

# **The Technical, Ethical, and Economical Dimensions of Cheating in Video Games**

A Research Paper submitted to the Department of Engineering and Society

Presented to the Faculty of the School of Engineering and Applied Science  
University of Virginia • Charlottesville, Virginia

In Partial Fulfillment of the Requirements for the Degree  
Bachelor of Science, School of Engineering

**Jack Donald Halliwill**

Spring, 2024

On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

Advisor

Bryn E. Seabrook, Department of Engineering and Society

## STS Research Paper

### Introduction

In 2023, 3.38 billion people globally played some type of video game (Morikawa, 2023). Almost half of the population is playing video games and as the player base continues to grow, so does an issue plaguing popular MMO (massively multiplayer online) games, cheaters. Cheaters are despised by players and companies alike. Firstly, players do not want to play in games where the integrity of the game is in question (Irdeto, 2018). Secondly, companies experience reduced revenues if playtime from non-cheating players is diminished. This presents an obvious mission for game development companies to eradicate all methods of cheating from their game, but it is not that simple. The cat-and-mouse game between cheat and anti-cheat developers is everlasting as there are lucrative incentives for both sides. In this paper, I use Susan Star's (1999) *The Ethnography of Infrastructure* to analyze properties of popular MMO video games contaminated with cheaters. This analysis will prove useful to answer the question: How do cheaters influence the gameplay experience of neutral players and impact gaming companies?

### Secondary Data Analysis on Reddit Posts

To address this question, secondary data analysis was performed on a dataset of 3,835 Reddit posts and 281,876 Reddit comments. Reddit posts were scraped using the Python Reddit API Wrapper (Praw, 2023) across eleven different subreddits pertaining to various popular MMO games. The posts were scraped based on keyword matching and saved to a SQLite database so that further analysis could be done without the full dataset in-memory. Sentiment analysis was performed on each Reddit comment using Cardiffnlp's (2022) machine learning model. This particular model was trained on ~124 million Twitter posts and is able to rank text

as either positive, neutral, or negative as well as a score indicating how much of the emotion is detected. Secondary data analysis was conducted in a variety of ways to determine gamers opinions similar to those in Irdeto's (2018) *New Global Survey: Widespread Cheating in Multiplayer Online Games Frustrates Consumers*. I then compare my research to Irdeto's findings to discover any changes in player views since 2018.

### **Background Information on Cheating in Video Games**

The cheaters of today have a negative reputation among the gaming community; however, it wasn't always like this. Some popular video games from the 1990's like Sonic the Hedgehog and Mortal Kombat had cheat codes intentionally embedded by developers for debugging purposes or as easter eggs (Tarantola, 2019). For example, in the SEGA Genesis version of Mortal Kombat players could enter a code via controller buttons to enable blood and gore, as the default was off. These codes were put in place as a preventative measure to prevent children from having access to gore in games as shipped, leading to the creation of ESRB (Codex, 2018). These early "cheaters" discovered these codes and used them for their personal advancement in the game. These cheats were typical in singleplayer or co-op games where if a player was cheating, the opposing player would know about it.

Today's MMO games differ from the games mentioned above. The difference is in the name itself, MMO. MMO games use large pools of players from all over the world to construct their player base. Matchmaking occurs at the start of a game to pair you with and against other random players that have similar skill levels, geographic location, or selected regions. This is a key difference. Now instead of gaming by yourself or against someone you know, you are playing against strangers. One of the most popular MMO games of today, Valorant has a monthly player base of 28 million active accounts (D'Anastasio, 2023). With a player base of

this scale, there will obviously be cheaters. Except this time, as opposed to the 1990's, players obtain cheats not intended by the game's developers.

A cheat is created by reverse engineering a specific piece of the game developer's system to gain an unfair advantage over other players. Cheats available in multiplayer games are the product of the unintentional vulnerabilities in the game company's system. Hardware, software, bugs, and online attacks are the most common pieces exploited. Within these exploitation categories, there are tens of hundreds of hacks that give a cheater the advantage: god mode, aimbots, wallhacking, extrasensory perception, etc. (Kanervisto, 2023). These types of cheats can be detrimental to the integrity of the game and subsequent enjoyment of non-cheating players.

## **STS Framework**

To analyze properties of popular MMO games, Susan Star's (1999) *The Ethnography of Infrastructure* framework is used to parallel her work on infrastructure to my topic of cheating in games. At the core, Star's framework defines a list of dimensions to describe the technological development of infrastructure in relation to society.

The first dimension used from the framework to analyze MMO games' properties is *scope*. Now knowing the difference between singleplayer/co-op and MMO cheats, the ethical distinction is clear. Singleplayer/co-op games are played in a vacuum where Player 1 knows whether or not Player 2 is cheating. If Player 2 is cheating and Player 1 willingly knows and does not oppose, that is not unethical. If Player 1 were to oppose, that would be unethical on behalf of Player 2, and Player 2 would typically experience ridicule or consequence from Player 1. When the scope is adjusted to MMO games, Player 2 is anonymous to Player 1, so no consequences are

imposed. Anonymity in online games has been a real driving force of cheating and hate experienced by neutral players (Grazotis, 2018). This exemplifies how varied a technology can be used and interpreted depending on the scope. Both scenarios are video games, but whether the game's scope is MMO or not can have a large impact on the incentives for cheaters and how Player 1 interacts with Player 2 as a player.

Another dimension from the framework *fixed in modular increments* parallels to the constant battle between game security engineers and the cheat developers. As games grow in popularity, so does the number of cheaters. Cheaters create a market demand for hacks and with lots of money willing to be spent. Thirty dollars per user per week is lucrative enough to coordinate cheat development operations that create and maintain cheats for some of the most popular video games (Izento, 2024). It is impossible for game security engineers to be prepared for what the next cheat will be. MMO games are extremely complex and have many vulnerabilities, so it is unreasonable to blame the engineers or company. But it is the responsibility of the engineers to take action and discover what is currently being exploited to fix the system with patches/bug fixes. Fortunately, a few court cases involving Bungie, Ubisoft, and Take-Two Interactive are indications that efforts are being made to dissolve the community of cheaters (Totilo, 2022). However, identifying and punishing cheat creators is not a sustainable solution. Preventive measures and modular, incremental fixes in code have so far seemed more cost-effective than active litigation.

The last dimension of the framework applicable to MMO games is *visible upon breakdown*. Speaking from personal experience, when playing a game and I know there is a cheater on the other team, it is draining. I usually quit the game once finished. My voice is concurred with thousands of others by the works of Irdeto (2018). The system designed by the

game design engineers is visibly broken to players, and the company pays for it in the form of lower overall playtime. This dimension is what inspired the research question for the paper: How do cheaters influence the gameplay experience of neutral players and impact gaming companies?

## Results From the Dataset

Simply answering the research question, both players and companies are negatively impacted by cheaters. The resounding results from the sentiment analysis provide clear evidence that cheating is disliked and a large issue from the perspective of the MMO gaming community. Analyzing the dataset of Reddit comments with specific keywords reveals the negative association players create between in-game purchases and cheaters, which can hurt companies' revenue. The results below convey the scale of the issue with both quantitative and qualitative data. The results are organized to give supporting evidence for answering the research question by providing MMO gamers perspectives' that have keywords matching to questions addressed in Irdeito's (2018) survey.

## The Players' Experience

To gain a general understanding of the data collected from scraping Reddit posts, Table 1 displays the results of running sentiment analysis on the dataset composed earlier.

Table 1

### *General Statistics of the Dataset*

	Total Comments	Total Comment Score	Average Comment Score
Positive	29778	21801	0.732
Neutral	106045	70836	0.668
Negative	145423	109533	0.753

One of the first glaring details from this table is the fact that there are almost five times as many negative comments as positive comments. This comparison exhibits the scale of the issue.

Instead of gamers having casual discussion about the game and their enjoyment of it, MMO gamers are flocking to Reddit to report the never-ending issues that ruin their experience.

Another detail from the table to address is the fact that the average comment score for negative comments is around 2% greater than the positive comments. This shows that the negative comments being left by gamers are more easily recognized as negative by the model than positive comments were recognized as positive. The difference can be explained by negative comments conveying their dissatisfaction using explicit language, CAPITALIZED TEXT, and excessive punctuation!!!! These findings are supported by Irdeto's (2018) survey question asking gamers how often their gaming experience is impacted by cheaters. The survey attained results that showed 23% of gamers often or always interacted with cheaters, ~40% rarely or never did, and the rest sometimes came in contact with cheaters. These results are much more moderate than those attained from my research in Reddit comments. Table 2 was derived by querying the

Table 2

*Frequency of Neutral Players Interacting with Cheaters*

	Number of comments with the words 'cheater' and	Scaling Negative Sentiment	Percentage After Scaling
Always	257	51.4	67.6
Often	58	11.6	15.3
Sometimes	1	1	1.3
Rarely	2	2	2.6
Never	10	10	13.2

comments dataset for words matching 'cheater' and a mix of other qualitative terms used by gamers in Irdeto's survey to rank their own experience. It is evident that there is a massive skew towards always and often posts. The difference is due to the nature of the queries using the negative sentiment qualifier and having access to a larger pool of comments. Upon rescaling by the quotient of the number of negative to positive posts, we still see over 80% of the comments

report interacting with a cheater often or always in MMO games. This is an increase of over 60% when compared to the findings from Irdeto's surveys. Temporally analyzing the results from the table with Irdeto's surveys in mind, a clear observation can be made that this is a growing issue. One consideration to keep in mind is that people are more likely to rapidly spread negative information rather than positive information online (Lu & Hong, 2022). Social media platforms, like Reddit, are prone to housing echo chambers of people who attempt to perceive the same feelings as others, even though in reality, they are not nearly as affected. In our case, this could skew gamers in their own experiences towards a negative direction into perceiving the cheating problem as larger than it actually is, causing them to leave a negative comment. Even with this consideration in mind, the results are statistically significant and indicate that players are upset with the cheaters plaguing their games. It is obvious that cheaters have a negative light in the gaming community, but what actions do cheaters cause neutral players to take that prove their experience was impacted? Irdeto's survey asks gamers how likely they are to stop playing a game if they are competing against a cheater. In the "very likely" category, out of six countries, the result for the U.S. is the maximum at 37%. This statistic displays that gamers do not tolerate cheaters and more than a third will remove themselves from the situation as soon as possible. Removing themselves from the game can look a variety of different ways. In an attempt to quantify how these player experiences are impacted, the dataset was queried for keywords like quit, leave, and uninstall. The results of these queries are confined to only "negative" sentiment comments with a score of 0.8 or greater in order to shine a light on the most dissatisfied players. Out of the 72 comments collected from the quit and leave queries, one sums up the feelings of all the others quite well, "my last 3 matches have had blatant cheaters just gonna leave this game alone for a few months" ([deleted], 2021). Basically, players play for a while and have a fun time



as the game is intended to be played, then their entire experience is ruined by cheaters in an instant, and players proceed to stop playing the game. The impact of cheaters completely wipes the players brain clear of all the fun they were having and leaves them with a bad taste in their mouth, which correlates the game itself with this negative feeling, as opposed to the cheaters.

After this cycle of quitting the game happens a few times, players might decide they are fed up and will no longer continue playing the game. When querying our dataset for comments with the keyword “uninstall”, the result is 133 unique perspectives discussing the topic. One anecdote from a Reddit gamer details their feelings in a relatively calm manner, “Yeah it’s became unplayable lately with aimbot/wallhack cheaters. Time to uninstall. A shame as when you get a fair game its fun but so many cheaters...” (ljw88, 2023). This perspective confirms that cheaters are impacting players experiences to the extreme. Also, the lighthearted nature of the comment displays that these gamers truly want to experience that game as it is intended to be played. They are not the type of people just looking for yet another thing to be mad about, they genuinely want a solution to this problem. This position is reinforced by RationalistFaith1’s (2022) up and down relationship with popular MMO game *Warzone*, “...I uninstalled this game 3 times now and I’m considering just deleting my account. They’ll never fix the cheater issue.” The anecdote proves that cheaters have a direct influence on the players’ experience. This player was so enraged by cheaters that they deleted the game for the first time, but then remembered all of the fun they had while playing. So, they redownload in hopes that the company has worked to mitigate this issue since they last played, but it is somehow even worse. The player has no hope in game companies to solve this issue, and their voice is echoed by hundreds of others in these results. These results are important because an uninstall or account deletion is the worst-case scenario for a MMO game company. At the core, they lose a customer every time this happens,

and therefore decrease their total possible revenue. Game companies must work to fix their games in modular increments to keep up with the cheaters. If these companies fall behind, they could risk not retaining their player base, and going bankrupt.

## Impacts on Companies

After understanding how cheaters influence neutral players and the subsequent actions they take, we can begin to explore the impacts on the game companies. From Table 3, Irdeto's survey results display that the majority of players across a variety of countries would purchase less in-game content because of cheaters in their games. In-game content and microtransactions

Table 3

### *Irdeto's In-game Purchase Results*

Country	Which, ONE, if any, of the following would best describe what you would do if you knew other gamers were cheating in a multiplayer online game?			
	Base: Gamers online who play multiplayer games			
	<i>Net Answer: I would buy more in-game content as a result of this</i>	<i>Net Answer: I would buy the same amount of in-game content as a result of this</i>	<i>Net Answer: I would buy less in-game content as a result of this</i>	<i>Net Answer: Don't know</i>
Global	14%	24%	48%	14%
China	18%	22%	51%	8%
Germany	8%	22%	45%	25%
Japan	17%	29%	43%	11%
South Korea	17%	31%	48%	4%
UK	2%	16%	57%	24%
US	14%	19%	42%	24%

*Note.* Sourced from Irdeto's (2018) survey on gamers.

are the main source of revenue for a majority of MMO companies (Koksal, 2019). The games included in the dataset receive their monetization through "skins" for weapons or characters that users purchase in-game via real money. With this question in mind, the dataset was queried for negative sentiment comments that contained the words 'skin' and 'cheater'. There were 1000 comments containing both of these words that reveal gamers true feelings about how they are less likely to purchase skins in the games they are playing. One player sees abstaining from

buying skins as a way to take action against Riot Games, producer of popular MMO games like *Valorant* and *League of Legends*, “dont buy skins and make riot think whats wrong” (kravas01, 2021). Another player expresses their dissatisfaction with the company’s failure to improve player experience, “...the game is filled with cheaters its actually disgusting to play anymore and riot only cares about how many skins they gonna sell” (Specialist\_Agent\_164, 2023). Gamers feel as though companies only focus on seeking to increase profit and do not put the necessary resources towards preventing cheaters. This leads to less in-game purchases by players, less revenue for the company, and even tighter budgets which do not properly address the cheating at hand. These results support Irdeto’s findings that players do not want to spend money on games in which cheaters run rampant without consequence. The results also show that the gamers feel as though the companies are responsible for restricting cheaters’ access, rather than blame the cheaters for their actions. This is a clear example of MMO games being visible upon breakdown, according to Star’s specifications. Which sparks innovation on behalf of the company to fix this issue for their customers.

### **Cheaters Cause Development of New Technology**

In an effort to restrict cheaters in their hit game *Valorant*, Riot Games developed Vanguard. Vanguard is a security tool aimed to detect cheaters running hacks on their computer. This program is required by Riot to be actively running in order to launch *Valorant* and play the game. Vanguard is unique in the field of anti-cheat software as it requires kernel-level access. The computer requires the program to be launched upon startup of the machine and if Vanguard is closed at any point, the user must restart their PC to enable Vanguard. Kernel-level access also gives Vanguard access to sensitive permissions on the user’s PC that other programs typically do not have access to. Both of these details have sparked concern among *Valorant*’s community

about the safety and security of their device and information (Laros, 2023). However, the modern wave of anti-cheat programs needs these elevated permissions to verify gamers are playing the game fairly.

Vanguard is a technical solution to an underlying social problem, cheaters. Without cheaters existing within our society, Riot would not have to spend presumably millions of dollars to develop and maintain Vanguard. The emergence of secondary anti-cheat programs like this supports Susan Star's (1999) ideology proposed in *The Ethnography of Infrastructure*. As opposed to technology developing at a linear, deterministic rate, Star proposes that technology is created to serve the various needs of different social groups. This is reflected in the case of Vanguard: *Valorant's* competitive gaming community yearns for an anti-cheat, but they are a small subset of all gamers worldwide. The specific needs of their community are met by the development of this new technology, but this does not apply to all MMO games as the solution is game-specific. These perspectives further support Star's theory as there is no current anti-cheat on the market that is a one-size-fits-all solution for games. It is non-deterministic. Every game and their respective communities have various wants and needs that need to be attended to with attention. Drawing the connection between cheaters as a social group and why Vanguard exists exhibits the direct link between social groups and their influence on the development of technology.

### **Limitations of This Research**

As for any research, there are some limitations to the results of this paper. One limitation that should be addressed is the fact that the word "cheat" is inherently negative. This was the keyword used to scrape Reddit posts. The innate bias of this word towards negativity could be part of the reason we see so many posts classified with a "negative" sentiment as opposed to

“positive”. Another factor to consider is that even though the research question at hand is attempting to understand the neutral player’s perspective, the data drawn from Reddit cannot assure that the commenter is not a cheater. These results are based on the assumption that a large majority of players discussing cheating are the ones affected, not causing the problem. The last limitation is more of a clarification/statement of assumption. The results are not unique players that commented about cheating, but total number of posts with the ‘cheat’ keyword. This means that a single commenter could leave multiple comments about their experience that would appear in the results. The impact seems negligible upon data review but is worth mentioning. With these limitations in mind, future works built on this paper may include recreating Irdeto’s survey results in the present day. These survey results would provide concrete evidence as to how gamer’s perspectives have changed over time as well as help support the analysis done in this paper.

### **Summarizing the Final Results**

After performing sentiment analysis on the secondary data source, Reddit posts and comments, we have uncovered the ways in which cheaters impact the neutral players experience and therefore affect the companies’ revenue. Cheaters cause players to temporarily quit or permanently uninstall games which results in lower overall playtime and thereby reducing the number of in-game purchases. The results also uncovered that players feel as though it is the companies’ responsibility to find a solution to this issue. This research is important for companies to understand the perspectives of players impacted by cheating, and how they can work to mitigate those effects. All in all, cheaters are malicious actors who intend to ruin other players’ experiences; however, companies must attend to insights from their audience on the frontlines of this issue in order to develop a wholistic solution.

## References:

- [deleted]. (2021). [https://www.reddit.com/r/Warzone/comments/lzsswk/blatant\\_cheat\\_doesnt\\_even\\_attempt\\_to\\_hide\\_the/](https://www.reddit.com/r/Warzone/comments/lzsswk/blatant_cheat_doesnt_even_attempt_to_hide_the/)
- Cardiffnlp. cardiffnlp/twitter-roberta-base-sentiment-latest · Hugging Face. (2022). <https://huggingface.co/cardiffnlp/twitter-roberta-base-sentiment-latest>
- Codex. (2018, December 21). *Mortal Kombat and the cheat code that changed gaming*. YouTube. <https://www.youtube.com/watch?v=-cIV71G30Xo>
- D’Anastasio, C. (2023, October 12). *How influencers helped riot games turn “Valorant” into a Gen Z hit*. Bloomberg.com. <https://www.bloomberg.com/news/articles/2023-10-12/how-influencers-helped-riot-games-turn-valorant-into-a-gen-z-hit?srd=premium>
- Grazotis, E. (2018, April 27). *The negative effects of anonymity and excessive participation in online gaming communities*. Debating Communities and Social Networks 2018 OUA conference. <https://networkconference.netstudies.org/2018OUA/2018/04/23/the-negative-effects-of-anonymity-and-excessive-participation-in-online-gaming-communities/#:~:text=In%20Chen%20and%20Wu’s%202015,follow%20group%20and%20social%20cues.>
- Irdeto. (2018). *New Global Survey: Widespread Cheating in Multiplayer Online Games Frustrates Consumers*. <https://resources.irdeto.com/media/new-global-survey-widespread-cheating-in-multiplayer-online-games-frustrates-consumers?page=%2Firdeto-global-gaming-survey&widget=619fe088c38ad74c335a025d>
- Izento. (2024, February 5). *The cracks in riot vanguard’s shield: Anti-cheat and the secret battle with hackers*. Esportsheaven. <https://www.esportsheaven.com/features/the-cracks-in-riot-vanguards-shield-anti-cheat-and-the-secret-battle-with-hackers/>

- Kanervisto, A., Kinnunen, T., & Hautamäki, V. (2023). GAN-Aimbots: Using Machine Learning for Cheating in First Person Shooters. *IEEE Transactions on Games*, 15(4), 566-579.  
<https://doi.org/10.1109/TG.2022.3173450>
- Koksal, I. (2019, November 12). *Video Gaming Industry & its revenue shift*. Forbes.  
<https://www.forbes.com/sites/ilkerkoksal/2019/11/08/video-gaming-industry--its-revenue-shift/?sh=bf5a8a8663e5>
- kravas01. (2021).  
[https://www.reddit.com/r/VALORANT/comments/mlf2fs/high\\_ranked\\_streamers\\_are\\_normalizing\\_smurfing/](https://www.reddit.com/r/VALORANT/comments/mlf2fs/high_ranked_streamers_are_normalizing_smurfing/)
- Laros, M. (2023). *The valorant anti-cheat: Vanguard - how it works*. GameChampions.  
<https://www.gamechampions.com/en/blog/valorant-anti-cheat-vanguard/>
- ljw88. (2023).  
[https://www.reddit.com/r/VALORANT/comments/150hbzo/cheating\\_increase\\_part\\_2/](https://www.reddit.com/r/VALORANT/comments/150hbzo/cheating_increase_part_2/)
- Lu, D., & Hong, D. (2022). Emotional contagion: Research on the influencing factors of social media users' negative emotional communication during the COVID-19 pandemic. *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.931835>
- Morikawa, Y. (2023, September 19). *The gaming industry sees a staggering surge in popularity*. globalEDGE Blog. <https://globaledege.msu.edu/blog/post/57295/the-gaming-industry-sees-a-staggering-surge-in-popularity>
- Praw: *The python reddit api wrapper*#. PRAW 7.7.1 documentation. (2023).  
<https://praw.readthedocs.io/en/stable/>
- RationalistFaith1. (2022).  
[https://www.reddit.com/r/Warzone/comments/rv8s9i/anti\\_cheat\\_works\\_fine\\_no\\_need\\_to\\_invest\\_more\\_money/](https://www.reddit.com/r/Warzone/comments/rv8s9i/anti_cheat_works_fine_no_need_to_invest_more_money/)
- Specialist\_Agent\_164. (2023).  
[https://www.reddit.com/r/VALORANT/comments/150hbzo/cheating\\_increase\\_part\\_2/](https://www.reddit.com/r/VALORANT/comments/150hbzo/cheating_increase_part_2/)
- Star, S. L. (1999). The Ethnography of Infrastructure. *American Behavioral Scientist*, 43(3), 377-391. <https://doi.org/10.1177/00027649921955326>
- Tarantola, A. (2019, June 18). *A brief history of cheating at video games*. Engadget.  
<https://www.engadget.com/2019-06-15-a-brief-history-of-cheating-at-video-games.html>

Totilo, S. (2022). *Lawsuits suggest some video game cheating could be illegal*. Axios.

<https://www.axios.com/2022/12/16/video-game-cheating-lawsuits>