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Analyzing Games with Varying Number of Players and its Significance using Physics in Mind

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Online multiplayer games have been on the rise in the recent years due to the immense reach and accessibility of the internet all over the world. The online multiplayer trend has been so popular that even notable single-player titles like Red Dead Redemption has begun to add multiplayer modes into their game to satisfy the needs of their customers. Fortnite and PlayerUnknown's Battleground have shaken the world with their enormous player count of over 350 million unique players and a total revenue of over \$1 billion despite having a Free-to-Play business model. Multiplayer Online Battle Arena (MOBA) games have shown us that video games can be as intense and competitive as real sports, boasting a prize of over \$15 million for coming out on top as the best team in the world. In this thesis, looked into the reasons why these online multiplayer games have been so popular over the years by focusing on the number of players chosen in the games.

From analysis MOBA games, we found certain cases where the game mode seems interesting and engaging in terms of motion in mind but is removed from the game. For example, Twisted Treeline is removed although the game was popular among fans due to several non-game related reasons. Dota 2 showed that its standard mode is more competitive than the 1vs1 mode, while Smite showed that its Joust mode had higher popularity than the standard mode due to its active playstyle.

Battle royale games revolved around reducing the number of players until there is only one player remaining. The reduction of players resulted in the change of difficulty in the game. PUBG and Fortnite showed that the game is the toughest at the start of the game, while Fall Guys showed that it is the most challenging at the very end. The dynamic difficulty helps to create engagement within players and could be the reason behind its popularity today.

Both soccer and basketball have a variation of itself, where it is played with lesser players on a smaller field, namely futsal and 3x3. Futsal is played with only 5 players on a team, while 3x3 is played with only 3 players on a team. Our findings showed that futsal should be more interesting and engaging due to its active playstyle. However, it is not true, probably due to the coverage by the media. 3x3 and basketball showed almost identical results in terms of motion in mind, signifying that both futsal and 3x3 is a very well-designed variation of the sport that maximises the excitement of the players and viewers.