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World of Warcraft Stats System: Evolution and Casualization

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Abstract

Since World of Warcraft release, it has remained as the MMORPG with more subscribers of the market, and during that time, it has evolved in diverse ways. One of the aspects that have suffered more changes is its character stats system, which is an elemental part of this game. By studying it, we can learn much about the game evolution. Some players feel that the game has evolved to appeal to more casual audiences. In this study, we will analyze the development of World of Warcraft character stats system through the expansions while trying to determine if these changes have promoted the casualization of the game. Study results could be interesting for game designers and game researchers as an example of the long-term evolution of one of the most important computer games in history.

Keywords: MMORPG, casual, game design, game studies, game industry

1. Introduction

MMORPG stands for massively multiplayer online role-playing games. Two different terms form this name, MMO and RPG. MMOs are online games that bring together many players in the same persistent world. The world is still active when the player disconnects and continues advancing without him until he reconnects. RPGs are games in which players are allowed to share the creation of their own story, where they play a main character [1]. A digital RPG is a role-playing game very similar to board role-playing games. According to Thomas H. Apparely, “... the key difference between paper and pencil RPGs and computer RPGs is that the game is no longer a collectively produced fantasy, but one that takes place in an official fantasy world with strict parameters defined” [2]. Therefore, an MMORPG is an RPG game in which a large number of players participate online in the same persistent world and interact with each other to achieve a common goal.

World of Warcraft, the title that we will analyze in this work, is precisely one of the most influential and relevant MMORPGs in history [3]. It was released on November 23, 2004, in North America, and on February 11, 2005, in Europe. Since then, Blizzard has been taking expansions of the game every few years, in addition to constant updates for each expansion. These changes have affected every aspect of the game, making World of Warcraft one of the games that has suffered more evolution along time.

Many players consider that World of Warcraft evolution has gravitated towards a more easy to play game, removing complex aspects that required an in-depth knowledge of the game mechanics to perform optimally, thus making the game more casual. Casualization is a phenomenon related to the game design, which consists in making various changes to the mechanics, difficulty, and effort required to facilitate mastering the game. Traditionally, MMORPGs required players to play for long times to progress in the game, and World of Warcraft, at least in its origins, was no exception.

One of the parts of the game in which fans consider that the casualization process had more impact is in the character stats. In World of Warcraft, each player takes control of a character or avatar through which he interacts with the game world. The characters are characterized, among other aspects, by their stats. According to Salen and Zimmerman, stats, also known as attributes, represent “qualities of objects that are part of a system” [4]. In this case, stats are qualities of characters that are part of the different game systems, such as craft, trade, or combat systems. Among these, the stats related to the combat system are probably the most important, as combat has been one of the main and more complex mechanics of interaction with the environment in World of Warcraft and many other commercial MMORPGs.

Character stats related to the combat system represent qualities such as their strength, agility, or resistance when fighting against other characters. A stat “is formed by an identifier and a value” [5]. The identifier indicates which character quality represents that attribute, while the value indicates the magnitude of the quality. The value of a stat depends on each game. For example, in “Dungeons & Dragons,” it is usually between 1 and 20, 10 being the average value of a human being, 20 being a value only attainable by gods and 1 representing the practical lack of that quality. In contrast, in World of Warcraft, the attributes may have values above 300 without being considered high, and, in fact, the scale of stats values has undergone numerous changes throughout the life of the game.

In this work, we will study the evolution of World of Warcraft combat stats system along the successive expansions that have taken place since the title’s launch. Our interest is to understand the reasons and motives behind the successive changes it has suffered and to determine if it has been casualized over time, as many players suggest, and, in that case, what are the changes that have been made by designers to simplify the game making it more casual?

2. Study design

Over the years, World of Warcraft has remained as the subscription-based MMORPG with more players all around the world, even entering the *Guinness World Records* as “The most popular MMORPG in number of subscribers with 10 million players in January 2008” [6]. Since then, the game has undergone numerous updates to maintain this success. One of the aspects of the game most affected by the updates, as we can see later, has been the character stats system.

According to some authors, the game has been casualized over the years. In its first versions, the need to exchange information, coordinate with other players, and receive help, encouraged interaction and socialization, but as a result of casualization, cooperation becomes obsolete, and socialization is no longer necessary [7]. Other authors suggest, on the contrary, that casualization was essential for the commercial success of the game in the long term [8]. In any case, despite the various opinions about the World of Warcraft casualization, we have not found papers that analyze how it occurred at the playable level.

2.1 Objective

In this work, we will study in detail the evolution of character stats system and their effect on the World of Warcraft combat system since its launch, to understand how the design of such an important game has evolved and to analyze whether and how the effects of these changes have contributed to its casualization.

This general objective can be summarized in the following research questions:

- Has World of Warcraft suffered a casualization process since its launch due to the changes in its stats system?
 1. Have been character stats required to play optimally reduced?
 2. Has been the improvement of character stats facilitated?
 3. Have been the game mechanics related to stats simplified?

2.2 Methodology

In the first place, we have recovered and synthesized information about World of Warcraft stats system and its evolution throughout the successive expansions, from the first version of the game, commonly called Vanilla, to the Legion expansion that was launched on August 14, 2018. To do so, we have processed the changelogs of these expansions and of other game updates that happened between them. This information has been later analyzed both quantitatively and qualitatively to determine their relation to game casualization.

To answer research question 1.1, we have driven a quantitative analysis comparing the stats available in each expansion. We have divided stats into four groups, one for each role that a character can take in combat: attack, defense, offensive spells, and healing spells. For each role we have identified the stats that a player would require to consider to play optimally. We have compared the amount and variety of these stats through expansions. This comparison allows us to determine the effort and complexity of decisions needed to equip a character optimally for his role. It also gives us insights on the necessary adaptations that a player must perform to play different roles.

Regarding question 1.2, we have separated each expansion stats in two groups, “item stats” that include those which can be directly improved by equipping items and “non-item stats” that include those which are derived from other “item stats” or that are obtained by other game mechanics, such as talents or abilities. We made this distinction because “item stats” are those that require more effort and planning to be increased, as a player can only get the best items by beating end-game quests and enemies. On the contrary, a player can obtain “non-item stats” by increasing the associated “item stats” or by activating talents or abilities, which are unlocked by leveling up. A reduction of “item stats” in favor of “non-item stats” would probably mean that the improvement of stats has been facilitated by making them depend on the character level and not on the acquisition of items, which require much more effort.

Finally, for question 1.3, we have performed a qualitative analysis on every change that the stats system and the related game mechanics have suffered through expansions, to determine if there has been a progressive simplification of game mechanics over time, requiring less effort or knowledge from the players to play optimally.

2.3 Scope

The scope of the study is limited to the evolution of the character's stats related to the combat system in the context of "player vs. environment" game mode, excluding "player vs. player" stats, as well as any other stats that may be related to non-combat game systems such as movement, professions, trading, etc.

The scope will also be limited to changes that affect stat types and their related game mechanics, but we have ignored changes that affect stats values, due solely to the balancing of the game. We will also exclude changes in other game-design aspects, like items or professions, only mentioning them when related to a change that affect character stats types and their associated game mechanics.

3. State of the art

3.1 Studies about World of Warcraft

World of Warcraft, due to its great importance in the field of video games, has been analyzed extensively from various points of view, such as sociological, anthropological, educational, mathematical, and ludological. Several of these studies also mention issues related to the casualization of the game. Below we discuss some of them, highlighting the aspects associated with this work.

In the article "Communication, Coordination, and Camaraderie in World of Warcraft," the author talks about the relationships and communication between players that occurs in a band group [9]. The article explains how they manage to win, despite not having the necessary equipment, thanks to teamwork, the excellent atmosphere of the group, and the coordination between them. Even when focused on communication, the article talks about the combat system and the character stats when it explains how, as soon as the band starts, players talk about how much fire resistance they have. According to the author, players need 180 fire resistances to overcome the mission. Despite players not reaching those values, they continue playing with a friendly and positive mood.

Another sociological cutting study would be "Analyzing the Evolution of Social Groups in World of Warcraft" [8]. This article discusses 192 million data, out of 18 million characters, from 1.4 million teams, over 4 years to investigate World of Warcraft's guilds and their evolution over time. The study differentiates eight different archetypes of guilds based on their activity level throughout the Vanilla game and the first two expansions. Regarding the casual play, the findings say that they have found a strong tendency towards brotherhoods aimed at the casual player. They also argue: "For the design of future games, our conclusion at this point is that for commercial success, it is of major importance to cater to the needs of the casual gamer."

Following this line, we can find articles like "Hardcore Gamers and Casual Gamers Playing Online Together" [10], which talks about how it is necessary to adapt MMO games to casual audiences, since they are quite expensive games to make and maintain that need to reach a broad audience. In the conclusions, they state: "To retain hardcore players, their time and dedication should continue to be rewarded, but should not be the main criterion in order to reduce the frustration of casual players." They also explain how World of Warcraft has shown improvements in this aspect in relation to previous MMORPGs.

We can also find articles that talk about World of Warcraft in more specific aspects of gameplay, such as "Optimizing Play: How Theorycraft Changes Gameplay and Design" [11], which explains how players can influence the design of

the game, and in particular the combat and stats systems, through the theorycraft. The theorycraft consists in analyzing the game mathematically to find a way to maximize the power of the characters, statistically speaking. This way, players can understand what items are more powerful, which spell settings or abilities will be most suitable for them, etc. This practice affects the guilds, who expect to perform well, and also designers, who must balance the game content and design by considering that players will use the theorycraft to optimize their actions.

Concerning the design of video games, we can find “GDC: Learning from World of Warcraft’s Quest Design mistakes” [12], which collects a GDC talk by Jeff Kaplan, the then-creative director of World of Warcraft. This talk discusses World of Warcraft missions, their function, and lessons learned from mistakes made when designing them. It explains design problems such as giving too many options to players, thus losing control over the user experience, or writing very long texts or uninteresting missions that are not read, among many other problems and proposals to solve them.

We can also find articles that demonstrate the importance of World of Warcraft in the video game industry. In “The Warning of the World of Warcraft Effect” [12], the author tells us what he calls “wow effect,” a tendency of videogame industry to create new MMOs in an attempt to take a share of the market that emerged from the success of World of Warcraft. The author explains that this effect is not unique and resurfaces every time a game becomes the norm, setting as an example “Minecraft,” “Call of Duty,” or “Fortnite,” among others. It suggests that developers should avoid falling for this effect, as it is challenging to compete against a game that has been on the market longer and leads the genre in question.

3.2 Studies about casual games

Focusing on the field of casual play, an essential point of this work, we can also find several relevant studies that specifically address this topic. An important aspect is to know what “casual game” means as the term can be confusing. In “Casual Games Discussion” [14], the following classification is proposed:

- Casual in games cultures: The phenomenon of the casual aspects of games cultures.
- Casual game: Certain properties of games are called casual, e.g., game has generally appealing content, simple controls, easy-to-learn gameplay, fast rewards, or support for short play sessions. These properties can vary depending on the game, and the term should be treated more or less ostensibly.
- Casual gaming. The aspects of the present game cultures are characterized as casual: the attitude towards gaming may be casual, e.g., playing games may be perceived as just one leisure activity among others (e.g., TV, movies, sports) or present clearly instrumental motives other than leisure for the playing activity.
- Casual playing: The way a game is used or played is characterized as casual, e.g., a game is played in small-time bursts or in a low cognitive state. This refers more to the play session than to the general attitude towards games.
- Casual gamer: A person who plays games in a casual manner, not necessarily casual games (casual playing), or who has a casual attitude towards gaming (casual gaming).
- Casual game player: A person who plays games that are called or labeled as casual (not necessarily playing casually). Studies show that the demography

covers almost everybody (from teens to older people, from newbies to lapsed gamers) and the largest group seems to be “women over 35.”

In this work, we considered World of Warcraft casualization in the sense of taking aspects of “casual games” to provide players a “casual playing” style of play. By any means, we have considered World of Warcraft as a “casual game.”

One of the most important works on casual games is the book *A Casual Revolution* by Juul [15]. Its author is a Danish game designer, as well as an educator and video game study theorist. In his book, he explains the growth of casual games, which reach an audience that goes beyond the traditional audience of video games.

This book has had a significant impact, as we can see from the various articles that build on it. An example would be “Congenial by Design: A review of A Casual Revolution” [16]. It is a review of Juul’s book focusing on how it addresses the growing popularity of casual games with the advent of the Wii, mobile games, downloadable games, etc. After reviewing several topics covered in the book, the author criticizes some aspects that he thinks should be explored more deeply, although he considers the book indispensable for anyone in the video game industry. Another article based on Juul’s book is “Not a Casual Review: Reading Jesper Juul’s *A Casual Revolution*” [17]. Similar to the previous one, it is a review of the book, albeit in greater depth, commenting on part by part and contributing with novel ideas, such as that a hardcore player can play a hardcore game casually.

Related to the casual theme, beyond *A Casual Revolution*, we can find “The Structure of Videogame Preference” [18], where its authors investigate statistical patterns of player preferences around different game aspects. They divide casual players from hardcore players and include a difference between genres. They also deal with other factors such as game theme and popularity. The authors conclude that the player’s gender predicts what kind of game they will play, with women being casual games generally. However, in its differentiation between mainstream games and niche games, this difference between genres cannot be seen.

4. Evolution of stats

In this section, we summarize and analyze collected data about World of Warcraft stats system evolution through its different expansions. It’s divided into sections corresponding to each one of the studied versions of the game, starting from the launch version known as Vanilla. In each section we summarize the most relevant changes on character stats and analyze them qualitatively, identifying motives behind each change, their in-game effect and their possible contribution to game casualization.

4.1 Vanilla

World of Warcraft’s first version is usually called Vanilla version. It was launched in 2004 in America and 2005 in Europe. In Vanilla version, character sheet contains stats, items, and abilities sections. Stats split into primary stats or attributes and secondary stats. There were five attributes: strength, agility, stamina, intellect, and spirit. Increasing an attribute also increased related secondary stats. For example, an increase in stamina also increased life while improving strength also increased attack power. Leveling up the character provides additional primary stats, while equipment can increase both primary and secondary stats, depending on the equipped items.

Primary	Attack	Defense	Spell offensive	Spell healing	Resistances
Strength	Strength	Stamina	Intellect	Intellect	Fire res
Agility	Agility	Defense	Spell damage	Spirit	Ice res
Stamina	Damage	Armor	Spell hit chance	Healing	Arcane res
Intellect	Attack power	Parry	Spell crit. strike	Spell crit. strike	Nature res
Spirit	Attack hit chance	Dodge	Spell haste	Spell haste	Shadow res
	Attack crit. strike	Block value	Spell penetration	Mana regen	
	Attack haste				

Table 1.
 Role stats in WoW Vanilla.

As secondary “item stats,” we can find the following: hit chance, attack power, attack speed, haste, damage, attack critical strike, defense, armor, dodge, parry, block value, spell hit chance, spell power, healing power, spell critical strike, elemental resistances, spell penetration, and mana regeneration. Haste is divided in three stats, for melee, ranged, and spell attacks. In the case of spell damage and elemental resistances, there is one stat for each type of element, these being arcane, fire, nature, frost, and shadows [19]. In total, we can find 28 different “item stats.” There are at least eight additional “non-item stats,” which are life, mana, energy, rage, attack speed, ranged attack speed, cast speed, health regeneration, and block chance. In **Table 1** we show how all item stats relate to the different roles a player can take during combat.

In this work, we will also consider defense skill and weapon’s skills, stats that are increased not by leveling or equipping the character but only when the character defends against attacks or attacks using a particular type of weapon. In Vanilla version there are many different weapon skills, one for every kind of weapon in the game, such as one-handed swords, two-handed swords, staves, or bows. Weapon skills increase the probability of hitting and critically hitting, as well as the damage done with that type of weapon. Defense skill increases the defense stat, which decreases the probability of being hit or critically hit, and also other defensive secondary stats as dodge, parry, and block chance. Weapon and defense skills were, therefore, opposing stats.

Other character aspects that have an impact on stats are race, class, and specialization. Each race had a different effect on character stats and weapon skills. Classes and specializations determine which stats have more importance for the character. For example, some classes based their damage on the strength stat, others on the agility stat, and others on the intellect stat. We will ignore all aspects related to races, classes, and specializations in this study to focus on the changes that have affected all players in general and the different roles that a character can play in combat, regardless of their specific class or race.

4.2 The Burning Crusade

4.2.1 Changes in this expansion

The first expansion of World of Warcraft, The Burning Crusade, is launched in January 2007. The maximum character level is increased from 60 to 70. In this expansion there are some significant changes regarding character stats.

In this expansion some combat-related secondary stats are changed from absolute percentages to arbitrary values that translate to percentages through

Primary	Attack	Defense	Spell offensive	Spell healing	Resistances
Strength	Strength	Stamina	Intellect	Intellect	Fire res
Agility	Agility	Defense	Spell damage	Spirit	Ice res
Stamina	Damage	Armor	Spell hit chance	Healing	Arcane res
Intellect	Attack power	Parry	Spell crit. strike	Spell crit. strike	Nature res
Spirit	Attack hit chance	Dodge	Spell haste	Spell haste	Shadow res
	Attack crit. Strike	Block value	Spell penetration	Mana regen	
	Attack haste				
	<u>Armor penetration</u>				
	<u>Expertise</u>				

New stats in this expansion are underlined.

Table 2.
Role stats in *The Burning Crusade*.

mathematic formulas, which take character level as a factor. Affected stats are since then called ratings, like hit rating, critical strike rating, dodge rating, or parry rating. During combat these ratings are converted to percentages by applying the mentioned formulas. These formulas use character level as a lowering factor, so that final percentages do not get too high when character level increases.

During the expansion lifecycle, two new stats are added: expertise and armor penetration. Expertise reduces the probability of enemies dodging or parrying melee attacks when attacking them frontally or just dodging when attacking from behind, as in that situation the enemy cannot parry. Armor penetration allows melee attacks to ignore a percentage of the target’s armor stat (**Table 2**).

4.2.2 Analysis of changes

The conversion of many stats from absolute percentages to relative ratings occurs with the implementation of the combat rating system [20]. Combat rating system is necessary as the expansion raised the character maximum level from 60 to 70, and, if they did not make this change, absolute percentages would have escalated excessively between level 60 and 70. This change also made it easier to balance the game just by tweaking the formulas.

Expertise reduces the chances of enemy blocking attacks, or parrying attacks when attacking frontally. It is an important benefit for the defensive roles as they always attack from the front but also important for attack roles. Armor penetration helps damaging enemies with high armor, which can help damage-oriented players when facing final bosses. Both stats are cap value stats, which means that when they are improved past a particular value, they stop providing any benefit to the player. This game mechanic increases the complexity of the game, requiring an in-depth knowledge from players to improve related stats optimally.

4.3 Wrath of the Lich King

4.3.1 Changes in this expansion

At the end of 2008 comes the second expansion of World of Warcraft, Wrath of the Lich King. The maximum character level is increased from 70 to 80. It applies some simplifications to the characters’ stats. It was in this expansion that the maximum number of players in the history of World of Warcraft was reached [21].

Primary	Attack	Defense	Spell offensive	Spell healing	Resistances
Strength	Strength	Stamina	Intellect	Intellect	Fire res
Agility	Agility	Defense	<u>Spell power</u> Spell damage	Spirit	Ice res
Stamina	Damage	Armor	<u>Hit chance</u> Spell hit chance	<u>Spell power</u> Healing	Arcane res
Intellect	Attack power	Parry	<u>Critical strike</u> Spell crit. strike	<u>Critical strike</u> Spell crit. strike	Nature res
Spirit	<u>Hit chance</u> Attack hit chance	Dodge	<u>Haste</u> Spell haste	<u>Haste</u> Spell haste	Shadow res
	<u>Critical strike</u> Attack crit. strike	Block value	Spell penetration	Mana regen	
	<u>Haste</u> Attack haste				
	Armor penetration				
	Expertise				

New stats in this expansion are underlined, removed stats are strikethrough.

Table 3.
 Role stats in Wrath of the Lich King.

One notable change is the elimination of weapon skills and defense skill. Since this change, these stats were always considered at the maximum available for the character level.

Besides, some stats are unified and simplified. The physical hit rating is unified with the spell hit rating, leaving only a hit rating for both physical and spell attacks. The same happens with critical strike rating and haste, which were split in two or three different stats and are now unified in this version. Similarly, but affecting only spellcasting classes, all types of elemental spell power are unified and also merged with healing power (**Table 3**).

4.3.2 Analysis of changes

Removing the skill system for both weapons and defense seems to be a change with the sole intention of avoiding players to waste time improving these skills. Before this change, if the character started using a weapon he had never used, he had to spend some time training with that weapon until he was able to use it optimally, which resulted in the player fighting enemies only with melee attacks, trying to lengthen the combat as much as possible to raise the skill. Removing these skills saves players from having to worry about this cumbersome process, allowing them to start using any new weapon optimally right away. Overall, it seems that these changes were beneficial for most players, especially for new ones, and for those who started leveling new characters.

Unification of the hit rating, critical strike rating, and haste between spells and physical attacks had little effect on players. Rarely a character bases his damage both in physical and spell attacks, so unifying both stats was probably done to simplify the system without affecting the gameplay deeply.

Something similar happened with spell power and healing power, but this specific change could have the intention of facilitating hybrid spellcaster to use both damage and healing spells with equal power, fostering the use of both offensive and healing spells to facilitate leveling up. Before this change, leveling up as a healer was a time-consuming task, since he had few ways to kill enemies quickly. After the

change, a healing class could also do significant amounts of damage, making it much easier to level up. In general, this change helped players that used healing-focused characters.

Regarding the removal of elemental damage, it meant the end of character builds focused on those stats, like mages that could specialize in fire or ice damage. With this change, all classes and specializations started using the same stat for damage calculations, facilitating their equipment.

4.4 Cataclysm

4.4.1 Changes in this expansion

The third expansion of World of Warcraft was launched in late 2010, called Cataclysm. The maximum character level is increased from 80 to 85. As of the release of this expansion, the number of World of Warcraft subscribers started to decrease progressively.

This expansion eliminates defensive stats on tank characters. Defense and block value are eliminated. The defense function of reducing damage is carried out by other stats, such as armor, parry, or dodge. Block value stat also disappears, making every character to block 30% of the damage by default.

Mana regeneration secondary stat is also eliminated, leaving the spirit as the only source of mana regeneration. Affected classes obtain a new active ability that allows them to increase mana regeneration. Besides, spirit stops giving life regeneration, being now an exclusive stat for mana regeneration.

Attack power is removed from all items, and spell power is left only on weapon items. Both stats can now be improved through character attributes: intellect provides spell power, and strength and agility provide attack power.

The block chance and armor penetration stats are removed from the equipment, keeping them in talents, mastery (see below), and some abilities. Items that lost these stats were compensated with mastery.

A new secondary stat is added: mastery. This stat is different from the rest, since it is associated with a specific effect that depends exclusively on the character specialization. As an example, in one specialization, mastery increases armor penetration, while in another, it increases the block chance. Whatever the effect, mastery is always a passive ability whose effectivity increases with the mastery stat.

Primary	Attack	Defense	Spell offensive	Spell healing	Resistances
Strength	Strength Attack power	Stamina	Intellect	Intellect	Fire res
Agility	Agility Attack power	Defense	Spell power	Spirit	Ice res
Stamina	Damage	Armor	Hit chance	Spell power	Arcane res
Intellect	Hit chance	Parry	Critical strike	Critical strike	Nature res
Spirit	Critical strike	Dodge	Spell penetration	Haste	Shadow res
	Haste	Block value	Haste	Mana regen	
	Armor penetration	<u>Mastery</u>	<u>Mastery</u>	<u>Mastery</u>	
	Expertise				
	<u>Mastery</u>				

New stats in this expansion are underlined, removed stats are strikethrough.

Table 4.
Role stats in Cataclysm.

A significant change is made to items and the stats they provide. Since the beginning, every item had an item level and a rarity, which determined the amount of primary and secondary stats it supplied to players. Since this expansion, stats provided by items no longer depend on their rarity and rely exclusively on their item level. Since this change, two items of the same level will give the same amount of primary stats, stamina, and secondary stats, differing only in the type of secondary stats provided (**Table 4**).

4.4.2 Analysis of changes

Most of the changes in this expansion had the effect of making it easier for players to get proper equipment for their characters and to make comparisons between items.

With the removal of block value, it becomes easier to find better shields as they only differ by their item level and the type of secondary stats it provides. When a player had to choose between two shields, the higher the item level of the shield, the better it will be for the player, except for secondary stats, which the player must consider only when there is a scarce difference between the item levels of both shields. This change, besides the elimination of the defense stat, facilitates the equipment of players with a defensive role, as they have fewer stats to consider.

By making mana regeneration depends exclusively on the spirit stat, spirit starts being the most crucial stat for healers and an ignored one by everyone else, which means that any item that provides spirit will be seen in most cases as an item for healers, since they are the only ones that can get a real benefit from it. Healing classes also have some talents that improve damage capabilities based on spirit, helping them to change between damage and healing specializations, especially for leveling up purposes. In general terms, this change makes it easier for healers to get useful items depending only on the spirit they provide.

The fact that the most important stats for damage specializations, attack power and spell power, are obtained only through the character's primary stat greatly increases the importance of that stat. It also simplifies the comparison of different pieces of equipment, because as already stated, items of higher level always provide more primary stats.

Finally, mastery is the first secondary stat in World of Warcraft that is useful for all characters, independently of their class or specialization. It starts a tendency that looks forward to make stats useful for different in-game roles, instead of having role-specific stats. In future expansions, we will see how this tendency is generalized, making almost all stats useful for every character and class.

4.5 Mists of Pandaria

4.5.1 Changes in this expansion

The fourth expansion of World of Warcraft is launched in late 2012. The maximum character level is increased from 85 to 90. In this expansion some stats are eliminated, and there are relevant changes in PvP stats.

As it previously happened with elemental spell power, elemental resistance stats are also eliminated in this expansion, leaving them only on certain spells and racial traits and overall reducing their impact and importance. Spell penetration, a secondary stat designed to surpass elemental resistances, is also eliminated.

Another change is that intellect stops giving maximum mana. From now on, it will only provide spell power and critical strike rating. The maximum amount of mana of a character depends solely on its level and increases considerably with

Primary	Attack	Defense	Spell offensive	Spell healing	Resistances
Strength	Strength	Stamina	Intellect	Intellect	Fire res
Agility	Agility	Armor	Spell power	Spirit	Ice res
Stamina	Damage	Parry	Hit chance	Spell power	Arcane res
Intellect	Hit chance	Dodge	Critical strike	Critical strike	Nature res
Spirit	Critical strike	Mastery	Haste	Haste	Shadow res
	Haste		Mastery	Mastery	
	Expertise		Spell penetration		
	Mastery				

New stats in this expansion are underlined, removed stats are strikethrough.

Table 5.
Role stats in Mists of Pandaria.

each level up, not becoming a cause of problems for mana-dependent classes anymore (Table 5).

4.5.2 Analysis of changes

According to developers [22], elemental resistances are eliminated because they were difficult to understand. Although potentially interesting, they were not using them in World of Warcraft and therefore decided to remove them. Once the resistances have been eliminated, magic penetration has no use and is also removed. With the elimination of the resistances, players no longer need to have a specific set of items with elemental resistances exclusively for some end-game encounters. There were rare cases in which this happened, mostly in Vanilla and Wrath of the Lich King expansions, but this type of battle did not happen in the last expansions. Resistances' removal thus facilitates equipping characters for end-game content, making them know that elemental resistances are something that they will not have to care about anymore. As in fact, elemental resistances were not being used in recent expansions of end-game content, the change has little impact on gameplay.

The simplification of intellect primary stat, removing its relationship with mana, allows game designers to control the exact amount of mana that each specialization will have available, as it no longer will depend on equipped items. In any case, the stat is still one of the most important for players, as it is the main form of improving damage and healing for spell casters, so the change does not have a substantial impact on gameplay.

4.6 Warlords of Draenor

4.6.1 Changes in this expansion

At the end of 2014 comes Warlords of Draenor, the fifth expansion of World of Warcraft, which aims to return somewhat to the roots of the game. The maximum character level is increased from 90 to 100. Many stats are removed, while new ones are added. A compression in stats also occurs for the first time.

Hit and expertise ratings are eliminated from the game and from the formulas used when hitting. That is, when a character attacks, the only thing that is considered to see if the attack fails to hit is the difference in level between the attacker and its target. It must be clarified that when an attack does not fail, it is still necessary to check whether it is dodged, parried, or blocked.

Primary	Attack	Defense	Spell offensive	Spell healing
Strength	Strength/agility	Stamina	Intellect	Intellect
Agility	Damage	Armor	Spell power	Spirit
Stamina	Hit chance	Parry	Hit chance	Spell power
Intellect	Critical strike	Dodge	Critical strike	Critical strike
Spirit	Haste	Mastery	Haste	Haste
	<u>Expertise</u>	Versatility	Mastery	Mastery
	Mastery	<u>Bonus armor</u>	Versatility	Versatility
	Versatility			
	Multistrike			

New stats in this expansion are underlined, removed stats are strikethrough.

Table 6.
 Role stats in Warlords of Draenor.

Dodge and parry ratings are removed from the items, and, instead, they start to depend on abilities, talents, and primary stats, such as agility, which increases the dodge rating, and the strength, which increases the parry rating. It's a similar change to the one suffered by attack power in Cataclysm expansion but now with defensive stats.

Agility and intellect stop giving critical strike rating. This change is compensated by adding a 5% base critical strike rating to all classes and a passive ability for all agility-based classes that increases critical strike rating by another 5% extra. With this change, all the uses that the intellect attribute had in the original version of World of Warcraft have been eliminated.

New secondary stats are added in this expansion: bonus armor, multistrike, and versatility. A new type of stats, tertiary, is also introduced with avoidance, indestructible, leech, and speed, which have less in-game effect than the secondary stats.

Finally, from this expansion onwards, items stop giving a particular primary stat, and, instead, they provide the most relevant primary stat for the character's specialization. In the same object, a mage sees that it gives intellect, and a warrior sees that it provides strength (**Table 6**).

4.6.2 Analysis of changes

According to patch notes [23], the elimination of the hit rating and the expertise is due to the game mechanics not being fun, since the goal of both stats was to remove a penalty, avoiding attack fail and attack being parried or dodged, respectively, and not to obtain an advantage. Therefore, designers decided to eliminate them from the game. In the case of the hit rating, now all attacks have a 100% chance of hitting. In the case of expertise, the probability of being parried when attacking ahead is fixed at 3%. Eliminating expertise and hit ratings removes the need for damage specializations to maximize those stats to a certain level to be fully effective when attacking. This way, players can center their efforts on the improvement of stats that increase the attack damage, no longer worrying about cap values for hit rate and expertise. Cap value was the maximum amount that a character should have in a stat to perform at the best level. Any additional rating above the cap had no in-game effects, so players needed a depth knowledge to avoid having an excessive rating that could be better used for other secondary stats.

In the case of dodge and parry ratings, stats focused on tanks, designers decide to eliminate them in exchange for the bonus armor, a tank exclusive stat. In the

patch notes, they explain that they want to keep these stats in low numbers, to avoid the tanks receiving damage peaks, and to make their life more stable. This will happen since the defense stat reduces all damage taken by a percentage, while dodge and parry ratings were based on attack avoidance. Previously, with high dodge and parry values, tanks could avoid many of the attacks received, but those blows that hit caused a lot of damage. Now, with the removal of dodge and parry ratings in exchange for bonus armor, tanks receive damage over time more homogeneously. This change simplifies equipping, as previously a player could be interested in an item depending on whether it improved parry or dodge ratings, and now the only option to consider is the bonus armor. Also, as the life is more stable, the work of the healer, who has more reaction time, is facilitated, and, in general, it will be easier to save someone who is receiving a lot of damage.

The elimination of the critical strike chance from agility and intellect is done to compensate for their difference with strength stat, which did not provide critical strike chance. This difference in primary stats made it challenging to balance primary and secondary stats. This simplification and the changes in equipment, which now adapts the primary stat provided to the specialization of the character using it, make strength and agility almost indistinguishable and facilitate, even more, the task of equipping a character.

Regarding the remaining new stats, versatility, in the same way that mastery, is a useful stat in every class and specialization, as it improves both damage, healing, and damage reduction. It's challenging to discover the reasons why multistrike was added, as it's similar to critical strike, and, in fact, it will be removed in the next expansion. The tertiary stats are merely small and random bonuses for items, which do not have a very considerable impact but that are appreciated when they appear.

4.7 Legion

4.7.1 Changes in this expansion

The sixth expansion of World of Warcraft is launched in 2016, Legion. The maximum character level is increased from 100 to 110. It makes few changes in the stats, except to discard some of those introduced in the previous expansion.

The spirit is removed, thus finishing with the possibility of improving mana regeneration through attributes. Mana regeneration, so crucial for healing classes, is no longer a stat and depends on abilities, talents, and items. Besides, the base mana regeneration for healing classes is increased.

Spell power is removed from the items (from weapons that provided it) and now can only be increased with intellect. This way, it suffers the same change that happened to attack power stat in Cataclysm.

Some other stats introduced in Warlords of Draenor are eliminated: bonus armor and multistrike. Only versatility and tertiary stats remain. All these stats are replaced by versatility, which in turn gets much more important than before (**Table 7**).

4.7.2 Analysis of changes

As developers explain in patch notes, the elimination of both the spirit and the bonus armor is done to reduce the amount of equipment changes between specializations, that is to say, to make the equipment carried by a healer or a tank to be also useful for damage specializations. This change facilitates equipping characters, allowing players to change specialization easily without needing to find specific items to play that role successfully.

Primary	Attack	Defense	Spell offensive	Spell healing
Strength	Strength/agility	Stamina	Intellect	Intellect
Agility	Damage	Armor	Spell power	Spirit
Stamina	Critical strike	Mastery	Critical strike	Spell power
Intellect	Haste	Versatility	Haste	Critical strike
Spirit	Mastery	Bonus armor	Mastery	Haste
	Versatility		Versatility	Mastery
	Multistrike			Versatility

New stats are underlined and removed stats are strikethrough.

Table 7.
 Role stats in Legion.

By eliminating the spirit of the objects, the regeneration of mana of many specializations must be compensated. The change requires mana user to manage mana with more care and more actively, as its regeneration now depends on abilities, talents, objects, potions, etc., complicating their labor.

The removal of spell power from item seems natural, as it already happened with attack power. Intellect providing mana and critical chance was the only reason to avoid the unification of intellect and spell power, but since the simplifications of primary stats that happened on Warlords of Draenor, their unification was expected.

Finally, secondary stats are adjusted to make them less relevant. Now the most crucial thing regarding item comparison is their item level, and rarely an item with lower level will have more benefits than a higher level one. This facilitates character equipping enormously.

5. Discussion

In the previous sections, we have identified and qualitatively analyzed changes to the combat stats through expansions. While it's apparent that stats and their related game mechanics have been simplified, in this section we will expose the quantitative analysis that will allow us to see this relationship clearly and to respond to the research questions.

In **Figure 1**, we can see that in every expansion since The Burning Crusade, the number of "item stats," which are those that can be directly increased by the player, has been reduced. In Legion, the last expansion analyzed in this work, the total amount of stats is 1/3 of the amount found in the first expansion. Some item stats were unified, others eliminated, and some others removed from items and included as effects of other game mechanics that depended on the character level, something we will discuss further later.

In **Figure 2** we can see that, besides reducing the total amount of item stats, the number of stats required to play a role optimally has also been reduced, especially if we compare The Burning Crusade expansion, where the stat system had more complexity, to Legion, the last expansion analyzed. The number of stats that the player had to pay attention to when equipping his character has been reduced by 3 for the attack role, 2 for the defense and spell healing roles, or 1 for the spell offensive role. We can now answer research question 1.1, confirming that the number of stats required to play optimally has been reduced.

Regarding research question 1.2, we have to pay attention to the stats that have been moved from the "item stats" group to the "non-item stats" group. Many of the

ITEM STATS

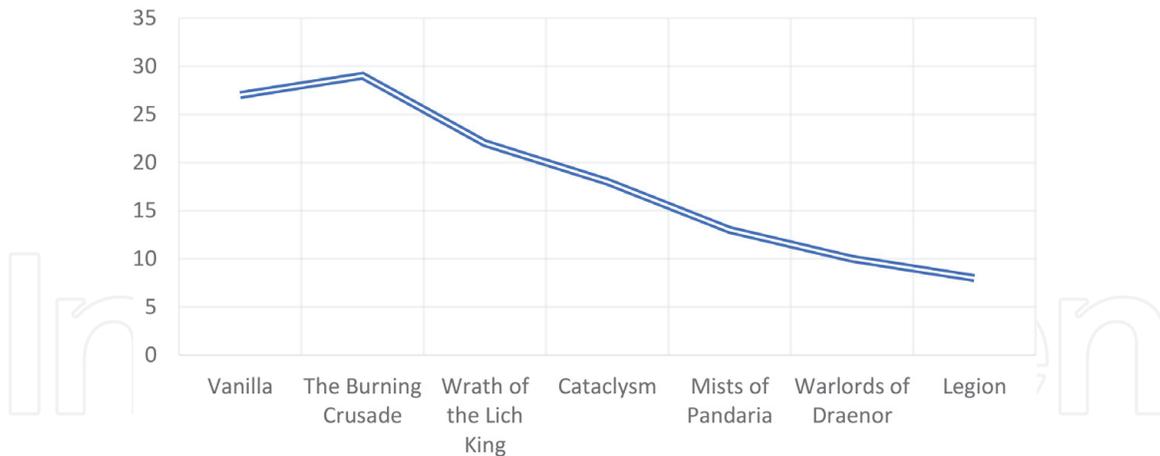


Figure 1.
Amount of item stats through expansions.

SPECIFIC ROLE STATS

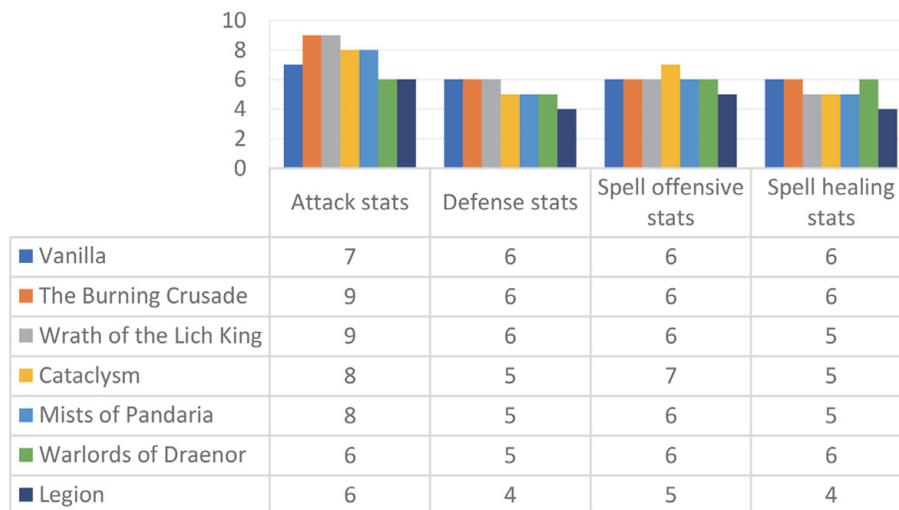


Figure 2.
Amount of item stats specific for each role through expansions.

stats that were initially obtained through the items were moved to other game mechanics, such as talents and abilities, which depend on the character level. As players can obtain character levels much more easily than good items, this change can be understood as a facilitation for players to increase certain stats. But this conclusion can be argued to be wrong, as talents and abilities have their own complexities. Talents require the player to make adequate decisions for his character, choosing some talents and leaving others out, while abilities require an active behavior from players in combat by activating the corresponding ability when they think it will be more useful. So instead of concluding that these changes have facilitated the increase of stats, it would be more appropriate just to say that the importance of items for stat obtention has been reduced in favor of other game mechanics (**Figure 3**).

Another way in which the obtention of stats has been facilitated is by making all stats useful for all characters. As we can see in **Table 8**, in Legion expansion there are scarce differences between the stats that are required to play different roles optimally. In the case of attack, spell offensive, and spell healing, the required stats are almost equal, knowing that items provide the primary stat that better suits the

ITEM / OUT OF ITEM STATS

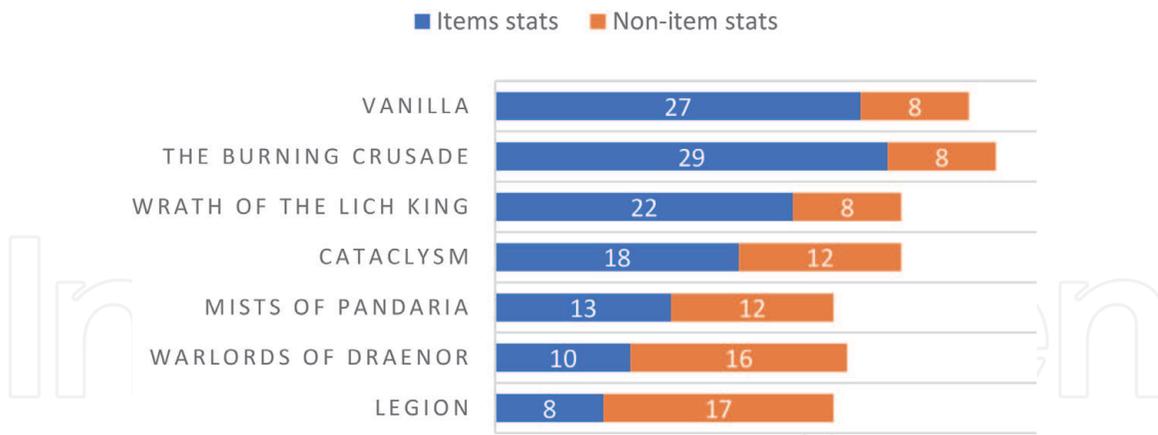


Figure 3.
 Comparison between item and non-item stats through expansions.

Primary	Attack	Defense	Spell offensive	Spell healing
Strength	Strength/agility	Stamina	Intellect	Intellect
Agility	Damage	Armor		
Stamina	Critical strike		Critical strike	Critical strike
Intellect	Haste		Haste	Haste
	Mastery	Mastery	Mastery	Mastery
	Versatility	Versatility	Versatility	Versatility

Table 8.
 Comparison of role stats in Legion.

character role, so the differences between strength, agility, and intellect are nonexistent. In the case of the defense role, it has even fewer stats to consider than their counterparts. The lack of variety in the role stats facilitates the increase of stats in two ways. First, when a player decides to change his character's role in combat, drastically reducing the need to find appropriate items to play different roles optimally, and second, by reducing the number of attempts required to find an item that suits the character role. With few possibilities, it's more probable that the random secondary stats provided by an item result useful for the character. While in the previous versions of the game a player had to beat a boss multiple times to find a good item that had all the stats required for his role, in the last versions, it's far more easy that he finds a suitable item in the first or second attempt. From this perspective, it is clear that the obtention of stats has been facilitated through the expansions.

Finally, to answer question 1.3, we must go back to the qualitative analysis of expansions made in the previous sections, where we have discussed many mechanical changes to the stats and combat systems. The elimination of the skill system simplified the combat by allowing every character to use any weapon and to defend optimally without previous training. The removal of stats that had a cap value reduced the knowledge and planning required to increase stats optimally for the character role, facilitating the game for new players and for those that were not interested in such in-depth details of the game mechanics.

Changes in defense role stats have also simplified the role of defensive and healing characters in combat, by reducing peak damage on defenders, giving more

time for healers to heal them. Changes in mana-related stats, as spirit, mana regeneration, and intellect, also reduced their importance in combat. On the other hand, the addition of mastery stat could be considered as an increase in the complexity of combat, as its effect depends on the character specialization and usually requires to adopt specific behaviors in combat to get more benefit from it.

In general term, we can conclude that the stats and combat game mechanics have been facilitated for new players and casual players by removing some of the most complex or time-consuming stats and their associated game mechanics in combat. But we cannot conclude that the simplification has happened for every player though, as, for example, mastery requires a more active behavior in combat, and the elimination of some defensive- and mana-related stats could have been compensated with changes in other game mechanics, such as talents and abilities. It would be required to study these game mechanics to determine if the combat system has been simplified or not in general terms.

6. Conclusions

Throughout this work, we have analyzed how the World of Warcraft stats system has evolved along successive expansions and updates. We aimed to determine if World of Warcraft has suffered a casualization process by simplifying its stats system, making it easier to understand and use by casual players.

The results show that the number and variety of stats that a player must pay attention to, in order to play optimally, has been significantly reduced. The reduction has happened by unifying and removing stats and by translating stats acquisition from items to other game mechanics. The translation of some stats to talents and abilities facilitates their acquisition, but, at the same time, they come with their own complexities, so we cannot consider this a simplification without a broader analysis. The reduction of the variety of stats that can be found on items does contribute to the casualization of the game, making it much easier for the player to change the specialization of his character without additional efforts required to obtain appropriate items and also reducing the effort required for any player to find suitable items for his character and specialization. Finally, we have also identified some mechanical changes that have contributed to the casualization of the stats and combat systems, making them easier to understand and use for the new and casual players, such as the disappearance of the skill system, the elimination of stats with cap values, or the removal of many defensive- and mana-related stats.

As limitations of this study, we can consider its scope, which does not cover the study of other combat-related game systems such as talents and abilities. Additional studies would be required to understand if the combat system has been casualized in general terms, looking beyond its relationship with the stats system.

The implications of the study are as follows: (1) the number of stats has been reduced in quantity, variety, and complexity along expansions. (2) The increase of character stats has been facilitated by making most of them useful for any character, independently of his role. (3) The stats system has been simplified for new and casual players by removing some complex to understand and time-consuming game mechanics. This study contributes to the field of game design by providing detailed insights on the evolution and casualization of one of the most important videogames in recent years. The results and conclusions of this study could be useful for game designers when designing stats and other related complex systems, discovering different ways in which those systems can be simplified and made more accessible for new and casual players.

As future work, we suggest the study of the evolution of other parts of the combat system of World of Warcraft, such as abilities and talents, or the PVP combat, as well as the study of the evolution of other parts of the game, such as the professions, economy, or guild system. We also consider that this type of study could also be applied to the game series that have suffered an evolution along their different sequels, like Diablo or The Elder Scrolls, to understand in which ways they have changed with the pass of time.

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