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An Analysis of the Effect of Bots in MMORPGs on Player Enjoyment and Morals

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## ABSTRACT

Bots that automate tasks can be seen in every online community. They are especially prevalent in video games, particularly MMORPGs (Massively Multiplayer Online Role-Playing Games). In MMORPGs, there are two main categories of bots – malicious ones created by third parties and helpful ones created by game developers. These bots have various positive and negative effects when they come in contact with players. This paper looks at the results of human-computer interactions between players and bots and how player enjoyment and morals change based on the prevalence and intelligence of bots. The research focuses on one game in the MMORPG genre, Final Fantasy XIV, which has ample examples of both third-party bots and developer-created bots with various levels of prevalence and intelligence. Through a literature review followed by coding comments about bots by players on Reddit, an idea can be formed of how the player experience is affected. This paper shows the results of coding Final Fantasy XIV players' comments about bots in the game and makes conclusions about how player enjoyment and morals are affected by interactions with third-party bots and developer-created bots in the game.

## TABLE OF CONTENTS

LIST OF FIGURES .....	iv
LIST OF TABLES.....	v
ACKNOWLEDGEMENTS .....	vi
Chapter 1 Introduction .....	1
Bots in MMORPGs.....	2
Key Concepts .....	3
Final Fantasy XIV .....	4
Definition of Physical Locations in FFXIV .....	5
Chapter 2 Literature Review .....	8
Overview of Bots in MMORPGs.....	8
Bot Detection Approaches .....	10
Bot vs Player Intelligence .....	12
Bots and Player Enjoyment.....	13
Spread of Cheating Behaviors.....	15
Chapter 3 Research Methodology.....	17
Gathering Data on Reddit.....	18
Quirkos Analysis Tool .....	21
Coding Process.....	22
Chapter 4 Results .....	24
Third-Party Bot Findings by Location .....	24
Overworld.....	26
Market Board.....	30
Eureka .....	33
Dungeons.....	35
Housing .....	38
Trust System Findings.....	40
Positive Effects on Players .....	42
Negative Effects on Players .....	45
Squadron Findings .....	47
Positive Effects on Players .....	50
Negative Effects on Players .....	51
Chapter 5 Discussion of Results .....	53
Bot Prevalence and Player Enjoyment.....	53

Bot Prevalence and Player Morals .....	55
Bot Intelligence and Player Enjoyment.....	56
Bot Intelligence and Player Morals.....	60
Limitations .....	62
Future Research.....	62
Chapter 6 Conclusion.....	64
Appendix A Quirkos Third-Party Bot Code Bubbles .....	65
Appendix B Quirkos Trust Code Bubbles .....	66
Appendix C Quirkos Squadron Code Bubbles .....	67
BIBLIOGRAPHY.....	68

## LIST OF FIGURES

Figure 1. Quirkos User Interface. Themes are on the left and text is on the right. ....	21
Figure 2. WordCloud for keyword "bots." .....	26
Figure 3. WordCloud for keyword "trusts." .....	41
Figure 4. WordCloud for keyword "squadron." .....	49

**LIST OF TABLES**

Table 1. Coded Themes for Third-Party Bots.....	25
Table 2. Coded Themes for the Trust System.....	40
Table 3. Coded Themes for Squadrons.....	48

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## Chapter 1

### Introduction

As humans look to automate simple tasks, robots that are meant to perform human functions online grow in popularity. It becomes important to ask how humans are affected by the subsequent increase in human-computer interactions. One of the most prevalent uses of robots, or “bots” for short, occurs in massively multiplayer online roleplaying games, or MMORPGs. While many studies have been done on these games in the areas of identifying bots, player versus bot intelligence, and how cheating on the part of bots influences players’ cheating behaviors, there is a lack of research on the topic of how human-computer interactions between bots and players can affect players. Such interactions have the potential to significantly impact a player’s game experience for the better or for the worse. Thus, it is vital for game developers to understand how to design games with human-computer interactions in mind for the best player experience. To gain an understanding of this area, a few questions must be answered: what effect does bot prevalence have on player enjoyment of the game and morals? Additionally, how does bot intelligence impact player enjoyment and morals?

Having the largest in-game communities, MMORPGs often have thousands of concurrent players on their own personalized characters at any given time. The goal of these games is to become stronger by defeating enemies and doing quests. Strength is based on a level system where a player usually starts at level 1 and grows in level as they play, increasing their survivability and the damage they can deal to enemies. In some MMORPGs, resources such as enemies or even items may be limited. Players may work together or compete to collect



materials, defeat enemies, or win achievements. A few examples of popular MMORPGs are World of Warcraft, Final Fantasy XIV, Guild Wars 2, and RuneScape, among others.

### **Bots in MMORPGs**

One popular use of bots in MMORPGs is as a cheating tool. Bots do not require rest and can do tedious but useful tasks non-stop that normally would take a long time for players. It is relatively easy to program bots to do simple tasks such as killing enemies for in-game currency or experience to level up. In many MMORPGs, players often encounter bots that disguise themselves as players and advertise in-game currency-selling services or gather materials and currency non-stop. These are malicious bots, created specifically by third parties to earn money from real players through their use. For example, in Final Fantasy XIV, malicious bots are prevalent in starting areas, often spending days at a time collecting in-game currency by killing enemies in the overworld or advertising Real Money Transfer (RMT) services in towns, an illegal practice according to the game's Terms of Service (Square Enix, 2019).

Another type of bot is a bot that is created specifically for the game by the game's developers. These native bots are meant to help players and often have some measure of intelligence. They are used for tutorials, replacements for real players in matches or dungeons, more immersive storytelling, and for many other things. These bots are programmed to either follow the player around or create their own routes. Oftentimes, they have some capability in combat as well, fighting alongside the player in dungeons or during quests.

For example, in Final Fantasy XIV, there are two systems for these types of bots. One system is called squadrons and the other system is called trusts. Squadrons are older and more

primitive, having been released many years prior to trusts, which were released in 2019 along with the Final Fantasy XIV: Shadowbringers expansion. In squadrons, a player can choose to go into dungeons with a group of non-player characters, or NPCs, that have a very simple artificial intelligence, or AI. These NPCs simply follow the player around everywhere, attacking enemies that the player attacks first. They can be commanded to follow, stay, or attack using the menu. They do not have the ability to dodge any attacks from enemies unless specifically directed.

The other system, trusts, features more intelligent bots, often representing NPCs that are heavily involved in the game's story. These NPCs also follow the player around, but they cannot be commanded by the player. Instead, they attack any nearby enemies. During fights, these NPCs are intelligent enough to dodge attacks correctly. Both squadrons and trusts are versions of smarter bots that serve very different purposes from third-party bots.

### **Key Concepts**

Whether game developers choose to add bots into a game, or the game becomes infested with bots over time, it is important to evaluate the interactions that players may have with bots and their effects. Potential interactions include player relying on a bot for a tutorial, having a bot in their party, viewing text in chat submitted by a bot, or competing with bots in the market and open world, which includes any openly accessible places in the game. This research aims to investigate how player-bot interactions affect the ability of players to enjoy the game. Player enjoyment is defined by Castronova (2007) as the ability of players to enjoy a game, whether it is through gaining experience, earning money, being immersed in the story, or competing with

other players. An additional area that is researched is how player-bot interactions affect players' morals, or individual principles that determine what is right or wrong.

The prevalence and intelligence of bots are a large factor in decreasing or increasing player enjoyment and may influence the morals of the player as well. For the purpose of this research prevalence is determined by how many bots there are in a game. Because games never give official counts of concurrently online bots, in most cases, prevalence is measured by how often players encounter and interact with bots. Bot intelligence, meanwhile, is signified by the advancement of the learning processes used by the bot. Bots with high intelligence can adapt to various situations dynamically. Bots with low intelligence can only perform simple tasks that never change, often also called automation. Varying the prevalence and intelligence of bots can aid in a better understanding of how player-bot interactions affect player enjoyment and morals.

### **Final Fantasy XIV**

The focus of this study is the MMORPG Final Fantasy XIV, or FFXIV. Released in 2010, Final Fantasy XIV is the popular fourteenth installment and the second multiplayer title of the long-running Final Fantasy series. According to MMO Populations, FFXIV is estimated to have 42 million subscribed players, with an average of 2 million players online per day (MMO Populations, 2023). Players can create their own characters and choose a class to play as they go through the main storyline of the game either alone or with friends. FFXIV was chosen for the study due to its popularity and because it offers a great model for player-bot interactions, having three different implementations of bots – third-party bots, trusts, and squadrons – easily visible and accessible in-game.

Bots are prevalent in all parts of the game with varying intensity. Ultimately, any instances of third-party bots in FFXIV are there as a part of RMT – collecting in-game currency, called gil, to sell it to real players for real money. Based on the setting, this goal can be accomplished in various ways. In total, there are 5 major locations in FFXIV where third-party and developer-created bots are found. These areas are listed and described below, ordered from highest third-party bot prevalence to lowest prevalence. Developer-created bots are only found within dungeons.

### **Definition of Physical Locations in FFXIV**

*Overworld:* The overworld is a blanket term for any open, outside zone in the game, including towns. These areas are where most of the story quests occur and where players can kill enemies and gather materials freely. Bots tend to use the overworld to farm monsters for gil and materials. In some cases, they may also do the story to gain experience and progress their character's level to unlock new areas that they can visit. In towns, which are the areas with the largest player populations, bots are often used to commercialize RMT services or scam unsuspecting players through chat messages.

*Market board:* The market board is the interface through which players can sell and buy goods. Unlike many other games with such systems, goods that are sold in FFXIV do not have low or high limits for the prices that can be set. Players are free to sell goods at any price that others are willing to buy them at. Crafters and gatherers make most of their money by gathering or creating goods to sell. Because both crafting and gathering are simple and tedious enough to

be done using a script or simple AI, bots are commonly used to collect materials and sell them for low prices on the market board to make gil.

*Eureka/Bozja:* Eureka and Bozja are both special instanced zones that can be unlocked when the player reaches level 70 and level 80, respectively. They are like the overworld in structure but have separate leveling systems from the rest of the game, much more difficult enemies and bosses, and special skills that the player can use. The more players that enter an instanced zone, the more difficult the enemies in that zone become. These zones also require the player to spend a lot of time killing enemies to level, spawn bosses, and collect materials. Many materials that can be found, especially rare ones, are worth a lot of money when sold outside of Eureka and Bozja. As a result, bots can be found in these areas, usually farming special timed quests called FATEs for a chance to get rare drops as a reward.

*Housing:* Within Final Fantasy XIV, players can buy house plots and apartments in special housing-dedicated safe zones to decorate with furniture and grow crops. While apartments are easy to get, houses are a limited resource. Each major town in the game has 24 housing instances that have 60 house plots each. With four major towns, that means that there are 5,760 house plots in total per server. However, the number of players per server is much larger. Thus, the demand for houses greatly exceeds the supply. Before April 2022, the housing system was extremely vulnerable to bots. Houses that were up for sale would be put on a 24-hour timer. During this time, the house could not be purchased until, at a randomly selected time, the house became available to be bought by a player that interacted with a placard nearby. Due to this, players that wanted a house competed with others by standing at the placard for hours and spam clicking it in hopes of catching the time that the house opened for sale. Bots and scripts were commonly used to ease this process. When the house purchasing system was changed to a lottery

system after April 2022, it got rid of bots in housing, but made many players unhappy because getting a house became even harder.

*Dungeons:* Dungeons are special areas that require pre-formed or randomly formed teams of 4-24 players to enter, depending on the type of encounter. Regular dungeons require 4 players to enter and usually require defeating 3 bosses to clear the dungeon. Raids require 8-player parties and usually have a single boss to defeat. Alliance raids require 24-player parties and often have 6 bosses or more. Dungeons are the fastest way for players to get levels, gear, and special drops, outside of doing the main story quests. While meeting bots in dungeons is a rare occurrence, bots use dungeons as another method of gaining levels and special drops that they can sell on the market board. However, dungeons are also where developer-created bots such as trusts and squadrons are used. By acting as party members, these bots allow players to fulfill the player requirements for parties and complete dungeons without relying on real players.

## **Chapter 2**

### **Literature Review**

Many studies have already been done on bots in the MMORPG environment. Bots have been proven to have a significant effect on the player experience in one of the largest MMORPGs, World of Warcraft (Castronova, 2007). Bots continue to be a popular topic in the areas of gaming and cheating.

For a better understanding of existing research around bots in games and their effects on players, this chapter provides an overview of bots in MMORPGs, bot detection approaches, and bot vs. player intelligence. Then, the chapter discusses the spread of cheating behaviors due to bots, and the relationship between bots and player enjoyment. Finally, this chapter reviews the principles of game design around bots.

#### **Overview of Bots in MMORPGs**

According to Castronova (2007), botting can be defined as the practice of automating the play of a character within a computer game using “software robots,” or “bots.” This definition encompasses the use of bots for any in-game actions that players would normally do manually, such as fighting enemies and looting them. Because bots do not get tired as human players do, those who use them have an advantage over those who do not, upsetting the balance of the game (Chen et al., 2006). Chen, Jiang, Huang, and Chu (2006) state that this is the reason for why using bots in games is usually against the rules.

The use of illegal bots in MMORPGs is a severe threat to security due to financial, reputation, and fairness losses to the game company caused by bots' monopolization of resources and player frustration (E. Lee et al., 2017). In a study about the use of bots in World of Warcraft, Castronova (2007) reported that an early botting program called Glider cost the company 18 million dollars per year, ruining the in-game economy, lowering the quality of game play, and increasing operating costs due to player complaints and increased developer workload. He reported a major loss of game satisfaction because of hyperinflation in the market, increased cost to play, loss of immersion, and cheating behavior.

In an investigation on cheating behavior in games by de Paoli and Kerr (2012), it was found that bots are the most prevalent cheating practice found in MMORPGs. Through a case study of the MMORPG Tibia, de Paoli and Kerr (2012) studied one reason for this phenomenon – the failure of game companies to punish cheaters, with punishments often being either too harsh or too gentle. Another reason is the spread of malicious or cheating behavior in online communities, or the “contagion of malicious behaviors” (Woo et al., 2018). Woo, Kang, and Kim (2013) found that through social reinforcement, players who see others adopt and commit to using bots are more likely to develop the same cheating behaviors.

One of the major challenges with detecting and punishing cheating through bots is that bots typically obey game rules completely, so it is difficult to tell a bot apart from a real player (Chen et al., 2006). Existing approaches for bot detection such as traffic analysis, self-similarity, and social interaction patterns have all been used to varying effectiveness in the past (Chen et al., 2006; E. Lee et al., 2017; Oh et al., 2013). Another method that can both prevent and detect cheating through bots utilizes social control mechanics, specifically punishment (de Paoli & Kerr, 2012). However, each of these approaches still have drawbacks because they may reduce



player immersion, have unreliable detection rates or effectiveness, and may collide with other security programs (Oh et al., 2013).

Bots may also be used legally by game developers to engage and challenge players (Soni & Hingston, 2008; Wu, 2023). In a study on League of Legends, Wu (2023) studied a legal type of bot, one that is native to the game. These bots are created by the developers to compete in matches against players, but they are disliked by players due to their poor performance (Wu, 2023). Generally, players are found to have the best experience with developer-created bots that are programmed to be human-like and match player skill levels (Soni & Hingston, 2008).

### **Bot Detection Approaches**

A major topic of discussion is the idea of bot detection and detection systems. In general, most bots in MMORPGs can be easily identified and reported by the player due to oddities in their movement or actions, such as “twitching” or “jerking” movements and constant repetitive behaviors (Goldman, 2021). According to Chen, Jiang, and Huang (2006), another reliable manual method of identifying a bot is to start a conversation with it, because bots cannot talk like humans. However, the authors admit that while it is easy for players to detect bots manually, automating bot detection is a much more efficient alternative.

Automation of bot detection systems is very difficult because bots tend to obey the rules of the game completely (Chen et al., 2006). Due to the high number of bots prevalent in MMORPGs and their constantly evolving ability to act like human players, existing detection systems for bots quickly lose effectiveness, with drawbacks such as reducing player immersion, low accuracy rate, and conflict with other security programs (Oh et al., 2013).

One of the earlier detection methods involves traffic analysis, the effectiveness of which Chen, Jiang, Huang, and Chu (2006) studied using the MMORPG Ragnarok Online. In this method, the network traffic of players is analyzed for patterns that are common to bots, such as consistently short response times and regularity in response times. By using these patterns, the correct decision rate for the study was found to be 95% with a false negative rate of less than 1%. However, due to bot evolution, such methods are much less effective now (Oh et al., 2013).

In a more recent study on accurate and non-intrusiveness bot detection methods done by Lee, Woo, Kim, and Mohaisen (2017) in three different MMORPGs, it was found that detection through bot self-similarity is effective. In this approach, automated systems evaluate logs of what players are doing in-game, and if there are logs for some players that completely match other players, the players are flagged as bots. According to the authors, this method is effective due to the tendency of bots to follow a scripted process for their activities that will match other bots' activities exactly.

Another method of finding bots is through their social interactions with players, which works because bots tend to form connections randomly, while players usually form connections strategically with players who have higher skills or money (Oh et al., 2013). According to Oh, Borbora, Sharma, and Srivastava (2013), who performed the study on bot detection through social interactions, this method detects game bots with high accuracy and without inconveniencing players.

### **Bot vs Player Intelligence**

With the appearance of machine learning and AI, bots are rapidly evolving (Oh et al., 2013). Based on interviews done in “Words with Friends,” a Scrabble-like online game that implemented matches against bots, this development was met with mixed feelings (Needleman, 2022). The study shows that some players like always having an AI opponent around, while others purposefully abandon matches with bots and report them. Needleman (2022) finds that human players of the game have difficulty differentiating between human player and bot. In general, players find that the bot is relatively proficient at the game, but after some time, patterns in the bot’s actions emerge. Predictability is one of the main indicators for bot-like behavior, because it shows that an opponent is following a static set of instructions (Soni & Hingston, 2008).

In a study done by Soni and Hingstong (2008) in a first-person shooter game, participants played in matches against various levels of neural bots that were trained to act like humans. Results showed that players strongly preferred when a bot acted as human-like as possible with similar reactions, reaction times, and skills. A match with an opponent being too predictable or too difficult to defeat was an easy indicator of a bot and Soni and Hingstong (2008) found that players usually disliked or felt frustrated by those matches. In this study, there was a strong positive correlation between a bot’s intelligence and player enjoyment.

Players’ desire and need for more advanced bots in games is further explored in another study by Wu (2023) that looks at the perception of AI in League of Legends. Wu (2023) finds that due to the low intelligence of the AI, players have a negative view of bots and consider them as a training tool only at very low skills levels of play. Wu (2023) states that because the bots do

not act like humans do in training matches, they fail to teach players how to play properly against other players. As a result, they are neither a good teaching tool for beginners nor a challenge for more advanced players, which makes players avoid AI matches in League of Legends.

### **Bots and Player Enjoyment**

According to Castronova (2007), the presence of illegal bots has been shown to have major consequences on MMORPG profits, in-game economies, gameplay, and player immersion, thereby affecting enjoyment. Castronova (2007) states that one main reason that people play MMORPGs is to get the satisfaction of achievement and success, which means having a lot of money or levels in the game. However, Castronova (2007) finds that bots are often used to cheat this process because they can work non-stop to earn gold or experience. This is inherently unfair to honest players and causes a lot of frustration, devaluing achievements and often encouraging honest players to also use bots and “cheat” the game, or driving them out of the game entirely (Woo et al., 2018).

In addition, bots ruin the game experience by forcing developers to devote more resources to fixing bot issues and punishing cheaters, resulting in two new sets of problems – less time and resources to develop new content and negative side effects from punishment systems (Castronova, 2007). Effective punishments for cheating are difficult to create and often are too heavy-handed or not punishing enough, causing outrage from players who are unjustly blamed or who feel that cheaters are getting away scot-free (de Paoli & Kerr, 2012). Players are the direct victims of cheating through bots not only because they suffer from the disruption of

balance and immersion in the game, but also because the measures that are taken against bots, if implemented carelessly, can accidentally punish innocent players (Oh et al., 2013).

Bots can also affect MMORPG economies. MMORPGs often have an established economy that works based on supply and demand from the players. However, when bots come in, they force hyperinflation by constantly feeding money into the economy, which is very hard to recover from and reduces the buying power of real players (Castronova, 2007). Bots can do this because they have nearly unlimited time to play the game and will cheat to get levels or resources, while players are limited in play hours by work, sleep, childcare, and many other reasons (Chen et al., 2006).

While studying *World of Warcraft*, Castronova (2007) also found that bots increase the costs of the game. One of the reasons cited in the study was that the company must add a bot detection system and constantly manage and update it. Any mistakes made by the system must be fixed manually by human resources. Additionally, bots create a lot of complaints from players, which means that many tickets must be dealt with as well. In his conclusions, Castronova (2007) reports that loss of game satisfaction in players stems directly from inflation in the in-game economy, loss of immersion, increased game costs, and frustration due to bot users' faster growth. Overall, if bot presence and effects remain, the reputation of the game and company is worsened greatly over time (E. Lee et al., 2017).

On the other hand, studies such as Soni and Hingstong's (2008) research on native bots developed for first-person shooter games show that bots also have the potential to increase player enjoyment. Soni and Hingstong (2008) conducted a study where they varied bot intelligence in matches against players and found that players liked matches where the bots were the most human-like, with skill matching their human opponents. Another study on native bots in *League*

of Legends by Wu (2023) showed the same tendencies in players. Wu (2023) found that players dislike the AI used in bot matches, citing that the bots are too predictable and simple for any players more advanced than beginners to have fun playing against.

### **Spread of Cheating Behaviors**

Bots are one of the most prevalent cheating practices in MMORPGs and are banned by the Terms of Service of most games due to the unfair advantages they offer players (de Paoli & Kerr, 2012). Bots are used by players to greatly speed up processes such as leveling or earning achievements and money, resulting in a loss of player enjoyment and game company profits (Castronova, 2007). In a study done by de Paoli and Kerr (2012), they found that MMORPGs often fail at preventing cheating because punishments are not effective enough, either being too heavy-handed or too forgiving. Countermeasures against cheating with bots, such as analyzing traffic or user attributes and transactions also are unsuccessful at preventing the spread of bots (Han et al., 2022).

In their study on the contagion of malicious behaviors in games, Woo, Kang, and Kim (2013) found that social reinforcement from friends who use bots leads to an increased chance that an individual user will cheat as well. The effect of the social contagion is usually present only in people who experience cheating more than once (Kim & Tsvetkova, 2021). Woo, Kang, Kim, and Park performed another thorough study in 2018 on the contagion of cheating behaviors. There, it was found that players with a high number of bot-using friends are at a high risk of cheating themselves (Woo et al., 2018). Woo, Kang, Kim, and Park (2018) suggested that

game moderators can use this finding to flag and catch bot users due to the influence of social reinforcement.

## Chapter 3

### Research Methodology

There is a lack of research on the topic of how human-computer interactions between bots and players in games can affect players. To collect more data on this topic, a literature review and data scraping on Reddit were performed. Data scraping from Reddit followed by research coding is a common method used in studies where the aim is to get a measure of opinions and ideas surrounding a topic commonly discussed on forums (Sutter et al., 2021).

Reddit is used by millions of users to exchange and rate information in the forms of texts, links, and images (J. Y. Lee et al., 2021). It is divided into smaller communities of interest called subreddits. Reddit was chosen because it has a large audience of Final Fantasy XIV players on its r/ffxiv subreddit. At the time of writing, 765,000 players are subscribed to r/ffxiv. Because there is no way to reach out to every player that plays Final Fantasy XIV, the subreddit is the most convenient and efficient method to gather data on a large sample of players. In addition, due to the publicly available nature of the data, IRB approval of the study is not necessary.

Final Fantasy XIV was chosen as the MMORPG to be studied due to its popularity in the MMORPG scene and its ability to model three different types of bots at various levels of prevalence and performance. As defined earlier, these types of bots include malicious third-party bots, primitive AI companions called squadrons, and more advanced AI companions called trusts. From this point forward, these bots will be referred to as “third-party bots,” “squadrons,” and “trusts” respectively. Regarding prevalence, third-party bots can be found almost anywhere in the beginner areas of the game. Meanwhile, squadrons and trusts are hidden behind in-game menus and access is restricted based on player level and unlocking of side content. However,



when it comes to intelligence, trusts have the most advanced AI of the three categories of bots, being able to match players in skill level. Squadrons have a much lower intelligence that is on par with the higher end of third-party bot abilities. Third-party bots generally have the least intelligence of the three categories.

The research and similar studies have been summarized in the literature review. Care was taken to collect literature on both third-party and developer-created bots. Data collection for this study used a combination of methods from other studies done through Reddit and some additional customization due to the specificity of the research question and topic.

Studies of bot and human interaction in other areas such as news can grant valuable information that can be applied to bot and human interaction within games. Thus, the first steps that were taken were gathering sources about the interactions and effects of bots on users in areas such as social media. After this, more sources were gathered in the sphere of video games, specifically MMORPGs, relating to how bots are identified, their effect on in-game player ecosystems and players themselves, and the contagion of cheating behaviors because of botting. Sources on how to best scrape and analyze data from Reddit were also collected.

### **Gathering Data on Reddit**

Post and comment data from the Final Fantasy XIV subreddit was collected using Reddit API with Python. Reddit API allows developers to interact with Reddit remotely through a web application or a script (Reddit, 2023). PRAW, the Python Reddit API Wrapper, was used to streamline the process of accessing Reddit through the API and automate the task of scraping data (Bryce Boe, 2022). Pandas, a Python data analysis library, aided in translating collected data

into Excel files. Once the data was manually filtered and verified, Pandas was also used to place the data into a SQL Server database for secure storage and easy, convenient querying.

At first, to collect the data, it was necessary to write a program in Python that would look through every post to find any comments that used the keywords “bot,” “trust system,” or “squadron.” These keywords were determined to best represent the three different groups of bots used in Final Fantasy XIV – “bot” for any kind of third-party bot, “trust system” for the recent addition of intelligent bots in higher-end content, and “squadron” for moderately intelligent bots in low-end content. Despite being a longer phrase, “trust system” was chosen because it was the way that, at a quick glance, over 20 posts in the r/ffxiv subreddit chose to speak about the higher-end bots. This phrase would also filter out possibilities of the word “trust” being used as a verb.

There were a few other requirements for the data that were also important to keep in mind. The data needed to be at most 3 years old, meaning that any posts before 2020 should not be considered. This time range was set because the trust system came out with the FFXIV: Shadowbringers expansion at the end of 2019. Selecting posts before that time would mean there would be a lack of comments on the trust system compared to the other keywords. To better keep track of where the data was from, post and comment IDs were collected to trace comments and posts on Reddit if necessary. To preserve user privacy, usernames were not collected.

The initial method of finding data proved to take an exceptionally long time because it checked through hundreds of posts and thousands of comments for each post in order. To increase the efficiency of the code, a separate .text document that collected the IDs of posts that have already been checked proved to be helpful. Therefore, each time that the program was restarted with a bigger limit of posts, it would skip posts it had already checked and only look at posts that were not on the list yet. This saved a lot of time and helped reach up to over 1000 posts

in less than 5 minutes. However, Reddit API has a limit of 1000 posts queried at one time. The data collected from 1000 posts was found to be not enough and due to the high volume of posts on the subreddit, the time range was a mere five days in the past.

Due to that discovery, the search method changed to querying posts for the keywords instead of comments. This way was much faster but had a possibility of missing discussions on bots if the post did not explicitly say the keyword in the first place. For this method, an existing tutorial on medium.com on scraping Reddit with Python was immensely useful for quickly writing another program that searched by keywords in posts instead of comments (Parth Bhardwaj, 2020). After some edits to the program to fit the necessary parameters and the addition of a method to keep track of posts and increase efficiency, the program collected the data much more quickly than the previous attempt. In the end, it gathered 40 posts for each keyword, or 120 posts in total. Each set of posts had about 6,000 comments or 18,000 comments total across all three keywords.

To filter these comments down effectively, the data was transferred to a .csv file in Excel. The Excel filter was used to again check the comments for the keywords, though this time “trust system” was shortened to “trust.” This introduced more error that needed to be further manually filtered out due to the verb “to trust” appearing in the comments, but as a result, comments that did not use the full phrase “trust system” were not filtered out. In the end, the number of comments was shortened to 1,300 comments for “bot” and around 500 comments each for “trust” and “squadron.” These filtered comments were transferred from the .csv files to SQL Server as another way of redundant secure storage in case the .csv files with the data are lost or corrupted.

## Quirkos Analysis Tool

While there are many applications intended to help analyze research data and perform research coding, it was important to find one that fit the needs of this project. Initially, statistical analysis applications such as JMP and SPSS seemed like good choices because of their familiarity and popularity. However, the nature of the data for this paper required qualitative analysis, not quantitative. For a qualitative nature of data, Microsoft Word, Excel, or a software application called Quirkos were well-recommended due to their simplicity. While Excel can be an effective way to create, analyze, and store data, Quirkos was the best choice.

With a 2-week free trial, Quirkos offers a very visually focused method for coding. The user interface is split into two sections – the right section is for inputting and reading a .csv or .txt file while the left section is an open area for creating and moving around colored bubbles that contain codes. Users can highlight text and drag it into the corresponding code bubbles. As a code bubble receives more input, it becomes larger. Once coding is finished, Quirkos allows multiple options to save the data. Users can create a detailed PDF report, input the data into .csv files, and create a Word Cloud. With the Quirkos interface, it was very easy to sort the data into themes and view all the created codes.



Figure 1. Quirkos User Interface. Themes are on the left and text is on the right.

## Coding Process

The coding process consisted of a mixture of inductive coding, or grounded theory, and deductive coding. The inductive approach to coding entails developing codes based on the data. These codes are terms or phrases that were used in the data itself. This type of coding is helpful for exploratory studies in less-studied fields and allows a researcher to capture complex and diverse data (Gioia et al., 2013). On the other hand, the deductive approach is narrower, where a researcher creates a framework of codes before starting to code the data. This type of coding helps to focus and generalize the coding and is helpful for newer researchers, at the risk of missing some data (Skjott Linneberg & Korsgaard, 2019).

By combining the two coding approaches, a more effective approach is created that lacks the weaknesses of each specific approach. This approach is called abduction (Alvesson & Kärreman, 2007) and utilizes a method that cycles between deductive and inductive coding based on need. For the coding of the Reddit data, the deductive approach was used first. A coding framework of codes gathered from literature on the topic was created for each of the three keywords used – bots, trusts, and squadrons. Then, the coding process began, and more codes were added based directly on words and phrases found in the comments, which was the inductive portion.

During the coding process, codes were created based on themes. This is called thematic or descriptive coding. Similar themes were grouped together. For example, the overlying theme of ‘immersion’ had underlying themes of ‘inability to play,’ ‘gatekeeping,’ and ‘abnormal behavior,’ which all were related to the concept of loss of immersion. Parts of the text that matched one or more themes were added to each relevant theme.

Once the comments were fully coded, Quirkos generated a WordCloud, a CSV report, and a PDF report. The WordCloud was based off all the input text and was useful in determining if the coding process got all the major overlying themes. The reports provided an easy way to look at and analyze every single theme and part of the text that was generated during coding.

## Chapter 4

### Results

This section presents the findings from doing research coding on Reddit's r/ffxiv subreddit comments in the categories of third-party bots, the trust system, and squadrons. For each category, a table and a WorldCloud first display and explain the themes found through coding. Next, excerpts from comments are used to show and discuss each of the themes and their significance to the question of how bot prevalence and intelligence affect player enjoyment and morals. The section concludes with a summary of all the findings. The third-party bot section, due to the amount of data that is in it, is further separated into the sections of Eureka, Overworld, Market Board, Dungeons, and Housing, which are all major physical locations in Final Fantasy XIV. For convenience, themes in each section are presented in order of prevalence.

#### Third-Party Bot Findings by Location

The data for this category comes from a query of the r/ffxiv subreddit for any posts and comments that include the words "bot," "bots," or "botting." This data was coded to find themes with a focus on the effects that bots have on players' enjoyment and morals. Most comments in the category of third-party bots fall into the themes of immersion, economy, hostility, game design, cheating, and scams. Each theme has various subthemes as shown by the table below. In total, the third-party bot category has 525 coded words or phrases and 35 themes. Data from comments shows that most bots in Final Fantasy XIV are found in Eureka, the Overworld, the Market Board, Dungeons, or Housing, though these regions were not differentiated between or separated during coding.

**Table 1. Coded Themes for Third-Party Bots.**

<b>Theme Title</b>	<b>Subthemes</b>	<b>Total Codes</b>
Immersion	Abnormal Behavior, Gatekeeping, Inability to Play, Giving Up, Lack of Time, Fighting Back, Security	132
Economy	Crashes	41
Hostility	Demoralization, Confusion, Frustration, Unfair, Annoying, No-Lifers, Players vs Bots	127
Game Design	Bad Support System, Player Support of Cheating, Cheat Wars	76
Cheating	Hurts Players, RMT, Bot Advancement, Missing Out, Lucrative, Farmers vs Buyers	135
Scams	Weak Targets, Phishing, Obvious	14
<b>Total Number of Codes</b>		525
<b>Total Number of Themes</b>		35

In addition to research coding, a WordCloud can be used to see themes and verify that coding captured all relevant major topics. After removing irrelevant words such as articles, pronouns, and various others, the image that can be seen below was created. It closely matches the findings from the research coding. The most used words were “bots” and “bot” because of the nature of the query that was used to retrieve the data. After that came the words “time” and “gil,” which relate to the main purposes of botting – to save time and to earn in-game currency, or gil. Areas of the game where bots have the most influence and emotions that they evoke from





*“They surround quest NPCs [suddenly] and then vanish again. Had to turn off the level up notification for other players because I'd get a bunch of '{gibberish name}' reached level 17!' and achievement pops whenever I so much as breathed near a main city state.”*

Bots in the Overworld cause a lot of annoyances for players. These bots tend to use exploits such as teleporting and hiding underground. They also travel in large groups with each bot having a username that is a random combination of letters. They clog up chat logs and ruin immersion for players that are trying to do the main story. They can also be actively harmful to players, as described by this player:

*“It actually hindered me once, needed to kill [monsters] in Upper La Noscea for my hunt log and the poor things kept getting sniped by bots the second they spawned.”*

One way for bots to farm gil is to kill monsters, which both gives them some gil for each kill and materials that can be sold on the market. Bots will stay in one location, often hiding underground in groups, and snipe any monsters that spawn nearby. This poses a serious issue for players that need to kill the same monsters to progress the main storyline or collect monster materials because the monsters are never available. This particular bot issue has been going on since the start of the game despite any actions taken by Square Enix. Some players are apathetic to it due to the frequency that bots appear, while others express their frustration:

*“No, I didn't just start playing the game yesterday and yes, I'll keep complaining about the bots. It's annoying no matter whether it's someone's first or twentieth time seeing it so don't be rude just because you stopped caring.”*

Due to the blatancy of Overworld bots, they are the bots that players see first and complain about most. This causes conflict between new players, who complain about the bots, and old players, who are often apathetic to the bots and are tired of seeing complaints about

them. For older players, a lot of the frustration comes from the knowledge that bots are hard to combat or that the company is not doing enough:

*“[Reporting] is the right thing to do, but this problem has existed for 8 years and they haven't done anything about it as far as I can tell. Reporting might feel cathartic, but it becomes tedious when you realize they don't care about reports on these kinds of bots.”*

While players may try to fight against bots by reporting them, ultimately this measure is very ineffective because bots are unlikely to get banned right away. In addition, some players believe that the company does not care about Overworld bots and will not fix them, which creates conflict between the player base and the game company. One reason that game companies are careful about banning bots is explained by the following comment:

*“Fixing [the teleport exploit] is ultimately useless because it's such a simple problem, it just means the bots will stop using it and find some other exploit you now need to take care of.”*

Game companies typically ban bots in waves rather than on an individual level. This is to make sure that bot creators do not know the exact reason that a bot was banned and cannot fix it. This also applies to fixing issues – keeping a harmless and easy-to-catch ability like teleportation around is preferable to fixing it and forcing bot creators to find some other exploit that may not be harmless. Bots having low intelligence is beneficial for the game because that makes them easier to find. In addition, as described in this comment, anti-bot measures can harm actual players just as much as they do bots:

*“I've seen countless posts of people just falling through the map while walking in Limsa. They'd get caught up in the 'bot filter' and [Square Enix] would be banning legitimate players/customers.”*

In a potential scenario in which Final Fantasy XIV does have a bot filter implemented, unfortunate players who use mods or simply glitch due to a bad internet connection or other reasons may get banned for being a bot. This is one of the main arguments against the implementation of a bot filter, as it creates even more conflict between players and the company. Some players take Square Enix's inaction as justification for using bots themselves, as suggested by this player:

*“People have gotten pretty brazen with FFXIV's lack of anti-cheat measures. There's also a ton of people using gathering bots for timed [gathering] nodes.”*

Due to the lack of care and slow time to action that Square Enix seems to have towards Overworld bots, players are more willing to bot, even on their main accounts. There is a very low risk of getting banned when doing so when the number of Overworld bots is so high and response rate is so slow. According to the follow comment, many players like to automate the gathering process due to many resources being on a timer and its difficulty:

*“The harder gathering is the more incentive to bot. Unfortunately, the [developers] are stuck between a rock and a hard place – make it incredibly difficult and rewarding for people to do on their own but encourage even more botting and gil selling or make it easier but less rewarding for players to do.”*

Players tend to use bots for gathering for two reasons – the inaction of Square Enix against bots meaning that botting poses little risk, and the combined difficulty and tediousness of gathering being justification to automate a process that makes them a lot of money. Until a balance is found, or a punishment exists, players will continue to use bots to play for them despite it being against the rules of the game.

## Market Board

The Market Board is an interface through which players can sell and buy goods. It is the backbone of Final Fantasy XIV's economy. Players that partake in crafting and gathering use the Market Board as their main source of income. Bots also use this interface for earning gil and RMT. While bots are prevalent in this area, it is very difficult to tell between a bot and a player due to the nature of the interface. To succeed in the Market Board, bots must also be relatively intelligent. A player explains why bots are so efficient at earning gil through sales compared to players:

*“The bot functions like a high frequency trading algorithm, requiring no constant input/oversight from an actual person, and doesn't need to eat/sleep/shower in order to not miss a sale.”*

Bots that use the Market Board easily earn more gil than players because they can watch and update prices to make sales quickly without needing any time to rest. This creates many issues, one being the high influx of gil into the economy, as explained by this player:

*“Bots also cause inflation due to RMT demand. If there were no bots producing the money, then the economy would be healthier due to less gil in circulation.”*

A direct effect of bots on the game economy is that they devalue the currency and cause prices on items to crash. It is very difficult for players to fight against bots because players' ability to control prices is greatly limited by the time they can spend playing. One of the ways that players combat bots in the Market Board is by using similar tactics as them, such as undercutting, or selling an item at a slightly lower price than the current lowest price:

*“Botters like those are very effective at frustrating sellers to the point where they either abandon the market for that item or start undercutting to slightly higher than production cost out of spite.”*

Undercutting, when done in moderation, is an effective tactic to sell goods. Most players undercut by one gil to sell quickly. However, some frustrated players begin to undercut those that they believe to be bots to extreme amounts, crashing the market even further. In the end, through a combination of bots and pettiness from players, players that cannot compete abandon the market entirely. This kind of behavior not only hurts other sellers, but also the person initiating, and is a major source of frustration between players. This comment is in response to a person who undercuts by large amounts to try and spite bots:

*“‘People are doing things I don’t like in a free economy! Must be a bot!’ So instead of losing 1 gil, you’d rather cut off your own nose to spite someone else’s face, lol.”*

Players who use the Market Board commit harmful acts such as purposefully crashing the prices because they do not like what others are doing, without verifying that the other player is a bot first. This confusion between players who undercut and bots who undercut results in a much higher estimate of bots who use the Market Board than in truth. The extreme competitive nature of the Market Board combined with player frustration due to bots has the following effect as shown in a comment:

*“I’m sure there are bots out there, but if you can’t emotionally handle that, maybe crafting high level items isn’t for you.”*

Gatekeeping, or limiting access to the Market Board, occurs as bots become another challenge that sellers must overcome. Players who are pushed out become angered and annoyed.

While many players stay out of the market afterwards, there are also those who find themselves facing a moral dilemma:

*“It makes me wonder why I even play legit because there's obviously no fear of getting banned for [using bots or RMT] when I see the same ones for years still going at it.”*

Frustration with the state of the Market Board may cause players to turn to using bots or RMT themselves, exacerbating the bot problem. Bots are an easy and cheap way to catch up to others in the game. Many players can relate to or understand the need for using bots on the Market Board:

*“The economy is getting increasingly difficult to profit from... For someone coming in now, they may be met with prices as low as \$20-\$30 for 20 million gil. That's a couple hours at work vs. an immense amount of grind time.”*

As it becomes more difficult to turn a profit in the market, new players, especially those who have families or are busy with work, get drawn to RMT. For a dollar or two per one million gil, it seems logical for them to spend real money instead of dozens of hours, despite the risk of getting banned. Even if they do not support RMT and bots, many other players approach this topic with sympathy towards the situation. Some players even support the bot creators who profit from RMT:

*“Think of it as passive income or a way to make money in a poor country... I'm honestly okay with those kinds of bots, some people around the world honestly can use that money.”*

Some players believe that if income earned from a bot is used to help someone who is struggling financially in a poor country, then the existence of the bot is justified. This outlook is quite different from those who villainize the bot creators but seems to be shared by several

commenters. They suggest that rather than blaming bot creators, the true issue is the players who are willing to fund RMT and cheat in the game.

## **Eureka**

Eureka is a high-level, high-difficulty area of Final Fantasy XIV that can bring in a lot of money by farming monsters and special events. This design makes it a challenge to bring bots into the zone, but several bots find their way in regardless. Bots have a lower prevalence in Eureka than in other areas, but due to the investment that must be put into them, they are usually more intelligent. However, even with this lower prevalence, bots can still be a major hinderance to players, as explained by this comment:

*“[Bots] are quite annoying in Eureka, because [Notorious Monsters] will be buffed based on the number of players in the instance, making them impossible to do at off-times due to the huge number of bots.”*

The zone design of Eureka was shown to have a huge vulnerability that made it nearly impossible for players to progress through a zone when there were few players online. Bosses and monsters in the zone scale in difficulty to the number of players in the zone, which is meant to encourage everyone to participate in killing them. However, bots do not help with killing bosses, preferring to wait around for special FATEs to spawn which give much more money. This causes frustration, as expressed by this player:

*“The problem with this approach is that it makes all of Eureka completely unplayable... I haven't gone to crystal farm or do bunny fates for like half a year because the instance difficulty becomes bloated, and the bunny chest drops are not guaranteed.”*



Even a small number of bots can force players to give up on progressing through Eureka, such as this player that stopped trying to farm for materials to progress through the zone or do bunny FATEs, which are special events that are the main source of income from Eureka. These FATEs are frequented by bots as well because the treasure hunt at the end of each event can yield rare, expensive items. Eureka is inherently a zone that requires a lot of time to progress through, which some players are not willing or able to put in, as stated by this player:

*“[The usage of bots] hurts the people who want to grind this content for gil but helps those who don't want to grind it to access [special] items.”*

This comment is justifying the use of bots in time-consuming content such as Eureka for players who have little time or will to play. Despite the game's Terms of Service specifically stating that bots are illegal, some players are of the opinion that bots can be justified if the content in the game takes too much time to do. There are players that blame Square Enix itself for not dealing with the bot issue by speculating that it may be beneficial for them:

*“People avoid Eureka as a whole because of bots... I'd like to think that they wouldn't put money above their player base but then again, corporations.”*

For this player, having his game experience ruined by bots made him hostile to the company that created the game because of their failure to properly act on the issue. Getting rid of bots is expensive and the reason cited by the player is that by not acting on bots, the company is saving money. While there are players that justify bots or have learned to simply ignore the bot issue, others are willing to fight back, such as this player:

*“Just because no one has solved the problem, it doesn't mean it can't be fought with. Nothing can ever change if people stay silent and just 'get used to' not being able to do certain*

*content because of bots and I don't think anyone should have to get used to it in a game they pay for either.”*

Some players are not willing to stand back and let bots run rampant. As a result, they call others to arms, saying that it is unacceptable to allow oneself to pay for a game where content is blocked off and that there are always ways to fight back. As one way to fight back, a player suggested this method for finding and reporting bots that do bunny FATEs and participate in the subsequent treasure hunt:

*“A bot in [Eureka] checks every chest spawn point, as they can't read the compass. Easiest way to tell if [it is a bot is if] a 'player' goes to each possible spawn looking for their chest.”*

Bots in Eureka act differently from players because they only frequent the bunny FATEs and, due to a lack of human intelligence, they must check each chest spawn point rather than using the compass. By following suspicious players, real players can report bots in hopes of getting them banned. With the investment required to get a bot into Eureka, this method is effective against bot creators if the bot is successfully banned. This is only one of the ways to fight back and regain enjoyment in the game that players use.

## **Dungeons**

Dungeons are instanced locations that can only be accessed through a queue and completed by a randomly formed or a pre-formed party of players, usually consisting of 4 or 8 people. They contain bosses and groups of monsters to defeat to clear the area. Players do dungeons in order to get experience for leveling, gil, equipment, and rare items such as mounts

and minions. Bots run dungeons for these same reasons, but they are not as prevalent in dungeons as in other areas in FFXIV due to the small party size and because bots can form bot-only parties. Due to the increased difficulty of dungeons in comparisons to other content, bots that run dungeons must be more capable of combat and pathfinding. Oftentimes, they will use cheats that players cannot. For players that are unlucky enough to be put into a party with bots, the dungeon experience may be ruined, as was the case for this player:

*“I loaded into the dungeon, and the other 3 party members immediately teleported away through the gate and started killing the first boss... They then teleported to the second boss, and the final boss, and the whole dungeon was over in just a few short minutes.”*

This player entered a dungeon with a randomly formed party of four people that included three bots. Due to the cheats that the bots used, the player did not get to participate in the dungeon at all. These experiences are common when dealing with bots and create a lot of hostility and suspicion towards any players that share any characteristics with bots. A player explains the reasoning for why a party they were in kicked another player:

*“[The tank] didn't put stance on, just kept pulling as many mobs as possible, wouldn't talk, and wouldn't emote. We ended up kicking him. We gave him a bunch of chances to prove he wasn't a bot too.”*

When entering dungeons with a party, players are usually wary of poor-performing party members. According to the Terms of Service, players may not kick others purely on the basis that they are not playing well, as that is considered bullying and toxicity. However, kicking others on the basis that they are a bot is allowed. Players that do not talk in chat, do not use their skills correctly, and do not listen to others are often put under suspicion of botting and kicked

from the party. This is problematic because this behavior creates a toxic environment that causes anxiety for newer players:

*“I think I was around level 40 conjurer before I did the [White Mage] quest... I definitely apologized when I screwed up, so hopefully no one thought I was a bot (even if they thought I was an idiot).”*

A player that was learning a new class felt anxious that her fellow party members would suspect her of being a bot because of her inexperience. Many other new and older players feel the same way when wanting to try and learn something different. As a result, these players either go through the same anxiety as the commenter or avoid trying new classes in dungeons altogether. Another reason that some players hesitate to participate in dungeons is merely due to the risk of being associated with a bot, as explained by this player:

*“Like yeah, if I was in a group with someone botting or hacking, I wouldn't want my name out there so I get banned too.”*

According to this player, being seen in the same party as a bot means that there is a risk of being banned. Paranoia due to the perception of high bot prevalence and low bot intelligence in dungeons causes anxiety for players and keeps them from participating in dungeons. However, this perception is not entirely correct – bot intelligence has seen a lot of improvement over time and bot prevalence in dungeons is not nearly as high due to bot tendencies to form parties with other bots. A commenter explains the reason for why some common bot characteristics may not be entirely correct:

*“A bot is never going to forget how to use tank stance and it's rotation is practically perfect.”*

Bots that go into dungeons are programmed to be able to engage in combat and win. It is unlikely that a bot will forget to use extremely important but basic abilities because programming a bot to do so is a simple matter. If anyone is likely to forget such things, it is going to be a real player. Similar comments added that tricks that used to work against bots, such as killing them on purpose, are no longer as effective either because newer bots work around them. Another commenter defends players who might be suspected to be a bot on the basis that they do not type in the chat:

*“Just because someone doesn't talk doesn't mean they are a bot. I won't say a word in dungeons generally, most the time I have my chat completely turned off.”*

To some players, the hostility that is shown to party members that do not respond in chat seems unwarranted. Some people simply have chat turned off or play on a controller where it is hard to type in chat. As a result, players should consider looking deeper and exercising more patience before identifying a fellow party member as a bot.

## **Housing**

Houses in Final Fantasy XIV are located in special housing zones in each major city. There is a limited number of house plots that can be bought on each server. Due to the recency of the housing purchase system overhaul, the comments on the r/ffxiv subreddit are mainly in response to the old system. In that system, buying a house was dependent on a random timer that opened the house for purchase at any point in a 24-hour period. Thus, players spent hours constantly clicking on a placard to buy a home, waiting for it to open. Under this system, bots

were prevalent in housing, albeit with low intelligence. For many players, even those who did not support bots in other areas, the housing system justified the use of bots:

*“This housing situation was so bad I didn’t feel bad for using macros at all. I saw other people either being bots or using macros too, no one clicks the placard at the same time with such robotic precision for so long. If you cannot beat them, join them.”*

Due to the difficulty of getting a house, players who otherwise did not cheat in FFXIV resorted to either using scripts or bots to have a better chance. This was partly due to convenience because it saved time and due to the fact, that to fight against multitudes of other bots or scripters, players had to use the same tactics. Meanwhile, other players that participate in the housing market but do not use bots try to come up with tactics to stop bots instead:

*“The bots were better back in the days when you could initiate a trade with them to break their script.”*

One tactic that players could use was initiating a trade with a bot, which the bot had no choice but to accept due to its programming. The bot would then be stuck in the trade window until the player closed it themselves. However, bots see constant upgrades to their intelligence and such tactics no longer work. Instead, those who get fooled by such tactics are oftentimes players who are using scripts instead of bots. For example, a user posted on r/ffxiv that they used a tactic where they place a shop in the area where a bot is so that the bot clicks on the shop and purchases a random extremely expensive item on purpose. In a reply, a commenter noted that:

*“The guy botting probably didn't make that purchase. Probably someone making a legitimate mistake. A bot wouldn't make a number mistake like that.”*

Even in housing where the requirements for bots to function are much less advanced than in other areas of the game, bots are still considered to be quite intelligent by players who are

informed of their capabilities. Though the original poster believed that they were fooling a bot, according to the commenter who replied, bots have been improved and no longer fall for such tricks. Rather, the person who was harmed by the trick was most likely a real player.

### Trust System Findings

The data for this category comes from a query of the r/ffxiv subreddit for any posts and comments that include the word “trust system.” This data was coded to find themes with a focus on the effects that trusts have on players’ enjoyment and morals. Most comments in the category of the trust system fall into the themes of teaching, trusts vs player parties, AI, immersion, and counterproductivity. Each theme has various subthemes as shown by the table below. In total, the trust system category has 310 coded words or phrases and 19 themes.

**Table 2. Coded Themes for the Trust System.**

<b>Theme Title</b>	<b>Subthemes</b>	<b>Total Codes</b>
Teaching	User Friendly	42
Trusts vs Player Parties	Toxicity, Good Alternative, Stress Free, Personal Responsibility, Anxiety	80
AI	Slow, Good at Mechanics, Players vs AI, NPC Deaths	84
Immersive	Interaction with NPCs, NPC Personalities, Solo Experience	77
Counterproductive	Hand Holding	27

<b>Total Number of Codes</b>	310
<b>Total Number of Themes</b>	19

In addition to research coding, a WordCloud can be used to see themes and verify that coding captured all relevant major topics. After removing irrelevant words such as articles, pronouns, and various others, the image that can be seen below was created. It closely matches the findings from the research coding. The most used words were “trusts,” “trust,” and “system” because of the nature of the query that was used to retrieve the data. After that came the words “dungeon(s)” and “players,” “level,” and “time.” These words relate to the location where the trust system is most used, its users, its purpose, and the main measure by which the trust system is judged by the players, respectively. Overall, the WordCloud is a good way to gain an overall understanding of the comment data that was gathered. Each theme is discussed in more detail throughout this section.

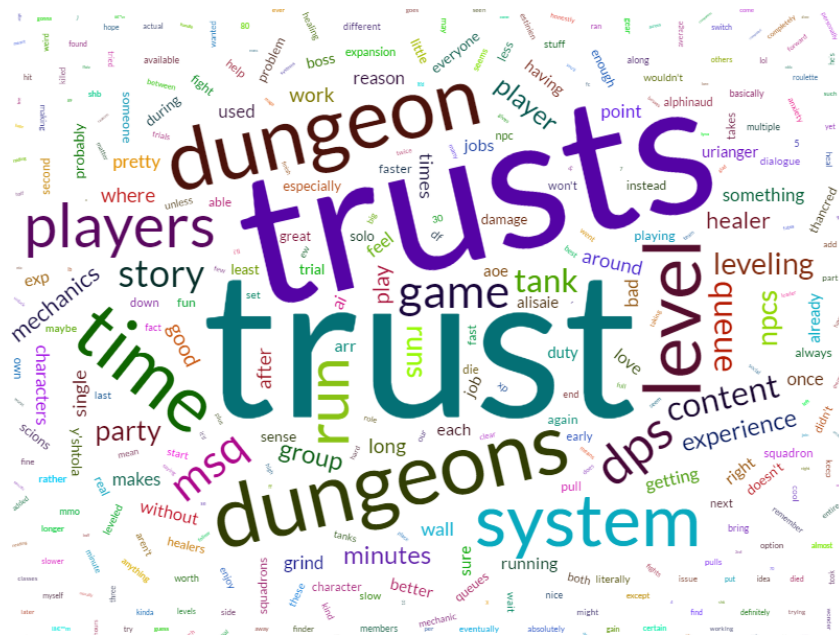


Figure 3. WordCloud for keyword "trusts."



The Trust system was implemented into Final Fantasy XIV when the third expansion to the game, Shadowbringers, was released in 2019. This system is only available in dungeons as a way for solo players to join up with prominent non-player characters (NPCs) from the story and do dungeons by themselves at their own pace with more immersive elements. Trusts are a marked improvement over the preexisting squadron system that in the game due to better, more intelligent AI that can be used in more advanced dungeons and more recognizable NPCs. It can be used in almost any dungeon throughout the game by using a special menu.

### **Positive Effects on Players**

One of the main ways that the trust NPCs are used is to teach players that are new to a dungeon the mechanics. Each dungeon has 3-4 bosses that each have their own style of attacking. Normally, players must figure out how to dodge these attacks in a group of four players who may or may not know how to do them. This comment gives advice for players who are doing a dungeon for the first time after the release of Trusts:

*“[Do the dungeon] with the trusts... They know exactly where to stand the millisecond a mechanic is about to start.”*

Trusts differ from players because they already know how to do all the mechanics correctly, even if a dungeon is newly released. This intelligence comes from a mixture of scripts and AI. Most players who do dungeons with trusts express approval of the fact that the trusts are skilled and intelligent enough to be reliable party members and teachers in dungeons. For players who experience anxiety when doing content with others, the ability to learn mechanics by themselves is a lifesaver:

*“A lot of the group anxiety comes from not know dungeon/boss mechanics. If I can run a trust at least once to figure out how the fights go, it lessens the anxiety to run that content with a group.”*

For this player, who feels anxious when he does not know how a boss fight in a dungeon works, the ability to learn mechanics with the help of AI companions in a solo environment is a great addition to the game. After this practice, the player feels a lot more comfortable running dungeons with real players. In the end, he can participate in and enjoy the game a lot more. Trusts also allow players who normally cannot play during peak periods of the day to have a better experience:

*“It's nice to be able to progress the [main story] at like 3 AM. In [the Oceania zone] now once it hits 9 PM, you're stuck and will just have to go to bed unable to advance in your multiplayer game.”*

Before trusts, players like this commenter who could only play during non-peak hours like the early morning were not able to progress the game because there were often not enough players online to go into a dungeon with. As a result, these players had to stop playing the game. With trusts, who are bots that are always available for use, this problem no longer exists and players can keep playing without being forced to stop.

Even for players like this commenter who do not use the trust system, dungeon runs became a lot smoother after the trust system's release:

*“I've seen the difference trusts have made in average player skill specifically at bosses, since a lot of people I've ran with seem to already know the boss mechanics, and those parts of most [dungeon] runs are smooth.”*

Due to the trust AI teaching players who are new to a dungeon how to correctly do mechanics, a much larger number of players go into dungeons already having learned the mechanics. As a result, dungeons go much more smoothly in general than before trusts were released. Players like this commenter who may have been frustrated at the low quality of players in dungeons enjoy the decreased time and effort that now goes into a dungeon run as a result.

Trusts also improve the dungeon experience by making it more immersive, as explained by this player:

*“[The trust NPCs] even have a little bit of dialogue throughout the dungeon, so it seems like the ideal way of going if you’re into the story. Can take your time and smell the roses that first run.”*

Those who use trusts can take their time looking at all the scenery, extra rooms, and secret details hidden in dungeons without feeling the pressure of other impatient players. Players also express their appreciation of the trust NPCs having story-related dialogue and reactions to events that happen in the dungeon, which makes the experience feel more real. The way that the trust NPCs behave during combat is found to improve player experience as well, as shown by a player’s description of an interaction between two trust NPCs, Alphinaud and Urianger:

*“...like early on Alphinaud misses a mechanic, and Urianger tells him how it works for next time. So, then Alphinaud doesn’t mess it up the next time. I love that they put their personalities into the trust system. Just makes it that much more fun.”*

The trust NPCs are programmed to be human-like and behave similarly to how the story characters that they represent would behave in a given situation. In the situation described by the player, a trust NPC named Alphinaud makes a mistake in combat and gets hit. He is taught by an older, more experienced NPC named Urianger how to avoid the mechanic and he does not make

the mistake again. This is one of many similar interactions during dungeons that are praised by players for the level of immersion they add.

### **Negative Effects on Players**

In addition to immersion, accessibility, and teaching capability, one of the main ways that players in Final Fantasy 14 judge the quality of the trust system is by how much time it saves compared to playing with real players. A player explains the difference in time between trusts and player parties:

*“[Trusts] are good for [players] if you get say 10 minute or more queues, but otherwise unless you get a bad [player party] (slow tank, no DPS healer, chain wipes, etc.) the [player party] is notably faster.”*

Because trust NPCs do not output good damage throughout dungeons, player parties tend to be much faster. The only situations where this may not be the case is when a player must wait in a long queue to enter a dungeon or if a player party happens to have players that perform worse than the trust NPCs. Many players dislike the slow speed of trusts, like this commenter:

*“Even as a [player of a class with long dungeon queue times], I prefer waiting 10/15 minute while doing a myriad of other tasks in the open world and then doing the dungeon in 12-15 minutes than staying a whole 30 minutes just doing the same dungeon I’m used to fast dead slow.”*

For players who are used to doing dungeons fast, the slow speed of trusts is almost unbearable. They prefer to wait and be productive doing other things while in queue, and then

run a much quicker dungeon with players. Other players share this opinion, adding that a player's ability is normally much higher than a trust NPC's:

*"To be completely fair, you would need to be extremely bad to do worse than trusts. Trusts take literally twice as long as any group of random people would."*

According to this commenter, dungeons with trusts take so long compared to dungeons with players because players are a lot better than trusts, going as far as to say that players who do as badly as trusts are extremely unskilled. This paves the way for increased toxicity against others. A player explains how the ability to compare AI versus players has some consequences:

*"It's kind of sad but I think people will be more judgmental since they can compare [players] to trust NPCs now."*

Trust NPCs provide a base measure for time and ability. Based on other comments, players generally expect their peers to exceed this measure. This player worries that this expectation will result in increased toxicity to other players if it is not met. Another aspect of trusts that leads to more negative interactions between players is described by this commenter:

*"Whilst I don't disagree that [trusts] can help people play test certain jobs in a party setting, [players will] be setting themselves up for disappointment and abuse if they think you can play at that pace with actual people."*

Players who are accustomed to playing with trusts at their own pace may be shocked when they run dungeons with real players who will not accommodate a slower pace. While doing dungeons with trusts is a good way to learn how to play a class, it cannot be a true replacement for other players because the way that the trust NPCs act is too different. Additionally, players like the following commenter worry about trusts failing to properly teach others how to play the game:

*“We have more than enough people who have no idea what they're doing at comically high levels as it is. Allowing them to stumble their way through every dungeon as a 0 [damage] White Mage with their Cure 1 key taped down is not a very healthy strategy for an online multi-player game.”*

This commenter believes that trusts do not put enough pressure on players. As a result, players do not learn their classes correctly, such as the healer who did not do any damage and only spammed healing abilities in the provided example. The inability of such players to carry their weight in dungeons leads to dissatisfaction from other players. There are other reasons that players bring up for why trusts are counterintuitive for an online game, such as:

*“While it is good, I think it degrades the core aspect of the game. I think FF14 would be better off convincing those players to join online than adapting to a more single player audience because it further degrades the social & MMO aspects.”*

Players such as this one believe that adding in a completely solo experience to the game is bad for the growth of the game as a massively multiplayer online game. Other players share this belief, saying that if there is no reason to play and cooperate with others, players will just do all the content by themselves. Some other commenters worry that it will also be harder to bring players into higher levels of content.

### **Squadron Findings**

The data for this category comes from a query of the r/ffxiv subreddit for any posts and comments that include the words “squadron” or “squadrons.” This data was coded to find themes with a focus on the effects that squadrons have on players’ enjoyment and morals. Most

comments in the category of squadrons fall into the themes of time saving, leveling, solo experience, and dumb AI. Each theme has various subthemes as shown by the table below. In total, the squadron category has 152 coded words or phrases and 13 themes.

**Table 3. Coded Themes for Squadrons.**

<b>Theme Title</b>	<b>Subthemes</b>	<b>Total Codes</b>
Quick	Easy, Less Waiting	36
Leveling	Good Alternative, Squadron vs Player Party	26
Solo Experience	Less Anxiety, Customization	21
Dumb AI	Bufs, Hard to Learn, Poor Execution	69
<b>Total Number of Codes</b>		152
<b>Total Number of Themes</b>		13

In addition to research coding, a WordCloud can be used to see themes and verify that coding captured all relevant major topics. After removing irrelevant words such as articles, pronouns, and various others, the image that can be seen below was created. It closely matches the findings from the research coding. The most used word was “squadrons” because of the nature of the query that was used to retrieve the data. After that came the words “level,” “dungeon(s),” “time,” “missions,” and “system.” These words relate to the location that squadrons are most used, their purpose, and the tasks that they can complete. Overall, the WordCloud is a good way to gain an overall understanding of the comment data that was gathered. Each theme is discussed in more detail throughout this section.





## Positive Effects on Players

Squadrons are one of the fastest methods to level a class from level 1 to level 60. Despite the AI being unreliable and the squadron system being difficult to access and understand, squadrons are nevertheless liked for the convenience and speed that they bring players who invest enough time. This player explains why he enjoys using squadrons:

*“I’ve used Squadrons a lot and leveled multiple classes with it, and it’s just way faster than with trusts. Sure, Trust NPCs do mechanics... Squadron NPCs don’t care and take zero damage from them.”*

Squadrons are faster players when it comes to dungeon completion time. Players can gain experience and level their classes much faster by creating a well-built squadron. Unlike trusts, squadron NPCs cannot do any mechanics, but this is offset by them being invulnerable to most damage. In comparing squadrons to trusts, some players commented that squadrons are better than trusts:

*“I just wish they were anywhere near as fast as the Squadrons. My squadron team absolutely blows through any of the available dungeons, while my Trusts are painfully slower than just queuing with randoms.”*

Players believe that squadrons are better than trusts because a squadron with good investment will do dungeons at extremely fast speeds, especially when compared to a trust. In addition to being a quick leveling method, squadrons also benefit players who prefer playing by themselves:

*“It is also a good alternative for people that want to run the dungeons, but without the anxiety of doing it with other people. I have a friend that does them instead for that very reason.”*

For some people, doing dungeons and interacting with other people is very nerve-wracking. Squadrons provide those people with a way to participate in Final Fantasy XIV in a way that is better suited for them.

### **Negative Effects on Players**

There are many aspects of squadrons that players dislike, most of all is the unintelligent AI. Squadrons are not able to respond to mechanics and sometimes fail at keeping the player alive. For squadrons to be adequately strong, players must level the NPCs’ damage buffs and micromanage the squadron during combat. One player describes the reasons why he had trouble with using squadrons:

*“I did a squadron dungeon, and it was the worst experience I've had. The tank would constantly lose aggro to me, and I was tanking half the dungeon on my [bard], especially the bosses. The healer was terrible and couldn't keep up with heals.”*

This player complains about his bad experience with trusts, citing that it was very difficult for him to stay alive because the NPCs were not performing their roles correctly. For example, the NPC tank was not able to hold the attention of the enemies and the healer did not heal enough. This experience is shared by many players who first start out with squadrons and have not yet learned how they work. The clunky AI system drives many people away from using

squadrons. For more experienced players, the general understanding of squadrons is summarized by this commenter:

*“Your squadron is stupid. You need to work with stupidity and just give orders and not [deal damage] as much.”*

Overall, squadron NPCs are unintelligent, so they must be carefully managed by the player, even if that requires sacrificing damage. Players should actively give the squadrons commands to “follow,” “retreat,” or “attack” for squadrons to be effective, rather than letting the squadron AI make those decisions. While some players like this level of control over their gameplay, after the release of the trust system, others such as this commenter prefer to use trusts:

*“Trust NPCs are far more reliable and stress-free.”*

Due to the level of micromanagement that squadrons require from users as a result of their unintelligent, unreliable AI, many players prefer trusts, which are reliable and stress-free. The consensus is that squadrons are for leveling quickly, while trusts are for enjoying the dungeon experience.

## **Chapter 5**

### **Discussion of Results**

This chapter contains a discussion of the findings that were described in Chapter 4. Conclusions are made based on the data about the effects of bot prevalence and intelligence and the enjoyment and morals of players. Then, the chapter provides the limitations of this study followed by recommendations for future research than can be done on the topic.

#### **Bot Prevalence and Player Enjoyment**

Castranova (2007) defines player enjoyment as the ability of players to enjoy a game through gaining experience, earning money, being immersed in the story, or competing with other players. In his study, Castranova (2007) reports that third-party bots directly cause inflation of the in-game economy, loss of immersion, and frustration due to cheating. From Castranova's research and the data gathered from Final Fantasy XIV players, there is a clear link between an increase in prevalence of third-party bots and a decrease in player enjoyment.

The findings from research coding on third-party bots are organized by location, with each location having a different bot presence. The Overworld, which includes towns and outside open areas, is one of the locations with the most bots and it is where player enjoyment is most affected. There are a variety of player-computer interactions with bots such as chat message spam from bots, teleport-abusing bots that travel in huge groups and kill enemies that players need, and gathering bots. Bots in the Overworld are the most visible bots to players who have

recently started the game and are the most mentioned type of bot online. The bots' abnormal behavior and blatant cheating break immersion and hinder player progress in the Final Fantasy XIV story, therefore greatly decreasing enjoyment.

The Market Board is another place where third-party bot prevalence is high. The use of bots in this area is as a "high-frequency trading algorithm" that works without rest to put items up for sale, update prices, and sell. Bots who use the Market Board are much more efficient than players at earning money and make for tough competition for players who use the Market Board as a source of income. More casual players find that entering the market competitively is almost impossible, leading to frustration due to not being able to earn money. With the high influx of money from RMT and bots into the economy, prices inflate or crash very quickly as well. Therefore, because of bots creating inflation in the in-game economy and preventing players from competing in the market and earning money, player enjoyment of the game is hindered to a great extent.

Bot prevalence is much lower in areas such as Eureka, housing districts, and dungeons. Consequently, the effect of bots on player enjoyment in these areas is also not as high. In the case of Eureka, due to the higher level of the area, it is more difficult for bots to reach it. Typically, bots in Eureka only stay around a single lucrative special event, not interacting with the area beyond that. Their presence only affects players in instances with a small population due to the difficulty scaling of bosses being based on the number of players in the area. With the difficulty scaling having been downgraded a few years after the release of Eureka, this scaling affects current players even less. In dungeons, it is very rare to encounter bots because bots tend to run dungeons in full bot parties. For players that do encounter bots, the effect is variable. For

some players, bots ruin the experience and immersion completely. For others, bots are relatively competent party members and hardly affect the player. In housing districts, it was very difficult to tell apart bots and real players because of the way that houses were bought. Player frustrations were mainly directed toward the house purchasing system rather than the bots that were used to cheat it. For each of these areas, player enjoyment suffered very little because the bot prevalence was much lower and the factors of immersion, earning money, or competition with players were not affected.

### **Bot Prevalence and Player Morals**

Morals are defined as individual principles that determine what is right or wrong. Cheating through using bots is strictly banned by the Terms of Service of most MMORPGs, including Final Fantasy XIV (Square Enix, 2019). Good morality signifies that players do what is acceptable and stay away from using bots, while bad morality means using bots without caring for the rules. Multiple studies on the contagion of cheating behaviors in games show that cheating spreads through social reinforcement, meaning that players who encounter cheating repeatedly, especially through friends, are more likely to cheat as well (Kim & Tsvetkova, 2021; Woo et al., 2013, 2018). This is reinforced by the data from research coding on Final Fantasy XIV, which shows that as bot prevalence increases, player moral values tend to degrade.

Bots are extremely prevalent in the Overworld and the Market Board areas. Due to the large number of bots and the ease with which bot creators can replenish them, it is extremely difficult to get rid of these kinds of bots without taking risky drastic measures. As a result, these bots are mostly left alone outside of the occasional ban wave, despite player reports. Then,

opportunistic players who see a lot of gain in using bots and little chance of punishment for cheating begin to cheat as well, particularly in gathering materials in the Overworld or in automating the price changing and selling process on the Market Board. Mounting frustrations with bots on the Market Board by more casual players who are not able to keep up competitively is another factor that leads to increased bot usage. In an attempt to stay caught up, these players turn to using bots to sell their goods, thereby breaking the rules of the game. Due to social reinforcement through bot prevalence and little threat of punishment, bot-infested areas such as the Market Board and the Overworld degrade player morals.

On the other hand, areas with low bot presence such as dungeons and Eureka result in less harm to player morality. Eureka is a difficult area for bots to get to and requires more investment, while dungeons are short encounters where encountering bots is rare. Because bots are less evident and fewer in number, players do not feel as affected by and frustrated with them as they do in places with higher bot prevalence. The effect of social reinforcement is decreased because players are less likely to be exposed to cheating for prolonged amounts of time (Kim & Tsvetkova, 2021). As a result, players feel less of an urge to break the rules of the game and use bots.

### **Bot Intelligence and Player Enjoyment**

Bot intelligence varies greatly between third-party bots and developer-created, native bots. Third-party bots in Final Fantasy XIV are limited to scripts and automation of in-game processes, while native bots such as trusts and squadrons are supported by artificial intelligence. Therefore, the effects of these two kinds of bots on player enjoyment, defined as the ability of

players to enjoy a game through gaining experience, earning money, being immersed in the story, or competing with other players (Castronova, 2007), are varied. Low bot intelligence decreases player enjoyment, while high bot intelligence increases it. In other words, as bot intelligence increases, player enjoyment increases as well.

Third-party bots in Final Fantasy XIV are strongly disliked by players. During research coding of the r/ffxiv subreddit, most comments related to them were heavy with frustration and hostility. When encountering bots in-game, players often try to bully the bot or report them. Due to the low intelligence of third-party bots, there are some definitive signs that help with determining if a player is a bot. Predictability is one of the main indicators of bot-like behavior (Soni & Hingston, 2008). Players that do the same thing over and over for hours at a time are cast under suspicion, especially on the Market Board, where it is easy to see when players are online to update prices and what prices they set. In the Overworld or Eureka, players that kill enemies or participate in Eureka's special bunny event nonstop for hours are usually also bots. In addition, bots are known for being very unintelligent. Players who refuse to communicate (Chen et al., 2006), indiscriminately fight any nearby enemies, or do not know how to play their class are very likely to be bots. Third-party bots decrease immersion for players due to their abnormal, unintelligent behavior and prevent players from earning money on the Market Board and experience in the Overworld. The typical characteristics of bots are taken by many players to be definitive, resulting in what can almost be called a witch hunt against bots.

Other players are affected by the hostility against bots due to common bot characteristics applying to them. New or unskilled players that are learning a new class or going into new content will make many mistakes. They are also less likely to communicate out of shyness or a



lack of knowledge as to how. As a result, their party members may end up suspecting them to be a bot. Newer players on the subreddit spoke about these situations, saying that they feel a lot of anxiety and guilt for dragging down the party and hope that they will not be kicked and reported as a bot. In some cases, innocent players who are suspected get kicked from dungeons, hindering their in-game progress. Other ways of dealing with bots, such as killing or trapping them on purpose, may also be used against innocent players. Due to stereotypes about third-party bot intelligence, low bot intelligence affects the enjoyment of unskilled players who are victimized by bot hunters.

In Eureka and the Overworld, players create special methods for identifying bots based on their behavior. For example, when doing the special bunny events in Eureka, bots must go and check every possible location where a chest may appear to get their reward at the end. This behavior is very different from players, who can use a compass that tells them how close or far away the chest is and in what direction. As a result, it is very easy to tell bots apart from players and report them, though it is time-consuming. Players who want to clear the area of bots focus their time on creating and carrying out these strategies rather than progressing in the game themselves to earn money and experience. Their immersion in the area and the story is also decreased, resulting in a loss of player enjoyment as defined by Castronova (2007).

On the other hand, intelligent bots such as squadrons and trusts are much more well-received. As shown by Soni and Hingstong (2008), players prefer playing with or against bots that are human-like and have a similar skill level. Matches against bots that matched these qualities were more enjoyable for the players. This is also the case for trusts and less so for squadrons, whose AI is a lot dumber than that of trusts. Players enjoy trusts a lot more than

squadrons because trusts are programmed to be human-like and are much more skilled and reliable. For example, while squadrons are unable to avoid attacks from bosses and are unreliable when it comes to the player's survival, trusts can teach mechanics, avoid damage, and prioritize keeping the player alive in most situations. In this way, trusts are more human-like, match players in skill, and are even noted to have personalities, dialogues, and flaws built in that are like those of the story NPC that the trust NPC represents. Trust NPCs will sometimes take damage on purpose based on their "personality." Players really like this aspect of the trusts because it makes the dungeon experience feel a lot more immersive.

Trusts and squadrons also allow players to gain levels and progress more easily and quickly in the story. Squadrons have a feature that allows them to ignore most damage and deal increased damage to enemies. With investment and micromanagement of squadron actions from a player, squadrons can outperform even real player parties in dungeon completion time. Trusts meanwhile are a great teaching tool for players because they know how to get past every boss mechanic without taking unnecessary damage. Players simply can follow them instead of trying to figure out new mechanics on their own. For players anxious about playing with others, being able to learn new content with bots before going into it with real players is a huge relief. Players who normally cannot join player parties either due to anxiety or playing during off-times are also helped by trusts and squadrons because they can earn experience and progress through the story smoothly. Because trusts and squadrons are intelligent and can mimic players in dungeons, players can have the same experience as playing with real people, but with shorter queue times, faster dungeon times, and less anxiety.

However, bots with too much intelligence can be counterproductive to the growth of players and the game. As an MMORPG, Final Fantasy XIV is focused on player-player interactions. Trusts and squadrons, meanwhile, are completely solo ways to play the game. Some players worry that making trusts too useful will result in fewer players being willing to join player parties because there will be no reason to. In addition, trusts do not play like real players because they match the speed and skill level of the player they are with. In reality, players will not be so patient and will expect other party members to match the pace of the party. Players who only play with bots will be caught off-guard because the bots failed to teach them how to play properly (Wu, 2023), leading to conflict and loss of immersion in the dungeon environment. In Final Fantasy XIV, this issue was foreseen by making trusts slower than real players at completing dungeons, encouraging players who want to progress faster to play with real players. It is an interesting phenomenon that while, in general, increasing bot intelligence also increases player enjoyment, bot intelligence that is too high tends to be disliked. This follows along with Soni and Hingston's study (2008) where they found that bot intelligence that was higher than that of players' intelligence resulted in players feeling too frustrated by matches rather than challenged.

### **Bot Intelligence and Player Morals**

When bot intelligence is low due to bad AI and bots cannot entirely replicate the way that humans play, players develop a negative view of bots, even if they are native to the game. For example, in a study on League of Legends, players developed the derogatory term "bot" for players that were unskilled at the game (Wu, 2023). This was because of the predictable and

dumb bots in tutorials and AI matches in the game. The use of the term added to the toxic environment in player vs. player matches. Toxicity of this type is against the Terms of Service in Final Fantasy XIV (Square Enix, 2019). However, players nonetheless compare bot intelligence to player intelligence, creating a more toxic environment as a result. Bullying or punishing other players for acting like a bot goes directly against the rules of the game and therefore against good moral values.

A way that third-party bots increase toxicity from players is through players trying to punish other players whom they suspect are bots. For example, bots on the Market Board are known for their undercutting practices. Generally, bots always follow a rule where they will sell items for a price slightly lower than the current lowest price. Players who recognize a bot on the Market Board will purposefully put items up for extremely low prices, hoping that the next time that the bot updates its item's price, the item will sell for almost nothing. This strategy uses the bot's low intelligence to make it lose money. However, other Market Board users are hurt by this practice because it often causes major price drops on items that used to be profitable. Other ways of punishing bots include kicking, killing, or trapping them on purpose during dungeons or in the Overworld. Such practices when turned on innocent players are extremely damaging and toxic, but players are still willing to go to that extent to punish bots.

Trusts and squadrons can also lead to a more toxic dungeon environment. When comparing trusts to real player parties, players acknowledge that while trusts are great for an immersive experience, the NPCs are not great at dealing damage, so dungeon completion times tend to be slow. The slowness of the trusts is the main reason many people prefer player parties. However, like in Wu's study (2023) on bots in League of Legends, players compare player

parties to trusts, saying that the only way that trusts would be faster is if a player party did extremely badly. Trusts become the new baseline for performance in dungeons, allowing players to judge fellow party members more easily for their damage and skill. If a party member is seen doing worse than a trust, this opens the way for toxicity similar to the use of the word “bot” in League of Legends matches (Wu, 2023). Comparing player intelligence to bot intelligence leads to more bullying in dungeons and the degradation of good moral values in players.

### **Limitations**

The limitations of this study include:

- 1) Only one coder was used during the coding process. To improve the coding process and follow good coding practices, more coders should be used.
- 2) The data that was collected is limited to data from Reddit and does not represent the entire population of Final Fantasy XIV.
- 3) The data collected did not include the date comments were posted.

### **Future Research**

In future studies, researchers may explore the topic of player-computer interactions in games in more detail. Interviewing or surveying players on their experiences with bots may yield more thorough results than coding player comments on Reddit. Additionally, looking at how player interactions with bots change as bots grow more advanced is another potential avenue that

can be researched by using Reddit or other forums. Lastly, another related topic is how game designers and developers can design around preventing or encouraging human-computer interactions. In this study, some areas of Final Fantasy XIV were heavily infested or influenced by bots, while others were relatively free from influence. For example, the difficulty of getting into and progressing in the Eureka zone discourages bot users from accessing it. However, bots that could get into Eureka caused significant issues on release due to the design of the difficulty scaling in the area. How can game developers design areas and systems to prevent bots from abusing them, while not affecting the quality of play?

## **Chapter 6**

### **Conclusion**

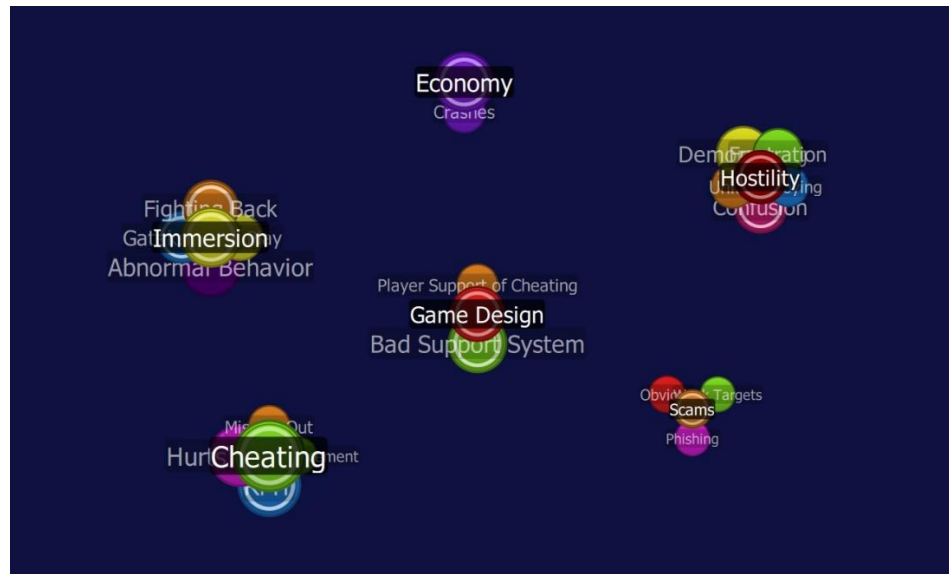
This study provides detailed research on the effects of player-computer interactions on players in the MMORPG Final Fantasy XIV. Findings from literature in the field and coding of Final Fantasy XIV player comments on Reddit show that bot prevalence and intelligence have significant effects on player enjoyment and morals. The findings are as follows: As bot prevalence increases, player enjoyment decreases, and player moral values degrade. As bot intelligence increases, player enjoyment increases as well. Comparing bot intelligence to player intelligence tends to form a toxic environment that degrades player moral values, no matter the level of intelligence of the bot.

The research and findings in this study contribute data that may help detect bots and design games in a way that makes them less vulnerable to exploitation from bots. It can also inform research on human-computer interactions in other areas such as news or social media concerning the effects of bots on users and suggest some possibilities for improving design and reducing intrusiveness of bots.

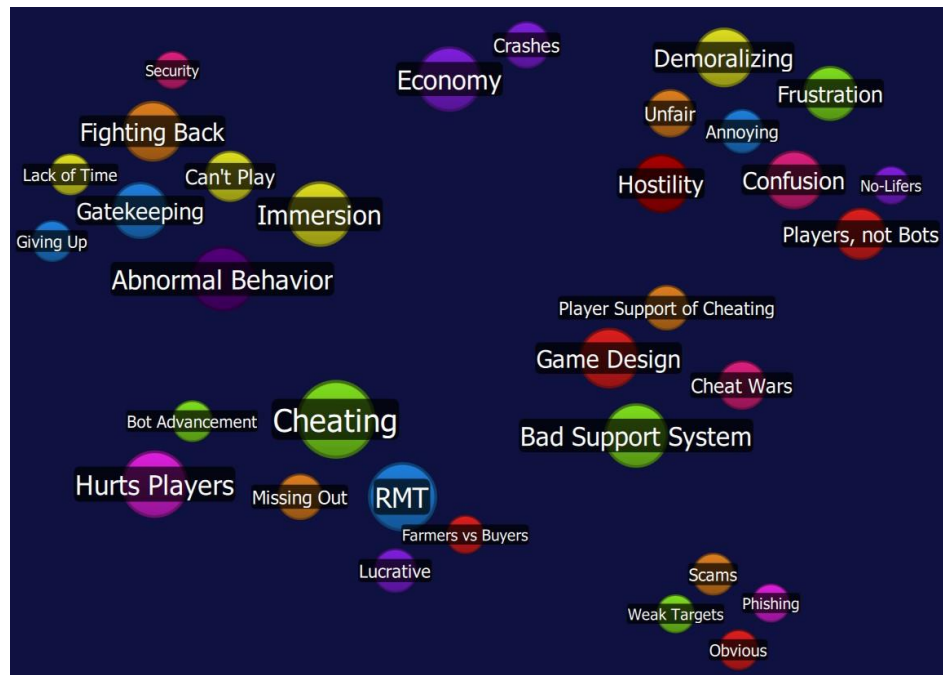
## Appendix A

### Quirkos Third-Party Bot Code Bubbles

#### Regular View:



#### Expanded View:

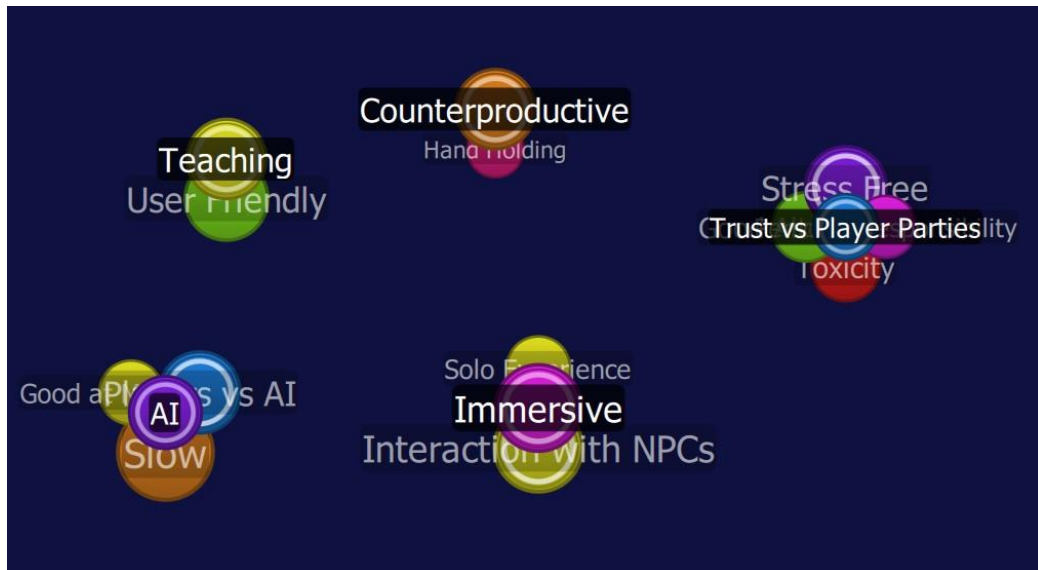




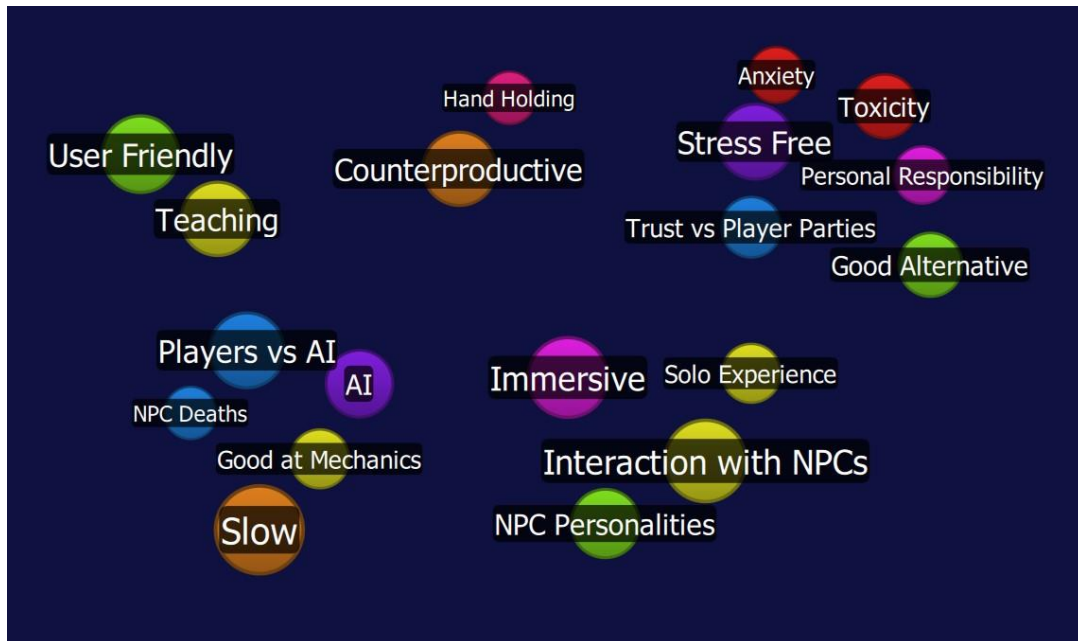
## Appendix B

### Quirkos Trust Code Bubbles

Regular View:



Expanded View:



## Appendix C

### Quirkos Squadron Code Bubbles

Regular View:



Expanded View:



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# Academic Vita

## Yekaterina Matveyeva

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### Education

#### The Pennsylvania State University

May 2023

B.S. Information Sciences and Technology: Design and Development  
Schreyer Honors Scholar

### Skills and Language

Python, Java, HTML, CSS, JavaScript, Microsoft Office, MySQL, Jira, Azure DevOps, Salesforce, Selenium, Russian, French

### Work Experience

#### QA Intern at American Cancer Society

June 2022 – August 2022

- Wrote test cases and bug reports for Salesforce and Donate projects.
- Tested forms, payment processing, and receipts for donations.
- Ensured that test scripts met all acceptance criteria and were well-documented.
- Recorded and maintained test results.
- Participated in continuous feedback and improvements of the testing process with manual and automation teams.
- Collaborated with team in daily standups and test case reviews to ensure requirements are met on-time for sprints.

#### IT QA Intern at Azenta Life Sciences

May 2021 – May 2022

- Acted as the primary tester for UX for the first stage of company rebranding; greatly improved customer satisfaction and helped ensure a smooth transition on release.
- Created and updated over 50 functional specification documents, making the training of new employees easier.
- Collaborated with another tester to design test cases for each step in the workflow of a major ERP migration project, decreasing the workload on multiple departments and increasing the productivity of future testing.
- Helped perform regression and smoke testing for new releases, improving QA team efficiency by 25%.

#### QA Analyst at uTest

November 2020 – May 2021

- Participated in 2-4 test cycles a week for various companies doing manual functional, usability, and exploratory testing across web-based and mobile applications.
- Reported 4+ accepted, high-quality bugs for every test cycle, ensuring satisfaction from companies using uTest.
- Paid close attention to customer requirements and in-scope/out-of-scope when reporting bugs.

### Project Experience

#### Application Design and Development

- Designed and developed a library database application hosted in AWS using Java, MySQL, and Swing (Fall 2020).

#### Web Design and Development

- Redesigned the website of a non-profit company based in Lehigh Valley; spoke with the client to gather information about requirements; used good design and accessibility practices along with HTML, CSS, and JavaScript to create a minimalistic prototype website design that was better for users with disabilities (Spring 2021).
- Created the front-end and back-end for a forum website using HTML, CSS, JavaScript, MySQL, and PHP (Spring 2022).