The Games We Play: Relationships between game genre, business model and loot box opening

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Abstract. The use of loot boxes is endemic in contemporary games, having originated in the free-to-play games of China and Japan they are now a common feature in almost every type of business model and genre. Primarily used to increase monetisation they are not without controversy as they have been accused of driving a "pay-to-win" approach to gaming and have even been linked to the development of problematic gambling behaviours. Considering the fact that there are a huge range of disparate practices connected to loot boxes, and that loot boxes are present in all forms of contemporary games this research asks the following question: Which business models and game genres, if any, are associated with increased opening of paid loot boxes? We employed survey data (N=613) gathered among gamers. We can conclude that loot boxes seem to be pervasive across games and there is no strong evidence that any business model of genre would clearly predict loot box opening activities and that players of all kinds of games probably encounter them in the gaming activities one way or the other. However, we can also conclude that loot box opening activities seems to be most strongly connected with both the retail and free-to-play business models as well as the shooter game genre.

Keywords: free-to-play, esports, gambling, video games, loot box.

1 Introduction

The use of loot boxes [9, 21] is endemic in contemporary games, having originated in the free-to-play games [2, 24] of China and Japan they are now a common feature in almost every type of business model and genre. Primarily used to increase monetisation [10] they are not without controversy as they have been accused of driving a "pay-to-win" approach [2, 14] to gaming and have even been linked to the development of problematic gambling behaviours [37].

Loot boxes are virtual items which provide players with a range of in-game items as rewards, the contents are commonly determined by a form of random number generation and loot tables, based on item rarity, at the point at which they are opened [25]. There are a number of various names for these boxes, depending upon the game in which they are featured, common names include: crates, chests, boxes, mystery boxes,

lock boxes. The term loot box is now commonly accepted as referring to all such items as they share the same underlying mechanic, this article will use the term loot box throughout. In the same way in which different games use different terminology, loot boxes can be obtained and opened in various ways, sometimes within the same game.

In some games loot boxes are provided to players as a reward for completing a designated stage, level, or any other specified in-game achievement; other games allow loot boxes to be purchased at will, some games award loot boxes what seems at random fashion. Similarly, although the majority of games require players to purchase a "key" in order to open loot boxes, some allow free openings, which may or may not be limited to a certain amount per day [27]. The most well-known games which make loot boxes available to players are, arguably, *Counter Strike: Global Offensive* (*CS:GO*) and *Overwatch*. In these games, and many others, the rewards are essentially decorative virtual items which are used to change the appearance of in-game items such as clothes, appearances, "skins" for equipment and so on [1, 16]. Other decorative items allow the players to personalise their games through the use of distinct poses and emoticons, audio clips and so on. However, in other games loot boxes provide players with items needed to progress in the game, such as upgrades or resources used to craft new items. It is this latter type of reward which has resulted in accusations of loot boxes driving a "pay-to-win" ethos [14].

The decorative items obtained from loot boxes are often graded by rarity [12]: in *Overwatch* there are six tiers, ranging from "standard" to "legendary" [29]; while in *CS:GO* five tiers span "battle-scarred" to "factory new" [30]. Essentially, the rarer an item, the more desirable it is for players. However, items may also vary in rarity simply based on the availability of the items in the secondary market where game items are being traded among the players [19]. Given that in many games the only way to obtain these skins is by paying real-world currency to open loot boxes, whose contents are randomly generated, there have been accusations that games are driving players into gambling-like behaviours [19]. Finally, some games allow players to trade items via an online marketplace where prices rise and fall according to supply and demand[19], skins can also be used as stakes in various third-party websites, the majority of which are unregulated [21].

It is the combination of paid opening, randomly-generated rewards/prizes, and the potential to exchange these rewards for real-world currency, which has resulted in gambling regulators across the world investigating the use of loot boxes in contemporary video games. Loot boxes have been classified as gambling in several jurisdictions, with investigations currently ongoing in many more [7, 33-34]. Several recent academic works have examined the relationship between loot boxes and gambling behaviours, suggesting positive correlations between purchasing loot boxes and problematic gambling behaviours, as measured by the Problem Gambling Severity Index [21, 37]. Due to their association with major esports titles loot boxes are often referred to in the media as being a form of esports gambling, where esports is conceived of as competitive video game play [13, 32]. However, this is somewhat misleading as loot boxes do not affect the way in which these games are played, and have no direct association with esports per se. Indeed, research has shown that engagement with esports is negatively correlated with loot box purchasing [21]. It would, therefore, be

more appropriate to refer to loot boxes as a form of video game-related gambling rather than esports gambling. Some have claimed that purchasing loot boxes, or the keys to open them, is simply another form of economic activity known by the term "micro-transaction" [16]. Yet this too has been shown not to be the case as the associations between purchasing loot boxes and Problem Gambling Severity Index (PGSI) score are not replicated in any other form of micro-transactional payments [37].

Given that purchasing loot boxes is currently one of the most important revenue streams for game publishers [10], and that it has been speculated to be positively associated with problematic gambling behaviours [21, 37] and that several organizations have difficulty determining the classification of loot boxes as gambling or gaming activity [23], there is a need to understand the contexts in which players of video games are being exposed to this specific activity. Two primary avenues of investigation, the esports environment and the economic practice of micro-transactional payments, have already been found not to correlate with increased purchases of loot boxes [21, 37]. Considering the fact that there are a huge range of disparate practices connected to loot boxes, and that loot boxes are present in all forms of contemporary games this research asks the following question: Which business models and game genres, if any, are associated with increased opening of paid loot boxes?

2 Method

Investigations into potentially sensitive topics can be subject to social desirability bias (SDB), with this in mind a number of steps were taken to limit any potential effects. The most significant of which was the use of an online survey to collect data, as it enabled respondents to participate anonymously, one of the most effective ways to reduce any such effects [17]. Furthermore, the survey was designed in such a way as to further limit any potential effects of SDB.

Data was collected via an online survey, publicised across several social media sites and discussion forums dedicated to video gaming and esports. The survey was available for a period of one month between November and December 2016, it was only available in English and was accompanied by information explaining both the purpose of the research and the means by which it was arranged and funded. As an incentive for participation, valid respondents were given the opportunity to participate in a draw in which five gift cards were available as prizes. In addition to demographic information, the survey asked about game-playing habits as well as the consumption of loot boxes and participation in other gambling activities.

2.1 Participants and Procedure

The survey was opened a total of 2,397 times, out of which 869 complete responses were received. The survey included a filter question and those that failed the filter were excluded from the final sample, as were those who reported not playing video games within the previous year. After filtering, the final sample consisted of 613 respondents, 25.57% of the original total. The final sample was overwhelmingly young, 58.1% were

under the age of 21, and male (91.4%), this is consistent with previous studies of video gamers who gamble.

The vast majority of respondents reported playing video games at least once a week (96.9%), with the most common reported time spent gaming being "up to 15 hours per week" (14.5%). Finally, the most commonly reported average amounts spent on video games per month, including all in-game purchases, were "$5 - $9.99", and "$10 - $14.99", with 15.3% each.

In total, 158 respondents reported opening loot boxes, of which eight did not participate in paid opening. However, of the eight who did not pay to open loot boxes, seven reported using skins, obtained via opening loot boxes, as stakes in other gambling activities (such as skins lotteries and online poker). Of the remaining 150 respondents who reported paying to open loot boxes, 105 also used skins to facilitate gambling activities by using them as stakes in third-party gambling sites.

2.2 Measurement

Respondents were asked to provide estimates of how much time, in hours, they spent playing each genre and business model per week, they were provided with a free-entry text box in which to enter their answers.

The advent of digital distribution channels has resulted in an increasing range of business models employed by games developers and publishers, no longer is the "boxed" model the only viable format for distribution. Instead products are framed as services, with novel forms of commoditisation [28, 31]. A review of game design literature was conducted in order to extract various approaches common in the contemporary games industry. The results were cross-referenced with one another in order to identify core similarities and differences. During the course of the review it was decided that the ways in which consumers purchase, or otherwise access, the content would be the main approach to categorising business models, this resulted in a finalised list of 5 different models: Retail, where consumers make a one-off purchase to access a game (either in its entirety or the core upon which later content is added); Free-to-play (F2P) or Freemium; Subscription, where consumers pay a monthly fee to access a game; Episodic, where consumers purchase episodes of the game at their discretion; and Early-Access, where consumers pay a reduced fee to access game content while it is still in development. Due to the nature of the study, F2P games were sub-divided into two categories, giving 6 finalised categories in total: F2P casino games, including social network casino games (SNCs); and all other F2P games.

Genre is a notoriously difficult issue to address, with frameworks and terms of reference changing to suit the context of intended use [6, 8]. While previous works have suggested different forms of genre classification, there is no accepted standard and the proposed structures bear little resemblance to the ways in which genre is utilised either by producers, retailers, or consumers [3, 4]. As such, it was decided that this study would utilise genres which mirrored usage in wider society. First several major online review sites were examined in order to understand the way in which they present game genres. These were compared to one another and any categories which were common to all were used to create a core list. Second, the process was repeated with digital distribution

platforms in place of review sites. Finally, online streaming services were reviewed and the process repeated. The three sets of core categories were cross-referenced in order to establish main genres. All additional classifications from each stage were then cross-referenced in order to create a secondary tier of common categories. The resulting list contained a significant number of categories and was considered unwieldy for use in an online questionnaire. With this in mind, the list was examined in order to find common principle and create composite categories which remained easily comprehensible to participants. In the finalised wording categories were presented in a list format with common sub-categories and games provided as examples. An example of a finalised category follows: "Construction and Management Simulations (includes: Business Simulations, sports management sims, etc.)". In total the finalised list of categories consisted of 16 individual genres: Action, Adventure, Collectable Card Games, Casino, Combat/Fighting, Music, Platformers, "Fast" puzzle, standard puzzle, Racing, RPG, Shooters, Vehicle Simulations, Construction and Management Simulations, Sports, Strategy.

2.3 Analysis

Both game business models and game genres were used as independent variables in a standard linear regression model, with the dependent variable being "loot box engagement", a composite variable made up of the following three consumption measures: frequency of purchasing loot boxes, average hours per week spent opening loot boxes, and average monthly spend on loot boxes. A composite variable was utilised, as incorporating a number of different indicators of engagement provides a more holistic appraisal than simply utilising a single measure, e.g. money spent opening loot boxes. Although the act of opening a single loot box does not take long, less than a minute, when assessing potentially problematic behaviours it is common practice to gather information on the time invested in any given activity. In this way, recording time spent on paid loot box opening is akin to measuring time spent playing slot machines, or any other high frequency event. Analysis was conducted using IBMs statistical analysis software SPSS version 24.

3 Results

When investigating the interactions between business model and engagement with loot box opening (model 2; table 1, below), linear regression revealed only one statistically significant relationship, that of the retail model. The path coefficient shows a positive relationship of moderate strength, ($\beta = .181$, $p < .001$).

The relationship between the episodic business model and loot box opening is slightly in excess of the commonly accepted threshold for statistical significance ($p = .064$). However, the closeness to the threshold indicates it is worthy of attention, especially so when considering it is the only business model which shows a negative path coefficient, albeit one which can be considered small ($\beta = -.076$).

In respect to game genre (model 2), the pattern of results mirrors that of model 1 in that only one statistically significant relationship was observed. The shooter genre was found to have a moderately strong, positive association with loot box opening ($\beta = .164$, $p = .001$). No other relationships of interest were evident.

Table 1. Results of Linear Regression

		Model 1		Model 2		Model 3	
	R2 (adj)	0.037		0.019		0.045	
		β	p	β	p	β	p
Business Model	Retail	**0.181**	0.000	-	-	**0.184**	0.001
	F2P Casino	0.009	0.830	-	-	0.079	0.270
	Non-Casino F2P	0.067	0.114	-	-	**0.109**	0.042
	Early Access	0.001	0.979	-	-	0.029	0.567
	Episodic	-0.076	0.064	-	-	-0.068	0.118
	Subscription	0.036	0.396	-	-	0.048	0.318
Genre	Action	-	-	0.016	0.785	-0.012	0.840
	Adventure	-	-	0.025	0.676	0.025	0.675
	CCG	-	-	0.068	0.110	0.072	0.090
	Casino	-	-	-0.020	0.662	-0.086	0.238
	Combat	-	-	-0.074	0.107	**-0.104**	0.035
	Music	-	-	-0.057	0.184	-0.066	0.127
	Platformer	-	-	-0.005	0.919	0.022	0.642
	Fast Puzzle	-	-	0.038	0.392	0.011	0.801
	Standard Puzzle	-	-	-0.025	0.623	-0.025	0.634
	Racing	-	-	0.029	0.530	0.039	0.396
	RPG	-	-	0.061	0.198	-0.033	0.536
	Shooter	-	-	**0.164**	0.001	0.068	0.225
	Vehicle Simulation	-	-	0.015	0.733	0.009	0.843
	Constr./Mngmt* Simulation	-	-	0.003	0.941	0.026	0.585
	Sports	-	-	0.041	0.354	0.059	0.181
	Strategy	-	-	-0.059	0.250	-0.110	0.055

Note: *Construction and Management Simulations

Finally, model 3, in which all independent variables were employed in the same model, examined the combined effects of business model and game genre on loot box opening. Of all the previously observed relationships only that of the retail business

model was found to retain its significance, with the path coefficient increasing marginally (β = .184, p = .001). However, in this model Non-Casino F2P games (non-casino games) were also found to exhibit a positive relationship to loot box opening (β = .109, p = .042). Furthermore, results show that the shooter genre is no longer statistically significant, but that the combat genre now shows a negative correlation with loot box opening (β = -.104, p = .035). The strategy genre also shows a negative correlation of low to moderate strength in this model (β = -.110), the p value of .055 is marginally outside the established threshold but is close enough to indicate that it is an item of interest.

4 Discussion

This work investigated the way in which the consumption of certain game types, defined according to genre and business model, correlate with loot box opening behaviour. Results indicate that the particular business model employed by game developers has more overall effect than the genre of the game. A discussion of the results follows along with theoretical and practical implications of this work.

The significance of the retail model (both model 1 and 3) is interesting as loot boxes were originally a monetisation mechanic developed primarily in the F2P model. The observed relationship indicates the way in which it has permeated the market and that it is being used to obtain further profits from a customer base who have already invested in the game by making an up-front purchase.

The finding that F2P games, in general, were found to have a statistically significant, positive correlation to loot box opening (model 3) was to be expected considering that they originated in this business model. However, that the F2P model was not found to be significant when considering only business models is, perhaps, more surprising. This may be explained by the fact that F2P games are now the dominant form in the contemporary games market, accounted for by the success of casual gaming titles for mobile technology [18, 26]. As such, they cover a vast range of game types, genres, and monetisation methods, including genre (model 3) allows the significance of the F2P model to become apparent.

As highlighted in the results section, the fact that the episodic business model is the only one which shows a negative correlation with loot box opening is noteworthy; that the p-value only just exceeds the standard threshold confirms that it is worthy of discussion. This relationship is important as episodic games are more story-driven, using narrative to promote greater player engagement with the game [20]. It may be that the use of further monetisation techniques, such as loot boxes or other in-game purchases, may detract from that engagement, with the result that players are less likely to continue purchasing new episodes as they are released. In addition, episodic games are, largely, single-player experiences with no opportunities to display a personalised avatar or in-game items to other players, thereby reducing the appeal of such cosmetic additions to the game.

When considering only the relationship between genre and loot box opening (model 2), the significance of shooter games can be explained by the fact that *PUBG*, *CS:GO*,

Overwatch and other similar online games are, arguably, those most strongly associated with loot boxes [15]. This is particularly true in relationship to the grey-market skin gambling scene which is predominantly focused on *CS:GO* skins [22]. Once again, it is interesting to note how this relationship disappears in the combined model (model 3), with the combat genre replacing shooters as the most, indeed only, significant individual genre. This relationship may derive from the fact that shooters are common genre across almost all business models. The incredible popularity of esports games such as *Dota 2* and *League of Legends*, which use loot boxes as a form of monetisation as part of the F2P model, may, therefore, be a potential explanation of this relationship. This is supported by the significance of F2P games in the combined model.

Finally, the negative relationship between strategy games and loot boxes may provide further evidence that games which are predominantly, although not exclusively, aimed at providing a single-player experience are less likely to engender a desire to indulge in ongoing personalisation and customisation. This is likely to be the case due to the fact that strategy games normally do not utilise avatars etc., and as such opportunities for customisation are more limited.

Overall, however, based on the results it appears that neither the business model or the game genre seem to have a clearly meaningful effect on prominence of loot box opening activities, as demonstrated by the low degree to which the model explained the variance of the loot box opening activities as well as the low number of indicators that significantly predicted such activities.

4.1 Implications

There are several theoretical and practical implications that arise from this study. First of which relates to the positive correlations between paid loot box opening and both F2P and retail business models: both consumers and consumer protection agencies must be aware of the spread of monetisation techniques into the retail model, meaning that the true cost of games are hidden and that initial purchases can be the start of an ongoing financial investment [12]. This is especially important for younger players and those who make purchases on their behalf [2], and who themselves may not be aware of current economic practices employed by the games industry. Furthermore, both consumer protection agencies and gambling regulators need to assess the way in which monetisation techniques resemble, and potentially encourage participation in, gambling and gambling-like behaviours. Potential solutions to these issues could be derived from existing gambling regulations [2].

In respect to the industry, game developers must recognise that their use of monetisation techniques have additional, unintended consequences as they can engender problematic gambling behaviours. Therefore, they must consider how monetisation is implemented in order to maintain a healthy relationship with their player communities. See King and Delfabbro [16], for an in-depth examination of such issues. For those who are interested in establishing more ethical monetisation techniques, fruitful areas to investigate include: the effects of single-player experiences, narrative engagement, and the role of rare, or limited, decorative items for customising avatars or other in-game displays.

Finally, the positive correlations between games of the Shooter genre, combined with the suggested negative correlation with story-driven (Episodic model) and predominantly single-player (Episodic and Strategy genres) games have a theoretical implication. These relationships may lend weight to the argument that players seek to use skins as a way to display gaming capital to others [35], rather than simply to personalise avatars for their own gratification. That this motivation may be being monetised via a randomised reward schedule suggests it may conform to a "dark game design" pattern [36] and requires ethical review in light of wider discussions around persuasive technologies [5].

4.2 Limitations

The most significant limitation of this work relates to the fact that that the dataset comprises of a self-selected, convenience sample, meaning that results are not generalizable to wider society. However, the fact the sample is relatively large and that its demographic characteristics match others in the area, mean that it is likely to reflect the specific population of interest. Furthermore, the data was collected from social media and discussion forums associated with video games and esports which are often structured around specific game titles, meaning that responses may be dominated by a certain community (for example, *CS:GO*, *League of Legends*, etc.). This may influence the results in that certain types of games, such as music or RPG games for example, have the potential to be under- or over-represented. A further methodological consideration is that the method of analysis, linear regression, means that causality cannot be inferred from the model, it simply reveals correlations between the different types of consumption.

Despite the methodological concerns outlined above, the approach taken by this work was deemed to be the most appropriate way to investigate relationships between paid loot box opening and various forms of games, for a number of reasons. First, although it is possible to obtain financial information on some games, it is not possible to obtain it for all games, and certainly not at the level of detail required, as such self-reported spending assessment is the only viable means of collecting such data. Secondly, the dependent variable of "loot box engagement" is a latent variable, comprised of several measures, as described in section 2.3. It would be extremely difficult, if at all possible, to collect data on individual players' behaviour related to frequency and time spent opening paid loot boxes from any other source. In addition, the use of an online survey acts to limit the potential for social desirability bias to influence participants [17]. Finally, by utilising an online survey to collect data, there are no limits placed on the types of games that can be included in the research. If an alternative data collection method were employed, for example a review of contemporary games and their implementation of loot box mechanics, the scope of the review would be limited by available resources. As such, the research would need to apply certain limitations to the scope of games included, this is not the case when utilising an online survey as the information provided by respondents is not subject to restriction.

A further limitation (or strength depending on the perspective) of the present study is that it measures respondent behaviour on an overall level. It does not address the playing practices of specific games, and their relationships to loot box opening within that same game. While such connections probably exist in the player communities, they may be impossible to detect in data such as that gathered in this study.

It remains possible, however, that there may be certain game genres or business models which do not feature loot box-style mechanics and that they may be removed from the models in order to focus on those particular relationships. A potential direction for future work, therefore, would be a qualitative review of the items used as independent variables (genre, business models), or to conduct studies of loot box opening in individual games.

Finally, the data used in this work was gathered before the introduction of new regulatory practices, e.g. Belgium and the Netherlands, and changes to the loot box trading systems by publishers such as Valve, the publisher of *CS:GO*. These changes may have affected some specific communities, when defined according to physical location or game preference, however the relatively large size of the data set and the global reach of the survey are likely to mitigate any potential effects.

5 Conclusion

This research adds to the current body of work on loot boxes by investigating potential relationships between consumption of video games, defined according to genre and business model. We can conclude that while loot boxes appear to be pervasive, there is no strong evidence that any business model or genre would clearly predict loot box opening activities. It is likely that players of all kinds of games encounter them in the gaming activities one way or the other and the issue, therefore, requires continued investigation. However, we can also conclude that loot box opening activities seems to be most strongly connected with both the retail and free-to-play business models as well as shooter game genre. A fruitful avenue for future work may be to examine loot box opening in the context of specific games.

6 References

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