

Twitch Plays Pokemon: An Analysis of Social Dynamics in Crowdsourced Games

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ABSTRACT

This paper analyzes the social phenomena that occurred in the social experiment Twitch Plays Pokemon. By reviewing research that has been conducted into the behaviour of players in other multiplayer online games, hypotheses will be devised on the type of behaviour that can be expected. These hypotheses will then be compared to the events that occurred in Twitch Plays Pokemon in order to verify or refute these hypotheses. This study found that despite clear evidence to support some claims regarding player motivation and demographics, the social dynamics that occurred are consistent with previous research. This suggests that social dynamics in online games are consistent, regardless of the details of the game mechanics and level of social interaction allowed by the game.

Author Keywords

Twitch Plays Pokemon; online games; multiplayer games; online communities;

ACM Classification Keywords

J.4. Social and Behavioural Sciences: Psychology, Sociology; K.8.0 Personal Computing: General-Games

INTRODUCTION

Since the introduction of World of Warcraft in 2004, Massive Multiplayer Online Games (MMOGs) have become some of the most popular in the world. These games offer a social experience that is unparalleled by other types of game. In games like World of Warcraft, there are millions of players, who all play the same game in different parallel instances, called realms. Within these realms, players can engage in any number of tasks, such as completing quests, exploring dungeons, and trying to earn “achievements”, points for completing more difficult tasks. Players are able to join a social group, called a guild, which allows them to interact with the same group of players on a regular basis.

The social interactions within an MMOG are quite complex, and many studies have been conducted to try to understand them. For instance, despite it being in a dungeon group’s

best interest to defeat all enemies in the dungeon, there are players, usually called either trolls or griefers, who will intentionally sabotage the group’s efforts, usually by attacking enemies while the group is unprepared. There are other sorts of troll-like behaviour that can occur as well, such as positioning a large mount (an animal that a player can ride) over a quest-giver or a mailbox. There are other non-trolling dynamics that are also complex, such as the dynamics of organizing and leading a raid (a large group of players, usually 25, working together to defeat a very large enemy).

In an MMOG, the form of interaction is always the same: each player controls their avatar and players can speak to each other using some sort of chat room interface. In February 2014, an anonymous broadcaster on Twitch, a video game streaming service, started a social experiment to determine what would happen when this type of interaction was changed completely. In this experiment, call “Twitch Plays Pokemon” (TPP), he wrote a program that parses text from a chat room and uses that as input into an emulator running a copy of Pokemon Red. In this experiment, all viewers (who were also players) shared control of a single avatar. As well, because the emulator used the chat room as input, it became unavailable for use by the players. For the first time, players were required to share control of a character, while at the same time, unable to communicate with each other.

No game has ever attempted to implement this sort of control scheme before. As a result, there is no research into how the social dynamics develop in this sort of scenario. This paper will attempt to analyze previous work that has been done on MMOGs, and determine whether those findings apply to TPP. Hypotheses will be developed based on the previous work, which will then be compared to the events that occurred in two playthroughs of TPP which used the same game.

Pokémon

The Pokemon video games are a set of Role Playing Games (RPGs) released by Nintendo for various handheld consoles, such as the Gameboy and Nintendo DS. In these games, the player starts by choosing a starter pokemon from some starter set. They then travel around the world, with the goal of eventually becoming a “Pokemon Master”. This is achieved by travelling to various towns, capturing additional pokemon, and defeating a series of “gym leaders”, eventually defeating the reigning world champion, after which the game ends. In these games, the player’s pokemon gain experience and become more powerful by defeating other pokemon. These battles use a turn-based system where players can perform

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various actions on each turn, such as attacking or using an item.

Twitch

Twitch is a streaming service that is used primarily to broadcast video games. Each broadcaster (also called a streamer), has a dedicated channel, which also has a dedicated channel on an IRC server. Streamers typically use this service to stream the audio and video output of some video game for others to watch. Typically, there is a delay of approx.30 seconds (known as Twitch lag), between an action occurring on the streamer's computer and it being visible to the viewers.

PREVIOUS WORK

Types of Players

In 1996, Richard Bartle published the first paper that classifies different types of video game players according to their playing habits [4]. In his paper, he divides players into four categories: Explorers, whose goal is to explore and learn about the world, Socializers, who focus on social interaction with other players, Achievers, who try to complete as many difficult tasks as possible, and Killers, whose main goal is to show their superiority by defeating other players. According to Bartle's test, players are given a score between 0 and 100 in each category, making it possible for players to belong to multiple categories. According to gamerDNA, the website that hosts the results of Bartle's online survey, 13.4% of WoW players are predominantly socializers, 28.7% are predominantly killers, and the remaining 58% are either explorers or achievers [3]. It can be inferred that the proportions would be similar in other games as well.

Suznjevic et al. conducted studies in which they attempted to determine how much time players spend in different activities [13, 14]. They found that on average, 15% of users engage in Player-versus-Player (PvP) activities, 35% engage in quests and dungeons (PvE), and 50% engage in single-player non-combat activities, such as socializing and trading, at any given time. Disregarding the non-combat activities, their results show that roughly 30% of users engage in PvP and 70% engage in PvE activities. These ratios are similar to the ratios found in the Bartle Test.

Bartle attempts to explain the motivation that different players have for engaging in different activities. He claims that Killer players typically engage in more competitive gameplay in order to assert their superiority over others. Explorer and Achiever players, on the other hand, are more motivated by a desire to overcome obstacles and achieving arbitrary goals and typically engage in non-competitive gameplay as a result. Finally, Socializers have minimal interest in the game itself, and play primarily in order to socialize with other players.

Trolling

Online or internet trolling is the practice of engaging in a provocative or destructive manner in some social scenario on the internet, where the goal is to anger others or cause chaos. Until recently, there has been very little research on this phenomenon. One of the major papers that studies internet trolling is Suler's The Online Disinhibition Effect [12],

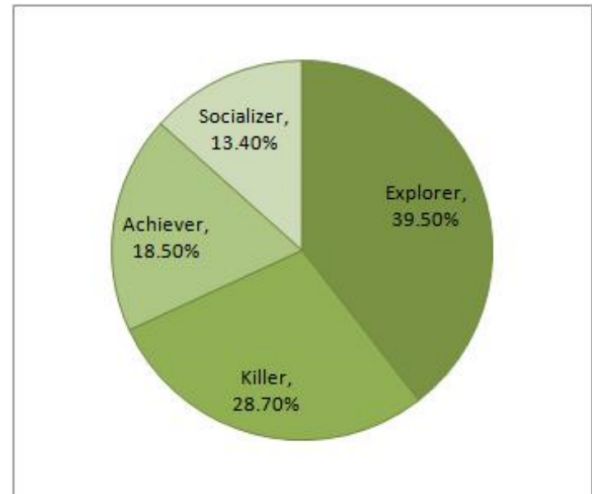


Figure 1. The breakdown of players in World of Warcraft by their highest Bartle Test score.

which introduces the concept of the online disinhibition effect, a term used to describe the phenomenon that causes people to act aggressively or destructively on the internet, when they would not act like that in person. Within the realm of online video games, there are a number of factors that Suler names. Dissociative anonymity and invisibility are when a troll cannot easily be seen or identified. This lets the troll act without concerning himself about the repercussions of trolling. Solipsistic introjection is when the troll creates a persona to take the place of the person they are trolling. They use this to justify their actions, in order to convince themselves that they are not doing anything wrong. This is also used to make the people the troll is antagonizing seem less real. Finally, dissociative imagination is when a troll feels as though their avatar or username is a separate person from themselves, and that they exist in a separate world entirely. This allows them to rationalize their actions by acting as though there are no negative consequences for others.

Other studies though, such as [5], show that internet trolls do not only act out of disinhibition. By conducting two surveys, they determined that there is a huge positive correlation between trolling and the "Dark Tetrad", sadism, psychopathy, narcissism, and Machiavellianism. Within this, they also found that given the other traits in the Tetrad, there was a very strong correlation between sadism and trolling. This indicates that even while other personality traits can contribute to troll-like behaviour, trolls act primarily out of sadistic urges.

In MMOGs, there are two types of players that can be classified as trolls. The first are the traditional trolls, who simply try to antagonize others directly. They will often harass other players with offensive messages and try to use this to disrupt them. The second are often called "griefers" who, as the name implies, try to cause grief, often using the game's mechanics to do so [1]. These include stealing items from other players, harassing players by killing them repeatedly, and scamming other players during trade. Unlike trolls, who simply wish to offend other players, griefers attempt to prevent other players from progressing in the game.

Social Interaction

A number of studies have been conducted on both the way that players interact with each other in online games as well as the impact that social interaction has on their experience. Suznjevic et al. found that voice and text chat are important factors when considering the level of player engagement in an MMOG [13]. By categorizing the amount of time player spend performing different types of actions, they found that players spend roughly 17% of their time communicating with other players. This is higher than the amount that players spend performing any combat activities, with the exception of raiding (fighting larger monsters with a large group of players). This indicates that players spend a considerable amount of time simply talking to each other.

Bardzell et al. claim that the “grouping” aspect of online games, which allows players to work together to achieve some seemingly difficult goal is one of the most enjoyable aspects of online games [2]. In these social groups, players are led to believe that their interaction with the group is one of the factors that contributed to their success. Bardzell also claims that the main reason why this is so rewarding is because players cannot control the group, and must construct dynamics that will allow the group to succeed. Chen et al. found similar results, and showed that players who interact socially with other players often experience a higher level of engagement with the game as well as a higher level of satisfaction [6].

Nardi found that social interactions can be categorized in a number of different categories [10]. The largest groups of players, called guilds, are categorized as communities. These communities often share a set of values or interests, although not necessarily the same desires or goals. The next largest groups are called knots. These are groups that form for a specific purpose, such as clearing a dungeon or defeating a large monster. These knots can sometimes turn a temporary grouping or friendship between players. The smallest group is pairwise collaboration with friends. Players can track their friends and chat with them at will. Finally, Nardi found that collaboration with other players can contribute to the players’ enjoyment of the game.

Latency

The effect of latency on decision making is very well documented. The first document analyzing the effect of latency on decision making was published by Forrester in 1958 [7]. In this paper, Forrester presents the bullwhip effect, which is the term used to describe increasing fluctuations in inventory in response to a change in demand. The bullwhip effect, named such because a graph showing inventory levels will look similar to a bullwhip, is often demonstrated using a beer distribution game. Created in the 1960s at MIT, the beer game is used to demonstrate how a very simple change in input can create a chaotic reaction. In this exercise, participants are asked to take on the roles in a beer store’s supply chain: The retailer, wholesaler, distributor, and factory. Every turn, a number of customers purchase beer from the retailer, and only the retailer has access to this information. Participants are able to send request for more inventory upstream, which takes two

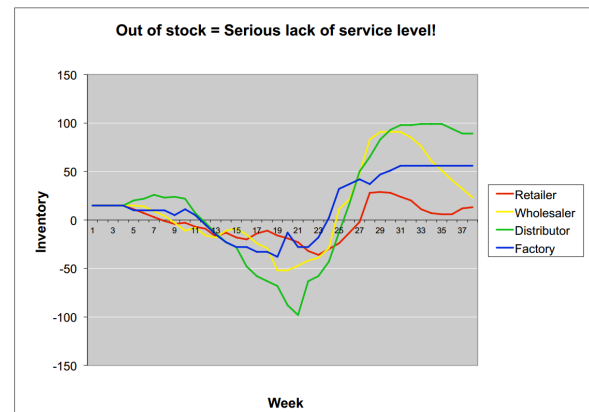


Figure 2. The inventory levels during a typical beer game. In this instance, the customer ordered 4 cases of beer for weeks 1-4 and 5 cases of beer for the remainder of the game.

turns, and can send inventory downstream, again taking two turns. There are penalties associated with having excessive or insufficient stock, and the goal of the exercise is to minimize the penalties that you incur.

In an analysis of the beer game, Sterman found that there were many behavioural factors that contributed to the bullwhip effect [11]. The most significant of these factors is the misperception of time lags. Sterman claims that most participants fail to account for the latency when making decisions. He found that the amount of beer that each point in the supply line needs to order at each interval in order to maintain their supply levels is proportional to the length of the delay. Most participants did not realize this, and instead only ordered the amount that they needed at that moment.

Other studies have been conducted analyzing the role of latency in online video games. Fritsch et al. conducted a study in which they evaluated the problems that users experienced while performing different tasks at different latency thresholds [8]. In this study, they asked users to complete a variety of tasks a Massive Multiplayer Online Game (MMOG), Everquest2, while manually controlling the amount of latency. They asked users to complete navigation, solo combat, and group combat tasks at latency thresholds from 250ms to 5000ms. They found that navigation and exploration were nearly unaffected by the latency, since both tasks are both handled locally. Combat tasks, which require interaction with the server, were rendered almost unplayable at 1250ms of latency. They also found that the length of combat was proportional to the amount of latency, and that the users’ performance in combat, measured by their remaining health and mana, was inversely proportional to the latency. This indicates that latency is only noticed in tasks where the results are expected to occur in real time.

Emotional Attachment

Livingston et al. recently conducted a study that attempts to determine why players often become emotionally attached to their in-game avatars [9]. In this study, they found that there are a number of reasons why players can become emotionally attached to their characters: Investment, where the player

becomes attached due to the time and effort invested, enjoyment, where the player becomes attached because it is fun, new experience, where the player becomes attached because the character represents a new experience, and sociability, where players become attached because the character gives them a way to interact with others, among others. This may explain why players were so willing to continue to play TPP despite the level of difficulty, and why the players were able to successfully complete the game.

HYPOTHESES

This section will present a number of hypotheses that can be drawn based on the previous work that has been done, and from the observations that were made during the first half of the original run of TPP.

H1. Due to the input latency, tasks that have a small target, such as exiting a room or selecting an item from a list, will be very difficult to complete.

As mentioned above, increases in latency render even the simplest in-game tasks very difficult to complete [11]. Because players are all constantly entering input, and typically do not account for latency, they will continue to enter commands until they see that a command has been fulfilled. At this point, there were be additional commands in the buffer that will cause the game to overcompensate for what they were trying to do.

H2. Trolling events will occur more frequently during more difficult events, such as rooms with traps or mazes.

Trolls typically act on sadistic urges, and want to antagonize other players as much as possible [5]. The more difficult a puzzle or obstacle is, the more frustrated the players will become as a result of the lack of progress. As players become more frustrated, troll-like behaviour will anger them more than usual, resulting in the trolls deriving more pleasure from antagonizing the players.

H3. Because players value their experience, they will be willing to use Democracy mode in times of extreme difficulty and sacrifice the entertainment value of TPP for the sake of progress.

H3.1. As soon as the difficulty has decreased, the game will revert to Anarchy mode almost immediately.

If the players are unable to overcome an obstacle, there is a risk that the number of viewers will drop, and TPP would be suspended. Because players have invested so much time in this experiment, they would be unwilling to see that happen. As a result, they are willing to temporarily decrease the amount of entertainment that TPP provides by switching to Democracy mode in order to ensure that progress can be made. As found in [2] achieving a seemingly impossible goal can be very rewarding, which may motivate players to pursue the goal at the expense of entertainment. Once the obstacle is overcome, players will not have any reason to sacrifice the entertainment value of TPP, and will revert back to Anarchy mode immediately.

H4. Players will still find a way to communicate with each other, despite the removal of the chat room interface.

According to [3], roughly 15% of players are only involved in online games because of the social aspect. As well, according to [13] and [14], at any given time, roughly half of the players in a game are involved in social and other non-combat activities. This indicates that there will be a significant number of players who, despite not actively participating in TPP, will want to discuss it with others. As well, multiple other studies show that social interaction is an important aspect of online game [6, 10, 2], so it can be expected that players will attempt to create some sort of community.

ANALYSIS

In this section, I will analyze the original run of TPP. This run used Pokemon Red, one of the original pokemon games. The run started on February 12, 2014, and ended on March 1, 2014. At its peak, there were over 120,000 concurrent viewers, with an average of 50,000 concurrent viewers. The dates used below, such as Day N, refer to the Nth day of the stream. As well, Red refers to the player character, taken from his name in the game.

Game Mechanics

Mechanically speaking, TPP is very simple. To pass a command to the emulator, players would enter a string into the chat room. These were “up”, “down”, “left”, and “right” for directional input, “A” to confirm a prompt or interact with an object or person, “B” to cancel or close a prompt, and “Start” to open and close the menu. Initially, “Select” would trigger the “select” button, but this was later removed; it could only be used to cause the game to crash. These commands correspond to the buttons on the Nintendo Gameboy. Players could also append a number from 1-9 to indicate that a command should be executed that many times. The commands were then put into a buffer, where they were processed at a rate of 0.5 seconds per command. Because of lag present in the original game, this also meant that a large number of commands were not processed; simple actions, like opening a menu and walking, take at least 1 second per action, and any intermediate actions would be discarded.

On Day 6, after the “Spinning Hell” event, described below, this method of handling user input was changed. The original method became known as Anarchy mode, and a new mode, called Democracy mode, was introduced. In Democracy mode, inputs were parsed in intervals, the duration of which changed multiple times, and whichever command was entered the most during this interval was processed as the next command. In order to let players switch between modes, “anarchy” and “democracy” commands were added. Whichever command was entered would move the mode in that direction. Within a set interval, if 80% of players supported Democracy, it would switch to Democracy, but if 50% of players supported Anarchy, it would switch to Anarchy mode. The thresholds were set at these levels to show that it would be easy for an anarchist group to undermine democracy in any social setting. This change led to an event that became known as the first “Start9 Protest”, which is an interesting example of people using troll-like behaviour for a cause.

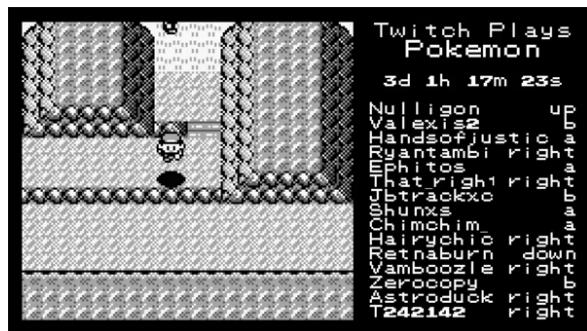


Figure 3. A screenshot of the TPP interface. This screenshot shows the player character falling off the ledge during the first ledge event. The box on the right side of the image shows the players' usernames and the commands that they entered.

Major Events

Because Pokemon Red is a somewhat complex game in its own right, and because TPP played this game for 17 days, there were several noteworthy events. All of these events occurred as a direct result of allowing all viewers to enter commands, and they all either demonstrate some of the issues that arise as a result of the media that was used to play the game or some of the interesting social phenomena that occur when playing any multiplayer game.

The Ledge

The ledge was the first event that made evident the ability of trolls to hinder the progress of the game, and required an entirely new sort of strategy to overcome. On day 4, Red encountered a long and narrow ledge that he needed to cross in order to progress. In the Pokemon games, a ledge is a terrain type that characters can fall off of, but cannot climb. In order to walk along the edge without falling, the game needed 30 seconds of continuous right commands. If 3 consecutive down commands were executed, Red would fall off and need to start again. Ultimately, this was overcome when a large number of players decided to work together on Reddit to develop the TPP metagame. In this instance, the metagame consists of discussions regarding the commands that need to be entered in order to perform some action, such as crossing a ledge.

The first Ledge event helped demonstrate the power that trolls have within a crowdsourced game. In a traditional MMOG, trolls are restricted to sending offensive messages to other players, and are able to sabotage players in very specific scenarios. In TPP however, because trolls have as much control over the character as other players, they can sabotage the game much more easily; in this case, all they needed to do was enter a down command. Although many players were opposed to this, the Democracy system was implemented to stop scenarios like this from occurring, where a single incorrect input can undo all progress that had been made in completing a task.

Rock Tunnel

Rock Tunnel was a somewhat unique event, because it was the first event that occurred where the players were unable

to see what they were doing. In Pokemon Red, Rock Tunnel is a cave the players must pass through relatively early in the game. This cave is particularly troublesome because the screen is almost entirely blacked out for the entirety of the cave. Players are expected to use a special ability to illuminate the cave, but because of the nature of TPP, this never occurred. As a result, the players were required to navigate a maze-like cave with minimal feedback regarding their progress. They were able to pass through this cave, although it did take 9 hours to do so. Additionally, this was before the addition of Democracy mode, so players were unable to use it.

Spinning Hell

Spinning Hell is the first major obstacle encountered during the game, and the one which led to the addition of Democracy mode. This obstacle consisted of a maze made of tiles that, when stepped on, would cause Red to spin and move across the room until a wall was encountered. Because the possibility of an incorrect input occurring is so high, the players were unable to progress past this event while using Anarchy mode. Once Democracy mode was introduced, players were able to complete this maze. The total time required to complete this maze was roughly 26 hours.

Because the maze was so complex, it's impossible to tell whether any trolls were trying to sabotage this segment of the game while still in Anarchy mode. Instead, it demonstrates how significant an effect latency can have on the ability to navigate a relatively simple maze. Even after Democracy mode was used, it took 4 hours to navigate through the maze. Because trolls were unable to influence the game during this time, the difficulty is due entirely to the latency.

Start9 Protest

The Start9 Protests shows that players could simply prevent the game from progressing if they wished to by engaging in trollish behaviour. After the introduction of Democracy mode, a number of players wished to show that they were dissatisfied with this change. The Start9 Protests simply consisted of the anarchist group entering the string "start9" as often as possible. This would then cause the emulator to open and close the start menu 9 times, effectively pausing the game. These protests started as a way of protesting the

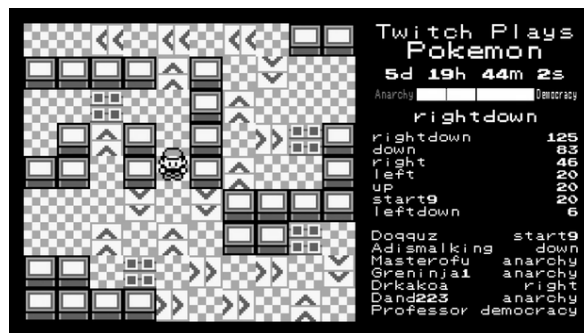


Figure 4. A screenshot capturing the "Spinning Hell" event after the introduction of democracy mode. The right side of the image now shows the number of each command entered during the current voting window, as well as the previously executed command.

addition of Democracy mode, which was done in the middle of the Spinning Hell event. Because the game character was trapped in the maze for so long, a large enough number of players supported Democracy, but the anarchist faction was large enough to still successfully protest. Eventually, these protests ended due to necessity, however they continued to occur whenever enough players thought that Democracy was being overused.

The Start9 events are of particular interest, because despite acting in an exceedingly trollish manner, none of the protesters would actually classify as trolls. As shown in [5] and [12], trollish behaviour is caused by sadistic players, often taking advantage of the nature of the internet. While there undoubtedly were some participants in the Start9 events who wanted to switch to anarchy in order to troll the other players, the majority felt that Democracy mode undermined the original idea, slowed the pace unnecessarily, and rendered the input of many players inconsequential. The reason this is so interesting is because it was the first significant protest within a video game, and certainly the first that used trollish behaviour to promote a specific philosophy. This also demonstrates that although trolls would be able to hinder or halt the game's progress during more difficult events, there are a significant number of players who would rather not prevent them from doing so. This may indicate that the players value the entertainment aspect of this game much more than the progress aspect, suggesting that troll-like behaviour would be accepted by other players as long as it is still seen as entertaining.

Bloody Sunday

The Bloody Sunday event is a prime example of some of the negative consequences that the latency can have on the game, and potential damage caused by it. On Day 11, the character caught a rare and powerful pokemon, who the character then had to retrieve from a storage system. At this point, the game was still in Anarchy mode. When the players attempted to retrieve this pokemon, they inadvertently began to release (the term for deleting) pokemon. Over the next 9 hours, 12 pokemon were released, as players tried desperately to stop. This was made more difficult by an increased delay caused by the game when using the storage system. As a result of this increased lag, some commands, such as the "B" button to cancel the prompt, were ignored by the game. In addition, because of the latency and the level of panic, players would overcompensate while navigating through the storage system's menus, causing the outcome to seem almost random.

Eventually, enough players were able to switch the game to Democracy mode for long enough that they were able to retrieve the original pokemon. This demonstrated that the excessive lag could cause real damage, and that the latency, when combined with the fact that multiple people control the game, can be a tremendous obstacle. This outcome agrees with the findings in [8], which stated that events that require you to react in real time, rather than being able to wait until you are given a chance to analyze the scenario, become almost impossible to complete once the latency passes a high enough threshold.

HYPOTHESIS TESTING

In this section, the hypotheses, which were devised based on research done using more traditional MMOGs, will be compared against the events that occurred in both the first and fourth runs of TPP. The first run used the original Pokemon Red, released in 1996, and the second run used Pokemon FireRed, a remake of Pokemon Red, released in 2004. The main difference between the first and fourth runs was that in the fourth run, some of the pokemons' abilities were randomized, resulting in them being learned in a random order. Because the hypotheses do not accommodate for this, it should not have any impact on the findings.

H1. Latency

First Run

The main events that demonstrate the effects of latency are the Bloody Sunday and Spinning Hell events, as outlined above. In these events, players were unable to properly control the character or the cursor, due to a 30 second delay between entering a command and it being executed. Even with the inclusion of Democracy mode, these tasks were very difficult to perform due to the latency. Despite players being given a window in which they could vote on the next command, this window was actually shorter than the latency period. As a result, many of the commands are entered 30 seconds after the situation that they were a response to happened, showing that players do not properly perceive or accommodate for the latency.

This is demonstrated most clearly in Spinning Hell, where the character consistently moves a single tile too far in each direction. For instance, the character would move left to navigate around an obstacle, and then move left again instead of moving down. This shows that players were still entering the left command, even though they should have known to enter the down command before seeing the character move left, due to the latency.

Fourth Run

Similar to the first run, a second Spinning Hell incident occurred. Again, players were trapped in the same maze, and required the use of Democracy mode to complete it. Even after Democracy mode was activated, it took an additional 7 hours to complete the maze. This shows that even with the experience that players would have had from the first run, they failed to account for latency again. The time taken to complete the maze after the change to Democracy was roughly the same as in the first run, showing that the issues caused by latency are consistent.

H2. Trolling

First Run

While trolling occurred throughout the run, there are a few instances that made the number of trolls apparent. The first is the ledge event. In this event, there were enough trolls that they were able to repeatedly execute 3 consecutive down commands. This means that during the ledge event, there were more people trying to troll other players than there were players trying to progress. This can be inferred because in order for these commands to be executed, there would need

to be more down commands entered than right commands. If this wasn't the case, and there were more right commands than down commands, then the down commands would only cause the character to face downwards, instead of jumping off of the ledge.

This ledge event was not the only event where this occurred. It was possible to see that trolls were attempting to sabotage the Spinning Hell maze, even after Democracy mode was added. It was also possible to observe this behaviour during the other two ledge events that occurred. In both other ledge events, trolls were able to successfully sabotage the players' efforts, causing both other ledges to take over 12 hours each to overcome.

These events show that as tension and frustration began to increase with the duration of the event, the number of trolls did not decrease, showing that trolling is likely to occur during some difficult events. There are also no occurrences of trolling of this magnitude outside of these events. For example, there are no instances of trolls attempting to turn the character around and walk back to a previous town at an arbitrary time. Large trolling events only seem to occur when the players encounter a significant obstacle.

Fourth Run

The amount of time required to clear the first ledge took roughly the same amount of time in both runs. Unfortunately due to technical issues with the video and a lack of information available, there is no way to be certain how long the other ledge events took in this run. A brief view of the third ledge event shows similar behaviour to the first time. Additionally, there was a Spinning Hell event in this run as well, and the same behaviour, where people were still trying to sabotage the game despite Democracy mode being present, occurred as well.

H3. Democracy Mode

First Run

There were a number of times when the players switched to Democracy mode. The first was during the Spinning Hell event where the concept was introduced, and again when they needed to return there to retrieve an item. The next occurred in "Safari Zone", a mini-game of sorts that is required to complete the game. After several failed attempts (totaling 11 hours) to clear the Safari Zone, the game was switched to Democracy mode. The mode then switched between Democracy and Anarchy several times during Safari Zone, mostly due to a series of Start9 protests that occurred. The next time occurred when players needed to navigate the first ledge a second time. It was also used during the Bloody Sunday event in order to prevent further damage. It was then used seemingly at random on Day 12 for a number of minor actions and to interact with the storage system. Afterwards, it was used to navigate a ledge and enter a building. It was used for the last time to navigate a puzzle-like dungeon, similar to Rock Tunnel, outlined above.

In all of these cases, Democracy mode was used for one of three reasons. Either it was an obstacle that the players had spent too much time trying to overcome such as clearing the

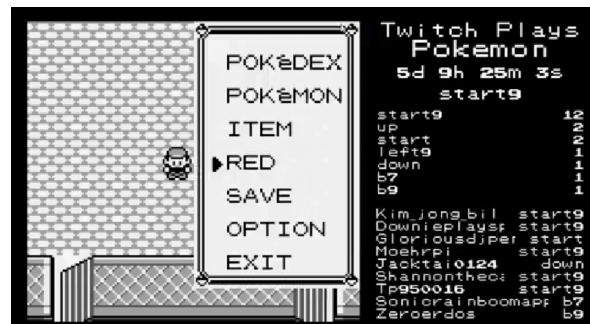


Figure 5. A screenshot capturing the first "Start9" protest, shortly after the introduction of Democracy mode. While appearing harmless, each processed start9 command would cause the game to open and close the menu 9 times, effectively bringing the game to a halt. According to anecdotal evidence, this was discovered accidentally.

ledge the first time, it was an obstacle that the players had overcome before and knew would be difficult, such as clearing the ledge a second time, or because they were aware of possible damage that could result from a lack of control, such as using the pokemon storage system. This indicates that the only times when Democracy mode was used was when the lack of progress that would have occurred from using Anarchy mode would have greatly detracted from the entertainment value of TPP.

Interestingly, during the second ledge event, there was a series of incidents that captured the way the players viewed obstacles. In this instance, Red needed to be moved along a ledge and into a building. After several failed attempts (and several hours), the players switched to democracy mode and successfully entered the building. Immediately after entering, the obstacle was seen as overcome and the game was switched back to Anarchy mode. The players promptly ran out the door and fell off the ledge. This cycle repeated a number of times before finally overcoming the obstacles inside the building. This, along with the time taken to revert to Anarchy mode after all other obstacles, demonstrates that as soon as an obstacle is deemed to have been overcome, players are no longer willing to compromise the entertainment value of the game.

Fourth Run

Due to a lack of annotated data, there is no way to tell when the modes were switched between Anarchy and Democracy mode. Available documentation does indicate that Democracy mode was added during the Spinning Hell maze in this run, so it can be assumed that it was used here.

H4. Social Groups

It should come as no surprise that a short time after TPP started (under 48 hours, according to available documentation), a number of social networks started to arise spontaneously. These had no official affiliation to TPP, and were created by viewers and players. The most prolific one is the Twitch Plays Pokemon subreddit, a forum on the social website Reddit. This social group consists of nearly 100,000 people who use this website for a number of purposes. While many users use it to track the progress of the game or devise strategies that they could use to overcome obstacles within

the game, there are many people who simply use it for social purposes. There are even several “political” and “religious” factions within this community, with the political factions arguing about the Anarchy and Democracy modes, and the religious factions arguing about several significant decisions made in the game (eg. which pokemon to choose at certain points). There are also many people who, instead of participating in these debates, created a continuous story to explain what was happening within the game as though they were Red, the protagonist. The emergence of these social groups, as well as the factions within each group, indicate that there is still a sizeable number of viewers whose main goal is to focus on social events, rather than on the game itself.

DISCUSSION

During the course of this analysis, it was found that all hypotheses above, which were based on research done on player behaviour in traditional MMOGs, correspond with behaviour seen in Twitch Plays Pokemon.

H1 is shown to apply to TPP due to the number of events that became significantly more difficult as a result of latency issues. These events include the Bloody Sunday event and Spinning Hell, neither of which would have been as difficult if there was no latency. There was also a poorly documented “Elevator Event”, where the players were trapped in an elevator for several hours. During this event, players would rapidly move from left to right, and were unable to send an up command while in front of a door. It is then safe to conclude that the latency is a significant contributor to the difficulty of TPP.

We can also conclude that H2 applies to TPP, although there is mixed evidence. While the amount of trolling that occurred was greater during more difficult events, such as the first ledge event, it is difficult to determine whether the amount of trolling actually increased, or if the effects of it were just more noticeable. There are also events such as the second ledge, where player repeatedly left a room and jumped off of a ledge, but there is not enough evidence to determine if this event, and others like it, were caused by intentional trolling or simply poor navigation (the building contained a maze, which may have led to players inadvertently exiting). The evidence is also unclear as to the proportion of players who were acting as trolls. It is possible that there was a link between the proportion of Killer-type players and trolls, but there was insufficient evidence to support this.

The way that the players handled the Democracy and Anarchy modes supports H3, the claim that players would much rather progress in the game than have fun. This may be because the need for progress became great enough to overrule the need for entertainment, but it is also possible that the level of frustration that players experienced during some obstacles was so great that it prevented them from enjoying the game. There is no clear way to determine which of these is the case. It is also noteworthy that as soon as obstacles were overcome, players would consistently revert back to Anarchy mode. Curiously, players did not even wait long enough for them to progress well past the obstacle. Often, something as simple as entering a building or exiting a cave was sufficient to imply that the

obstacle had been overcome, and that they could revert to Anarchy mode. This demonstrates that given the choice, players will undoubtedly choose both entertainment and progress.

There is also strong evidence that the social aspect of this game is critical to its enjoyment. Almost immediately after the start of the game, communities started to develop around it. These communities included social and political commentary, comedic religious factions, and viewers trying to create a story to match the experience. Interestingly, the number of peak users on the main TPP subreddit corresponds to between 10 and 15% of the number of viewers on the TPP channel, indicating that the number of viewers who are interested in socializing instead of playing the game roughly corresponded to the numbers found in [3], indicating that the remainder of the breakdown may be accurate as well.

It seems then, that there is strong evidence to support the hypotheses made above. This may indicate that the research that has been done on traditional MMOGs may in fact be applicable to almost all MMOGs, independent of the control mechanism or communication method.



Figure 6. The “The End” screen shown after successfully completing the game, showing that despite all odds, the players were able to successfully complete the game.

CONCLUSION

In the 17 days that TPP initially ran, a total of over 2000 man-years of video footage were watched. Despite being a children’s video game, the claim that this was a significant phenomenon is irrefutable. It is therefore important that the social dynamics that occur in this sort of scenario are properly understood. This paper has demonstrated though, that the previous research into MMOGs is still relevant, and that the social dynamics do not change noticeably when the way each player interacts with the world changes, whether they share control of a single avatar or control their own personal avatar. It may therefore be possible to apply these dynamics to other areas of research, where the domain of a problem contains social dynamics, even though the form of interaction between people is different. In any case, this experiment demonstrates that in any social context with obstacles, both external and within the social network, the social group as a whole is able to unite in order to overcome these obstacles and achieve its goals.

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