An Analysis of League of Legends Data & Usability

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ABSTRACT

In this paper I will be conducting research into the popular MOBA title League of legends, analysing telemetry data provided by riot, of leagues 9th season in 2019 [3]. To research what can be learned from 1000 matches of league, from the enormous amount of data even from one game to understanding why players make their choices. Additionally, to this I will be conducting a user experience (UX) user study, to understand what will this user study reveal about the game's usability? My study will be a brief 1 on 1 interview and play session with a handful of participants varying in experience and skill with league.

KEYWORDS

UX, Telemetry, Data, Analysis, Games

1 Introduction and Background

League of legends has within this past decade become one of the biggest and most prolific titles within ESport & MOBA communities. It has expanded vastly upon its release in 2009, adding ARAM [1], a new level and game mode in 2012 and as of 23rd September 2021 now totalling at 157 playable champions [2]. This many playable characters have made the combinations and possibilities of a game in league limitless.

Contemporaneously with this comes a substantial amount of telemetry data from the game. Riot over the years release all telemetry data freely, and within this paper I will be analysing the data of 1000 matches from LOL season 9, which ran between January 24th, 2019, to November 19th, 2019 [3]. Using this data, I aim to answer the question of what can be learnt about how players are playing League of legends? From this I aim to find specific details within the data that will assist in understanding and answering this question. Finding answers such as: what are the most chosen/ popular champions and why? Does gaining the first tower kill give you a higher chance of success? Etc.

As well as analysing leagues telemetry data, I will also be conducting a Usability (UX) study on 3 participants, each participant experience with LOL will vary to keep results consistent. I will conduct a short study of 30 mins for each participant, observing them play League of Legends for 15 minutes followed up by questions. This study will be aiming to answer the question what does a user experience user study demonstrate about the game's usability?

2 Telemetry Analysis

The amount of data that League of legends can provide from a singular match within itself is immense. My primary focus analysing this telemetry data will be on these questions: the most chosen/ popular champions, and their success rates (win to lose rates). The most popular items and why players consistently chose them, weather they're easier to obtain or better fit to most champions and playstyles. Studying to see if higher rank players of Master, diamond, and platinum, have statistically higher success rates than lower rank players.

I am also looking to uncover weather gaining the first tower kill guarantees a team's higher chance of success. And finally, I'll be studying to see how much gold on average is earnt by a singular kill, and how much gold players earn throughout a match.

2.1 Methodology

Riot released their telemetry data in the form of 12 Json files, 10 matches files, a champion index, and an item index. As mentioned prior this data is recorded from leagues 9th season in 2019 [3], so these json files only include the champions, items, runes etc, that were in rotation at the time, the champion count for this season being 143 champions [2].

To break down this data for my research I used Pandas & Spyder 4.0, scripting in python to make this data much more readable.

Firstly, I wanted to find out what were the 10 most used champions, to do this I made a short script loading all the champion data, then proceeding to create a counter, this counter gave me the number of usage for each champion. Once I had this, I proceeded to find what these 10 champions win and lose rates were, as well as their winning percentages. I feel this benefitted my research in finding what champions are being picked the most, and if it was entirely based on their win percentage or popularity, perhaps players chose these champions based on their difficulty or playstyle.

Next, I proceeded to find out the most used items, I wrote a few lines of script to load up the data, then similar as to before, created a counter for items usage. Studying the item data, I thought would

be crucial for my research of leagues telemetry data, Items being a key part of gameplay, items matching to specific champion abilities and statistics, as well as why players chose these items in particular, weather they are easy to obtain like boots at the start of a match, or they are effective for most champions, such as items that increase damage, health, mana etc.

For analysing if higher rank players commonly have higher success rates than lower rank players, I conducted a Chi2 test of win and lose percentages for Master, Diamond and platinum ranked players, compared to any rank lower within the league data. This calculation of data was very insightful in finding out if higher rank players more so mean they win more games, or if rank is simply based on a players skill level/ what it meant to be.

Calculating weather gaining the first tower kill in a game of league, gives a team a higher chance of success, I calculated the mean of winning teams that got first tower kill and losing teams that got the first tower kill. This would benefit in knowing within this perplexing MOBA, if gaining the first major move within a match, will grant you a more likely victory, or if the game can have a major turn of the tide, and destroying the first tower is irrelevant to a game's success.

Finally for calculating the average amount of Gold that is gained by a singular kill, I created 2 variables filtering for all kills and all gold earned by participants, then creating a statistical model comparing kills to gold earned, finding the average and relationship between these two variables, and finally outputting this data onto a scatter plot. Analysing this I thought was interesting, seeing the exact data of how much players earned by their number of kills, and seeing exactly how much league rewards the player for getting kill streaks or singular kills at different points throughout a match.

2.2 Findings

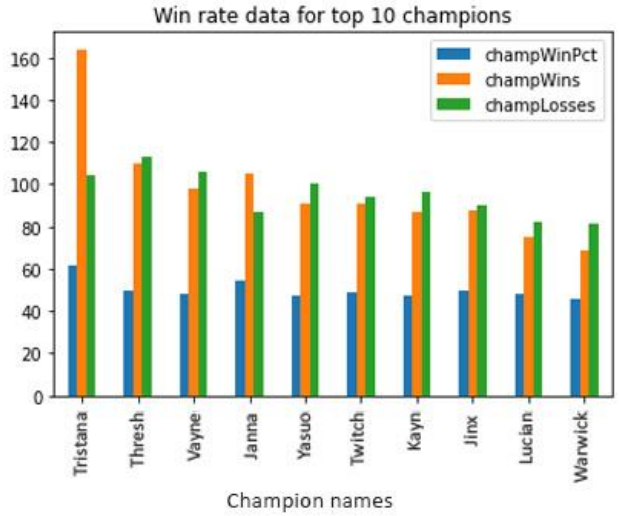

Figure 1: Win rate & Top 10 most chosen champions

Here you can see in figure 1 my findings for the 10 most used champions alongside with their win and loss rates, and there winning average percentage. These champions had the highest usage rates throughout the telemetry data. From this data I can predict that these champions that were chosen the most, is not necessarily based on difficulty (with these 10 having a variety), however Tristana has the lowest difficulty, and she is the most picked. But 5 of these champions are marksman classes, and 7 are ranged type. Judging from these results is clear that most players enjoyed playing ranged champions in league at this time.

Here are my findings for the Top 10 most used items:

1. Warding Totem
2. Ninja Tabi
3. Berserkers Greaves
4. Oracle Alteration
5. Infinity Edge
6. Mercury's Treads
7. Sorcerer's Shoes
8. Farsight Alteration
9. Doran's Blade
10. The Black Cleaver

Studying these results, I can see that these most used items are commonly boots/ items that increase player speed in movement and attack speed. 4 of these items were boots, 3 of these items were weapons (2 legendary), and the final 3 all were trinkets [4]. From this analysis I can see that players prioritise upgrading movement speed within league, as well as increasing damage for their champion, Doran's blade being the 9th most bought item makes sense, with it being a starting item, immediately and easily accessible to any player at the start of a match. Another interesting point is Elixir of iron was the least used item (a potion/ consumable), as well as infernal mask which is a champion exclusive item to Ornn [4].

My results from my Chi2 test for higher rank players winning statically more than lower rank players was quite surprising. The test proved to be not significant.

P = 0.10738677762755636

Meaning the result was negative, that higher ranks of Master, Diamond and platinum are not winning significantly more than lower rank players. This shows me that ranks within league are more based on other statistics and attributes of players, not just there win rate/ percentage.

Calculating what percentage of winning and losing teams got the first tower kill proved to be interesting, 66.7% of winning teams gained the first tower kill and won, and 30.4% of losing teams got first tower kill and lost. This analysis shows that clearly the team that destroys the first tower are more likely to win, destroying the first tower seems to be a crucial turning point within the beginning of a match.

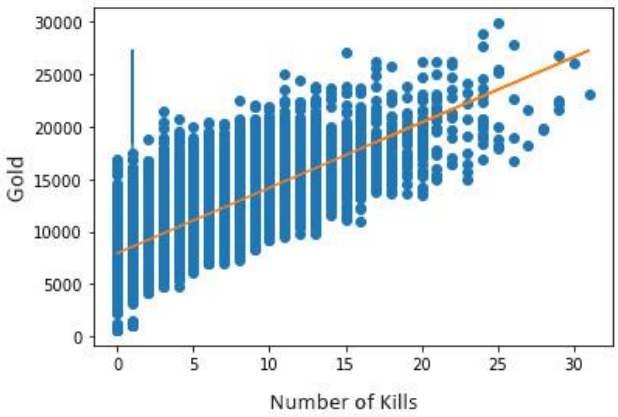

Figure 2: Number of Kills to Gold Earned

Lastly here you can see in figure 2 my results for my linear regression chart, of how much gold players earnt throughout a match, and the average gold earnt by a singular kill. Within Spyder the exact number the player is netting from every kill is 622 gold. This data revealed to be very useful, in learning the average amount of gold earned from a kill, as well as seeing the common amount of kills most players are getting, as you see when number of kills gets any higher than 25, the data becomes much sparser.

3 UX User Study

league of legends can be quite overwhelming and difficult for some new players to learn when starting out, the game has a substantial amount of information to take in when learning, as well as mountains of statistics for damage, champions stats for all abilities, items, armour etc. With all this information for players to learn, it really is crucial in how the game both teaches and presents all of this to the player. In which I will be conducting a user experience study on how participants play league of legends, and what this will demonstrate about the game's usability?

3.1 Methodology

For my study I conducted a short 15-minute play session of league on 3 participants, before the play session I asked them one question: Have you played league before and how experienced would you say you are? The session itself was, each participant played a bot game of league for 15 minutes, while I observed and took notes, and not talking throughout. For better observation I asked the participants to "think out loud" when playing, taking inspiration from Fullerton's [6] method of playtesting. After the 15 minutes, I then asked participants 10 questions, in a 1 on 1 interview for another 15 minutes, as well as covering their observations and extra questions I might have had on those, this method in Medlock's [5] GUR cookbook.

I felt this method would be effective by having a personal playtest 1:1, allowing them to take their time with answering questions and not feeling pressured or shy when speaking out loud when playing. Most importantly as well I thought this would gain better data, asking them questions in an interview style than an online survey, by writing down their thoughts and having their answers much fresher.

3.2 Results

Out of the 3 participants, P1 was beginner level experience with league, only played 1.5 hrs in total. P2 was extremely experienced in league, has played LOL for years, and lastly P3 was amateur level, played league some time ago, knows limited about the game.

3.2.1 Observations

P1 played quiet casually, was defensive in playstyle, didn't buy any items until 6 minutes in, didn't unlock ultimate ability and didn't know how to lock the camera perspective to the character until 11 minutes in.

P2 played very much offensive and confident, knew champion abilities and playstyle very well, used shortcuts for cutting camera perspectives, knew what items to buy and what compliments best with chosen champion, only participant to destroy a tower.

P3 played aggressively, charged towards enemies, died 5 times, didn't unlock ultimate ability, stated minions take too long to spawn, chooses comfort pick champion and items.

3.2.2 Post Test Questions

Q1: Could you understand what your opponents were going to do? Was there an effective visual effect of their abilities? All participants said they could understand from the set animations for different types of abilities used. However, P1 stated that you shouldn't exactly know what their ability will do, saying that because the game is reaction based, the game should have a fog of war.

Q2: How do you find the UI and HUD in lol? Was it easy to understand? All participants found the HUD and UI design extremely clear, simple, and easy to use.

Q3: Did you understand your abilities after using them once? Or reading them once through? Participants 2 & 3 both said they on average take 2 or 3 times using an ability to learn it fully, P1 stated only need to read it once to understand.

Q4: How did you know what your items did and when you used them? Did they have a visible effect on gameplay for you? All participants said that items don't have much visual effect when used, only way to see change is in stats. And participants 1 & 3 both said they read item abilities not description, takes too long to read/ a wall of text.

Q5: Could you keep track of your gold? And was it understandable how you earned it? All participants found both the placement on the HUD, gold counter and how they earned gold from kills very clear and concise. P3 stated the game should perhaps have a better UI element when you receive gold.

Q6: How could you tell if you were winning or losing? All participants said that they all glance at what towers have been destroyed. Participants 1 & 3 both mentioned sometimes it's hard to keep track or lose where the game currently is, as well as stated they preferred to focus on their own gameplay, their own kills/ success.

Q7: Did you understand how to use the map and to control the camera? Every participant understood very well how to use the map, they all mentioned that the function to lock the camera to the character should be default, and its button on the HUD should be redesigned.

Q8: What made you choose your champion? Participants 2 & 3 chose their champions as comfort picks, prior experience, and preference. P1 chose their champion based on class and playstyle. P1 stated that they prefer ranged styled gameplay.

Q9: How did you find navigating the item shop? Participants 2 & 3 found the item shop simple and clear to navigate and buy items, P1 found it cramped in sections and difficult of where to go to find what. However, participants 2 & 3 also mentioned for first time users of the item shop, it can be overwhelming/ a bit of information overload.

Q10: Could you tell where your teammates positions and progress were throughout the game? Was it clear? Participants 2 & 3 could keep track by using the map, HUD elements and cutting to different camera's focused on teammates. However, P1 stated they didn't care about their teammates, focused on own gameplay.

3.3 Analysis

From this data of 3 participants, I managed to capture a range of user experiences in league. All participants it seems felt the same about the game's HUD & UI, all stating its clear and easy to follow, except for the item shop menus. There feedback showed that the layout and navigation of the Item shop menus are well designed, except for the walls of text for item descriptions and how P1 stated some sections have far too much information and feel cramped.

The most striking bit of data from these results is P1 not being able to find the function to lock the camera until 11 minutes into the test. Analysing this tells me this function should be far better represented within the HUD, or as participants 2 & 3 mentioned should be the default camera perspective, as most players play with this enabled.

However, like most elements within league it takes time to learn, this data shows that new players find league to have a significant learning curve in learning all the information the game provides to fully understand and utilise gameplay. This data also revealed that most players tend to only focus on themselves within this team-based game, my results showed that perhaps the game itself does not incentives teamwork, this being the cause of why participants 1 & 3 did not care about their teammates positions or progress throughout the test.

4 Conclusions and Future Work

Within my research I have learned how players play league of legends on a large scale of telemetry data, as well as studying on first accounts of user experiences with the game. In conclusion of my analysis of the telemetry data I have learned that players favour the choice of ranged gameplay within league, as well as prioritising in upgrading speed in both movement and attacks, alongside this upgrading all types of damage. As well as teams that destroy the first tower have a much higher chance of success within a match. Concluding my UX user study, has revealed that this game is designed incredibly well, however the complexity and amount of information that league includes creates a large learning curve for newer players. Furthermore, league should try motivating players more in working together, as the game itself is a team based MOBA, and 2 participants within my study showed to neglect there teammates entirely.

For researching this further, this would need the same aim of answering these questions but on a much larger scale. Perhaps analysing multiple seasons of league's telemetry data from distinctive versions of the game upon its release, as well a UX study on as many participants as possible, all ranging in varying experiences and skill levels with league.

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