

# Connecting the Dots: Quantifying the Narrative Experience in Interactive Media

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**Abstract.** In this paper we analyze narrative in interactive media with a special focus on emergent narrative. We detail the criteria for creation of an online questionnaire for the evaluation of emergent narrative as a subjective experience and present the result of a large scale survey in which it was applied. The survey was conducted during a three-week-period in May-June 2015, receiving answers from 14,259 people. Each participant answered based on one of the twenty games chosen for the investigation. The twenty games were chosen to meet one of three inclusion criteria's. Firstly on the usage of descriptive narrative in their communities, which indicates a strong emergent narrative experience, secondly their emergent narrative potential and thirdly for their potential to be used as comparative or baseline measurements. The results strongly indicate that the Emergent Narrative questionnaire is effective for measuring the occurrence of an emergent narrative, when compared to the test-subjects' self-reported experience.

**Key words:** Emergent Narrative · Interactive Narrative · Computer Games · Narrative research · Quantifying emergent narrative · Experienced narrative · Closure · Immersion · Narrative Transport

## 1 Introduction

For the past 15-20 years the notion of emergent narrative has received great attention and many efforts have been made to theoretically define its fundamental characteristics. In this paper we attempt to improve the existing definitions in order to propose empirical instruments to assess and measure the degree in which a particular application enables the experience. The questions the present work means to answer are twofold: how to define emergent narrative in the context of video games, how it is experienced by the player and what design considerations or game mechanics are most likely to facilitate such experience.

Until now, no major attempts have been made to measure how an emergent narrative is experienced by players. Considering the apparent lack of consensus on a concrete definition, this article is seen as a step towards an operational definition that may enable a method for assessing and measuring the degree in which a subject experiences an emerging narrative. Furthermore, we see our contribution as an attempt to bridge the apparent gap between the research and the development communities.

With the objective of developing a methodology to measure how much a particular interactive application is prone to instantiate an emergent narrative, we designed a questionnaire composed of ten questions and we conducted a survey targeted to on-line players communities. For each of the participants, the questionnaire was followed by a second questionnaire, in which test subjects were asked to rate the individual game mechanics based on their perceived influence on the narrative experience, and to report whether they thought they had experienced an emergent narrative, based on a given definition of the concept. The participants in the study belong either to communities dedicated to video games that yield strong on-line accounts of storification processes and who use descriptive narrative in their retelling of their in-game experiences, or to communities dedicated to games that fit into our other inclusion criteria. Seven main communities were chosen, with thirteen additional games picked based on either their emergent narrative potential, or to be used as a contrasting comparative baseline.

From this group of potential participants, 13,547 people gave usable answers for the emergent narrative questionnaire, and 9438 for the game mechanic questionnaire.

The test was conducted on-line during a three week period in May-June 2015. The results strongly indicate that the emergent narrative questionnaire worked in measuring emergent narrative when compared to the self-reported emergent narrative experience with a strong correlation ( $R=0.947$ ,  $p<0.05$ ). It is therefore assumed that the survey succeeded in measuring the emergent narrative experience, based on the explanation given to the test subjects.

## 2 Background

Since introducing interactivity to the narrative process, the question has been raised about who holds authorial control during the experience. The "narrative paradigm" claims that human beings make sense of any series of events as ongoing narratives, and that most meaningful communication is done through storytelling [7]. Self-constructed narratives serve as a direct representation of a person's perceptual model of experience, sense of personal and cultural identity, and are involved in the creation and construction of memories and social relational patterns [3, 17]. It is therefore possible to look at narrative as a cognitive act, ingrained in human experience: a mental construct we use to interpret and understand behaviors and people, and even interactive systems [19].

*"The greater our urge to tell stories about games, the stronger the suggestion that we experienced the game narratively. "* - Ryan 2006 [19]

If asked, anybody could tell you a story about any game or any experience; Murray [15] argues that all games are narratives, no matter how abstract they are. Ryan [19], on the other hand, argues that retell ability, at its base level, is not enough for a game to be considered a narrative, but rather she suggests a middle ground between stating that games can never offer a narrative experience and that all actions in games can be classifiable as narrative.

People will apply different levels of storification to games, as to their life experiences, depending on the impact it has on them. In games, it would depend on the nature

of the particular system. Therefore games can also be defined or classified based on their narrative potential.

But how can this cognitive process of storification be measured? Once a personal narrative is written down, it is no longer in the ownership of the author, but becomes understood and interpreted by its audience based on their shared knowledge and experiences [12]. This is one of the main elements that makes storification a hard subject to measure. As soon as a story is told, written down or expressed in any other manner, it will change. On those lines, a story experienced and formed by a video game player through his experience of the game, will remain a story in the player's mind until he finds the need to discuss it or retell it. The actions and events encountered will be experienced, and its not until they are retold that they turn into narrative [1, 2, 18] One of the requirements for descriptive narrative is that the player actually has a story to tell. This can be related to narrative intelligibility and narrative closure, as proposed in [4]. In this perspective, intelligibility is the process by which an audience interprets the narrative in a way that is close to what the author intended. On the other hand, closure is a "process where the audience may construct its own meaning out of what is being mediated, independent of whether that meaning corresponds or gets close to what is intended by the author" [4]. Closure at the system level is usually experienced as meaningful interaction that may result from interactions that are independent of the author and the goal of the system. At the embedded narrative level, closure "entails a good sense of having experienced a narrative, which, however, does not necessarily coincide with the author's preferred or intended interpretation" [4]. This tells us that whether or not a system or narrative is created with the purpose of creating a highly didascallic or intelligible narrative, a user can still experience closure on either of these levels.

## 2.1 Emergent Narrative

The concept of emergent narrative has been discussed in the field of interactive narrative for around twenty years. In 1995, Tinsley Galyean offered what may be the first account of emergent narrative in connection with interactive media:

*"We all construct narratives out of our daily activities to help us remember, understand, categorize and share experiences. [...] We, by combining the elements of these spaces with our goals, allow a narrative to emerge. If any narrative structure emerges it is a product of our interactions and goals as we navigate the experience. I call this 'Emergent Narrative'."* [9, 21]

In our paper, games are seen as a medium which has a great potential for narrative when designed with specific considerations in mind. But saying that all games are narrative and that all games can contain stories is counter-productive. What needs to be looked at, are the nuances and experiences that the player has, which makes him perceive and experience the game as narrative and how these experiences differ between games.

As mentioned by Ryan [19], games have the basic ingredients to create a narrative: characters, events, settings and beginning and end states. However, not all games will include all these ingredients as it will depend on the purpose and design of the specific game. Walsh [21] sums up a lot of the ongoing discussion. He argues that the seemingly

straightforward notion of emergence gets more complicated in the context of digital media. He sees two different ways of how “emergent narrative” is being considered. The first one could be classified as the storification process, while the second is seen as a product the of interaction between the user and the digital agent (or bot) within the simulated environment.

The two ways or models of looking at emergent narrative are similar, but have different implications. Both look at interactivity as a prerequisite for emergence, but differ in where the creation of the narrative takes place during the interaction between the user and the system [21]. The storification process looks at emergent narrative as being created within the player himself, involving his cognitive processes, but affected by the feedback his interactions with the system offer.

The second model, a character based narrative system, is meant to account for the emergence of narrative through interaction, but within and from the system. We do not take sides in this here, since both accounts may contribute towards the design and creation of emergent narratives. Maybe the key point is not to so much to simulate narrative but to orchestrate the experiencing of it, and while character narrative systems are not fully developed, emergent narrative should still be pursued on a personal level, through the creation of systems which can facilitate its emergence within the player’s cognitive processes.

As already mentioned, the term ”emergent narrative” has been widely discussed and there are several different definitions [1, 2, 8–11, 13, 14, 19, 20]

Therefore it is pertinent to provide an operational definition for the purposes of this paper:

*Emergent narrative is an intrinsic experience, which transpires as a mental process, through cognitive storification or alter biographing, as a player interacts with a systematic virtual environment. As the player navigates and interacts with the game environment and ludic system, the story emerges through that interaction, either during the play session, or post-facto, once the player has had time to reflect on the events experienced. The story that emerges is therefore a non-scripted, self-narrated player story that gives a sense of closure. It is a narrative that to the player feels unique.*

Or in other words:

*Emergent narrative is created, internally by the player, as a non-scripted self-narrated player story that gives a sense of closure.*

In the survey, it is explained to the test subjects as:

*An emergent narrative experience is something that happens to you as player, as you progress and interact with the game world. Under some circumstances the player might start experiencing events or “stories” that don’t tie directly into the storyline of the game, but rather are events that you feel are unique stories happening to you just because you chose to act in a certain way (and might not happen again).*

## 3 Survey Design

### 3.1 Questionnaire

The purpose of the work detailed in this article is the development of methods to assess and quantify the potential for an emergent narrative experience in particular applications. In general, computer game narratives are inherently different from narratives presented in other traditional media. This is due to the interactivity afforded by the medium and in how the story is presented and how it evolves around the user. This is especially the case when dealing with emergent narrative games. Therefore, trying to use traditional measurements of narrative might present difficulties and ambiguities when measuring the occurrence of emergent narrative.

When trying to look at internalized narrative or emergent narrative, asking people to write or retell their descriptive narrative [16] might not necessarily gather the most usable data, as mentioned by both Calleja and Ryan [5, 19]. Furthermore, as soon as a story is told or expressed in another manner, and as soon as you ask a person to tell you the story, the internalized aspects of it will change. This change can be caused by choice of language, storytelling skill or storytelling methods. Additionally, asking a person to tell a story might induce the player into creating a story, even if no such a process was triggered by the narrative experience.

The story could be analysed and conclusions drawn from it; however, this would not necessarily help in establishing whether the experience yielded an emergent narrative. For these reasons, the questionnaire needs to look for instances of storification and at what features can “cause” an emergent narrative. The questionnaire was designed using a five point Likert scale, with an additional N/A option.

Ten questions were designed to highlight the following aspects of the narrative experience:

- The player breaks out of the perceived game rules and structures, to make decisions of their own and experience their own story.
- The game offers enough narrative freedom for the player to experience the emergence of a personal narrative.
- The player feels ownership and/or emotional attachment of/to the narrative and the characters in it.
- The player has a need to describe or retell their experiences.

The following 10 questions composed the questionnaire:

1. While playing, I was more interested in creating my own goals than following the main objectives given by the game.
2. I was more interested in experiencing the game world and creating my own objectives, than following the main or side quests/objectives in the game
3. The main character had different objectives than those presented in the main story
4. If given the option, I would have made different choices than my main character
5. My story was somehow special. I think I experienced a story that not many other people have experienced

6. I found myself thinking about how the main character would react in situations not presented in the game
7. I found myself thinking about the main character's background story, even information not presented in game itself
8. On occasions I have found myself thinking about what I would do in the game, while not playing it
9. While playing, I felt like my in-game decisions had no effect on the story I experienced
10. I feel strongly about my experience and would consider writing it up or talking about it to other people (either online, offline or both)

The ratings given to the ten questions are combined in an emergent narrative score calculated as a normalised mean value of the each question's rating.

### 3.2 Games

The next step was finding released game products that already seem to facilitate the experience of emergent narrative. A few games already fall into that category, based on the fact that the designers were indeed trying to specifically create emergent narrative with their games. But in order to get a broader spectrum to analyse, this next section will talk about how a total of twenty games were chosen for the evaluation. An on-line search was conducted to find communities of gamers who have written detailed stories, covering their experiences in games. On Reddit.com and other on-line gaming forums, a great amount of player reported stories were found concerning certain games. From this, the assumption was made, that the players of those games were indeed experiencing some form of emergent narrative.

In her model of interactivity [19], Ryan defines four main types of interaction. The internal type of interactivity is when the player will project him or herself as a member of the virtual environment. This happens when the players starts identifying with an avatar, which can be shown both in the first and third person perspective. In an external interactivity, the players point of view is situated outside or above the fictional world. The player then does not "physically partake in the happenings of the world, but rather participates through omnipotent observation. Exploratory interactivity allows players to navigate the game environment but does not allow altering of the plot, the player therefore becomes an observer rather than participant of the games event, and by contrast, in ontological interactivity, the decisions of the user will affect the story and story world in predictable or unpredictable manner giving a sense of agency or participation in the story.

According to Ryan's model of interactivity games that are internally ontological, or externally ontological are more likely to create emergent narrative than other types of games. The focus was therefore put on choosing games that would fall into those categories. For further analysis purposes, a wider range of games were also be included: both games that seemed to offer emergent narrative, but also games which could serve as comparisons; from other genres or design considerations and games that fall into the modes of interactivity. Lastly a few more basic, so called, "arcade" games were included. The reasoning for this is the assumption, that these types of games would have

	Internal	External
Exploratory	<ul style="list-style-type: none"> <li>● Battlefield 4</li> <li>● Bioshock Infinite</li> </ul>	<ul style="list-style-type: none"> <li>● Super Mario</li> <li>● Spellunky</li> <li>● Space Invaders</li> <li>● Donkey Kong</li> </ul>
Ontological	<ul style="list-style-type: none"> <li>● EVE online</li> <li>● Skyrim</li> <li>● Arma 3 (Multiplayer)</li> <li>● Far Cry 4</li> <li>● Minecraft</li> <li>● DayZ</li> </ul>	<ul style="list-style-type: none"> <li>● Mount &amp; Blade: Warband</li> <li>● RimWorld</li> <li>● Europa Universalis 4</li> <li>● Total War: Rome II</li> <li>● The Sims 4</li> <li>● Civilization 5</li> <li>● Crusader Kings 2</li> <li>● This War of Mine</li> </ul>

**Fig. 1.** The games included in the survey classified according to Ryan's categorisation of interactivity, internal / external and exploratory / ontological [19].

relatively rare instances of emergent narrative, and could therefore provide a baseline for the questionnaire. As part of including the widest range possible, games that offered either multiplayer or single player experiences were also included to see if the social aspect would influence the appearance of emergent narrative. [6]

Further inclusion criteria were the size of the on-line communities. Since the aim was to create an on-line survey, the bigger communities of gamers that fitted into our classification, should be reached. On Reddit.com, individual sub-reddits show the number of people that subscribe to it, so after classifying a list of possible games that met the requirements, in some instances the games with the bigger community would be chosen. The games chosen have all been released in the past five years (with the exception of the arcade games, and EVE Online, which has received continuous updates since its launch in 2003), and all have a relatively big and active online community.

Figure 1 shows the list of selected games categorised according to the type of interactivity organized along two conceptual pairs: internal / external and exploratory / ontological [19]. Among these games, the following are connected to an active community with a strong presence of online descriptive narrative, or to communities where players discuss and retell their experiences on forums and sub-reddits in a way that could strongly indicate an emergent narrative experience: *Civilization V*, *Crusader Kings 2*, *DayZ*, *Europa Universalis 4*, *EVE Online*, *Rimworld* and *Total War: Rome II*.

Additionally 13 other games were chosen, either based on their emergent narrative potential: *Far Cry 4*, *Minecraft*, *Mount & Blade: Warband*, *The Elder Scrolls V: Skyrim*, *The Sims 4* and *This War of Mine* or to be used for comparisons: *ARMA 3*, *Bioshock Infinite*, *Battlefield 4*, *Donkey Kong*, *Space Invaders*, *Spellunky* and *Super Mario Bros*.

**Table 1.** Emergent narrative questionnaire mean scores compared to mean self-reported level of emergent narrative.

	Game Questionnaire Score	Self-reported Emergent Narrative
Crusader Kings 2	1,274	1,645
Europa Universalis 4	1,261	1,458
Eve Online	1,242	1,710
RimWorld	1,199	1,382
DayZ	1,161	1,625
Total war: Rome II	1,058	1,317
Minecraft	0,953	1,095
Civilization 5	0,933	1,237
The Sims 4	0,885	1,077
Mount & Blade Warband	0,883	1,295
Skyrim	0,721	0,999
Arma 3	0,641	1,145
Far Cry 4	0,404	0,796
Bioshock infinite	0,343	0,062
Spelunky	0,204	0,250
Battlefield 4	0,003	-0,159

## 4 Results

The demographics of the final sample was very much as expected; predominately male (67%, female: 32%, other 1%), with most participants in the below 15 age group (0-15:62%, 15-20:20%, 21-25:11% and the remaining 7% spread out over higher age groups) and most participants from the United States of America. The age question on the demographics page had the age 15 and below preselected. Since not all test subjects filled out the demographics page, these numbers cannot be fully trusted.

In order to clean the collected data, four properties needed to be looked at before any meaningful analysis can be performed. Because the Likert scale questions were set up so that Neutral was preselected, all participants who had Neutral answers for all questions, were removed. Additionally duplicate answers had to be removed, due to the way the survey was implemented.

Since Likert scales are being created, each questionnaire had to receive at least four answers to be included. If a person had answered with N/A for more than the total number of questions - 4, those answers were excluded from that particular questionnaire's data. The last thing to check in the datasets, is whether there are any extremes (i.e. people who only answered, either, strongly disagree or strongly agree). These answers are most likely from participants who only wanted to participate for the chance to win one of the prizes. This could be checked in the Emergent Narrative questionnaire, since question nine was negatively worded (and reverse scored).

Note that we have excluded the arcade games (*Donkey Kong*, *Super Mario Bros* and *Space Invaders*) and one of the modern games (*This War of Mine*), as their response rate was below our inclusion threshold. From, the initial 14259 questionnaires answered, approximately 5% were removed in this process resulting in a total of 13547 valid data

answers. The resulting Emergent Narrative score for each game can be seen in Table 1, sorted in a descending order.

#### 4.1 Validation of the Questionnaire

To validate the results of the Emergent Narrative questionnaire we had included a question in the Game Mechanics questionnaire, that asked the participants to rate how much they thought they have experienced emergent narrative. In order to minimise the chance that the participants answered based on their own preconceptions, they were presented with the following description of emergent narrative:

*An emergent narrative experience is something that happens to you as the player, as you progress and interact with the game world. Under some circumstances the player might start experiencing events or “stories” that do not tie directly into the storyline of the game, but rather are events that you feel are unique stories happening to you just because you chose to act in a certain way (and might not happen again).*

This description and question was presented to the participants *after* having answered the questions in the Emergent Narrative questionnaire, to avoid any potential biasing this might have introduced. Comparing this data with the results from the Emergent Narrative questionnaire reveals a strong and significant correlation with a Pearson’s R value of 0.947 at an alpha level of 0.05. The validity of the questionnaire’s score is further strengthened by the the lack of significant difference between the Emergent Narrative and self reported scores revealed by a pairwise Mann-Whitney performed on each game.

Additionally, the results of the Emergent Narrative questionnaire match very well with the games that we selected because of their strong descriptive narrative communities and with the games we selected because of their emergent narrative potential. The games showing the strongest communities were: *Crusader Kings 2*, *Dayz*, *Europa Universalis 4*, *EVE Online*, *Civilization V*, *Rimworld* and *Total War: Rome II*. Five of these six games, make up the highest rated emergent narrative experiences. Furthermore the games perceived as having a strong emergent narrative potential line up most of the middle half of the scale with the exception of *Far Cry 4* being rated lower than expected.

From this we can conclude that what we tried to measure in the Emergent Narrative questionnaire, and the self-reported emergent narrative question of the Game Mechanics questionnaire (based on our explanation of it) in the survey are close to the same. We can therefore say that the Emergent Narrative questionnaire measures the almost same amount of emergent narrative as the self-reported answers.

#### 4.2 Emergent Narrative and Game Mechanics

Looking at the game mechanics could give an indication of which systems are the strongest in the creation of emergent narrative. However this is debatable on many levels: the game mechanics where chosen and defined by us. All game mechanics might

not have been included for a specific game or a particular game mechanic could have been omitted from the Game Mechanic questionnaire, because it is not present in the games we chose. What can be concluded is that the highest rated game mechanics seem to match with those seen in the highest rated Emergent Narrative games. This indicates that the systems of those games have been designed to include game mechanics that in a way facilitate emergent narrative. So investigating exactly what these interconnections are would be an interesting next step. Taking the top ranking game mechanics results in a list of likely game mechanics that can increase emergent narrative, if implemented properly. However as no analysis on the implementations of the game mechanics and their in-game relationship has been performed, no further conclusions will be made at this time. Further analysis into the design of these specific systems, and the considerations used in their creation could lead to interesting results.

## 5 Discussion

The results presented in the previous section confirm the validity of the proposed questionnaire across the games considered in the survey in relationship to the aforementioned definition of emergent narrative. It is therefore interesting to analyse the absolute scores that some of the games analysed have achieved. For instance, the games of *The Sims* franchise are in many ways an abstract simulation of human life, and are widely referenced in the research community. So why does it get only an average score on the emergent narrative questionnaire? It could be exactly because it is an abstract simulation of human life. There are not any goals built into the system of the game, it is just a simulation of life. There are no system actively working against you, trying to make you fail the game and this completely open and “unopposed” gameplay might not be giving the players the closure they need to experience emergent narrative.

*Minecraft* was expected to be higher on the emergent Narrative score; however, it is interesting to notice that the emergence in *Minecraft* happens within the games creation process, not as an experienced story for the player. The players discuss mostly their creations and their experience of constructing them, and do not talk about the stories they experienced in the game. While there are some stories about the adventures of *Minecraft* players, they are mostly anecdotal in nature.

The score achieved by *Mount and Blade: Warband* is most likely due to a lack in character interaction. The game system offers a great amount of re-playability, since its system will never play out the same way, but it has a low degree of closure; people rarely finish a full game, but frequently start up new games using new player created modifications.

Similarly to *The Sims*, the games *Skyrim* and *Far Cry 4* achieved an unexpected low score. Both games are strong in free exploration and player choices but also really strong in getting the player back on track by mixing it with linear narrative, and both score middling to low on the Emergent Narrative questionnaire. It would be interesting to take a closer look at these two games and investigate the exact nature of the narrative experience players are having in these games

Another aspect worth considering is the extents of the validity of the proposed questionnaire, as the base-line value measure used to validate it describes only a specific

definition of emergent narrative. While it is our belief that the explanatory text presented to the test participants captures the emergent narrative experience well enough, and in a format understandable in layman's terms, a researcher interested in a different definition of emergent narrative would need to perform a validation of the questionnaire presented in this article.

As part of the questionnaire, the test subjects were asked how many hours they had put into the game, with the option to answer somewhere between 0 to 50+ hours. The reason nothing is being concluded from that data, is that it is seen as a missed opportunity. A more important question, could have accounted for re-playability, by asking how many times the test subjects have started a new game, or how many times they have created a new character, which could have given an indication of the replay value of that title. That combined with the emergent narrative score would then have shown more definitely which games are offering strong emergent narrative experiences with re-playability. Another fact about that question is that we cut it off at 50+ hours. It is worth considering that people who go out of their way to subscribe to a specific subreddit where only a single game is discussed, are very likely to have put some hours into the game, making the question quite irrelevant. On top of that, we received number of the personal messages and on-line comments to the survey, criticizing that question as giving way to low values. Our original idea with this question was our assumption that in order to start experiencing emergent narrative, a player would need to have played a certain amount of hours (dependent on the game) in order to fully understand the game mechanics and therefore, becoming fluent enough in the "language" of the game to start experiencing his own emergent narrative, but we could have used this question to a much greater effect.

All in all, the Emergent Narrative questionnaire, shows that the emergent narrative experience can be quantified to certain extent, and that the research community could benefit from looking closer at what the industry is currently doing. The data set gathered in this research also shows great promise where further analysis could yield design frameworks or design considerations for designers and researchers alike.

## 6 Conclusion

In this paper, the first attempt to quantify emergent narrative has been outlined with the creation of an Emergent Narrative questionnaire. An on-line survey was designed and conducted of which one part was the the Emergent Narrative questionnaire. The survey was presented to members of 20 different groups in the Reddit.com community, each concerning one of the twenty games chosen. The final tally of use-able answers was 13,547. When analyzing the results there was no significant difference measured between the emergent narrative questionnaire and the self-reported emergent experience ( $P = 0.06 < 0.05$ ) with a strong correlation of  $R(14)=0.947$ ,  $p < 0.05$ . It is therefore assumed that the questionnaire created in this paper worked relatively well in classifying emergent narrative. There is still a great deal of work that needs to be done. The questionnaire itself needs further analysis and validation, before it can be considered complete. An interesting next step could be giving increased attention to the games that ranked the highest on the emergent narrative scale, and do qualitative analysis on how

the systems within those games work and how they influence the player's experience of emergent narrative. It is our belief that useful design frameworks and considerations could be developed from this work, which could possibly make their mark on the research community and the video game industry alike.

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