

Statistical Analysis of Gamer Behavior

A Junior Interactive Qualifying Project

Submitted to the Faculty of

WORCESTER POLYTECHNIC INSTITUTE

In partial fulfillment of the requirements for the

Degree of Bachelor of Science

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Abstract

In this project, we sought a better understanding of gamers and what influences game popularity. Using GamerDNA's database, we searched for relevant trends and analyzed player activity. Our results demonstrate that game ranking sites don't influence the popularity of games. Downloadable content influences the longevity of games; when it adds enough new features or has a good price point. Lastly, some gamers will play games just for achievements.

Acknowledgements

We would like to thank Professor David Finkel from the Department of Computer Science, Worcester Polytechnic Institute for his guidance, instruction and help on this project. Also, we wish to express our gratitude to Stephen Sopp at GamerDNA, for his guidance through our detailed analysis of the GamerDNA data. We would like to thank Michael Voorhis, of the WPI CS Department, who has setup the database on one of WPI's computers for this project and provided very useful technical support during the extent of the project. This study was done as an extension on top of a previous report and study by Qian Wei³⁶, a Computer Science graduate from WPI. This study could never have been done without their help. Their time and efforts are greatly appreciated.

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Section 1: Introduction

1.1: Intro

With the help of GamerDNA, a social networking website for gamers, we set out on an investigation to answer some important questions about games and gamers. GamerDNA provided us with a large database of information on Xbox Live gaming activity of GamerDNA subscribers. The first thing we did was to formulate high level questions and then translate them into queries that we would then run on the database. We would then export the results of these queries into Microsoft Excel. Excel was very helpful in organizing the information from multiple queries into large tables. In addition to the data gathered from the database we added information from other sources, such as Metacritic, to compare with our information. This vast amount of information formed the basis for our analysis and study. From it we were able to draw numerous graphs and relevant figures, which can be found throughout this report.

We came up with three high level questions. In section 3.1 we discuss our first question; does a game's critical ranking directly affect the popularity of a game. In section 3.2 we looked at the effect of downloadable game content and people playing the game. And lastly in section 3.3, we look into the behavior of gamers who could be considered achievement hunters. In section 1.2 we discuss further what GamerDNA is, how they came to be, and what they did. Following that, in sections 1.3 – 1.5 we go into more background on Metacritic, achievements and achievement hunters, and downloadable content.

With the GamerDNA database we could tell when any one of thousands of people played a game, when any game was played, and how many people had played it over the three year period the database covers. Through our analysis of this data we were able to successfully answer all of these high level questions with low level answers supported by the data. We found that a game's critical ranking does not directly affect the popularity of the title. We also found that the release of downloadable content, depending on the type of content and its price point, can alter the longevity of the game. We were also able to gain insight into the behavior of achievement hunters and the games they like to play. While it is difficult to classify an individual as an achievement hunter, we were able to identify potential achievement hunter behavior.

1.2: GamerDNA Background

GamerDNA is a social networking website with a twist; it is specifically targeted at gamers. GamerDNA, formerly GuildCafe, was created by Jon Radoff in September of 2006³. Jon Radoff has experience with game design, growing successful companies and building online communities. In the early nineties Jon started the company NovaLink, the company that produced one of the first commercial massively multiplayer online role playing games (MMORPGs): *Legends of Future Past*. Meanwhile Radoff's wife, Angelina, who is also an avid gamer created her own guild, Section One, that consisted of about 1,000 players. This guild played multiple MMO's including Star Wars Galaxies⁵, World of Warcraft⁶ and Guild Wars⁷. There were obvious difficulties when it came to managing this many people across the different games and servers, and that's what gave Jon the idea for GamerDNA¹.

By realizing that the MMO industry needed more content than just gameplay, Radoff was able to take some of the technology he created for the business world and use it for the game industry. When players would change servers, guilds, characters or even games they would most likely have a difficult time in staying connected to all the different social networks that they had built up over the time they were playing. GamerDNA provides a place for gamers to keep in touch with all of their friends they know through games while not playing the game itself². GamerDNA placed a significant focus on space for guilds, gamers and gaming groups to allow for interaction. There have also been great improvements in the way people find old friends, new games and unknown content. GamerDNA has all the common social networking tools available like blogs, profiles, videos, pictures and forums available for all its users. With each member having their own space for their information about what games they play, their real name, avatar names, servers, games, guild, etc. you are able to search for former friends or guild mates by using any of these criteria.

In addition to networking members can also link up their different gaming accounts to their profile, including Xbox Live, XFire, Steam and Play Station Network. These attached accounts are then able to be tracked by GamerDNA. This does a couple of things. For one, it allows gamers to see what their friends are playing and what they personally have done in the past. Secondly, it allows GamerDNA to track the same information. By providing this service for its users, GamerDNA has built up a massive database containing information about gamers and what they are playing, how they classify themselves, how long they play, when they play and so much more.

We were given access to a snapshot of their Xbox Live gamer database. This database is the main focus of our research. The snapshot contains about three years of data on over 165,000 unique users. The database took up over a few hundred gigabytes of physical memory. The database was set up at WPI thanks to the previous MQP work done by Qian Wei³⁶. We queried the database using MySQL while on the WPI network.

1.3: Metacritic Background

Metacritic.com is a website that launched in 2001 and set out to “provide access to and summarize the vast amount of entertainment criticism available online”⁸. Their rating system is used for more than just video games; it is also used for scoring movies, DVDs, TV shows and even music. Each medium has its own way of being rated on Metacritic. We looked at how Metacritic ranks games because that is what our research focused on.

A metascore is different than any normal review you may read on a gaming website. They are called metascores because it is not a single score from a single source, it’s an aggregate of multiple scores weighted together. Metacritic uses a weighted average because they believe that certain critics and publications have more merit than others and weight each review, “based on the overall stature and quality of those critics and publications”⁹. This has proven to be an interesting topic of debate on various sites because it is not entirely clear as to Metacritic’s exact methods in the weighting process, but it is this process that truly sets them apart from the other ranking aggregate sites.

Each Metacritic listing has more than just the metascore and the game title. Metacritic uses a 0-100 scale for scoring games and places each game into one of five categories. These categories range from overwhelming dislike to universal acclaim. Each game also gets a color associated with it that corresponds to the category it belongs to. The top two categories receive a green color indicating favorable reviews, yellow is for those games that received mixed reviews, and last two categories are red for unfavorable reviews. In addition to the general color and number system, Metacritic provides a small excerpt from each of the reviews used to generate the metascore. Metacritic also provides a link to the full reviews whenever they are available online. This is a very useful feature because it allows for a couple of things: not only can people go and read all the reviews that contributed to the metascore, but it is also possible to generate an un-weighted score from the pool of reviews that Metacritic used to get each metascore.

Since we set out to find what influences popularity of video games, a site like Metacritic may provide some insight into what games are popular. We use their metascores for games as a way of measuring how well a game is seen by critics and compare that to popularity.

1.4: Achievements & Achievement Hunters

Achievements are challenging acts that can be performed within a game on the Xbox360. All disc based Xbox360 games are required to have a set of obtainable achievements that span the extent of the game that must award at most 1000 Achievement points.¹⁰ With every achievement you achieve you are notified of your accomplishment and it is recorded under your Xbox Live account. Each achievement is worth a certain number of Achievement points based on how difficult the road to completing the achievement was. These points are added together and make up an Xbox Live user's Gamerscore(G)¹⁰.

For some, achievements offer a new twist and incentive to playing their favorite games. Climbing to the highest point in the game or destroying six monsters with a single explosive not only grants an awesome view, but also awards 100 Achievement points. For others these points are what drive them to play the game to total completion and see or do everything there is to see or do within the game. Achievements are like complements and for most people it is nice to get them. They act as a pat on the back for a job well done for the person(s) involved in the achievement.

The sites xbox360achievements.org¹¹ and achievementhunter.com¹² are both community sites for gamers, similar to GamerDNA. But, unlike GamerDNA these sites function like community forums where people discuss and rate the various achievements in Xbox360 games. Both sites provide full lists of the various achievements in nearly all of the games released for Microsoft's Xbox360 console. These sites also host video walkthroughs, printed guides and community forums where people share their experience in getting the achievements for the many games cataloged on these sites. Depending on the popularity of a game the hosted guides can be very sparse for not well known titles or very dense for the "triple A" titles on the Xbox360.

Sites such as these and other achievement or trophy sites show how when you award people points for doing something, no matter how arbitrary the points may be, people will want to do the activity. These sites arise as people actively seek out more and more points to add to their collective Gamerscore. Although the points gained by achievements don't mean anything intrinsically, gamer communities such as those on [Xbox360achievements](http://xbox360achievements.org) and [Achievement Hunter](http://achievementhunter.com) see a person's gamer score as a badge of honor and a testament to how good of a gamer that person is. A person with a high score has seen and done much more in games than someone with a lower score and is somewhat treated like a veteran. A person with a high Gamerscore who gives advice on an achievement is usually thought highly of and their advice is accepted.

1.5: Downloadable Content

Downloadable Content (DLC) for games consists of new material such as maps, weapons armor and gear, new playable characters, new missions, etc. These additions to the game are provided over the internet and are downloaded directly onto a game console or computer. To get DLC it most often costs money but sometimes DLC is given for free for a promotional event or for pre-ordering the game. Unlike game expansions which add a large amount of new content such as new additions to the game's story or new playable races in an RTS game, DLC typically only adds a small piece to the game and costs significantly less than an expansion. The first Xbox Live title to offer DLC was MechAssault for the original Xbox.¹³

There is a lot of criticism around DLC, why it's released, how and why it's developed, and whether DLC is really adding new content or is merely unlocking content on the disk. Microsoft has taken the brunt of the criticism around DLC because of their points system on Xbox Live and their notoriety for holding back developer content in order to turn it into purchasable DLC later.¹⁴ The Microsoft point system requires that Xbox Live users must first buy Microsoft Points in predetermined amounts and then use some of the points to buy DLC. The thought is that by releasing several DLC packs as opposed to a single expansion, it shows greater support for the game and will hopefully get new people to play the game. Later on in the report we investigate the relation of DLC and its effects in section 3.2.

Section 2: Other Statistical Websites

In addition to Metacritic, we looked at other websites that ranked games as well as some websites that have statistical information about games. Those that deserve mention are GameStats, GameRankings, and Gamasutra. While some of these websites had their own unique ways of rating games, we decided to use Metacritic as the primary ranking metric during our analysis. Still, we feel that these sites can provide additional information and that they may be of interest to readers.

2.1: GameStats

GameStats.com¹⁵ is a website founded in 2002 by IGN that focuses “squarely on providing the most objective view on games, both released and unreleased”¹⁶. GameStats collects articles from the web about games (mainly reviews) and press ratings and allows visitors to rate games or leave comments. GameStats also maintains a database of more than 27,000 games and their collective ratings.

The site uses what they call a Game Popularity Metric (GPM); a system that rates the current popularity of a game at any given time, which is displayed on a gauge that ranges from 0 to 100. According to the website, the GPM is determined by data gathered from IGN’s visitors that covers emails, message boards, article page views and more. Visitors to GameStats can find the precise numerical GPM of any game in their database along with its overall rank based on GPM and its rank among other games on the same platform. In addition, the site tracks the change in a game’s popularity, which is indicated by a trend arrow shown alongside the GPM rating. With this information, visitors can see whether certain games are gaining or losing popularity. If the popularity of different games can be taken as an indication of what gamers are playing, it provides some idea of recent trends in gamer activity.

In addition to the GPM, GameStats compiles average press ratings for each game. The site’s scoring system ranges from 0 to 10; proclaimed by GameStats as the industry standard. Since the website also allows visitors to rate games and submit reader reviews, each title has an average “gamer score”, which is displayed alongside the press rating. Finally, the site averages both scores into an overall GameStats score (GS score), which can then be used to rank games overall or per platform.

GameStats was considered as a possible metric for us to rank games during our analysis of the GamerDNA database. Their GPM is certainly a unique system, but ultimately we chose to exclusively use Metacritic due to its general popularity and extensive coverage.

2.2: GameRankings

GameRankings.com¹⁷ is a website that was founded in 1999 and collects game review scores from both online and offline sources and combines them into one composite score. For online scores, the source sites must meet a certain set of requirements for their scores to be included in GameRankings's composite score. For example, the websites "must publish a minimum of 15 reviews a month, must be visually appealing and look professional, must have a dedicated domain name", and the reviews "must be well written"¹⁸. According to GameRankings, they try only to include scores from sites that review a large number or variety of games and are consistent in their scoring. Their thoughts are that using reviews from sites that don't show consistency or only review a limited number of games could potentially cause a situation where the scores for certain games become skewed. Their criteria for offline publications are not specified on the site.

Their scoring system rates games as a percentage (1-100), and gives separate scores for each platform per game. In addition, the site keeps links to the reviews it collects as well as a database of all the sites it gathers reviews from, in addition to the general information for each game. The site also ranks the games overall and on their respective platforms, as well as among all other games (both overall and on that platform) released in that year.

GameRankings was not used for our analysis. Unlike GameStats.com, it does not have user reviews or some system to measure popularity, just review scores. Although we considered it as a potential source for identifying highly acclaimed games, we felt that Metacritic alone was adequate.

2.3: Gamasutra

Gamasutra.com¹⁹ is well known for their many featured articles and studies focusing on the business side of the gaming industry. Aside from in-depth game industry studies and news reports on the site, Gamasutra also plays a large role as a job listing site. Site members can post their resumes on the site and if a company that advertises on Gamasutra needs someone with your skills you will be contacted. The site features post-mortems on games as well as studies on gamers. All of the articles and features on the site pertain to one of the major aspects in the business of games. Some of the topics Gamasutra features include programming, art, audio, design, and production of games. Gamasutra tries to gather the best, brightest, and most professional people from within the game industry to seriously discuss the topics surrounding games and the game industry.

Gamasutra hosts a lot of very good discussions and articles on the game industry and community surrounding it. Gamasutra also hosts many published studies done by various groups including GamerDNA. We gained great insight and inspiration from the Gamasutra articles for our analysis of the GamerDNA database and what data we should be looking into and comparing. Such articles, like the analysis of Gears of War and Gears of War 2 players, gave us the idea to study those games as well.²⁰ Gamasutra is a standard in game and gamer analysis and we are striving to have our analysis reach the same level of quality and insight.

Section 3: Analysis

3.1: Popularity VS. Metacritic Score

Critics let us know if they think something is good or not and whether or not we should go out and try that something. We tend to believe that the things critics rave about are the things people will buy or try and will be the most popular compared to other similar things. We took a look inside our database of thousands of game players to try and find a correlation between the critically acclaimed games and the most widely played games. For a standard in measuring the critical acclaim of a video game we looked no further than Metacritic.com. Metacritic.com is one of the main sites people look to determine if a game is good or not and whether or not to buy it based on the collective metascore it has on the site. The metascore for a game is the average critical rating taken from several other game rating sites that has been scaled based on the site's credibility.

Figure 1 is a scatter plot attempting to show a correlation between the Metacritic score for a game and its popularity. The Metacritic score is measured on the x-axis in a range from 40 to 100 while the popularity is measured over the y-axis from 0 to 140,000 players. This popularity information was attained by counting the number of unique players that had ever played each particular game in the database. We then went through the Metacritic score postings on the Metacritic webpage for the top 100 most popular games we found in the data and matched the scores up for our analysis. This data set counts any person who played the game, no matter how much they played it. This data does not reflect sales numbers or the entirety of the Xbox Live community.

Looking at Figure 1, there is a very wide range of popularity for all Metacritic score ranges. Top Tier games with a Metacritic score above 93 are the only games that go above the general range of popularity seen for games with a score between 60 and 90. Even so the popularity of three top tier games drop below popular games with scores in the 80's. Only five out of the top thirteen most popular games have Metacritic scores in the 90's for our data set.

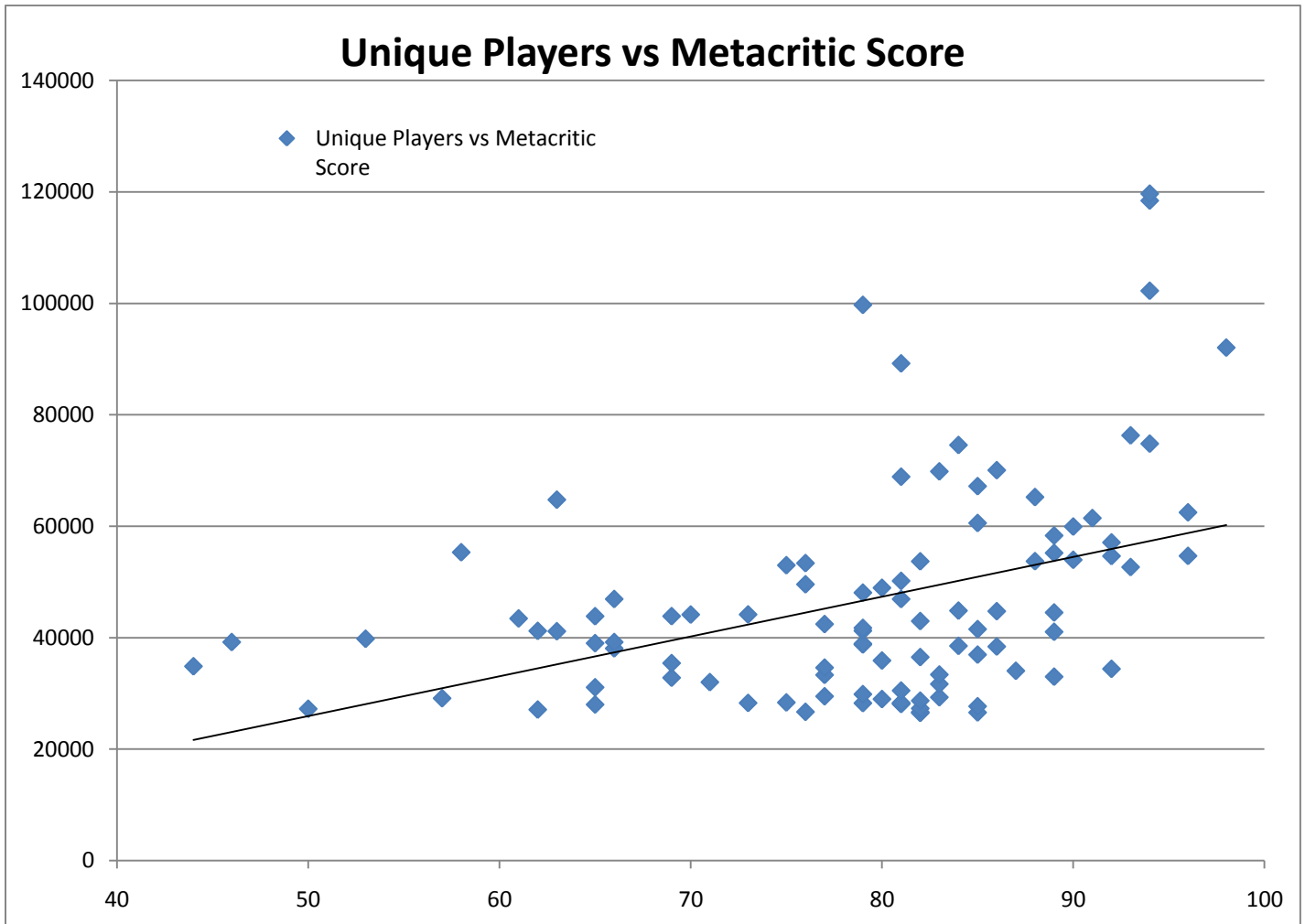


Figure 1: Here we see a very scattered distribution of popularity over Metacritic score with only a slight positive correlation between popularity and Metacritic score.

This does not mean that the highest rated games don't get played more than lower rated games. The very highly rated games do have the largest player base. But once a score drops below 90, it is very difficult to draw any correlation between its Metacritic score and popularity.

One prime example of the lack of correlation is the game UNO²¹. The database shows that UNO places in the top ten most popular games while only having an above average Metacritic score. Like a big summer action blockbuster, its Metacritic rating is 81, above average but not fantastic. UNO also holds the spot of being the sixth most popular game in our data set. Reasons for this may include the fact that it is easy to play, enjoyable, cheaper than its real life counterpart and comes with three computer opponents to play against if no friends are around.

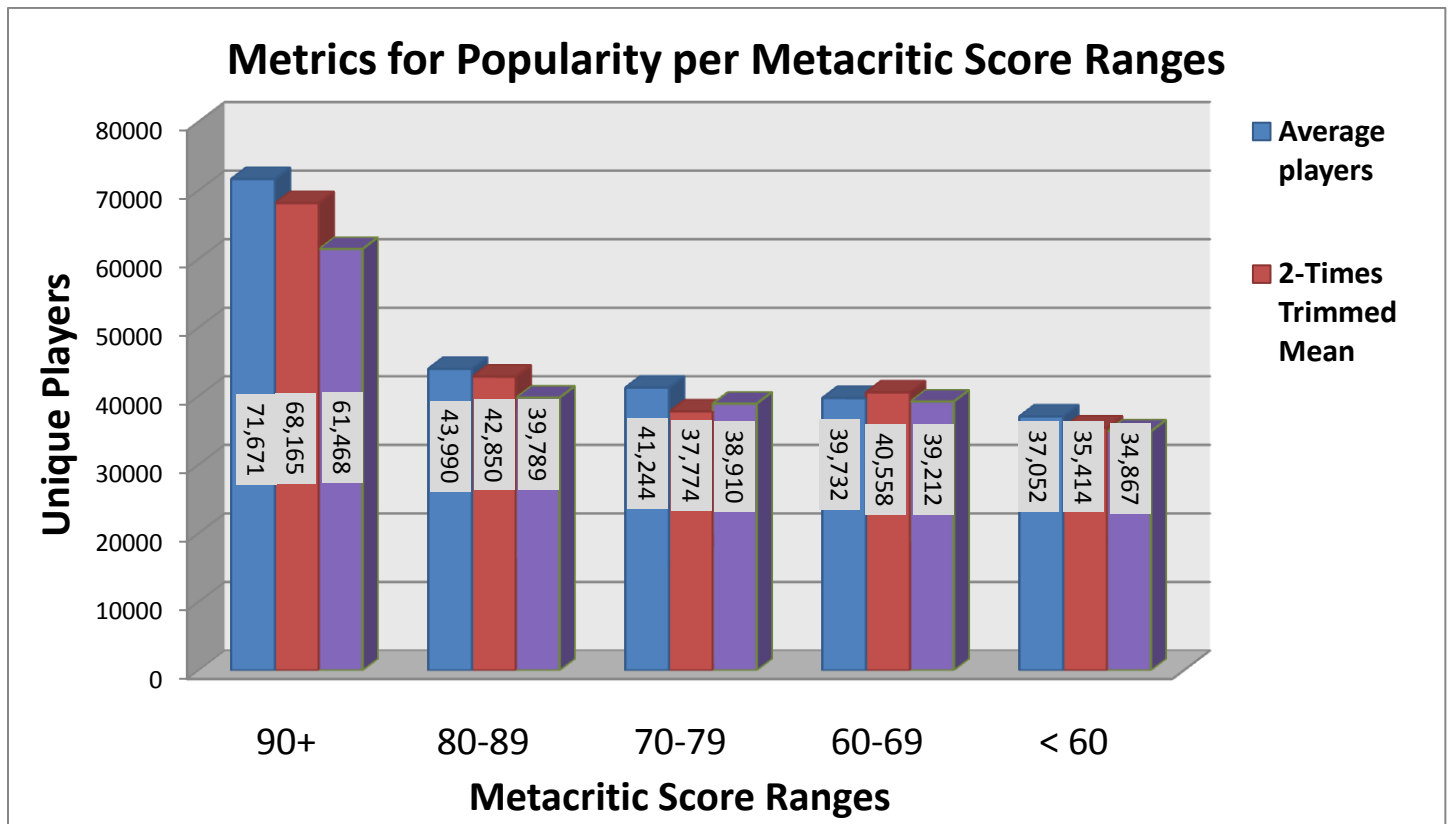


Figure 2: This graph shows that, based on GamerDNA’s player-base, games that have a Metacritic score in the 90’s have a larger player-base on average and a larger median number of players compared to games that score lower. It also shows that when a game scores anywhere from the high 80’s to as low as the 60’s on Metacritic, its average number of players stays fairly consistent based on that same player-base.

Figure 2 shows the average number of people who have played games in four ranges of Metacritic scores. Here we see mean and the median number players per game with Metacritic scores ranging from 89-60 are very close together with an average number of players per game around 40,000. The average number of players per game for games with a Metacritic score of less than 60 dip below this plateau with 37,000 players per game. Games with a Metacritic score of 90 or above have the largest average number of players per game.

With this figure we can clearly see a correlation between Metacritic score and a game’s player base. As the Metacritic score of a game increases the game’s player base does not incrementally increase as the score rises. From this data we can see how only at the extremes, >90 and <60, can we see a noticeable positive correlation.

Overall, Metacritic seems to have little influence on how popular a particular game is. There are many more important factors that determine how much a game is played besides the critical scores. Metacritic scores do little themselves to influence the popularity leaving factors such as price, availability, ease of play, and marketing to be greater factors for determining the

popularity of a game. It is understandable that a game with a Metacritic score above 90 will have received awards for excellence and those in turn providing a marketing point for the game.

When you see popular products you might believe that these are popular because they are the best and highly rated for being the best. This belief however is not always true. With such entertainment media like movies, music or games, the highest rated media are not always the most watched, heard or played. This is apparent in the GamerDNA data. Of the top 100 games, the number of players per game fluctuates as Metacritic scores stay steady. This fluctuation shows that Metacritic score doesn't have much of an impact on the number of players. Just like B action movies, some games can have cheap thrills that can be enjoyed by many people. These movies or games may not be highly acclaimed but still manage to get many people to partake in them.

Table 1: Top 100 Games Played by Unique Users in GamerDNA database

1	Halo 3	119701	29	Street Fighter II' HF	53384
2	Gears of War	118463	30	Worms	53004
3	Call of Duty 4	102275	31	Fallout 3	52675
4	Hexic HD	99743	32	Saints Row	50192
5	GTA IV	92072	33	Undertow	49582
6	UNO	89238	34	DOOM	48952
7	Gears of War 2	76319	35	Marble Blast Ultra	48084
8	Oblivion	74834	36	TMNT 1989 Arcade	46938
9	CoD: World at War	74585	37	Perfect Dark Zero	46934
10	Geometry Wars Evolved	70067	38	Viva Pinata	44856
11	Crackdown	69848	39	EA SPORTS FN 3	44754
12	Assassin's Creed	68895	40	Left 4 Dead	44520
13	Guitar Hero III	67198	41	Small Arms	44166
14	Rainbow Six Vegas	65242	42	Ultimate MK3	44145
15	Texas Hold'em	64770	43	Boom Boom Rocket	43863
16	BioShock	62497	44	Bankshot Billiards 2	43851
17	Mass Effect	61468	45	Frogger	43450
18	DEAD RISING	60582	46	Rainbow Six Vegas 2	42979
19	G.R.A.W.	59942	47	LUMINES LIVE!	42441
20	Call of Duty 2	58334	48	Carcassonne	41752
21	Guitar Hero II	57095	49	Splinter Cell D.A.	41531
22	Aegis Wing	55331	50	Assault Heroes	41247
23	Fable II	55211	51	PAC-MAN	41216
24	The Orange Box	54683	52	Contra	41155
25	Rock Band	54655	53	Castlevania: SOTN	41053
26	Forza Motorsport 2	53979	54	Dash of Destruction	39800
27	PGR 3	53732	55	Sonic The Hedgehog	39212
28	Call Of Duty 3	53708	56	3D Ultra Minigolf	39212

57	Feeding Frenzy	39012
58	LOST PLANET	38910
59	Alien Hominid HD	38775
60	Bomberman LIVE	38525
61	GRAW 2	38409
62	GALAGA	38082
63	DEAD OR ALIVE 4	36954
64	Marvel Ult. Alliance	36512
65	Cloning Clyde	35897
66	Pinball FX	35433
67	TotemBall	34867
68	Zuma	34621
69	Rock Band 2	34403
70	Burnout Paradise	34051
71	Yaris	33796
72	Pac-Man C.E.	33382
73	Heavy Weapon	33317
74	Burnout Revenge	32996
75	Bejeweled 2	32811
76	Paperboy	32017
77	BF: Bad Company	31687
78	Gauntlet	31092

79	Rockstar Table Tennis	30502
80	Kameo	29857
81	Battlefield 2: MC	29479
82	NFS Most Wanted	29306
83	Double Dragon	29129
84	Madden NFL 07	28981
85	Prince of Persia (Arcade)	28687
86	Smash TV	28372
87	Condemned	28305
88	The Force Unleashed	28281
89	Prey	28252
90	LEGO Star Wars II	28210
91	Catan	28080
92	DIG DUG	28001
93	Guitar Hero World Tour	27686
94	Castle Crashers	27301
95	Novadrome	27231
96	Marathon: Durandal	27093
97	RoboBlitz	26686
98	Test Drive Unlimited	26655
99	Soulcalibur IV	26575
100	The Darkness	26487

3.2: Downloadable Content Effect on Player Base

Downloadable Content for games (DLC) can add a few features to an already complete game, such as new levels, playable races, items, missions, story, and in general more game. These DLC packs usually come at a small price compared to the original cost of the game. Companies put out DLC in an effort to gain more money by having people buy them and possibly getting new people interested in the game with all its new content. We set out to find out if this strategy actually works in bringing in new people to play a game they haven't tried before as well as if these added content packs keep people playing the games for longer.

The GamerDNA database gave us access to 3 years of player data. With 3 years worth of stat tracking on thousands of players we can accurately observe the rise and fall of a game's popularity and player base over time. We can observe the various fluctuations in the player base of a game caused by the release of DLC as well as the fluctuations caused by the release of sequels and other similar games. We can track the number of unique players who logged on to Xbox Live and played a game for each day observed in the database. In all the gathered data we found frequent fluctuations of unique players per day on a weekly basis. These fluctuations are caused by the weekend of every week. On the weekend more people have more time to enjoy a game so they do, leading to an increase of players on the weekends and a decrease during the week days.

One of the first games we looked into was the very popular FPS title Halo 3²². The timeline of concurrent players can be seen in Figure 3. Halo 3 had a very successful launch, but as time passed people slowly stopped playing until the number of players leveled out at around 7500 per day. The first peak in the graph we see falls around the Christmas season. Many people are probably buying the game as a present to themselves or others and those people are playing the game. A few months after December the first map pack (Heroic Map Pack) is released. This DLC release has no visible effect on the player base for Halo 3. A month later from this more DLC is released (Legendary Map Pack) with very little effect on player base yet again. In another month Grand Theft Auto IV²³ (GTA IV) is released and the player base for Halo 3 is cut in half from around 8000 daily players before the release to a little over 4000 players after. The daily player base does not recover until we see a sharp spike on Bungie Day where Bungie released a free multiplayer map (Cold Storage). The final influence we see is not until two months later when a large update is released for the game adding new achievements and an experience point system is added to reward players who play Halo 3 multiplayer. In all the released Halo 3 DLC did very little to increase the player base of the game while the release of GTA IV and a free update to the game had much greater and long lasting effect to the player base.

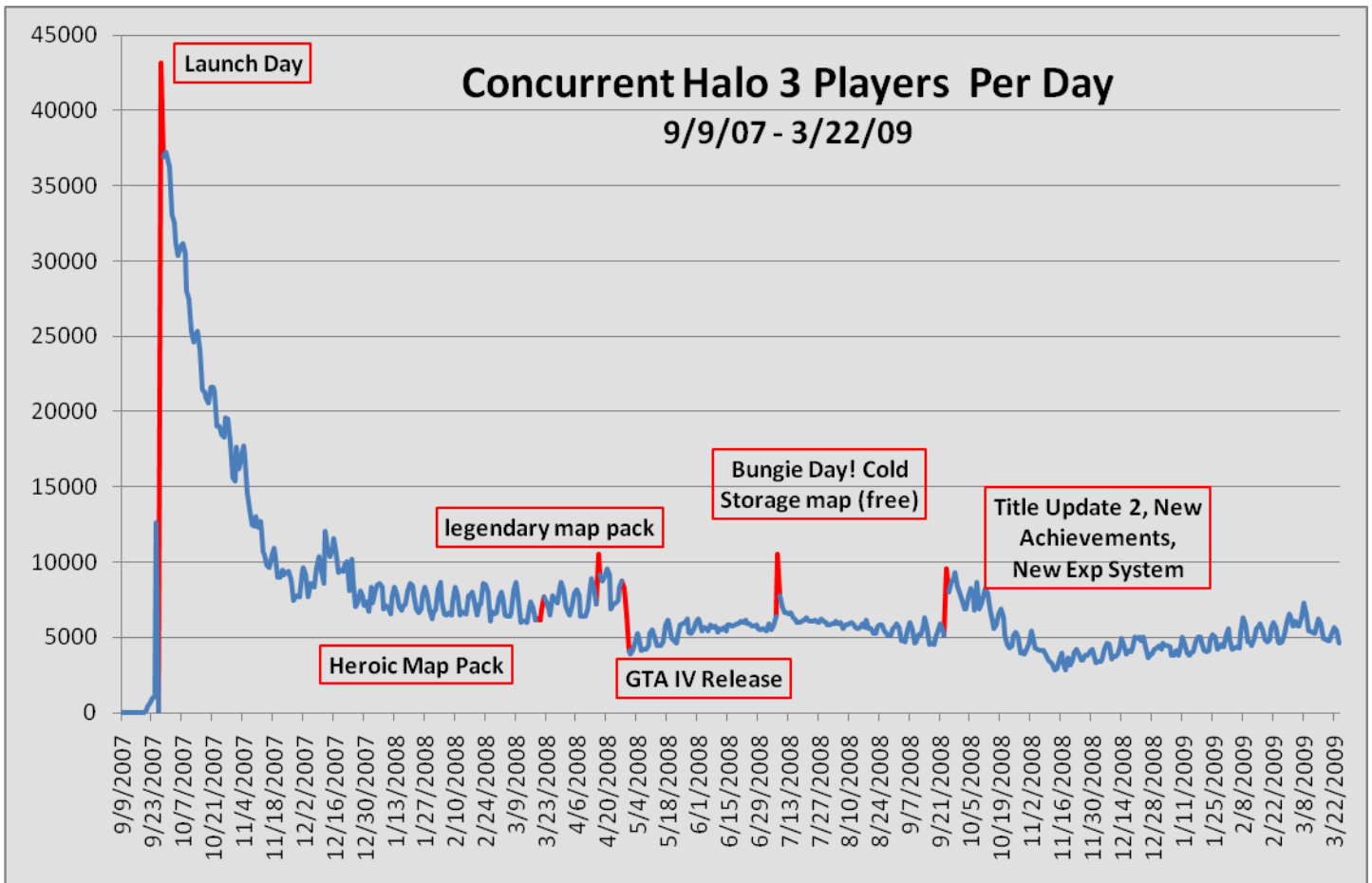


Figure 3: After the game launch the greatest influences in the player base of Halo 3 was the release of GTA IV and a free update that added to features and achievements to the game.

Another game we looked into was Fallout 3²⁴, a First Person Role Playing Game developed by Bethesda. Fallout 3 was released near the end of our window of information but still has some very discernible affects from DLC (Figure 4). The after launch decline in interest for Fallout 3 is much less severe when compared to Halo 3 and other bigger name titles. This may be because the player base starts smaller and consists of a much more loyal crowd, or it could be that since the single player campaign is much longer than most games people took their time to beat it over many successive plays. We eventually see our first increase in player base around Christmas time. The downward trend of interest continues on for a little while until we see our first DLC pack (Operation Anchorage This causes quite a spike in the number of concurrent players and this effect is long lasting. The number of daily players does not reach what we would have expected it to be had the DLC not been there for another month. Most DLC such as the free Cold Storage Map for Halo 3 saw a large spike but then immediately dropped down to the average level one day later.(Figure 3)

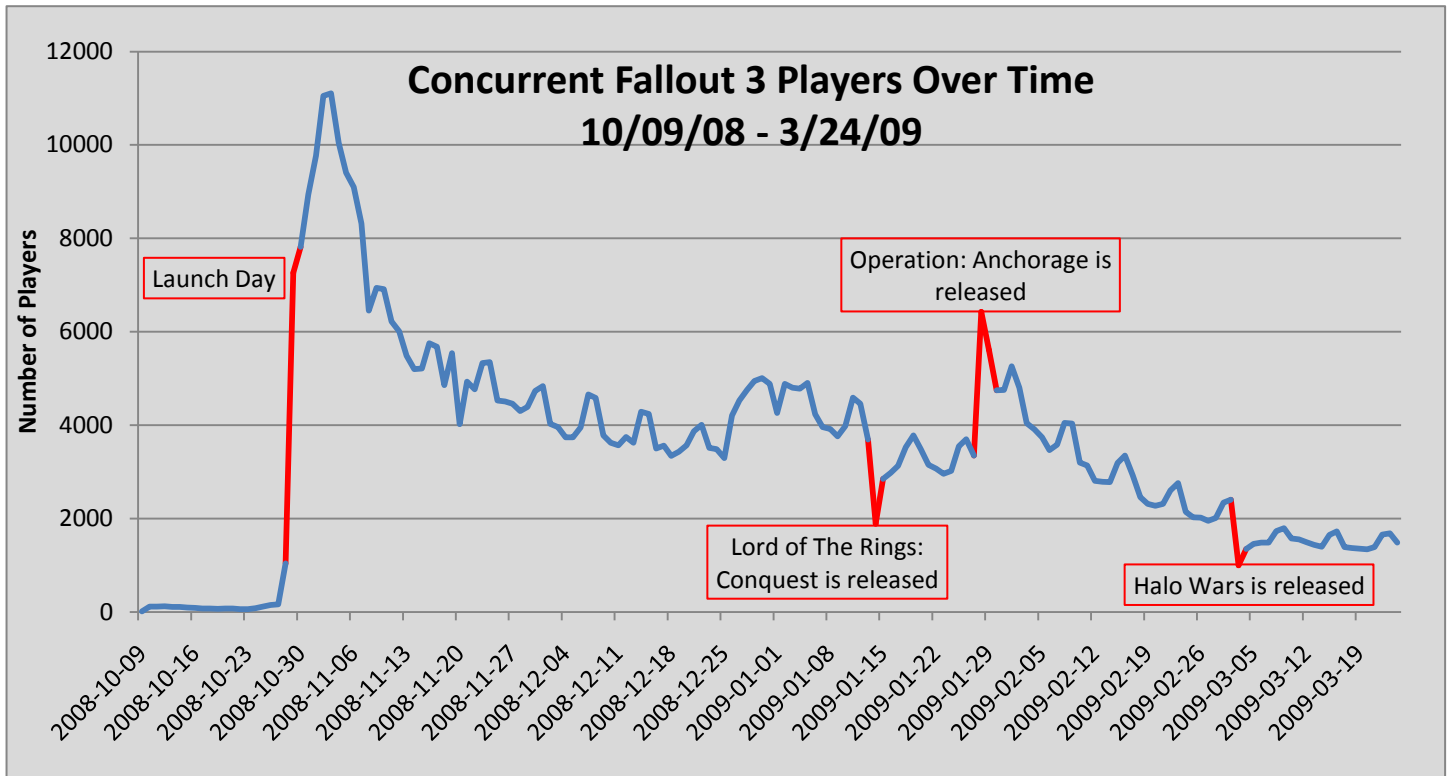


Figure 4: The greatest influences in the Fallout 3 player base was the onset of the Christmas season and the DLC Operation Anchorage. It is to be noted that the daily rate of decline in interest for this single player only game is much less then the rates observed for multiplayer action titles.

Another game we looked into was Burnout Paradise²⁵, a racing game developed by Criterion Games. The timeline of concurrent players can be seen in Figure 5. Burnout Paradise is one of the few games that we found that had very clear and defined peaks and valleys due to DLC and outside influences. After the gradual decline in interest of the game we see a clear drop in the number of core players starting on the day that GTA IV was released. The next spike comes three months later when the Cagney Update was released. This update added new game modes, bug fixes, new cars and other new features. The Cagney spike did not have a long lasting effect on the number of daily players. The largest spike in the number of daily players occurred when the Bikes Pack added motorcycles to a game that formerly only had cars. Once again, the number of daily players quickly dropped down to its previous level. The final two spikes occurred close together near the end of our data set. They did not bring back as many players as previous updates but held its effect a little while longer than the previous spikes.

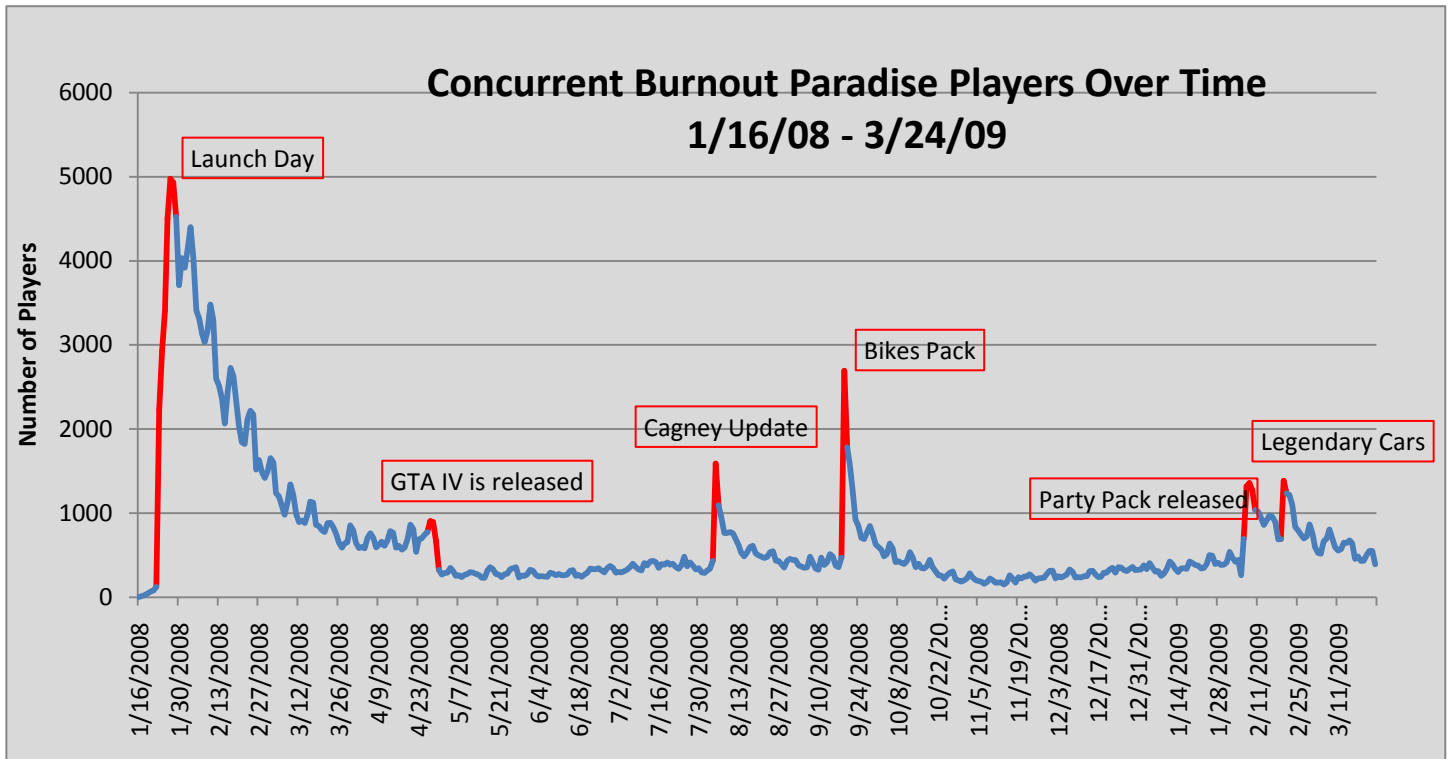


Figure 5: The greatest influences in the Burnout Paradise player base was the release of GTA IV, the Bikes Pack and the Party Pack. The greatest spike besides launch day was caused by the Bikes Pack.

Finally, we have Gears of War²⁶, a 3rd person shooter developed by Epic Games. Gears of War has many updates and DLC releases that are captured in our database (Figure 6), as well as competing game releases. The first significant event we can see in the timeline is the release of the first update over Xbox Live which added two new maps for free. This update, which was released fairly recently after the game's launch, brought back a significant number of players, almost as much as the game's highest peak during the weekend after its launch. The next spike occurred at the time of the release of the game's third update which added a new game mode called *Annex* and brought back quite a significant number of players. The next event was the release of the Hidden Fronts map pack, which contained for new maps available for purchase on the Xbox Live marketplace. Later on this same map pack was made free to download and we see a corresponding spike in number of players in our database. The fourth update, which we referred to in Figure 6 simply as the June 14th Patch, added additional achievements related to the previously mentioned *Annex* game mode and Hidden Fronts maps, as well as various bug fixes.

Aside from updates and DLC, the figure also shows the effect of other game releases. The biggest impact on Gears of War was the release of Halo 3, which cut the player base in half. Another point of interest is the announcement of a sequel, Gears of War 2²⁶, which brought back a few players for some time. The release of GTA IV had some impact, but as the graph shows the players returned after only a few weeks time. Finally, the release of Gears of War 2

practically killed the Gears of War player base, though a few dedicated fans still played consistently until the end of our data.

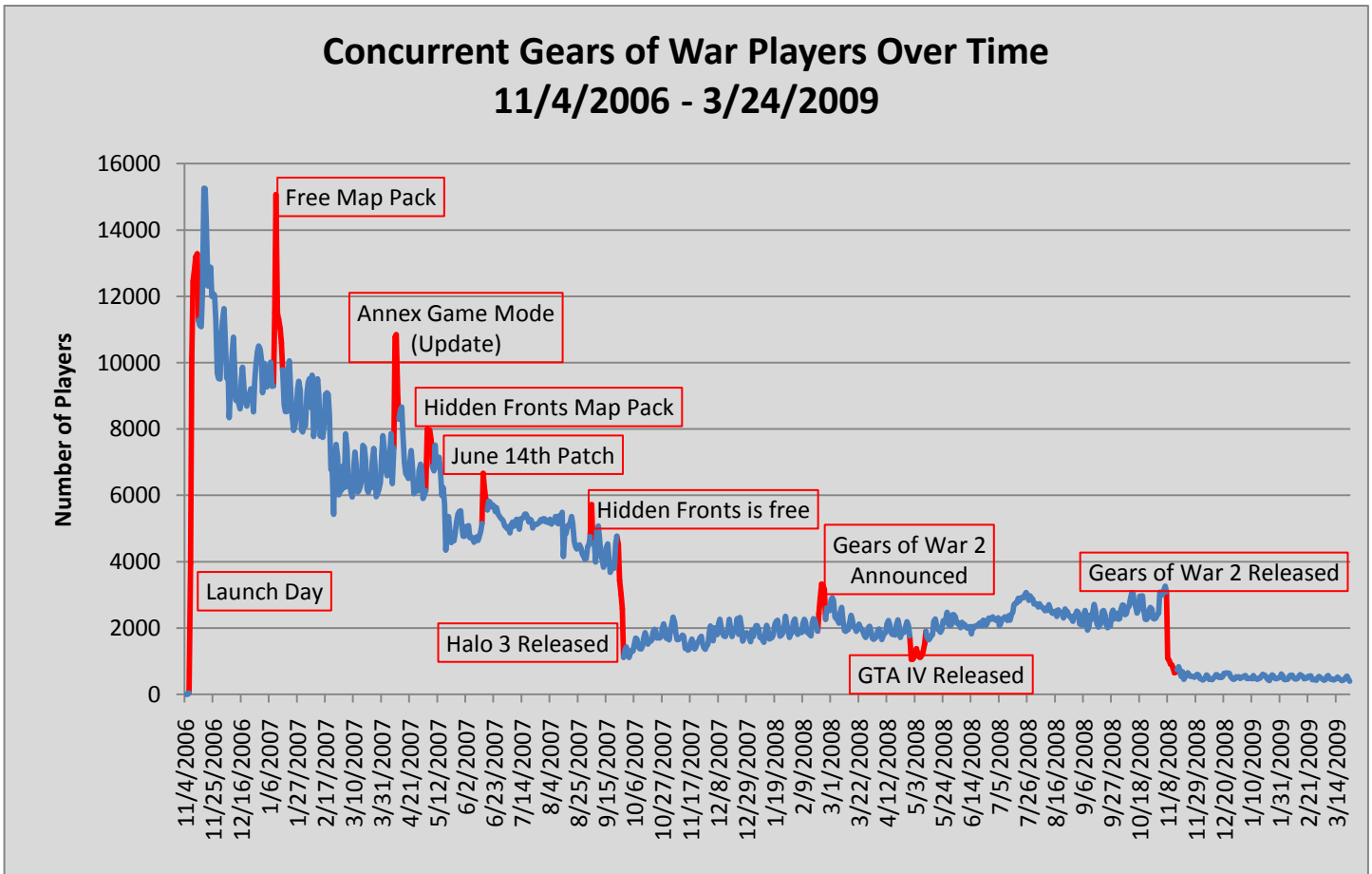


Figure 6: New maps and updates kept players coming back, but the player base of Gears of War took a major hit from Halo 3's release, as well as the game's sequel Gears of War 2.

Based on the games we examined, different types of DLC affect the longevity of a game in multiple ways. The release of DLC for primarily single player games seems to affect the longevity by a greater factor than map packs for multiplayer games. Free DLC and content causes a very visible positive effect in the player base but does not last long. Free content released in the life-cycle can bring back a large portion of the player-base especially if it is released early on before interest drops too far. DLC that is not free will obviously not reach as many people, but if it is enticing enough, like adding a lot of content to play through or adding new features that add to the enjoyment of the game, will also affect the amount of concurrent players by a visible amount and the effect lasts longer. In general we can say that DLC rarely increases the player base for any particular game.

3.3: Achievers and Achievement Hunters

As we discussed in section 1.4, every Xbox 360 game has achievements. As you play the game and accomplish tasks both difficult and easy you are sometimes awarded with an achievement. These achievements award the player with gamerpoints which sum together to make up a player's gamerscore. For most people these achievements are a mark of progress through the game; however for some people they stand for pride and prestige among the gaming community. These players who wear their gained achievements as badges of honor and actively seek to improve their gamerscore are known as achievement hunters. Achievement hunters are defined as those who play many games in order to increase their gamerscore. Some of these achievement hunters will play obscure, cheap knockoff and children's games in order to beef up their gamerscore.

We attempted to find these kinds of individuals within the GamerDNA database and compare them to the typical gamer. In order to identify achievement hunters, we looked for players who had played more than 25 games and for each of those games had completed at least 80% of their achievements. In all we found around 125 individual achievement hunters for whom we could look at their gaming history. We identified their most played games and compared the total number of achievement hunters who played these games with the number of achievement hunters who acquired every achievement for that game.

The results of our queries are shown in the Figures below. Figure 4 is a bar graph showing the total number of achievers for the top 100 achieved games. The orange bars represent the number of achievers from our sample that played each game. The overlaid blue bars represent the number of those achievers who completed all the achievements for each game.

Game Completion Ratio of Top 100 Achievers

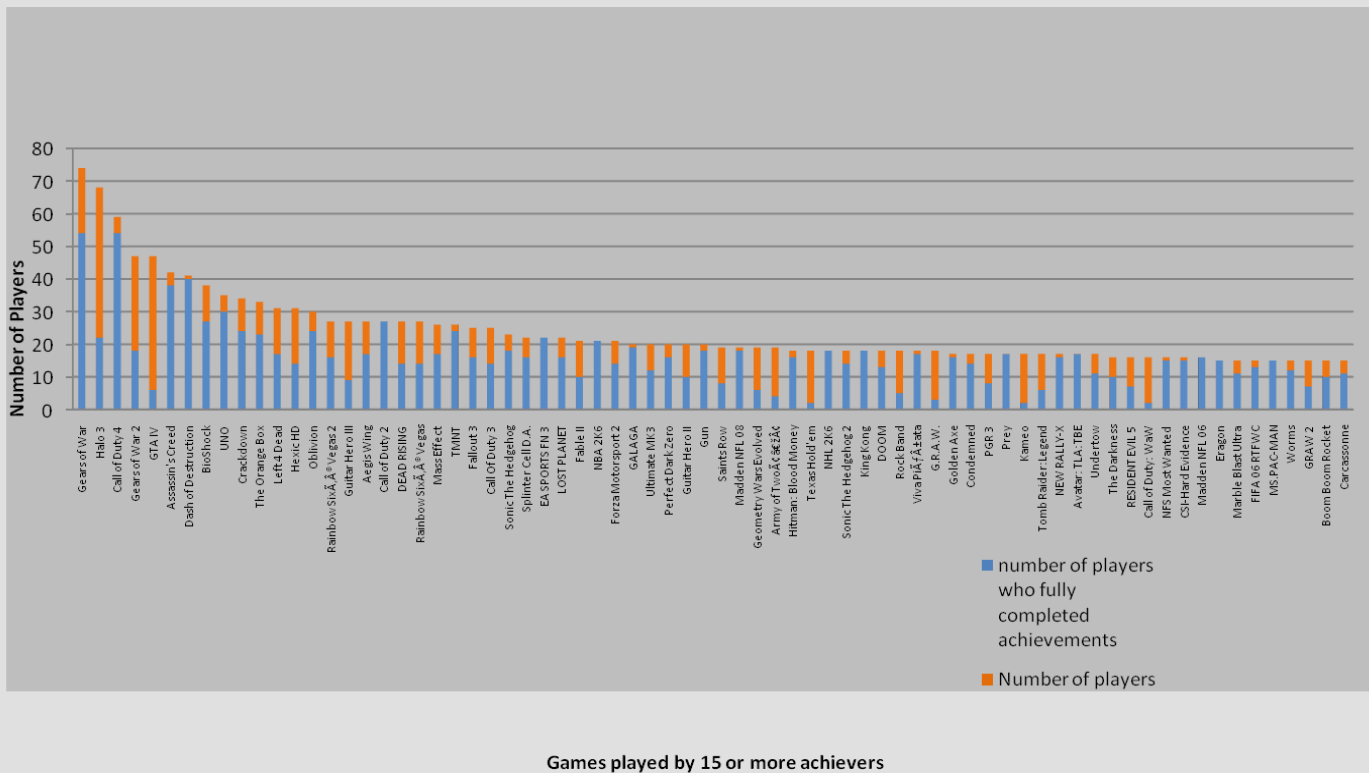


Figure 7: As shown by this graph, some games are more highly achieved than others. This can be an indication of which games are target by achievement hunters. For example, Call of Duty 2²⁷ was completed by all 100 achievers, whereas only around 15% of those same individuals completed GTA IV's achievements.

From the figure we can see that many popular games played by achievement hunters are some of the most generally popular games. Games such as Gears of War, Halo 3, Call of Duty 4 Modern Warfare²⁸ and GTA IV all show up in the top 10 popular games for achievement hunters and general gamers. When we compare the ratio of achievement hunters who have acquired every achievement for a game to achievement hunters who have only 80% of a games achievements we see no correlation with how popular the game is (Figure 7).

In Figure 8 we took the same data from Figure 7 and represented it in a graph with a single set of bars. Each bar represents the proportion of achievers who completed all of the achievements in that game to the total number of achievers for that game. There are 10 games that have been fully achieved by every achievement hunter in our sample. The data is ordered in the same way as in Figure 7; by how many achievers played each game.

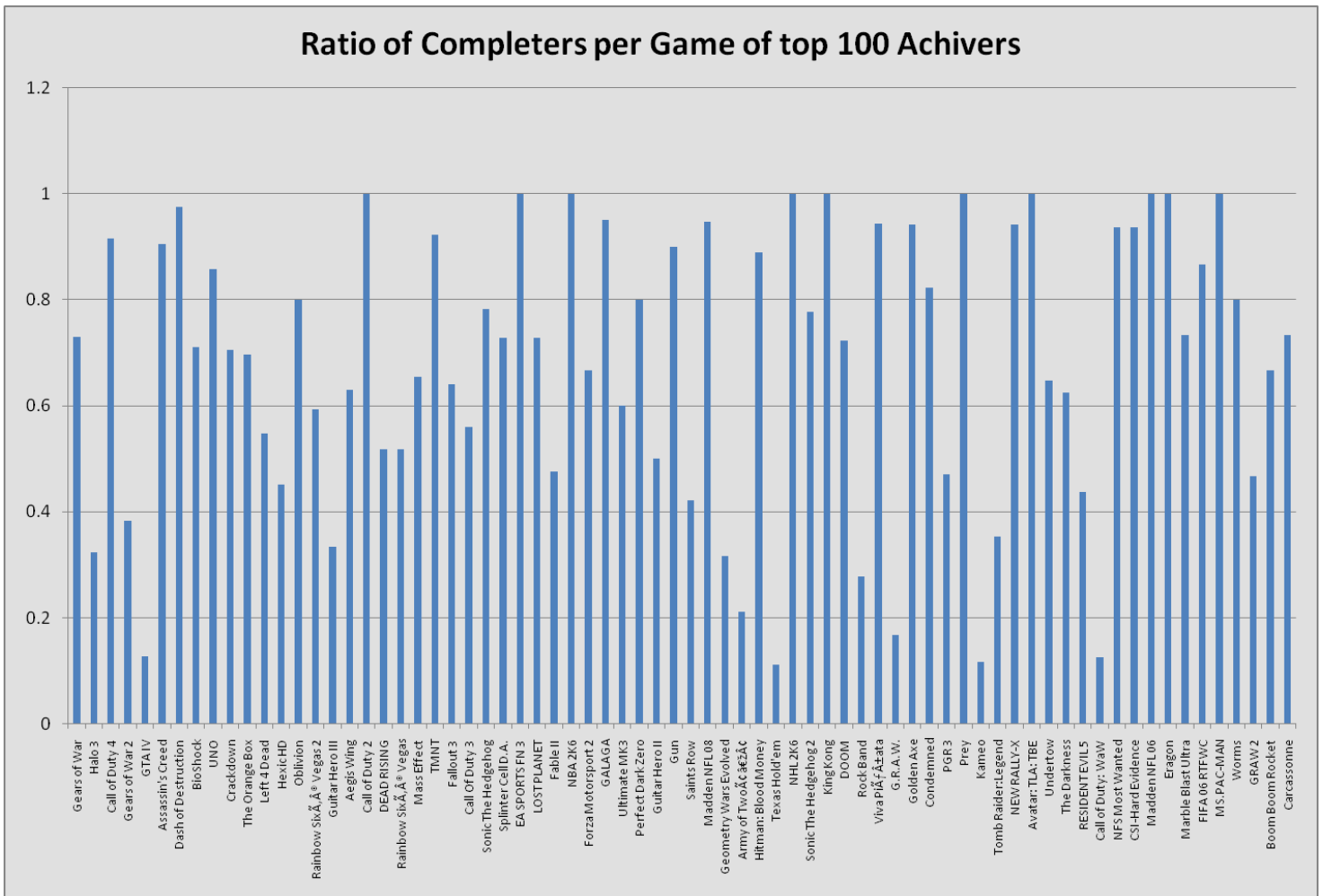


Figure 8: The ratio of people who fully complete each game out of the top 100 achievers greatly varies from title to title showing that achievers play a wide array of games at varying intensities in order to increase their gamerscore.

Of the games on this list that have a high proportion of completed achievements, some are games that score low in terms of overall popularity. These include games geared toward younger audiences (children's games), licensed movie or TV show games, and arcade games, and include such titles as Avatar The Last Airbender: The Burning Earth²⁹, King Kong³⁰, TMNT³¹, Dash of Destruction³² and Eragon³³. These are not the type of games commonly found on our list of top 100 popular games. These results clearly show that we have found some set of achievement hunters in the GamerDNA community, and become much more interesting when we compare them to the results of the general player data.

For each game in the previous list we found the total number of unique players in our database who have played it. We then compared that number to those players who had completed 80% of achievements. We see this data graphed in Figure 9 with the number of achievers graphed on top of the total number of players for each game.

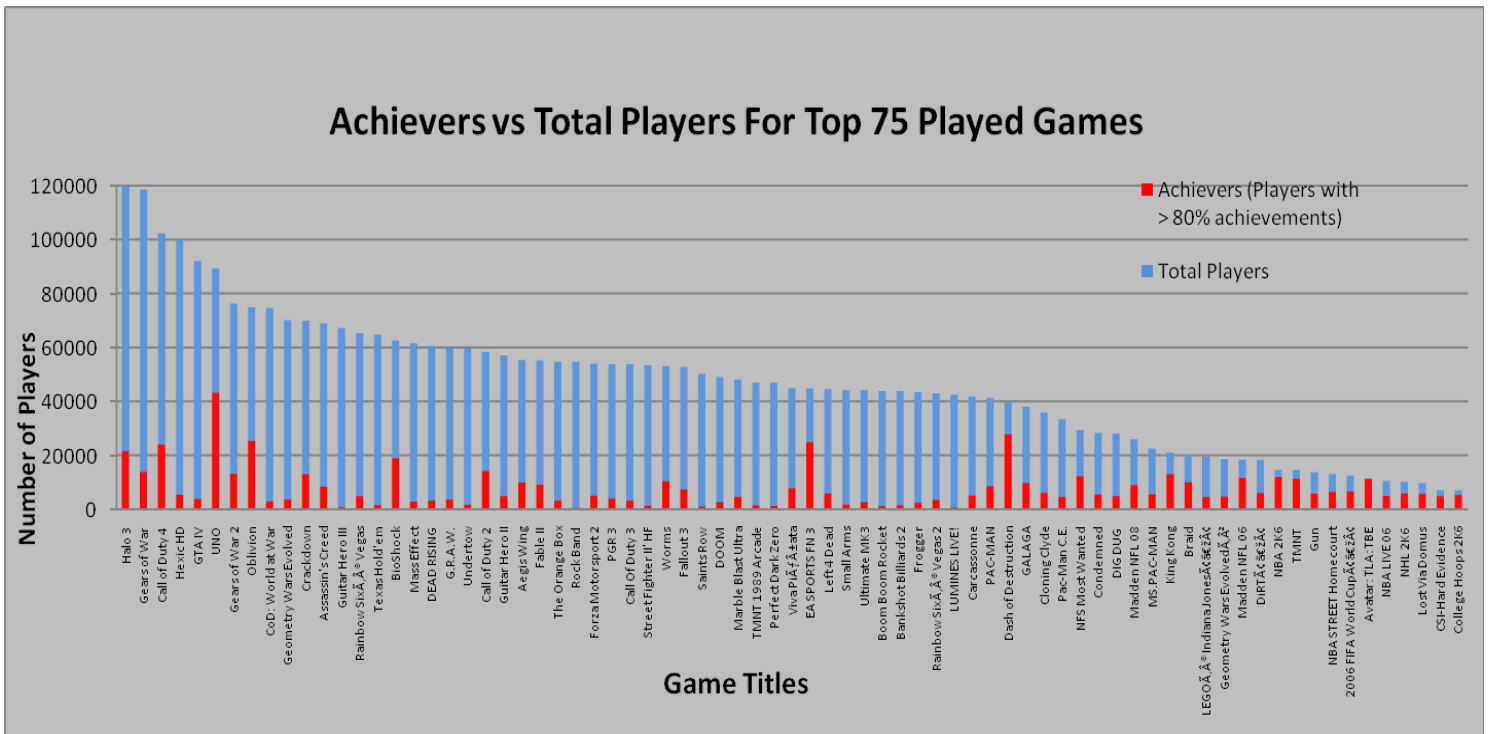


Figure 9: In general popular games have the same number of players pursuing achievements as less popular titles.

A few choice games have large numbers of achievers compared to the rest of their neighbors. From this we can see little to no correlation between the popularity of a game and the total number of achievers, and that the number of achievers is fairly consistent. Figure 9 shows how achievers will play all games relatively equally no matter how unpopular or obscure.

In Figure 10 we took the same data from Figure 9 and represented it in a graph with a single set of bars. Each bar represents the proportion of achievers to those gamers who have merely played the game. In doing this a different picture became apparent. Even though the total number of players declines, the number of achievers stays nearly constant. This graph shows that as a game is played by fewer people the ratio of achievers to non-achievers increases, in other words there is a negative correlation between popularity and proportion of achievers.

Section 4: Conclusion

4.1: What we learned

Through the exploration of our high level questions we discovered different behaviors of gamers. When comparing review scores from Metacritic to popularity of games we found that there was very little correlation between the two. This lack of correlation leads us to believe that even if a game gets a less than favorable review it can still do quite well. When looking at the concurrent number of players of a particular game we were able to see the different fluctuations in the values day by day. These fluctuations nearly always occurred when some sort of DLC was released or when another game came out. We also learned that even though DLC may not decrease the rate at which gamers stop playing a game it can bring a large number of players back for a short amount of time. While searching for a way to find achievers in our database we needed to classify what an achiever was. By doing this we learned a lot about what achievers do differently than other gamers. After finding our set of achievers in the database we were able to actually see how they differ from other gamers in terms of what games they play. Achievers play all manner of games even games for which they are not the target audience, such as kid and family titles.

4.2: What People could do in the Future?

Even though the GamerDNA database is large we feel as though we have exhausted the limits of what it can tell us. Getting an updated version of the database may not be possible due to the current state of GamerDNA. But if it were somehow possible to get an updated database it would be difficult to come up with any new findings beyond what we have already done here.

One area that we looked at but did not outline in detail in our report is the relation between Xbox Live zones and what types of games are played. Our initial findings on the subject were not very conclusive or interesting. It seemed that a gamer's zone did not make any difference in the types of games that they played. Qian Wei had done some work in this area for his MQP and also found there to be very little difference between the gamers in each zone.

While we did draw some interesting conclusions about gamers, it's still limited to GamerDNA's subscribers and only covers Xbox360 players. In order to make broader conclusions about gamers in general, broader data would be required. For example, a future project team could consult with Microsoft directly in order to start building a database similar to GamerDNA's database. This database would be substantially larger and would allow for much broader analysis and conclusions about what gamers do on Xbox Live. Another interesting possibility would be comparing the data we have gathered here to other console network statistics databases, if such databases exist. For example, a group could compare player activity on the Playstation Network to Xbox Live. This could broaden the scope of the analysis to a more general gamer population, rather than just Xbox Live players.

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Appendix

SQL Queries

This section contains a list of some of the SQL queries that we ran. Some more trivial queries that we also used are not listed here. Some of these queries were along the lines of:

```
SELECT COUNT(DISTINCT gamertag) FROM recentgames WHERE name = "Halo 3";
```

Here are the more complex queries with comments describing what they do:

Get unique users for each game

```
SELECT COUNT(DISTINCT gamertag), name FROM recentgames GROUP BY name;
```

Get gamertag, average percent completion of achievements, and number of games

```
SELECT * FROM (SELECT gamertag, AVG(apercent) AS avgachievements, COUNT(DISTINCT name) AS numgames FROM (SELECT gamertag, name, achievements/totalachievements AS apercent FROM recentgames GROUP BY gamertag, name)a GROUP BY gamertag ORDER BY avgachievements)b WHERE numgames >= 15 AND avgachievements > 0.8;
```

Get gamertag, average percent completion of achievements, number of games, and total gamerscore

```
SELECT * FROM (SELECT gamertag, AVG(apercent) AS avgachievements, COUNT(DISTINCT name) AS numgames, SUM(gamerscore) FROM (SELECT gamertag, name, achievements/totalachievements AS apercent, gamerscore FROM recentgames GROUP BY gamertag, name)a GROUP BY gamertag ORDER BY avgachievements)b WHERE numgames >= 15 AND avgachievements > 0.8;
```

Get gamertag, total # completed achievements, total # achievements, % of completed achievements, gamerscore, total gamerscore, gamerscore %, and number of games, where number of games >= 15 and achievement % > 0.8


```

SELECT * FROM (SELECT gamertag, achcomp, aichtotal,
achcomp/aichtotal AS achpercent, gscore, gtotal, gscore/gtotal
AS gspercent, numgames FROM (SELECT gamertag, SUM(achievements)
AS achcomp, SUM(totalachievements) AS aichtotal, SUM(gamerscore)
AS gscore, SUM(totalgamerscore) AS gtotal, COUNT(DISTINCT name)
AS numgames FROM (SELECT gamertag, name, achievements,
totalachievements, gamerscore, totalgamerscore FROM recentgames
GROUP BY gamertag, name)a GROUP BY gamertag ORDER BY gtotal)b)c
WHERE numgames >= 15 AND achpercent > 0.8;

```

Get gamertag, total # completed achievements, total # achievements, % of completed achievements, gamerscore, total gamerscore, gamerscore %, and number of games, where number of games >= 15, achievement % > 0.8 and <= 1, and get only the top 100 results

```

SELECT * FROM (SELECT gamertag, achcomp, aichtotal,
achcomp/aichtotal AS achpercent, gscore, gtotal, gscore/gtotal
AS gspercent, numgames FROM (SELECT gamertag, SUM(achievements)
AS achcomp, SUM(totalachievements) AS aichtotal, SUM(gamerscore)
AS gscore, SUM(totalgamerscore) AS gtotal, COUNT(DISTINCT name)
AS numgames FROM (SELECT gamertag, name, achievements,
totalachievements, gamerscore, totalgamerscore FROM recentgames
GROUP BY gamertag, name)a GROUP BY gamertag ORDER BY gscore)b)c
WHERE numgames >= 15 AND achpercent > 0.8 AND achpercent <= 1
limit 100;

```

Get a timeline with number of unique players per day for Burnout Paradise

```

SELECT COUNT(DISTINCT gamertag), DATE(datestamp) FROM
recentgames WHERE name = "Burnout Paradise" GROUP BY
DATE(datestamp);

```