

# Immersion Levels in Digital Interactive Environments

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**Abstract:** When discussing narrative in games, game designers and academics alike often ignore a very potent narrative component in favor of more traditional literary devices. The narrative component in question is the game world itself. Doug Church argued that the narrative within games refers to any narrative thread that binds events together and drives the player to complete the game. With this in mind, the game world is a very important part of the game narrative, as the player will be exposed to the game world for the duration of the entire game. It is for this reason that this paper aims to look at the narrative components of the game world. In the past, two definitions were established to describe the game world as a narrative component, namely narrative spaces and narrative descriptors. However, these two definitions prove to be insufficient for the scope of game worlds found in current day game. With this in mind, this paper aims to expand on those two definitions, by analyzing game worlds and deriving new definitions from those worlds and forming models based on those. On top of that, this paper seeks to validate these newfound definitions through the use of the Game Experience Questionnaire (QED).

**Keywords:** Game design, Interactive Design, Narrative Design, User Experience (UX).

## 1. INTRODUCTION

Most often, when talking about the presence of narrative within games, game designers and academics alike often refer to classic narrative elements. Even if they refer to in-game objects that have a narrative function, they refer to objects that can fill the role of a narrator.

Church argues that the game story does not necessarily mean “expository prewritten text,” but rather that it refers to “any narrative thread, whether design-driven or player-driven, that binds the events together and drives the player forward to the completion of the game.” (as cited in Huaxin, 2010) With this definition in mind, we can argue that the game world is able to be a narrative component as well. In fact, since the game world is the container to all elements that are needed for the player to complete the game in the first place, we might even consider the game world to be one of the most important narrative components within the game.

More than any other medium, users of games are continuously exposed to the game world. Not

only in terms of average game length, but because games are interactive by nature. Users can find themselves revisiting previous locales because the narrative demands it, the user feels there is still unfinished matters present within the locale, because users need to return due to a precious resource only available in particular locales, and so on. In fact, it could be argued that through most of the game, the user is actually not involved in advancing the plot of the game, but instead hard at work simply playing the game by immersing himself and interacting with the game's environment. This requires the user to take up the game world in greater detail, as it is a necessity in order to complete the game. More so than the worlds contained within traditional media such as movies or books, players find themselves involved with the world itself.

One could argue that these player actions are a part of emergent narrative, where the user's actions determine the shape of the narrative. However, before actions that build emergent narrative can take place, the locations in which these actions take place need to be established first to give players a reason to interact with them. The goal of this paper is to look at the game world as a narrative component and to form definitions and models through an extensive software survey. The validity of these definitions and models will be tested through their ability to immerse the player into the game world.

## 2. PRELIMINARY RESEARCH METHOD

### 2.1. Equipment

For most games that were surveyed, we used their respective consoles to analyze them. The consoles used were Nintendo, Super Nintendo, Nintendo 64, Gamecube, Wii, Gameboy, Gameboy Advance, Nintendo DS, Playstation, Playstation 2, Playstation 3, Xbox 360 and PC. For other games for which we either lacked the hardware or the ability to play, we used internet resources in the form of Let's Play's, which are video walkthroughs of games.

### 2.2. Protocol Design

For the software survey, we choose games in which the player had to control an avatar in order to interact with a digital game environment. Therefore, games that were more abstract in nature, such as puzzle games and rhythm games, were largely ignored.

**Table 1:** A selection of the games used for the survey

Platform	Title
Nintendo	Crono Trigger, Super Mario World, Tetris, The Legend of Zelda A Link to the Past, Terranigma, Lost Vikings, Little King's Story, Muramasa the Demon Blade, Illusion of Gaia, Golden Sun, Castlevania Portrait of Ruin, Banjo Kazooie.
Playstation	Wild Arms, God of War, Jak & Daxter, Ratchet & Clank, Prince of Persia, Uncharted, Folklore, Okami, Digital Devil Saga, Viewtiful Joe, Final Fantasy X.
Personal Computer	Dishonored, Super Meat Boy, Mark of the Ninja, Super Monkey Island, Day of the Tentacle, Psychonauts, Bioshock, Overlord, Deus Ex Human Revolution, Darksiders 2.
Xbox	Kameo Elements of Power, Blue Dragon, Final Fantasy XIII.
Sega	Sonic The Hedgehog, Skies of Arcadia.

## **2.3. Data Analysis**

Games were analyzed on how the progression in the game was structured. Furthermore, the narrative spaces and narrative descriptors within the games were analyzed to find recurring themes among them. Lastly, we analyzed whether games had narrative that was not necessarily relayed to players in the game itself, but whose presence was either hinted at in the game or whose presence was further explained through other media, such as books.

## **3. PRELIMINARY RESULTS**

### **3.1. The game world as a narrative component**

When looking at the game world as a narrative component, Salen and Zimmerman (2004) defined two properties that could define the world as a narrative component, namely narrative spaces and narrative descriptors.

- Narrative space is the 2D or 3D space in which a game takes place.
- Narrative descriptors are the representations within the narrative space that help players understand the activity in the game within a larger narrative context.

Unfortunately, the issue with Salen and Zimmerman's definition of those elements is that it is too simplistic. The example they used to explain their definitions, namely the game Asteroids, is a game that consists out of only one screen with very few elements. While their definitions may hold true for a game of this scope, when looking at games of a broader scope, their definitions fall flat. Therefore, building on these definitions as a base, we sought to expand these definitions.

### **3.2. Encompassing Narrative**

One thing that Salen and Zimmerman's elements do not take into account is the massive amount of background information that is present in today's games. Case in point is the game World of Warcraft, as well as antecedent games in the franchise. These games have a vast lore regarding its universe, including novels to explain history that took place before the timeline in the games. This lore is not necessarily disclosed to the player in the game itself, but it serves as important guidelines to shape the world of the game.

The encompassing narrative consists out of all the base information that is needed to build all the locales within the game; it gives form and identity to the narrative spaces and descriptors present in the game world. This includes, but is not limited to, the game world's history, the races that inhabit the world and the sociological properties of the game world. The encompassing narrative is generally not communicated directly to the player, at least not in its entirety.

### **3.3. Narrative Spaces**

Narrative spaces are the containers that hold all of the descriptors. They can be considered the game's locales. They serve as the basic forms that the descriptors will take and are therefore more abstract in nature. Whereas the encompassing narrative contains information that is not necessarily present within the game itself, the narrative content of the narrative spaces are all available to players.

#### **3.3.1. Narrative HUB**

The narrative HUB differs from a normal narrative space in that it has a central role. While narrative can be present within a narrative HUB, it is limited compared to a normal narrative space. It is made to connect a wide variety of narrative spaces together so that players can easily (re)visit those spaces.

A common incarnation of the narrative HUB used in the Japanese role playing games is the so

called world map. In the world map, the player wanders across a miniature version of the entire accessible universe of the game. On the world map exists icons of locales, such as towns or caves. These icons serve as the entrances to new narrative spaces.

### 3.4. Narrative Descriptors

Descriptors are the smallest quantifiable part of the visual design of a game world; they are the building blocks that give meaning to the narrative space and communicate their role and the role of the narrative space to the player. There are four kinds of descriptors that can be present within a narrative space.

#### 3.4.1. Narrative Descriptor

Narrative descriptors are descriptors that primarily fill a narrative function and they serve as the most basic of descriptors. They serve no to limited interactivity to the player and serve to establish the role of the narrative space they are located in. Through their presentation, they can also provide the player with information regarding the history of the locale and the relation of the locale to that of others.

#### 3.4.2. Functional Descriptor

Functional descriptors do not necessarily communicate the narrative role of the narrative space to the player. They serve to give the player a point of reference from a game-play perspective.

In the game Alundra, the player will encounter pot-like objects throughout the entire game world. From a narrative perspective, these objects are completely out of place and should not exist, as it is unfathomable that someone would travel the world on a regular basis just to make sure these pots are in order. Not to mention that these pots exist in places that are generally not accessible by average people, further casting doubt on why these pots exist. However, from a game-play perspective, these objects serve to tell the player that the player has to use a particular item called “Magic Bean” in that spot. When used correctly, the pot will produce a spring-loaded plant which will launch the player to higher spots.



**Figure 1:** The game Alundra, with the titular main character using a “magic bean” on a pot.

#### 3.4.3. Narrating Descriptor

Narrating descriptors are narrators within the game with whom the player can interact. They generally serve to either tell the player something directly about the game world at large, or to give the player directions to new possible goals. Narrating descriptors in that sense do not have to be humanoid; any object that relays text to the player after interaction is a narrating descriptor.

It should be noted that when referring to narrating descriptors, we refer specifically to those descriptors the player can choose to interact with. Narrators that narrate store to the player through

means the player does not have any control over should be considered normal narrators and not narrating descriptors.

### 3.5. Linear and Open Model

Before creating the model based on the definitions that have been established in this paper, a closer look at how game-play is structured within a game is needed. The reason for this is that the type of game-play can have an effect on the way the narrative world needs to be structured as well. We can distinguish between two types of structures; the linear and open structure.

#### 3.5.1. Linear Structure

The linear structure has the player going from one point to another until the player has beaten the game. The player visits each narrative space in succession and has little to no control which narrative spaces the player can visit. For that reason, descriptors are mostly limited to what information they can convey to the player. On one hand, the descriptors can be more focused on expressing narrative, but on the other hand the player's exposure to them is only very short, since players cannot get back to previously visited locales.

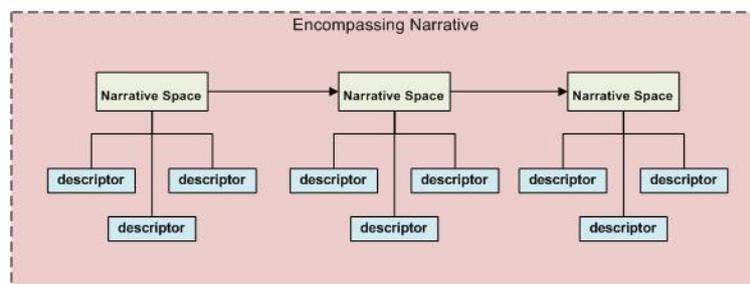


Figure 2: Linear Model

#### 3.5.2. Open Structure

As opposed to the linear structure, the open structure gives the player the ability to revisit previously visited locales. This in turn has an effect on how the narrative components need to be established, as the player needs to be aware of their existence. This is due to the nature of the open model, which allows the players to visit narrative spaces of their own choosing. Players need to be aware of the functions of narrative spaces and the elements within them in order to gain a reason to return to them. In order to accommodate an open structure, the open model has a need for one or more narrative HUBS in order to connect the narrative spaces together.

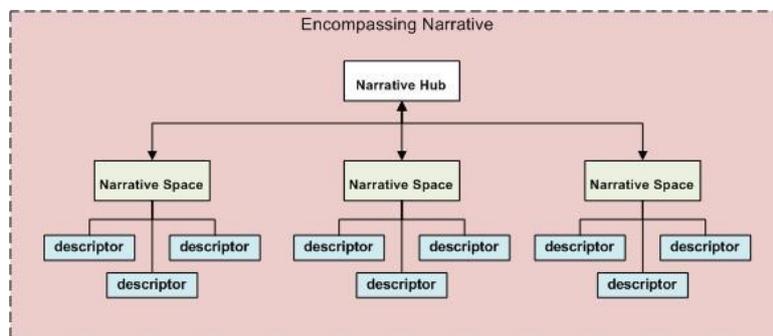


Figure 3: Open Model

## 4. VALIDATION METHOD

### 4.1. Participants

There were a total of 15 participants, of which 9 were male and 6 were female. The average age was 27.4 years with a standard deviation of 7.06. 8 participants were of Japanese nationality, whereas the other participants had varying nationalities.

### 4.2. Equipment

The computer used for the experimental game prototype was an Intel Core i5-2400 3.1GHz, with 4.0GB RAM and a AMD Radeon HD 6450 1.00GB. The operating system used was Windows 7 Enterprise (64bits). Additional hardware to control the prototype was used in the form of a Microsoft Wireless XBOX360 Controller for Windows.

### 4.3. Preparations

An experimental prototype to contain the stimuli was designed using the Unreal Development Kit July 2012 Beta. The prototype takes the form of a side scrolling action type game, where the game camera is always fixated to the side of the environment. The user is able to move left and right, run, jump, crawl, descend or ascend staircases as well as enter doorways. Two stimuli, divided into 3 stages each, were prepared for the experiment. Each stage of the stimuli shows more details of the environment (see table 2).

**Table 2:** Stimuli Setup

Stage	Stage contents
Stage 1	Basic geometric shapes, no descriptors.
Stage 2	Basic descriptors to establish basic identity of the narrative space.
Stage 3	Full narrative descriptors and narrating descriptors.



**Figure 4:** Stimulus 1, with stage 1 to 3 (from left to right).



**Figure 5:** Stimulus 2, with stage 1 to 3 (from left to right).

#### 4.4. Protocol Design

Users were first expected to complete a tutorial stage, to get the users accustomed to how to play the prototype. During this stage they were verbally guided by the examiner. After that, the users were required to play through the stages in a fixed order. After every stage the user had to fill in the in-game module of the Game Experience Questionnaire (QED) before they could continue to the next stage. After completing all the stages, the users were required to complete the core module of the QED.

#### 4.5. Data Analysis

For the data analysis, we used the core module and the in-game module of the QED. The social presence module was ignored since the experimental prototype did not contain any interactions with other players. Furthermore, we decided to forego the post-game module in exchange for the core module, as the post-game module did not test immersion in-depth. Out of the 7 components of the QED, we focused on sensory and imaginative immersion, flow, tension/annoyance, negative aspect and positive aspect. The other two components, namely competence and challenge, was not necessary for this particular research. Due to the limitations of the experimental prototype, we were unable to validate the functional descriptor, which is therefore not included in the data analysis.

### 5. VALIDATION RESULTS

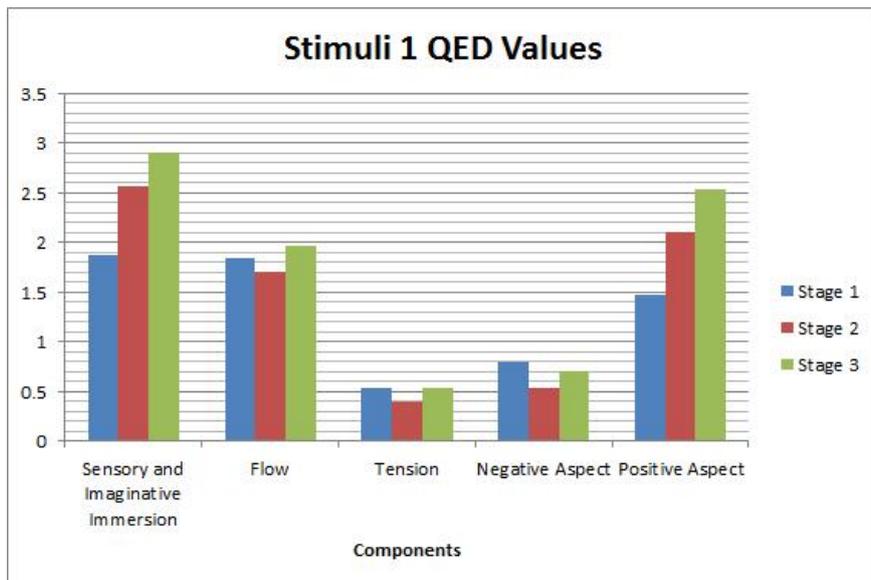
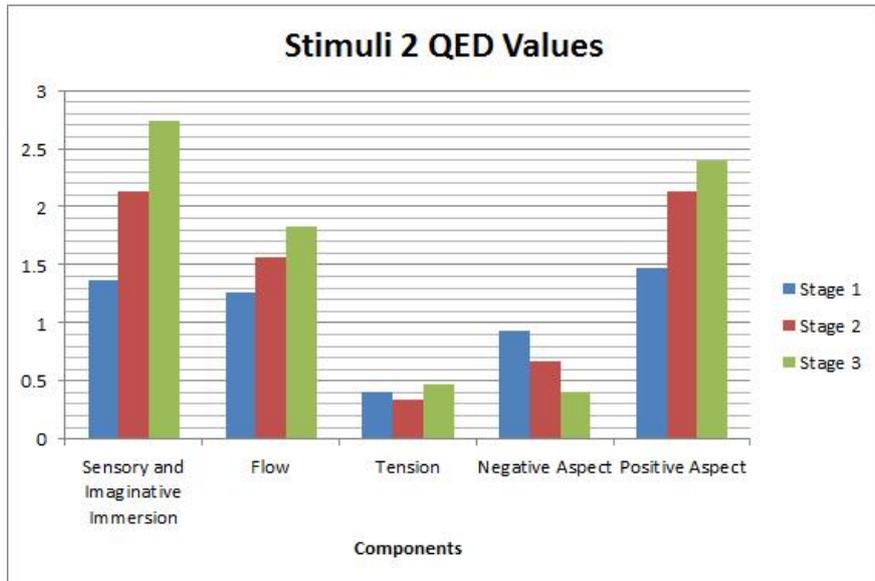


Figure 6: Stimuli 1 QED in-game module values.



**Figure 7:** Stimuli 2 QED in-game module values.

**Table 3:** Significance values stimuli.

Component	Stimuli 1	Stimuli 2
Sensory and Imaginative Immersion	0.0003	0.0000
Flow	0.6227	0.0300
Tension	0.7521	0.7982
Negative Aspect	0.5137	0.2014
Positive Aspect	0.0021	0.0114

Figure 5 and 6 show that when participants played the stages in the stimuli, the stages that contained the biggest variety of narrative descriptors and narrating descriptors scored significantly higher than the areas who did not. Furthermore, the positive aspect module also showed distinct differences between the areas. There was a minor decrease in negative aspect when compared the first stage against the second stage, but the difference was not significant enough to give it any attention. Flow requires further testing. Tension scores were insignificant as well, though it can be argued that tension relates more to challenge rather than immersion, which was not the goal of this experiment.

## 6. LIMITATIONS

Due to the nature of the experiment, the development of the stimuli takes a long time. A limitation of this study was that due to the allotted timeframe, we were only able to develop two stimuli. However, due to the size of the stimuli, we feel the result is still relevant, though a few elements (such as the flow component) require further validation.

## 7. CONCLUSION

Games become bigger and bigger as each generation of software passes. The possibilities of the

present, with games containing large sprawling 3D worlds full of life and color, as compared to those of the past, with games being severely limited by hardware and only able to convey the most necessary of information, are vastly different. Whereas in the past the major motivation to play game arguably came from gameplay, nowadays games have become very capable of immersing players.

As the game industry continues to innovate, so will the worlds in which the games take place continue to grow bigger and more expressive. However, with game worlds growing to the sizes they are these days, it also becomes necessary to try and understand them. How can we create a world that the player will be able to successfully immerse himself in? How can we use all of the available resources without confusing the player with too much information? In order to answer questions such as these, we first need to understand the game world itself. It is at that moment that the definitions such as those in this paper become necessary.

Using the definitions and models as defined by this paper, we will become able to understand the narrative properties of the game world itself. Furthermore, we will become more successful at immersing players into the game world.

## **8. FUTURE WORKS**

We wish to analyse how much narrative can be relayed to players of games through using the definitions as defined in this paper. More specifically, we want to find out to what extent narrative descriptors as well as narrative descriptors are able to relay narrative, since they are the most important elements when it comes to giving the game world a narrative purpose.

Furthermore, we wish to continue analyzing game worlds, so that if there is a need we can expand upon the already existing definitions with new ones. We are of the opinion that further analysis is necessary so that more distinctions can be made in the various elements in the narrative world models.

## **ACKNOWLEDGMENTS**

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