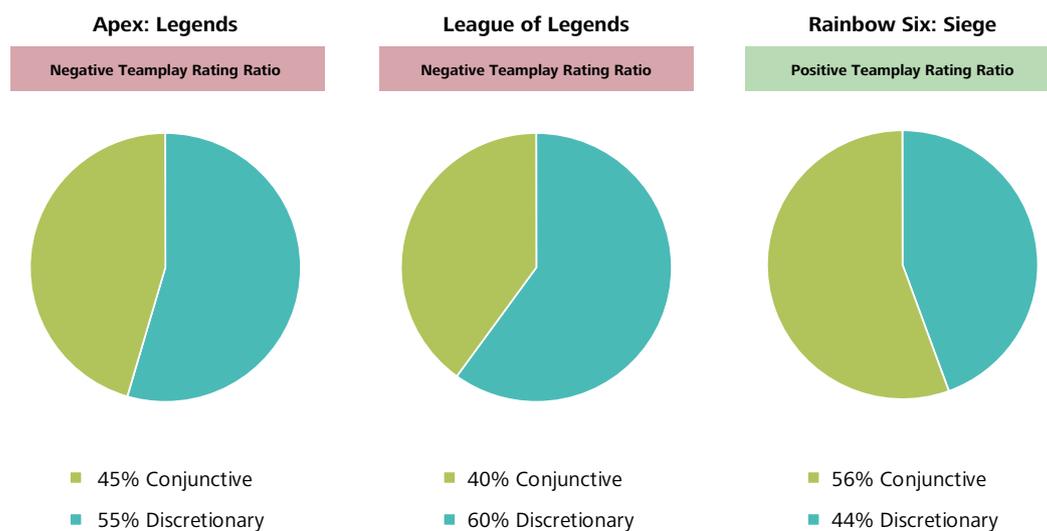


Fig. 24: Collaborative Task Types of Interdependent Team Mechanics in *Apex: Legends*, *League of Legends* and *Rainbow Six: Siege*

All interdependent game mechanics in the table in Fig. 13 appeared at least once among the three games - none of the listed mechanics were absent from all of the top-scoring games. The distribution of discretionary and conjunctive tasks in all three games closely resembles each other, however *Rainbow Six: Siege* stands out with a positive teampay rating ratio. This could be an indication that even though they share similar ideas for interdependent game mechanics, the corresponding mechanics for *League of Legends* and *Apex: Legends* are not optimized to encourage teampay.

It is also noticeable that more than half of the interdependent team mechanics in *Rainbow Six: Siege* are conjunctive task types while in the other two games, there are more discretionary task types. This suggests that mechanics with conjunctive tasks need to be focused on when designing team mechanics to encourage teamwork. However, since the difference is relatively

small, game developers can also give players plenty of discretionary task types to give them the freedom to decide in which ways certain group challenges need to be solved, as long as these task types are designed in a way that encourages teamwork.

Balancing the amount of conjunctive and discretionary tasks is also important because, as Depping and Mandryk (chapter 5.4, Interdependency) explain, “cooperation can also induce tension and pressure; however, only when the game is also interdependent. When players’ actions do not affect each other (low interdependence), cooperating decreases the perceived tension.” Meaning, if the conjunctive tasks in a game significantly overshadow the discretionary tasks, the tension mentioned above is more likely to appear in the players. It is therefore advised to balance conjunctive and discretionary task types accordingly.

7.4 Reducing the Impact of Negative Behavior on Collaboration

As mentioned in chapter 5.1 (Emotional Literacy), report systems can reduce the instances of negative behavior by giving behavioral feedback to players. For example, Valve reported statistics about their game *Dota 2*, after they introduced a new category for reporting players - reporting for abusive communication:

“60% of players who receive bans go on to modify their behavior and don’t receive further bans.”⁴¹

Player behavior can be conditioned through positive and negative reinforcement by applying Skinner’s ideas of operant conditioning⁴² to game mechanics. It might be possible to increase the number of teamwork instances by focusing on reinforcement methods to promote successful teamplay and to decrease instances of negative behavior. The following sections suggest potential solutions for the negative behaviors that affect collaboration discussed in

41 *Dota 2 Blog - Communication Reports*

URL: <http://blog.dota2.com/2013/05/communication-reports/>

URL Time Date: 25th of March 2020

42 B. F. Skinner, 1951, *Science and Human Behavior*, p.59-107

chapter 3. Entirely eliminating or controlling negative behavior is not possible, but through incentives for good behavior (e.g. rewards, community, or unlocking modes) and punishments for negative behavior (bans, isolation, restriction of communication) game developers can help steer a gaming community in the direction of a considerate and friendly gaming environment and more teamwork-oriented players.

Network Code, Unstable Connection, and Latency can be controlled by monitoring the player's network performance in the game. As soon as a game server or the matchmaking system recognizes latency values that would deteriorate the quality of the match, the server will not allow the player to access and participate in it. The system can also work to detect and punish players who consistently disconnect from public matches.

It would also be beneficial for games to allow for the creation of custom lobbies for players who want to play with friends who are across the world or who have otherwise poor connection quality. With custom lobbies that are separate from the main matchmaking system, players can choose to play together without disrupting public matchmaking.

Incompatibility and Distortion of Player Expertise can be addressed by matchmaking players together with a similar expertise level to ensure a balanced match. Even if some players do not play ranked matches, many games calculate an invisible individual rank in order to matchmake the player with players of the corresponding skill level.

Matchmaking can become a problem when a group of players with a high difference in their expertise level want to play together in a team. Good matchmaking systems recognize this and try to compensate these expertise differences by searching for another group of players that have a similar difference in their expertise level. This does not always work out. Either no other group of players can be found or the tolerance level for the matchmaking system increases over time as it is searching for other players in order to keep down the waiting time for those in the matchmaking queue. With an increase of this tolerance level for different ranks of players, there is a higher chance that two teams with asymmetrical (unbalanced) expertise levels get matched against each other, which could cause unfair advantages and disadvantages for them. This issue could be addressed with an isolated "mixed bag" gameplay mode: the teams

with asymmetrical expertise levels could be balanced out by applying controlled gameplay handicaps on players with the highest expertise levels in the group. Handicaps like this could be a reduction of gained resources, reduced life points, increased death timers, unavailability of certain characters, or restrictions of certain roles. These handicaps do not work with every game and need to be carefully considered and designed.

Another way of balancing out groups with asymmetrical expertise levels is an obvious display of ranks and roles for each player, but only within the team. This clarifies which player rank is playing which character, so higher ranked players recognize whose expertise level is relatively low who might need more patience and guidance in understanding the game's mechanics.

Boosting accounts can be addressed by introducing features that discourage buying boosted accounts in the first place. Legacy cosmetic items that can only be unlocked if a player finishes lengthy time-consuming quests that are only available at certain ranks could work as an incentive for a player to want to build their own account as opposed to buying one that was quickly leveled over a short period of time for the sake of being sold. The disadvantage of this method would be the creation of an incentive for players to start selling their old accounts with such exclusive items for a lot of money to compensate their invested time.

So far, there are no good solutions to address smurfs and griefers. A lot of players with low empathy derive enjoyment out of ruining other players' games and do these negative behaviors on purpose. Since their idea of entertainment involves deliberately disrupting gameplay for other people, it is unlikely that these players get affected by the community's opinion of them or by game mechanics that attempt to reinforce good behavior. The only remedy for these types of smurfs and griefers is a reduction in their number through effective banning. For example, a reporting system that enables every player to report another player for a very specific category of negative behavior would give the game's system an idea of a pattern of behavior for these players and the specific issues they are causing. If a reported player receives a certain amount of reports from multiple parties in several matches over a specific period of time, the game system recognizes this and deals with this player accordingly. The consequences for a reported player are different depending on the game and on the reason they were reported. Some games punish these players by preventing them from playing online for a certain amount of

time, or putting them in a special matchmaking category that groups them with other players that receive similar reports, while others outright ban the player from the game altogether. The punishment should be appropriate for the offense. For example, if the player is guilty of griefing through communication abuse, preventing them from using certain communication tools for a set amount of time could prove to be an effective punishment.

Not all players who create smurf accounts do so with malicious intent. As mentioned earlier, sometimes matchmaking fails to balance out matches for players who are trying to play together while having asymmetrical expertise levels. The higher ranked players then try to guarantee more reliable and fair results for their lower ranked friends by creating a new account and boosting it to their friends' rank. These smurfs generally try not to play disruptively, but still create an unfair advantage for their team. The situation can then worsen through the smurf player generating more rank-building victories and unintentionally boosting their friends' ranks to be higher than their actual skill level, further throwing the accuracy of matchmaking system off in future matches. The "mixed bag" gameplay mode could decrease instances of smurf accounts that are created for the sake of better matchmaking. Another useful feature could be the possibility for the higher ranked player to participate in the lower ranked matches as a coach. This would allow the higher ranked player to train their friends and play as a strategist in the match, but without actually disrupting the level of gameplay that the lower ranked players are capable of.

Cheaters are usually addressed by integrating a corresponding anti-cheat system that recognizes cheating patterns, programs, and different kinds of hacks that distort any norms of the multiplayer game.

Anonymity as a Shield for Consequences poses a unique problem within games. On one hand, anonymity and being known by an alternate name can help players feel immersed in a game's world, on the other hand, it gives them a sense of detachment from reality and allows them to act in a way that they would normally not consider acceptable.

Anonymity can be controlled, by requiring personal information from the players, but this method is very unsafe in the current digital age. Information leaks, people giving false data, and infringing privacy laws, and posing ethical concerns all have a high potential of severely

backfiring on the developers. Even in the best case scenario, requiring players to give their personal information in order to play can break their sense of immersion in the game since that partially stems from a certain level of detachment from their daily lives and treating the game world as a separate environment.

A potential way to address the problems anonymity causes without infringing on the player's privacy would be through having the accounts carry a stable identification number. Anonymity would not be taken away from the player because they can still use their in-game tag, but their account ID would be consistent and there could be consequences for that account if the player chooses to play disruptively. The drawback is of course, the players creating new accounts to avoid these consequences. There are a few potential ways to discourage players from creating alternate accounts. The most effective method would be to put access to the game behind a paywall. However, for free-to-play games, developers can try adding some kind of sentimental value to the player's main account by adding personalization depth to it (playstyle statistics such as number of players killed, leaderboards, legacy items, achievements, etc.), and putting access to public matchmaking for newly created accounts behind a training stage that would be useful to new players but annoying and discouraging to veteran players looking to make a quick account.

The aim of having a valuable account is not to make consequences for bad behavior more meaningful to the affected player. Upon being banned, the player should not only feel frustrated about the fact that they are not able to play the game anymore, but also be upset about losing everything they have achieved and that got saved on their account (e.g. character unlocks, skins, guild membership, achievements, in-game friend lists, in-game player blacklists, etc). It is assumed that if a player's account has the ability to grow over time, the player gains incentive to suppress bad behavior to protect their account from consequences. This can be enhanced when the account ID is stable and players are able to mute/block/ignore/blacklist other players for negative behavior and the player gets feedback about being excluded for poor conduct.

The difficult part about trying to solve these issues is that the worst of the players will not care no matter the reinforcement and punishment strategy. However, according to the statistics released by Valve at the beginning of this section, about 60% of the cases of poor player

behavior are players who simply needed an external incentive to remedy, or at least suppress, their negative behavior.

Another way to address the problems anonymity creates in games is by reducing it through the creation of self-regulating communities within games and encouraging bonding between players. Integrating guilds/clans, in-game friend lists, matching players who have rated each other positively in the past together, and other "grouping" activities can reduce anonymity in such a way that players play more often with the people whose behavior pattern they are compatible with, even if they are not directly friends.

Individual Value of Time can be addressed by giving each team a voting system to end a match that they feel is a waste of their time. For example, *League of Legends* introduced "Surrendering" as voting option to end a match:

"Surrendering is a vote allowing a team to forfeit the game. A player can call a surrender vote by typing /surrender, /ff, /concede or /forfeit in chat, or by pressing the "Surrender" button in the options menu. Initiating a surrender vote will show a pop-up for 60 seconds from which players will be able to cast their vote for or against the motion.

At least 80% of the team must agree to surrender in order for the vote to pass, calling a surrender vote automatically votes on the instigator's behalf. This means that on a team of three or fewer players, the entire team must agree. Any player who abstains from the vote is counted against the motion to surrender. If the vote is completed, and less than 80% of the team have agreed to surrender, the vote fails and cannot be initiated again for three minutes. If more than 80% do agree to surrender, the game will end in victory for the opposite team."⁴³

This voting system allows players to end matches that they consider to be lost and players will

⁴³ *League of Legends Wiki - Surrendering*

URL: <https://leagueoflegends.fandom.com/wiki/Surrendering>

URL Time Date: 27th of April 2020

not have to spend their time waiting until the match has ended by their opponents. Meanwhile in a similar game, *Dota 2*, every player is stuck in the match until the game has been lost or won, often being taunted by the players who have the advantage and harassed by team members who are bitter about the loss. Both games have relatively long match times (average 30+ minutes) and negative consequences for a player simply leaving the game while in the process of a match.

On the other end of the spectrum, there are games that pose no negative consequences for players going out of matches at will. For example, *Apex: Legends* is missing a system that would hold players accountable for leaving their team during an active match. This results in players randomly leaving matches at any point during their duration – even while in the picking phase before the match even begins, forcing their team to waste their time re-queuing for matchmaking and making the time they've already spent in queue pointless. This might be one of the reasons why *Apex: Legends* has been rated with bad teamplay experiences in the survey. The ability to drop in and out of matches at will pushes *Apex: Legends* into a "fast food" gaming experience with unhealthy side effects on teamwork: players start to care less about their team members since there is no reason for average casual players to try and fight for a good match when they are able to instantly abandon the team and re-queue in the matchmaking system for a new public match as soon as they are unhappy with the progress of their current match. To further push the idea of low-investment and not caring about the team, the game displays the hint "Press F to mute your squad" at the beginning of every round. These design choices can result in frustration and a sense of hopelessness in players who try to matchmake with strangers and feel their time is being wasted on matches where they are not certain whether or not they will be abandoned by their team and forced to forfeit, or whether or not the enemy team will also stay intact for them to have a fair and rewarding match. The players also have no way of knowing if their communication efforts are being instantly muted before the match even begun, and therefore have no reason to trust their team to be responsive, much less to try and collaborate on suggested strategies.

The player's assessment of whether or not their time is being valuably spent depends on their perception of the progress of the match, the amount of effort and personal involvement they are investing, and on the amount of time spent.

For example, playing a match in *League of Legends* or *Dota 2* requires the player to work with the situation they're in for the duration of the match, with no breaks or interruptions. While in these games a bad situation can be changed into an advantageous one over time, the players often get into a bad mindset when the match is going poorly in the moment, and start to feel like their time is being wasted on an unlucky situation. This frustration can quickly escalate as the match timers get higher and higher in front of their eyes and the players feel they are investing too much time into a match they feel is lost. Meanwhile, in *Rainbow Six: Siege*, one match consists of multiple rounds that last 3-4 minutes each. With each round, all players start together with a fresh character. The chances of a player getting frustrated within a short round are significantly lower. The overall match could potentially last as long as a match in *League of Legends* or *Dota 2*, but the player's perception of progress, time, and personal investment is altered.

Social Loafing can be addressed by designing games with a manageable amount of players per team (as discussed in chapter 3.1.5). GUI elements that provide information about the player progression and measurable contributions to their team can also be useful. These mechanics can enable players in exposing social loafers.

These mechanics have to be carefully designed because they might also increase the chances for negative behavior if the players react poorly and become toxic when exposing social loafers. For example, some players will start to blame other team members when the GUI elements make pointing out players scores too easy and when the objective of the game is score-dependent or open to interpretation. Some games offer many viable tactics that can lead to victory and when players do not understand this, they might begin obsessing over each other's scores. For example, games like *Dota 2* can be won even when players have low scores compared to the enemy team.

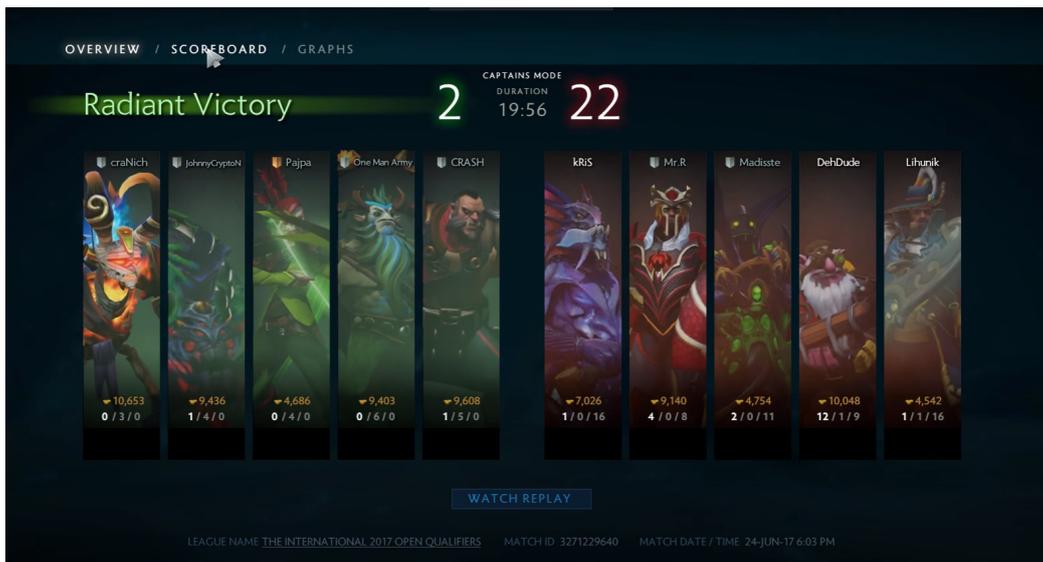


Fig. 25: The end result of a match from *Dota 2*, open qualifiers for the world championship *The International* (2017). The team with the overwhelmingly lower kill score (left) was victorious due to better strategy.

A GUI that is too obvious and harsh in measuring the player's performance is also unfair towards the players who do not intentionally loaf, but genuinely struggle with keeping up with the rest of the team and get harassed for their performance. This is why game designers need to carefully integrate these monitoring GUI objects. They should be obvious enough for players to correct themselves, but not prioritized on the screen in such a way that players get start hyper-focusing on them and start harassing each other over the scores.

Egocentrism can be partially addressed by integrating VoIP features that enable players to communicate with each other. Compared to other modes of communication, VoIP lets the players hear each other's tone of voice and read their mutual emotions better. According to the survey, most players prefer VoIP over other communication methods.

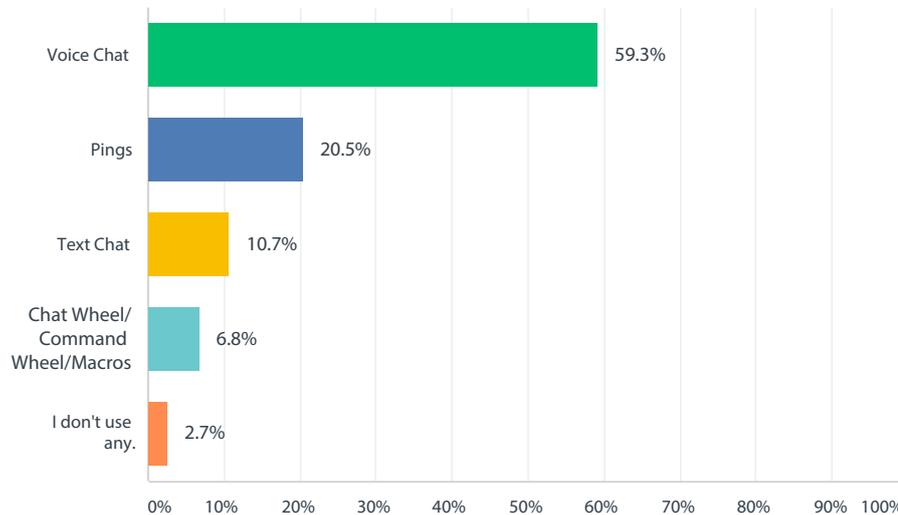
Q6: Which communication tool is your favorite to use in any game? (Optional)

Fig. 26: Survey - Communication and Teampay Experiences in Team Based Multiplayer Games, Q6

Additionally, question 10 of the survey supports this idea as well. Q10 is the last optional question of the survey and asked the players to write down what kind of communication methods they are missing or would like to see implemented into the games they play. Majority of the respondents wrote about a better VoIP experience. All responses to Q10 can be read in the chapter **Personal Research**.

To encourage players to use VoIP in a helpful and friendly manner, it would be beneficial for the game to somehow give each player feedback on what other players think of their behavior. For example, games could implement a VoIP rating system that enables each player to recommend/up-vote other team members specifically for helpful and positive VoIP communication, and to report/down-vote those with negative VoIP behavior.

After a certain number of matches, each player would receive a personal conduct summary that helps the player analyze their behavior. Potential negative behavior issues can be brought to their attention to give the player a chance to recognize and correct their behavior before it gets to the point where they will have to face consequences such as bans, low-priority matchmaking, and communication blocks. By the same token, players who receive high positive ratings can

be encouraged through the good feedback to keep performing the positive behavior and to identify themselves with it, as well as enjoy benefits that come with good behavior such as priority matchmaking, getting matched with other well-behaved players, and profile badges or special cosmetic items. Occasional in-game rewards for consistently maintaining good conduct or for making significant progress in improving their behavior scores can further encourage players to pay attention and to make an effort to be friendly and considerate towards others within games.

Another way to enable players to better read each other's emotions and reduce instances of egocentrism is through introducing emotional communication methods, such as status messages and emoticons that can help show a player's current mood (e.g. frustration, relief, sadness or happiness). Team members who recognize this emotional communication might react differently to their team members in certain situations.

The key to reducing egocentrism in players is building different kinds of awareness in the player base. It's not possible for game mechanics to encourage players to develop the emotional maturity that is necessary for empathy and being able to take on another player's perspective, but game mechanics can help give players as much awareness as possible about each other's situation within the game to make being considerate easier. For example, it might be helpful when all game mechanics that enable players to perform teamwork actions give obvious audio-visual feedback in order to make all team members aware of the intent for teamwork and the performed actions. Games should also consider integrating a well-designed team GUI that shows detailed status about everyone on the team to help players be aware of what situation team members might be in without the need for explicit communication. Lastly, giving players tools for emotional communication might help curb egocentric thinking.

Gaming communities need to spread awareness of the need for life skills such as emotional literacy, anger management, empathy, and reducing egocentrism, and their benefits within games. Game mechanics can help identify players who struggle with emotional management and egocentrism through a detailed report system that gives them feedback about their behavior to give them a chance to correct themselves. There is a limit on what game mechanics can do to help players regulate their emotions and change their thinking patterns for the better. Certain aspects of human nature and player personality cannot be changed.

Insufficient Intrinsic Motivation

A lot of players seem to lack the intrinsic motivation that is necessary for good communication and cooperative teamwork. For example, some players care about winning matches and advancing their rank and do not care about being friendly and cooperative with their teammates unless there is a direct reward for such behaviors. However, there are ways for people to learn to internalize behaviors that initially don't come naturally for them. Ryan and Deci describe how extrinsic motivation can help to develop intrinsic motivation:

"Extrinsically motivated behaviors are not inherently interesting and thus must initially be externally prompted, the primary reason people are likely to be willing to do the behaviors is that they are valued by significant others to whom they feel (or would like to feel) connected, whether that be a family, a peer group, or a society. This suggests that the groundwork for facilitating internalization is providing a sense of belongingness and connectedness to the persons, group, or culture disseminating a goal [...]"⁴⁴

This approach could be used in designing game mechanics that are based on extrinsic motivation but with the long-term goal of helping players internalize the rewards associated with the behavior. Game developers should treat fostering a healthy gaming community around their games as a key element of their game design. Community-based achievements and rewards, developers' direct involvement in the community through forums and events, and carefully designed game mechanics that promote and reward good and friendly teamwork can all help players adapt an extra layer of motivation when they feel involved in the community.

As mentioned earlier, *Apex: Legends* does not encourage players who are not intrinsically motivated to communicate with their team to at least try and experience positive and helpful communication and how it can help them win matches. The first thing players see when the match loads is the option to mute the entire team. A player who is not intrinsically motivated towards teamwork through communication will just mute the team right away and will not be exposed to the connection between communication, cooperation and winning more matches.

⁴⁴ Ryan, Deci, 2000, *Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions* p.3, 11

This is a game that is not designed to foster community building or creating connections among team members, which could be one of the reasons it has bad teamplay ratings. Being immediately muted by the team punishes players who, through their own intrinsic motivation, intended to play in a friendly and communicative manner.

Introducing extrinsic rewards for good teamplay needs to be done with caution. Since a lot of players already possess the intrinsic motivation to be a good teammate, constantly rewarding their good behavior can backfire by making them associate their initially intrinsically motivated behavior with extrinsic rewards, making them question whether they are performing it for the rewards or out of internal interest. This can result in the initial motivation for a player to play a game as a team to become overshadowed by these extrinsic rewards, and for the player to be distracted with prioritizing these rewards and achievements. Also as a game becomes over-saturated with constant rewards and every small behavior is frequently rewarded, the rewards become predictable and insignificant, and the player loses interest in them even if they were initially effective.

B.F. Skinner's research on training behavior revealed that a random and unpredictable schedule of reinforcement is one of the most effective ways to get someone to consistently display the behavior that can prompt a reward.⁴⁵ Introducing random surprise rewards for consistent good behavior can be a great extrinsic motivator for players to keep their behavior scores up, without over-saturating them with rewards.

The hope is that, over time, the players will learn to associate the good behaviors with the benefits they bring to them in terms of mood and quality of gameplay, and internalize the motivation for performing them – at that point, the random rewards become a pleasant surprise for the player rather than an extrinsic reward aimed at encouraging them to behave in a certain way. The types of rewards and achievements introduced into games should be based

45 Lumen - Introduction to Psychology, *Reinforcement Schedules*

URL: <https://courses.lumenlearning.com/wmopen-psychology/chapter/reading-reinforcement-schedules/>

URL Time Date: 2nd of May

on the different interests players have when playing games, and aim at satisfying the different types of players the particular game attracts.

Bartle's taxonomy of players identified four key types of players: The Killer, Socializer, Explorer and Achiever, and what aspects of gameplay are the most interesting to them:

*"Socializer are interested in people, and what they have to say [...] Killers will occasionally work in teams, but only as a short-term exercise; they will usually revert to stalking their victims solo in the next session they play [...] Explorers delight in having the game expose its internal machinations to them. They try progressively esoteric actions in wild, out-of-the-way places, looking for interesting features (e.g. bugs) and figuring out how things work [...] Achievers regard points-gathering and rising in levels as their main goal, and all is ultimately subservient to this."*⁴⁶

This suggests that players which are a mix of Killers and Socializer might have good potential for being intrinsically motivated to communicate with each other in order to defeat their opponents as a team, and might not need many extrinsic rewards to encourage them to play as a team. But if a team consists of all different kinds of players, correspondingly if a game attracts all four different types of players (for example by a high variety and range of tasks), the teams might experience difficulties while trying to coordinate with each other, because every player sees different priorities in the game.

Games could try to tailor the achievements and rewards that are interesting to the different types of players to guide them towards teamwork and to matchmaking compatible player personalities together for better team cohesion. Some games could also consider better defining their target audience and to pick the primary kind of player type they would like to attract to their game. If a game caters to the player's intrinsic interests, they will most likely have the pre-existing intrinsic motivation to play the game how it was intended without the need for extrinsic rewards to guide them to behave a certain way within the game.

46 Richard Bartle, 1996, *Hearts, Clubs, Diamonds, Spades: Players Who suit MUDs*

Chaos & Disorganization

Sometimes players are unaware of their own disorganized hardware, software, or gaming environment. When players don't have a point of reference for how a game should perform, they could be experiencing the game in really poor quality and not be aware of it. For example, since they have poor hardware, they will interpret a low frame rate as the standard way that games usually perform. By introducing a testing environment or a benchmark test into games that measures the performance of the hardware and the player's Internet connection, players will know through the results whether they are playing in a suitable gaming environment. Some issues are not easily recognizable for the player. For example, players do not know if their microphone is distorted until other players bring it to their attention in an ongoing match. Having a hardware and environment benchmark test within the game that helps the player calibrate settings and test their equipment before queuing for public matchmaking can reduce instances of chaos and disorganization.

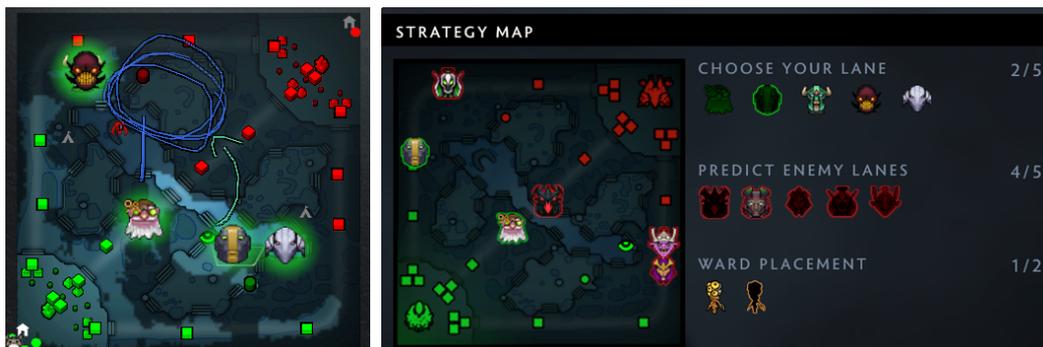


Fig. 27: *Dota 2*, Drawing and marking on the minimap.

Chaos also arises when players don't speak a common language. Having communication methods that are language-independent can help reduce chaos in these situations. For example, context-sensitive pings and chat wheel commands that are automatically translated into the language the player has installed the game in. Some games also allow the players to draw and mark things interactively on the minimap. Mandatory tutorials for basic controls and on how to use these features can help make players aware of them and encourage them to use these tools when they encounter players who they might not otherwise be able to communicate with.

7.5 *Elementar* as an Example for Integrated Interdependent Team Mechanics

Elementar is a 2D team based multiplayer game that is still in development at the time of writing this thesis. The author of this thesis is one of the two developers working on *Elementar*. The visuals and ideas do not represent the final version of the game. The overall game design of *Elementar* aims to reveal the potential for excellent teamwork. *Elementar* features all interdependent team mechanics that are shared between *Apex: Legends*, *League of Legends* and *Rainbow Six: Siege*. *Elementar* is not seen as a proof of concept for promoting successful teamwork with the help of interdependent game mechanics, but rather as a learning environment to teach and present the value of teamwork among players, and as an example of how these interdependent game mechanics can look like when they are integrated into an indie game.



Fig. 28: *Elementar* - In-game screenshot of a player's perspective, presenting the world and the GUI.

The screenshot in Fig. 28 presents three characters in a part of a generated level arena. The level arena layouts are procedurally generated and different each time a player is opening a server for other players to play on. The hand-painted textures are placed on procedurally generated collision boxes to indicate walking areas (green grass texture), sliding areas (blue grass texture) and areas that cannot be walked on (dark stone texture). The green health bars above each character indicate team members, while red health bars are an indicator of opponent players.

In *Elementar*, players choose one character from a pool of different characters. Each playable character represents an element or force of nature that clashes with other forces to fight for prevalence in different environment layouts. The chosen character by each player fights within a team of three against three other opponent players (**max. Team Size < 10**).



Fig. 29: *Elementar* - Consistent Display of Team Status In-game. From left to right: Team 1: *Poison, Void, Ice*.

The passed time of the match (center), Team 2: *Wind, Stone, Light* (dead and out of the match for 24 seconds).

The consistent status of all team members is shown at the top of the screen while playing (Consistent Display of Team Status In-game) and shows whether a team member or an enemy is has fallen. Additionally a death timer indicates how long a fallen character needs to wait until the character can re-spawn. The team member's chosen characters are represented with an individual icon shape and a corresponding color that emphasizes the character's element.

All characters in *Elementar* hold unique abilities and attributes, which gives them certain strengths and weaknesses (**Exclusive Specialized Roles and Characters within the Team**).

Fig. 30 presents the part of the GUI where the players are able to select the character they wish to play. Only one character type is allowed within a match to ensure a more asymmetrical gameplay experience. Above the character icons, character roles are displayed and can be clicked on to filter the pool of characters by the chosen role.



Fig. 30: *Elementar* - Character Selection Screen - Exclusive Specialized Roles and Characters within the Team

The character abilities are displayed as illustrated thumbnails (Fig. 31) with distinctive colors that are assigned to each character and their respective icon.



Fig. 31: *Elementar* - Ability Thumbnail Examples

The key feature of *Elementar's* game design is the possibility for a player to temporarily transfer abilities to another team member. The receiving team member of that transferred ability is then able to combine it with their own ability, which creates a stronger attack over a temporary period of time and synergizes unique gameplay modifiers such as crowd control effects like stuns or silences (**Ability Synergies among Team Members**). It is possible for one player to receive a maximum of two different abilities, each from one team member. It is not possible to combine two abilities of the same kind.



Fig. 32: *Elementar* - Initial GUI for player health (green bar), mana (blue bar) and a character's ability (center) with open combination slots (top) - combined with stored abilities from other team members (bottom).

On the top, Fig. 32 shows open slots left and right to the character's own ability which is centered on the GUI element. The open slots can be filled with received abilities from other team members (Fig. 32 bottom). The distinctive colors for each received ability thumbnail help the player to quickly identify the ability and from which character it is coming from. Instead of just copying the shared ability, a compromise is introduced: energy (Mana) will be consumed by the giving player in order to enable the transfer of the ability. This compromise supports the feeling of one person giving another person a part of themselves and makes the intent of sharing more clear and valuable. Similar to sharing in the real world, it also puts the sharing player at a disadvantage which can increase the emotional significance of the shared object for the receiving player.

Players become heavily dependent on one another as soon as they want to perform these powerful actions. If such actions are successful, it is assumed that a strong and rewarding feeling of satisfaction will be triggered and that it will motivate players to repeat these actions. The reason why players should transfer their own ability to another team member would be to give the receiving player a chance (while carrying this extra portion of strength) to achieve something powerful which could not have been achieved without the ability combination.

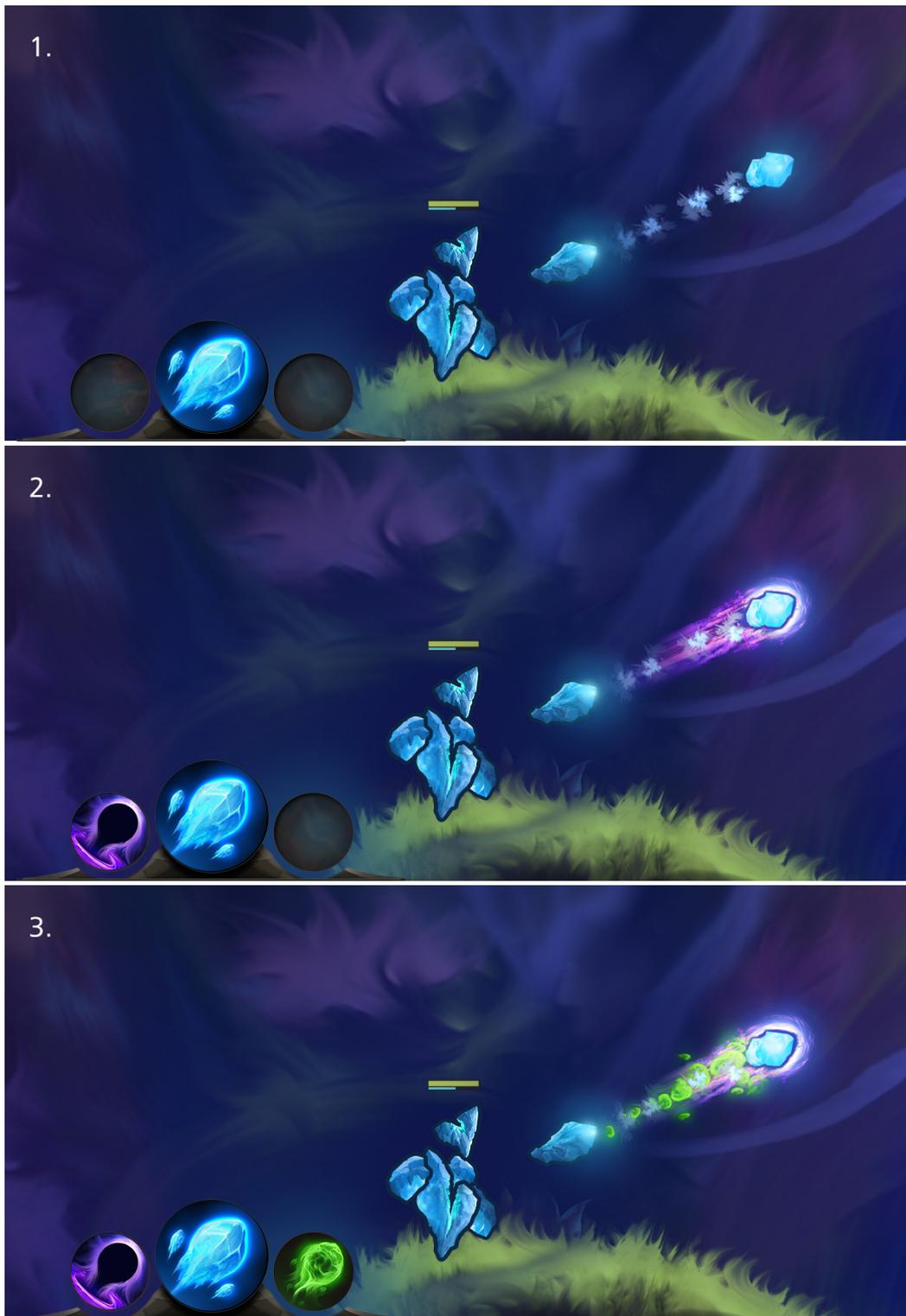


Fig. 33: *Elementar* - Ability Synergies Among Team Members - Combination Concept of *Ice*, *Void* and *Poison*.

Fig. 33 shows three combination possibilities using the *Ice* character as an example. The top panel (1) shows the *Ice* character, shooting the *Ice* ability from its hand. The *Ice* ability is a fast flying projectile that can slow down the movement speed of an opponent player upon a successful hit. The middle panel (2) shows the change in the GUI that signifies that the player received the *Void* ability. The shot projectile now combines the key characteristics of the received *Void* ability together with the *Ice* ability. These key characteristics affect the visuals and the gameplay. For example, the velocity, damage, and range/lifetime of the *Void* ability are added into the combined *Ice-Void* projectile, making it stronger. In the third panel (3) the *Ice* ability gets combined with the *Void* and *Poison* abilities, resulting in a maximum amount of abilities that can be combined at a time by one character. The addition of the *Poison* ability slows down opponent players upon a successful hit. Again, the visual and gameplay affecting characteristics from the *Poison* ability get combined with the previous combination from the second panel: the slow effect is now combined with the *Void* and *Ice* ability characteristics, resulting in an *Ice-Void-Poison* combination.

Some of these characters hold abilities that allow them to heal or protect their team members. For example, the projectiles of the *Ice* ability can also be stacked up to create an *Ice* wall (Protecting Team Members).



Fig. 34: *Elementar* - Protecting Team Members - *Ice Wall* Concept

All incoming enemy projectiles collide with the *Ice* projectiles of the *Ice* Wall and get destroyed. In return the *Ice* projectile that got hit gets destroyed as well.



Fig. 35: *Elementar* - Healing Team Members - Water Orb Concept

It is also possible to heal team members when a player chooses to play as the Water character. Fig. 35 shows the Water character, which is able to shoot out a Water Orb that can be collected by team members with a low health. As soon as the Water Orb collides with such a team member, it restores a certain amount of health. In return, the Water character needs to consume a part of their mana/energy to activate this healing ability (**Healing Team Members**).

7.5.1 Arguments that Speak for the Success and the Weaknesses in the Theory

Every character in *Elementar* holds one unique ability, which narrows down possible responsibilities and encourages the player to focus on specific tasks, compared to games with multiple unique abilities per character that force the player to multitask and make their role more vague. The survey of this thesis shows that the majority of players are willing to give away hard earned resources to another player in their team (Fig. 2). in order to increase their chances of winning a match.

Elementar supports this idea by allowing players to share their ability with another player at the cost of their mana. Therefore, it is assumed that a game mechanic which enables players to share something valuable with another team member will be accepted by the player base. Additionally, support roles in other multiplayer games are played and enjoyed by many players. In *Elementar*, as soon as a player chooses to share an ability with a team member, the player takes over the role of a support within the game.

On the other hand, heavy interdependent game mechanics have a chance to backfire, since a strong dependence among players requires a durable focus on the objectives of the match and depends on the players' willingness to coordinate their characters for the actual mechanics to work. With poor team mindsets and clashing player chemistry, heavy interdependent mechanics can be a source of frustration for the players.

8. Final Conclusion

The statement of this thesis claimed that games with the highest interdependence potential hold game mechanics that potentially encourage the teamwork. A pattern seems to be that interdependent team mechanics are necessary to encourage teamwork, but in a way that is approachable for public matches in which strangers get matched together.

The comparison of the collaborative tasks in chapter 7.3 shows the pattern that the more discretionary tasks come with a game, the higher the negative teamplay ratio. One could assume that conjunctive task types are the key to successful encouragement of teamplay. However, tension among team members can arise as soon as the players become too interdependent and forced to rely on one another in many aspects of the game. Therefore, the design of interdependent tasks in a game need to be balanced, featuring conjunctive (heavy interdependent) and discretionary (light interdependent) tasks as well as mechanics with self-benefit.

Especially the tasks for Exclusive Specialized Roles and Characters within the Team need to be clear and focused (see *Rainbow Six: Siege* specificity of character roles – chapter 7.1.2) in

order to avoid misleading actions that would deteriorate the teamplay experience for other team members. This requires a reduction of the task range a player character or role can get assigned to.

Game designers need to be aware of the limitations that come with this design choice and need to put themselves into the mindset of their target audience to ask themselves how much the players would enjoy a limited range of tasks for their role. Besides the range, the complexity of the tasks also needs to be addressed. If the task range is low, but the task's complexity is not adapted for the target audience, a low range of tasks will not make much of a difference. The results would either be overly complex tasks that certain target audiences cannot handle or overly simplified tasks that demand too little from the players and cause boredom. The balance between task range, complexity, and impact are the key to design successful team mechanics.

The designed mechanics need to give freedom to the players but also suggest how the game, a role, or a certain character should be played, without making the game flow too predictable. A too predictable game flow can cause repetition that reduces the re-playability of the game. It is important that players know their tasks and roles without arguing with each other in the middle of a match about strategies, tactics, or how a certain character should be played.

Too much interdependency among team members combined with complex tasks or mechanics can cause difficulties in trusting other team members, and also make it more difficult to coordinate. The more complex the team mechanics are, the harder it is to pull off successful teamwork scenarios, especially with random players in public matches. The more teamwork potential a game has, the more frustrating it can become when the player's expectations for teamwork are not fulfilled. Multiplayer games with complex mechanics and a high range of tasks can work in the Esport scene, where all team members professionally communicate with each other to synergize in order to play efficiently, but can cause negative behavior among the average playerbase that relies on matchmaking with strangers to play the game.

If game designers do not want to compromise on the complexity of their multiplayer games, an integrated strong social system can support and emphasize community building (chapter 5). This community will encourage players to play together and to make connections within

the game, so players have consistent compatible people to play with. Meanwhile, playing with random players will be subtly discouraged by introducing player profiles, friend lists and group invite options and the founding of guilds and clans.

Game trailers or idealistic representations of game features let players see the potential of a game and build up their expectations: the players are promised of how the game's teamwork experience is going to be. Meanwhile, in reality the coordination with random players and their individual level of expertise do not deliver the expected results to the players, which can become frustrating and cause bad teampay ratings even when a game holds high potential for collaboration.

In the end, players cannot be forced to use all the available tools that potentially reduce negative behavior, and no behavior reinforcement tools and game mechanics work on all players within a game. Ultimately it is up to the players to take the step in the right direction in creating a good gaming atmosphere and to choose to play as a team.

„You can lead the horse to water, but you can't make it drink.“

8.1 Prospects and Open Questions

Through all the research and topics that have been discussed, certain issues were left open and new questions appeared. The thesis discussed possible reasons for the lack of helpful communication among strangers in online multiplayer games. But what exactly causes the lack of helpful communication in a specific game? Is it one specific reason or is it a combination of multiple issues? Also, could the lack of helpful communication from Q5 of the survey be the main reason for the ratings of unsatisfying teampay experiences?

Certain interdependent team mechanics can encourage teamwork. The thesis examined how game mechanics with a self benefit can reduce the interdependency among team members. An interesting addition to research would be exploring what other kinds of game mechanics discourage teamwork. Furthermore, how would teamwork experiences look like when games with team mechanics that encourage teamwork and games with mechanics that discourage teamwork are compared in a scientific isolated gaming environment?

8.2 Overview of Keypoints

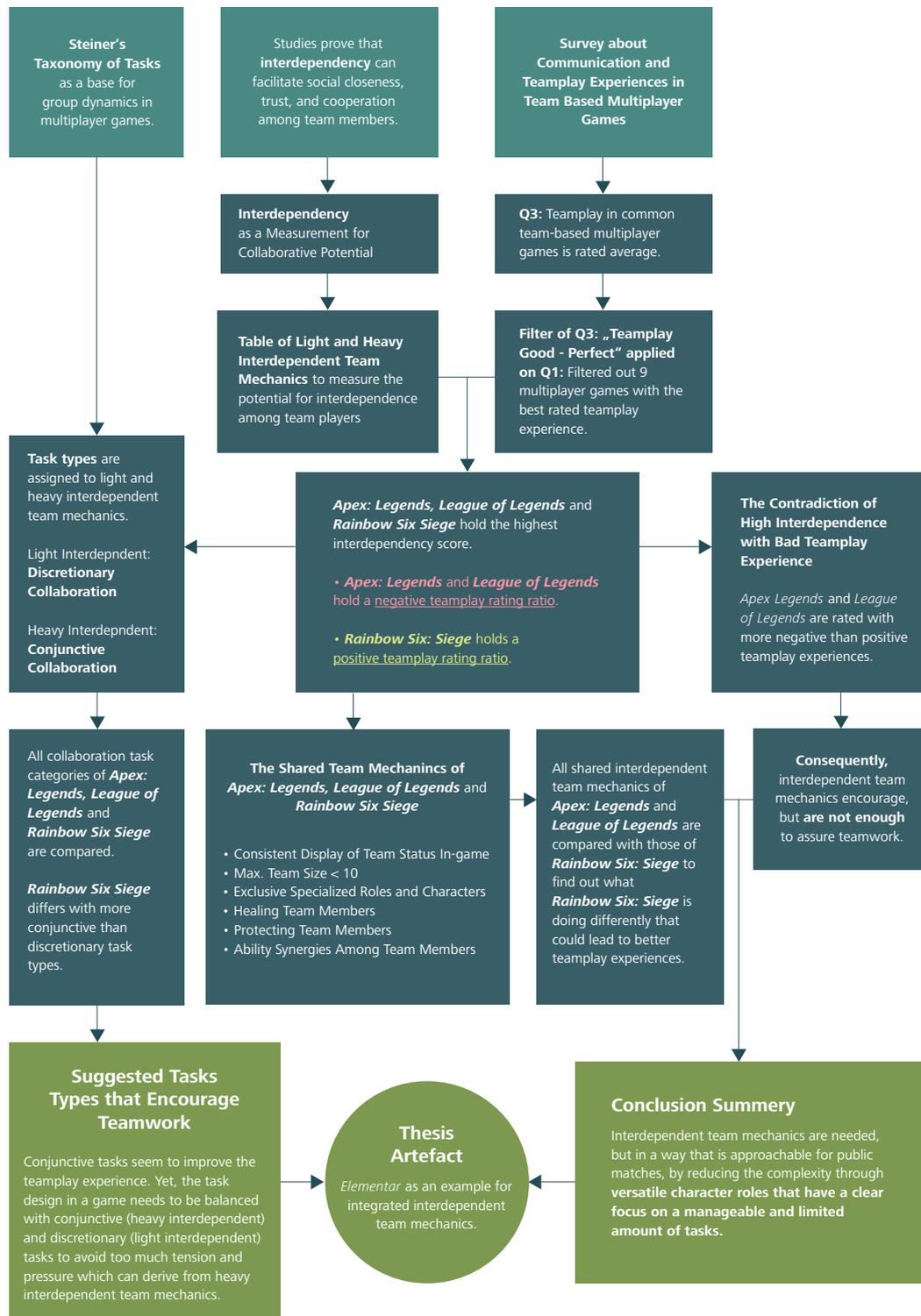


Fig. 36: Overview of Keypoints - Flowchart

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Ludography

Game	Developer / Publisher	Release Year
Apex: Legends	Respawn Entertainment / Electronic Arts	2019
Call of Duty: Modern Warfare (2019)	Infinity Ward / Activision	2019
Counter Strike: Global Offensive	Hidden Path Entertainment / Valve	2012
Dota 2	IceFrog / Valve	2013
Elementar	Stone Arch Games	unreleased
Fortnite	People Can Fly / Epic Games	2017
League of Legends	Riot Games / Tencent Holdings Ltd.	2009
Overwatch	Blizzard Entertainment	2015
Planetside 2	Rogue Planet Games / Sony	2012
Rainbow Six: Siege	Ubisoft / Ubisoft Montreal, Sperasoft Studio	2015
Team Fortress 2	Valve	2007
Warcraft II: Tides of Darkness	Blizzard Entertainment	1995
Warframe	Digital Extremes	2013
World of Warcraft	Blizzard Entertainment	2004

All games were examined in their latest version in May 2020.

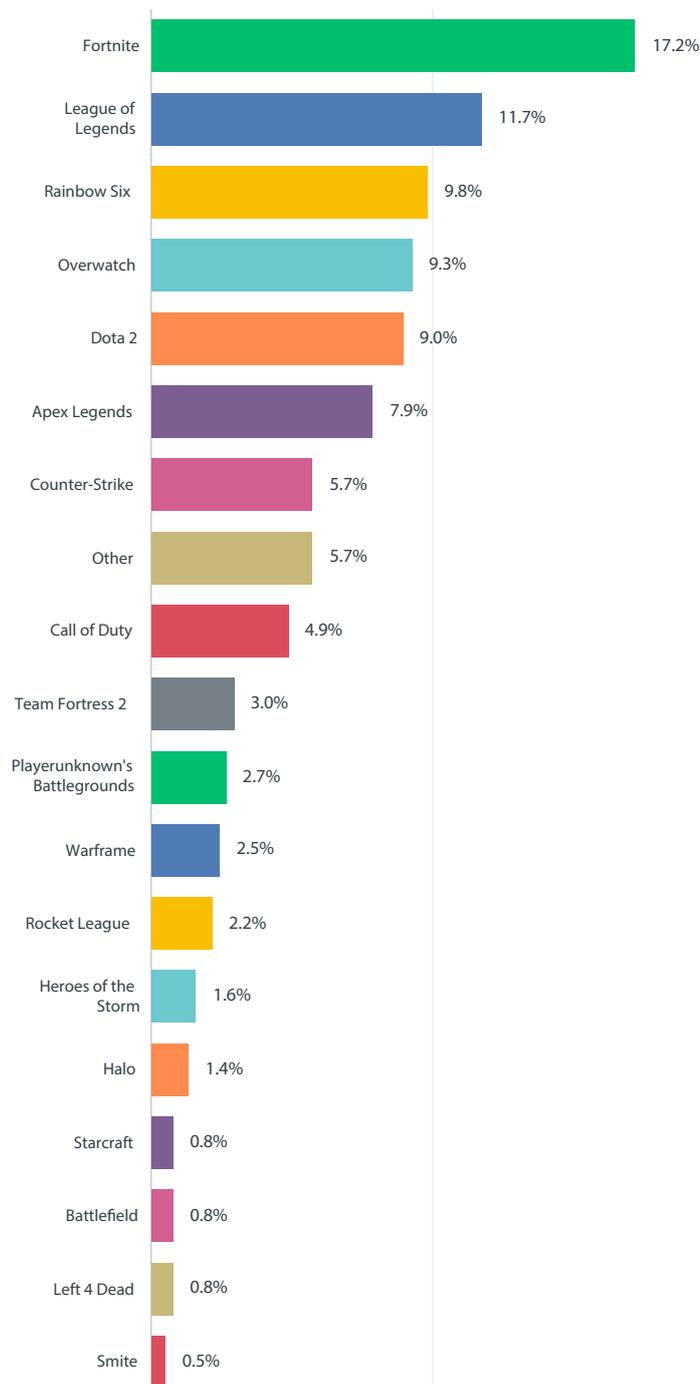
Personal Research

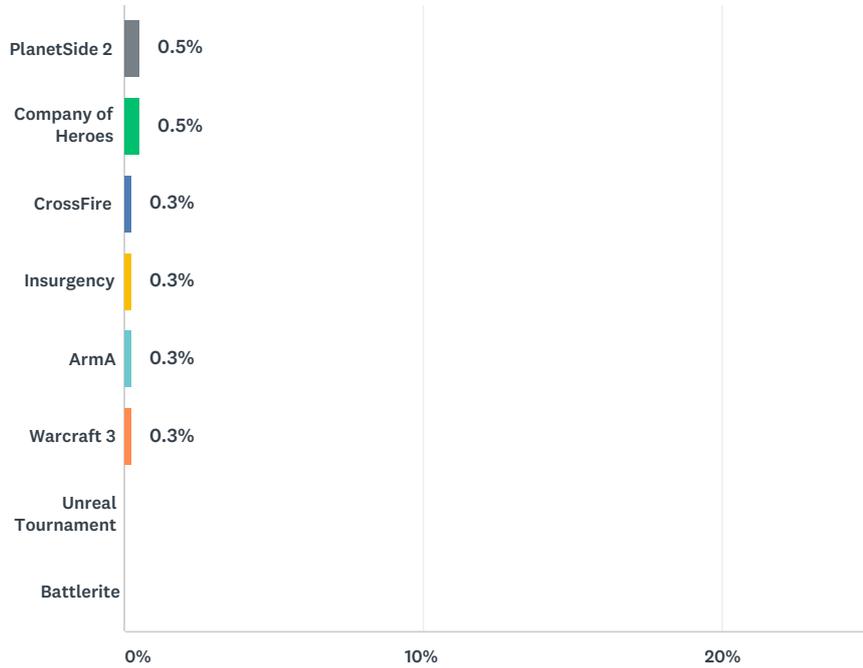
Survey about Communication and Teamplay Experiences

in Team Based Multiplayer Games - (Conducted in September 2019)

Q1 Please pick one of these team based multiplayer games that you play or have played on a regular basis and adjust your answers accordingly.

Answered: 366 Skipped: 0





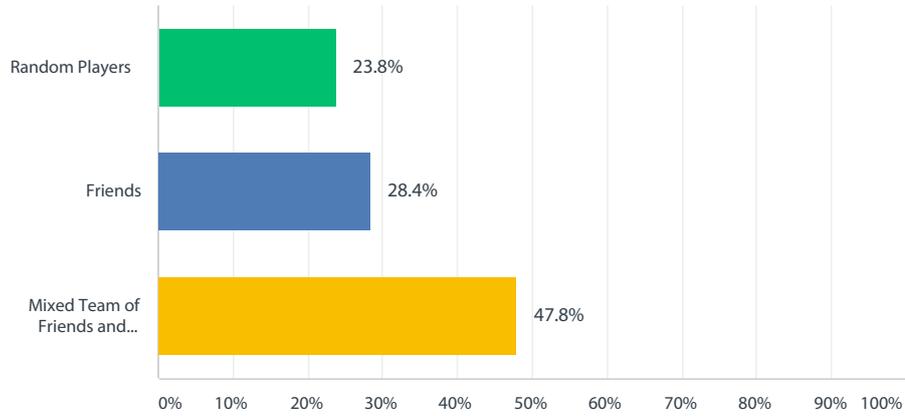
ANSWER CHOICES	RESPONSES	
Fortnite	17.2%	63
League of Legends	11.7%	43
Rainbow Six	9.8%	36
Overwatch	9.3%	34
Dota 2	9.0%	33
Apex Legends	7.9%	29
Counter-Strike	5.7%	21
Other	5.7%	21
Call of Duty	4.9%	18
Team Fortress 2	3.0%	11
Playerunknown's Battlegrounds	2.7%	10
Warframe	2.5%	9
Rocket League	2.2%	8
Heroes of the Storm	1.6%	6
Halo	1.4%	5
Starcraft	0.8%	3
Battlefield	0.8%	3
Left 4 Dead	0.8%	3
Smite	0.5%	2

PlanetSide 2	0.5%	2
Company of Heroes	0.5%	2
CrossFire	0.3%	1
Insurgency	0.3%	1
ArmA	0.3%	1
Warcraft 3	0.3%	1
Unreal Tournament	0.0%	0
Battlerite	0.0%	0
TOTAL		366

#	OTHER	DATE
1	Monster Hunter	7/17/2019 2:20 AM
2	All of them	7/16/2019 7:39 PM
3	Pokemon go	7/16/2019 7:25 PM
4	Total War Three Kingdoms	7/16/2019 12:14 PM
5	Tera	7/16/2019 8:06 AM
6	S4 League	7/16/2019 1:56 AM
7	Minecraft	7/15/2019 11:31 PM
8	World of Warships	7/15/2019 8:13 PM
9	World of Warcraft	7/15/2019 12:52 PM
10	Homeworld	7/15/2019 12:11 PM
11	Star Wars Battlefront (1 & 2)	7/15/2019 8:18 AM
12	Destiny 2	7/15/2019 7:33 AM
13	Minecraft Hypixel Skywars/Bedwars	7/15/2019 7:06 AM
14	Paladins	7/15/2019 5:41 AM
15	Minecraft	7/15/2019 4:34 AM
16	Fortnite	7/15/2019 2:27 AM
17	Paladins	7/15/2019 2:26 AM
18	Ring of Elysium	7/15/2019 1:41 AM
19	FiveM	7/15/2019 1:36 AM
20	Star Wars The Old Republic	7/15/2019 12:52 AM
21	Minecraft	7/14/2019 5:49 PM

Q2 Who do you usually play with in your team?

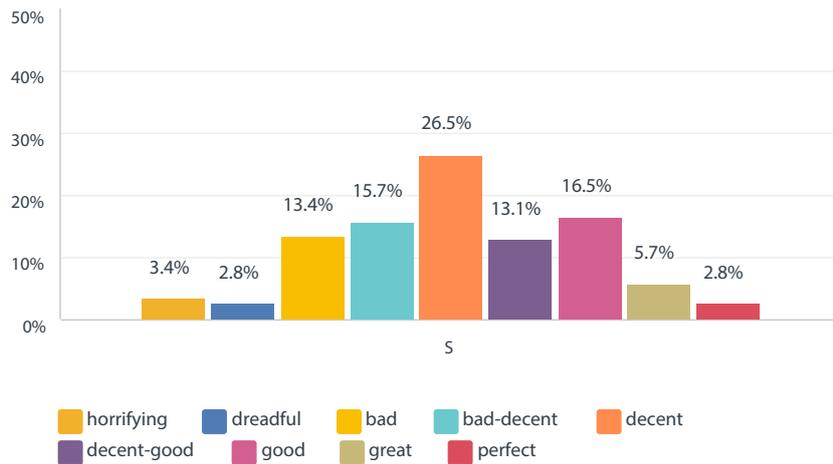
Answered: 366 Skipped: 0



ANSWER CHOICES	RESPONSES	
Random Players	23.8%	87
Friends	28.4%	104
Mixed Team of Friends and Random Players	47.8%	175
TOTAL		366

Q3 How would you rate your overall teamplay experience in your chosen game when you play in public with random players? (Skip this question if you only play with friends)

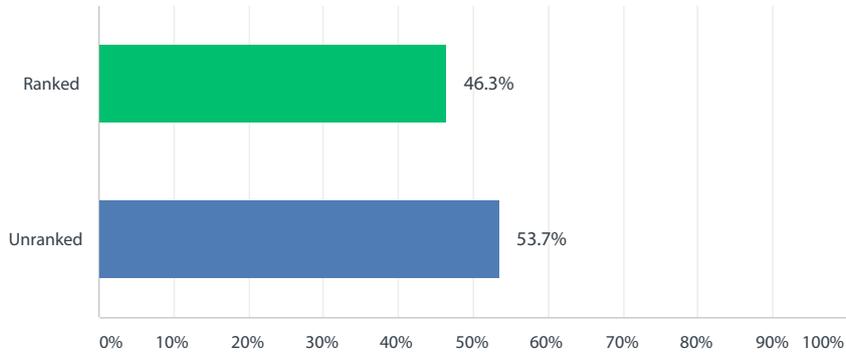
Answered: 351 Skipped: 15



	HORRIFYING	DREADFUL	BAD	BAD-DECENT	DECENT	DECENT-GOOD	GOOD	GREAT	PERFECT	TOTAL	WEIGHTED AVERAGE
S	3.4%	2.8%	13.4%	15.7%	26.5%	13.1%	16.5%	5.7%	2.8%	351	5.10
	12	10	47	55	93	46	58	20	10		

Q4 Are you mostly playing ranked or unranked matches? (Skip if not applicable to your game)

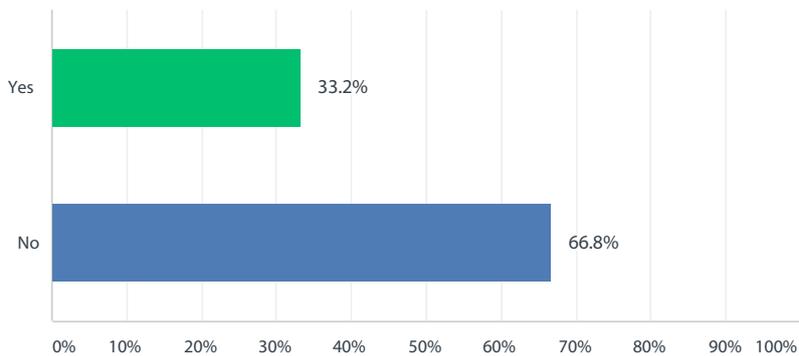
Answered: 328 Skipped: 38



ANSWER CHOICES	RESPONSES	
Ranked	46.3%	152
Unranked	53.7%	176
TOTAL		328

Q5 Do you think there is enough helpful communication going on when you play public matches? (Skip if you only play with friends).

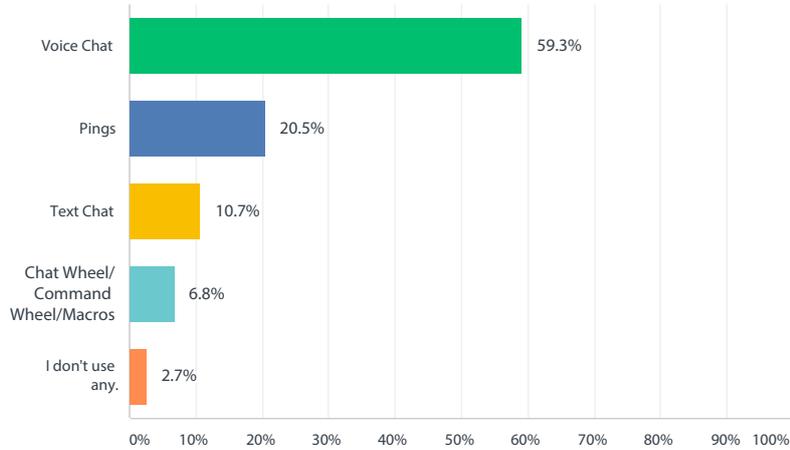
Answered: 331 Skipped: 35



ANSWER CHOICES	RESPONSES	
Yes	33.2%	110
No	66.8%	221
TOTAL		331

Q6 Which communication tool is your favourite to use in any game?

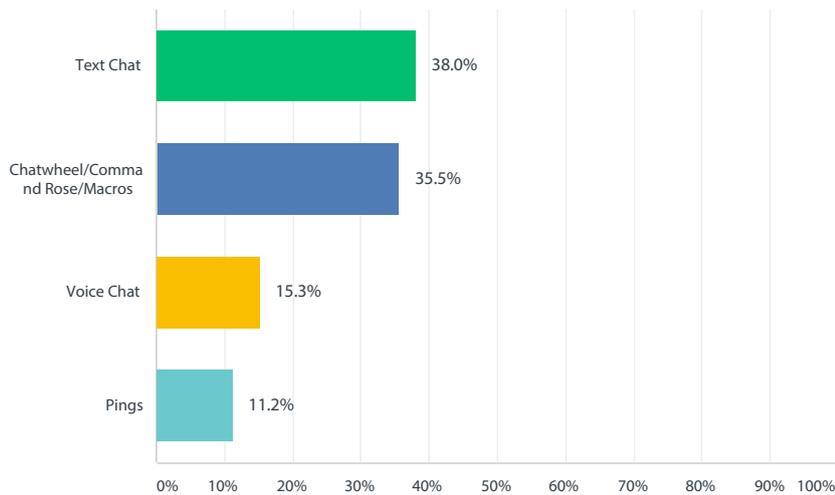
Answered: 366 Skipped: 0



ANSWER CHOICES	RESPONSES	
Voice Chat	59.3%	217
Pings	20.5%	75
Text Chat	10.7%	39
Chat Wheel/Command Wheel/Macros	6.8%	25
I don't use any.	2.7%	10
TOTAL		366

Q7 Which communication tool is your least favourite to use in any game?

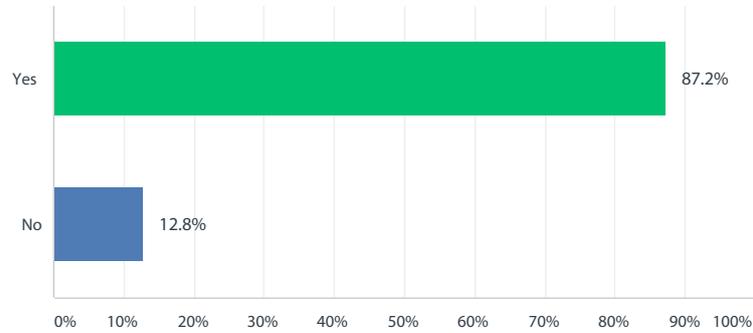
Answered: 366 Skipped: 0



ANSWER CHOICES	RESPONSES	
Text Chat	38.0%	139
Chatwheel/Command Rose/Macros	35.5%	130
Voice Chat	15.3%	56
Pings	11.2%	41
TOTAL		366

Q8 Would you be willing to give away hard earned resources to another player on your team in order to increase your chances of winning a match? (e.g. gold or items)

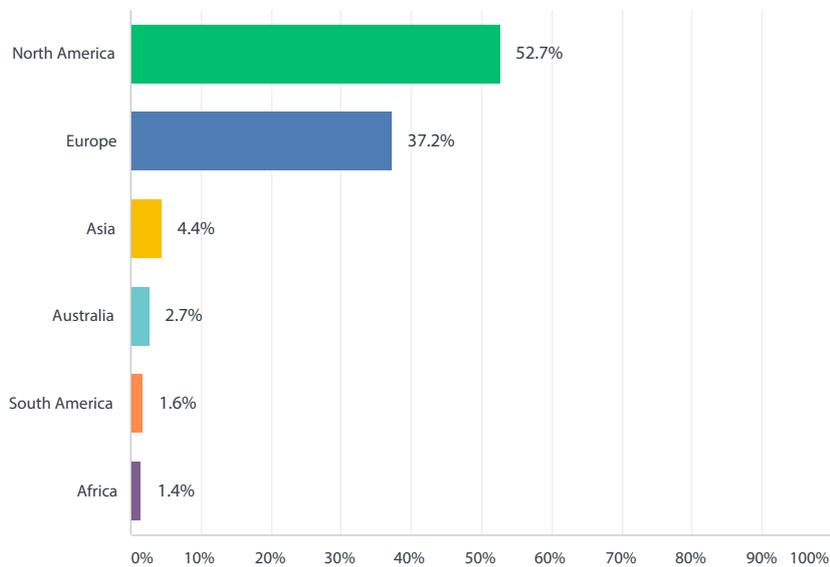
Answered: 366 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	87.2%	319
No	12.8%	47
TOTAL		366

Q9 (Optional) From which region do you usually play from?

Answered: 366 Skipped: 0



ANSWER CHOICES	RESPONSES	
North America	52.7%	193
Europe	37.2%	136
Asia	4.4%	16
Australia	2.7%	10
South America	1.6%	6
Africa	1.4%	5
TOTAL		366

Q10 (Optional) What kind of communication method are you missing or would you like to see implemented? (200 words or less)

Answered: 120 Skipped: 246

#	RESPONSES	DATE
1	Hand gestures and facial expressions just as you get in-person communicating.	9/2/2019 1:35 AM
2	N/A	7/25/2019 2:01 AM
3	Definitely voice communication. It's just that the devs are apprehensive about the increase of toxicity if this were added to the game. How come other games like Overwatch have embraced it? Seems like a no-brainer. The devs said it themselves that the most optimal way to play the game is with five people in comms, yet refuses to add voice chat for solo queue to the game.	7/24/2019 12:19 AM
4	nothing	7/17/2019 8:12 PM
5	n/a	7/17/2019 8:11 PM
6	-	7/17/2019 7:30 PM
7	Proximity chat	7/17/2019 7:30 PM
8	Its all good	7/17/2019 7:30 PM
9	I dont know	7/17/2019 7:25 PM
10	Unsure	7/17/2019 3:50 AM
11	Gesture	7/17/2019 3:04 AM
12	N/a	7/17/2019 2:21 AM
13	I can't really name any other communication methods that they could cover, other than hand gestures from certain characters, and even then, I don't think that'd really be great.	7/17/2019 1:45 AM
14	The best system is an in-game push-to-talk button. Failing to add or use such a system renders public games a considerably lower experience. As would failure to include mute functions.	7/16/2019 11:29 PM
15	Methods are fine, will/desire to communicate is lacking.	7/16/2019 10:48 PM
16	Lack of microphones in matchmaking, or players using non-game chat, like Xbox Party Chat or Discord.	7/16/2019 9:46 PM
17	I know that pokemon go stop the in game chat due to inappropriate conversations with underage kids but there has to be some kind of in game communication that can be implemented so that gamers can talk with one another about the game and possible meet ups as a group or if the person is available at the time to raid or play pvp.	7/16/2019 7:25 PM
18	Its not the method, its the mindset of people in mainstream games. If you play a game such as squad communication is never a problem...	7/16/2019 10:09 AM
19	I really want people to actually use call outs in rainbow six siege instead of just sitting there with their mics off. I lose half of my ranked matches because there is NO communication among randoms other than that one 8 year old kid thats loud and annoying	7/16/2019 7:36 AM
20	Automated 'pings' where I can hit a key on an enemy and have it automatically relay the information to my teammates, and show a generalized location on their map. I've seen games do this with a "Spotting" mechanism.	7/16/2019 1:56 AM
21	Advanced voice chat probably	7/16/2019 1:36 AM
22	voice chats just need to be in more games and easier to access. in some video games like only two people know how to use the voice chat.	7/15/2019 11:11 PM
23	quick talk macros that say something like we are moving on this camp or attacking the main base or that give direction	7/15/2019 11:03 PM
24	When playing with friends, we use Discord voice chat. When playing with random players, there is very little communication regardless of communication methods available.	7/15/2019 10:29 PM

25	I think voice and text chat would be cool, but also a report system that would allow players to find trolls and very toxic people and maybe chat ban or completely ban them.	7/15/2019 8:59 PM
26	Text macros link to abilities. i.e. macros used in EverQuest and WoW that let teammates know when someone was using a specific ability or spell in order to coordinate attacks.	7/15/2019 6:37 PM
27	like apex legends has very good communication method through pings ... it would be nice if it was in another games as well :D	7/15/2019 3:51 PM
28	For Apex Legends specifically I would want better voice chat quality.	7/15/2019 2:45 PM
29	Nothing Else, but voicechat should be more used.	7/15/2019 1:58 PM
30	Better quality VOIP Voice chat	7/15/2019 1:46 PM
31	Telepathy	7/15/2019 1:28 PM
32	I would like to have a more adequate voice chat, so that it feels better when you talk to your group/squad.	7/15/2019 1:07 PM
33	Non-verbal communication as used in Apex Legends, a very robust and succinct selection of communication prompts that give great information quickly without the need for voice chat.	7/15/2019 12:29 PM
34	I feel like the communication methods are great, the only thing needed is people that actually user the communication methods.	7/15/2019 12:01 PM
35	.	7/15/2019 11:20 AM
36	A more specific and alerting ping system to go along with voice chat so that when team-mates are speaking you can accurately and quickly transfer information to others but at the same time alert them to it aswell due to the fact most of the time no one will see your ping Dota 2 missing from lane pings are a good example because in the heat of things you usually wouldnt notice it unless you are truly attempting to pay attention	7/15/2019 10:39 AM
37	maybe where you can add connections on your rainbow account showing maybe your discord, skype, youtube, twitch etc. Then you can also see your rainbow acc on discord. idk, seems kinda cool	7/15/2019 9:42 AM
38	More Voice Chat.	7/15/2019 9:17 AM
39	I'm a PC player, so I think it'd be neat to have a small window in a corner of your screen showing what a teammate sees, thus avoiding the time commitment for text chat and cursing, etc. for voice chat, to know where others are/are seeing.	7/15/2019 8:18 AM
40	I think it would be useful for people without mics to somehow be able to show what's in their inventory or how much ammo they have. I don't know how this could be implemented, but it could be useful to see your teammates full inventories at a glance, even for people with mics. Sometimes people forget to mention what items they have that could help in certain situations.	7/15/2019 7:08 AM
41	I would like to see more games that involve story-based multiplayer. I think that communication is fine so far. I just think that theres no good story-based communication games. I also think the rise of A.I. emulators is a big deal. Eg. Drivatars from Forza.	7/15/2019 7:06 AM
42	n/a	7/15/2019 5:52 AM
43	well tbh i am when it regards to the coms on the it's all fine for me no need to change anything	7/15/2019 4:54 AM
44	In games that rely more on text chat (League, for example), I would want some way to quickly write things to your teammates, for example "let's take ____ objective" or "watch out for the enemy [role] in [area]."	7/15/2019 4:11 AM
45	Na	7/15/2019 3:44 AM
46	If people don't have mics then we shouldn't be matched with them.	7/15/2019 3:34 AM
47	I am not exactly sure how it could be accomplished, but with this game I would like to see something that strongly encourages voice chat so that people have to communicate with each other.	7/15/2019 3:00 AM
48	Overwatch needs pings	7/15/2019 2:56 AM
49	Global ingame chat synchronized with Discord (or any other good communication tools) inside the game Overlay is not good enough	7/15/2019 2:55 AM
50	Im satisfied with the current communication methods.	7/15/2019 2:31 AM
51	None Sub 2 pewds	7/15/2019 2:27 AM

52	I think a better text chat system would be great. Not many people use text chat to actually communicate (instead of being toxic)because doing so takes time and means you can't actually play while doing it. So if someone could come up with a better system that would be awesome.	7/15/2019 2:27 AM
53	Voice chat with randoms	7/15/2019 2:23 AM
54	Discord :)	7/15/2019 2:14 AM
55	Voice chat in league	7/15/2019 2:13 AM
56	Quick interaction call out (like a wheel or something) to quickly say phrases or callouts (either static or let you pick which to have in the wheel) instead of having to go through a sub menu of callouts	7/15/2019 2:09 AM
57	Proximity voice chat should be more common	7/15/2019 1:53 AM
58	Better voice chat	7/15/2019 1:47 AM
59	I would love if you could communicate using text to speech in fortnite like apex legends, that would be awesome	7/15/2019 1:44 AM
60	None	7/15/2019 1:39 AM
61	More of a apex style of pinging(looking then pressing a button to point something out)	7/15/2019 1:35 AM
62	N/A	7/15/2019 1:34 AM
63	No communication option is missing, but a more encouraged party chat would be nice.	7/15/2019 1:32 AM
64	I would love to use gaming headphones so I can have a better quality game and sound.	7/15/2019 1:25 AM
65	i would like to see more markers at once, what i mean by this is that when you mark on the map or just looking around you should be able to have more than one marker.	7/15/2019 1:22 AM
66	Voice chat in Rocket League	7/15/2019 1:20 AM
67	i think chat box in league should be changed where people can only send a certain amount of messages to decrease flame	7/15/2019 1:20 AM
68	In all honesty I just wish people were nicer.	7/15/2019 1:18 AM
69	None	7/15/2019 1:17 AM
70	Text to speech because sometimes people without mics won't get their messages read	7/15/2019 1:16 AM
71	Common sense	7/15/2019 1:14 AM
72	Braille	7/15/2019 1:10 AM
73	Discord a must	7/15/2019 1:08 AM
74	coaching should be updated	7/15/2019 1:03 AM
75	quick chat mechanics in warframe	7/15/2019 1:01 AM
76	To be honest? I would like a bigger set of smart pings added to the game itself. Apart from this I would like a pre match and during match full team voice chat	7/15/2019 1:00 AM
77	Easy chat would be good	7/15/2019 12:59 AM
78	Custom commands	7/15/2019 12:58 AM
79	Voice chat with the team when you're playing with randoms.	7/15/2019 12:58 AM
80	Some shorter communication/lines in Warframe would be cool. Coms aren't always needed in WF. It's got a great system already.	7/15/2019 12:56 AM
81	For apex legends (any real team PvP) people do a lot more than I scroll wheel can say, in my opinion voice is the best way to communicate but say if some one is reviving or doing something just crazy there needs to be more, even if it was voice to text it would be better than a lot of communication but in a PvP you can't have typing you need to have something quick and easy	7/15/2019 12:56 AM
82	I feel like text chat is just to troll the enemy team in dota 2	7/15/2019 12:56 AM
83	An automatic one Enemy on left side is called out by character to all team members	7/15/2019 12:55 AM
84	.	7/15/2019 12:54 AM
85	More specific pings	7/15/2019 12:53 AM
86	A chat wheel would be nice.	7/15/2019 12:53 AM

87	Just people not being so toxic.	7/15/2019 12:53 AM
88	N/A	7/15/2019 12:52 AM
89	Well I hope to see some sort of text chat like in Fortnite STW mode because often times, I don't have my mic for vc. It would be very nice to implement a text chat in fortnite in coming updates :)	7/15/2019 12:52 AM
90	I would like to see push to talk via controller plugged headset on consoles(ps4) so we have less open mic annoyances. I just want to tell everyone to keep the channel clear.	7/15/2019 12:52 AM
91	Voice Chat. Rocket League has poor, low-quality voice communication. Fast paced games like Rocket League are vital for team communication, especially when playing with random teammates that are not used to each others' play styles.	7/15/2019 12:52 AM
92	Better customization for voice chat. Like specific rising of volume and such. I also think narrator could be a nice option. Or maybe speech to text	7/15/2019 12:51 AM
93	not to mutch talking mostly the basics to worn my teemates	7/15/2019 12:51 AM
94	Proximity chat please	7/15/2019 12:51 AM
95	i would perfect a ping and voice chat system and maybe more it's really interesting	7/15/2019 12:51 AM
96	More ping variants, best example is how Apex does it, I would like to see tag implemented in Rainbow.	7/15/2019 12:51 AM
97	ldk	7/15/2019 12:50 AM
98	If you say something it typse the words you say and then the people van Read it	7/15/2019 12:50 AM
99	R	7/15/2019 12:49 AM
100	Maps or Coordination plans that can be filled out and edited by everyone on your team before the match starts. Kinda like a Google Doc but with strategy.	7/15/2019 12:49 AM
101	Proximity chat in all games.	7/15/2019 12:49 AM
102	Pc style comms on the console	7/15/2019 12:48 AM
103	I consider all methods of communication available to me now are already sufficient.	7/15/2019 12:48 AM
104	text to speech so that things said in chat by teammates can optionally be converted to audio	7/15/2019 12:48 AM
105	quick type system, kinda like already made phrases you can say by picking out a few	7/15/2019 12:48 AM
106	Ping system like in Apex Legends. Really lets you communicate with random matched players on your team.	7/14/2019 7:41 PM
107	If the game could suggest an action and the team vote on it (eg push bot lane, 10s vote)	7/14/2019 7:02 PM
108	Speech to text so you don't have to be on comms with randoms but also don't need to pause and type	7/14/2019 6:52 PM
109	Being able to reach through the internet to punch someone in the face for their stupidity :)	7/14/2019 6:16 PM
110	Vector commands, sorta like drawing arrows. It would function in a similar way like Pangolier's Swashbuckle, but it would draw a visible arrow to indicate which direction an action should come from.	7/14/2019 5:50 PM
111	Voice chat, pings and text is all that's needed.	7/14/2019 5:49 PM
112	Tactic Commands, like Split Push , or Play around Nash , That can ne used like a Ping	7/14/2019 5:48 PM
113	I don't do voice chat much myself, not really used to talk on the microphone on a daily basis since the area I play in is quite loud.	7/14/2019 5:47 PM
114	Dota 2 is pretty much complete in terms of available communication methods. The only issue is the toxicity which players may fester in and inevitably enjoy.	7/14/2019 5:47 PM
115	I need more than 2 chat wheels.	7/14/2019 5:43 PM
116	any way to communicate or relay information via in game action that doesn't rely on chatting.	7/14/2019 5:42 PM
117	I would like a ping system in Fortnite STW just like the one they have in BR.	7/14/2019 5:37 PM
118	Voice	7/14/2019 5:31 PM
119	Bigger emote wheel, the ability to mute team chat (which is being added in 9.14) & more consistent pings on abilities/passives (i.e more stuff like the # of stacks Draven has).	7/14/2019 5:29 PM
120	Google Translate for Russians flaming in chat	7/14/2019 1:09 AM

Author's Declaration

I hereby declare that I am the sole author of this thesis. To the best of my knowledge this thesis contains no material previously published by any other person except where due acknowledgment has been made. This thesis contains no material which has been accepted as part of the requirements of any other academic degree or non-degree program, in English or in any other language. This is a true copy of the thesis, including final revisions.

Z

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Zürcher Hochschule der Künste
Zurich University of the Arts

Erklärung Master-Thesis Originalität, Master of Arts in Design
Version 15.02.2019

Originalitätserklärung zur Master Thesis Design

Ich, (Name Vorname) Julian Bauer geboren am 13.02.1991 versichere, dass:

- die vorliegende Master-Thesis (Titel) Encouraging Teamwork Through Interdependent Game Mechanics selbstständig und ohne fremde Hilfe erarbeitet wurde.
- sie bisher weder in gleicher noch in ähnlicher Form an anderen Hochschule eingereicht noch veröffentlicht wurde.
- bei Gruppenarbeiten, die Angaben darüber, wer welches Kapitel verfasst hat, genau den Tatsachen entsprechen.
- keine anderen als die angegebenen Quellen und Hilfsmittel verwendet wurden und dies sich auch auf alle in der Arbeit enthaltenen Zeichnungen, Skizzen, bildliche Darstellungen und dergleichen bezieht.

Ich anerkenne, dass diese Master-Thesis in den Bestand der ZHdK aufgenommen wird und allenfalls, in Teilen oder als Ganzes, publiziert oder Dritten zugänglich gemacht wird.

Die eingereichte Master-Thesis Theorie hat einen Umfang von 192479 Zeichen.

Ort, Datum

Lörrach, 09.05.2020

Unterschrift