

Functional or Social? Exploring Teams in Online Games

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ABSTRACT

Team collaboration in multi-player online games provides opportunities for players to interact with each other. Facilitating teams has become one of the main design principles to increase social activities. However, there is no research evidence that collaborating on tasks in game teams can produce the desired relational outcome. This paper examines more than half a million solo and team activities during a week in *Dragon Nest*, an MMO game. We measure the degree of team engagement using the percentage of time played in teams and the percentage of play with repeated teammates, and we then identify different types of players using this. The results show that solo players and team players are two distinct populations and they are highly predictable based on players' in-game status. Moreover, we find that spending more time in teams does not always lead to more social interactions. The interviews with players are conducted to validate the findings.

Author Keywords

Online games; MMORPG; team engagement; team collaboration; network sociality; solo player.

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION

Massively multiplayer online role playing games (MMORPGs) create an immersive virtual environment for players to experience intellectual challenges and make it possible for players to socially interact. Compared to traditional video games, team collaboration or confrontation in combat activities is an important game mechanism to create social dynamics among players and increase the user stickiness and loyalty of the game.

In online games, players are self-organized into teams (also called knots [4]) to accomplish challenging tasks and fulfill common goals in a short period of time. According to Activity Focus Theory [5], the team tasks and goals act as

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the common foci and catalyze relation building. As a consequence of team activities, individuals involved are more likely to develop interpersonal relations since they are more exposed to each other. Therefore, promoting team activities has become one of the primary design goals in many online games.

On the other hand, different from social groups, Wittel [19] suggested that short-term teams and virtual communities are a type of network sociality, in which “social relations are not 'narrational' but informational.” Short-term projects, flexible tasks, and increasing turnover make it difficult to develop a common narrative. A good team player should have the ability to establish relations on a task-by-task basis and help achieve a higher performance. Tasks are both the goal of, and the reason for, the existence of task teams. For example, players may form groups with randomly selected teammates for one-time quests. Once the task is accomplished, teams will disband and individuals are free to join other teams. These pickup groups (PUGs) may not induce enduring bonding relationships.

In order to understand the true nature of teamwork and social environments in game, we need to characterize the patterns of team activities in game. By exploring different types of players and their team activities, we try to answer a fundamental question: Why does a player choose to join a team vs. play solo?

This paper examines more than half a million solo and team activities extracted from one week of server logs in *Dragon Nest*, an MMO game. By characterizing solo and team players, we connect players' in-game status with their teamwork behavior. Based on two measures of team engagement, the percentage of time played in teams and the percentage of play with repeated teammates, we explore functional-oriented and social-oriented players and evaluate the outcomes of in-game incentives for team collaboration.

RELATED WORK

Communities vs. Network Sociality

German sociologist Ferdinand Tonnies described two ideal types of human society, community and association (*Gemeinschaft und Gesellschaft* in German), in 1887 [15]. *Gemeinschaft* is a social group based on personal relations and a common basis of traditional social mores. In contrast, *gesellschaft* characterizes associations that consist of rational and self-interested individual. Relationships in

these associations are usually impersonal and indirect compared to persistent social bonds such as family and friendship based face-to-face interactions.

In the physical world, communities and associations usually overlap: people in one community can form many associations and individuals in a business association can develop social relations based on face-to-face interactions. However, advanced information and communication technologies (ICTs) have facilitated a new form of virtual associations such as online communities, short-term task-oriented teams, and new media. In these groups, relations are primarily informational and based on ephemeral exchange of data. Wittel [8] considered short-term teams and visual communities as network sociality, in which “social relations are not 'narrational' but informational.” The functional features of network sociality such as short-term projects, flexible tasks, and increasing turnover make it difficult to develop long-lasting social ties.

Task and Project Teams

ICT-enabled task or project teams enable collaborations with others worldwide [8, 13]. Individuals are self-organized into groups based on common interests or activities [1, 5, 10] such as scientific research [7] and open source software (OSS) [6]. They have the freedom to choose what they work on and with whom they work according to their interests and expertise. After finishing team activities or tasks, teams are dissolved and individuals do not have to maintain relations with previous teammates.

Although virtual teams are short-term and task-oriented, many studies find that social relations and interactions do exist in such teams. For example, Crowston et al. [2] find that people in OSS teams meet in-person and speed up certain kinds of tasks. Readers of Ms. Nielson’s blog developed strong bonds with her and helped fund-raising after a plane crash [18].

Teams and Social Interactions in Games

Players frequently group together forming a type of task teams to finish challenging tasks in game. Only a few studies examine players’ social interactions and validate whether the interactions in game teams have relational meaning for the participants.

Ducheneaut et al [3] is the first quantitative study using in-game data to explore social interactions in MMORPGs and found that online games are less social than people expected. They posit that this is because players are exposed to a social environment but not engaged in social dynamics. Using records collected by data scripting, they found that many World of Warcraft (WoW) players do not join groups before they reach level 55 and they only team up for difficult endgame dungeons. However, because data scripting techniques do not capture the team composition and actual player relations, their study focuses more on the impact of guilds, i.e. in-game player organizations, and provides limited information about task teams in game.

Nardi and Harris [11] enumerate different types of collaborative play in WoW such as parties, raids, friends, and guilds in an immersive ethnographic study. They find that raw time is a problematic metric for capturing sociability while informal collaborations such as chatting and PvP (Player versus Player) play are key aspects of socializing in WoW. This reveals that function-oriented measures such as play time contribute much less to players’ social interactions than narrational activities do.

Some research studies player collaboration in different types of games. Xu et al. [20] explore the meaning of social relationships in Halo 3, a First-Person Shooter games. Qualitative interviews and game match records suggest that people tend to connect to a small set of offline friends and family members. On the other hand, participants played with 93% of playmates only once. McEwan et al. [9] study social dynamics and sociality in PlayOK, an online casual game site. Their analysis of game records show that although the site seems very social with many activities and subgroups, the population is highly transient without any social history or interaction: most people stay for only a few days, engage in very little verbal communication, and consistently play with new and unknown partners only once.

However, Halo 3 and PlayOK do not provide an immersive game world and corresponding team structures as there are in MMORPGs. Players have different motivations and they are more likely to compete against each other as opponents than to collaborate on specific tasks.

Motivations of Game Play

Yee [21] categorizes the player motivations into three overarching components: achievement, social, and immersion. The natures of team collaboration in MMORPGs illustrate two sides of task teams: functional and social. Playing in teams allows players to progress more rapidly and optimize their performance, and thereby fulfill the advancement and mechanics factors in the achievement component [21]. On the other hand, teams act as a special mechanism to bring players together to support the social component by: having an interest in helping others (i.e. socializing), deriving satisfaction from being part of a group effort (i.e. teamwork), and the desire to form long-term meaningful relationships (i.e. relationship). It is not clear, however, how the two sides are connected in task teams.

TEAMS IN DRAGON NEST

Dragon Nest is an action-oriented MMORPG developed by Eyedentity, a South Korean game developer. As a free-to-play game, Dragon Nest has been released in eight countries including South Korea, Japan, China, the United States, and other countries in South East Asia since 2010. Operated by Shanda Games Limited, the Chinese version of Dragon Nest hosts over 400,000 concurrent users with ten million dollars of in-game purchases per month according to THISISGAME, a Korean game news site.

In Dragon Nest, players create characters, explore the virtual land of Lagendia, fight evil dragons, and find power stones that enable them to communicate with the sleeping goddess and save the world. As in many multiple player online games, characters have four distinct classes: warrior, archer, sorceress, and cleric. The classes are designed to have unique skills and equipment and to play different roles in team: as tanks, warriors have strong physical attack ability and specialize in defense; as damage dealers, archers make long-range attacks and move while attacking; as debuffers, sorceresses have medium-range spells and inflict a variety of harmful spells; as healers, clerics heal and protect others in their team. Characters can play alone or in a small team in instanced (the team interacts privately with the environment) dungeons to fight dangerous monsters, earn experience points, and advance their levels.

Incentives of Teamwork

Unlike other MMORPGs, Dragon Nest encourages teamwork for players at any - not just high - level and has implemented two unique design mechanisms to promote team collaborations: multiple task difficulties and fatigue points for game play.

In Dragon Nest, task difficulty is an option to make dungeons progressively harder. Players can select the difficulty of each dungeon before entering it. Five types of difficulties are available for most tasks in the game, in order of difficulty: easy, normal, hard, master, and abyss. Difficult tasks have more monsters and result in better outcomes, and therefore may need more players. Easy and normal tasks are for solo players; a team of 2 is recommended for hard tasks and a team of 4 for master and abyss. The difficulty mechanism provides open choices for team settings. Any character, even at entry levels, can choose to play alone at easy/normal task difficulty, or choose to form a team for higher difficulty types and consequently better outcomes. They also have the option to play solo for abyss difficulty and team up for easy difficulty.

Moreover, Dragon Nest uses a fatigue point system to introduce costs for engaging in dungeon tasks. Every character is assigned 700 fatigue points per day and spends a certain amount of points to engage in each dungeon activity. Higher level and more difficult dungeon activities require more fatigue points. Players cannot enter dungeon activities after running out of points. In order to use the points more efficiently and play more activities, players can join a team and pay fewer points for the same activity compared to what they would pay if they engaged in it as a solo activity. For example, a dungeon requiring 40 points for a solo player only costs 17 point per person for a team of four. Since players spend fewer points in larger teams, the fatigue point system encourages players to form teams to reduce the cost of play.

Dragon Nest uses a few routine game interfaces to facilitate forming teams, choices of task difficulties, and

consumptions of fatigue points, and therefore reinforces the two mechanisms designed to facilitate team formation. For example, as shown in Figure 1, players need to decide whether to join a team (called a party in game) each time they enter a dungeon.



Figure 1: Pop-up window with “Find Party” each time entering fields.

Data Set

Because all teams are freely formed and have similar sizes (i.e. from 2 to 4), Dragon Nest provides a simplified environment to explore the nature of team activities in online games and evaluate the effectiveness of designing mechanisms to facilitate team activities. We acquired from Shanda three months of server logs of the Chinese version of the game. To avoid local holiday and school schedules, we chose the 4th week of February in 2011 as the sampling period, i.e. February 22nd to 28th, 2011. We identified all 35,057 player characters in the population who registered before February 21st, 2011 and played during the sampling week. For each player, we measured their levels, classes, guild status, and numbers of friends on February 21st, 2011.

ID	Level	Class	In guild	Gender
P1	50 ^a	Sorceress	Y	Female
P2	31	Warrior	N	Male
P3	35	Archer	N	Male
P4	60 ^a	Warrior	Y	Male
P5	50 ^a	Cleric	Y	Male
P6	40	Archer	Y	Female
P7	36	Warrior	N	Male
P8	60 ^a	Cleric	Y	Male
P9	16	Sorceress	N	Female

^a. Top-level has been increased to 60 since our data snapshot.

Table 1: Information of nine interviewees.

To characterize the nature of team play and reveal potential player motivations, we apply mixed research methods. First, employing the “social accounting” techniques used in previous studies, e.g. [3, 9], we identified all solo and team combat activities in the sample population within the sampling week from player vs. environment (PvE) logs. In each combat activity, one player or a team of up to four players enter a dungeon instance and kill monsters in a finite amount of time. Since the id number of each dungeon instance (or activity) is unique, we can separate solo and

team activities and recover the team membership. Second, we interview 9 players in the game with open ended and rating questions and use their opinions to validate our findings. The basic information of the interviewees is included in Table 1.

TEAM COMPOSITION AND TEAM ENGAGEMENT IN DRAGON NEST

Among 568,763 combat activities identified, 82% involve only one player, 4.6% are completed by teams of two, 2.0% are teams of three, and 11.3% are teams of four.

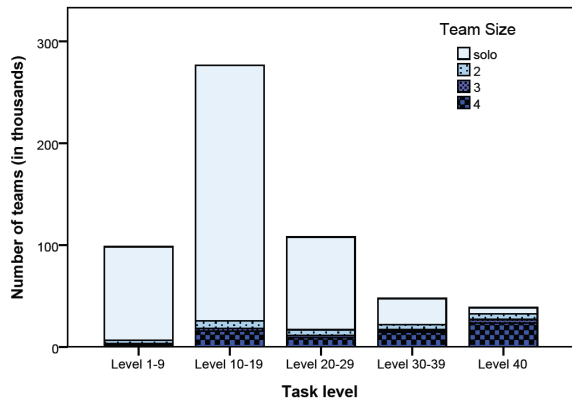


Figure 2: Numbers of teams by task level and team size.

Usually in each combat activity, a player or a team tries to finish a task at a level that matches with the player’s level. Figure 2 shows the detailed distribution of solo and team activities by levels of tasks involved and team sizes. In general, there are more team activities for higher level tasks. For example, there are only 6,338 teams for tasks at Level 1-9 but 32,368 teams worked on level 40 tasks. Alongside this disparity in team activity, the decrease in the number of solo player activities in high level tasks is very dramatic. There are only 6,059 solo activities for Level 40 tasks compared to 251,289 for Level 10-19 tasks.

At all levels, setting aside solo players, the team of size 4 is the dominant team type. Because more fatigue points are needed for high level tasks, especially at level 40, playing in a big team is a more efficient way to maximize the return of investment (in terms of outcomes) on individual fatigue points.

As mentioned earlier, to promote team activities, each task offers five types of difficulties for different team sizes. Figure 3 shows the detailed distribution of solo and team activities according to task difficulties.

Although the recommended team sizes for normal, hard, master, and abyss tasks are 1, 2, 4, and 4, respectively, Figure 3 shows that the vast majority of teams are formed for abyss tasks and there are only a few team activities for other difficulties. It is clear that most teams are outcome driven and only focus on highest payoffs at abyss difficulty. Still, solo players account for more than a quarter of the abyss activities. Comparing to the distribution of solo activities by task levels shown in Figure 2, we find that

many high level players solo for abyss versions of low level tasks to get some easy points and attractive items.

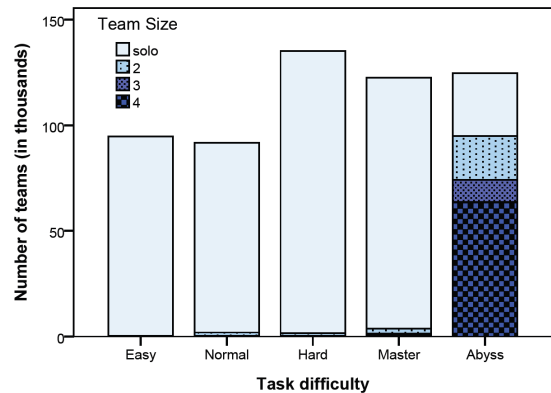


Figure 3: Numbers of teams by task difficulty and team size.

Team Engagement

Of the 35,057 player characters active during the sampling period only some were involved in team collaboration. In order to estimate their levels of team engagement in the game, we develop two measures: the percentage of time spent playing in teams and the percentage of play with repeated teammates.

Percentage of time in teams

The percentage of time in teams is defined as time played in teams of 2, 3, or 4 divided by all play time spent on Player versus Environment (PvE) activities. This time-based measure of team engagement has been used in many studies such as [3].

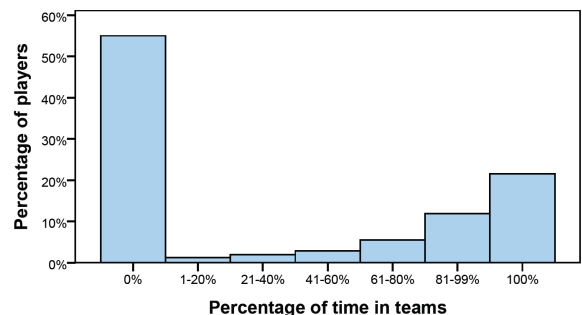


Figure 4: Numbers of players by the percentage of time played in teams (N=35,057).

In Figure 4, the histogram of the percentage of time in teams reveals a polarized player population: 55% of players spent 0% time in teams and 21.6% of players spent 100% time in teams. Only 23.4% players play both solo and in teams. The lack of intermediate population, especially the players who spent 1-60% time in teams, indicates that the solo and team players are two distinct populations and solo players do not evolve into playing with others gradually. Instead, it seems that there is a phase shift in team engagement: many users are mostly solo players and only some switch over to become active team players at some point. One possible explanation is that teams are designed for difficult tasks: after finishing the easy, soloable tasks

players need to spend a lot of time teaming for difficult ones. We will validate this hypothesis by looking at player levels in the next section.

Percentage of repeated teammates

While the time measure of engagement captures amount of time in teams, it does not capture if there is a strong relational quality that might develop in teams [11]. Hence we also investigated players' team engagement from a relational perspective. There are 15,773 characters who played in at least one team, i.e. spent more than 0% time in teams, and some of them played with the same teammates many times. The percentage of repeated teammates over all distinct teammates reveals whether players tend to play in teams with prior teammates (stronger relational quality) or with strangers: 100% of repeated teammates indicates that a person plays with each of his or her teammates together in at least two team activities and 0% of repeated teammates indicates that a person never plays with others more than once.

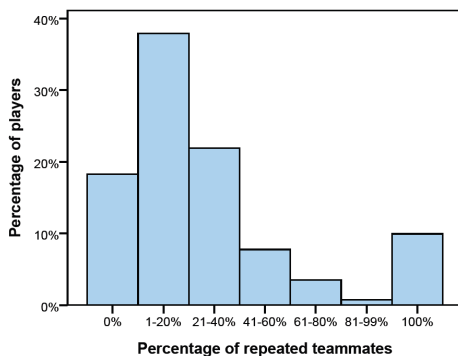


Figure 5: Player distribution by the ratio of repeated teammates (N=15,773).

Similar to the distribution pattern of the time based measure of team engagement, there are two extreme types of team players: 9.9% of players who always play with prior teammates (i.e. 100% repeated teammates) and 18.3% of players who play with strangers all the time (i.e. 0% repeated teammates).

All our interviewees joined pick up groups (PUG, teams formed by game mechanism) in game and P1 and P3 even spent 80% time in PUGs. They all agreed that “must finish a specific dungeon/quest” is the main reason for joining a PUG. When they have some specific tasks, it is easy and fast to use in-game tools to find players with the same interests and work together. PUGs become the most efficient way if you cannot finish a task alone. Interviewee P1 said,

“Even in the same guild, people have different online time. If somebody in my guild needs to do the same quest, we can play together. However, usually we cannot find the same time. Moreover, people need different things. So most of time I played in pick-up teams ... Teaming with guild members is more fun since we can talk while doing quests. Pick-up groups are just to finish tasks.” (P1)

Clearly not all teams produce repeated interactions. Because of PUGs and one-time matching, even though 45% of the population played in teams at least once, the players with repeated relations are not as high as expected. This confirms the relational finding suggested in [11]: spending more time in teams does not necessarily mean having more frequent social interactions with others.

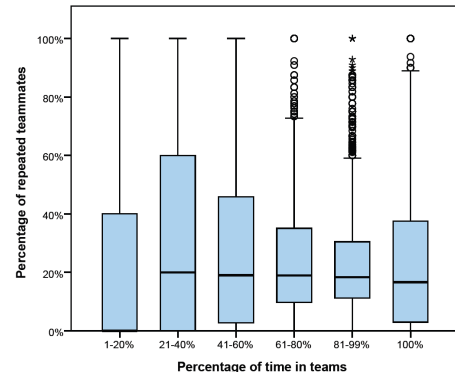


Figure 6: Percentage of repeated teammates by percentage of time in teams (N=15,773).

It is interesting that the relational measure of team engagement is not correlated to the time based measure of team engagement. Figure 6 shows that five player groups who spend from 20% to 100% of their game time in teams (indicated by the 2nd to 6th box plots) have the similar medians of the percentage of repeated teammates around 20%. These results suggest that spending more time in teams does not increase the likelihood of playing with others repeatedly, which show that team time and repeated teammates are two distinct perspectives in measuring players' interactions in teams. As a very clear example, the 1st box plot, i.e. players who spend less than 20% of their play time in teams, has a median at 0% because half of them only play once in teams resulting in zero repeated teammates by definition.

Although characters tend to have a low ratio of repeated teammates, there is a small group of more social players. The outlier in the upper right corner of Figure 6 indicates 932 players out of 15,773 who spent 100% of their time in teams with repeated teammates only.

WHO ARE MORE ENGAGED IN TEAMS?

Player level, class, in-game guilds, and friend lists are the common elements of game design in many MMORPGs. In this section, we examine the detailed impacts of these four factors on team engagement in game.

Player Levels

Player level is the most important measure of a player's experience in the game. In the sample population, character levels range from 2 to 40 with an average of 26. Similar to the strong increase in grouping starting after level 55 discovered by Ducheneaut et al [3] in WoW, we find a point of inflection at level 33 in Dragon Nest. The average percentage of time in teams is almost constant at 20% for the players below level 33. The average increases to 70%

for players between levels 33 and 40. Although the change is much bigger than what was found in [3], it supports the previous hypothesis that high level players spend more time in teams.

Because the player population has a bimodal distribution based on their time in teams, the average numbers do not reveal the true connection between players' levels and their time spent in teams. Considering players with 0% team time as solo players and the rest as team players, Figure 7 shows the two distinct populations at different character life stages.

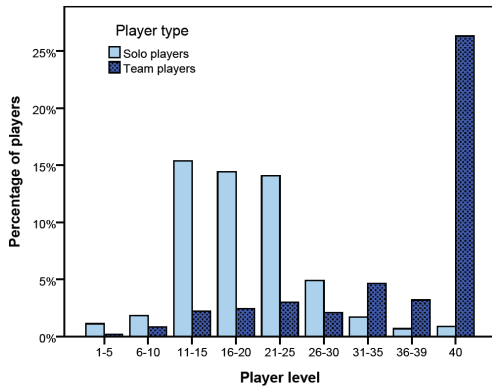


Figure 7: Solo and team players by player levels.

At low levels, characters mainly play solo. Players may prefer efficiency at the early stage of the game. High-level players, especially end game players at level 40, are facing tasks with high difficulty and more costs in fatigue points. Therefore, players need to join teams to help each other and achieve high performance.

In the interviews, all players acknowledged that they were aware that low and high levels have different requirements for fatigue points, experience points, and play time to advance. 6 of 9 felt strongly that dungeons suddenly became very difficult for solo play at a certain level. As a result, all of them spent much more time in teams at high levels, even for 4 of them who never joined a team at low levels. A top-level Cleric said,

“At low levels, while the dungeons are easy, playing in teams will get less experience points (for each person). Therefore solo will be faster. At high levels, although teammates still need to share experience points, solo play is much more difficult. Solo may take half an hour while it is just 10 minutes for a team. So I play more in teams.” (P8)

The paradox is that although high-level players are more likely to team play, they tend to have a lower ratio of repeated teammates. Figure 8 shows that when player levels increase from 11 to 40, the median percentage of repeated teammates decrease from 40% to less than 20%. In the interviews, when asking for the scenarios of their first team experience, 5 of 9 reported they started at low levels with someone they know offline such as sisters, friends, and classmates and the rest 4 played with strangers for difficult

tasks at high levels. The small amounts of team players at low levels usually have pre-existing social connects in game and therefore they tend to play with them repeatedly for relational proposes. On the other hand, the teams at high levels are more functional and task-driven. Players are less likely to play again together after finishing a task.

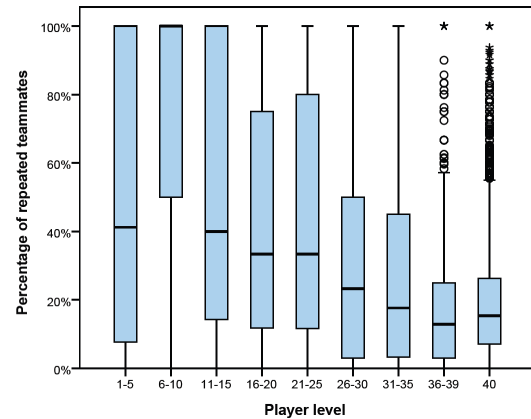


Figure 8: Ratio of repeated players by player levels.

From both time and relational perspectives, instead of the generic claim that high level players are more social, a more accurate description is that all players are performance driven and choose different play styles according to the tasks at their levels. Low-level players only need a relatively small amount of experience points to advance. Therefore, most of them finish the tasks by themselves and achieve a higher efficiency. After reaching a certain level, they have to work together for team tasks. Finding strangers and collaborating in one-off pick-up teams becomes the key to improving efficiency at higher levels.

In fact, the functional nature of teams at high levels may hurt the development of social relations. The following example show the different play styles in teams for high-level and low-level tasks:

“I usually prefer mentoring new guild members to finish mandatory tasks but not the teams for challenging abyss tasks. ... Challenging tasks have very high requirements. Sometimes a single mistake from one person fails the entire task. With this pressure, one time is fine. If play it very often, I feel very tired mentally. In contrast, mentoring others in team is easy. I can have some small talk with teammates while finishing the task. It is impossible in teams for abyss tasks since you need to run around following the leaders and make precise actions according to your class.” (P8)

Player Classes and Team Roles

Dragon Nest has a traditional class design to implement various team roles. Based on the skill set specified in game, Warrior and Cleric are more independent classes, while Archer and Sorceress are supporting classes. From the game design perspective, an independent class is more balanced between attack and defense. They have better

survivability than supporting classes when engaged in independent combat in dungeons. To engage in combat in dungeons with greater efficiency, supporting classes have a greater need to play in teams. The team play dynamics of the 4 classes are basically motivated by their needs and potential contribution to teams: because Clerics have the ability to heal, they are the most popular class as a teammate, while they also have no trouble to play solo; Warrior can play solo but their abilities – high self-defense – is not necessarily needed by teams; Archers and Sorceresses cannot play solo with high efficiency due to their low survivability, so they need to play with other Archers or Sorceresses to enhance attacking power, reduce the damage dealt by monsters, or play with Clerics for their healing ability. The interviewees’ responses are consistent: they ranked Archers or Sorceresses as the most team-oriented classes followed by Clerics; Warrior is considered a more solo-oriented class.

In our sample, 41.9% of characters are warriors, 22.3% are archers and sorceresses, and 35.8% are clerics.

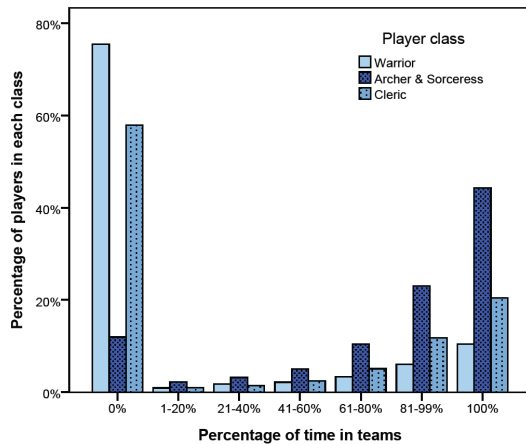


Figure 9: Time in teams by player classes.

Figure 9 shows that different classes have different team preferences: 75.5% of Warriors and 57.9% of Clerics play solo; Archers and Sorceresses are the dominant team players and 44.3% of them spend 100% of their time in teams. The differences among the three class groups are significant, $F(2,35054) = 5212.28, p < .001$.

Although Warriors are more capable of fighting solo and Archers and Sorceresses are more team-oriented, the two groups have no difference in percentage of play with repeated teammates, $t(6896.44) = 1.632, p = .103$. This suggests that Archers and Sorceresses play more in teams not because they are more social. In fact, the class design makes teamwork the only efficient play method for them. On the other hand, Clerics have about 4% more repeated teammates than other classes, $t(9506.76) = -7.629, p < .001$.

Interviews confirm the strong associations between classes and the level of team engagement. All interviewees except one agree or strongly agree with the two statements: “you choose character classes to meet your preference of playing

solo or in teams” and “your character class influences your time of playing solo or in teams.” This shows that team behavior has been stereotyped in characters’ functional design and has less relational meanings.

Guild Ranks

66.9% of team players are in a guild. In Dragon Nest, guilds themselves have multiple ranks: higher level guilds have more members and more money.

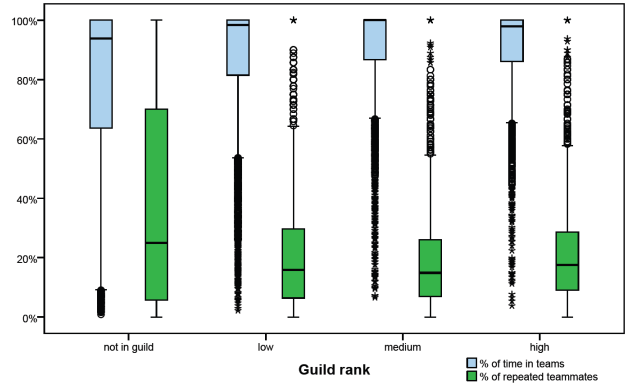


Figure 10: Team engagement by guild rank.

On average, players in a guild spend 88.8% of their time in teams and those not in a guild spend 78.9% of their time in teams. The difference is significant, $t(7534.79) = 23.283, p < .001$. However, players in a guild play much less with previous teammates: guild players have 22.2% of repeated teammates but non-guild players have 38.7%, $t(7259.64) = -28.942, p < .001$. Among differently ranked guilds, players in low rank guilds spend a slightly smaller amount of time in team engagement while players in medium ranked guilds have the smallest average ratio of repeated teammates.

This suggests that guilds provide an organizational mechanism to facilitate the formation of task-oriented teams and make their members spend more time in teams. However, guild members tend to have a low percentage of repeated teammates probably due to the variety of tasks or more selective processes of choosing teammates. On the other hand, non-guild players tend to organize teams based on their relations. Although they spend less time in teams, they are most likely to play with the same players repeatedly.

Friends in Game

In-game friendship, as formalized by the friend list game mechanic, has a similar impact on team engagement. One is not required to play only with friends in this game. In general, team players with more players on their friends lists tend to spend more of their time in teams: players with no friends on average spend 72% of their time engaged in teams; players with 1 to 20 friends have 84%; and players with more than 20 friends have 91%. However, team players with at least one friend only have 24% repeated teammates compared to an average of 55% for players with no friends, $t(1886.74) = -30.727, p < .001$. Having more friends does appear to help finding teammates and

encourage team collaboration, but more friends do not necessarily lead to more persistent team relations.

On average, interviewees reported that their friend lists have less than 10% static friends. Players use friend lists mostly for tracking new players and to play together occasionally when they are online. They have no intention to further develop their relations. One example is:

“I have no more than 10 contacts in my friend list. 3 or 4 are people I know offline. Others are I met online but I have almost no connections to them. I just take game as an entertainment but not a way to get friends.” (P7)

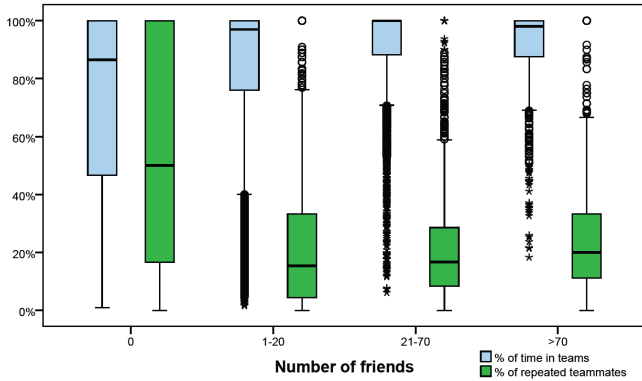


Figure 11: Team engagement by number of friends.

PREDICTING TEAM PLAYERS

Since the players in game measures are related, e.g. high-level players are more likely to join guilds and usually have more friends, we use three binary decision models to illustrate their joint impacts on social interaction levels using logistic regressions. Model 1 uses in-game status to predict solo players (i.e. 0% of time in teams) versus team players based on their levels, warrior class dummy variable, guild ranks, and the number of friends we discussed in the previous sections. Model 2 uses dichotomized versions of the level, guild, and friend variables for the same prediction: level higher than 32, in-guild (i.e. rank is low, median, or high), and has-friends (i.e. the number of friends bigger than 0). Since players who spend more time in teams are not necessarily more social, we use the percentage of repeated teammates to examine the relational side of team engagement among players in teams in Model 3. Since the medium number of the percentage of repeated teammates is around 20% for most user groups (shown in Figure 6), we assume the players with more than 20% of repeated teammates are more social than others who tend to play with different team members. Samples are thus divided into two populations, PUG team players and social team players, with similar sizes.

	Model 1	Model 2	Model 3
Prediction target	Team player	Team player	Social team player
Player level	0.07*	^a 1.59*	-0.71*
Warrior class	-1.31*	-1.04*	-0.15*
Guild rank	1.20*	^a 1.13*	-0.003

# Friends	0.20*	^a 3.32*	0.01*
Constant	-2.43*	-2.00*	2.00*
N	35,057	35,057	15,773
^b Pseudo-R ²	0.71	0.78	0.10
^c Accuracy	89%	92%	64%

^a. Variables are dichotomized: Level >32, Guild rank >0, # Friends >0; ^b. Nagelkerke R Square; ^c. correctly classified at the cut value .5; indicates p<0.001

Table 2: Predicting team players and social team players.

Model 1 shows some factors that successfully facilitate team collaborations: advanced players with higher levels, non-Warrior classes, high ranked guilds, and more friends are more likely to be team players. Considering the distinct solo and team player populations, Model 2 has the same findings and binary measures offer slightly better explanatory power, which demonstrates that the impacts of in-game statistics are not linear. Whether a player is above or below Level 33, is of the warrior class or not, has at least one friend, and is in a guild or not, can predict solo and team players with 92% accuracy.

Overall our results suggest that players’ decisions to join a team are mostly functional and highly predictable by their status in game. The game has two different stages: tasks that can be handled solo at the early stage and challenging end-game tasks that require teams. At both stages, players just adapt to the game mechanisms and follow the most efficient play styles to advance their levels.

Model 3 suggests that reasons for playing repeatedly with others are different from joining teams. High-level players are less likely to play with others repeatedly and guild status has no effect on the social perspective of team engagement. The low prediction accuracy shows that the game design and in-game status are less important considerations when players choose repeated teammates.

DISCUSSION

Phase Shift from Solo to Team Players

In Dragon Nest, solo players and team players are two distinct populations and are closely associated with the game design. Most of the characters play solo at the early stage of the game. Team players are characterized by a set of four status characteristics in the game: above level 33, non-warriors, in guild, and having friends on their friend list.

The increase of team players after the point of inflection at level 33 is much steeper than it is in WoW [3]. There is almost no transitional population, i.e. players do not gradually increase their involvement in teams. Playing in teams is based more on being at an advanced stage of the game rather than players’ choices. When solo players reach certain levels in game, solo tasks can no longer provide enough experience points and items to advance their levels in the game quickly. All interviewees agreed that “spending less time and get experience points more efficiently” and “getting help from others” are the two main reasons to join teams at high levels. In this case, team collaboration is still

functional and outcome-oriented instead of a social motivation.

Dragon Nest introduces more difficult versions of beginner tasks and tries to promote teamwork as early as possible. However, our analysis shows that, instead of facilitating teams of low-level players, this mechanism actually attracts many high-level characters to play solo in abyss versions of low-level tasks. Low-level players prefer to solo even for tasks at a master level of difficulty, which is designed for teams of four.

Team tasks at the early stage do not break the bimodal pattern. Since higher difficulty versions of beginner level tasks are not mandatory team tasks, low-level players stick to their solo behavior as long as they have a choice.

Contributing to Teams is Better than Relying on Teams

Most MMORPGs design a unique team role for each of the classes by granting them different skills. This is intended to stimulate collaboration among players across classes. Ideally each class should have its own irreplaceable contributions and therefore equally motivated to join teams. Dragon Nest illustrates different modes of class differentiation as well as their consequences in team engagement.

As a baseline, warriors have a balanced skill set with high defense abilities. Even though joining teams can reduce their expense of fatigue points, they still highly prefer to play solo. Archers and Sorceresses are incentivized for teamwork by having diminished defense skills, which make it difficult for them to survive alone. Because their attacking capability is not unique, their roles are replaceable and less attractive to teams. As a result, although the two classes spend most of their time in teams, they have the same percentage of repeated teammates as Warriors do. On the other hand, Clerics have a unique healing power, which can protect themselves as well as others in teams. Although capable of playing alone, they are very popular in teams and have a higher percentage of repeated teammates than all other classes.

These findings show that incentives of team collaboration work better than disincentives of solo play: contributing to teams with unique skills leads to social-oriented interactions while relying on teams for help leads to functional outcomes. From the design perspective, introducing the demand for long-ranged attacks and tank roles in tasks could generate more balanced team engagement across classes.

Task Teams Erode Relationships

In many MMORPGs, players at higher levels, in guild, and with many friends spend more time in teams. High level players have enough experience and good equipment and in turn more control over their own activities. Guilds and friend lists provide easy organizing tools to find tasks and teammates. Teamwork becomes temporal, i.e. coming

together for a specific task and then disbanding, which in turn promotes performance-driven collaboration.

Many of the phenomena observed here are related to Sennett's conceptualizations of *decentralisation and control, flexibility, and teamwork*, which lead to the erosion of enduring relationships [14]. "Teamwork is the group practice of demeaning superficiality," Sennett writes. A good team player should have the ability to establish relations on a task-by-task basis and achieve a quick and higher return. Therefore short-term teams might not be able to bring people together.

Consistent with Sennett's arguments we find that players with high "social" status and more time spent in teams actually have a lower ratio of repeated teammates than those at low levels, not in a guild, and having no friends.

Implications for Design

Although some studies suggest that online gaming may result in strong social ties [16], this paper shows that teams still play a functional role in MMORPGs. Teaming is a necessary component of difficult tasks and to some extent is required by specific game mechanisms such as end game tasks and class design. The main motivation of players to join teams is to finish tasks more efficiently. Even though they spend a lot of time playing with others, it does not help in building long-lasting relations.

The design of many games tries to facilitate emerging social relations online through spontaneous self-organized groups [17]. More difficult tasks, better in-game teammate searching, and team incentive (or solo disincentive such as fatigue points) do increase the team activities. However instead of building potential relations, they become more professional in exploiting the methods, i.e. "analyzing the underlying rules and system in order to optimize character performance" [21]. This suggests that team mechanisms cannot force people to be more social. Although this finding is based on Asian players, the same scenario can be observed in many other games. This online blog [12] provides an example of similar discussions among western WoW players:

"While I think MMOs should absolutely support group play, and offer group options for all solo content, there should also be enough solo content that is fun and challenging to keep a solo player's attention. Trying to push them into groups just make those players unwilling or unable to group leave the game. WoW, unfortunately, features no solo content that is actually a challenge." (DarkWalker)

Instead of focusing too much on the functional side, providing a relaxed environment in teams may be more effective in bringing players together. Many players in our interviews mentioned that they enjoyed chitchats in teams and had more fun than tasks themselves. Consistent with previous studies, informal collaborations in teams are key aspects of socializing [11]. Similarly for virtual teams, due

to their concentration on functional and informational features, informal activities are especially important to provide a persistent narrative in building long-lasting ties.

CONCLUSION

This paper explores the detailed patterns of solo and team activities in Dragon Nest and provides a comprehensive picture of players' in-game status and team engagement. We find that solo and team players are two distinct populations, which can be explained largely by game design mechanisms. We find that collaborating on tasks in teams is more functionally-driven and is not motivated by a desire for relational outcomes.

Of course informal collaboration as suggested by Nardi and Harris [11] could be more effective in facilitating the process of relation building rather than the formal PvE task teams we investigated. Future research should explore other types of player interactions and their impact of sociality in game.

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