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# Narrative in Story-Driven Video Games: A Comparative Study of Emergent, Embedded and Mixed Narrative Techniques

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**Abstract.** The very outstanding video game storytelling methods are embedded and emergent narrative and finding a balance between these means building a story-driven game that is engaging and entertaining. Embedded narrative has a pre-generated narrative which differs from emergent in which the player contributes to the narrative. This paper explores the most popular narrative techniques and rates a game based on many factors. The primary goal is to determine whether the difference in narrative technique plays a major role in players preference towards games. Survey and experiments are performed on games populated from gaming critic sites and publicly available online lists on certain factors of games such as narrative techniques, game genre, game scores and number of players. The results are analysed and compared to conclude which narrative technique is most popular and used more by designers and which one is implemented more in the available game genres. The result is computed using statistical methods and displayed in charts to distinctively differentiate the values. The final results demonstrate a statistically significant correlation between the game players preference towards emergent storylines over mixed storylines and users seem to give more average score to the games which employ emergent narrative technique; however, the other variables seem to have no meaningful influence on players preference. In regard with game genre, it is observed that some genres such as open-world use emergent technique the most, on the other hand, genres like puzzle games mostly adopt embedded narrative.

**Keywords:** Emergent Narrative · Embedded Narrative · Narrative Technique · Story-driven Video Game · Game Narrative · Non-linear Storyline · Interactive Storytelling · Video Game Genre.

## 1 Introduction

Narration in video games and its types namely *Emergent* and *Embedded* have been a major area of study in the field of game design or ludology[1, 22]. Emergent narrative is the construction of systems in which users actively participate in the narrative process in a highly flexible realtime environment, where authorial activities are minimized [34]. On the other hand, embedded narrative refers

to those scripted narrative elements that are embedded throughout a game to form the background story. That is the pre-generated narrative that is part of the game before the player interacts with the story [34, 36].

Game designers are always trying to include a story in the games to satisfy some emotional intentions of players or to create some sort of aesthetic distance while playing the game, although it is possible to have games without stories or even as Lazzaro claims, to have emotional connections with the players without merging the game play and narrative [20]. There are also some special game genres like Role Playing Games (RPG) which are incomplete without a back story. Aside the genre, the characteristics of the players play a significant role when defining the game narrative. Some players enjoy being involved in a fictional story instead of character development.

Narrative in games is one of the most significant aspects of the video games but yet unexplored in the way it deserves [14]. Although there are many research, considering either the value of having a story in the game [2, 17, 18, 24, 26] or defining narrative techniques which can be used in games [8, 6], there is no dedicated study or conducted analysis on the matter of popularity and market preference of either of the techniques in video games. This neglect, may cause the gaming companies to develop story-driven games that are perfectly designed but poorly narrated from the market's point of view.

The presented research will address this gap in the study of narrative in video games by analyzing the market preference towards each of the narrative techniques. To achieve this goal, a sample of the published story-driven games is selected, the narrative technique which is used in each game title is determined, the market-related data of each game title is collected and finally, by analyzing the data and performing the statistical tests, the market behaviours towards each narrative technique is discovered and demonstrated.

Game developers may use the results of this study to better adapt their games' narrative techniques with the game genre of the games and to attain more market attention by gaining more positive narrative-related feedbacks from the market.

## 2 Literature Study

The impression of using narration in game has always been a controversial subject. The consensus is hardly gathered in the literature on the matter of the importance of the presence of narrative in games. Some researchers and game designers claim that focusing on narrative in order to create a narrative-driven game, may affect the whole engaging characteristics of the game and in some cases, it may be harmful [5, 9, 17, 11]. There is a famous quote by John Carmack, the creator of *Doom*, denouncing the importance of story in games: "*Story in a game is like story in a porn movie: it is expected to be there, but it is not that important*" [27]. On the other hand, many contemporary game designers and researchers try to prove that narrative is a must for the games [28, 14]. For instance, Clint Hocking, the writer of *Far Cry 2* and *Splinter Cell: Chaos The-*

ory believes that: *"The idea of having [story] separate from the design is not constructive and that it holds us back."* [14]. Nowadays, it seems that the tide is turned in favor of narrative-driven games and we are observing many games with storylines that employ different narrative methods such as cut scenes, voice over narration, character development and even quests[34].

Although the narrative driven games are finding their way in the market, the incompatibility of narrative and game play is still a remaining dilemma [2, 17, 18, 24, 26]. As Finn states, although there are some similarities between games and movies or stories, interactivity of the games make them a complete different medium [10]. When watching a movie or reading a story, the characters drive the narrative forward, from a beginning point towards the end. This is achieved through the usage of story with a plot or multiple plots; however, a game does not necessarily always follow this rule. This can also be related to the difference of the factor of *sequence* between games and written stories which is brought up by Juul [17]. Stories usually follow a fixed and linear sequence but games are non-linear due to the relative freedom of players. The other difference of narrative and game play is the *time* in which the events of story happen. As Genette implies in the book of Narrative Discourse, narrative is a double temporal sequence: The time of the signified and the time of signifier [12]. But in the games, the events are happening right now and the player is the one who creates the story. The player can easily choose a weapon, aim at the enemy and decide how to kill him. These differences have been the incentive of many different workarounds during the past decades.

## 2.1 Embedded Narrative

Some games, specially during 80s and 90s, tried to avoid merging narrative and game play. Instead, they used a naive form of storytelling such as a text or a cut scene at the beginning of the game or each level. Some, like *Neoclyps*<sup>1</sup> merely conveyed the story on the package cover of the game and in the simplest way possible: *"You are the good guy. Your mission is to destroy the bad guys."* [17]. The games in this category, follow a pure *embedded* storyline. That is to say, as professor Whiteman of the University of California states in his lectures, in an embedded narrative, the narrative content is pre-generated prior to a players interaction with the game [37, 19]. The story in embedded narrative is a means of motivating the player for taking particular actions and to develop the story arc [37, 13].

## 2.2 Emergent Narrative

The other form of story telling is observed recently in open ended simulation games which are called *Sandbox Games*. Due to the progress of hardware and internet connectivity, these games are becoming more popular especially when they take advantage of virtual or augmented reality features. Sandbox games

<sup>1</sup> <https://www.mobylgames.com/game/neoclyps>

have open-ended worlds, through which there is no single or correct pathway [33]. In sandbox games, the story is not decisive and everyone who plays the game, creates her own original story [32]. Take the game *the Sims*<sup>2</sup> for example. In this game, the player interacts with the other players and NPCs<sup>3</sup>, talks with them and decides how to react to their requests. The player can decide whether to go out with a player and if she says "yes" to a proposal, the whole story will be changed, just like our real life. These story lines are not previously defined whatsoever. The artificial intelligence, behind the scene, will analyze each user's and probably NPC agent's behaviours and will adapt the whole world according to the player's actions. The games in this category are mostly powered by pure *emergent* narrative.

The emergent narrative concept is described by Sandy Louchart et al, 2014 in their paper "Authoring emergent narrative based games" as a novel approach to interactive narrative in which the responsibility of narration is shared by the author of the game and the players of the game instead of the author imposing it on the players [22]. Louchart also demonstrates some main components of an emergent narrative as its *essential rules*:

- The story must be perceived as a process, in a dynamic rather than analytical way.
- The plot is at best hypothetical. It is composed of interrelated hypothetical plot elements.
- The storyline is created as the different characters interact with each other, in real-time.
- Characters must be written for interaction, implies rich, deep and emotionally engaging traits
- The user must be considered as a participant to the performance rather than a spectator or author

By following these rules, it is observed that the games which are using particular types of gameplay and game design are most likely to employ emergent narrative. For instance, games with multiple endings or non-linear storylines usually apply emergent narrative as well.

### 2.3 Mixed Narrative

Another form of narrative which is observed in some games is to provide a player with a simple back story which is started in the past and continued up until now, then make the player interact with the game and connect the previously defined plot through communicating with game objects. While defining narrative techniques of the games in this research, it was noticed that some games belong to the both embedded and emergent class and apply the characteristics of both techniques. This type of narrative emerged as the technology, and hence, game mechanics evolved in late 90s and at beginning of the new century. The game

<sup>2</sup> <https://www.ea.com/games/the-sims>

<sup>3</sup> Non-Player Character

*Neverhood*<sup>4</sup> is one of the examples of this sort of narrative. Most games in this category use a mixture of both *embedded* and *emergent* narrative at the same time.

### 3 Research Method

#### 3.1 Research Goal

The main research goal of this study is to find "*if there is a difference between the narrative techniques which are used in story-driven video games in terms of players preference*"; however, in order to measure all involved factors, the main goal of this research is broken down into four sub-questions which are related to each dependant variable that is going to be investigated.

#### 3.2 Sub Questions

The sub questions are presented as follows:

- **RQ1:** Which narrative technique in story-driven video games does gain more positive feedback from the players?
- **RQ2:** Which narrative technique in story-driven video games does provide the players with more compelling storylines?
- **RQ3:** Which narrative technique in story-driven video games attract more game players?
- **RQ4:** Which narrative technique is used more in each of the main available game genres of video games?

#### 3.3 Hypotheses

- **Q1H0:** There is no difference in likelihood of gaining more positive feedback between different narrative techniques in story-driven video games.
- **Q1H1::** There is a meaningful difference in likelihood of gaining more positive feedback between different narrative techniques in story-driven video games.
- **Q2H0::** There is no difference in providing players with more compelling storylines between narrative techniques in story-driven video games.
- **Q2H1::** There is a meaningful difference in providing players with more compelling storylines between narrative techniques in story-driven video games.
- **Q3H0::** There is no difference in the average number of players between narrative techniques in story-driven video games.
- **Q3H1::** There is a meaningful difference in the average number of players between narrative techniques in story-driven video games..
- **Q4H0::** There is no difference in frequency of the usage of each narrative technique between the main available game genres of video games.
- **Q4H1::** There is a meaningful difference in frequency of the usage of each narrative technique between the main available game genres of video games.

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<sup>4</sup> <http://www.bestoldgames.net/neverhood>

### 3.4 Variables and the Logic Behind

In order to answer sub-questions and accept or reject null-hypotheses, the independent and dependant variables of the research must be defined. As it is observed in Rosas experiment [4] and also studied by Zammitto [38], the most important independent variable related to users' preference in video gaming is "*Game Genre*". This important classification method of the games alongside with the main variable of this report, namely "*Narrative Technique*" will be the independent variables which will be studied in this research. Moreover, the indicators of the market preference towards a game are the "*Number of Players*" and the "*Score*" or the reviews that the players give to that game. These indicators have been comprehensively studied by Sacranie as the measures of video games market preference [30]. These variables are widely used by game markets and portals such as Google Play, Apple Store or Steam and are the only publicly available variables that can be processed to determine games success and market preference towards a game. However, there are more parameters involved in measuring the market preference. Session-related KPIs are among these parameters; nevertheless, these measures are either completely confidential or not available for all the games [25]. Furthermore, the platforms in which the games are released are different. Therefore, these extra measures and KPIs which can be collected by game engines or markets may vary.

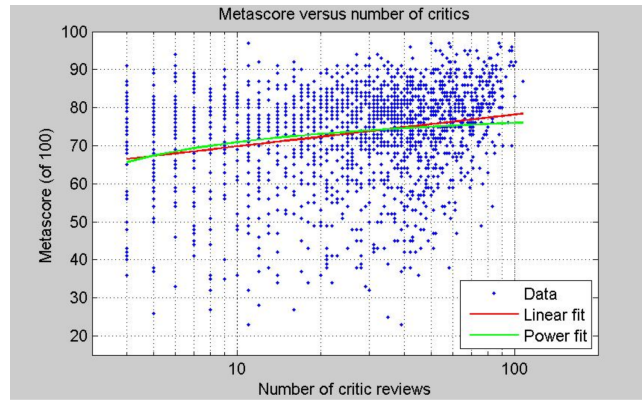
In order to evaluate the validity of user score/reviews as an indicator to measure the game quality or in other word, the preference of the market towards a game, the previous analysis of researchers have been studied. It is found that when the number of voters and critics increases (more than 100), the difference between the average scores of a particular title of game on different gaming platforms and portals get negligible [7]. When talking about the best story-driven games, all of them have obtained thousands of votes on game portals; hence no matter which major game portal is chosen as the source of data, the average score will be valid and will express the market preference. In this research, the main source of data for the game scores will be Metacritic<sup>5</sup> which is a major review aggregator. Metacritic is especially famous in aggregating proper game scores from different major game portals and critics' blogs and is addressed as "the premier review aggregator of video game industry" by different critics' portals [29, 21].

The number of sales/players of each game title is also fetched from the main Wikipedia page of each game. This number is usually provided by game companies or the game distributors and is publicly available. This measure works the same as "box office" measure for movies and provides researchers with the possibility of apple to apple comparison of the games and their market success [31].

In addition to number of players and score, in this research, the "*Storyline Likes*" of the games will be used as well. This variable is a measure to understand the players preference towards a particular genre or narrative technique when

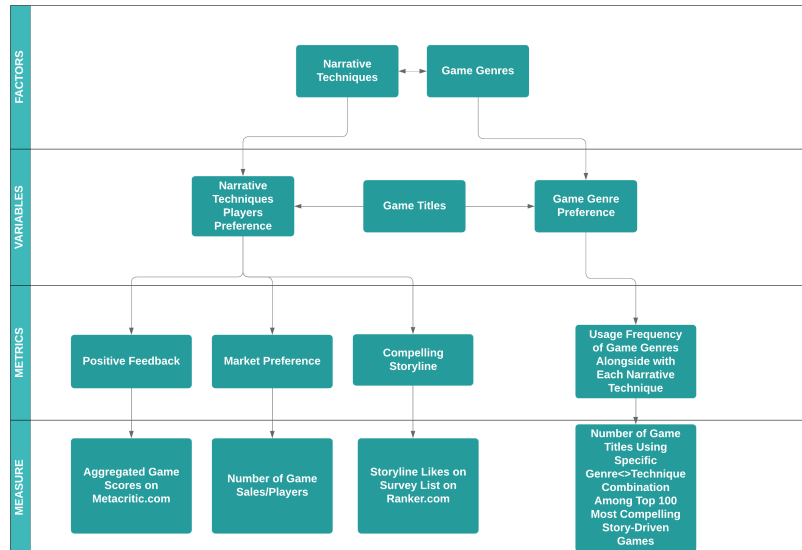
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<sup>5</sup> [www.metacritic.com](http://www.metacritic.com)



**Fig. 1.** Number of critics' reviews and the average score of game titles on different gaming portals. It indicates that different portals report the same result.

playing a story-driven video game. Storyline like works just like score, nevertheless it only focuses on the narrative of the games instead of focusing on the whole characteristics of the game. This variable is not known to the regular game portals and is measured for each game individually through an online survey. This survey plus its validity threats are comprehensively described in "scope" section of the paper.

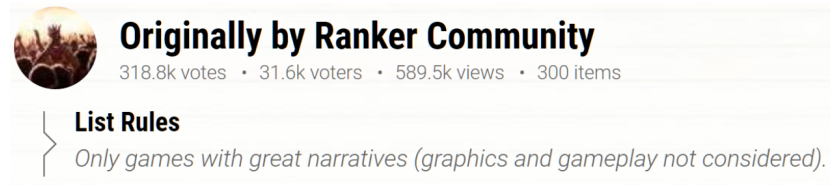


**Fig. 2.** Variables and metrics used in measuring process



### 3.5 Scope and the Validity Concerns

Since there are a huge number of newly released games every year and the narrative technique used in those games is not usually clear or well-defined, it seems impossible to study all the available games one by one. As a result, if a game is going to be studied regarding the narrative technique, the researcher should first clarify whether the game benefits from a story or not. These sorts of games are usually called story-driven games and are listed on some online directories. In this research, one of these lists has been selected to be studied. The list contains of 300 most popular story-driven video games of all time and is publicly available on Ranker.com<sup>6</sup>.



**Fig. 3.** Publicly available online survey on ranker.com

The games are selected by the users of the website and can be edited by them at any time. Ranker features polls on entertainment and claims to be one of the largest databases of opinions [3]. There are also many articles, news reports and posts employing Rankers lists and polls as a reference to their claims<sup>7</sup>. The results of such crowd-sourced surveys can be assumed legitimate while the number of participants is significant enough. Moreover, these opinion databases can be used as a means of crowd-sourcing the objective answers to subjective matters [16].

The list also reveals another key attribute of the story-driven games and is sorted by the most to the least compelling storyline. Users can like/dislike the games that are provided on the list according to the story of the game. There is no limit in liking/disliking of different games on the list for a user, however a user can only like/dislike a particular game title once. Each user can also pick five games out of the list in a process called "re-ranking" and claim this mini-list as the five most compelling storylines of all time. The number of times each game has appeared on a re-ranked list alongside the number of likes and dislikes indicates the position of the game in the list. Since more than 31,500 unique voters have already participated in this survey and around 320,000 votes have been collected, this list seem to be an adequate sample for this research.

<sup>6</sup> <https://www.ranker.com/crowdranked-list/the-most-compelling-video-game-storylines>

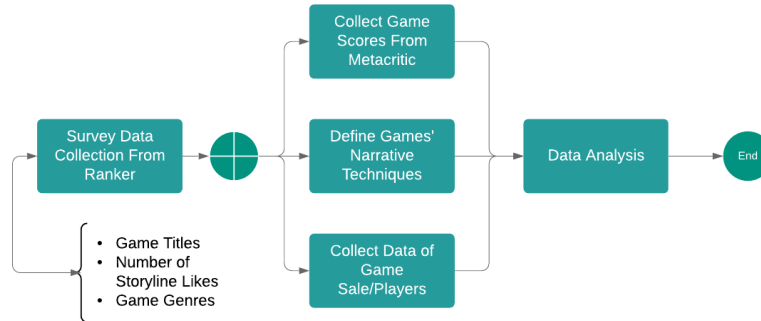
<sup>7</sup> Links to some of these papers and articles are available on: <http://blog.ranker.com/press/>

By choosing this list, one can be certain that the games being studied use a story and at the same time, the likes of the storylines indicate the preference of users towards game titles. Since the survey asks users to vote for the games merely based on the storyline of the game, this can be assumed that the likes are the indicator of the narrative excellence and the other aspects of the games such as game play, aesthetics, characters, etc will not affect the voting process (Figure 3). Furthermore, considering the fact that everyone can add her own favourite story-driven game to the list which makes the list fairly large, only top one-hundred games of this list have been studied in this research. In the presented research, only storyline likes are analysed as a variable and dislikes on the list are not separately counted as a variable due to the reason that a dislike may be biased in anonymised listed votes and as Daniel Van Boom claims, even when it is not anonymised "A dislike button would let people give their tick of disapproval without contributing anything meaningful" [35].

### 3.6 Data Collection and Qualitative Assessment

As mentioned before, main data of the research is collected from a public survey which is available online on Ranker. The survey data was fetched on 2 January 2019 and a sample screenshot of the survey is depicted in appendix A. All game scores are also fetched from Metacritic, an aggregator website which is also publicly available. These data were fetched on 6 January 2019.

After data collection, each game title should be studied individually and the type of narrative technique which is used in that particular game title should be defined (Figure 4).



**Fig. 4.** Data collection and analysis process

Defining the games narrative technique is one of the most crucial tasks of this research. The techniques used in games are not defined clearly on game

portals or by the game companies. Furthermore, just like the game genre, deciding the type of narrative technique for each game is a subjective matter. To achieve this goal, by reading through literature and analysing the games that are known as obvious examples of emergent and embedded narrative, a guideline for narrative technique analysis is proposed. As mentioned in the introduction and literature study section, both techniques are recognised by the difference between the following items:

*Freedom of the main player to make his own choices:* Emergent narrative usually enables players to decide what they want to do and where they want to go during the game. Different game objects are accessible throughout the game and player is free to grab them or interact with them even if the objects are not related to the game storyline. This form of narrative can be best observed in games such as *Tell Tale's The Walking Dead*.

*The effects of the players choices on the storyline:* Emergent narrative tends to enable players with the ability of changing the storyline. Players can conduct the storyline by their interaction with the other characters in game or by the actions that they take or any other decisions that they make.

*The ending of the game:* Some games like *Heavy Rain* which employs emergent storytelling, benefit from multiple endings. This means that there are some different possible storylines that can lead to either of the defined endings. The actual ending that a particular gamer can see depends completely on the decisions that she makes during the game.

*Short or no predefined storyline:* Most emergent games have a very short or half-baked storyline. They mostly depend on players to create their own storyline with the tools that are provided for them within the game.

In order to analyse these characteristics of each game title and indicate the narrative technique of the game, the following guideline for a qualitative decision making process was followed. Each step is followed by related validity threats:

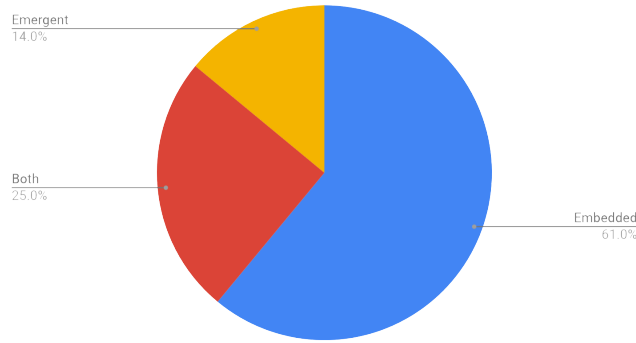
1. Read critics reviews and see if the game title exists in the lists of "emergent games" that critics have made.
  - Since there are many available lists on the web which are organized by different critics, some games may appear on some lists and not on the other ones. The solution is to assume a game as emergent only if it shows up on most of the selected lists. Inter-rater consensus method was also used for the games that are considered emergent in most critics reviews.
  - The other issue with these lists is that they only mention whether the game is 100% emergent, although there are many games that employ both emergent and embedded techniques at the same time. For those games, the other steps of the guideline is used as well.
2. Reading the storyline and plot of the games which are available on Wikipedia.
  - The decision may depend on how the reader interprets the storyline and its complexity. To overcome this dilemma, all games were analysed twice by both writers of this research in order to perform a rigorous analysis. Both writers gave a point to each game indicating whether they have found the game narrative emergent, embedded or a mixture of both considering the storyline and plot.

- The storyline is not the only indicator of the narrative technique of the games. To specify the technique, the other steps of the guideline should be followed as well.
- 3. Play the game or watch the gameplay on Youtube. This step also contains a subjective matter and is done by both writers.
  - Like the storyline section, each writer gave each game title a score indicating whether the gameplay supports an emergent narrative technique, an embedded or a mixed one.
- 4. Ending of the game. The games with multiple endings are marked as they are the potential candidates of having emergent or mixed narrative technique.

There may be some other steps that can be taken in order to comprehensively assess the narrative technique of the games. For example there are many lists written by different critics presenting the games with non-linear gameplay. Since non-linear game play, as mentioned before is a characteristic of emergent narrative, these lists can be used in the process of assessment as well. Due to the time limit of the report, such further steps could not be considered.

## 4 Results

After classifying all top 100 games of the main survey into three categories of narrative techniques, 61 game titles were classified as embedded, 25 as mixed and 14 as emergent<sup>8</sup> (Figure 5).

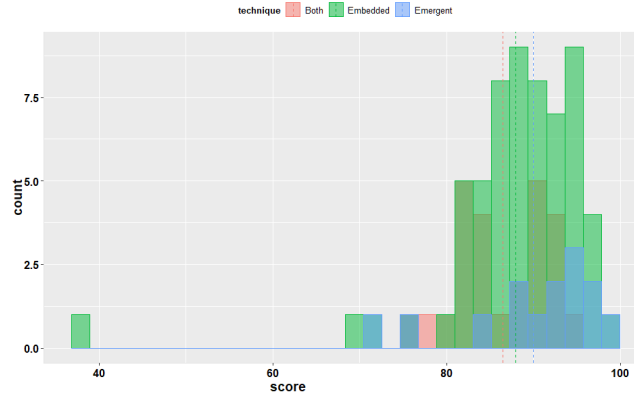


**Fig. 5.** Frequency of game titles using each narrative technique

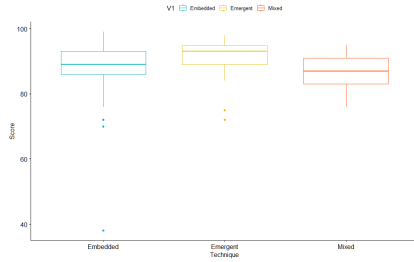
The group sizes are not balanced and eyeballing the charts indicates that the data is not normally distributed in all cases; therefore, it is rational to conduct non-parametric statistical tests to find out whether a significant effect of the factor is involved when analysing each hypothesis.

<sup>8</sup> Complete data set is available on <https://tinyurl.com/y79olnuf>

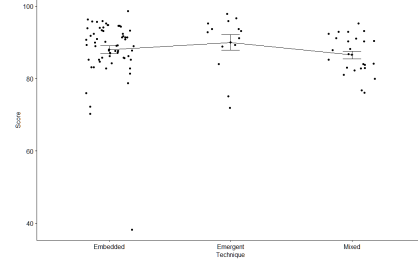
**Narrative technique x Game score** Kruskal-Wallis test shows a significant effect of narrative techniques on the average game score of each game title ( $X^2_{(2, N = 100)} = 6.4, p < 0.05$ ); however, the post-hoc Tukey pairwise test indicates that the effect is due to the difference between emergent and mixed techniques ( $p < 0.01$ ) and the effects of the other combinations are not significant. In other words, video game players tend to prefer playing a video game that employs emergent technique over a video game using mixed narrative technique (Figures 6, 7 and 8).



**Fig. 6.** Game score distribution among different narrative techniques



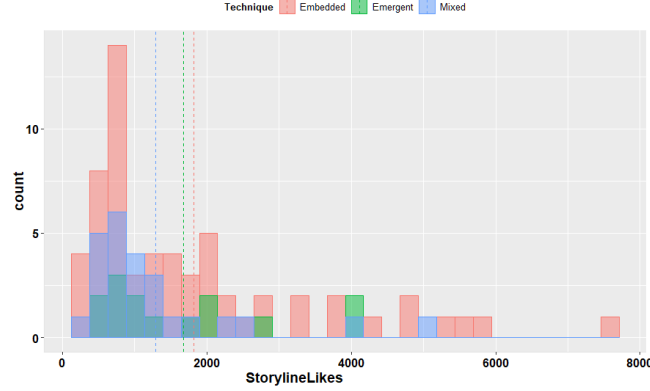
**Fig. 7.** Box plots of narrative techniques and game scores



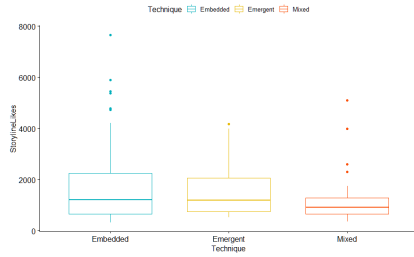
**Fig. 8.** Mean plots of narrative techniques and game scores

**Narrative technique x Storyline likes** The same test indicates no significant correlation between narrative technique which is used in the games and the

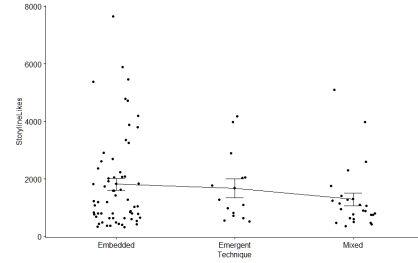
number of storyline likes gained by the game on the online survey ( $X^2_{(2, N = 100)} = 1.8, ns$ ) (Figures 9, 10 and 11).



**Fig. 9.** Storyline likes distribution among different narrative techniques



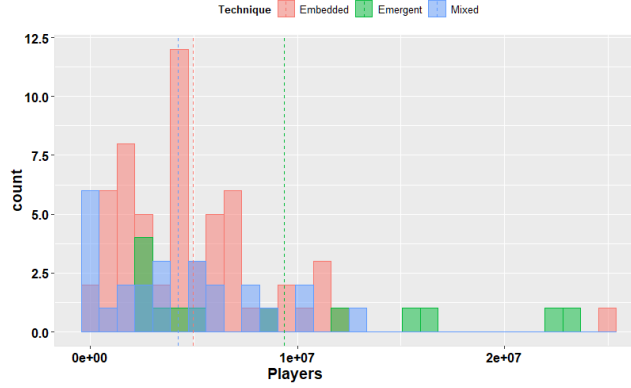
**Fig. 10.** Box plots of narrative techniques and storyline likes



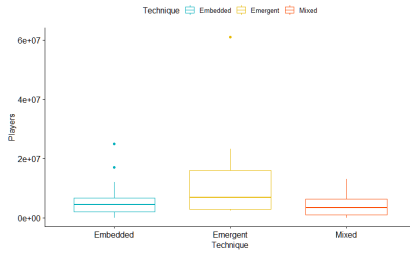
**Fig. 11.** Mean plots of narrative techniques and storyline likes

**Narrative technique x Number of players** Like the number of storyline likes, statistical tests indicate no significant correlation between narrative technique which is used in the games and the number of players of each game title ( $X^2_{(2, N = 100)} = 5.9, ns$ ) (Figures 12, 13 and 14).

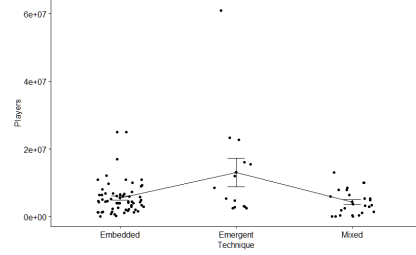
**Narrative technique x Game genre** Each game title may be placed in up to three different class of genre. For instance, *Portal*, which is a famous puzzle game, employs some characteristics of puzzle and action genres as well as platform



**Fig. 12.** Number of players distribution among different narrative techniques



**Fig. 13.** Box plots of narrative techniques and number of players



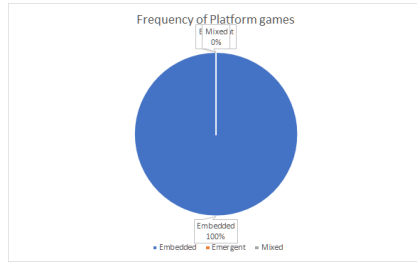
**Fig. 14.** Mean plots of narrative techniques and number of players

genre. Game genre of each game is publicly available on game markets such as *Steam*<sup>9</sup> or on *Wikipedia*. In this research, the Wikipedia page of each game title is used to determine each game's genre.

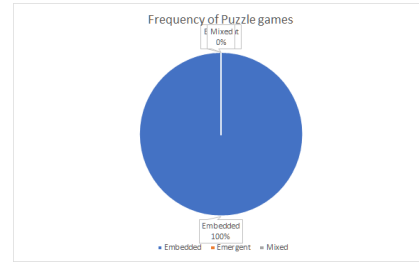
Interestingly, games with some particular game genre tend to use particular narrative techniques noticeably more. For instance, in puzzle and platform games, embedded technique usage is predominant (Figures 15 and 16). On the other hand, in open-world games, emergent and mixed techniques are mostly being used (Figure 17). Complete analysis of all genres is presented in appendix D.

**Outliers** While analysing some variables, it was observed that some game titles gain much more market attention than the others (Appendix C). This may cause the presence of some outliers in the data set. Although the outliers are all valid data, after removing them, a set of post-statistical analysis was conducted as

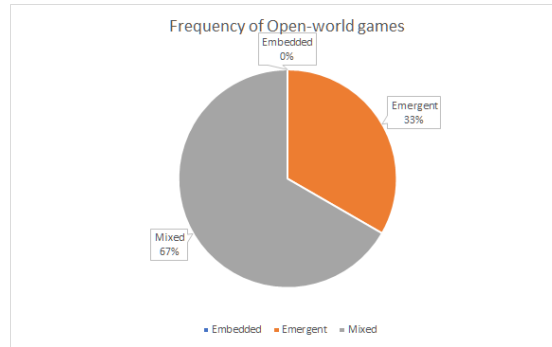
<sup>9</sup> <https://store.steampowered.com/>



**Fig. 15.** Distribution of platform games using each narrative technique



**Fig. 16.** Distribution of puzzle games using each narrative technique



**Fig. 17.** Distribution of open-world games using each narrative technique

well. The findings were the same as the prior results and there was no significant difference between the findings before and after removing the outliers.

## 5 Discussion

The results of this study support the claims of some researchers like Louchart regarding the common conservative approach of most game companies towards game narrative [23]. Although the recent technological breakthroughs such as virtual and augmented reality have enabled game designers to provide the market with a more radical and progressive narrative, embedded narrative is still the predominant narrative technique used in popular games. The outcome of the correlation assessment of the factors revealed that unlike some contemporary assumptions by researchers who believe that the market is in favor of more avant-garde narrative styles [34, 15], in most cases, narrative does not play a direct role in shaping the market preference. Users rather play a high quality combination of narrative and game play. Since there was no prior market research on such claims, this study shed light upon the matter by analysing the end users' behaviours.



Due to the time and resource limitations of this study, further research on larger lists and with more rigorous qualitative analysis may be required to fully explain the current situation of the market. Furthermore, by acquiring sufficient data resources from the third party providers, more factors can be analysed. Because of the financial limitations of the study, access to this data was impossible.

## 6 Conclusion

This paper has examined in detail the embedded and emergent narrative techniques and has discussed their characteristics. An extensive study is performed on the presence of narrative in games and the dilemmas of this fusion. The research also broadly explains the type of storytelling in the games. It is seen that game designers are usually trying to include a story in the games to satisfy some emotional intentions of players without proper market awareness and merely based on assumptions. Therefore, the market preference towards each narrative technique is studied extensively in this paper. The main goal of this research is implemented by defining, measuring and validating the independent variable: narrative technique; and the dependent variables: storyline likes, game scores and number of players for a game. The research is conducted from data collected from different game critics' sites and game survey sites for the framed dependent variables. The experimental procedure is well described by figure 4. The results show a meaningful attraction of the market to the games with emergent narrative in comparison to the games that use mixed narrative technique. This result led to the rejection of the null hypothesis of the first research question; however, no other meaningful correlation is found between any other variables. These findings may help game designers to make the right choice of narrative technique for their games based on the various scenarios discussed in this paper. Future research into this area of study could focus on conducting similar experiments by collecting and analysing data based on different characteristics of the game instead of storyline likes, number of players and game scores. The outcome of this research can be validated to a certain degree as the analysis is performed only on the games listed on one particular survey and a few number of critics' blogs.








## References

1. Aylett, R.: Narrative in virtual environments towards emergent narrative. AAAI Symposium on Narrative Intelligence pp. 83–86 (1999)
2. Barr, P., Marsen, S., Noble, J.: Oppositional play: Gathering negative evidence for computer game values. ACM International Conference Proceeding Series, Proceedings of the Second Australasian Conference on Interactive Entertainment **123**, 3–10 (2005)
3. Bilton, R.: Ranker turns crowdsourced lists into big data (October 2014), <https://digiday.com/media/ranker-turns-crowdsourced-lists-into-big-data/>

4. Blocker, K., Write, T., Boot, W.: Gaming preferences of aging generations. *Geron-technology : international journal on the fundamental aspects of technology to serve the ageing society* **12,3**, 174–184 (2014)
5. Bogost, I.: Video games are better without stories (April 2017), <https://www.theatlantic.com/technology/archive/2017/04/video-games-stories/524148/>
6. Craig, A.: Story and narrative structures in computer games. Centre for Virtual Environments University of Salford (2005)
7. Darkly, S.: In defense of the number: a note on video game review scores (January 2015), <http://www.escapistmagazine.com/forums/read/9.872132-In-defense-of-the-number-a-note-on-video-game-review-scores>
8. Dubbelman, T.: Narrative game mechanics. Conference Paper in Lecture Notes in Computer Science (2016). [https://doi.org/10.1007/978-3-319-48279-8\\_4](https://doi.org/10.1007/978-3-319-48279-8_4)
9. Eskelinen, M.: The gaming situation. *The International Journal of Computer Game Research* **1**(1), 151–158 (2001)
10. Finn, M.: Computer games and narrative progression. *M/C: a journal of media and culture*, <http://journal.media-culture.org.au/0010/narrative.php> **3**(5) (2000)
11. Frasca, G.: *Simulation versus Narrative: Introduction to Ludology*. Routledge press (2003)
12. Genette, G.: *Narrative Discourse: An essay in method*. Cornell University Press (1972)
13. Hirst, T.: Emergent stories (2008), <https://digitalworlds.wordpress.com/2008/04/05/emergent-stories/>
14. Howitt, G.: Writing video games: can narrative be as important as gameplay? (Feb 2014), <https://www.theguardian.com/culture/australia-culture-blog/2014/feb/21/writing-video-games-can-narrative-be-as-important-as-gameplay>
15. Hughes, S.: Get real: Narrative and gameplay in the last of us. *Journal of comparative research in anthropology and sociology* **6**(1), 149–154 (2015)
16. Iyer, R.: Crowdsourcing objective answers to subjective questions online. First AAAI Conference on Human Computation and Crowdsourcing (2013)
17. Juul, J.: A clash between game and narrative. a thesis on computer games and interaction fiction. Masters Thesis, University of Copenhagen (1999)
18. Juul, J.: Games telling stories? a brief note on games and narratives. (2001), <http://www.gamestudies.org/0101/juul-gts>
19. Katie, S., Zimmerman, E.: *Rules of Play: Game Design Fundamentals*. MIT Press (2007)
20. Lazzaro, N.: Why we play games: four keys to more emotion without story. Game Developers Conference, XEODesign (2004)
21. Leack, J.: Opencritics gamer-centric style is everything metacritic should have been (September 2015), <https://www.gamerevolution.com/features/11820-opencritics-gamercentric-style-is-everything-metacritic-should-have-been>
22. Louchart, S.: The emergent narrative theoretical investigation. Centre for Virtual Environments University of Salford (2014)
23. Louchart, S., Aylett, R., Kriegel, M., Dias, J., Figueiredo, R., Paiva, A.: Authoring emergent narrative-based games. *Journal of Game Development* **3**(1) (2008)
24. Mallon, B., Webb, B.: Stand up and take your place: Identifying narrative elements in narrative adventure and role-play games. *ACM Computers in Entertainment* **3**, 1–20 (2005)
25. McCalmont, T.: 15 metrics all game developers should know by heart (July 2015), <https://gameanalytics.com/blog/metrics-all-game-developers-should-know.html>

26. Polaine, A.: The flow principle in interactivity. ACM International Conference Proceeding Series, Proceedings of the Second Australasian Conference on Interactive Entertainment **123**, 151–158 (2005)
27. Reed, A.: Creating interactive fiction with INFORM7. Course Technology Press (2011)
28. Ronan, E.: Why do video games need narrative to stand out? (Dec 2018), <https://www.johnyorkestory.com/2018/12/why-videogames-need-narrative/>
29. Rose, M.: Metacritic is here to stay, but can we fix it? (July 2012), <http://www.gamasutra.com/view/news/173879/>
30. Sacranie, J.: Consumer perceptions video game sales: A meeting of the minds. Honors Projects (2010)
31. Schiller, C.: Legally speaking, it depends: How do you measure success? (September 2015), <https://www.scriptmag.com/features/legally-speaking-depends-measure-success>
32. Sorens, N.: Stories from the sandbox (April 2008), <http://www.gamasutra.com/view/feature/3539/>
33. Squire, K.: Open-Ended Video Games: A Model for Developing Learning for the Interactive Age. The Ecology of Games. Connecting Youth, Games, and Learning. The MIT Press (2008)
34. Tustin, Z.: Game of tomes: Embedded and emergent narrative in video games (April 2016), <https://tkbr.publishing.sfu.ca/pub802/2016/04/game-of-tomes-embedded-and-emergent-narrative-in-video-games/>
35. Van Boom, D.: Why you'd really, really hate a facebook 'dislike' button (February 2018), <https://www.cnet.com/news/facebook-dislike-button-hate-it-downvote/>
36. Wei, H.: Embedded narrative in game design. In: Proceedings of the International Academic Conference on the Future of Game Design and Technology. pp. 247–250. Futureplay '10, ACM, New York, NY, USA (2010)
37. Whitehead, J.: A narrative theory of games (2007), [http://www.few.vu.nl/~vbr240/onderwijs/pim/Narrative in Games.pdf](http://www.few.vu.nl/~vbr240/onderwijs/pim/Narrative%20in%20Games.pdf)
38. Zammitto, V.: Games User Research as part of the development process in the game industry: Challenges and best practices, pp. 15–30 (2018)

## A Main Data Source

- |    |   |   |  |
|----|---|---|--|
| 4  | <div style="display: flex; align-items: center;"> <div style="border: 1px solid #ccc; padding: 2px; margin: 0 5px;">↑</div> <div style="border: 1px solid #ccc; padding: 2px; margin: 0 5px;">↓</div> </div> <div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">4,762</div> <div style="margin-right: 5px;">2,758</div> </div> |    | <p><b>Mass Effect</b></p> <p>Shooter game, Third-person Shooter, Action role-playing game</p> <p><i>Mass Effect is a 2007 science fiction action role-playing third person shooter video game developed by BioWare for the Xbox 360 and ported to Microsoft Windows by Demiurge Studios. The Xbox 360 ...more</i></p>  |
| 5  | <div style="display: flex; align-items: center;"> <div style="border: 1px solid #ccc; padding: 2px; margin: 0 5px;">↑</div> <div style="border: 1px solid #ccc; padding: 2px; margin: 0 5px;">↓</div> </div> <div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">4,818</div> <div style="margin-right: 5px;">2,040</div> </div> |    | <p><b>Star Wars: Knights of the Old Republic</b></p> <p>Action role-playing game, Adventure, Role-playing video game</p> <p><i>Star Wars: Knights of the Old Republic is a role-playing video game developed by BioWare and published by LucasArts. Written by Drew Karpyshyn, the soundtrack for the game was composed by Jeremy ...more</i></p>                  |
| 6  | <div style="display: flex; align-items: center;"> <div style="border: 1px solid #ccc; padding: 2px; margin: 0 5px;">↑</div> <div style="border: 1px solid #ccc; padding: 2px; margin: 0 5px;">↓</div> </div> <div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">5,155</div> <div style="margin-right: 5px;">1,810</div> </div> |    | <p><b>Red Dead Redemption</b></p> <p>Action-adventure game</p> <p><i>This game is an open world, western action-adventure video game developed by Rockstar San Diego and published by Rockstar Games. It was released for the PlayStation 3 and Xbox 360 consoles on ...more</i></p> <div style="text-align: right;"> <a href="#">buy at amazon</a> </div>         |
| 7  | <div style="display: flex; align-items: center;"> <div style="border: 1px solid #ccc; padding: 2px; margin: 0 5px;">↑</div> <div style="border: 1px solid #ccc; padding: 2px; margin: 0 5px;">↓</div> </div> <div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">5,423</div> <div style="margin-right: 5px;">2,380</div> </div> |    | <p><small>midnightq2 added</small></p> <p><b>BioShock Infinite</b></p> <p>Shooter game, Action-adventure game, Action role-playing game</p> <p><i>BioShock Infinite is a first-person shooter video game developed by Irrational Games and published by 2K Games. It was released worldwide for the Microsoft Windows, PlayStation 3, and Xbox 360 ...more</i></p> |
| 8  | <div style="display: flex; align-items: center;"> <div style="border: 1px solid #ccc; padding: 2px; margin: 0 5px;">↑</div> <div style="border: 1px solid #ccc; padding: 2px; margin: 0 5px;">↓</div> </div> <div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">2,925</div> <div style="margin-right: 5px;">2,384</div> </div> |    | <p><b>Half-Life 2</b></p> <p>Shooter game, Action-adventure game, Survival horror</p> <p><i>Half-Life 2 is the well-received sequel to Half-Life. Half-Life 2 takes place in the dystopian City 17 and the surrounding area, almost 20 years after the events of the original Half-Life. In ...more</i></p>  |
| 9  | <div style="display: flex; align-items: center;"> <div style="border: 1px solid #ccc; padding: 2px; margin: 0 5px;">↑</div> <div style="border: 1px solid #ccc; padding: 2px; margin: 0 5px;">↓</div> </div> <div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">4,011</div> <div style="margin-right: 5px;">2,291</div> </div> |  | <p><b>Fallout 3</b></p> <p>Shooter game, Action-adventure game, Apocalyptic and post-apocalyptic fiction</p> <p><i>Fallout 3 is an action role-playing open world video game developed by Bethesda Game Studios, and is the third major installment in the Fallout series. The game was released in North America, ...more</i></p>                                 |
| 10 | <div style="display: flex; align-items: center;"> <div style="border: 1px solid #ccc; padding: 2px; margin: 0 5px;">↑</div> <div style="border: 1px solid #ccc; padding: 2px; margin: 0 5px;">↓</div> </div> <div style="display: flex; align-items: center;"> <div style="margin-right: 5px;">4,240</div> <div style="margin-right: 5px;">2,136</div> </div> |  | <p><b>Final Fantasy VII</b></p> <p>Console role-playing game, Japanese role-playing game, Role-playing video game</p>  |

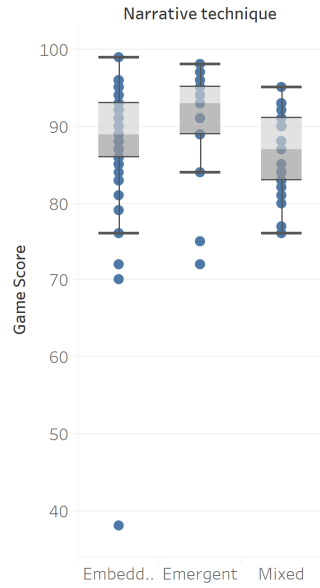
A part of the list of top one-hundred compelling storylines of story-driven video games, fetched on 2.Jan.2019

## B Games List

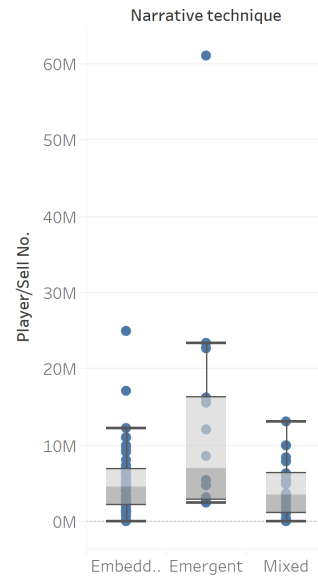
Game rank	Game title	Genre	Narrative technique	Game Score	Storyline Likes	Release year	Player/Seil No.
1	BioShock	Shooter game, Action-adventure game, Survival horror	Embedded	96	5,892	2007	25,000,000
2	Mass Effect 2	Third-person Shooter, Action role-playing game	Embedded	94	5,453	2010	7,290,000
3	The Last of Us	Action-adventure game, Survival horror	Embedded	95	7,654	2013	17,000,000
4	Mass Effect	Shooter game, Third-person Shooter, Action role-playing game	Embedded	89	4,721	2007	2,910,000
5	Star Wars: Knights of the Old Republic	Action role-playing game, Adventure, Role-playing video game	Embedded	93	4,781	2003	2,190,000
6	Red Dead Redemption	Action-adventure game	Both	95	5,096	2010	13,000,000
7	BioShock Infinite	Shooter game, Action-adventure game, Action role-playing game	Embedded	94	5,373	2013	11,000,000
8	Half-Life 2	Shooter game, Action-adventure game, Survival horror	Emergent	96	2,898	2004	2,400,000
9	Fallout 3	Shooter game, Action-adventure game, Apocalyptic and post-apocalyptic Emergent	Emergent	91	3,981	2008	4,700,000
10	Final Fantasy VII	Console role-playing game, Japanese role-playing game, Role-playing v	Embedded	92	4,200	1997	11,000,000
11	The Legend of Zelda: Ocarina of Time	Action-adventure game, Action role-playing game	Embedded	99	3,886	1998	10,000,000
12	The Witcher 3: Wild Hunt	Action role-playing game	Both	93	3,981	2014	10,000,000
13	Dragon Age: Origins	Role-playing video game	Embedded	91	3,257	2009	4,500,000

A part of the games data set which was collected and analysed in this paper.  
 Complete list is available on <https://tinyurl.com/y79olnuf>

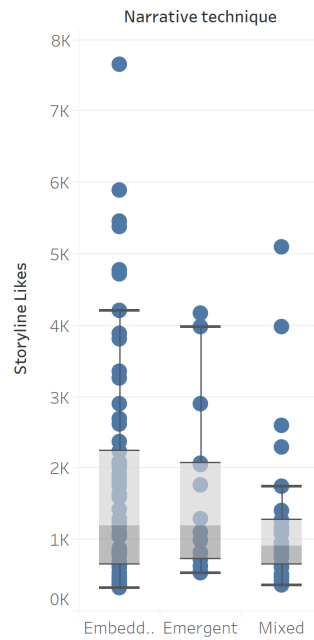
## C Distribution of Game Titles



Distribution of average game score

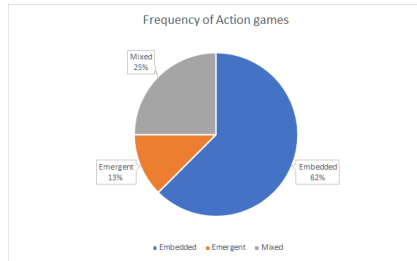


Distribution of sales/players of game titles

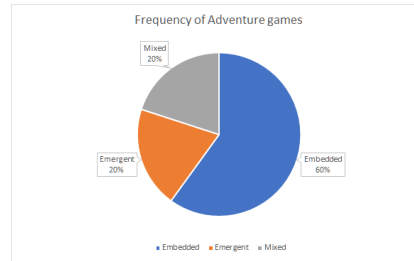


Distribution of game storyline likes

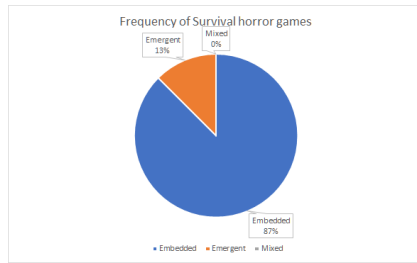
## D Narrative Techniques used in Different Game Genres



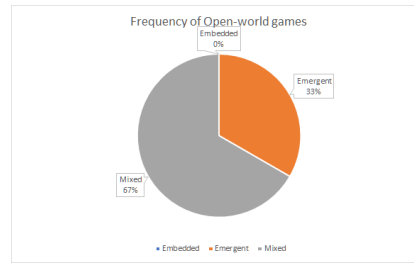
Narrative techniques in action games



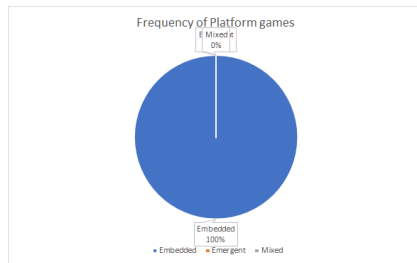
Narrative techniques in adventure games



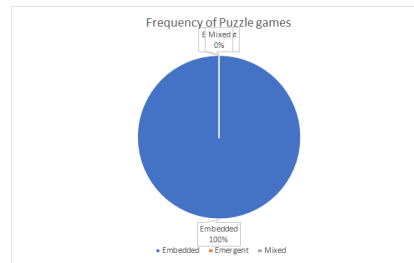
Narrative techniques in survival horror games



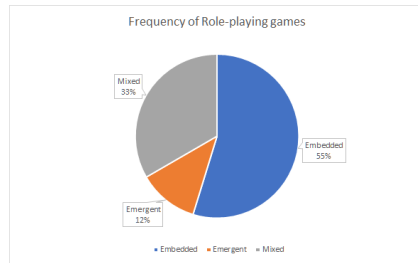
Narrative techniques in open-world games



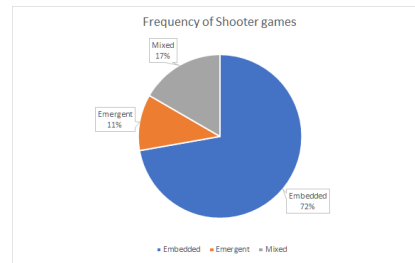
Narrative techniques in platform games



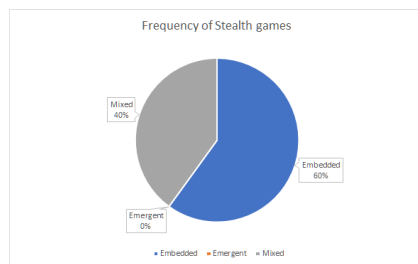
Narrative techniques in puzzle games



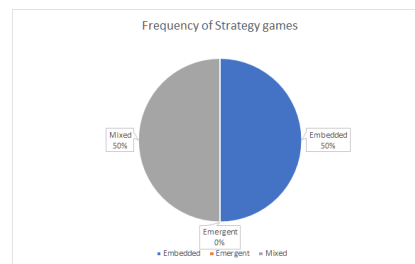
Narrative techniques in role-playing games



Narrative techniques in shooter games



Narrative techniques in stealth games



Narrative techniques in strategy games