Current Practice and Challenges in Coaching Esports Players:

An Interview Study with League of Legends Professional Team Coaches

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Abstract: Esports is rapidly growing around the globe. The need for coaching best practice is becoming essential with growing investments in teams and players. In this paper, we investigated the current coaching practices and challenges in League of Legends professional teams by interviewing professional coaches from international teams. Our results showed unanimous agreement that coaching in Esports remains in its early stages, with a need to develop standards for coaching. We were able to understand the role of coaches, their different positions, and their skill requirements. We were also able to learn the challenges players face such as long practice hours, player attitudes, mental stress, and other health concerns such as back and wrist injuries. From the interview, we identified nine aspects of research requiring future studies.

Keywords: Coaching, Multiplayer Online Battle Arena (MOBA), League of Legends (LOL), Challenges, Esports, Stress

1 Introduction

Competitive and organized video games, also known as Esports, have been rapidly growing for several years and are projected to become a $1.5 billion market by 2023 [1]. The majority of games in the Esports genre are fighting games, real-time strategy (RTS), first-person shooters (FPS), and multiplayer online battle arena (MOBA) games, with MOBA games being the largest Esports scene [2,3]. League of Legends (LOL) is one of the most popular MOBA games [4]. According to Statista, the League of Legends Championship Finals had 99.6 million viewers in 2018 [5], significantly higher than the NBA Finals, which averaged 17.7 million viewers [6], and very close to the 2018 Super Bowl game, which had an estimated 103 million viewers [7]. Esports tournaments are played in traditional sports arenas/stadiums that can host tens of thousands of fans, in which the players are setup in the center of the arena with large screens overhead for the fans to watch, as seen in Figure 1. This photo was taken by one of the authors in 2019 at Little Caesars Arena (22,000-person capacity) in Detroit, Michigan, which hosted the 2019 North American summer LOL playoff semi-finals and finals. LOL tournaments have been taking place in large stadiums long before that. In 2013, tickets for the LOL finals hosted at Los Angeles's Staples Center sold out in an hour [8]. This growth in popularity is attracting more investors, from celebrities to billionaires, such as Mark Cuban, Michael Jordan, Shaquille O'Neal, Ashton Kutcher, and Jennifer Lopez [9]. As a result, the value of Esports teams is booming. For example, *Cloud9*, an Esports team participating in LOL and other games, was valued at $400 million USD in 2019 [10]. Additionally, the average salary of professional players in North America is about $410,000 in 2020 [11].



Figure 1. North America League of Legends Semi-finals 2019, Little Caesars Arena, Detroit, Michigan

In 2020, during the COVID-19 pandemic, LOL Esports tournaments were not canceled because, unlike traditional sports, there is no need for players to be in close proximity. In fact, the number of Esports leagues is increasing during the pandemic. For example, Ontario Post-Secondary Esports, which is a new Esports league located in Ontario, Canada, launched in fall 2020 [12].

An increasing number of universities are offering scholarships for Esports players. Robert Morris University (RMU) was the first university to recognize Esports as a varsity sport under its Athletics Department [13], and many other universities are now offering Esports scholarships to students, such as the University of California-Berkeley [14], University of Utah [15,16], and Western Kentucky University [17]. Some Ivy league universities have fielded their own teams to intercollegiate and intramural competitions in gaming, such as the Harvard College Esports Association [18], University of Pennsylvania eSports Association [19], and Columbia University eSports [20].

Studies on Esports are still in their infancy and there is not enough research to understand the current situation of professional Esports teams. In addition, the methods to evaluate professional players, coaches, and teams have not yet been explored by the research community. Therefore, to fill this gap, the current study aims to establish a knowledge base for understanding coaching in Esports, specifically using League of Legends (LOL) as an example. Additionally, this paper sheds light on the challenges faced by Esports coaches, teams, and players, such as long practice hours, players' attitudes, mental stress, and health concerns.

League of Legends has four major competitive regions and a total of 47 major teams: 10 teams in North America (NA), 10 teams in Europe (EU), 10 teams in Korea (KR), and 17 teams in China (CN). With rapid growth and huge investment going into Esports, the need to protect such investments and ensure the quality and performance of players is becoming increasingly important. In the first two years of LOL's 11-year history, most teams had no coaches. Starting from the third year, the teams started to hire coaches after realizing the importance of coaching. Currently all professional teams have coaching staff typically including a head coach, an analyst, and sometimes an assistant coach [21]. In the current study, we interviewed LOL coaches to understand the challenges they face and find research opportunities that would address and aid in solving these challenges.

2 Literature and Background

Although studies on Esports research are rapidly growing, researchers acknowledge that such studies are still in their early stages [22]. For example, regarding mental factors affecting professional players, Nilsson and Lee (2019) looked at the mental pressure that players are exposed to, such as the pressure from parents, social media, and toxic behaviors in MOBA games. Mora-

Cantallops and Sicilia (2018), in their paper "MOBA games: a literature review", studied the current state of research in MOBA games and identified relevant papers published in this field. Their findings showed that LOL is the most-researched MOBA game, yet the field remains underexplored by researchers.

Regarding Esports player performance, related research is very limited. A recent study analyzed the variables associated with performance in MOBA Esports, such as the numbers of Towers and Inhibitors destroyed in the match; Towers and Inhibitors are structures in game, and destroying them is a core objective to win a match [24]. However, further research is required to determine the effectiveness and relevance of these variables because the results showed association that may not be causation. Researchers also found that video game players' reaction times start dropping by the age of 24, leading to a relatively young retirement age of 25 [25,26].



Figure 2. LOL Arena

The most-explored MOBA games are LOL and Defence of the Ancients (DOTA) 2 [22]; these games have different execution but are similar in concept. The following paragraphs provide a brief introduction to the basic game rules and strategies. In LOL, two teams of five players fight against each other to destroy each other's Nexus, which is a structure located inside a team's base. There are three lanes in the arena (Top, Middle: Mid for short, and Bottom: Bot for short) with a jungle area separating the lanes, as seen in Figure 2. The Top and Mid lanes almost always see one player fielded in each, whereas the bot lane sees two players fielded, a damage dealer and a support (usually a utility champion to enable or protect the damage dealer). The jungle is where the 5th player goes, and this player is referred to as a "jungler".

During a match, the players will first enter the "champion select" phase, in which each player is assigned a lane, and a champion (a character to control in game) is chosen from a pool of approximately 150 champions each with different strengths and unique abilities. The players will



Figure 3. LOL Laning phase

then enter the arena and move to their designated lane. Each player in a lane, sometimes referred to as “laners”, will kill creeps (non-player characters constantly generated by the game to fight for each side) to obtain gold, an in-game currency that will be used to purchase items to strengthen their champions, as well as experience that will level up champions for more stats (ability points). This phase of the game is referred to as the “laning” phase. Moreover, during the laning phase, players will try to attack their opponents, hoping to either kill them or distract them from killing creeps. An example illustration of “laning” can be seen in Figure 3, in which the larger characters are champions, characters controlled by the players, and the smaller ones are the creeps, also referred to as minions.

During the laning phase, the jungler kills monsters in the jungle, also referred to as jungle camps, to gather gold. Sometimes, a jungler will assist laners by ambushing opponents in a lane to help their team-mates gain an advantage. Killing an opponent’s champion is rewarded by approximately 10 times more gold compared to killing a creep.

Laning phase usually ends when a team gathers enough gold and experience and believes they are strong enough for a team fight, in which they group up to secure objectives such as destroying towers. Towers are structures that defend a battlefield, and each team has a total of 10 towers spread across the map. Destroying these towers enables a team to control a battlefield and move closer to the enemy Nexus, which is the main objective. A team usually wants to prevent the enemy team from destroying a tower and in some scenarios is forced into a fight to defend their tower. The stronger team will usually win the fight and attack the enemy tower until it is destroyed and/or their enemy is dead. Players’ champions remain dead for a few seconds before spawning again and returning to the battlefield. A team will have to destroy all the towers in one of the lanes to reach the Nexus, and the team that destroys the enemy’s Nexus first wins the game.

The following is a list of concepts and terms frequently used in LOL and other MOBA game player communities.

Scrim. This term is derived from "scrimmage" and is used to describe a practice match between teams.

The meta. This is a term used to describe the best way to play the game by utilizing characters, items, or other variables within a game. LOL implements small changes every two weeks, which results in a "shift in the meta" or a change in game balance and the optimal way to play the game.

"Int" or "run it down". This means intentionally dying in the game. This is viewed as an issue because a death provides resources to an enemy team. In pro play (professional games), an "int" or a player "running it down" is considered to have died in a foolish way, sometimes due to lack of focus or being distracted.

Tilt. This is a mental state in which a player becomes frustrated and loses focus. Sometimes a tilt results in players giving up or making desperate plays.

Solo queue. This means going into a game with random team members and competing with other random players.

"**Buffs" and "nerfs**"**.** In the context of the in-game balance patches, buffing or nerfing relates to an increase or decrease in specific attributes. The game designers monitor the performance of champions and items to check if they over/under perform relative to each other, then "buff" or "nerf" the champions or items accordingly [27]. For example, if a champion is "buffed", this means that the champion has gained more power or influence in the game. In contrast, if a champion is "nerfed", this means that the champion has lost some power or influence. The terms buffs and nerfs applies to both champions and in-game items.

Although Esports are becoming increasingly popular, there is almost no existing literature on Esports coaching methods and the challenges coaches face. As a result, further investigation is required to understand the current state of coaching, and this can be done by interviewing professional LOL team coaches to provide the knowledge foundation for future research. One of the authors of this paper has eight years of experience playing LOL and was rated in the top 1% of players in solo queue games in 2017 and 2019. This experience and knowledge allowed us to understand the coaches and identify key issues during the interview study.

3 Interview Setup

In professional LOL games, there are four major regions of play (North America, Europe, China, and Korea). We contacted all 47 teams using their public contact information, of which six teams agreed to participate in this interview study. Among the six participants, there were five males and one female, with age ranging from 26 to 33 years old (average 28.8 years). Two of them were from North America, and four were from Europe. Their roles included four head coaches, one analyst, and one general manager.

The interviews were conducted to gather data and allow each coach to express their thoughts and concerns. The participants were given a list of questions in advance to shape the overall theme, and then a meeting was scheduled using an online platform of their choice such as Skype, Discord, or Hangouts. The general theme of the questions revolved around performance assessment methods, training in Esports, general game knowledge, and challenges a coach faces in Esports. The participants were asked for their consent at the start of the interviews. During each interview, they were asked to talk about the current state of the league in general, without the need to reveal specific information about their own team.

The average time for the interview was one hour. The participants volunteered their time and were not paid or compensated. This study was reviewed and approved by a research ethics committee at the University of Waterloo. The interviews were audio recorded using Open Broadcaster Software (OBS). Recordings were then transcribed into text manually because transcription software failed to recognize game-specific terminologies, such as “scrim”, “meta”, and “int”. Two researchers independently performed thematic analysis using a combination of deductive and inductive approaches. The comparison of coded data from the two researchers showed high similarity and consistency, so the results were merged and grouped into a hierarchical structure of themes and keywords (Appendix A). The following section presents the results in details.

4 Data from the Interview

The information obtained from the interviews was categorized and grouped into different sections. The major findings were grouped into two categories with accompanying subcategories, as follows.

4.1 Esports coach general information

4.1.1 Role of a coach

Every coach had their own philosophy, perhaps because the challenges facing each team are different. For example, Coach #2 said, “*The role of a coach depends completely on the roster. Each team will need a varying level of skill based on their needs*.” Although there was no consensus on the best practice for coaching, there was a unanimous consensus over five key objectives of a LOL coach: identifying the players’ potential and create winning conditions for the team, developing synergy and trust within the team, developing the micro and macro play of the

team, setting goals to continuously improve the players, and motivating the players to improve and maintain peak performance.

Players' potential. Each player has their own strengths and weaknesses, and a team usually aims to pick a roster in which each player's strengths are complemented and their weaknesses are covered. However, the number of variables that account for the strengths and weaknesses of players are unidentified and differs between roles. In LOL, there are five core roles: top, jungle, mid, Attack Damage Carry (ADC), and support. Each of these roles has its own sub-role, which is basically the style a given player uses to execute their objective. For example, a support role can generally be a utility player, a "play-maker" player, or a damage dealing player (there might be more sub-roles, but this is a simplification to illustrate the potential amount of variables), and these sub-roles can be executed with many different champions. The number of champions in LOL as of 2020 is over 150 [28], and this number increases by approximately six champions per year [29]. These variables collectively shape the strengths and weaknesses of players and teams, and head coaches are expected to utilize these variables. The reason for releasing new champions is to add new gameplay opportunities for players to engage with, which is viewed as mini-expansions according to the game developers [30].

Synergy and trust. According to the coaches, synergy and trust go hand in hand. For example, Coach #3 coach stated:

> "*If you want to have a good team, then you need to obviously have a bond of trust between players so that players feel they are able to make mistakes in order to take opportunities. If you are constantly afraid of making mistakes, you won't take opportunities that you have. The same goes for if the player is not trusted, the team will not follow up with his calls, which leads to bad synergy*."

In LOL, players are constantly making decisions. In many cases, there is not enough time for the players to communicate their thoughts, and as soon as an opportunity presents itself, players are expected to react swiftly. These reactions collectively determine whether an objective is achieved. Players need to know what their team needs from them at any given time and act on it with minimum communication, because the window of opportunity might be only a few seconds, not enough for communication. As soon as a player sees an opportunity, they should react and trust that their teammates will follow up with whatever actions necessary to win in that situation. This trust takes time to develop, and head coaches try to ensure that such trust and bonds between players are as strong as possible. There is no standard approach to develop such a bond. However, a few coaches try to arrange for the players to do activities together outside of practice and competition, such as watching a TV show or going for a short trip on vacation days.

Micro play. Generally, micro play skills mean a player's ability to control his individual champion character and press advantages in a game [31]. It depends on many factors, such as knowledge about a champion's abilities, optimal ways to use those abilities, positioning the character in a game, and landing skill shots. Individual players may be lacking in some of the micro aspects of the game, and coaches are expected to either train them using their "positional coaches" or avoid putting them in positions where the enemy can capitalize on such weaknesses. A positional coach usually has enough game knowledge to train a player's micro skill during practice days. This aspect of LOL relies heavily on what is referred to as "mechanics," which refers to the player's hand-eye coordination and response speed.

Macro play. Macro play involves the bigger picture and relates to the strategic side of the game. It relates to how the team moves around the map and executes their strategy to win objectives [31]. This aspect of the game relies on game knowledge and awareness. A head coach

and an analyst, along with the players, develop the macro play of the team. One way of developing a team's macro is by analyzing their opponents and creating a countermeasure strategy.

Goal setting. Coaches are expected to set weekly goals to improve the players and the team overall. The goals depend on the current strengths and weaknesses of teams and players. The players aim to achieve these goals by practicing in scrims and solo queues. The goals may be related to macro play, micro play, or communication. For example, a team might be underperforming because their leader is not decisively communicating their thoughts, so their teammates will hesitate to follow up. A head coach usually identifies this through discussions after the game and then sets a goal for the player to be more decisive on practice days.

Motivating players. Because the game is constantly changing, the players need to routinely practice to maintain their skills, as optimal tactics and the best game characters to choose keep changing with game updates and balance patches. Keeping the players motivated to practice long hours is difficult, and the coaching staff are expected to help the players with motivation. This is an ongoing problem, and coaches are still looking for the best ways to motivate players.

4.1.2 Coaching positions

There are four main coaching positions in LOL teams.

Head coach. The head coach is responsible for the team's overall performance. A head coach's role in a team is to determine "*whatever the team needs in order to perform at peak performance*" (Coach #4), from managing the players and their environment to planning practice routines and strategies. Additionally, they are responsible for developing synergy and trust within a team.

Assistant coach. The assistant coach is expected to complement and assist the head coach. Additionally, they schedule and supervise scrims and make sure goals are being met.

Analyst. An analyst works together with the head coach and assistant coach to generate strategies based on information obtained from their team or their opponent. Both the team members and opponents are analyzed, and their strengths and flaws are pinpointed to develop a strategy that can utilize the strengths and flaws of a team. The information is usually obtained by either analyzing their game stats or analyzing the match's replays. Both are provided by the game developer.

Positional coach. A positional coach focuses on improving each individual player based on their role or "position" in the team. This is done by identifying opportunities for improvement and then working together with the player to achieve the set goals. Additionally, they record information related to each player to assess and improve the players.

Other notable positions are as follows.

Scouts. This position is responsible for identifying players that have potential to recruit them. This is usually done by monitoring solo queue games across regions and academy teams.

Sport Psychologists. Sport psychologists are becoming more popular in Esports; however, not every team has one. The role of a sport psychologist depends on a team's needs. This ranges from managing the stress levels of players performing on big stages to creating a team atmosphere that supports trust and growth. The reasons not every team has one includes cost and that some coaches believe a sport psychologist cannot understand or connect with Esports players, perhaps because they are unfamiliar with the situations or the gameplay.

4.1.3 Coach skill requirements

The coaches surveyed unanimously agreed on four essential skills for coaches: Leadership, communication, ability to set goals, and game knowledge. When it comes to game knowledge, a team with established veteran players will need a coach that can work on the environment and

control the team's discussions, because veteran players are good enough to fix their own game-related problems, and the coach's role in this case is to have enough game knowledge to identify whether things are getting off-track. In contrast, a team with new talent (rookies) will need a coach that has greater game knowledge compared to a coach for a team of veterans.

4.1.4 Evaluating the performance of coaches and players

The coaches unanimously agreed that there is no single best practice to evaluate coaches and players; however, the current evaluation approaches are as follows.

Evaluation of coaches. This depends on the role of a coach and the goals they were expected to achieve within the team. Currently, teams evaluate coaches based on results (e.g., win/lose ratio), pre-defined goals, and in some cases, through feedback from the players. Coaches are relatively hard to evaluate as their roles involve more qualitative factors.

Evaluation of players. Players are evaluated by the coaches based on their growth, progress in week-to-week goals, and overall results (e.g., win/lose in lane). For example, a player in the Mid lane can "lose the lane" by dying to their opponent. However, there are no standard quantitative key performance indicators for teams to assess their players.

The coaches mentioned that fan feedback on social media platforms can influence a team's decisions and shape the fans' opinions on players and coaches. As a result, there have been cases where teams removed or recruited players due to community (fan) pressure. Increasing the number of fans will make the players feel their support on stage, which would increase their confidence. Additionally, more fans mean more revenues from advertisement and sponsorship. Currently, teams are sponsored by a wide range of international companies such as energy drinks, gaming peripherals, multiple gaming PC brands, insurance companies, and car companies.

Selection of coaches. Most of the coaches agreed that there was no single best practice to evaluate and recruit a coach. Sometimes the team's top management asks for players' feedback after having a specific coach for a time. Most coaches' activities take place behind the scenes, and it is very difficult to assess a coach's impact on a team. Currently, there is no defined career path for someone to become a coach. Ideally, a coach should be a professional player first then transition into coaching. Still, due to the relatively new scene, there are not enough professional players who have retired and transitioned to coaches. An experienced player transitioning into coaching will have excellent game knowledge and earn the player's respect relatively easily. Some coaches currently suffer from players not respecting their opinions due to the coach not being mechanically skilled in the game.

Selection of players. There is no best practice for assessing and acquiring a player, but it is relatively simple compared to acquiring a coach. Teams and coaches rely on the "eye test", in which they will observe and evaluate a player's public games. LOL has a "Pro-view" feature which enables spectators to watch tournament games from a player's point of view; this feature aids the spectator in understanding and evaluating a player's movements, responses, awareness, and other macro and micro skills. What is lacking, however, is a method to evaluate new players (rookies). Even though the solo queue game records of rookie players are publicly available, this is not enough to evaluate a player as they are playing both with random players and against random players, so skills such as teamwork and performing under pressure in high-stakes games are hard to assess. LOL has an application programming interface (API) in which in-game data are recorded to be used for analysis; however, coaches have expressed that the data available are not sufficient and seem to be associated with wins and losses rather than the causes.

Teams and coaches value the following aspects of a player: their growth potential, communication skills, attitude, and sometimes language in the case that a certain player is a foreigner from another region.

4.2 Challenges in LOL Esports

4.2.1 Practice Routine in LOL Esports

Coaches and players set weekly goals that they aim to achieve through scrims and solo queuing. Scrims usually last 6 hours, which includes 6 games against another team and discussions between games. On top of that, they practice in solo queues for an average of 6 hours at a time. Total daily practice times are 12 hours on average, with minimums of 8 hours and maximums of 15 hours. There are 4 break days during a month (i.e., once a week), but even on those days, some players choose to play in solo queues, to stay ahead of the competition.

During scrims, teams practice strategies against other professional teams; however, the level of cooperation between teams is limited. For example, if a team wants to practice against a team with a specific composition, they do not ask their opponent to adopt that composition. One reason for this is because a team that cooperates will deviate from their own objectives, and then the practice time from their point of view will not be sufficient. Additionally, teams are afraid of revealing information during practice, which disincentives teams to cooperate. As a result, most cooperation happens between a team and their academy team, which is a sub-team within an organization. Every major team has an academy team, and these teams have their own small tournaments for the purpose of developing new talent. Sometimes a team practices against its academy team when they do not want to reveal strategic information to potential opponents.

The coaching staff struggle to keep the players motivated, which leads to players sometimes not taking scrims seriously. This is common among most teams, perhaps because of

the long working hours, as it is difficult for a player to stay focused when they practice for 12 hours a day, six days a week. Additionally, the game does not have any practice tools for teams to train on a specific phase in the game or under specific scenarios. As a result, if a team wants to practice a team fight when all players' characters are at the max level, they will have to play through all the previous phases of the game to level up and reach the maximum level before practicing the real deal. It not only wastes time but also makes players less motivated during practice because they have to play through the "boring" part of the game first. The reason players need to practice for long hours is because the meta, the best way to play the game, is constantly changing due to the high frequency of game patches. Approximately every two weeks, a new "balance" patch is applied to the live servers, in which some champions and items are "buffed" and "nerfed". These constant and frequent changes cause the meta to shift rapidly, and players are continually searching for the best way to play the game as a result.

4.2.2 Stress in LOL Esports

All the coaches agreed that stress has a noticeable significant impact on a player's performance. Coach #6 said,

> "*We are spending so much time practicing the game, and spending very little time nurturing the mind and managing stress levels*," and "*Mechanical skills is what gets you there but it does not make a difference if you cannot manage the stress*."

The coaches' concerns related to stress can be summarized into five categories including: translating scrim performance to stage performance, stage nerves, social media, disappointing the organization and fans, and being evaluated. The factors triggering stress are overlapping and interconnected.

Translating scrim performance to stage performance. This is the most common cause of stress to players according to the coaches we interviewed. Teams usually practice specific strategies during their scrims; however, most teams seem to struggle to perform the same way when they play on stage. Some argued that playing in front of crowds might be affecting the players, while others said that their opponents in scrims play in more risky manner than they do on stage. In scrims, players can develop methods to punish such risky behavior, but on stage, their opponents may play more conservatively, which is a style the players did not practice against. This issue of players playing riskier in scrims and then switching to a conservative style seems to be a recurring issue, and some teams struggle because during scrims they do not get to practice against teams that play conservatively. As a result, in some cases, even when the players perform very well in scrims, they lack confidence going into a stage game out of fear that they may face a different style than prepared for. This issue also reduces the efficiency of training before stage games.

Regarding risky behavior, most players prefer to play that way in scrims to "test their limits", as it is a quick way to understand what works and what does not work before an important match; this kind of attitude may help the player who took the risks, but it gives a false scenario to the opponent they practice against. Coach #5 partially supported the risk-taking behavior in scrims and added,

> "*They have always developed by being decisive, not by rationally thinking if every single move is the optimal move. They check if it is the optimal move by going for the instinct of decision… it's a massive process of trial and error*". He also added a downside for this trial and error process, "*by focusing on their individual development, they are making it*

harder for the rest of the team to individually develop, because the rest of their team isn't able to play on what you can say stage circumstances".

Stage nerves. Esports players are not used to playing on a stage in front of thousands of people. They are young adults who spend most of their time alone in their rooms in front of a computer, and the transition from their rooms to a stage is a relatively huge step compared to traditional sports. In 2020, due to the COVID19 pandemic, the League of Legends European Champion (LEC) tournament was played online and not on stage. Two teams with new rookies were able to stay at the top of the league, and qualified for the world championship. However, the world championship was played on stage in China, and that seemed to affect the players of these two teams. Their performance was below expectations, and their coaches expressed on Twitter that their players were nervous and new to such exposure and asked the fans to go easy on them on social media.

Another angle to stage nerves is related to the change of environment. As the players spend around 10 hours a day playing in their comfortable room, the sudden change to a stage setting has a noticeable impact. For example, Coach #3 said:

"*I don't think the fear of stage is due to a social stimulus… I think it is just a very new environment where things are very different to what they are used to, the lights are different, the smell is different, the temperature is different, the sound is different, and all those are distractions*."

Coach #3's approach was to minimize the effects of these distractions by replicating the stage experience. This included using the same setup (table, chair, screens, temperature, etc.) as the one on stage. Additionally, players on stage play with "white noise" in the background so that they do not hear the fans (as required by the game rules); however, players are not used to having

white noise, and sometimes the verbal communication quality is reduced. Verbal communication on stage is done through earphones, and only the players can communicate with each other. The coaches cannot communicate with the players during the match. However, the coaches can listen to the player's communication for evaluation purposes. As a result, most teams have started to use white noise in the background during scrims to reduce the distraction when they go on stage. Also, each player brings their own peripherals (mouse, mouse pad, and keyboard) because a slight change in a peripheral will make the player uncomfortable with his abilities, and their performance will significantly drop. As the players rely on what they call "feel", they do not think about the movement of their hand on the mouse or keyboard, since it just feels "right", and they can instinctively perform the right moves to execute a commend. If a professional player suddenly changes their mouse to another type, they cannot rely on feel because something has changed and they will no longer be in their comfort zone [32].

Social media. In Esports, a professional player is more connected to the fans compared to traditional sports, because the player can randomly meet fans in a solo queue (the public server) or during streaming. Fans of Esports players can also watch their favorite players stream their solo queue games on streaming platforms like Twitch, which enables them to watch and communicate live with a player. Moreover, professional players are active on Twitter, where they communicate and respond to fans. Another platform used extensively by the community is Reddit, in which fans can post any topic related to the game, and in some cases express their opinions on players. Players have grown used to regularly checking Twitch, Twitter, and Reddit, and with the huge amount of information, especially when related to their performance, it becomes hard for the player to stay focused on the game. This sometimes leaves the players so stressed out that they play very passively because they do not want to make mistakes. According to the coaches, this type of issue

seems to be common among new players, but not veteran players, and therefore, coaches ask new players to distance themselves from social media to reduce the distractions.

Disappointing the organization and fans. Fears of disappointing the organization or of losing their job are apparent in many players. Coach #1 said,

> "*A lot of the pressure comes internally from the organizations themselves …… disappointing the organization and risk of losing your job…. a lot of organizations base their opinions of social media*".

These players are mostly young adults, usually between the age of 18 and 27 with an average age of 21 [33], who are not used to doing anything on their own, so the transition from their parents' house to a gaming house where a team trains is often a significant shock. Given the amount of time they spend in the game, they have no time to develop skills that would help them transfer to another job outside of the Esports industry. The stake of losing their game playing job is relatively high.

Being evaluated. Social media shapes the public opinion on a given player, which may impact their job. New players are more effected by this than established players. Most of the coaches agreed that players stressed about public perception as they enter the stage. Players are being judged by the fans, teammates, opponents, and the casters (shout casters commentating on the game). Additionally, spectators (fans watching the game) can watch the game from the players point of view, which allows spectators to easily detect mistakes and post it on social media to harass the players. Fans of an opposing team usually initiate such harassment on players on social media.

4.2.3 Attitude of players

A negative attitude and non-cooperative personality of a player can be damaging to a team's environment. There have been many incidences in which players do not cooperate with their coaches; this seems to stem from the fact that professional players are not used to playing in a team environment because their initial practice before becoming a professional player was in solo queues with random players, and they became skillful without the need to listen to others. One coach in a public interview said [34]:

> "*I think it is hard for them to respect a coach, I think, part of it is because their success is derived from them disobeying their parents pretty much, so like, they have had success by not listening to the big authority figure in their life*."
>
> He further added:
>
> "*Putting them in a situation where now they have to go listen to someone, well I mean they got to where they were not listening to people and now they are being forced to listen to, like that's a weird kind of transition to what they have been used to*."

This is a struggle that coaches face when they recruit whom they called "ego players"; these players are usually very skilled but are "hot-headed", and it takes a great deal of effort to transform them into team players. Coaches in general avoid recruiting such players; even though they are very skilled, they can be very damaging to a team's environment, and there are no known ways to deal with them. Coach #1 added,

> "*Toxic behavior of Esports players are an issue. In traditional sports they are usually weeded out through middle school, high school and collegiate programs, where you learn that such a mentality is not beneficial. But in Esports you don't have that growing up into it*".

Stress Management. There is no single best or common approach to stress management in Esports. Some teams have started using meditation, sport psychology, and/or going to the gym, which may reduce players' stress levels. However, there is no empirical evidence as to whether these methods result in a positive impact on a team.

After evaluating players' readiness to practice, one team began using fitness tracking wearables to track their heart rate variability (HRV) and sleep to plan their training sessions. HRV can be used to assess one's readiness to tolerate stress on a given day, which can help a user to determine if they should train or rest that day [35]. However, at the time of the interview, the coach of that team had only used HRV training for 6 weeks, which was not enough to confirm whether it had an impact or not. However, the coach was optimistic and felt that this approach seemed to have potential in Esports training.

4.2.4 Health Issues in LOL Esports

The coaches expressed concerns for both physical and mental health of the players.

Physical health. The most common physical health issues facing teams are wrist and back injuries, which is believed to be due to the extreme number of hours players practice with bad posture. Even though it sounds easy to fix, it is hard to change the players; they do fix their form initially, but they quickly revert back to the bad posture as they start focusing on matches. Even with good postures, long hours of playing and training can continue to cause repetitive strain injuries. Teams usually resort to a physical therapist to treat such conditions. However, players prefer not to rest or take time off because they feel they may lose their competitive edge and may be replaced. As a result, there have been cases where players have had to retire at a relatively young age due to the severity of their health issues. For example, a 22 year old Chinese player known as "UZI", one of the most valued LOL Chinese players, had to retire in June 2020 due to

chronic shoulder and wrist injuries [36]. UZI added, in a public record, "*One time I went to the hospital for a checkup and the doctor said my arms are similar to that of a 40 to 50 year old."*

Coach #5 and one of his players had wrist issues, and they solved it by lowering their mouse's DPI sittings. DPI stands for dots per linear inch, which controls the mouse's sensitivity and speed. When DPI increases, the mouse's sensitivity and pointer speed will increase. Coach #5 argued that reducing the DPI helped him and his team player fix their wrist issues by gradually adapting to playing on lower DPI. Such an observation is worth being explored.

Mental health. Players are under a lot of mental stress due to the competitive nature of the game, and it is very easy for a player to burn out and collapse from the extremely long practice hours. Also, Esports players take a big gamble by not continuing their studies, and if they fail at Esports, they have very few skill sets that can be transferred to other professions.

An additional problem noted by one of the coaches was the issue of substance abuse. This coach expressed his concerns over the growing habit of using Adderall, a stimulant drug that is used to help increase players' ability to focus, to maintain their performance and stay competitive. We looked into the literature and found a few papers supporting the coach's claims that some Esports and casual players in general, not just specific to LOL, are using performance-enhancing drugs such as Adderall and Ritalin [37,38].

5 Need for future research

Esports coaching is a nascent research field, and there has been very limited data in this domain. In the current study, we provided a broad overview of coaching practice by gathering opinions and comments from League of Legends professional team coaches. A limitation of the current work is the qualitative approach, but the findings from this study could support future work

to focus on specific issues using more quantitative approaches. The coaches in this study were asked what answers they hope to find from the research community and to suggest what types of research they hope to see that would help Esports teams. Their requests are as follows.

Identify players' fatigue levels. Because of the long practice duration, many players burn out during the season, or at best have a reduced efficiency during practice. There is the need to find methods to identify whether a player needs more practice or rest.

Identify the conditions for peak performance. Each team or player has what the coaches called a "pop-off" moment, in which a player performs at their peak. The coaches would like to explore whether there is a scientific method that would help them identify what the conditions were leading up to a particular pop-off moment. Additionally, they mentioned that they struggle to get their players "in the zone" (being extremely focused), and they did not know whether this is related to a situation in a game, a mental state, or other factor.

Coaching best practice. Currently, coaches try their best to help their teams win, with the methods used depending completely on what the team needs, and they try their best to educate themselves through looking at other sports. They all agreed that there was no best practice for coaching, and that they are continuously trying to learn and improve without having a source for guidance. All the coaches expressed the need for a standard of coaching. Also, due to the lack of performance measures in coaching, it was very difficult to know whether a coach was doing a good job.

Identify key performance indicators for coaches and players. Currently, there is no key performance indicators for coaches and players. Coaches think that it is not currently possible to evaluate coaches due to their role being mostly qualitative relative to that of the players.

Additionally, player's performance measures will be different for each role, and currently, they rely mostly on the "eye test" (expert subjective evaluation of player game play).

Experimenting with shorter practice time duration. The average daily practice duration is around 12 hours. Most coaches would like to see if shorter practice times would yield better results; however, they were not willing to take the risk and then fall behind in a tournament. Another solution would be to increase the efficiency of practice. Currently, the game client does not allow a player to customize the game, which means that during practice, both teams will have to join a normal game and play through all phases of the game. If a team wants to practice a certain situation in the game, they cannot skip through the early phases of the game and just practice that certain situation. As a result, it would be interesting to study the impact of having such a tool on practice time.

Automation. When coaches and analysts prepare for a match, they need to review footage of their opponents to identify their strength and weaknesses. Additionally, they also need to review their own team's footage to identify the same factors to generate strategies and practice routines for that specific match. This process is done by manually watching the games, and the coaches hope that with the aid of image-tracking, coding, or other methods, they could review footage more quickly and reach conclusions faster. Right now, it is not possible for coaches to analyze all their opponents, and sometimes they must prioritize which opponents should be studied and which should be ignored. For example, if a team wants to study only one match for a particular opponent, they need to review a game that is on average 30 minutes long five times, because there are five players on every team and they need to know how each player behaves in certain situations, thereby identifying the strengths and weaknesses of that team. Of course, an analyst will need to review more than one match for a particular team to reach a concrete conclusion.

Supplements. The coaches were concerned about wrist and back injuries, and they wanted to know whether certain supplements like Omega-3 would reduce or delay such injuries. According to them, the literature on these subjects was conflicting. They also asked if there were any natural supplements that would improve cognitive function or at least increase endurance.

Talent development. This is becoming a trending issue in the North American (NA) region. Most of the LOL teams in NA rely on imports who are established players from other regions, and they do not develop local talent. There is no one clear reason for the lack of talent development, but it seems to stem from the lack of a method to evaluate a player's performance. An additional reason that has been expressed publicly by many experts is the lack of good scouts. These two problems might be connected in a way, because if there is no good performance indicator metric, it is hard for a scout to identify good players. The problem of talent development was discussed heavily on social media platforms after the LOL 2020 world championship, where NA teams were criticized about their performance, which was perceived as being below expectations. Cloud9 team owner, Jack Etienne, said on Twitter:

> "*I'm incredibly disappointed by the results of our region so far at #Worlds2020. All of our teams need to reevaluate how we operate as this is not acceptable. Our talent development, recruitment, and training strategies need to be reviewed and improved for positive change*." (Oct. 10, 2020, Twitter)

A limitation of this study is that we only interviewed LOL coaches from North America and Europe regions. Coaches from China and Korea were not interviewed. The experts in LOL Esports believe that Western regions have significantly different practices than Eastern regions [39]; [40], which would be beneficial to explore and compare in future studies.

6 Conclusion

The results from this interview study allowed us to understand the general information of coaches such as their role, their different positions, their skill requirements, and evaluation process. However, all the coaches expressed a lack of proper performance measures for coaches and players, with coaches being the hardest to evaluate due to their role having more qualitative factors.

We were also able to understand some of the challenges facing the coaches such as long and gruesome practice hours with an average of 12 hours a day, mental stress, attitude of players, and health concerns. The long practice duration makes it difficult for the coaches to keep the players motivated. Players face many mental stresses, with social stress seeming to be the most dominant. The most common health concerns are wrist and back injuries. Some coaches expressed a growing concern that some players across all Esports are using performance enhancing drugs such as Adderall and Ritalin.

Esports coaches are facing many challenges, and there are many opportunities to make this job a little easier. A large part of their job is done manually and consume a significant amount of time such as reviewing match games, which will take hours to review from all the players' perspectives. We were able to understand how coaching is approached in LOL Esports; however, there does not seem to be a common practice because each coach is fixing a different problem based on the team's specific needs. There are many research opportunities in LOL Esports for researchers to explore.

Comparing Esports coaching with traditional sports coaching, there are three major differences. First, game rules are constantly changing in Esports. In LOL, new champions (player-controlled characters) are regularly added to introduce new ways of playing, and character strength is also frequently adjusted to balance the game. Coaching staff are needed to explore new game

mechanisms and identify the best strategy. Players need to practice for extremely long hours to maintain a competitive edge and remain up to date with the new best way of play after each game rule change. This demanding workload has caused many players to burn out and have to retire at a relatively young age (e.g., 25 years old). Better coaching strategies are needed in Esports to adapt to the fast pace of game rule changes.

Second, Esports can be played online, and players' social life is also mostly online. Professional Esports players can stream their games when they practice in the public server. This allows the fans to watch their favorite players outside the tournament games and interact with them in the stream chat. During frequent online interaction with fans, Esports players tend to be more exposed to online verbal abuse and harassment than traditional sports players. Mental health issues are more of a concern in Esports than traditional sports, and this concern needs to be properly addressed in Esports coaching.

Third, since Esports is still very young, there has been no standard practice of coaching or player selection pipelines. In traditional sports, players are often coached, trained, and selected from an early age; however, Esports players usually play on their own without any coaches until they join a professional team. Players' trust in coaches and the acceptance of coaching methods are issues in Esports. While many scientific studies have been conducted to guide practice in traditional sports, there is a lack of studies on Esports best practice. In contrast to the focus on physical capacity and skills in traditional sports, Esports research will need to focus on mental capacity and skills, which involve topics such as working memory, attention, workload, and mental stress.

The increasing importance of Esports coaching has been clearly evidenced in LOL. Players are challenged by the demanding practice routine, stress from game stages and social media, and

physical and mental health issues. There is a common agreement that coaching staff are essential to the success of a professional team. In particular, there is a need to hire more coaching staff to support the needs of the teams such as sport psychology. Coaches are interested in learning from researchers about these issues, but there has been very limited research on coaching in Esports. From the current study, we identified common challenges in LOL Esports coaching, which are important areas for future research. We hope that our work could introduce more researchers to this domain that has unique challenges and needs for academic research to support Esports coaches and players. While some of the current findings may be applicable to other Esports games beyond LOL, future studies are needed to gather data from other games and identify common themes and implications.

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Appendix A. Hierarchical structure of themes and keywords from thematic analysis.

1- Esports coach general information:

1.1 The role of a coach

1.1.1 Identify the players' potential and create winning conditions for the team.

Keywords: game knowledge, understand player strengths

1.1.2 Develop synergy and trust within the team.

Keywords: synergy, trust, rapport, empathy

1.1.3 Develop the micro and macro play of the team.

Keywords: game knowledge, balancing strengths and weaknesses

1.1.4 Setting goals to continuously improve the players.

Keywords: player weaknesses, player strengths

1.1.5 Motivating the players to improve and maintain peak performance.

Keywords: motivation, understand players motivations

1.2 Coaching positions

Keywords: coach, general manager

1.3 Skill requirements

1.3.1 Leadership

Keywords: leadership, coaching theory

1.3.2 Communication

Keywords: coach synergy, communication

1.3.3 Ability to set goals

Keywords: setting goals

1.3.4 Game knowledge

Keywords: game knowledge

1.4 Evaluation and Selection

1.4.1 Evaluation of Coaches

Keywords: team results, player feedback, qualitative

1.4.2 Evaluation of Players

Keywords: mechanical abilities, statistics, watching players, evaluation of goals, teammate feedback

1.4.3 Selection of Coaches

Keywords: game knowledge, setting goals, leadership, coach synergy, team needs

1.4.4 Selection of Players

Keywords: sense of team, mechanics, communication, game knowledge, player history, work ethic, talent, passion

2- Challenges an Esports coach faces:

2.1 Demanding practice routines

Keywords: long hours, rest days, team practice, individual practice, training

2.2 Stress

2.2.1 Translating scrim performance to stage performance

Keywords: performance, scrim to stage

2.2.2 Stage nerves

Keywords: different environment

2.2.3 Social media

Keywords: public image, social media

2.2.4 Disappointing the organization and fans

Keywords: internal pressure, external pressure, fans

2.2.5 Being evaluated

Keywords: losing one's job

2.3 Players' attitude

Keywords: player personalities, team building

2.4 Stress Management

Keywords: dealing with stress, sports psychologist, replicating stage conditions

2.5 Players' health issues

2.5.1 Physical health

Keywords: health, physiotherapy, nutrition

2.5.2 Mental health

Keywords: stress, burnout, motivation

3 Need for future research

3.1 Identify players' fatigue levels.

Keywords: fatigue, burnout, sleep

3.2 Identify the conditions for peak performance.

Keywords: good performance

3.3 Identify best practice for coaching in Esports and how to achieve this.

Keywords: no coaching standards

3.4 Identify a key performance indicator for coaches and players.

Keywords: how to evaluate coaches, developing performance indicators

3.5 Experiment with shorter practice duration.

Keywords: practice length, burnout, fatigue, taking longer breaks

3.6 Automate some of the coaches' tasks, such as game review.

Keywords: game review

3.7 Explore the impact of supplements on Esports players' wrist and back injuries.

Keywords: supplements

3.8 Identify talent development in Esports for players, but especially for coaches.

Keywords: talent development

3.9 Investigate substance abuse.

Keywords: drugs