
# Power creep in videogames, an analysis of the competitive scene in Pokémon games

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# Abstract


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**Abstract:**

There are many factors that influence the development of modern videogames, one of these is the economics behind them. As with any business the main goal of videogame developers and publishers is to make a profit. Depending on the type of videogame the avenues that are used by the developers to generate revenue vary significantly.

With the rise of mobile gaming the use of micro-transactions has risen significantly as well, and this is especially true for online games where the players interact with each other more actively. Micro-transactions have also made their way into many competitive games such as League of Legends, Dota or Counter Strike. While most of the micro-transactions are focused on the cosmetic side with for example skins being a big part of especially online games, there are also some games that lock content behind an in-game currency that takes time to collect. In most cases this content can also be unlocked using real-world currency. This means that there is a monetary incentive for developers to make the newest content worth the monetary spend for players that do not have the time to grind out the in-game currency.

This in turn has the potential to lead to power creep, the tendency for newer content to be better or more powerful than the older content. This study will focus on the Pokémon series of games and try to establish a pattern for whether power creep exists. By comparing the usage rate and share of viable Pokémon in the VGC format over the years the study will attempt to answer to three main questions. If power creep is present, if it is present is it bad for the metagame and how power creep affects the development of the videogames.

Data for four different VGC formats was analysed with the Pokémon divided into groups based on the generations that they belong to. The study focuses on the VGC format as it is the format used for the official world championships which is sponsored by the publisher of the videogames. The result of the study shows that there is a tendency for the newest generation to be severely overrepresented on the teams used by the competitive players of the VGC format.



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# List of Abbreviations

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| CS:GO: | Counter Strike: Global Offensive |
| DLC: | Downloadable Content |
| EA: | Electronic Arts |
| HS: | Hearthstone |
| LoL: | League of Legends |
| MtG: | Magic the Gathering |
| ORAS: | Pokémon Omega Ruby and Alpha Sapphire |
| SWSH: | Pokémon Sword and Shield |
| TCG: | Trading Card Game |
| USUM: | Pokémon Ultra Sun and Ultra Moon |
| VGC: | Video Game Championships |

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# 1. Introduction

This chapter will present the background for the study as well as giving some information on the structure. The chapter will also present the main research questions of the study and give some information on the problem formulation.

## 1.1 Background

As the videogames market has matured and grown, new controversies and scandals have started to surface. This has been especially evident during the last few years when the scrutiny levelled at the industry has also become increasingly strict. This in turn has led to man gamers and communities becoming less trusting of the developers and the work that they do. In some cases even governments have showed an interest in reigning in some of the more atrocious business practises that have found a place in many of the videogames that we enjoy. One example of the latter are the legal troubles that companies such as Electronic Arts (EA) have faced with some of the mechanics that have been implemented in their sports games ex. FIFA, Madden NFL, or NHL. This all reached a boiling point in 2018 when EA was sued for breaching gambling regulations in Belgium, this led to Belgium banning so called "loot-boxes" from being sold to minors which basically meant banning them outright (BBC, 2018).

But while the loot-box saga has been the controversy that has received the most attention from the public some gamers see other issues as more significant. Man communities of gamers have in the later years become more aware and sensitive of a phenomenon that has been dubbed as "power creep", what this means is that newer content is made more powerful to encourage players to invest in this newer content. Gamers argue that this is bad for the games integrity as it invalidates earlier progress that has been made by players and thus makes the time players have invested seem like a waste, it is easy to see how this could have a demoralising effect on players who have spent a considerable amount of time to achieve something in-game only to have it be made obsolete, sometimes by something that can just be bought outright with money. Some argue that there is a monetary incentive for developers and

publishers of so-called freemium games to act in this way, as it gets their players to spend more money on their products and become what the industry calls “Whales”.

This business model is in no way something that is exclusive to videogames, as it can be found in many Trading Card Games (TCG) like for example Pokémon. All it takes to realize this is to look at the differences in power level between the original cards from the late 90’s (Base set) and compare them to the cards released nowadays. The big difference is that most TCG:s have systems in place to restrict which cards can be played in the current rotation. Magruder (2022) focuses on another popular TCG, Magic the Gathering (MtG),which was the most played TCG in the world in 2016 ("Most played trading card game", 2022) with over 20 million players. According to Magruder (2022) the designers behind MtG have openly stated that they believe that the success of their game is due in part to the low levels of power creep this sentiment is also held by Rosewater (2005) who claims that an unchecked power level will eventually lead to the games demise. Magruder (2022) finds that there are about 1.56 cards released per year that are direct upgrades to earlier cards, this is especially impressive since Magruder (2022) also states that there are around 1000 new card faces released per year, that would mean that about 0.0015% of these cards are direct upgrades. According to Stoddard (2013) the design team for MtG go out of their way in order to avoid printing direct upgrades to older cards. Stoddard (2013) also points out that although they do their best to avoid it some power creep is inevitable and argues that the only way to stop power creep would be to completely stop releasing new cards. In addition to this Stoddard (2013) points out that the older sets should not be held to the same standards as the sets released today, further adding that the measure of how powerful a card is should be relative to the cards that exist around it and not solely focused on the individual card.

If we go back to the earlier example of the Pokémon TCG, we can see that the official rules limit the card that can be used to cards released after 15th November 2019 (2022 Pokémon TCG Championship Series Season Format Rotation, 2022). This is similar to how things are done in MtG, according to Rosewater (2005). This means that even though there have been cards printed since the late 90´s that could technically be played in the same game as the newer cards on the competitive level, this is not allowed. This is done in part to force the meta to move on and change but

also since the creators of the TCG want players to spend money on the newest sets and newest cards. This same sentiment can be found in videogames especially ones that rely on user continually spending money on them either through a subscription service or to get access to the latest content.

The Pokémon series of videogames might not fit very well into this description as they have for the most part been separate games with their own stories and mostly having close to no interaction with each other. There is however one way that these games are all connected, since the very beginning of the game series the ability to move characters from last generations games to the new ones has been a key feature. Today this is even easier and more widespread than it has ever been as the Pokémon company, the developers of the Pokémon games and also the TCG, provide a subscription service (Pokémon HOME) to make the moving of characters easier between everything from the relatively new mobile game (Pokémon GO) as well as the current generation of main series games (Pokémon Sword/Shield) and even the remakes of older generation games (Pokémon Brilliant Diamon/Shining Pearl). The existence of this subscription service has created much animosity amongst long-time fans with many being critical of the fact that they would have to pay for moving their characters from the earlier games to the new generation of games.

## 1.2 Problem

Why is power creep a problem and does it even exist in videogames or is it just a red herring? As stated earlier both Stoddard (2013) and Rosewater (2005) claim that it is very important for a game or game formats health that the power level is kept at a reasonable level, avoiding any huge changes in the power level of cards or characters. This is what I will attempt to analyse in this thesis. This thesis will mainly focus on the Pokémon franchise of games and as such I will specifically investigate whether power creep can be found in these games. This will be done by looking at the usage percentages of both moves and characters and comparing these percentages to the release dates of the characters. The reason for this being a good game series to do such tests is that it has existed for over 20 years, and it also has a relatively big competitive scene that also has a 10+ year history. Another important thing is that the competitive format has been the same for a long time.

The reason why it is important that there is a competitive scene is that the competitive players will utilise only the most powerful characters in a bid to increase their chances of winning, this means that there will also exist an established meta based on the power level of the characters, this in turn, is important as it allows us to see the true power level of the characters which we might not do if we exclusively looked at more casual players.

## 1.3 Aim and research questions

This thesis will be conducted as a study on the trends of character usage in the competitive scene of the Pokémon games, it will mainly focus on the Video Game Championships (VGC) format. The VGC format has been chosen as it is the format that is used for the officially recognized World Championships and it has also stayed relatively similar for a long time, it is also important to note that the VGC format is different than many of the other formats as it is level capped at level 50 instead of level 100 which is standard in many other formats ("An Introduction to VGC - Smogon University", 2010). The VGC is also not based on any form of tier system to limit which Pokémon can be used, except for limiting Legendary Pokémon to two (2) per team of six (6). The biggest difference between VGC and other formats is that it is a format for double battles, this means that each player has two Pokémon on the field simultaneously ("An Introduction to VGC - Smogon University", 2010), this obviously means synergy between the team members is very important.

The research for the study will be done on data collected form several years of VGC competitions and analysing different trends in this data. The areas that the study will focus on is the usage percentages of the Pokémon, the usage percentage of items on the most popular Pokémon as well as how common certain combinations of Pokémon are. All data will be taken from pikalytics.com.

The main research questions for the study will be the following:

*RQ1: Does power creep exist within the VGC format?*

*RQ2: Is power creep bad for the meta game of VGC?*

*RQ3: What effect does power creep have on the development of videogames?*

## 1.4 Structure

The thesis consists of nine chapters, the chapters will all focus on different things and are divided as follows:

**Chapter 1** includes the introduction the thesis as well as lays down some background information that might be important for the reader, it also establishes the problem as well as the research questions and goes over the goals of the study.

**Chapter 2** goes over the concepts that are used in the study as well as provides more information on the phenomenon of power creep. It also establishes what will be defined as power creep for the purposes of this study.

**Chapter 3** Focuses on the economics of videogames to give the reader an understanding of why and how developers and publishers of videogames make decisions. It also goes over the stakeholders that exist for videogames and how the interests of these different groups are looked after.

**Chapter 4** focuses on the research methods and the data that will be used to conduct the research. It goes over why the research methods were chosen as well as the strengths and weaknesses of them, it also presents the sources of the data and argues for why this source is used.

**Chapter 5** contains the main data analysis part of the thesis; this is where the different analyses are shown and explained.

**Chapter 6** goes over the results of the study and delves deeper into what kind of conclusions can be made from them.

**Chapter 7** discusses the results of the study as well as goes the usefulness of the information and providing answers to the research questions. It also discusses and recommends potential future research in the subject.

**Chapter 8** draws conclusions from the study and presents them in a way that is quick to read and easy to understand.

**Chapter 9** is a quick summary of the study in Swedish.

# 2. Power creep as a concept

This chapter will explain the core concepts that will be discussed in the study. It will attempt to explain what power is in a videogame sense and how power can be used as an incentive for getting players hooked. The chapter will also try to explain why power is important to players as well as how the importance of power has changed with the introduction of competitive videogames. Further the chapter will attempt to give a definition of what power creep is and how it affects a videogame as well as how it might be detrimental for the balance of a competitive game.

## 2.1 Understanding Power

One of the central concepts that will be discussed in this study is the concept of power in videogames. It is important to define what exactly is meant by power when talking about it in a videogame context. Thue et al. (2010) state that agency plays an important role when it comes to the well-being of people. Thue et al. also claims that agency plays an important role in making videogames appealing. Agency in videogames can be produced through many different avenues such as for example through gameplay or the way the player interacts with the environment of the game. Challenges in the game that add a goal for the player to overcome this can be for example a timer or a high score for a certain part of the videogame or for certain content within the videogame or through the interactions that the player has with the other characters in the videogame as well as with the storyline of the videogame, if the videogame has a story element to it (Thue et al., 2010).

In addition to the previously mentioned ways to generate agency, online-games offer another way to generate agency, namely through the competitive elements that the online mode offers players a way to compare their skills against other players. Consalvo (2009) suggests that being a good player is important for players and this has led to players developing different mediums through which to share strategies or tips and tricks for improving and optimising their gameplay. Some videogame companies have also been involved and released magazines that function as a way for the players to share strategies. Consalvo (2009) claims that these magazines have played a big role in enabling the sharing of information and mentions some of the

things that would usually be discussed in the magazines. According to Consalvo (2009) strategy guides and maps of things like levels or stages, explanations of how a certain game works, such as game rules or how the game counts points or score are among the things that have appeared in the videogame magazines.

One way to view the concepts that Consalvo (2009) explains is as a pursuit to expand or increase the power that the player has in the game. The forums and magazines give players a place to compare their own power level to others and this in turn gives players more motivation and inspiration to further improve and become more powerful. While Consalvo (2009) mainly focuses on games that existed before the widespread adaptation of the internet and, thus focuses mainly on the way that this dynamic works for single player games or at most local multiplayer games, the concepts take on an entirely different meaning when applied to games with online competitive elements. The difference that this switch makes could be compared to someone who used to play a sport with their friends, mostly for fun, going on to play the same sport competitively. There are new incentives for players to be the best as this could potentially lead to lucrative business opportunities for example a professional contract.

This evolution has led to power becoming more and more important to the players who see that there is both fame, money, and status at play and that this is far more widespread than what could be achieved before the videogames had an online mode. Consalvo (2009) explores the psychology behind what players consider to be acceptable when it comes to increasing ones in-game power and what is seen as cheating. The issue with a player's willingness to take part in cheating coupled with the increased incentives for cheating brought by the online gaming revolution is something that the videogame developers have noticed as well. To combat this they have started developing different anti-cheating measures. Lehtonen (2020) focuses on how the different anti-cheating measures work and how they impact gameplay. Lehtonen also compares some of these anti-cheating measures and tries to figure out ways for them to be improved. By considering what Consalvo (2009) and Thue et al. (2010) write on the incentives for improvement and player agency. It can be concluded that power can be defined as the players' ability to affect what happens in the game or the game environment itself.

When we apply this definition to the competitive gaming scene and what role it plays, we can see that the main goal of competitive gamers is to amass as much power as possible while playing within the rules of the game. These rules are often decided by the game developers, and they utilise anti-cheat programs or systems to ensure that every player is playing by the same rules. The deciding factor in a competitive environment is both the amount of power that a player can achieve as well as how efficiently this power can be deployed. It is therefore important that videogames, especially competitive ones, with multiple playable characters are balanced and that no one character is stronger than the rest. The optimal situation would be that even the most powerful characters while strong against most are weak against others and this allows for what Meades (2015) refers to as counterplay.

## 2.2 Defining Power creep

By understanding what power in videogames is and how it can affect the competitive players especially, we can try to build an understanding of what power creep is. The *Glossary of videogame terms* uses the definition by Dobra (2013) that defines power creep as "the gradual unbalancing of a game due to successive releases of new content". What Dobra (2013) suggests is that the newer content is purposefully made more powerful than the older content. The reasoning for this may be different depending on the videogame in question, but the effects that this kind of power creep has on a game is often the same. The older content is no longer good enough to be competitive and thus falls out of favour with the competitive players who are willing to do everything to unlock more in game power.

Power creep has been a topic in many videogame communities for a long time a reddit thread in the r/leagueoflegends subreddit created in 2018 discusses the ways that power creep has affected the game balance of *League of Legends* (LoL) (*R/leagueoflegends - power creep and its choke hold on lol*). The user who has since deleted their account on reddit laments the feeling that the characters that he used to enjoy playing now feel as if they are at a disadvantage when compared to the characters released during the time of his absence. The comments on the post indicate that some of the users are not convinced that the claims the post makes are true but some of the users echo the same sentiment with user Exver stating that the power creep is already common knowledge and that "everybody knows this"

(*R/leagueoflegends - power creep and its choke hold on lol*). This discussion might have been focused on the way that power creep had affected the way a player feels when returning to the game after a hiatus, that being the older characters that the player had been accustomed to and had been enjoying before now felt powerless to contend with the newer characters that had been released while they were gone.

This problem, however, is not confined to only LoL as similar discussions can also be found on community forums focused on other games such as for example pokemondb.net. In a post created in 2013 by user MonoUmbreon asks for a definition of what power creep is as they had been assured that the power creep that had been experienced between game generations would make sure that some of the older Pokémon would remain in the less limited tiers (in this case OverUsed or OU) (*What is a "power creep"?* 2013). User Flafpert explains that the gradual increase in power that has been seen in the newer versions means that the older Pokémon will lose some of their relevance to the competitive metagame unless their power is boosted as well.

Some of the most egregious examples of power creep in the videogame scene comes from the game *Hearthstone* (HS) released by Blizzard Entertainment in 2014. Hearthstone is a digital collectible card game and shares many similarities with MtG and other TCG:s when it comes to how the release of new content is handled. The content is divided into expansions all expansions are part of different formats, usually based on years (*Hearthstone Official Game Site*). What this system does is that it divides the content is such a way that only more recent cards are playable in the main competitive format. This means that it is not directly obvious that cards have been power crept as the new cards will only be compared to other cards that are relatively new. Power creep has always been prominent in HS as we can see from Fig 1. the cards on the left are direct upgrades to the cards on the left. It is also important to note that the cards on the left were ones available on release as free cards that anybody could use while the cards on the right were added in the fourth expansion *The Grand Tournament* that released about one and a half years after the initial release of the game.


*Fig. 1 Examples of power creep in Hearthstone.*

These forum posts combined with the statements made in Rosewater (2005) about how curbing power creep is one of the most important factors when it comes to making sure their card game MtG stays interesting and alive, it is plain to see the importance that being aware of and doing what is possible to curb power creep is important. Similarly the medium that the game is played in does not seem to matter when it comes to whether power creep is present. Although the term power creep originates from TCG:s it is still present in videogames that follow the same model of delivering new content such as HS. According to Rosewater (2005) the developers of the game be it a videogame or a card game have to be careful when introducing new

content  and make sure that this new content is not too strong when compared to the content that already exists in the game.

## 2.3 How Power creep affects the competitive metagame

With the effects that power creep can have on the mentality of both an individual player but also a community being so severe, it is also important to know how the effect of power creep tends to affect the competitive scene of a videogame or TCG. As was established earlier in the chapter too much power creep makes players feel forced into using the newer content to stay competitive. This effect would naturally be seen more clearly in the competitive scene as the players that are part of this scene place more importance on winning and this in turn requires a different mindset (Vitturi, 2020). Vitturi (2020) further claims that it is important to have the correct mindset to reach the top of the competitive scene in eSports and part of this mindset is the will to do anything to reach the top.

This would mean that if newer content is more powerful it would also make it more appealing to someone that has the goal of becoming the best at a videogame. Too much power creep can thus lead to the competitive scene becoming filled with nothing but the strongest characters or strongest cards as these give the player the highest chance of winning.

# 3. Economics of Videogames

The idea of this chapter is to give some information on central subjects for the analysis of the research paper. The chapter will attempt to explain who the stakeholders are for videogames and will also try to pinpoint how the different stakeholders can influence videogame development. The different monetisation methods will also be explained in this chapter together with how using a particular monetisation model or method will affect the stakeholders and the games development. Finally, the chapter will mention the effect that eSports can have on the development of a videogame as the potential adds potentially new incentives for developers when designing their games.

## 3.1 Stakeholders

To understand the economics of the modern videogames industry it is important to understand who the stakeholders are for the various types of videogames, and videogame companies. Varvasovszky & Brugha (2000) define a stakeholder as "an actor who has an interest in the issue under consideration, who is affected by the issue, or who --because of their position – has or could have an active or passive influence on the decision-making and implementation processes". Freeman (2010) goes into more detail when defining who the potential stakeholders are, Freeman defines them as "customers, suppliers, owners, public, society, etc." by this definition a stakeholder can potentially be almost anyone and they do not need to be a single person but can also be for example a group of people or all of society. Freeman further clarifies this by stating "a stakeholder is any group or individual who can affect, or is affected by, the achievement of a corporation's purpose". Both the definition by Varvasvszky & Brugha and the definition by Freeman make the same argument, that to be considered a stakeholder you must be someone who has something to gain or something to lose by the decisions made by a corporation. This definition would mean that for some companies and particularly in some areas of business almost everyone can be considered a stakeholder.

When considering who the stakeholders are in the videogame industry or the entertainment industry, it is safe to say that the scope for who would be considered a stakeholder is much smaller than for example, a company that controls for instance crucial infrastructure. This is since most people go unaffected by the success or the failure of a particular piece of entertainment. This is true for anything from movies to music and this is also true for videogames. If we look at the whole of the videogame industry, the number of potential stakeholders increases. Fielin et al. (2014) mention that, for example, governments and foundations have shown an interest in the videogame industry as the industry matures. According to Fielin et al., both foundations and governments have taken an interest in the videogame industry as they see potential use cases for the technology that powers modern videogames in, for example, improving global health outcomes or helping both teachers and students with teaching and learning respectively.

Especially in the field of teaching, there has been a big interest for the potential that videogames might have in the field. Sousa et al. (2017) research the potential for videogames as a pedagogical tool. Sousa et al. (2017) recognize that while videogames might have a bad reputation, there is also potential for videogames to help with teaching many things, for example, communication and problem solving, Sousa et al. also claim that videogames have utility in the way that they can be used as a way of self-expression. The conclusions that Sousa et al. make about the utility of videogames as a tool to be used in teaching transferable knowledge and communications is particularly interesting for this study, as this way of teaching has many parallels with the way competitive communities function when understanding for example preferred or optimal strategies. These strategies will often be formed through the trial and error of the community members who then either directly tell or indirectly show other members what they have learned through either online interactions in-game or on forums, message boards or other community-created discussion spaces. Sousa et al. (2017) also emphasise the importance of focusing on other stakeholder groups than the students in order for potential future experiments with using videogames as a pedagogical tool to be successful, Sousa et al. argue that this would increase the familiarity levels with the medium, which is necessary in order to achieve optimal results.

Both Freeman (2010) and Varvasovszky & Brugha (2000) help us better understand who the stakeholders for the main series Pokémon games are. While combining what we learn from Freeman and Varvasovszky & Brugha with the conclusions that Sousa et al. (2017) make helps us understand how communities can form around videogames and how members of these communities can help each other grow and learn. The main stakeholders of the Pokémon games are the developer (both the company and the programmers, but also other personnel working at the company), the publisher, the players of the games and the stores that sell the games whether they are online based, such as Nintendo´s own eShop or Amazon, or whether they are brick and mortar stores such as Game Stop (Kerr, 2002). As we can clearly see from this list of stakeholders, very little of the influence is held by the players and even less so by the relatively small number of competitive players. This means that the competitive balance, while certainly being taken into consideration when developing the game, is not the most important aspect to pay attention to from the viewpoint of the company making the game (Kerr, 2002). This is corroborated by Freeman (2010) who argues that a corporation must try and understand what the different stakeholders are trying to achieve in an attempt to make the best decisions possible. It would, thus, be reasonable to conclude that doing this would result in the viewpoints of the most hardcore of players are not seen as important as the more casual players. This is because the casual audience is much larger while still generating the same amount of profit for the corporation per member of the group. Prices are after all not decided by the level at which a player plays the game. Kerr (2002) states that it would be naïve to conclude that the players and their needs do not influence the development at all despite them not being a part of the development process and, thus, not having a say in the decisions that are made. The reason for this is, according to Kerr (2002), the fact that for a product to be successful it needs to be appealing to the customers. In this case that would be the players. This, in turn, means that the players' interests are important to other stakeholders as well. This forces developers to take them into consideration when developing the game.

It is important to remember that pleasing the group of players that this study will focus on is as such not the main concern for the actors that are responsible for the game balance. They are motivated by other stakeholder to a way larger degree and as such will focus primarily on the concerns of the other larger and more influential, and thus more important groups.

## 3.2 How Videogames Make Money

As is the case with any industry the primary focus of the company's creating entertainment is to make money on the back of the entertainment that their artists create. As with any other part of the entertainment industry this is also true for the videogame industry, but the tools available for developers have been drastically changing in the last few years with the introduction and popularisation of for example different crowdfunding methods (Smith, 2015), while the ways a game can generate profit has drastically changed with the constant improvement to portable devices such as smartphones (Marchand & Hennig-Thurau, 2013). Combining these developments with the improvements made in mobile networks and you have the recipe for an interesting blend of opportunities through which videogame companies can generate the funds they need to realise more and more impressive products.

Aside from crowdfunding which according to Smith (2015) is a relatively new way to generate income for videogame developers there are other more traditional ways to generate revenue. Marchand & Henning-Thurau (2013) splits the more traditional revenue stream into two distinct categories, the sales of physical or digital copies of games as well as the sale of hardware (the sale of hardware is not an option for most developers as the barrier to entry is very high and cash intensive, which makes it impossible for anyone but the largest companies in the videogame industry) and the sales of what Marchand & Henning-Thurau refer to as virtual goods. Out of these two the sales of software make up most of the income generated, estimated $67 billion in 2012, with the sales of virtual goods generating about $12 billion.

### 3.2.1 Crowdfunding

As one of the newer forms of funding that videogame developers have access to (Smith 2015) crowdfunding is very much interesting, not only for new developers but also older and more established players in the market. Aside from simply adding a new way to generate funds needed for videogame development, crowdfunding especially adds yet another group of stakeholders to the pot. Smith (2015) explores the ways in which this new group of stakeholders shape the development process of videogames. An interesting note is that the crowdfunding backers are often part of the player base of the finished game, this has the potential to give the players a

bigger say in the direction that a developer decides to take their game. Smith (2015) claims that this kind of interaction between developers and players has been very limited up until the introduction of the crowdfunding model to the videogame industry. In the case studied by Kerr (2002), the developers of the game actively sought to build a relationship with potential future players through a beta test program that simultaneously helped the developers find problems with the design of the game, one of the interviewees even noting that the development team took on board some of the ideas or suggestions made by the beta testers.

An interesting point that Kerr (2002) mentions is the fact that one of the interviewed developers admits that team had to cut the number of beta testers from about 1600 to around 200. The reason for this cut to the number of beta testers was that the development team found it impossible to manage and administer all the beta testers and were forced to scale back the program drastically (Kerr, 2002). This realisation by the developers in the Kerr (2002) case indicates that simply having beta testers is not worthwhile if you are unable to manage all the data that you collect from them, this suggests that robust data collection and management systems are needed in order to best utilise the potential benefits of collecting player opinions and feedback during development. Such a data collection system could also be utilised when designing future updates to the software after the initial release.

There are many different platforms that developers can use to run their crowdfunding campaigns, the most prevalent of these is Kickstarter (Crowdfund.news, 2021), with around 2000 games having launched after raising money through the service. Altogether around $1.6 billion has been raised by more than 4000 videogame projects (Crowdfund.news, 2021). Even though Kickstarter is the biggest site to use for crowdfunding there are other sites that are focused solely on crowdfunding for videogame developers with two examples being Fig and LookAtMyGame. While neither of them is as big as Kickstarter the fact that videogames is their main focus means that they can offer specialised privileges to backers, for example both LookAtMyGame and Fig offer backers the possibility to receive a portion of a projects future revenue (Crowdfund.news, 2021). This means that players can invest in ideas for games that they believe in in the same manner that a publisher would do and similarly get rewarded with a portion of the future revenue generated. This

makes the players more of a relevant stakeholder in the projects that they choose to invest in.

### 3.2.2 Sales of Virtual Goods

The sales of virtual goods is recognized as a major source of revenue for the videogame industry by Marchand & Hannig-Thurau (2013), at the time of their study it was still a relatively small part of the total revenue in the videogame industry. With the relative growth of the mobile games segment of the videogame industry, which according to Newzoo (2022) is now more than half of total revenues for the entire videogames industry, the share of revenue from virtual goods is bound to be a bigger slice than it used to be. This is supported by the findings of Alha (2020) that suggests that the preferred model of monetisation in mobile games is what Alha refers to as the freemium model. This model focuses on generating revenue from the sales of virtual goods while often giving the game itself away for free (Alha, 2020). Klézl et al. (2018) suggests that there are different factors that affects the likelihood of a player choosing to buy a virtual good in a game. Klézl et al. (2018) also finds that more than half of players have purchased premium content in one or many of the games that they have played.

As proven by Alha (2020), Klézl et al. (2018) and Marchand & Hannig-Thurau (2013) the sale of virtual goods makes up a very good way to generate revenue for videogame companies, especially those in the mobile gaming segment where the preferred model seems to be the freemium model (Alha, 2020). Combining this knowledge with the statistics presented by Newzoo (2022), that shows the more and more dominant position of the mobile gaming segment in the videogame industry, we can assume that the sales as a service model is very effective in generating revenue. One other advantage of the freemium model is its ability to generate recurring revenue as the player can spend money continuously as opposed to the sale of software model where the player only spends money to buy the software and is not encouraged to continue investing into the game.

Kimppa et al. (2016), takes the analysis a step further as they split this category of games in to two distinct categories, lure-to-pay and pay to pass sometimes referred to as pay to win. Compared to the more traditional revenue generating methods such as

for example sales of software both lure-to-pay and pay to pass are seen as being less ethically sound (Kimppa et al., 2016). Kimppa et al. (2016) claims that some revenue generating methods can lead to the players being taken advantage of, Alha (2020) brings up some of the ways in which this might affect the players, mainly addiction and especially the possibility of younger players being introduced to different types of gambling mechanics or unnecessary violence. Another criticism that has been levelled at games that utilize the sale of virtual goods or services as their main revenue generating model is the way that they weaponize behavioural economics to increase the likelihood that a player spends more money on the game (Alha, 2020). Kimppa et al. (2016) corroborates some of the same thoughts as Alha (2020) and adds that the more modern a payment method is the harder it is to determine whether or not it is harmful, and this in turn makes the players more suspicious of the developers as their intentions are harder to discern.

### 3.2.3 Sales of Software

The more traditional model of generating revenue is also a the simplest and easiest to implement for the developer, by selling the game all in one piece this makes it easier for the player to understand how much a product costs as there are not any hidden payments (Kimppa et al., 2016). Kimppa et al. (2016) defines this payment method as a pay once model. This model also makes it easier for the customer to understand the motives of the developer as it is very simple, make a product, sell the product, potentially add free extra content, or free updates and try to create as good a product as possible to generate more sales (Kimppa et al., 2016). The fact that the developers rely on a high number of sales to generate revenue might also lead to them focusing on making sure the game is well supported for longer as they will want to keep the sales of the game going for longer than just the period directly after the launch.

According to Kimppa et al. (2016) the customer expects that a game that uses this as its main revenue model is in a playable state when bought and that any potential updates to the game will be given to the players free of charge. Updating a game has been made easier through the popularisation of online storefronts like for example Steam that allows users to download updates on their own something that would not have been possible without these storefronts or other online launchers through which a developer can distribute such updates. One of the big advantages with the

traditional model is that it affords the developers with more freedom when it comes to the design of systems in their games, Kimppa et al. (2016) suggests that games based around a pay to win model must be designed in such a way that players are incentivised to pay for the items in the in-game store.

The negatives of the traditional model of revenue generation are the fact that there is only a set amount of revenue that can be generated from each player, this is in stark contrast to the pay to play models where most of the revenue is often generated by a relatively small part of the player base (Alha, 2020), Nieborg (2016) suggests that all revenue in a sales of virtual goods model is generated by less than 10 percent of the player base. The fact that the potential amount of revenue earnable per player is low compared to any of the pay to play models is made into more of a handicap due to the way that the industry functions with very few games becoming big and even fewer managing to stay relevant for long as the market is highly competitive and hit-driven (Nieborg, 2016). Consequently this means that it is important for games to be able to generate continuous revenue for the developers to have enough money to invest in further developing the game and make sure it stays relevant. This is where the inflexibility of the traditional method of revenue generation is a big hinderance as the players who would be willing to pay for in-game content are unable to.

### 3.2.4 Esports

Aside from the revenue streams mentioned earlier in chapter 3.2 Marchand & Hennig-Thurau (2013) also mention that eSports is a way for players to earn money. This has turned out to be a particularly good prediction looking back at the way things would develop during the next ten years as evidenced by Block & Haack (2021). According to Block & Haack (2021) the prise pools for professional eSports tournaments has risen from around $3 million for all tournaments held in 2010 to the top ten games alone having paid out over $130 million during 2018. This is a significant increase and has led to the biggest tournaments having prize pools that can be compared to, while in some cases being significantly bigger than that of, many traditional sports' biggest tournaments (Block & Haack, 2021).

While Marchand & Hennig-Thurau (2013) predicted this development they did not emphasize the effect that this would have on the videogame companies as much.

However the revenue for the global eSports market has grown as fast if not faster than the prize pools having increased tenfold since 2012 (Block & Haack, 2021). Block & Haack (2021) attribute much of this growth to Twitch.tv who through streaming has provided a stable platform for eSports where communities have been able to grow thanks to the stability the platform has given to eSports. The one area where eSports lags significantly behind traditional sports is the money generated per fan, with an eSports fan generating under $2 on average, compared to regular sports fans that generate $54 on average (Block & Haack, 2021). This would indicate that even though eSports have experienced massive growth during the last 10 years there is still much room for revenue growth which in turn would be beneficial for the videogame companies that manage to establish themselves in the market.

## 3.3 Factors that impact decisions in videogame development

By using what we have learned about the different revenue generating streams from Kimppa et al. (2016), Nieborg (2016) and Alha (2020) we can clearly see that the decision on whether to utilize a potential revenue method or not has a big impact on the stakeholders of the product. Both Kimppa et al. (2016) and Nieborg (2016) suggest that using a pay to play or pay to win model necessitates certain decisions be made when it comes to game design for this method of revenue generation to be effective. The fact that such a large share of the revenue is generated for such a small part of the players is bound to lead to this subsection of players being seen as more important by the developers and this in turn might affect the decisions made by the developers (Kimppa et al., 2016). Nieborg (2016) makes sure to emphasise the competitiveness of the market and claims that to stay relevant a game utilising a pay to win model needs to attract a large enough player base in order to survive, as this enables them to use economies of scale to generate revenue. Combining the claims of Kimppa et al. (2016) with the statements made by Nieborg (2016) shows us quite clearly that using the sales of virtual goods as the main revenue stream comes with many caveats and is in no way a guarantee that the revenue generated will make up or the loss of players that the sacrifices made to the gameplay will lead to.

Crowdfunding shares some similarities with the pay to play model in this regard as it also relies on a small part of the future player base believing enough in the developers' vision that they are willing to put up money up front without a guarantee

of the final product being what they envisioned. It is also important to remember that not all crowdfunding projects are successful, only 40% of videogame fundraisers on Kickstarter have been successful (Crowdfund.news, 2022), even if a project manages to achieve its fundraising goal the product might never be finished. As such the crowdfunding model is bound to repel the more risk avers gamers as they will not want to lose their investment in a project. Where crowdfunding differs from the pay to play and pay to win methods of revenue generation is that, even though they initially affect the game developers the same, once a crowdfunded game releases it is no longer relying as much on the players who supported the game during the crowdfunding process. This means that the influence the players who supported the crowdfund campaign will lose some of the influence they have over the developers over time.

When it comes to competitive games it is very important that the games are perceived as having good competitive integrity (Railsback & Caporusso, 2018). Lacking competitive integrity would mean that the game would not be seen as fair, and this would be a problem for it when entering the eSports scene. Despite this the biggest competitive games utilise a free to play model, for example *League of Legends* (LoL), *Counter Strike: Global Offensive* (CS:GO), and *Fortnite Battle Royal* (Alha, 2020). Kimppa et al. (2016) suggests that using a free to play model for competiteve games is risky as it increases the likelihood that developers will introduce power creep to the game to generate more hype for newer content and through this increase revenue. Alha (2020) claims that it is less likely that a game that attempts to enter the eSports scene uses a pay to win model to maintain competitive integrity.

While the Pokémon franchise has never been specifically intended as competitive games, evidenced by the fact that the prize pool for the TCG is significantly higher than that of the VGC (*2022 Pokémon World Championships prizes*), even though they are both arranged by the game developer (Nintendo) and are held at the same time and during the same event, the ability to play with and against your friends has been a central concept of the series since its inception. Due to this it can be asserted that the in-game balance has always played a role in the development of the games. According to what Alha (2020) and Railsback & Caporusso (2018) claim this means

that the Pokémon game series would not be a good fit for monetisation methods or revenue streams that might jeopardise the competitive integrity of the games. This has also been the case for the most part as there has not been any downloadable content (DLC) for any of the games until the newest generation of games *Pokémon Sword and Shield* (SW/SH).

Pokémon SWSH was also the first game in the series to not include access to all the characters of the older games without any extra cost, some of the characters are not available even if you pay for the expansion pass. As the competitive scene especially the VGC format that is supported by the developers is based on the latest release in the series there are some problems concerning the competitive integrity that comes with a move like this. One thing that might have a negative effect on the competitive integrity of the series as there is no longer any guarantee that the characters that have been removed from the newest generation of games will be available for use in the competitive scene again.

# 4. Methodology

This chapter will establish the methodology that will be used in the analysis and laying the groundwork for specifics of the methodology. The chapter will also explain the data that will be used for the analysis and go over its origin. The specific competitive format that will be used for the analysis will also be explained alongside justification for why the format was chosen. The chapter will also go over the rules that are specific to the format chosen and what effects the rules might have on the data. The irregularities present in some of the data sets that will be used in the analysis will also be mentioned and explained.

## 4.1 Assessment of Research Methods

It is important to have a clear picture of what kind of research is being performed to best select the methods that will be used to perform the research. Kothari (2004) talks about the basic types of research and gives a short overview of what differs between the types of research and what is important to remember when conducting a specific type of research. The categories that Kothari (2004) identifies are *Descriptive vs Analytical*, *Applied vs Fundamental*, *Quantitative vs Qualitative*, and *Conceptual vs Empirical*, further stating that all other types of research are merely a combination of elements form these categories.

Based on the categories laid out by Kothari (2004) it is possible to categorise the research that will be done in this research paper and lay down some base rules that are helpful when designing the analysis. The first thing to note is that this study is more analytical than descriptive in nature as it focuses on using data that is freely available and drawing conclusions based on this data. Further this study would be categorised as a fundamental study rather than an applied study, as this study is not interested in solving wider societal problems but rather focuses on establishing a basic theory for how certain aspects of competitive gaming are affected by an outside factor. This study would also be classed as a quantitative study as it is centred around data collected from the competitive gaming scene in form of percentual values that can be added together and directly compared rather than data collected from for example interviews.

Lastly this study would be considered an empirical study according to the instructions laid out by Kothari (2004) as it focuses only on the data at hand and drawing conclusions form it. With the structure and the goals of the study laid out it is easier to make decisions on what kinds of methods are best to use in designing the analysis.

## 4.2 Data

The data that is used for the analysis in this study was gathered form Pikalytics.com over a period between March and September 2022. As the statistics are collected by Pikalytics.com are updated regularly some of the data may differ from what can be found on the site at the time of reading. The main data point used is the usage percentage of the Pokémon, as this gives a good feel for how popular a particular Pokémon is or was during a particular set of VGC rules. It is also important to note that data has been collected from different VGC formats which means that small differences in usable Pokémon might be found, the dataset most impacted by this is the data collected for VGC 2022 as it is played on another game and a different generation than the rest of the formats encompassed by this study.

The criteria used for weather or not a data point would be considered was that the usage percentage was high enough. This choice was made to shave off the Pokémon that would be considered non-important for the metagame. The cut-off for the data points was set at a usage percentage of at least 0.1%. It is worth noting that since each team consists of six Pokémon and each Pokémon is only allowed to be chosen for one of these six spots the total usage percentage of a team might add up to more than one hundred percent. To work around this the total percentage of a team is 600%. To make the analysis easier the Pokémon have also been divided into groups based on the generation that they were released in, a generation might span several games but have the distinction that they are based on the same game engine and usually span several years. To date there have been eight generations but for three of the four data sets used in the analysis only seven generations were available as the eight on had not yet released. Due to this the eight generation will not be represented in the earlier datasets.

## 4.3 VGC-Format

The central part of this study is based on data collected from competitive games played in a specific format namely the VGC format. The VGC format has been chosen as it is the format used for the world championships as well as for the fact that it has stayed relatively similar throughout the different versions of the games and that it is the format dictated by The Pokémon Company (Traylor, 2022). The main structure of the format is also important to keep in mind as it plays a central role in how players decide to construct their teams. A team in this context is the group of Pokémon that the players have chosen to use for the match (referred to as battles). In the VGC format players are allowed to select up to six different Pokémon for their team, what is considered a different Pokémon is decided by what is known as *Species Clause* that dictates that a player is only allowed to have one Pokémon of any species. *Species Clause* mostly comes into effect when discussing Pokémon with regional variants or multiple forms such as for example *Rotom* (Traylor, 2022)

Some of the core rules of the VGC format are that the winner is determined by who is the *Last one standing* or the player with Pokémon with Health Points (HP) left at the end of the battle, the battle type is set to *Double Battles* which means that each player can have up to two Pokémon on the field at any given time and that the battles are always held on the current mainline Pokémon game. The document published by The Pokemon Company (2022) goes into more details on what is allowed and what is not allowed. One of the things that is outlined in The Pokemon Companys (2022) document is the list of restricted or limited Pokémon some of these lists can be seen in Fig. 2 and Fig. 3. A Pokémon on the restricted list is not banned but no player may have more than two Pokémon from the restricted list on their six Pokémon team.

**List of restricted Pokémon for VGC 2019 Ultra Series**

Players may use up to 2 Restricted Legendaries. This includes:

- Mewtwo
- Lugia
- Ho-Oh
- Kyogre
- Groudon
- Rayquaza (Cannot have Dragon Ascent)
- Dialga
- Palkia
- Giratina
- Reshiram
- Zekrom
- Kyurem
- Kyurem-White
- Kyurem-Black
- Xerneas
- Yveltal
- Zygarde-10%
- Zygarde-50%
- Zygarde-Complete
- Cosmog
- Cosmoem
- Solgaleo
- Lunala
- Necrozma
- Necrozma-Dawn Wings
- Necrozma-Dusk Mane

*Fig. 2 List of Restricted Pokémon for VGC 2019 played in Pokémon Ultra Sun/Ultra Moon (Liquipedia)*

**List of restricted Pokémon for VGC 2022**

Players can include **two** of the following Restricted Pokémon:

- Mewtwo
- Lugia
- Ho-Oh
- Kyogre
- Groudon
- Rayquaza
- Dialga
- Palkia
- Giratina
- Reshiram
- Zekrom
- Kyurem
- Xerneas
- Yveltal
- Zygarde
- Cosmog
- Cosmoem
- Solgaleo
- Lunala
- Necrozma
- Zacian
- Zamazenta
- Eternatus
- Calyrex

*Fig. 3 List of restricted Pokémon for VGC 2022 played in Pokémon Sword/Shield (Liquipedia)*

Other rules of note are the rules concerning held items, held items are items that can be held by a Pokémon that can be either a positive or a negative depending on things such as type or species. According to the rules each Pokémon may hold an item but no two Pokémon may hold the same item, this forces the players to be careful when choosing items as the same item may be the optimal choice for several of the Pokémon on their team. As stated earlier a player's team may contain up to six Pokémon but only four can be chosen for a particular battle and players will get a preview of their opponent's team before the start of the battle. Players will have the ability to choose which four Pokémon they want to use during the battle, these choices are made for every new round and are not regulated further.

One more thing to keep in mind when it comes to the VGC format is that there is a certain group of Pokémon that are not allowed. This group is called mythical Pokémon and are usually not available in the games unless the player attends an event or takes part in some other type of organised giveaway. This makes these mythical Pokémon very hard to obtain when compared to other Pokémon. This rarity is also the reason behind the ban, as it would not be fair for newer players to have to compete with players who have had time to acquire the mythical Pokémon over the years. Since some of the mythical Pokémon have only been available at a couple of events or in a couple of giveaways acquiring a specific mythical Pokémon can be very hard.

# 5. Data analysis and modelling

This chapter will focus on the analysis of the data and showing the results. The chapter will also go over the structure of the analysis and explain why the analysis was structured in this way. Some extra information about the data will also be explained in this chapter, this information is important to understand to get the most out of the results.

## 5.1 Creating the structure for the analysis

Structuring the analysis in a way that works well for the data that is used is essential to the quality of the results. If the analysis is not structured correctly the results might not be trustworthy and thus the conclusions that can be drawn from the results would also be of poor quality. As the data used in this study has been collected from different years of competition it is important to remember that the amount of available Pokémon during each of the years of competition is slightly different specifically between the data collected from VGC 2022 and the other data sets. The reason for this difference is the fact that the games that VGC 2022 is played on Pokémon SW/SH is the first one in the series to not include all Pokémon from the previous games.

This leads to some of the Pokémon that had a significant place in the metagame of the older tournaments (for example Jumpluff, Smeargle and Muk) not being available and this in turn makes a direct comparison between the data less consistent. Inconsistencies like these could make it seem like older generations are seeing less use due to them not being as good or as powerful, even if the true reason is that some of the more powerful Pokémon are not available in the newer games and thus not allowed in the newest format analysed. To reduce the impact of such inconsistencies in the Pokémon not available in different VGC formats have been reduced from the total amount of Pokémon available for a generation when performing the analysis on affected formats.

The analysis performed in this study is based on comparing the usage percentage for Pokémon and comparing them with each other. To make this easier the Pokémon have been divided into groups based on which generation they were introduced in. Dividing the Pokémon in this way makes the data more consistent as it means that the groups will be the same size and contain the same Pokémon, this makes it possible to compare the popularity of a generation between two VGC formats. Another advantage with dividing the data by generation is that it makes it easier to spot potential power creep since most Pokémon from a certain generation are released at the same time often through the release of a new game.

There are also some problems with dividing the Pokémon according to which generation they belong to. The biggest disadvantage is that the generations differ in the amount of Pokémon they contain varying between about 70 on the low end and around 150 on the high end. This means that some of the groups are more than twice the size of the smallest group. To avoid this the groups usage percentage has been generated by comparing the amount of Pokémon that reach a specific usage percentage to the total amount of Pokémon in the group. One thing that has not been considered when performing the analysis is the amount of Pokémon in each generation that is fully evolved. This means that some generations might have a higher percentage of fully evolved Pokémon than other generations. Since the majority of competitively viable Pokémon are fully evolved this would mean that the pool of potentially competitively viable Pokémon is larger than in other generations.

As mentioned earlier, the analysis was focused on finding out the amount of Pokémon in each generation that reached a certain usage percentage. In order to get more specific data on Pokémon that can be said to have a bigger impact on the metagame the Pokémon with the highest usage percentages are extra interesting. Another cut-off was used to see the number of high usage Pokémon from each generation. This is interesting as it gives information on how much of the total usage percentage is due to a small number of very strong Pokémon.

The cut-offs that were chosen for the two categories were 5%, for the Pokémon considered to have a high usage percentage and 0.1%, for the lowest usage percentage of Pokémon considered in the study. The 5% means that a Pokémon would show up in one game out of 10 on average, this might not seem like much but when considering that the total number of available Pokémon is over 800 it can be seen as quite significant. The low-end number of 0.1% usage would mean that a Pokémon shows up in about 1 in 500 games played on average. Pokémon with a usage percentage of less than 0.1% were not considered in this study as the impact these Pokémon have on the competitive scene was not seen as significant. In total the combined usage percentage of the Pokémon outside the scope of this study accounts for less than 1.5 % of total usage percentages.

Leaving some Pokémon outside of the scope also comes with another benefit, as it gives some insight into the amount of Pokémon in each generation that is not relevant for the competitive metagame. This is helpful when identifying the overall power level of a generation.

## 5.2 Details of the analysis

The analysis was performed on four different data sets collected from four different years of VGC competitions. All data was collected from Pikalytics.com during March 2022. This also means that there are slight differences in banned and limited Pokémon between the datasets. The VGC formats that were chosen for the analysis are VGC 2017, VGC 2018, VGC 2019 Ultra and VGC 2022. Since VGC 2022 is still the active format the current data found on pikalytics.com might differ slightly from the data used for the analysis in this study. For the data from the VGC 2022 format the Pokémon from generations 1-7 that are not available in Pokémon SW/SH were not considered when comparing the number of Pokémon that achieved a usage rate of more than 0.1% to the total number of Pokémon. The same was done when comparing the Pokémon with a high usage percentage to the total number of Pokémon. In both cases the unavailable Pokémon were subtracted from the total number of Pokémon available in each of the previous generations (1-7).

For most of the data there were only 7 generations of Pokémon released, only the VGC 2022 format had Pokémon from generation 8 available. For this reason the analysis of VGC 2017, VGC 2018 and VGC 2019 Ultra will not take generation 8 into consideration. This means that the data for generation 8 collected from the VGC 2022 format will be compared to the newest generation in the other datasets, this would be the data for generation 7 in all cases.

## 5.3 The analysis in practice

The analysis was mainly focused on three main points of interests

*The total usage percentage for each generation*

*The percentage of viable (higher than 0.1%) and meta defining (higher than 5%) Pokémon from each generation*

*The average usage percentage for the Pokémon that were at least viable*

To get clear insights into these three different analyses were performed. The first one focused on calculating the total usage percentage of the Pokémon from each of the generations, with a total of six hundred percent (since there are six Pokémon on a team) the average percentage for each generation should be around 85% for the first three data sets and 75% for the fourth one. A result closer to this would mean that the Pokémon in this generation is well balanced. If any generation of Pokémon has a higher or lower total usage percentage than this means that the generation in question is either too strong compared to the other generations, if the total usage percent is higher or too weak compared to the other generations, if the total usage percentage is lower.

The second focus point for the analysis is meant to serve as a method for balancing out the groups or in this case the generations. This is needed as there is, as mentioned earlier in the study, a relatively big variation in the size of the groups. Some generations are simply bigger and this in turn means that they should have a higher number of strong Pokémon as well. In contrast to the first focus point how high the percentage of viable Pokémon is is not important here, as the goal would be for all

generations to have a similar amount of viable Pokémon when considering the total number of Pokémon for each generation. Any outliers would mean that the generation in question is either stronger or weaker than the others depending on if the percentage of viable Pokémon is high or low.

The final focus point is meant to give insight on how top heavy the generations are. If a generation is top heavy, it would have only a few Pokémon with very high usage percentages and thus the average percentage in this analysis would be very high. If a generation is more evenly distributed, it would have a relatively low average as there would be some very strong Pokémon and several more somewhat viable Pokémon that drag this average down. If a generation had no strong Pokémon and only had Pokémon that are either barely viable or not particularly strong, the average percentage would be lower than the other generations.

# 6. Results

This chapter will go over the results of the preceding analysis and attempt to visualise the results in a way that is easy for the reader to understand, even without earlier knowledge of the competitive Pokémon scene or the VGC format specifically. The chapter will start by presenting the general results of the analysis before going into more detail on the specific areas of interest. These areas of interest include the total usage percentage for each generation and the number of used Pokémon per generation. Visualisations of the data will also be presented for each of the areas of interest.

## 6.1 Results in general

The results of the analysis mostly confirmed the hypothesis that was laid out earlier in the thesis. The hypothesis was that the more recently released Pokémon would be more powerful than the older Pokémon. In the data that was used for this analysis this would be represented by the Pokémon from the later generations having a higher usage rate than Pokémon form the older generations. This is partly in line with the results of the analysis as most of the upcoming graphs will show, a strong tendency for the very latest generation to have by far the highest usage rating was one of the common factors for all the different VGC formats that were used in the analysis. In most cases the difference to the generation with the second highest usage percentage was very high, in most cases the most recent generation of Pokémon had a usage rate of close to double that of the second highest one. In some cases the difference was even greater than double.

As for the other areas of interest that were laid out in the earlier chapters, the amount of Pokémon from each generation that made it to at least some kind of relevance in the competitive metagame and the average usage percentage for Pokémon in each of the generations. For the first one of these, the amount of Pokémon that achieved a higher usage rate than 0.1% the newer generations were again strongly represented especially generation seven had a very high percentage of viable Pokémon. As for the number of Pokémon form each generation that can be seen as having a defining effect on the metagame, or the ones that reached a usage rate higher than 5% this is

where generation really shines. In some of the analysed formats the percentage share of meta defining Pokémon from generation was higher than the number of viable Pokémon from most if not all other generations. Most of the same was also true for generation eight in the one format that it was available in, VGC 2022, where it was only surpassed in percentage of usable Pokémon by generation seven.

This points to the fact that the very newest generations are considered very strong by the competitive players, but the power creep is not as noticeable in the rest of the generations. Generation six is the outlier here having the lowest usage numbers in three of the four analysed formats. This seems to indicate that generation six is severely underpowered compared to not only the generations that came after it but also compared to most of the generations that came before it. When looking at the number of viable and meta defining Pokémon it is revealed that the reason for generation sixes low score on the total usage rate charts seems to stem from the distinct lack of meta defining Pokémon. In most of the analysed formats is clearly the generation with the lowest percentage of meta defining Pokémon while the number of viable Pokémon is mostly comparable to the other generations, except for generation seven and eight.

The other outlier is generation one, the oldest generation. In most of the format's generation is very well represented in both the percentage of the generations Pokémon that are competitively viable as well as the percentage of Pokémon that can be seen as meta defining. This could probably be partly attributed to the fact that generation one is one of the two largest generations, alongside generation five. But when comparing generation fives numbers to those of generation one the results are mostly favourable for generation one. This infers that the power level is similar in both the oldest and the generation most comparable in size to generation one of the newer half of generations. The same cannot be said of the rest of the older generations with only generation three being somewhat competitive when compared to generation one.

The final point of interest was the average usage percentage of the Pokémon that made it into the analysed data, this means that they had a usage percentage higher than 0.1%. The idea behind this analysis is to see if the generations are carried by a few very strong Pokémon or if the generation is stronger on average compared to the other generations. The main take away from this analysis is that most if not all of the generations with very high total usage percentages also had at least a few very strong meta defining Pokémon that were the reason for the high total usage percentages. Another interesting thing to take note of regarding the averages were that most of the generations that were not the newest one had a similar average usage rating, there are some cases this is not true for most notably generation six that was again the underperformer here.

## 6.2 Total usage percentage

The total usage percentage is perhaps the most important indicator of how strong a particular Pokémon is in the eyes of the competitive players. This is because a Pokémon that has very good stats and the potential to be strong but sees little to no use is either not as strong as the stats would let on, or it does not do well against other strong Pokémon in the metagame. As Pokémon as a game is built as an advanced version of rock paper scissors, where certain types of Pokémon (for example Fire, Water or Grass) are strong against some types of Pokémon while being weak against others. Therefore the usage percentage is a good indicator of which Pokémon do well in a certain format.

The pool of available Pokémon is very large, around 800 for the first three formats VGC 2017, VGC2018 and VGC 2019 Ultra and around 750 for VGC 2022. Therefore it is surprising that in all formats there is a definite top tier of Pokémon with individual usage rates above 50%, usually one or two per format. These Pokémon were so powerful that they were a part of every other team. This also means that every match would be more likely to have one team using one the Pokémon with the highest usage rates, than have none of the teams using the Pokémon in question. This is points to there being massive differences in the power levels of the individual Pokémon with many of the competitive teams using mostly the same Pokémon.

Starting with the first format VGC 2017 (Fig. 4 Total usage percentage for VGC 2017) we can see that the usage percentages for the different generations is very imbalanced. The reason for this is mainly the huge usage rate for the generation seven Pokémon. Apart from generation seven the only other group that reaches the 85% threshold of ideal balance between the generations is generation one. On the other end of the spectrum the three generations with the lowest total usage rate do not even reach 85% of total usage if they were combined. Generation seven reaches a total usage percentage of around 307,5% this means that over half of the Pokémon used in this format were from generation seven. This also means that all the other generations combined have a lower total usage rate than generation seven.

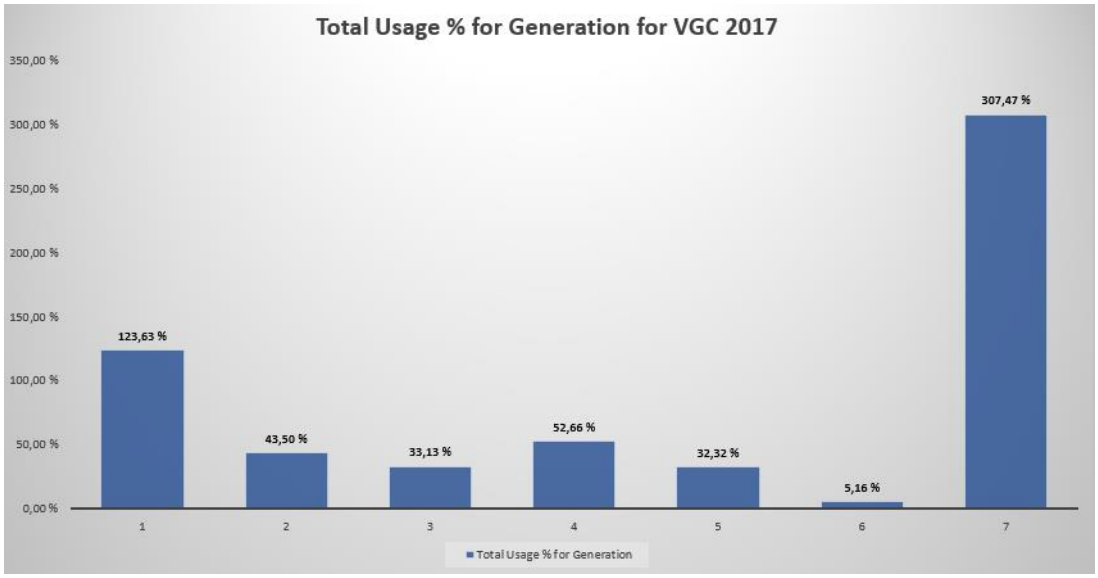


*Fig. 4 Total usage percentage by generation for VGC 2017.*

This massive imbalance in the competitive metagame is an indicator of how powerful the newest generation of Pokémon were when compared to the older generations. Another way to explain this is that 16 of the 83 total Pokémon from generation seven had usage rates higher than 5%, this is more than all other generations combined as they only have 12 Pokémon that reach the 5% threshold. It is also important to remember that the other generations have a total pool of over 700 compared to the 83 of generation seven. While most of the other generations are relatively close to each other, the only exceptions being generation six that has the lowest total usage rating by far and generation one that has a more than double the usage rate of any of the other generations if not counting generation seven.

Generation six is another interesting point in the graph in Fig. 4 as even though it is the second newest generation it is by far the one with the lowest total usage rate. Meanwhile, at the same time generation one, which is the oldest generation, has the second highest usage rate. This would mean that the power level is not necessarily higher in the newer generations.

The total usage percentages for VGC 2018 (Fig. 5 Total usage percentage by generation for VGC 2018) share some similarities with the same graph for VGC 2017 (Fig. 4). The first of the similarities is that generation seven is again by far the generation with the highest usage rate. While the total usage percentage for generation seven is not as high as it was in the VGC 2017 data it is still almost double that of the next highest generation. Generation six is again the group with by far the lowest total usage percentage, while generation one is still sitting at an above average total usage percentage. The main winners when compared to the VGC 2017 data is generation five and generation three. Generation five is the one with the second highest total usage percentage and is the only generation to reach a total usage rate above 100% other than generation seven.

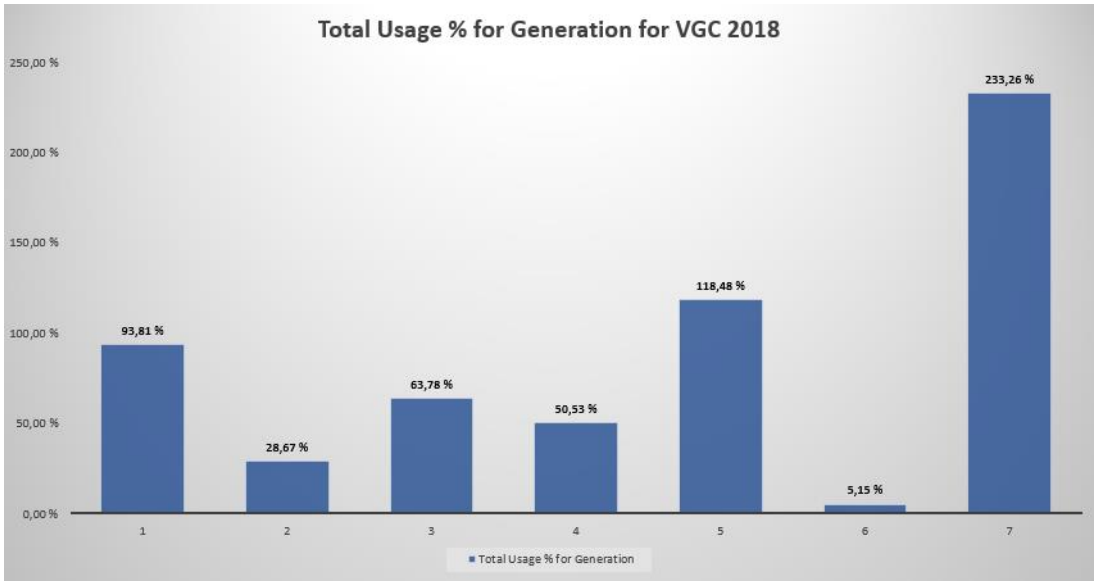


*Fig. 5 Total usage percentage by generation for VGC 2018.*

The total usage percentages for VGC 2018 are again not necessarily indicating that there is any power creep present in the competitive scene, but it does again point to the overwhelming supremacy of the latest generation when compared to all the other generations. Generation six is also interesting as it has been by far the lowest scoring when it comes to total usage percentage. In the first two formats generation six is the only one to not have reached a total usage percentage higher than 25%. Aside from this all-other generations have had individual Pokémon with higher usage rates than all of generation six combined. This is interesting as it points to the second newest generation also being by far the weakest and the fact that this is true for consecutive VGC formats points to it not being a fluke.

Fig. 6 shows the total usage percentages for VGC 2019 by generation and as with the two earlier datasets it is again obvious that generation seven is far ahead of the other generations. Aside from this there are only a few other similarities between the other formats and this one. The first other similarity is that there is again one generation that is considerably weaker than the rest. This time however, it is not generation six that is at the bottom but instead generation four. This is interesting for two reasons, the first one is that generation four had been sitting securely at around 50% total usage rate in the earlier two formats, who had the same Pokémon available for use.

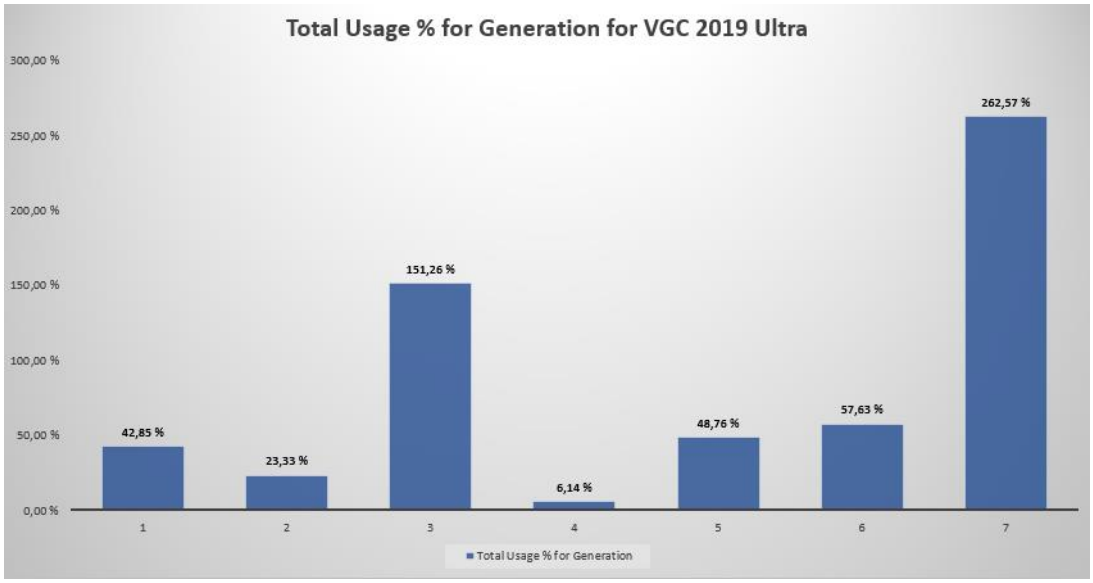


*Fig. 6 Total usage percentage by generation for VGC 2019 Ultra.*

The other is that generation six that had been by far the weakest group of Pokémon, now has the third highest total usage percentage. The other big winner in this format is generation three. With over 150% of the total usage generation three has the second highest usage percentage in this format, this is also the first time any generation aside from generation seven has a higher usage percentage than 150%. One of the big losers in this format compared to VGC 2017 and 2018 is generation one. This is the first format where generation one is not above the target usage for a balanced generation (85%) and not only that generation one manages only around 40% total usage. As for if there is a pattern of newer generations being more powerful than the older one, the VGC 2019 Ultra format is the one format that supports this the most. Aside from generation three being strong, the third and fourth most powerful generations according to the total usage rating of the Pokémon form the generations is generation six and five, both at around 50% total usage.

In contrast to the three earlier formats VGC 2022 is the first format to be played after the release of generation eight. This means that generation seven is no longer the newest generation and the effects of this can be seen in the graph for total usage in VGC 2022 (Fig. 7). The differences between this format and the three earlier ones are still not that many. The newest generation, generation eight is again the one with the highest usage rate.

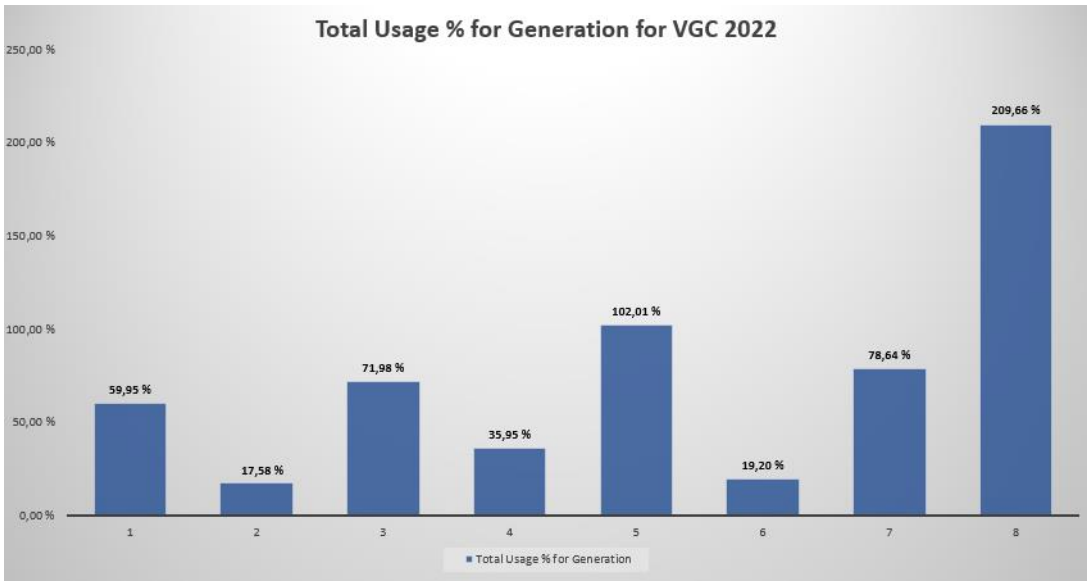


*Fig. 7 Total usage percentage by generation for VGC 2022.*

The usage percentage for generation eight is around 210%, which is lower than any of the total usage percentages generation seven managed in the formats where it was the newest generation. Another similarity between the data for VGC 2022 and the others is that generation two is now the weakest, being one of two generations not even reaching 20% total usage. Generation five is back to being relatively strong and generation seven is also well represented being the third generation with a total usage percentage above the expected for a balanced generation (75%). Aside from generation six this is the format that shows the clearest tendency for newer generations being stronger than older ones.

## 6.3 Number of used Pokémon

While the first four graphs focus on the raw usage percentage for the generations without considering how many Pokémon each generation has, the following four graphs (Fig. 8, Fig. 9, Fig. 10, and Fig. 11) will take this into account and compare the number of strong and viable Pokémon form each generation with the total number of Pokémon in the generation. This will make the comparisons more balanced as the size of the generations fluctuates so much. The differences in generation size might be one of the reasons for generation sixes poor total usage percentages as it is by far the smallest generation when looking at total Pokémon count.

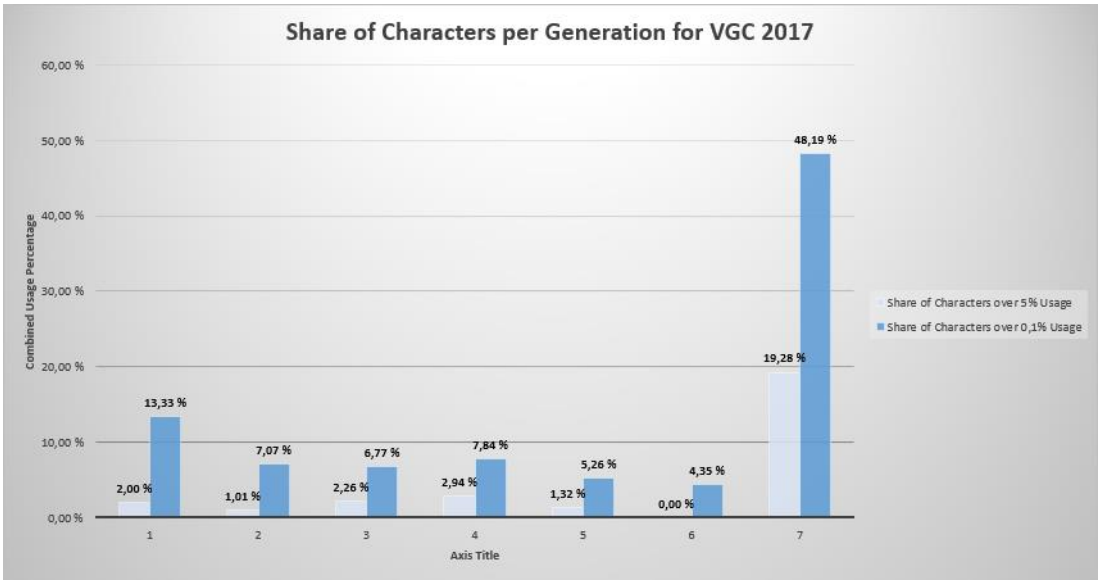


*Fig. 8 Share of Pokémon per generation for VGC 2017.*

Fig. 8 shows the percentage of strong and viable Pokémon for each generation. It is immediately obvious that generation seven is the big outlier here as it has a far higher percentage of both viable and powerful Pokémon than any other generation. As an example generation seven has a higher percentage of powerful Pokémon than any other generation has viable ones. Another point of interest is the relative balance between the rest of the generations, generally having around 2% of their total Pokémon being powerful and around 7% of their total Pokémon being viable. Generation six is the only one to not have even a single Pokémon that could be considered as powerful. Generation one is the generation with the widest pool of viable Pokémon outside of generation seven.

Many of the same points from Fig. 8 are also true for Fig. 9 on the same statistics for VGC 2018. The main difference is that generation seven has fewer powerful Pokémon while having more viable ones. The number of viable Pokémon for generations other than generation seven has also gone up overall with only generation two having a lower number than in the VGC 2017 format. The number of powerful Pokémon for generations one through six is pretty much the same as it was for VGC 2017.

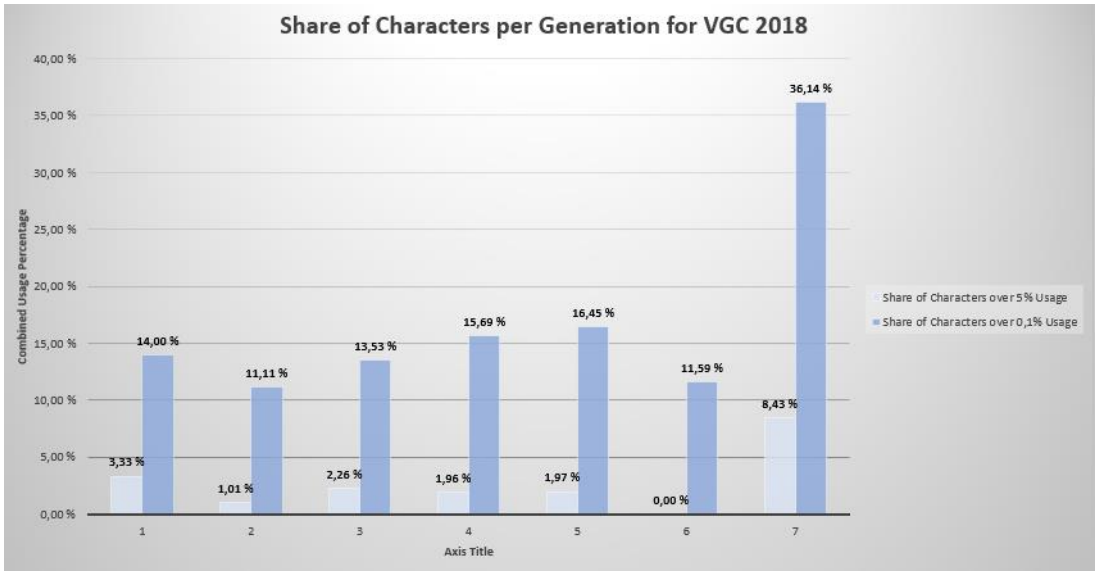


*Fig. 9 Share of Pokémon per generation for VGC 2018.*

In VGC 2019 Ultra (Fig. 10), there are bigger differences compared to VGC 2017 and 2018. This is the first time that generation six has even a single powerful Pokémon, but it is also the format where the lowest amount of generation six Pokémon were viable tied with VGC 2017. This time generation four is the only generation to not have a Pokémon considered powerful. Aside from this the total number of Pokémon that can be considered viable is down in comparison to VGC 2018 while being slightly higher than the numbers for VGC 2017.

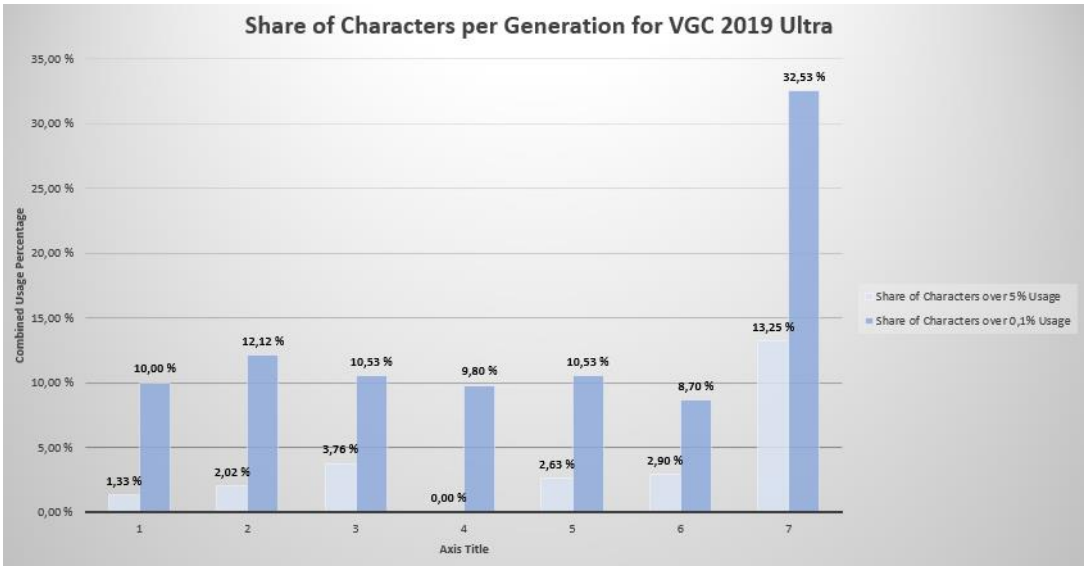


*Fig. 10 Share of Pokémon per generation for VGC 2019 Ultra.*

Fig. 11 being the data for VGC 2022 is again the one with the biggest differences when compared to the others. It is also the only one where the newest generation is not obviously stronger than the rest as generation seven has a higher percentage of viable Pokémon than generation eight. However, generation eight is still the generation with the highest percentage of powerful Pokémon with around 9% of the group being seen as powerful. This is close to double the percentage of powerful Pokémon than the second highest which is generation five with around 5%. Generation six is again the generation with the lowest percentage of viable Pokémon it also has a respectable percentage of powerful Pokémon, comparable to most other generations. The generation with the lowest percentage of powerful Pokémon is generation two. However generation two has one of the highest percentages of viable Pokémon as well.

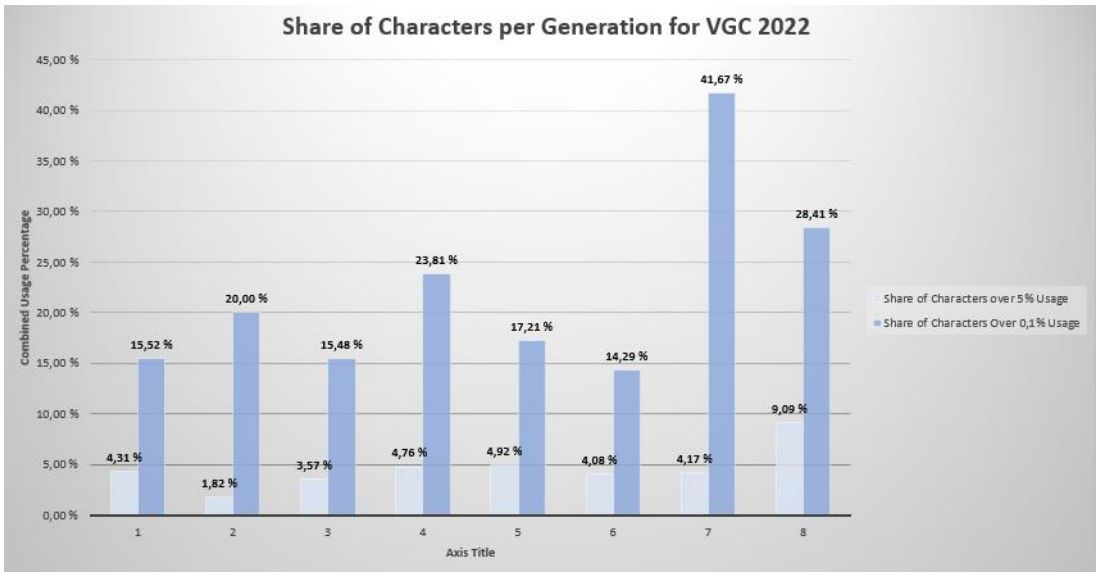


*Fig. 11 Share of Pokémon per generation for VGC 2022.*

To conclude it seems that many viable Pokémon is not as important for the total usage percentages as only a few powerful ones with very high usage rates. This becomes very apparent when comparing the first group of graphs (Figs. 4-7) with the second group of graphs (Figs. 8-11). In all cases where a generation did not manage to get a usage rate above 10%, the generation in question did not have a single Pokémon considered as powerful.

## 6.4 Average and median usage percentage

The final group of graphs (Figs. 12-15) will focus on the average and medina usage percentages of the Pokémon that were seen as atleast being viable. This means that the number of Pokémon in the generation is not important as the graphs only focus on the Pokémon that managed to qualify for this study. The averages and medians will help show if the Pokémon that managed to get a high enough usage percentage to be part of the study are balanced inside the generation or if the generations are carried by a couple of powerful Pokémon.

Fig. 12 shows the average and median usage percentages for VGC 2017 by genereation. Out of all the generations only generation three and generation six have medians that are close to the average. This means that most generations have many

weaker Pokémon and the total usage percentage is high only because there is a number of powerful Pokémon with high usage percentages.

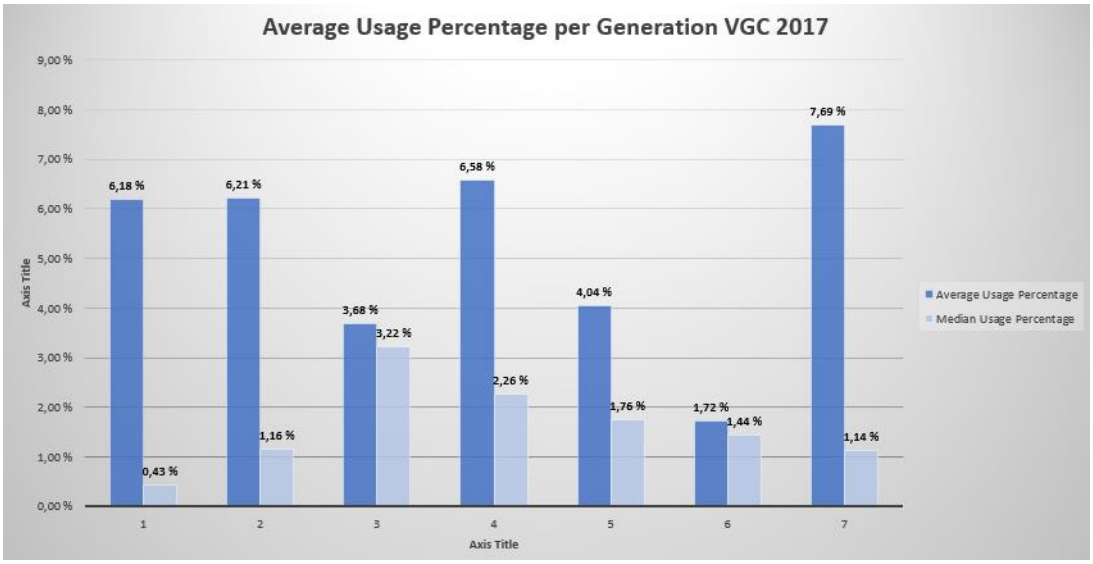


*Fig. 12 Average usage percentage per generation VGC 2017.*

This fenomenon is especially obvious in the case of generation one. Generation one is the generation with the second highest percentage of viable Pokémon in VGC 2017 (Fig. 8) but it is also the generation with by far the lowest median usage percentage. This is an indication that generation one has many Pokémon that are barely seen as viable with usage rates between 0.1% and 1%. The generation with the biggest difference between the average and the median usage percentage of Pokémon that are at least viable is generation seven. This indicates that generation seven also has many Pokémon with very low usage ratings while at the same time also having a few Pokémon with very high usage percentages.

Fig. 13 shows the same data for VGC 2018 and again there are some similarities between the two. The first similarity is that generation seven is agin the generation wirth the biggest difference between the average and the median usage percentages. Generation five that had the second highest total usage percentage also has a big differnece between the average, where it is second only to genertaion seven, and median where it isamong the lowest. Again generation six has similar average and median usage percentages.

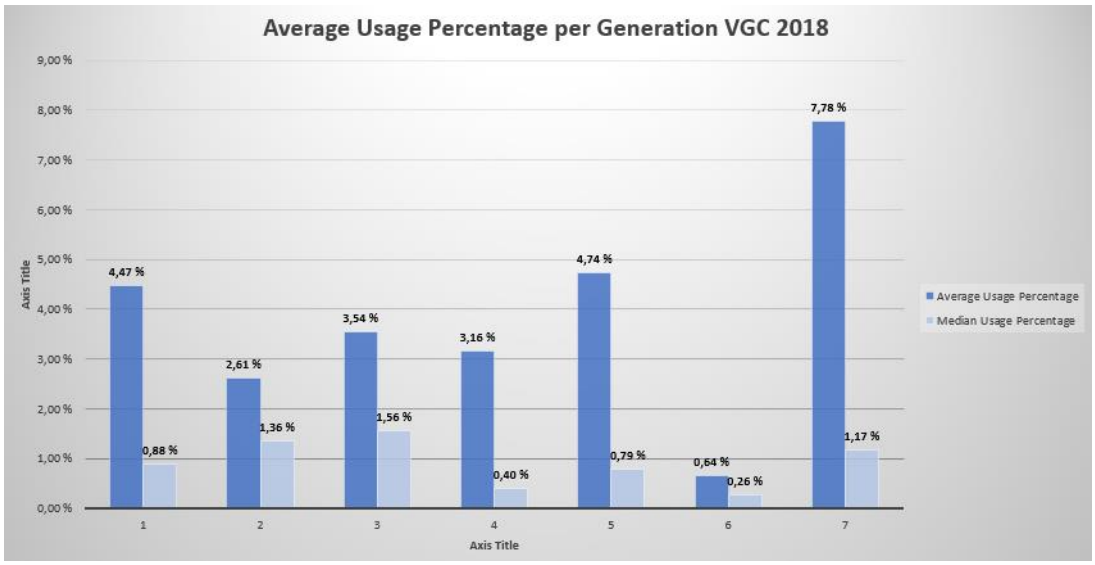


*Fig. 13 Average usage percentage per generation VGC 2018.*

Another interesting thing to note about generation sixes average usage percentage is that it is lower than all but one other generations median usage percentage. Generation four has the second lowest median while having a comparatively high total usage (Fig. 5). This would indicate that there are a couple of powerful Pokémon from generation four in this format while most of the Pokémon that made the cut for this study from generation four are barely viable.

Fig. 14 shows the an interesting picture as well as this is one of the only times that there are three generations competing for the top spot. Surprisingly generation three is the generation with the highest average even though it has a lower total usage compared to generation seven as can be seen in Fig. 6. The median for generation three is also interesting as it is one of the lowest medians, this is in stark contrast to both generation six and generation seven both of which have an average percentage that is very close to the 10% that generation four has. Both generation six and generation seven have very high medinas as well as having high averages, this would mean that they are not as top heavy as generation three is.

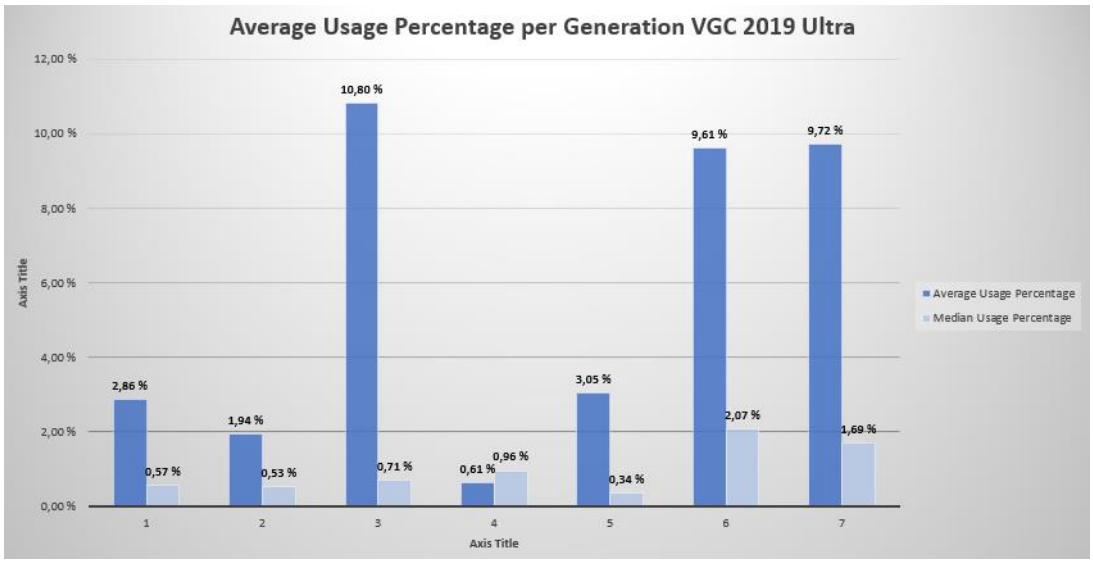


*Fig. 14 Average usage percentage per generation VGC 2019 Ultra.*

Furthermore generation four is also interesting as it is the only generation to have a higher median percentage than average percentage. This means that the majority of the viable Pokémon from generation four are only barely viable while none of the Pokémon have high usage percentages.

In Fig. 15 there is yet again a generation that manages to have a higher median percentage than average percentage. This is only the second time that it hasa happened in all of the formats and this time it is not even the generatoin with the lowest total usage percentage that manages it, as generation six has a higher total usage percentage than generation two (Fig. 7). As for the big winners generation eight, which is the newest generation, has the highest average percentage but a pretty average median percentage. The highest median usage percentage is actually held by generation six that as noted earlier also has the lowest average usage percentage as well as the second lowest total usage percentage.

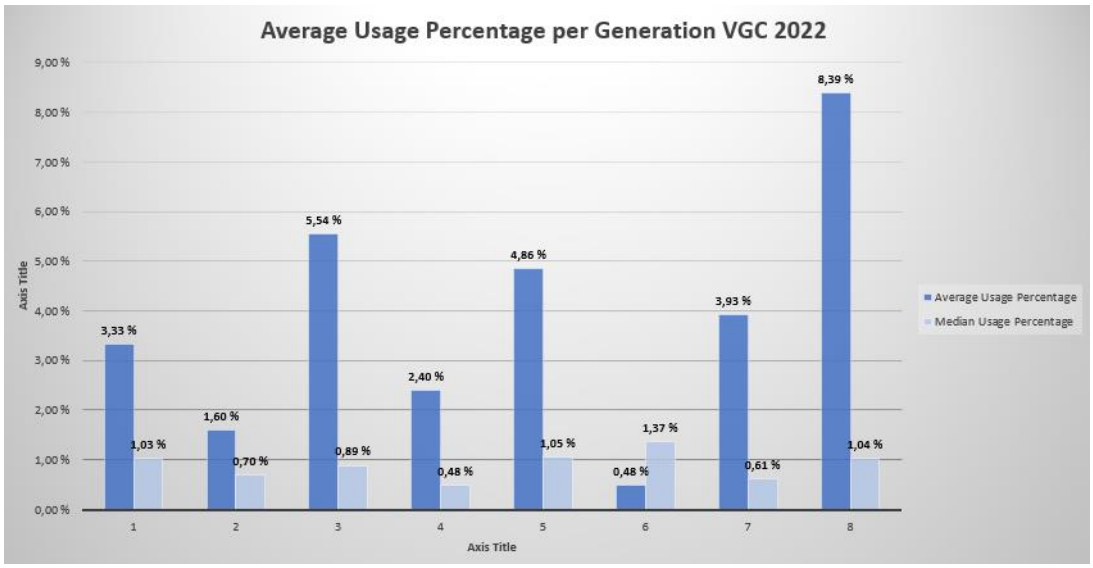


*Fig. 15 Average usage percentage per generation VGC 2022.*

Overall the average usage percentage is almost always higher than the median. The only two exceptions are for generations that have among the lowest total usage percentages in the format. This seems to confirm that most generations are more reliant on having a few very powerful Pokémon with high usage rates rather than having a fair number of viable Pokémon. This is especially true for the generations with the highest total usage percentages, as they tend to also have far higher average usage percentages than median usage percentages. Further the differences between the two is usually largest for generations with the highest averages.

# 7. Discussion

This chapter will attempt to start a discussion around the results and give suggestions to what can be discerned from the results of the analysis. The chapter will also go over things that could have been handled differently in the study and give ideas for potential further studies into the subject.

## 7.1 Discussing the results

The results for the four formats that were part of the study have some similarities and even some patterns that can be used to draw conclusions. The most obvious similarity is that in almost every single metric that was analysed in the study the newest generation of Pokémon comes out on top. This is especially true for the total usage percentages. In this metric the newest generation is always the one with the highest score, most of the time by a huge margin. This indicates that as a player you are more likely to come up against a Pokémon from the newest generation than from any other. In all the formats the newest generation had over 200% total usage. This translates to generation seven averaging more than two Pokémon out of a six Pokémon team in both VGC 2018 and VGC 2019 Ultra. In VGC 2017 generation seven was even more imbalanced with a higher total usage rate than all the other generations combined.

Likewise generation eight was also the leader in total usage rate in the only format where it was available. In VGC 2022 generation eight averaged a little over two Pokémon per six Pokémon team. This indicates that the Pokémon from the newest generation is indeed very powerful when compared to Pokémon from older generations. This could also be seen as a form of power creep being present, but this the power creep does not seem to be linear in nature. There is not a single format where the second newest generation is the one with the second highest total usage rating. This means that there is not a single format where the second newest generation comes out as the second most powerful generation. In VGC 2022 (Fig. 7) the second newest generation is third strongest and the same is true for VGC 2019 Ultra (Fig. 6). Furthermore the third newest generation can only once be found in the

top three highest usage rates. This was the case in VGC 2018 (Fig. 5) when generation five had the second highest total usage rate.

This shows that even if the newer half of generations tend to have a higher total usage rate than the older half of generations in most cases this is due to the newest generation having such a high total usage rate. The second and third newest generation is very seldom above the expected usage rate for a generation if all of them were equally powerful (85% for VGC 2017, 2018 as well as 2019 Ultra and 75% for VGC 2022). To the contrary the second newest generation is often very weak compared to the other generations. This can be seen by the overall poor performance of generation six in both VGC 2018 and VGC 2017. Another argument against the existence of linear power creep is the fact that both generation three and generation one had the second highest total usage rate on separate occasions.

Overall the data indicates that there is a clear gap in power level between the newest generation and the rest of the generations. This difference can however not be found in either the second or the third newest generations. This suggests that a generation has a lower power level in the format directly after the format that it was the newest generation in. This is clearly demonstrated in the data for VGC 2022 (Fig. 7) were generation seven, that had dominated in the total usage rate for the formats in which it was the newest generation, barely manages to be above the expected 75% in terms of total usage rate. This is an interesting phenomenon that seems to indicate that the power level of the second newest generation is consciously lowered to make the newest generation the strongest. This is an indication that there is indeed some form of power creep present even if it is only temporary. This can, for example, be achieved through adding special abilities or mechanics that are only available to Pokémon from the newest generation.

The second focus of the analysis was on the share of Pokémon from each of the generations that made the cut for this study. The results show that in every single one of the formats, generation seven was the generation with the highest share of Pokémon being at least somewhat viable. For most of the formats, generation seven was clearly above the other generations. Only the VGC 2022 (Fig. 11) format has a difference smaller than 20 points, between generation seven and the generation with

the second highest share of viable Pokémon. For most of the formats the other generations had very similar shares of viable Pokémon. Again VGC 2022 is the odd one out as there were a couple of generations other than generation seven that had significantly higher shares of viable Pokémon than the others.

The other statistic that was brought forward in this analysis was the share of Pokémon from a generation that had high usage rates. This data showed more of the same, with the distinction that the newest generation always was the generation with the highest share of powerful Pokémon. In most of the formats the generation with the second highest share of powerful Pokémon had less than half the percentage points than the newest generation. VGC 2022 is again the only format where this is not the case. However even in VGC 2022 the difference is only slightly below double. This is even more concrete evidence to the power level of the newest generation is much higher than that of the other generations. This means that the Pokémon with a higher usage rate for each of the formats is more likely to be from the newest generation than a Pokémon with a lower usage rating. This is another indication of the existence of power creep in the  Pokémon main series games.

The last area of focus for the study was the median and average usage rates for Pokémon that qualified for the study. This was done to find out whether a generation has more Pokémon with very high usage percentages or if the Pokémon in the generation is more evenly balanced. In most cases the average is way higher than the median. This suggests that most generations have a few Pokémon with high usage rates and several Pokémon with very low usage rates. Only in two cases was the median higher than the average. The first one is in the data for VGC 2019 Ultra, where generation four had a median of 0.96% and an average of 0.61%. The other was in the data for VGC 2022 where generation six had a median of 1.37% and an average of 0.48%. In both cases the generation is question had a total usage rate of less than 20%.

Another way to see the difference in power level between generations is to look at the total stats of the Pokémon from the different generations. Imgur user Zbrah21 (2017) analyses and compares the average total stats of all Pokémon (Fig. 16).

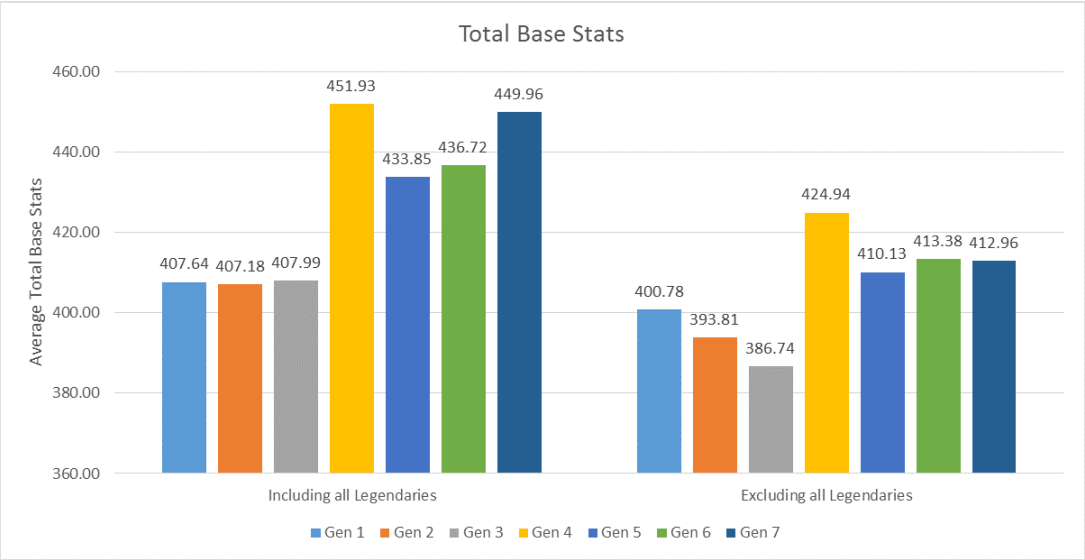


*Fig. 16 Average total base stat per generation. (Zbrah21, 2017)*

Zbrah21:s data shows a clear difference between generations four onwards when compared to the first three generations. This is a clear indication that the raw power of the newer generations is higher than the older ones. However the base stats are not the only thing that is important for a Pokémon to be competitively viable. The statistics from Zbrah21:s analysis does agree with the analysis done in this study when it comes to the existence of power creep in the Pokémon games.

According to the data analysed in this study there are clear signs of power creep in the Pokémon videogames. This is clearly seen in the total usage rate of the newest generation. However it seems as though when a generation is no longer the newest one the usage rates plumet. This can be clearly seen in the usage rate for generation seven in the VGC 2022 format which is clearly lower than the high usage rates that the same generation managed while it was the newest one. This suggests that not only is the newest generation made more powerful, but the second newest generation is much less powerful than what it was when it was the newest generation.

The power creep also seems to have a very strong effect on the competitive metagame as there is a clear group of Pokémon with very high usage rates in evert dataset. This is an indication of the effect that power creep has on the metagame. Because of power creep most of the Pokémon in this group with massive usage rates is from the newest generation. This is also the reason the newest generation has such

a high total usage rate. The big difference between the average and median usage rates for the newest generation is also an indication that there is a huge difference between the Pokémon with the highest usage rates and the ones with the lowest for the newest generation.

## 7.2 Future research on power creep in videogames

There have been several interesting revelations concerning the power level of the different generations revealed in this study. Further there has also been some insights into how the competitive meta in the Pokémon videogames tend to work. It has become clear that the top of the meta has a very high usage rate. This can be seen in the fact that for every format there is one or more generations with lower total usage rates than the usage rate of some individual Pokémon. These are all important things to consider when designing future studies into the concept of power creep in the Pokémon games. Another thing to take consider is the different size of the generations. This must be accounted for when comparing the generations as the size differences are so large.

When designing future research for analysing power creep in other games one important thing to get right is the grouping. While the grouping for the Pokémon videogames was easy to do since there are very clear differences between the generations, this is not always the case. Therefore it is important that the study clearly defines what characters belong to which group. Defining the groups and what they are based on is also important. The time when a piece of content was released is a good metric to use for dividing the characters into groups.

The subject of power creep and whether it exists is not a subject that has been that thoroughly researched. This is especially true for academically sound studies. Most of the analysis that has been done on the subject has been done by a member of the community and in many cases the analysis is looking for a particular result to support the belief already held by the community. This means that the quality of the data and the analysis is not known, and the analysis can be hard to trust due to this. While there are many reasons for a developer to implement some form of power creep into their game this study has been interested in the economic aspect. That means that the

power creep is used to force a player that wants to be competitive in an online game to invest in the newest content of the game.

Another possibility is that power creep is used to force older content to lose relevance to stop a game becoming stale. This factor was not the focus of this study but there does seem to exist some indications that this is at least part of the reason for the drastic differences in power level between the newest generation and the rest. However both factors have much potential for further studies into them. The most important thing to consider when researching power creep is that the power creep comes in different flavours. This means that it can be for example more optimised stat-lines or improved synergy in the characters toolkit. Power creep does not necessarily mean that the raw power of the character is higher.

The effect that power creep has on the development of new videogames is not entirely clear, but it seems as if the Pokémon games at least definitely have some form of power creep. The reason for this power creep seems to be that the developers want to get players invested in the new Pokémon. The reason for this is monetary as the new Pokémon can then be used in other forms of media or to help move new merchandise. To get a definitive answer to the question of the effect of power creep on videogame development more research is needed.

Another thing that is worth mentioning is the different factors that affect the power level of a Pokémon. This study has not gone into detail on these different factors, but they present an interesting target for further research. The factors that are most interesting is which held items see the most use, which abilities see the most use as well as how well the Pokémon with the highest usage rate synergise with each other.

# 8. Conclusion

This chapter will conclude the research paper and attempt to draw conclusions based on the analysis presented previously. The chapter mainly focus on giving an answer to the research questions proposed in the earlier chapters. Each of the research questions will be given their own subchapter where the conclusions will be presented.

## 8.1 RQ1 *Does power creep exist within the VGC format?*

The main research question for the study was the first one, *"Does power creep exist within the VGC format?"*. The existence of power creep is something that has very rarely been the subject of academic research. According to the data gathered and analysed in this study there are some conclusions that can be drawn concerning the existence of power creep and how drastic it has been. One of the only things that remained constant between the four formats that were analysed in the study was the fact that the newest generation was always the generation with the highest total usage rate. This is a clear sign that the competitive scene sees the Pokémon from the newest generation as more powerful than those of older generations.

However it seems as if this power creep is limited to only the generation that is currently the newest. The generation that is second newest is often at the very bottom of the total usage rate rankings. This is an indication that not only is the current newest generation made stronger than the older generations but the generation that used to be the strongest before is also made weaker with the release of a new generation. This can be seen when comparing the data for VGC 2017, VGC 2018 and VGC 2019 Ultra with the data for VGC 2022. Generation seven, which was the newest generation for the three first formats, also had the highest total usage rate for the three first formats. In the VGC 2022 data however generation seven is not even second in the total usage rate rankings.

This sudden drop in usage rate is surprising when considering that generation seven had around double the usage rate of any other generation in each of the three formats where it was the newest generation. That means that not only has generation lost out to the newest generation, but it has become more balanced when compared to the

other generations as well. To conclude there are clear indications that there is some power creep present in the Pokémon videogames, but it is limited to the newest generation. Not only is it limited to the newest generation but once a generation is no longer the newest it quickly loses relevance and the usage rate for Pokémon from the generation drops as a result.

Aside from the newest generation there does not seem to be any way to tell which generation will be powerful. The best predictor seems to be the number of Pokémon in the generation, as both generation one and generation five do well in several of the VGC formats. Generation five and generation one are the generations with the highest number of Pokémon at around 150 each. On the other end generation six is last in usage rate in two of the formats and second to last in one. This is easily the worst showing of any generation over the four formats. This is despite generation six being the second newest for three of the four formats. Not surprisingly generation six is the smallest generation, with only around 70 Pokémon in total.

## 8.2 RQ2 *Is power creep bad for the meta game of VGC?*

The effect that power creep has on the VGC metagame is an important part of why players are so weary of power creep (Rosewater, 2005). This is since a videogame where some characters are clearly superior compared to others is at risk of becoming stale with players being forced into a specific playstyle to stay competitive. This phenomenon seems to also be present in the VGC format. According to the data every format has a handful of Pokémon with usage rates that are far above the rest (around 30-50%). In most formats there are around five Pokémon that fall into this category. This means that there exists a group of Pokémon that are so powerful and so influential on the metagame that they will be a part of one in three teams. This is obviously not a good thing for the health of the competitive format as it risks becoming boring if everyone is forced into using the same strategies.

The only way to solve this would be to balance the Pokémon better. However this is not an easy task as there are many factors that need to be considered when designing new Pokémon to ensure that they are not too powerful. Things like held items, abilities were not considered in this study and might pose significant challenges when it comes to balancing the game.

To conclude the data analysed in this study suggests that only a handful of Pokémon influence the metagame in a big way. This means that to stay competitive a player will be forced to play in a certain way. This in turn is not good for the competitive scene as it risks becoming stale since there is a correct way to play that is better than all other strategies. While the VGC format certainly has some imbalances there is still some variance concerning the Pokémon that see play in the competitive scene. It is worth noting that while the problem is not massive at this time it can quickly change if the developers are not careful when introducing new Pokémon in future generations.

## 8.3 RQ3 *What effect does power creep have on the development of videogames?*

The effect that power creep can have on the development of videogames is significant. As Alha (2020) states the best way for a game to generate revenue is to have a way of generating continuous income. This can be done with the sales of virtual goods. Both Klézl et al. (2018) and Marchand & Hannig-Thurau (2013) also consider the sale of virtual goods as a good source of continuous income for videogames. But for the new content to be more appealing to players they must bring extra value to the players. This is where power creep comes in. By intentionally making the newest content more powerful or intentionally making older content weaker the developers can create a need for the new content. This is especially true for games that have a competitive element to them.

The VGC format seems to have also fallen victim to some of these tactics. While there is not a direct in-game motivation for the developers to make the newest content more powerful as all the Pokémon from the newest generation are available with the initial purchase of the software, there is still power creep present in the Pokémon videogames. The reason for this is outside of the scope for this study but since Pokémon is not only a videogame franchise but also make movies and other media there might be some external incentives for making the new Pokémon popular. An easy way to do this is to make the new Pokémon stronger in the videogames to force their use in the esports scene.

To conclude there are many incentives for developers to generate continuous revenue from their videogames. One way to do this is through the sale of virtual goods. To incentivise players to buy these virtual goods players need to get something out of the purchase. Power creep can be the easy way out for this, particularly in online games or games that have a competitive scene. Developers need to be careful that they do not make the power creep to obvious as this might lead to the competitive format becoming stale.

## 8.4 Final thoughts

Overall the existence of power creep in the Pokémon games is not surprising. Just by looking at the average total stats in Fig. 16 it is easy to see that the newer generations are more powerful on average than the three first generations. It is still surprising that this is not really reflected in the usage rates of Pokémon from the different generations. The seeming supremacy of the newest generation is also evidence of the fact that there is some amount of power creep present in the Pokémon videogames. The most surprising discovery of the study is the fact that the other generations outside of the newest one seems to be relatively balanced when compared to each other.

The subject of power creep and especially the effect it can have on the competitive side of a videogame is something that will have to be considered when designing videogames in the future. Getting the balance right between incentivising players to invest in the new content and keeping the older content relevant is going to be important for videogames that want to stay successful. It is also worth considering that making older content weaker systematically is not good for the developer's goodwill as players will not want to spend money on content that will be replaced once the next new thing is released.

# 9. Swedish summary–Svensk sammanfattning

Detta kapitel är en sammanfattning av studien på svenska. Kapitlet kommer att behandla studiens struktur, teoretiska bakgrund, metod samt resultat.

## Power creep i videospel, en analys av tävlingsscenen i Pokémon-spel

## 9.1 Bakgrund

I och med att internet blivit allt populärare har även online-spel blivet en allt större marknad. Enligt Marchand & Henning-Thurau (2013) var den globala videospels marknaden värd nästan 100 miljarder år 2012. Under de senaste åren har marknaden vuxit ännu mera och är nu mera värdefull än såväl filmindustrin som musikindustrin (Marchand & Henning-Thurau, 2013). Även intressenterna för videospel har ändrat under de senaste åren i och med att videospels utvecklarna har hittat nya sätt att generera kapital för utvecklingen av nya spel (Smith, 2015). Även metoderna som videospel använder sig av för att generera inkomst har förändrats (Alha, 2020) och speciellt försäljningen av virtuella varor har ökat såpass mycket att de utgör en majoritet av intäkterna i videospelsmarknaden.

Detta har i sin tur lett till att utvecklare och utgivare av videospelen har fått allt mera motivation för att generera återkommande inkomst. Ett lätt sätt att göra det är genom försäljning av nytt innehåll till spel som redan existerar. Detta är fördelaktigt då det innebär lägre kostnader för utgivaren medan det även ser till att spelet hålls fräscht. Det finns olika sätt att motivera spelare att investera i de nya innehållet och ett fenomen är det som kallas för ”Power creep”. Power creep är en idé som kommer ifrån så kallade ”trading card games” och innebär att nyare innehåll med designas på ett sätt som gör att det är bättre än äldre innehåll för att uppmuntra spelare att investera i det nya innehållet. Många spelare har spekulerat i huruvida utvecklare av videospel använder sig av liknande taktiker för att uppmuntra spelare att investera i de virtuella varorna.

Denna studie ämnar undersöka Pokémon spelen för att skapa en förståelse för vilka Pokémon de tävlingsinriktade spelarna ser som bäst. Att förstå detta möjliggör dragandet av slutsatser angående huruvida power creep existerar i Pokémon spelen eller inte.

## 9.2 Metod

För att undersöka huruvida power creep existerar har data samlats in från Pikalytics.com över vilka Pokémon som är de vanligast framkommande i Video Game Championships (VGC) formatet. Denna data har sedan analyserats för att se huruvida Pokémon ifrån de nyare generationerna används mera än Pokémon ifrån äldre generationer. Studien är en kvantitativ studie enligt definitionen som Kothari (2004) ger. För att göra analysen mera betydelsefull har data delats in i grupper baserat på vilken generation karaktärerna tillhör. Indelningen har gjorts baserat på generationerna eftersom största delen av Pokémons som tillhör en generation släpps samtidigt. En indelning baserat på generation är optimal då det möjliggör en direkt jämförelse mellan Pokémon från olika tidpunkter.

## 9.3 Resultat

Studien fokuserade på att besvara tre forskningsfrågor:

1. Finns det power creep i Pokémon-spelen?

2. Hur påverkas tävlingsscenen av power creep?

3. Vilken effekt har power creep på utvecklingen av videospel?

I studien genomfördes tre analyser i syfte att få svar på ovannämnda forskningsfrågor. Den första av dessa var den totala användningsgraden för de enskilda generationerna. Den andra var mängden använda Pokémon ifrån de olika generationerna i förhållande till hur många Pokémon generationen har totalt. Den tredje var medianen samt medeltalet på användningsgraden för samtliga Pokémon som kvalificerade för studien, dessa var igen indelade baserat på generationen. Dessa tre analyser genomfördes på fyra olika år av VGC regler (VGC 2017, VGC 2018, VGC 2019 Ultra samt VGC 2022). Detta innebar att tre av datauppsättningarna har

sju grupper medan den sista har åtta grupper. Detta leder i sin tur till att data inte är direkt jämförbart mellan alla fyra datauppsättningarna. För att kvalificera för studien sattes ett minimikrav på användningsgraden. Minimikravet var 0,1% användning. Utöver detta delades karaktärerna in i de som ansågs ha en hög användningsgrad och övriga. Pokémon med en användningsgrad över 5% ansågs ha en hög användningsgrad.

## 9.4 Slutsats & diskussion

Data som analyserades visar tydliga tecken på att power creep skulle existera i Pokémon-spelen. Detta märks tydligast om man ser på hur mycket Pokémon från den nyaste generationen används jämfört med Pokémon från de äldre generationerna. Speciellt den nyaste generationen är den som har överlägset högst användningsgrad. Detta är en klar indikation på att den nyaste generationen anses vara överlägsen de övriga, vilket skulle tyda på att det finns power creep i Pokémon-spelen. Data tyder dock på att det inte skulle handla om en linjär utveckling, att den äldsta generationen skulle ha lägst användningsgrad medan de nyare generationerna skulle ha högre användningsgrader beroende på hur nya de är. Data visar att så inte är fallet. Det verkar i stället som att den näst nyaste generationen ofta har bland de lägsta användningsgraderna.

Slutsatsen på den första forskningsfrågan skulle vara att det existerar power creep i Pokémon spelen men enbart temporärt då en generation snabbt tappar relevans då den inte längre är den nyaste. Detta kan ses tydligt då man jämför sjunde generationens användningsgrad från de tre första datauppsättningarna med den sista data uppsättningen. Den sjunde generationen hade överlägset högst användningsgrad i de tre först data uppsättningarna medan den i den sista bara låg på en tredje plats. I de tre första datauppsättningarna var den sjunde generationen den nyaste. Det verkar även som att de Pokémon som har högst användningsgrad ofta har en mycket högre användningsgrad än övriga. Detta leder också till att de generationer som har de bästa karaktärerna också är de generationer med högst totala användningsgrad. Det finns alltså några karaktärer som bestämmer metaspelet medan övriga används väldigt sparsamt.

Detta tyder på stora skillnader i hur bra de olika karaktärerna är enligt spelare på högsta nivån. Slutsatsen på den andra forskningsfrågan skulle enligt detta vara att power creep har stor inverkan på vilka Pokémon som används i tävlingsscenen.

Den sista forskningsfrågan är svårare att svara på men eftersom power creep används och speciellt på enbart den nyaste generationen skulle detta tyda på att power creep definitivt inverkar på utvecklingen av videospel. Orsakerna till denna tendens ligger utanför denna studies fokus men skulle vara en perfekt idé att bygga vidare på ifall ytterligare studier genomförs. Detta skulle antagligen kräva att flera spel analyseras.

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# Attachments:

Attachment 1: Aggregated data used for graphs

VGC 2022

| Generation | Total Pokémon | High Usage (Over 5%) | Qualified 5% | Above 0,1% | Qualified 0,1% | Total % | AVG % | Median % |
|---|---|---|---|---|---|---|---|---|
| 1 | 116 | 5 | 4,31 % | 18 | 15,52 % | 59,95 % | 3,33 % | 1,03 % |
| 2 | 55 | 1 | 1,82 % | 11 | 20,00 % | 17,58 % | 1,60 % | 0,70 % |
| 3 | 84 | 3 | 3,57 % | 13 | 15,48 % | 71,98 % | 5,54 % | 0,89 % |
| 4 | 63 | 3 | 4,76 % | 15 | 23,81 % | 35,95 % | 2,40 % | 0,48 % |
| 5 | 122 | 6 | 4,92 % | 21 | 17,21 % | 102,01 % | 4,86 % | 1,05 % |
| 6 | 49 | 2 | 4,08 % | 7 | 14,29 % | 19,20 % | 2,74 % | 1,37 % |
| 7 | 48 | 2 | 4,17 % | 20 | 41,67 % | 78,64 % | 3,93 % | 0,61 % |
| 8 | 88 | 8 | 9,09 % | 25 | 28,41 % | 209,66 % | 8,39 % | 1,04 % |
| Total | 625 | 30 | 4,80 % | 130 | 20,80 % | 594,97 % | 4,58 % | |

VGC 2019 Ultra

| Generation | Total Pokémon | High Usage (Over 5%) | Qualified 5% | Above 0,1% | Qualified 0,1% | Total % | AVG % | Median % |
|---|---|---|---|---|---|---|---|---|
| 1 | 150 | 2 | 1,33 % | 15 | 10,00 % | 42,85 % | 2,86 % | 0,57 % |
| 2 | 99 | 2 | 2,02 % | 12 | 12,12 % | 23,33 % | 1,94 % | 0,53 % |
| 3 | 133 | 5 | 3,76 % | 14 | 10,53 % | 151,26 % | 10,80 % | 0,71 % |
| 4 | 102 | 0 | 0,00 % | 10 | 9,80 % | 6,14 % | 0,61 % | 0,96 % |
| 5 | 152 | 4 | 2,63 % | 16 | 10,53 % | 48,76 % | 3,05 % | 0,34 % |
| 6 | 69 | 2 | 2,90 % | 6 | 8,70 % | 57,63 % | 9,61 % | 2,07 % |
| 7 | 83 | 11 | 13,25 % | 27 | 32,53 % | 262,57 % | 9,72 % | 1,69 % |
| 8 | - | | | | | | | |
| Total | 788 | 26 | 3,30 % | 100 | 12,69 % | 592,54 % | 5,93 % | |

VGC 2018

| Generation | Total Pokémon | High Usage (Over 5%) | Qualified 5% | Above 0,1% | Qualified 0,1% | Total % | AVG % | Median % |
|---|---|---|---|---|---|---|---|---|
| 1 | 150 | 5 | 3,33 % | 21 | 14,00 % | 93,81 % | 4,47 % | 0,88 % |
| 2 | 99 | 1 | 1,01 % | 11 | 11,11 % | 28,67 % | 2,61 % | 1,36 % |
| 3 | 133 | 3 | 2,26 % | 18 | 13,53 % | 63,78 % | 3,54 % | 1,56 % |
| 4 | 102 | 2 | 1,96 % | 16 | 15,69 % | 50,53 % | 3,16 % | 0,40 % |
| 5 | 152 | 3 | 1,97 % | 25 | 16,45 % | 118,48 % | 4,74 % | 0,79 % |
| 6 | 69 | 0 | 0,00 % | 8 | 11,59 % | 5,15 % | 0,64 % | 0,26 % |
| 7 | 83 | 7 | 8,43 % | 30 | 36,14 % | 233,26 % | 7,78 % | 1,17 % |
| 8 | - | | | | | | | |
| Total | 788 | 21 | 2,66 % | 129 | 16,37 % | 593,68 % | 4,60 % | |

VGC 2017

| Generation | Total Pokémon | High Usage (Over 5%) | Qualified 5% | Above 0,1% | Qualified 0,1% | Total % | AVG % | Median % |
|---|---|---|---|---|---|---|---|---|
| 1 | 150 | 3 | 2,00 % | 20 | 13,33 % | 123,63 % | 6,18 % | 0,43 % |
| 2 | 99 | 1 | 1,01 % | 7 | 7,07 % | 43,50 % | 6,21 % | 1,16 % |
| 3 | 133 | 3 | 2,26 % | 9 | 6,77 % | 33,13 % | 3,68 % | 3,22 % |
| 4 | 102 | 3 | 2,94 % | 8 | 7,84 % | 52,66 % | 6,58 % | 2,26 % |
| 5 | 152 | 2 | 1,32 % | 8 | 5,26 % | 32,32 % | 4,04 % | 1,76 % |
| 6 | 69 | 0 | 0,00 % | 3 | 4,35 % | 5,16 % | 1,72 % | 1,44 % |
| 7 | 83 | 16 | 19,28 % | 40 | 48,19 % | 307,47 % | 7,69 % | 1,14 % |
| 8 | - | | | | | | | |
| Total | 788 | 28 | 3,55 % | 91 | 11,55 % | 597,87 % | 6,57 % | |

# Attachment 2: Raw data for VGC 2022

| Position | Name | Generation (Group) | Usage percentage |
|---|---|---|---|
| 1 | Zacian | 8 | 61,93 % |
| 2 | Incineroar | 7 | 58,85 % |
| 3 | Kyogre | 3 | 38,33 % |
| 4 | Regeleki | 8 | 30,71 % |
| 5 | Grimmsnarl | 8 | 26,84 % |
| 6 | Thundurus | 5 | 25,88 % |
| 7 | Rillaboom | 8 | 21,83 % |
| 8 | Groudon | 3 | 19,05 % |
| 9 | Calyrex-Shadow | 8 | 18,49 % |
| 10 | Amoonguss | 5 | 16,85 % |
| 11 | Whimsicott | 5 | 16,83 % |
| 12 | Calyrex-Ice | 8 | 14,90 % |
| 13 | Landorus-Therian | 5 | 13,98 % |
| 14 | Charizard | 1 | 13,96 % |
| 15 | Gastrodon | 4 | 13,68 % |
| 16 | Zapdos | 1 | 12,83 % |
| 17 | Indeedee-F | 8 | 12,17 % |
| 18 | Venusaur | 1 | 10,69 % |
| 19 | Yveltal | 6 | 9,72 % |
| 20 | Palkia | 4 | 8,63 % |
| 21 | Urshifu | 8 | 8,38 % |
| 22 | Porygon2 | 2 | 8,11 % |
| 23 | Tornadus | 5 | 7,91 % |
| 24 | Ditto | 1 | 7,01 % |
| 25 | Dialga | 4 | 6,48 % |
| 26 | Ferrothorn | 5 | 6,12 % |
| 27 | Dusclops | 3 | 6,04 % |
| 28 | Solgaleo | 7 | 5,58 % |
| 29 | Blastoise | 1 | 5,31 % |
| 30 | Kartana | 6 | 5,15 % |
| 31 | Seismitoad | 5 | 4,00 % |
| 32 | Mimikyu | 7 | 3,81 % |
| 33 | Kyurem-White | 5 | 3,21 % |
| 34 | Kingdra | 2 | 3,02 % |
| 35 | Urshifu-Rapid-Strike | 8 | 2,82 % |
| 36 | Shedinja | 3 | 2,69 % |
| 37 | Raichu | 1 | 2,57 % |
| 38 | Torkoal | 3 | 2,14 % |
| 39 | Ho-Oh | 2 | 2,03 % |
| 40 | Cinderace | 8 | 2,02 % |
| 41 | Lapras | 1 | 1,97 % |
| 42 | Rotom-Heat | 4 | 1,91 % |
| 43 | Eternatus | 8 | 1,90 % |
| 44 | Weezing | 1 | 1,77 % |
| 45 | Lunala | 7 | 1,69 % |
| 46 | Zygarde | 6 | 1,63 % |
| 47 | Coalossal | 8 | 1,55 % |
| 48 | Regigigas | 4 | 1,52 % |
| 49 | Comfey | 7 | 1,44 % |
| 50 | Volcarona | 5 | 1,42 % |
| 51 | Xerneas | 6 | 1,37 % |
| 52 | Tapu Fini | 7 | 1,28 % |
| 53 | Entei | 2 | 1,23 % |
| 54 | Klinklang | 5 | 1,23 % |
| 55 | Kingler | 1 | 1,19 % |
| 56 | Metagross | 3 | 1,19 % |
| 57 | Umbreon | 2 | 1,16 % |
| 58 | Mienshao | 5 | 1,05 % |
| 59 | Dragapult | 8 | 1,04 % |
| 60 | Tsareena | 7 | 0,94 % |
| 61 | Sableye | 3 | 0,89 % |
| 62 | Necrozma-Dusk-Mane | 7 | 0,88 % |
| 63 | Chansey | 1 | 0,87 % |
| 64 | Bronzong | 4 | 0,85 % |
| 65 | Talonflame | 6 | 0,84 % |
| 66 | Mamoswine | 4 | 0,82 % |
| 67 | Barraskewda | 8 | 0,80 % |
| 68 | Gothitelle | 5 | 0,79 % |
| 69 | Spectrier | 8 | 0,77 % |
| 70 | Suicune | 2 | 0,70 % |
| 71 | Zamazenta | 8 | 0,68 % |
| 72 | Stakataka | 7 | 0,67 % |
| 73 | Indeedee-M | 8 | 0,64 % |
| 74 | Shuckle | 2 | 0,64 % |
| 75 | Tapu Lele | 7 | 0,63 % |
| 76 | Reshiram | 5 | 0,59 % |
| 77 | Tapu Koko | 7 | 0,59 % |
| 78 | Chandelure | 5 | 0,58 % |
| 79 | Clefairy | 1 | 0,54 % |
| 80 | Rayquaza | 3 | 0,52 % |
| 81 | Zekrom | 5 | 0,51 % |
| 82 | Togekiss | 4 | 0,48 % |
| 83 | Ludicolo | 3 | 0,44 % |
| 84 | Celesteela | 7 | 0,43 % |
| 85 | Persian-Alola | 7 | 0,43 % |
| 86 | Glastrier | 8 | 0,42 % |
| 87 | Araquanid | 7 | 0,41 % |
| 88 | Pincurchin | 8 | 0,39 % |
| 89 | Rotom-Wash | 4 | 0,39 % |
| 90 | Giratina-Origin | 4 | 0,37 % |
| 91 | Centiskorch | 8 | 0,34 % |
| 92 | Meowstic | 6 | 0,31 % |
| 93 | Cresselia | 4 | 0,31 % |
| 94 | Marowak-Alola | 7 | 0,30 % |
| 95 | Liepard | 5 | 0,29 % |
| 96 | Marowak | 1 | 0,29 % |
| 97 | Lugia | 2 | 0,26 % |
| 98 | Moltres-Galar | 8 | 0,25 % |
| 99 | Dracovish | 8 | 0,23 % |
| 100 | Togedemaru | 7 | 0,22 % |
| 101 | Latias | 3 | 0,22 % |
| 102 | Hatterene | 8 | 0,22 % |
| 103 | Zapdos-Galar | 8 | 0,21 % |
| 104 | Krookodile | 5 | 0,19 % |
| 105 | Hitmontop | 2 | 0,18 % |
| 106 | Landorus | 5 | 0,18 % |
| 107 | Arcanine | 1 | 0,18 % |
| 108 | Milotic | 3 | 0,18 % |
| 109 | Dedenne | 6 | 0,18 % |
| 110 | Shifty | 3 | 0,17 % |
| 111 | Cobalion | 5 | 0,17 % |
| 112 | Butterfree | 1 | 0,17 % |
| 113 | Snorlax | 1 | 0,17 % |
| 114 | Pikachu | 1 | 0,16 % |
| 115 | Slowbro | 1 | 0,15 % |
| 116 | Tyranitar | 2 | 0,15 % |
| 117 | Drifblim | 4 | 0,14 % |
| 118 | Heatran | 4 | 0,14 % |
| 119 | Porygon-Z | 4 | 0,13 % |
| 120 | Duraludon | 8 | 0,13 % |
| 121 | Turtonator | 7 | 0,13 % |
| 122 | Escavalier | 5 | 0,13 % |
| 123 | Nihilego | 7 | 0,12 % |
| 124 | Swampert | 3 | 0,12 % |
| 125 | Oranguru | 7 | 0,12 % |
| 126 | Gengar | 1 | 0,12 % |
| 127 | Pheromosa | 7 | 0,12 % |
| 128 | Excadrill | 5 | 0,10 % |
| 129 | Raikou | 2 | 0,10 % |
| 130 | Riolu | 4 | 0,10 % |

# Attachment 3: Raw data for VGC 2019 Ultra

| Position | Name | Generation (Group) | Usage percentage |
|---|---|---|---|
| 1 | Incineroar | 7 | 76,47 % |
| 2 | Groudon-Prime | 3 | 57,43 % |
| 3 | Xerneas | 6 | 39,16 % |
| 4 | Tapu Fini | 7 | 39,12 % |
| 5 | Tapu Koko | 7 | 35,83 % |
| 6 | Salamence | 3 | 28,26 % |
| 7 | Rayquaza | 3 | 25,04 % |
| 8 | Kyogre-Primal | 3 | 23,60 % |
| 9 | Stakataka | 7 | 21,75 % |
| 10 | Amoonguss | 5 | 19,90 % |
| 11 | Tapu Lele | 7 | 16,58 % |
| 12 | Gengar | 1 | 15,81 % |
| 13 | Lunala | 7 | 14,39 % |
| 14 | Yveltal | 6 | 13,99 % |
| 15 | Kangaskhan | 1 | 13,98 % |
| 16 | Necrozma-Dawn-Wings | 7 | 12,30 % |
| 17 | Landorus-Therian | 5 | 10,95 % |
| 18 | Nihilego | 7 | 10,50 % |
| 19 | Metagross | 3 | 10,62 % |
| 20 | Kartana | 7 | 9,74 % |
| 21 | Crobat | 2 | 7,59 % |
| 22 | Jumpluff | 2 | 7,41 % |
| 23 | Necrozma-Dusk-Mane | 7 | 7,37 % |
| 24 | Tornadus | 5 | 5,94 % |
| 25 | Togedemaru | 7 | 5,82 % |
| 26 | Ferrothorn | 5 | 5,08 % |
| 27 | Ditto | 1 | 3,68 % |
| 28 | Shedinja | 3 | 3,63 % |
| 29 | Whimsicott | 6 | 3,50 % |
| 30 | Venusaur | 1 | 3,24 % |
| 31 | Smeargle | 2 | 2,98 % |
| 32 | Mimikyu | 7 | 2,69 % |
| 33 | Bronzong | 4 | 2,52 % |
| 34 | Umbreon | 2 | 2,45 % |
| 35 | Celesteela | 7 | 2,21 % |
| 36 | Accelgor | 5 | 2,19 % |
| 37 | Togekiss | 4 | 2,00 % |
| 38 | Lucario | 4 | 1,81 % |
| 39 | Solgaleo | 7 | 1,69 % |
| 40 | Mewtwo | 1 | 1,68 % |
| 41 | Gothitelle | 5 | 1,58 % |
| 42 | Gastrodon | 4 | 1,38 % |
| 43 | Mandibuzz | 5 | 1,18 % |
| 44 | Lopunny | 4 | 1,10 % |
| 45 | Chansey | 1 | 1,08 % |
| 46 | Ribombee | 7 | 1,07 % |
| 47 | Naganadel | 7 | 1,05 % |
| 48 | Raichu | 1 | 0,91 % |
| 49 | Kommo-o | 7 | 0,89 % |
| 50 | Tsareena | 7 | 0,89 % |
| 51 | Palkia | 4 | 0,81 % |
| 52 | Mawile | 3 | 0,73 % |
| 53 | Manectric | 3 | 0,69 % |
| 54 | Ho-Oh | 2 | 0,66 % |
| 55 | Zygarde | 6 | 0,63 % |
| 56 | Porygon2 | 2 | 0,59 % |
| 57 | Tapu Bulu | 7 | 0,57 % |
| 58 | Snorlax | 1 | 0,57 % |
| 59 | Gyarados | 1 | 0,50 % |
| 60 | Hitmontop | 2 | 0,46 % |
| 61 | Zapdos | 1 | 0,43 % |
| 62 | Dialga | 4 | 0,42 % |
| 63 | Medicham | 3 | 0,41 % |
| 64 | Aerodactyl | 1 | 0,38 % |
| 65 | Liepard | 5 | 0,35 % |
| 66 | Azumarill | 2 | 0,33 % |
| 67 | Bisharp | 5 | 0,33 % |
| 68 | Shuckle | 2 | 0,30 % |
| 69 | Krookodile | 5 | 0,30 % |
| 70 | Lugia | 2 | 0,29 % |
| 71 | Persian-Alola | 7 | 0,29 % |
| 72 | Salazzle | 7 | 0,28 % |
| 73 | Comfey | 7 | 0,26 % |
| 74 | Gardevoir | 3 | 0,25 % |
| 75 | Charizard | 1 | 0,25 % |
| 76 | Lilligant | 5 | 0,23 % |
| 77 | Drapion | 4 | 0,21 % |
| 78 | Aegislash | 6 | 0,20 % |
| 79 | Toxapex | 7 | 0,20 % |
| 80 | Raichu-Alola | 7 | 0,19 % |
| 81 | Milotic | 3 | 0,19 % |
| 82 | Pheromosa | 7 | 0,19 % |
| 83 | Mienshao | 5 | 0,18 % |
| 84 | Volcarona | 5 | 0,16 % |
| 85 | Suicune | 2 | 0,15 % |
| 86 | Blaziken | 3 | 0,15 % |
| 87 | Zekrom | 5 | 0,15 % |
| 88 | Talonflame | 6 | 0,15 % |
| 89 | Braviary | 5 | 0,14 % |
| 90 | Oranguru | 7 | 0,13 % |
| 91 | Torkoal | 3 | 0,13 % |
| 92 | Breloom | 3 | 0,13 % |
| 93 | Wigglytuff | 1 | 0,13 % |
| 94 | Ampharos | 2 | 0,12 % |
| 95 | Rotom-Wash | 4 | 0,11 % |
| 96 | Pikachu | 1 | 0,11 % |
| 97 | Gallade | 4 | 0,11 % |
| 98 | Excadrill | 5 | 0,10 % |
| 99 | Clefairy | 1 | 0,10 % |
| 100 | Silvally | 7 | 0,10 % |

# Attachment 4: Raw data for VGC 2018

| Position | Name | Generation (Group) | Usage percentage |
|---|---|---|---|
| 1 | Landorus | 5 | 64,51 % |
| 2 | Incineroar | 7 | 46,32 % |
| 3 | Tapu Fini | 7 | 43,00 % |
| 4 | Kartana | 7 | 42,96 % |
| 5 | Cresselia | 4 | 33,04 % |
| 6 | Charizard | 1 | 26,59 % |
| 7 | Tapu Koko | 7 | 25,71 % |
| 8 | Tapu Lele | 7 | 24,56 % |
| 9 | Metagross | 3 | 18,93 % |
| 10 | Zapdos | 1 | 18,38 % |
| 11 | Heatran | 5 | 16,54 % |
| 12 | Tyranitar | 2 | 15,37 % |
| 13 | Nihilego | 7 | 15,11 % |
| 14 | Amoonguss | 5 | 15,03 % |
| 15 | Gengar | 1 | 14,32 % |
| 16 | Milotic | 3 | 13,72 % |
| 17 | Kangaskhan | 1 | 10,91 % |
| 18 | Salamence | 3 | 10,51 % |
| 19 | Snorlax | 1 | 9,91 % |
| 20 | Tapu Bulu | 7 | 7,70 % |
| 21 | Gastrodon | 4 | 5,08 % |
| 22 | Rotom | 4 | 4,51 % |
| 23 | Slowbro | 1 | 4,35 % |
| 24 | Celesteela | 7 | 3,79 % |
| 25 | Mimikyu | 7 | 3,57 % |
| 26 | Aegislash | 6 | 3,52 % |
| 27 | Rhyperior | 4 | 3,22 % |
| 28 | Kommo-o | 7 | 3,11 % |
| 29 | Araquanid | 7 | 3,07 % |
| 30 | Gardevoir | 3 | 3,04 % |
| 31 | Gothitelle | 5 | 3,00 % |
| 32 | Ludicolo | 3 | 2,99 % |
| 33 | Volcarona | 5 | 2,99 % |
| 34 | Politoed | 2 | 2,94 % |
| 35 | Ferrothorn | 5 | 2,73 % |
| 36 | Porygon2 | 2 | 2,71 % |
| 38 | Blaziken | 3 | 2,49 % |
| 37 | Bisharp | 5 | 2,49 % |
| 39 | Thundurus | 5 | 2,42 % |
| 40 | Mawile | 3 | 2,31 % |
| 41 | Stakataka | 7 | 2,27 % |
| 42 | Smeargle | 2 | 2,23 % |
| 43 | Clefairy | 1 | 2,21 % |
| 44 | Braviary | 5 | 2,13 % |
| 45 | Raichu | 1 | 1,82 % |
| 46 | Manectirc | 3 | 1,76 % |
| 47 | Pelipper | 3 | 1,60 % |
| 48 | Persian-Alola | 7 | 1,55 % |
| 49 | Latias | 3 | 1,51 % |
| 50 | Hitmotop | 2 | 1,49 % |
| 51 | Excadrill | 5 | 1,47 % |
| 52 | Swampert | 3 | 1,40 % |
| 53 | Torkoal | 3 | 1,39 % |
| 54 | Azumarill | 2 | 1,36 % |
| 55 | Togedemaru | 7 | 1,32 % |
| 56 | Xurkitree | 7 | 1,22 % |
| 58 | Scizor | 2 | 1,12 % |
| 57 | Lurantis | 7 | 1,12 % |
| 59 | Blacephalon | 7 | 1,11 % |
| 60 | Pheromosa | 7 | 1,09 % |
| 61 | Whimsicott | 5 | 1,08 % |
| 62 | Venusaur | 1 | 1,05 % |
| 64 | Drifblim | 4 | 1,01 % |
| 63 | Scrafty | 5 | 1,01 % |
| 65 | Gyarados | 1 | 0,99 % |
| 66 | Cradily | 3 | 0,97 % |
| 67 | Naganadel | 7 | 0,95 % |
| 68 | Suicune | 2 | 0,90 % |
| 69 | Nidoqueen | 1 | 0,88 % |
| 70 | Blastoise | 1 | 0,83 % |
| 71 | Accelgor | 5 | 0,79 % |
| 72 | Lycanroc | 7 | 0,74 % |
| 73 | Garchomp | 4 | 0,60 % |
| 74 | Camerupt | 3 | 0,59 % |
| 75 | Tsareena | 7 | 0,54 % |
| 76 | Marowak-Alola | 7 | 0,51 % |
| 77 | Oranguru | 7 | 0,46 % |
| 78 | Abomasnow | 4 | 0,43 % |
| 79 | Lopunnyq | 4 | 0,42 % |
| 80 | Hydreigon | 5 | 0,40 % |
| 81 | Staraptor | 4 | 0,38 % |
| 82 | Empoleon | 4 | 0,38 % |
| 83 | Dragonite | 1 | 0,37 % |
| 84 | Greninja | 6 | 0,33 % |
| 85 | Hawlucha | 6 | 0,33 % |
| 86 | Ninetales-Alola | 7 | 0,32 % |
| 87 | Gallade | 4 | 0,31 % |
| 89 | Porygon-Z | 4 | 0,31 % |
| 88 | Primarina | 7 | 0,31 % |
| 90 | Togekiss | 4 | 0,29 % |
| 92 | Terrakion | 5 | 0,28 % |
| 91 | Muk-Alola | 7 | 0,28 % |
| 93 | Malamar | 6 | 0,27 % |
| 94 | Kingdra | 2 | 0,26 % |
| 95 | Lucario | 4 | 0,26 % |
| 96 | Goodra | 6 | 0,25 % |
| 97 | Arcanine | 1 | 0,23 % |
| 98 | Serperior | 5 | 0,23 % |
| 99 | Jellicent | 5 | 0,23 % |
| 100 | Nidoking | 1 | 0,22 % |
| 101 | Conkeldurr | 5 | 0,21 % |
| 103 | Tornadus | 5 | 0,20 % |
| 102 | Mudsdale | 7 | 0,20 % |
| 105 | Latios | 3 | 0,19 % |
| 106 | Purugly | 4 | 0,19 % |
| 104 | Deagalge | 6 | 0,19 % |
| 107 | Murkrow | 2 | 0,18 % |
| 108 | Primeape | 1 | 0,16 % |
| 109 | Mandibuzz | 5 | 0,16 % |
| 110 | Sylveon | 6 | 0,15 % |
| 111 | Marowak | 1 | 0,14 % |
| 112 | Breloom | 3 | 0,14 % |
| 113 | Gigalith | 5 | 0,14 % |
| 114 | Silvally | 7 | 0,14 % |
| 117 | Illumise | 3 | 0,13 % |
| 116 | Krookodile | 5 | 0,13 % |
| 115 | Sandslash-Alola | 7 | 0,13 % |
| 118 | Beedrill | 1 | 0,12 % |
| 119 | Pidgeot | 1 | 0,11 % |
| 120 | Aerodactyl | 1 | 0,11 % |
| 121 | Rhydon | 1 | 0,11 % |
| 125 | Raikou | 2 | 0,11 % |
| 124 | Banette | 3 | 0,11 % |
| 123 | Lilligant | 5 | 0,11 % |
| 122 | Meowstic | 6 | 0,11 % |
| 128 | Bronzong | 4 | 0,10 % |
| 126 | Seismitoad | 5 | 0,10 % |
| 127 | Musharna | 5 | 0,10 % |
| 129 | Salazzle | 7 | 0,10 % |

# Attachment 5: Raw data for VGC 2017

| Position | Name | Generation (Group) | Usage percentage |
|---|---|---|---|
| 1 | Arcanine | 1 | 80,23 % |
| 2 | Tapu Koko | 7 | 54,41 % |
| 3 | Kartana | 7 | 36,13 % |
| 4 | Porygon2 | 2 | 34,96 % |
| 5 | Garchomp | 4 | 31,54 % |
| 6 | Tapu Fini | 7 | 31,35 % |
| 7 | Tapu Lele | 7 | 28,96 % |
| 8 | Celesteela | 7 | 26,75 % |
| 9 | Snorlax | 1 | 23,37 % |
| 10 | Gigalith | 5 | 19,65 % |
| 11 | Nihilego | 7 | 19,37 % |
| 12 | Ninetales-Alola | 7 | 16,17 % |
| 13 | Muk-Alola | 7 | 13,28 % |
| 14 | Tapu Bulu | 7 | 11,34 % |
| 15 | Metagross | 3 | 10,96 % |
| 16 | Buzzwole | 7 | 9,11 % |
| 17 | Drifblim | 4 | 8,96 % |
| 18 | Pheromosa | 7 | 8,61 % |
| 19 | Togedemaru | 7 | 8,49 % |
| 20 | Gyarados | 1 | 7,97 % |
| 21 | Marowak-Alola | 7 | 7,68 % |
| 22 | Mudsdale | 7 | 7,30 % |
| 23 | Gastrodon | 4 | 7,11 % |
| 24 | Xurkitree | 7 | 6,27 % |
| 25 | Hariyama | 3 | 5,82 % |
| 26 | Milotic | 3 | 5,80 % |
| 27 | Araquanid | 7 | 5,35 % |
| 28 | Mandibuzz | 5 | 5,04 % |
| 29 | Salamence | 3 | 4,42 % |
| 30 | Mimikyu | 7 | 3,74 % |
| 31 | Smeargle | 2 | 3,70 % |
| 32 | Aerodactyl | 1 | 3,27 % |
| 33 | Pelipperq | 3 | 3,22 % |
| 34 | Golduck | 1 | 2,75 % |
| 35 | Porygon-Z | 4 | 2,71 % |
| 36 | Persian-Alola | 7 | 2,54 % |
| 37 | Torkoal | 3 | 2,53 % |
| 38 | Goodra | 6 | 2,47 % |
| 39 | Slowking | 2 | 1,87 % |
| 40 | Magnezone | 4 | 1,81 % |
| 41 | Krookodile | 5 | 1,80 % |
| 42 | Whimsicott | 5 | 1,78 % |
| 43 | Braviary | 5 | 1,73 % |
| 44 | Clefairy | 1 | 1,71 % |
| 45 | Talonflame | 6 | 1,44 % |
| 46 | Lilligant | 5 | 1,43 % |
| 47 | Raichu-Alola | 7 | 1,43 % |
| 48 | Oranguru | 7 | 1,32 % |
| 49 | Trevenant | 6 | 1,25 % |
| 50 | Scizor | 2 | 1,16 % |
| 51 | Politoed | 2 | 1,11 % |
| 52 | Vikavolt | 7 | 0,96 % |
| 53 | Kommo-o | 7 | 0,93 % |
| 54 | Incineroar | 7 | 0,75 % |
| 55 | Tsareena | 7 | 0,72 % |
| 56 | Drampa | 7 | 0,72 % |
| 57 | Lucario | 7 | 0,71 % |
| 58 | Chansey | 1 | 0,59 % |
| 59 | Eevee | 1 | 0,59 % |
| 60 | Salazzle | 7 | 0,59 % |
| 61 | Gengar | 1 | 0,55 % |
| 62 | Starmie | 1 | 0,45 % |
| 63 | Murkrow | 2 | 0,45 % |
| 64 | Vanilluxe | 5 | 0,45 % |
| 65 | Stoutland | 5 | 0,44 % |
| 66 | Clefable | 1 | 0,41 % |
| 67 | Sandslash-Alola | 7 | 0,39 % |
| 68 | Alakazam | 1 | 0,38 % |
| 69 | Machamp | 1 | 0,34 % |
| 70 | Type: Null | 7 | 0,28 % |
| 71 | Espeon | 2 | 0,25 % |
| 72 | Comfey | 7 | 0,25 % |
| 73 | Weavile | 4 | 0,24 % |
| 74 | Cloyster | 1 | 0,21 % |
| 75 | Dugtrio-Alola | 7 | 0,21 % |
| 76 | Slowbro | 1 | 0,20 % |
| 77 | Exeggutor-Alola | 7 | 0,20 % |
| 78 | Dragonite | 1 | 0,18 % |
| 79 | Mismagius | 4 | 0,18 % |
| 80 | Primarina | 7 | 0,18 % |
| 81 | Wishiwashi | 7 | 0,16 % |
| 82 | Lycanroc | 7 | 0,16 % |
| 83 | Sableye | 3 | 0,14 % |
| 84 | Silvally | 7 | 0,14 % |
| 85 | Oricoiro | 7 | 0,14 % |
| 86 | Dhelmise | 7 | 0,13 % |
| 87 | Bewear | 7 | 0,13 % |
| 88 | Pikachu | 1 | 0,12 % |
| 89 | Flygon | 3 | 0,12 % |
| 90 | Masquerain | 3 | 0,12 % |
| 91 | Decidueye | 7 | 0,12 % |
| 92 | Tauros | 1 | 0,11 % |
| 93 | Electivire | 4 | 0,11 % |
| 94 | Jolteon | 1 | 0,10 % |
| 95 | Exeggcute | 1 | 0,10 % |