

The Importance of Matchmaking in League of Legends

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Section 1

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Introduction and Problem Statement

Online Games

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- In online games, players connect to one another over a network and play with each other.
- Some games are 1v1, while others are team based.
- In many of these games, players' skill levels can vary widely.
- For enjoyment, players want to play with other players of similar skill.



Matchmaking

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- Matchmaking places players of similar skill together in a match.
- Better matchmaking algorithms form more even matches.
- Matchmaking needs to be fast



Multiplayer Online Battle Arena (MOBA)

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- Competitive, team based
- Win the game through killing enemy structures
- MOBAs are session based, so players develop skill and increase their ranking by winning games



League of Legends (LoL)

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- Most popular current day MOBA [Forbes 2012]
- Free to Play
- Developed by Riot Games in 2009
- WPI has many LoL players to study



Ranking and Matchmaking in LoL

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- Each player has a visible rank and a hidden matchmaking rating (MMR)
- This rating is based on the Elo formula, originally designed for chess
- LoL ranks: Bronze, Silver, Gold, Platinum, Diamond, Master, and Challenger.



Research Questions

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- How balanced is matchmaking in LoL?
- How long do players wait for a match?
- How do players perceive how well matchmaking works?
- What factors affect player enjoyment?

Section 2

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Study Methodology

Study Methodology Overview

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- Collect player ranks to determine how evenly matched teams were by rank
- Collect player perceptions of how even game turned out
- Collect game data to show how even game was statistically
- Compare these to see how much of an impact matchmaking has on game

Study Advertising

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- Solicited subjects by emailing IMGD majors, Gaming club, and asking friends
- Offered open time slots for subjects to come in
- Held studies on the weekend when more people are generally free

Study Regulations

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- Players signed consent forms
- Players set up their game settings
- Asked to play 5v5 games, solo queue only as this affects the matchmaking
- Play Ranked if possible
 - Uses their Ranked MMR which is represented by their visible rank

Surveys

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- Collected demographic player information pre-game
- Collected player perceptions post-game
- Done before and after each game
 - Game was fresh in player's mind

Environment

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- Computer lab where all the players could see, hear, and talk to one another during games.
- Many subjects came in groups
 - Although they were playing separately, often interacted

Matchmaking Data Collection

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- Collected ranks of each player in each game through third party website while game in progress
- lolnexus.com

Player Survey

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- After each game:
 - Game enjoyability
 - Game evenness overall and at different times during game
 - Reasons for win or loss
 - Outlier players

Game Data

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- Collected game data from Riot's match history website:
 - Gold difference at 20 minutes and at the end of game
 - Kills for each team
 - Game time
 - KDA for each player
 - Position played

The screenshot displays a match history table for a League of Legends game. The match was a VICTORY for the blue team, with a gold difference of 90.5k and a game time of 37 minutes. The table lists five players from the blue team, including their names, game times, kills, and gold earned. At the bottom, it shows team statistics: Bans (3), Towers (9), Dragons (3), and Barons (0).

Player	Game Time	Kills	Gold
JJAY	1/9/20	19	12.6k
Draklon	10/7/21	383	23.0k
al1313	7/11/21	267	18.6k
Prdy	14/6/14	311	21.4k
JerryZw	5/11/16	124	15.0k

Team Statistics: Bans: 3, Towers: 9, Dragons: 3, Barons: 0

Even vs Uneven

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- There are many measures to show how even or uneven a game was:
 - Kill difference
 - Gold difference (Gold is obtained by killing enemies and enemy structures)
 - Game Time (If one team is far ahead, they are likely to finish the game quickly)

Section 3

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Analysis and Results

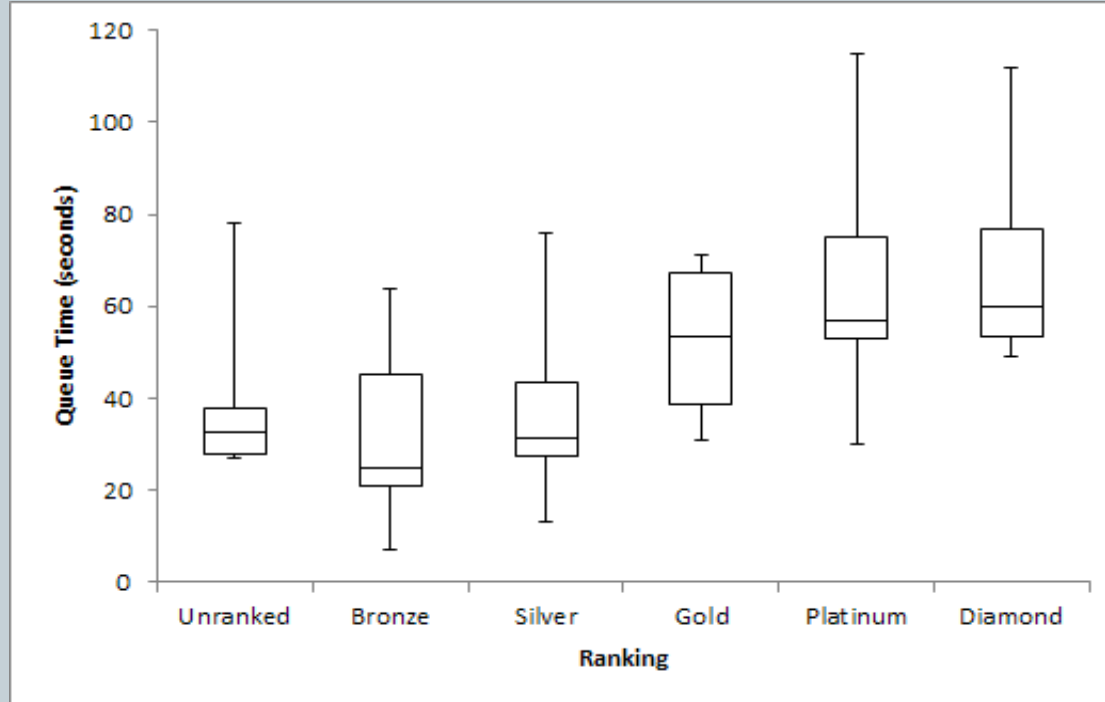
Study Results and Demographics

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- 23 unique participants
- 3 studies, 5 hours each
- 65 games, 52 complete and valid surveys
 - Website for data collection went down during one study

How does queue time correlate with rank?

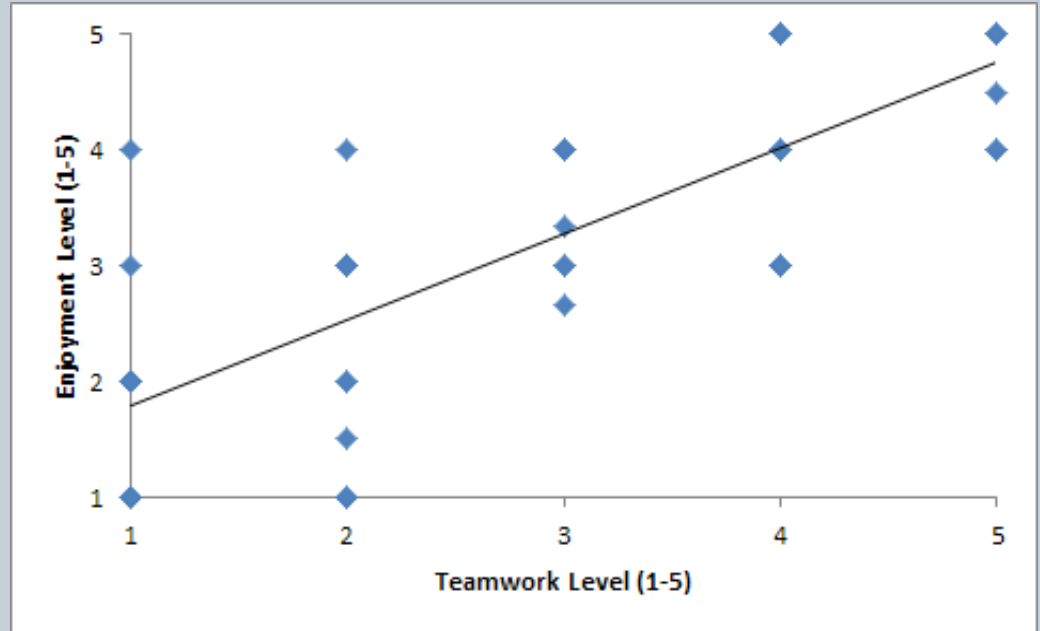
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Does better teamwork lead to higher player enjoyment?

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- Axes:
 - x: “How well did your team work together?”
 - y: “How enjoyable was the game you just played?”
- The line of fit shows the positive correlation between these responses.



Are even games more fun?

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- Axes:

- x: “How even was the game you just played?”
- y: “How enjoyable was the game you just played?”

