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Cena i treść gry komputerowej – ile to zbyt mało, ile zbyt dużo

Game price and content – how little is too little, and how much is too much

Streszczenie: Wybór ceny gry jest trudnym zadaniem dla wielu twórców. Większość ogranicza się do sprawdzenia cen podobnych gier w sklepie. Analogicznie z doborem czasu rozgrywki. Aby nie podejmować tak kluczowych decyzji losowo, zebrano i przeanalizowano dane dla tysięcy gier wydanych na Steam. Codziennie, przez sześć miesięcy zbierano aktualne listy najlepiej sprzedających się gier, a następnie te dane zostały połączone z czasami rozgrywki pobranymi ze strony howlongtobeat.com. Efektem tych badań jest analiza relacji pomiędzy czasem rozgrywki a ceną gier komputerowych oraz analiza tagów i gatunków, które mogą sprawić, że cena gry jest znacząco odległa od oczekiwanej.

Słowa kluczowe: Cena, czas rozgrywki, gry wideo, gry komputerowe, Steam, gatunki.

Summary: Choosing the right selling price for a game is a hard task for many creators. Their actions are often limited to checking the price of already published, similar games. The same thing usually happens when deciding about the game's length. To make this essential process more premeditated, data coming from thousands of games published on the Steam platform was collected and analyzed. List of top selling Steam games was being collected daily for over six months. These data were combined with gameplay time statistics gathered from howlongtobeat.com website. Result of this research covers an analysis of time-price relation for computer games, and also analysis of tags and genres, that may cause a game to be cheaper or more expensive than average.

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Introduction

The video games market is very diverse. Some games can be completed within minutes, while other ones provide the player with more than a hundred hours of the main story. Some games cost over a hundred dollars, while some are free. Traditionally, the decision about the amount of gameplay is made by the game designer. Same time, choosing price is the responsibility of the game publisher. Both decisions are crucial for the success of the game and should depend on each other, but often are taken separately[2].

The main point of this article is to find the relation between gameplay time and game price. Another point of focus is finding types of games, that tend to be extraordinarily long, short, cheap, or expensive.

The literature on the subject is shockingly sparse. It's limited to a few press articles, including [Koster2018], [Atkinson2017], [Yannick2018], [Bycer2016], [Vogel2014]. As a result, creators are often forced to choose the price and content amount based on their intuition or on similar games that were already published. While such an approach may work, it is limited and biased.

Same time, the amount of PC games published every day is close to one hundred. This amount is so significant that it gives enough data to use the statistical approach and at least try to conclude. This article is an attempt to draw such conclusions from the available data.

Top-selling games list locations

The amount of PC games released each year is impressive. This article is focused on games from the Steam store, as it is currently the biggest store selling PC games [Becker2012]. On Steam itself, there are tens of thousands of titles. The majority of these are small, independent titles which did not reach financial success.

As this research focuses on the well-earning Steam games, a decision was made to use only top-selling titles.

[2] Unfortunately, this process has not yet been described in academic writing. It is known only from one's experience and articles on the creators' blogs, such as https://bit.ly/35lEaxy.

There is a public list of top-selling games on Steam. It is available at https://store.steampowered.com/search/?filter=globaltopsellers. This list is always up to date – it changes after each purchase and is sorted by sales made during the last 24 hours. It contains every game that sold at least one copy during that period and is the best source of data about well selling Steam games.

Data on the duration of the game in the given games

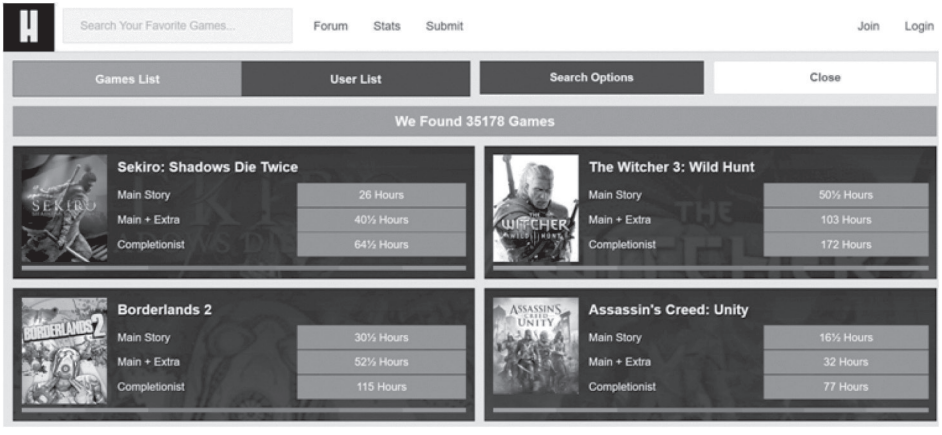
It is impossible to find the relation between playtime and price without having playtime info.

Three websites are containing such data:

- https://www.completionator.com/ – "Completionator is a website dedicated to tracking your video game collection and the games you've played."
- https://backloggery.com/ – "Backloggery helps gamers keep track of unplayed and unfinished games in their collection. "
- https://howlongtobeat.com/ – "How long does it take to beat your favorite games?"

All three are community-driven. Players intending to have a database of games they have played, playtime and information if they have completed a particular game are using these websites, and then websites are collecting these data and creating playtime statistics for games.

Figure 1. howlongtobeat.com – gameplay lengths for example games



In this research, howlongtobeat.com was used, as it is the most popular one.

Game tags on the Steam store

While games are traditionally divided into genres, this approach is far from perfect [Hunicke2004]. One game can fit many (or none) genres, and in many cases, it is hard to assign a genre to a game. Steam's approach to solving this problem is by introducing tags [Windleharth2016]. Tags are more than 300 predefined features that a game can have. For example, a game can be tagged as „RPG", „Female protagonist", and „Open world". Tags can be helpful to users looking for a particular game type and are the base of a game recommendation service. While tags are assigned to games by players, the game creator has the right to suggest tags (just like any other user) and to remove them. It is crucial because tags can be misleading. For example, the game House Flipper was tagged by a user as „Free to play" but then the tag was removed by creators, because it is a premium game.

Despite the fact that most tags are added by the Steam community, usually, they tend to be as valuable as other user-created Steam content, for example, game reviews [Eberhard2018].

In this research, tags for each analyzed game were downloaded. Information about game tags in each case was obtained directly from Steam.

Obtaining and combining data

All data mentioned in sections 2., 3. and 4. are available on a website, via the WWW interface.

The most natural solution would be to use a kind of API (application program interface) that would allow downloading structured data directly. Unfortunately, howlongtobeat.com does not provide any API. Steam does provide an API, but it was too limited and not allowed to download some data, like a list of tags or a list of top sellers. Data were collected using a web scraping technique[3].

To combine game tags with top sellers, the Steam App ID was used. The Steam App ID is a unique number that identifies each game, demo or DLC on Steam – such an approach guarantees a correct match.

[3] In order to obtain data, an application in C# was written. It allowed downloading data directly from the mentioned webpage. These data were then parsed using Regular Expressions, and stored in the SQL database. More information on the subject of web scraping can be found in [Sirisuriya2015].

Combining gameplay duration data (from howlongtobeat.com) with data from Steam was nontrivial. As there is no relation between Steam App ID and identifiers used on howlongtobeat.com, the match needed to be done by name. Unfortunately, names of the same game on both websites were in many cases different. The primary issue was caused by the fact that howlongtobeat.com is not limited to the Steam store. It is not unusual when a game published in different stores has a slightly different name. In most cases, the difference is adding a subtitle or different punctuation. To limit this issue, only alphanumeric characters from the English alphabet of both names were compared. Letter case was ignored. If despite these two rules, the match was not perfect, the game was skipped and not used in this research, as the wrong match could be more damaging than fewer data.

Figure 2. Table showing sample data from Steam and HowLongToBeat.com combined

	Price	Main	Main+Extras	Completionist	Additional content
What Remains of Edith Finch	$19,99	2,0h	2,5h	3,0h	50%
Aaru's Awakening	$14,99	3,0h	3,0h	3,5h	17%
FAR: Lone Sails	$14,99	3,0h	3,0h	3,5h	17%
Dude, Stop	$14,99	2,5h	3,0h	4,0h	60%
Tacoma	$19,99	2,5h	3,0h	4,0h	60%
ToeJam & Earl: Back in the Groove!	$19,99	2,5h	3,0h	4,0h	60%
INSIDE	$19,99	3,5h	4,0h	4,5h	29%
SUPERHOT VR	$24,99	2,0h	2,0h	4,5h	125%
Flower	$6,99	2,0h	3,0h	5,0h	150%
FINAL FANTASY XV EPISODE ARDYN	$9,99	2,0h	3,5h	5,0h	150%
Little Nightmares	$19,99	3,5h	4,0h	5,5h	57%
The House of Da Vinci	$19,99	5,0h	5,5h	5,5h	10%
Katamari Damacy REROLL	$29,99	4,5h	5,0h	5,5h	22%
Pinstripe	$14,99	2,5h	3,5h	6,0h	140%
The Red Strings Club	$14,99	4,0h	4,5h	6,0h	50%
GRIS	$16,99	3,5h	4,0h	6,0h	71%
Quadrilateral Cowboy	$19,99	5,0h	6,0h	6,0h	20%
LIMBO	$9,99	3,5h	4,0h	6,5h	86%

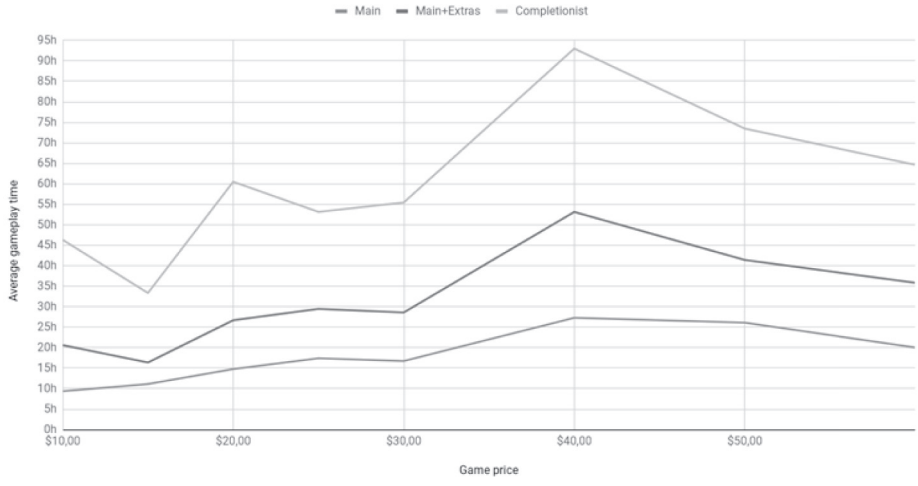
The resulting dataset contained 322 games that were among 200 top sellers on Steam between 2018-11-10 and 2019-05-10 and has gameplay data.

Copy of dataset is available at https://bit.ly/2I0Ufhv.

Price per hour of gameplay

Statistical analysis of data mentioned in section 5. shows that games on Steam costs on average $1.7 per gameplay hour. More details and values for various play styles are visible on the figure 3.

Figure 3. Average gameplay times for games with a particular price (only prices with 10+ games visible)



Playtimes are taken from HowongToBeat.com, and "Main" refers to main story time, "Main+extras" is the playtime for a game and all downloadable content. "Completionist" is playtime for a player who aims to have the maximal score on every level.

Tags most common among long top-selling games

Table 1 shows a list of tags that are both common among long games and uncommon in short ones. This was achieved by counting the percentage of games shorter than 5 hours on a list of top-selling games. Then the same count was made for games more extended than 10 hours. Results were ordered by the difference between these values.

Table 1. Tags that are more common among top-selling long games

Tag	Long	Short	Difference
RPG	58%	24%	35%
Singleplayer	93%	61%	32%
Open World	58%	26%	32%
Story Rich	49%	19%	29%
Atmospheric	55%	26%	29%
Adventure	70%	43%	27%
Great Soundtrack	57%	31%	26%
Action	73%	54%	18%
Action RPG	20%	3%	17%
Third Person	28%	13%	15%
JRPG	16%	1%	15%
Fantasy	27%	12%	15%
Sandbox	35%	22%	13%
Stealth	16%	4%	12%
Turn-Based	17%	5%	12%
Character Customization	16%	5%	11%
Female Protagonist	19%	8%	11%
Anime	19%	9%	10%
Moddable	14%	6%	8%

Tags most common among short top-selling games

The same steps as in section 7 were performed to find tags popular among short games and not so popular for long ones.

Table 2. Tags that are more common among top selling short games

Tag	Short	Long	Difference
Indie	68%	32%	37%
Puzzle	14%	-	14%
Massively Multiplayer	10%	-	10%
Realistic	10%	-	10%
Pixel Graphics	9%	-	9%
Local Multiplayer	9%	-	9%
Local Co-Op	9%	-	9%
Platformer	9%	-	9%
War	9%	-	9%
Casual	22%	13%	9%
Simulation	40%	32%	9%
Psychological Horror	8%	-	8%
2D	16%	11%	5%

Tags with the highest impact on an average price per hour

Calculation of average price per hour of gameplay was repeated for each tag owned by any game that was on the top-sellers list during the researched period. Such an approach let to find anomalies and tags that are connected to extraordinarily expensive or cheap games, considering their length.

Table 3. Tags owned by games with the highest and lowest price per hour of gameplay

Tag	Games	Average price per hour	Difference from averege	Tag	Games	Average price per hour	Difference from averege
Short	10	$6,46/h	+287%	Education	7	$0,62/h	-63%
Bullet Time	4	$5,50/h	+229%	Space Sim	4	$0,63/h	-62%
2D Fighter	5	$5,31/h	+218%	Agriculture	4	$0,64/h	-62%
Time Manipulation	5	$5,23/h	+213%	Romance	7	$0,71/h	-57%
Competitive	8	$5,15/h	+208%	Epic	6	$0,71/h	-57%
2.5D	10	$4,28/h	+156%	Turn-Based Combat	13	$0,73/h	-56%
Fighting	16	$4,10/h	+146%	Diplomacy	4	$0,73/h	-56%
4 Player Local	4	$4,10/h	+146%	Party-Based RPG	9	$0,74/h	-56%
Narration	5	$3,95/h	+137%	TrackIR	5	$0,82/h	-51%
Superhero	5	$3,78/h	+126%	CRPG	9	$0,87/h	-48%
Arcade	14	$3,75/h	+125%	Cult Classic	4	$0,88/h	-47%
3D Platformer	7	$3,58/h	+114%	Star Wars	5	$0,93/h	-44%
Puzzle-Platformer	11	$3,46/h	+107%	Dating Sim	9	$0,95/h	-43%
Robots	6	$3,46/h	+107%	Real-Time with Pause	17	$0,97/h	-42%

Price per hour of playtime

Data shown in section 6 have interesting implications. The first one is that an average $10 game has 10 hours of gameplay. More expensive games tend to have longer playtimes. Games for $40 usually are the longest ones. If a game can deliver more than 20 hours of gameplay, then every price greater or equal $30 seems to appreciate.

Considering prices available for game publishers on Steam (fig. 4), multiplying gameplay time in hours by 1.7$/h, rounding to full tens and subtracting $0.01 gives a rough estimation of what price for a particular game a publisher could choose.

$$price = 10 \cdot \left\lceil \frac{time \cdot 1.7\$/h}{10} \right\rceil - 0.01$$

Figure 4. Prices available for game publishers on Steam

11. Long games

Let us try to answer the question „What should be avoided when working on a tight budget?".

Table 1 shows tags popular among top-selling long games. Tags on that list are not a surprise. It is easy to understand that if a game is, for example, a story-rich open-world RPG, both players and creators prefer this game to be long. For creators, they want the user to have time to discover the story and explore the world as well. For the player, if he (or she) invests time and energy into creating and developing his character, it is desired for this character to be there long enough to build a relation with the player.

A separate topic is a relation between price per hour and game tags. Games with particular tags can be cheaper, and it does not say anything wrong about game or genre. For example, let us consider fishing games. In real-world fishing does not seem to be a fast-paced reflex-based sport. It is instead something relaxing and time-consuming. Therefore, the fact that fishing games have a lower cost per hour seems natural. Considering the right side table in

figure 3, it is worth to notice tags like Agriculture, Diplomacy, or Space-Sim. Games with these tags, even if they are very long, usually will not be costly.

Short games

One of the most critical questions that were base of this research project was: „Can very short games earn for themselves?". The answer to that question is positive.

Games like „What Remains of Edith Finch" (2 hours gameplay, $19.99) have proven that making a short and satisfying full-price game is possible.

Let us try to answer the question: „Are there genres or tags that favor short, independent games?".

Table 2 contains some inspiring suggestions on the matter. All types of multiplayer games (Local multiplayer, Local co-op, MMO) tend to be short. It is logical – if a game relies on interactions between human players, putting a long story would be distracting. In the case of multiplayer games, the story mode is often only a tutorial.

It might be surprising that both „Realistic" and „Pixel art" are on this list. In terms of graphics, both styles have a common feature: they are hard to make and expensive. Realistic look is hard to achieve, because of the uncanny valley [S.m.2006], and pixel art is harder than it seems, because of love reusability. Artwork in this style usually cannot be scaled or rotated. Therefore the amount of content that needs to be made is significant. Summarizing, it is hard and expensive to make content in these styles. Therefore usually artists prefer to make a short and excellent looking game, rather than gaining more gameplay and less quality.

Also, table 3 shows that various tags usually come with games with prices higher than gameplay time alone would suggest. The most significant tag here is „Short" itself. The game can be designed to be short from the beginning, and if done well, it can work to the game's advantage.

Conclusions

One of the most crucial factors in choosing the price of the game is the gameplay time the game provides.

This statistical relationship is shown in figure 3. If the ratio of the planned price and playtime for a given game after adding it on this chart would be above the „Completionist" or below the „Main" series on the chart, it may suggest that the price is chosen incorrectly.

Some features make players look at the valuation of the game under a different account. The most significant are listed in table 3. If a game has any of these features, it is recommended to modify the price of the game accordingly.

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