

The Narrative and Ludic Nexus in Computer Games: Diverse Worlds II

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ABSTRACT

To examine relationships between narratological and ludological elements in computer games, we undertook an empirical study of 80 contemporary titles. We drew inspiration from Jenkins' 2004 paper on dimensions of narrative architecture and Aarseth, Smedstad and Sunnanå's (2003) paper on a typology of ludological factors in games. Although these two groups of concepts have not been fully explicated, we defined them in concrete terms, citing example game titles. We intersected six groups of narratological factors with seven groups of ludological factors and present the data in this paper. Of the four dimensions of narrative architecture, evoked was most problematic and of the typology of ludological factors, topography and pace of time were least useful. The nexus between narratological and ludological factors is most obvious in the relationship between embedded and emergent narrative and player structure, determinism and strategic objective. We present implications, many game examples and future research ideas.

Keywords

ludological, narratological, content analysis

This study demonstrates the relationship between the two major approaches in contemporary video game theory, narratology and ludology, by interrogating their application in contemporary significant titles. It forces together theoretical concepts of narrative architecture from Jenkins [10] and ludological typology from Aarseth, Smedstad and Sunnanå [1] and is part of a larger project we call Diverse Worlds.

The Diverse Worlds Project is an ongoing large-scale interdisciplinary study of computer game texts. The first [3], was a content study of 130 games in the five dominant platforms. It presented a quantitative baseline of over 90 measures for representation of physical space, characters, style and narrative. Diverse Worlds II picks up where the original project ended. It adds to the data

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pool additional titles and extends the focus of the original project to study the nexus of narratological and ludological factors and is the focus of this paper.

In four steps we...

1. identify narrative and ludological concepts,
2. determine the meaning of the concepts in concrete terms so that they could be observed in contemporary games,
3. deconstruct titles in the five major gaming platforms to observe the presence or absence of the narrative and ludological concepts, and
4. analyse the results to explicate patterns of nexus between narrative architecture and ludic design.

LITERATURE

As computer games have become an object of academic study, the discourse about them has been constructed in part as an opposition of narratologists and ludologists and has run that games are either optimally story-telling or optimally play-based media. The genesis of this bifurcation can be traced to the introduction of the term “ludology” by Frasca in 1999 [6] as a label for the field of study of playing and games. Frasca offered ludology following reference to the established term, narratology.

Antagonism between those who might self-identify as ludologists—like Eskelinen [4] and Juul [11] and those who would self-identify as narratologists like Murray [15] and Laurel [12]—has waxed and waned since Frasca’s introduction of ludology, reaching a character of reconciliation in the first international conference of the Digital Games Research Association, Utrecht in 2003. There, Frasca [5] argued that conflict between the two camps was a function of definitional misunderstandings.

Although typologies and labels of narratological and ludological factors have emerged in the last decade to help scholars study computer games (Fuller and Jenkins [7] illustrate the genesis of game narratology), the definitional misunderstandings are likely to continue partly because of the protean nature of both the texts and the studying of them; the nature of the medium is so intrinsically technological that the rapid changes of technology are forcing new concepts and definitions to allow analysis. Moreover, definitional misunderstandings may continue so long as thinking and writing in this field focuses on static categories rather than on dynamic relationships among the categories. Two sources of inspiration illustrate the argument: Jenkins’ “Game Design as Narrative Architecture” [10] and Aarseth, Smedstad and Sunnanå’s “A Multi-dimensional Typology of Games” [1]. Arguably both sources offer conciliation yet continued distinction for narratological and ludological game elements. Both provide labels for their respective architectures and both relate well to other works in their camps.

Narratological Factors

Jenkins approaches the application of narratological frameworks to video games by drawing upon the idea of environmental storytelling. This notion surfaced in his writing (with Fuller) in “Nintendo and New World Travel Writing: A Dialogue” [7] in which an intriguing relationship is noted between the ability to save game progress and game geography in relation to game story. Among other things, narrative life in video games is positioned as a series of goalposts (p. 67). In

his article on narrative architecture, Jenkins [10] writes (p. 123):

Environmental storytelling creates the preconditions for an immersive narrative experience in at least one of four ways: spatial stories can evoke pre-existing narrative associations; they can provide a staging ground where narrative events are enacted; they may embed narrative information within their mise-en-scene; or they provide resources for emergent narrative.

For our purposes, the four dimensions of narrative architecture provide the basis of a search for the nexus between narratological and ludological elements of computer games.

Evoked Narrative draws upon a pre-existing story or franchise. It may be understood that a particular game is part of a larger narrational network which exists in a hyperdiegesis. *Star Wars: Knights of the Old Republic* (Xbox), for example, exhibits a narrative within and expands the *Star Wars* universe. Similarly, any sequel, by definition, employs evoked narrative. Here *Grand Theft Auto: Vice City* (Xbox) serves as an example. Jenkins [10] offers an expansive definition of this concept when he not only incorporates pre-existing stories, but also “broadly shared genre traditions” (p. 123). He uses the horror genre and the iconic haunted house to exemplify the idea of a tradition broadly understood. This invites debate about whether narrative architecture is determined by audiences or by game writers and designers. To the extent that any player is able to draw upon earlier texts for narrative meaning while playing a game, evoked narrative is present. Jenkins alerts us to the polysemic dimension of evoked narrative and audiences’ narrative competencies. Problematically then, this scope makes exclusion of most computer game titles from this architecture nearly impossible. Indeed, nearly all games will exhibit evoked narrative in some form or another for some audiences. The nature and degree of evoked narrative in game texts then can be understood not as a question of whether a game exhibits evoked narrative, but whether it is read as evoked narrative.

Enacted Narrative occurs through experience with the game elements including any combination of backstory, cut scene, pre-rendered sequence and game play. In this way the combination of elements, rather than a particular element is important in the delivery of the narrative. However, Jenkins [10] discusses the exposition in cut scenes explaining necessary background in the narrative to the player in terms of clumsiness in game design seemingly calling for designers to use more sophisticated structures than long cut scenes to advance the narrative. Here we are reminded of *Metal Gear Solid 2: Sons of Liberty* (PS2) in which a 17-minute cut scene overshadows early game play. “As inexperienced storytellers, [game designers] often fall back on rather mechanical exposition through cut scenes, much as early film makers were sometimes overly reliant on intertitles rather than learning the skills of visual storytelling” (p. 126). He returns to the primacy of environmental storytelling: “The organization of the plot becomes a matter of designing the geography of imaginary worlds, so that obstacles thwart and affordances facilitate the protagonist’s forward movement towards resolution” (pp. 124-125).

Embedded Narrative is present when the player can evolve a sense of story over time by stumbling across spaces and objects or artifacts that become familiar and are thus decoded for embedded meaning or importance. In the opening sequence of *Rear Window* (Hitchcock, 1954) elements in the film’s mise-en-scene are imbued with multiple narrative significance as explicated by Monaco [14] (p. 173). This mode of storytelling is akin to embedded narrative in

games. As a film spectator creates “story” from “plot” (in the formalist sense of the terms) in the process of interpretation of narrative events, a gamer may decode narratively embedded fragments in the mise-en-scene. This is Jenkins’ [10] idea of narrative leaving “traces on the landscape” (p. 127), whereby past narrative events are inferred from the visual evidence. We think here of the *URU: Beyond the Ages of Myst* (PC) in which the player powers up different worlds or ages. Revisiting the age, the mark of the player is felt instantly in the animation now present in the mise-en-scene. In this example, embedded narrative is clearly connected to enacted narrative in the sense of geographical storytelling: the player enjoys the act of discovery. Similarly the mark of embedded narrative is felt in games that may appear less impregnated with narrative such as *V8 Challenge* (PC) in which the skid of tyres in one lap remains for the player(s) to see in subsequent laps. Jenkins [10] uses *Black and White* (PC) as an example when he writes, “the player’s ethical choices within the game leave traces on the landscape or reconfigure the physical appearances of their characters” (p. 127). Of course, embedded narrative can be pre-authored in a way that evokes an inferred past story event such a room in which pictures are askew on the wall, a body lies bloodied and mutilated on the floor and fractured pieces of furniture are strewn about the room such as in *Resident Evil* (Game Cube [GC]).

Emergent Narrative occurs when the player imagines or “authors” the story by playing in a world she actively constructs. “Will Wright frequently describes *The Sims* (PC) as a sandbox or dollhouse game, suggesting that it should be understood as a kind of authoring environment within which players can define their own goals and write their own stories” (p. 128) [10]. Thus, *Sim City 4*, *Civilization III* and *Homeworld 2* (all PC) are examples of this type of narrative environment. *Microsoft Flight Simulator 2004: A Century of Flight* (PC) invites emergent narrative, but on a different level. The player can set-up routes, determine flying conditions including time of day, weather and traffic, and can establish schedules, flight numbers and other “authoring elements” to imagine the story. Indeed, the user community can contribute mods in the form of scenery and aircraft and one could establish an historical context for a flight recreation. An interesting application of emergent narrative architecture is *Animal Crossing* (GC) in which the player enters a pre-built world, but like *Flight Simulator 2004*, can adjust and contribute to the further evolution of that world by, for example, taking on pets, naming, and planting vegetation. One wonders, however, whether the conceptualisation of this and embedded narrative need more precision? Clearly leaving a mark in the form of tyre tracks or planting a tree suggests the active trail of a player in the mise-en-scene for which meaning is assumed. How would we better understand these two types of narrative architecture if, for example, embedded narrative were more narrowly defined as pre-authored spaces, objects and artifacts to be read by the player while emergent narrative allows the mark of a player in many facets whereby the world is significantly transformed?

Another approach to understanding narrative is Majewski’s narrative models [13]. While narrative architecture can be thought of as ways in which narrative can be told in environmental storytelling and these architectures are elements of such storytelling, narrative models are the global structure of a game’s narrative. A game may exhibit only one rather than any of the models demonstrating that the model is complete. Jenkins’ notion of narrative architecture allows a game to have any combination of architectural components. Majewski [13] identifies four narrative models. In turn these are the string of pearls model, the branching model, the amusement park model and the building blocks model. In a game using a string of pearls model the player progresses through a series of pre-set events. Between these events, the player has

relatively greater freedom, but ultimately can only go on to the next event or level as determined by the game's designer(s). By comparison, a game in which the player may affect the story by choosing from pre-designed narrative paths uses the branching model. In a game using the amusement park model, exploration is emphasized over the central storyline. The player has a certain degree of freedom to move from one sub-plot to another, and advances made in one sub-plot may affect other sub-plots suggesting there is an overarching plot that needs to be resolved in order to finish the game. In the fourth model, building blocks, which eschews the dominance of pre-authored narrative of the first three, the player controls a world or creates a world and character(s) within it rather than guiding one particular character through a predetermined world. The player guides a civilization through history, or a city or community over time and thereby more concretely authors this game world.

Jenkins' [10] narrative architectures and Majewski's [13] narrative models have considerable scope and perhaps less precisely measurable instances than formalist narrative structures traditionally applied to film. Secondary interest in this study was given to these formalist structures. For example, Bordwell and Thompson [2] define narrative in terms of "a chain of events in cause-effect relationship occurring in time and space" (p. 60). They identify non-narrative from in terms of using an alternative organisational structure. In games, one would identify non-narrative in abstract environments where game-play ignores characters, spaces and interrelated events and where the game world requires no "lived-in" space, privileging a purity of game play.

We envisage that some games, particularly compared with other media, would have a mid-point between narrative and non-narrative structures. We propose there exists a structure "pseudo-narrative" and in which games tend to employ a building blocks narrative model with a high level of emergent narrative architecture. Particularly in sports games, contest is narrative, but not completely pre-authored. In a pseudo-narrative the game tells a story with the help of the player's imagination. In our more conservative interpretation of game narrative, we think that elements of evoked and emergent narrative architectures offer affordances to the player who may imagine a contest in terms of story. In this way, pseudo-narrative games are imbued with narrative significance by virtue of extradiegetic narrative supports [17] such as a back story in the game manual, the slick or indeed transmedia narrational networks. In defense of this arguably slippery category, we suggest that the debate about the relative primacy of ludological versus narratological elements of games may be most hotly contested and therefore illuminated in this space where games are neither completely narrative nor completely non-narrative (privileging ludological elements).

Bordwell and Thompson [2] identify more fundamental formal structures of narrative that apply to games. "All the components of our definition [of narrative] causality, time, and space are important to narratives in most media" (p. 60). Player causal influence on the game narrative, in particular, invites study since here what the player does, determines at least the speed with which the narrative unfolds but potentially, like stories with multiple endings, the player may be afforded a high level of causal influence by the game design. The player's influence on the game's story progress and outcome can thus be conceptualised by level. A low level of causal influence would exist in games with one story path and only one possible ending. A medium level of player causal influence may be defined as a game with multiple paths and one possible ending. Player causal influence at the highest level would be constructed in a game exhibiting

multiple paths and multiple endings.

A simpler and more concrete set of narrative elements identified by Bordwell and Thompson [2] include the setting of the events of the game's story in time such as past, present, or future and manipulation of story order by such techniques as flashback (action cuts to an earlier event in the game story), flash-forward (action cuts to a future event in the game story). Further, a game may be more or less restricted in terms of the level of information the gamer has about the story world and may be more or less deep in terms of the information's level of subjectivity (in a game, this would be represented in terms of objective presentation—from a third-person perspective camera—perceptual-subjective, from a first-person point of view, but without mental interpretation of the character which would form the deepest level of subjectivity).

Ludological Factors

Aarseth, Smedstad and Sunnanå [1] approach all games including computer games from the perspective of a multi-dimensional ludological model. This model identifies space, time, player structure, control and rules. Other ludologists have proposed organisational structures for video games privileging what we refer to as ludological factors. Whereas Aarseth and his colleagues consider both the design of the game text and how the player interacts with it, others seem not to have generated the same scope and concreteness lending their models to empirical interrogation. For example, Järvinen [9], like Salen and Zimmerman [16], examine ludology in terms of building abstract models. With time these will no doubt produce concrete elements for study. However, for our purposes, they were not elucidated for empirical study. Similarly, Juul [11] offers an examination of the utility of ludology establishing the primacy of ludological inquiry, but doesn't offer a concrete typology per se.

Any number of books on game design sketch necessary gameplay features but few scholars have adequately created a universal structure for gameplay. Aarseth, Smedstad and Sunnanå's [1] typology appears to provide a solid and comprehensive model for concrete study. They delineates thirteen factors which model the ludological dimension of video games:

Space

Perspective: A game is experienced visually by the player and the player's seeing is determined by the perspective of a "camera" aimed into the game diegesis. This "camera" can be fixed or dynamic and it can offer first- or third-person perspective.

Topography: "A game's topography can be either geometrical, with continuous freedom of movement as in a driving or exploration game, or topological, giving the player only discrete, non-overlapping positions to move between" [1]. As a function of game technology most games feature 3D rendered environments with very few contemporary games employing a topological spatial orientation. *Advance Wars 2* (GBA) is one of the rare contemporary examples, betraying the Game Boy Advance's 32-bit architecture.

Environmental Control: "Some game environments remain unchanged for the duration of the game, while others may be modified by the player" [1]. In some titles like *Madden NFL 2004* (GC) and *Tiger Woods PGA 2004* (Xbox) the player can set the weather and the scenery dynamically. However in many exploration games and platformers such as *Ape Escape 2* (PS2), the environment cannot be manipulated. A game with dynamic control incorporates the

possibility that a change a player makes alters the functionality of the environment.

Time

Time/Pace: If time in the game rolls on without stopping for players to take turns, it is defined as having real-time pace. In *The Sims* (PC) time marches on even though the player takes turns making decisions. They player may even stop the clock. But in this state, the progress of the game diegesis itself is paused. In a game like *Tiger Woods PGA 2004* (Xbox) play operates like golf in the real world with players taking turns at hitting their ball.

Time/Represented: Time in games can be presented in terms of real-world time or arbitrary time. Concretely, time is arbitrary in a game that allows the player to build an empire in an day, such as a talented player may achieve in *Rise of Nations* (PC). In an abstract sense of time, a game diegesis may ignore time such as *Marble Madness* in *Midway Arcade Treasures* (Xbox).

Time/Teleology: Some games never reach a clear winning state as *Flight Simulator 2004* (PC). These games exhibit an infinite teleology. Other games are determined by a clear successful outcome of the player as in a *Mario Kart: Double Dash!!!* (GC). Games of this nature are finite in terms of a final goal.

Player Structure

Player structure is the most complex social mix possible for a game's player. The simplest player structure is the single-player game and *Max Payne 2: The Fall of Max Payne* (PC), like many other games, uses this structure. Two-player games like *SSX3* (PS2) and many other fighting sports titles in particular allow two players to compete or cooperate. Multi-player games such as *Midnight Club II* (Xbox) allow four controllers to plug into a single console and with additional hardware, two consoles to link for more players. Other player structures allow single-, two- and multi-team play. Here we think of *Smack Down!: Here Comes the Pain* (PS2).

Control

Mutability: "Games control player behavior with rewards of various types" [1]. When rewards affect the player's position, this is called mutability. Games with no mutability are static. Games with temporary mutability are characterized by powerups such as *Metroid Prime* (GC), and games such as *The Elder Scrolls III: Morrowind* (PC) in which the power of the player's character is permanently enhanced are called "experience leveling".

Savability: The ability of the player to save the game has an impact on game play and strategy. Games with conditional savability (generally at the end of a level or sequence or in a specific location) include such titles as *Prince of Persia: Sands of Time* (Xbox). A game that can be saved at any time in the progress of play is unlimited and this particular dimension is prominent in PC games. Games with no savability are rare, but here *EyeToy Play* (PS2) is a good example.

Determinism: "Some games rely on a random function to introduce elements and situations" [1] such as *Sim City 4* (PC) when a tornado is unleashed. These non-deterministic games proceed without predictability, "since the outcome of two identical situations may be dissimilar regardless of the player's action at that point." Certain genres capitalize on this format: sports and fighting games, for example. In this way, determinism has implications, particularly, for player structure and emergent narrative experiences in which players determine subtle changes in

every game-play iteration. By contrast, in deterministic games such as *The Getaway* (PS2), a player will experience exactly the same response from the game's mechanics and diegesis every time she completes a mission or acts in a given way on the game world. As artificial intelligence continues to improve and takes on a higher level of significance for interactivity, this ludological element will need revision.

Rules: Aarseth and his colleagues [1] argue that rules are plentiful and hard to categorise. To overcome the unwieldy nature of these, the authors conceptualise three dimensions based on time, space and function. Topological rules are determined by a player's character being in a particular location thus changing the condition of the game-play, say entering a doorway or stepping on a boobie-trap. In *Super Mario Sunshine* (GC) the player can jump on and pass through drain covers, break crates to reveal new object. Time-based rules are those that change the status of play in an important way based on a clock or timer (such as a race, or a mission). Timed recovery missions in *Call of Duty* (PC) are an example. Objective-based rules are those in which the progress of a game depends on some specific objective or task being met such as meeting a spy in *No One Lives Forever 2* (PC).

We propose an additional category affecting the coordination of the rule system of the game which we call strategic objective: The grand ambition of the player, clearly connected to genre, ties together in a global system the many rules and ludological elements outlined by Aarseth and his colleagues [1]. Moreover, the thematic and content-driven potential of the strategic objective may reveal an important on often overlooked link between ludological and narratological form.

It is here that we begin to hypothesise a nexus between narratological and ludological elements of games. As Aareseth and colleagues [1] point out in the opening of their "Typology" paper, "Games are the most culturally rich and varied genre of expression that ever existed. Here, we think of how Evoked Narrative also applies when we play games like *Super Mario Advance 4: Super Mario Bros. 3* (GBA)!!!"

METHODS

The centre-piece of this project was a content analysis of 80 titles identified by the popular games press as significant games of 2003 (identified in the *GameSpot* "Best and Worst of 2003" feature [8]) across all five contemporary platforms including the PlayStation2, Xbox, Game Cube, Game Boy Advance and personal computer drawn from the following 12 genre classifications used by *GameSpot*. The games were donated by the Interactive Entertainment Association of Australia for the purposes of this study.

Sample

The titles for this project included potential canonical works such as *Grand Theft Auto: Vice City*, *Metroid Prime*, *The Legend of Zelda: The Windwaker*, *Max Payne II: The Fall of Max Payne*, *Advance Wars II: Black Hole Rising*, *Elder Scrolls III: Morrowind*, *Super Mario Sunshine*, *Panzer Dragoon Orta*, *Star Wars: Knights of the Old Republic*, *Flight Simulator 2004: A Century of Flight*.

As we did with *Diverse Worlds I*, we identified four units of analysis including the slick (the cover or box), the manual (or handbook), the introductory cinematic sequence and the first ten minutes of game-play. Our view was that a player's experience with the game is determined by

exposure to each of these elements, that each element familiarises the audience with the game world and with the extent and nature of narrative and game play. This paper reports only the game-play unit of analysis.

Measures

We catalogued five representational elements of game content including the physical and object-oriented world, leading characters, style, narratological factors and ludological elements, together representing the components that create the game experience. The latter two are the focus of this paper.

An important innovation of the Diverse Worlds Project is the systematic examination of ideas about narrative and game play from the formalist research tradition associated with film studies and the emerging field of ludology using a relatively large-sample content analysis.

Accordingly, seven narratological factors were studied including the narrative model conceptualized by Majewski [13], Jenkins' narrative architecture [10], and Bordwell and Thompson's [2] formal system, degree of player causal influence, temporal setting, manipulation of story order, range of story information, and depth of story information. A portion of the measurement instrument used to code for these factors is in Appendix 1.

Twelve ludological traits drawn from Aarseth, Smedstad and Sunnanå [1] included topography, environmental control, temporality in terms of pace, representation and teleology, player structure, mutability of character powers, savability, determinism, and rules including topological, time-based and objective-based rules. The coding instrument for these traits is in Appendix 1.

Analyses and Reporting

Coding progressed through stages to ensure parallel coding from one coder to the next coder. Titles were coded conjointly by four coders initially, then by pairs of coders and then by individual coders. We returned frequently to code in pairs to ensure that we applied the operational definitions of concepts accurately.

Our goal is to demonstrate the nexus, not the numbers...this philosophy is presented in the way we have reported the data for this study. Raw total proportions for the relationships (Crosstabulations) between narratological and ludological factors are presented in tables, however our text attempts as much as possible to eschew this detail in favour of trends.

RESULTS

The bond between narratological and ludological factors in critically acclaimed computer games published in 2003 is more than just wet cement. Fine joins in this bond present intriguing new understandings. Details of these "fine joins" are in Table 1. The rows in the table present ludological factors presented as a proportion of ALL TITLES used in the study with the single dimension on its own, not crossed with other dimensions, in the far right-hand column. In other words, 95% of all games in our sample featured geometrical topography. To simplify and reduce the size of this table, we have omitted the alternative factor (particularly where there are only two options) for each dimension. In other words, "geometrical" topography is not presented with "topological" and "static" environmental control is presented without "dynamic". Columns in

Table 1 present narratological factors grouped by formal system, model, architecture, and more mechanical elements of narrative construction. The bottom row of the table presents individual narrative factor results not crossed with any ludological factors. For instance, 75 percent of games in our study employed a narrative formal system. We suggest using the table in conjunction with Appendix 1 which presents an image of the sections of our instrument used to produce figures in the table. Within the table, we present the proportion of ALL TITLES for which the crosstabulation of narratological and ludological factor captures. For example, 72% of all games in our study feature both geometrical geography and narrative form. Similarly, 9% of all games use emergent narrative and feature multi-player capability.

Narratological Factors

Variable Narratological Factors: Three-fourths of games in this study featured a narrative formal system. About a tenth each were pseudo-narrative and non-narrative. Half of narrative or pseudo-narrative titles employ a string of pearls narrative model.

Nearly three-fourths of games in this study employed evoked narrative, four-fifths use enacted narrative, nearly half use embedded narrative and one-fifth use emergent narrative. Nearly half of narrative games are set in the present. Most games present restricted range of story information (74%).

Static Narratological Factors: Only seven games manipulate story with flashback and only one (*Broken Sword: The Sleeping Dragon*, PC) does so with flash-forward. Depth of story information is objective (91% of titles) and in only three titles is it mental subjective. Given that these factors, then, will not vary when related to ludological traits, they were removed from the nexus analysis.

Relationships Among Narratological Factors

Working on the assumption that better understanding of narratological concepts can come from examining their inter-relationships we briefly looked for trends in a narratological-by-narratological crosstabulation (we do this in text only with no tabular presentation of the data here). For example, we observed that 88% of all games using a string of pearls model allowed the player a low degree of causal influence, validating the definition of this model. Enacted narrative architecture is present in all but one game using a string of pearls model. All games using an amusement park model also employ evoked narrative (although not all evoked narrative games are amusement park). Similarly, all games using a building blocks model also use an emergent narrative architecture games. Demonstrating our point that narrative architecture is a dynamic narratological element, not all emergent narrative games are building blocks model games.

Ludological Factors

Variable Ludological Factors: Most games (86%, Table 1) do not allow dynamic control of the game environment. Temporality mimics the real world (94%) and time is finite in which the player reaches a clear winning or end state in 85% of games. Most games (62%) employ the traditional single- or two-player player structure with less than a third offering more complex player permutations. More than half (57%) reward the player with experience leveling mutability of the player's character; less than half (48%) of games offer temporary mutability mainly in the form of power-ups. Savability of the game is conditional in 52% of games, unlimited in 42%.

Random and/or intelligent environments are the exception with nearly two thirds of games employing deterministic responses to player input during game play. Topological rules feature in three-quarters of texts, time-based rules are used in less than half of games (43%) while objective-based rules are the norm (85%). Overcoming evil is the most common strategic objective, followed by growing points, winning the battle, and winning the race. Fewer games featured building an empire, solving puzzles or operating a simulation for the grand ambition of the player. Across this plane of ludological traits, then, we crossed those narrative dimensions which showed some variation.

Static Ludological Factors: All but four titles in the study offered geometrical topography allowing freedom of movement that is continuous in the game space. The exceptions were a few GBA titles using topological geography betraying the graphical limitations of the ageing handheld architecture. Similarly, all but five titles used real-time rather than turn-based pace for temporal representation. Straight away, these factors were not included in our nexus analysis because they would not differ or vary by significant measure across narrative dimensions.

Relationships Among Ludological Factors

Again assuming that better understanding of concepts can come from examining their inter-relationships we briefly looked for trends in a ludological-by-ludological factors before with examined the ludological/narrative nexus. (Again, we do this in text only with no tabular presentation of the data here). It is striking that game worlds are much like the real world in terms of our presences in their dimensions of space and time; in games players experience geometrical, real-time, mimetic environments. The relationships among these factors hover around 90% for each combination. As we would expect, single-player games are deterministic 88% of the time. Every game that used time-based rules, was set in a real-time pace. We found understandable patterns when we crossed rules with strategic objectives. For example, overcoming evil was present in 93% of objective-based games. In 70% of games in which growing points was the strategic objective, time-based rules applied. Time-based rules also applied 86% of the time when winning a race was the strategic objective. Thus, we have offered these cross-tabulations to inspire some confidence in the empirical study of these seemingly slippery concepts with which we are grappling.

Table 1: Crosstabulation of Narratological and Ludological Factors

	Narrative	Pseudo-narrative	Non-Narrative	String of Pearls	Branching	Amusement Park	Building Blocks	Evoked	Enacted	Embedded	Emergent	Low Causal Influence	Med Causal Influence	High Causal Influence	Past	Contemporary	Future	Other	Flashback	Restricted Story Info	Some Restriction	Objective Depth	Perceptual Subjective	Row Total %
Geometrical %	72	14	10	51	17	17	9	73	78	41	21	44	27	23	22	49	13	15	9	74	18	86	19	95
Static %	71	9	7	51	18	13	5	69	76	42	12	46	30	12	18	42	13	18	6	72	15	80	14	86
Real-time %	70	12	11	51	16	17	9	72	77	40	22	46	26	22	22	49	12	15	9	73	18	85	18	94
Mimetic %	61	12	7	43	15	17	4	64	71	35	13	36	25	18	17	42	8	14	6	64	14	74	18	80
Finite %	69	10	8	53	20	11	4	70	75	39	12	46	28	13	17	46	13	16	8	7	17	79	17	85
Single-player %	35	4	4	30	4	8	1	30	40	34	8	27	11	5	12	18	8	9	7	34	8	41	11	42
Two-player %	13	4	4	8	8	3	0	16	15	5	1	8	9	1	16	13	1	1	0	15	4	18	3	20
Multi-player %	17	1	4	8	4	4	5	17	15	1	9	9	4	9	18	12	3	4	1	17	4	18	3	21
Power-up %	48	1	4	34	10	4	3	42	49	28	7	28	17	7	11	19	10	13	2	46	7	44	14	48
Exper. Levelling %	53	8	1	31	16	11	7	50	56	31	14	32	20	13	17	28	7	14	4	51	13	60	8	57
Conditional Save %	42	6	4	34	12	8	0	44	49	26	4	31	16	7	9	31	12	6	4	44	10	50	7	52
Unlimited Save %	32	6	4	17	8	8	9	33	33	18	14	13	14	14	13	15	1	12	5	30	10	39	10	42
Deterministic %	52	3	6	45	8	7	0	45	56	36	4	38	18	3	13	27	10	13	5	47	12	54	13	61
Non-deterministic %	24	11	5	9	12	11	9	32	26	8	18	9	12	21	9	24	3	5	4	30	9	37	6	41
Topological Rules %	61	9	4	42	15	11	7	58	64	32	13	36	20	17	15	33	13	14	5	55	17	67	17	73
Time Rules %	24	11	9	17	11	11	4	33	32	9	12	16	14	12	9	27	1	6	4	28	10	39	5	43
Objective Rules %	64	11	10	49	16	13	9	64	69	39	21	42	25	20	22	39	12	17	9	63	19	76	18	85
Win Race %	10	3	1	7	4	3	0	12	10	0	0	7	3	4	0	10	1	1	1	10	3	13	0	14
Win Battle %	14	3	0	11	4	1	1	13	14	6	1	7	7	4	4	12	0	1	1	13	4	13	6	16
Build Empire %	6	0	1	0	0	1	7	5	4	1	6	0	1	7	5	0	1	1	0	4	4	8	0	7
Solve Puzzles %	1	0	3	3	0	0	0	3	1	1	3	3	0	1	0	4	0	0	1	3	1	4	0	4
Op Sim %	0	5	3	0	0	4	3	3	1	1	5	0	1	5	1	4	0	1	0	4	0	5	1	7
Grow Points %	0	5	3	13	9	8	0	27	28	14	5	16	14	0	3	17	3	1	1	27	4	30	3	30
Overcome Evil %	43	0	0	34	7	4	0	35	45	28	1	30	1	4	1	14	9	13	4	40	5	41	1	43
Column Total %	75	14	11	51	19	16	9	74	79	42	21	44	28	22	21	49	12	17	9	74	20	88	19	100

The Nexus

At the risk of privileging narratology, yet seeking simplicity, we use narrative architecture as a topical framework to force together narratological and ludological dimensions of computer games, beginning with enacted narrative.

Enacted Narrative: By definition, games with any narrative system should feature enacted narrative and this what we found. All those games that offer power-ups and experience leveling employ enacted narrative. What this means is that the ability to grow and develop in a game is associated with the primacy of experiencing narrative by doing. Inasmuch as enacted narrative games put the player “on rails,” we weren’t surprised to see that conditional savability more prominently featured within this kind of narrative architecture. Enacted narrative features the highest proportion of single-player structure and deterministic interaction. These ludological factors make sense in relation to one another, and further suggest that enacted narrative is the way an individual player best experiences narrative when working alone. The dominance of enacted narrative among other architectures and the dominance of overcoming evil, growing points and winning battles illustrates that the single-player enacted environment is a common one. Games such as *Deus Ex: Invisible War* (Xbox) are iconic in this nexus.

Embedded Narrative: In this nexus a symmetry of representation exists in player structure with 81% of single-player games using this narrative architecture and 81% of embedded games featuring single-player social structure. Topological rules are favoured in this architecture. These games are commonly atmospheric and require the player to decode the complex mise-en-scene. Topological rules naturally lend themselves to the active exploration of these spaces. The mystery title, *Silent Hill 3* (PS2) is richly embedded and a game suited to the lone investigator. Similarly, *Metroid Prime* (GC) has elements of mystery, of artifacts and signs to decode for the lone explorer and of topological triggers for major events. *Beyond Good & Evil* (Xbox) is another example. Only 20% of games using embedded narrative have a non-deterministic interaction (the lowest proportionately across narrative architectures). This naturally relates well to topological rule structures and to the richly, but ultimately predictable spaces in which the story unfolds.

Emergent Narrative: In this nexus, ludological principles feed the openness of the emergent narrative architecture. The freedom of movement and options for play provide resources for environmental storytelling in the imagined and player-authored diegesis. Environmental control tends to be dynamic, allowing players to engage in authoring experience and the principles of time in emergent narrative naturally exhibit mimetic temporal representation and infinite teleology. The fidelity of mimesis in games necessarily requires ellipses in the representation time without which, most games, even emergent narrative games, and particularly off-line games would be too painfully protracted to play. In some cases we viewed time as mimetic when these ellipses were clear to us. *Sim City 4* (PC) has both mimetic and arbitrary temporal representation. Cars move up and down the street at one pace, while day turns to night at another. An extraordinary case is *Animal Crossing* (GC) in which “Life ticks by in real-time—and seasons change just like they do in the real world!” explains the game slick. In this game, the player enters a world in which she will contribute building, but also in which she arrives much like she would arrive in a new town. The emergent diegesis, by virtue of possessing a player-centred construction, lends itself to single-player or multiple-player (but ultimately individual play, precluding most team play) structures. The

strategic objective in this narrative architecture is proportionately more focused on building empires and operating simulations, either of which can be accomplished by these player structures. *Railroad Tycoon 3* (PC) is an example of a hybridisation of both building an empire and operating a simulation in a multiplayer-authored world.

Evoked Narrative: In this nexus, we found no patterned relationships with the range of ludological factors. The implication of this finding is that evoked narrative either is independent of ludological aspects of games, not a distinctive source of narrative or not amenable to our system of measurement. Other narrative factors help us make a determination about which of these is plausible. To do this, a case study of *Enter the Matrix* (Xbox) serves. This title is significant in terms of trans-media story-telling. This title uses a narrative formal system, string of pearls narrative model, is one of the most strongly evoked in our study, is enacted and embedded. The player is on rails having low causal influence on the story (there are many cut scenes), no manipulation of story order, and object depth. In sum, a film in game context, an interactive movie. Ludologically, it features static environmental control, finite, mimetic, single-player, temporary power-ups, conditional savability, deterministic with topological and time-based rules in which the player overcomes evil.

Now consider *Madden NFL 2004* (GC). This is a pseudo-narrative game using a branching narrative model. It is evoked by virtue of the *Madden* franchise, enacted, and emergent (owner mode). The game offers a high degree of player causal influence, flashbacks in the form of replay footage, and some restricted narrational knowledge. Ludologically this title offers dynamic environmental control, finite and mimetic teleology, two-team player structure, unlimited savability, no power-ups or experience leveling, non-deterministic, using all the rule systems and in which the grand ambition of the player could be any of the strategic objectives depending on the player making the judgement.

These are very different games ludologically. They both use evoked narrative, but in radically different ways. Returning to our list of implications, we argue the evoked narrative architecture requires redefinition. Our view is that this would involve different classifications of evocative spaces.

DISCUSSION

Inevitably, the attempt to place limits of social-scientific empiricism on art creates unexpected outcomes. Not least of which is the endless possibilities for interrogating two systems of typology in relation to one another. This paper presents the beginning of a process of rethinking what we mean by ludological and narratological factors of computer game architecture and player experience. Our plan is that *Diverse Worlds III* will explore the dynamic relationships rather than static and discrete labels of ludological and narratological factors, and the nature and degree of their application in games over time. *Diverse Worlds IV* will explore audience experience with these dimensions of game story engagement and play.

In pleading and “proving” the case that games tell stories, Jenkins [10] artfully outlines four pillars of narrative architecture. These are

wide pillars, these are long pillars. In other words Jenkins is too encompassing with his definitions. For this reason, they inevitably create an indestructible edifice. Until, that is, we attempt to apply it to a large sample of titles and observe it seeking variation in relation to ludological traits, and finding little utility in the edifice. In other words, we seek more narrowly defined labels for aspects of game narrative. Within the definitions, there are illuminating ideas, there are also applications of the notion of narrative that are less useful. Evoked narrative architecture is the label we have found least functional for this analysis. Similarly, what to do with geometric topography and real-time representation? These were the least functional ludological factors although Aarseth and his colleagues [1] feature them as part of the variable ludology of games.

Our sample contains popular, acclaimed titles among contemporary works. If our study had included older games, perhaps as far back as those for the Nintendo Entertainment System, these narrative and ludological categories would exhibit higher analytic utility.

Moreover, our introduction of strategic objective as a ludological factor is useful for the nexus. Strategic objective is the heart of the game play and the story. It is strategic both in terms of how the game is won, but also how the story is told. Whether to win a race or win a battle, to build an empire or to operate a simulation, to solve puzzles, to grow points or to overcome evil, these dominant types of objectives expand our understanding of how rules intersect with the narrative of a game. Indeed, nexus seems inherent in the idea of strategic objective, we see interdependence of narrative and ludos because the wider story is told and the grand mission is played.

More useful were the relationships we found between enacted, embedded and emergent narrative and ludological factors. As Jenkins [10] presciently notes, the interaction of enacted and embedded narrative architecture, for example, represent the balance between “the flexibility of interactivity” and the “coherence of pre-authored narrative” (p.127). Here too, ideas of ludos enter the thinking about narrative in games. We look forward to exploring these ideas in coming years.

APPENDIX 1: NARRATOLOGICAL AND LUDOLOGICAL INSTRUMENT PORTIONS

NARRATIVE FACTORS					
Fomal System	Slk	HB	Cin	GP	O
Narrative					1
Pseudo-narative					2
Non-narrative					0
Narrative Model	Slk	HB	Cin	GP	O
String of pearls					1
Branching narrative					2
Amusement park					3
Building blocks					4
Narrative Architecture	Slk	HB	Cin	GP	A
Evoked					
Enacted					
Embedded					
Emergent					
Degree of player causal influence	Slk	HB	Cin	GP	O
Low					1
Medium					2
High					3
Temporal Setting	Slk	HB	Cin	GP	A
Past					
Contemporary					
Future					
Other					
Manip., story order	Slk	HB	Cin	GP	A
Flashback					
Flashforward					
No manipulation					

LUDOLOGICAL FACTORS					
Topography	Slk	HB	Cin	GP	O
Geometrical					1
Topological					2
Environmental Control	Slk	HB	Cin	GP	O
Dynamic					1
Static					2
Time/Pace	Slk	HB	Cin	GP	O
Realtime					1
Turn-based					2
Time/Represented	Slk	HB	Cin	GP	O
Mimetic					1
Arbitrary					2
Time/Teleology	Slk	HB	Cin	GP	O
Finite					1
Infinite					2
Player Structure	(Highest Possible)				O
Single-player					1
Two-player					2
Multi-player					3
Single team					4
Two team					5
Multi-team					6
Mutability	Slk	HB	Cin	GP	A
Temporary/Power-up					
Experience Leveling					
Savability	Slk	HB	Cin	GP	O
Non-saving					1
Conditional					2
Unlimited					3

Range, story information	Slk	HB	Cin	GP	O
Restricted					1
Some Restriction					2
Unrestricted					3
Range, mixed & fluctuating	Slk	HB	Cin	GP	O
Yes					1
No					0
Other					8
Unclear					9
Depth, story information	Slk	HB	Cin	GP	A
Objective					
Perceptual-subjective					
Mental-subjective					
Other					

Determinism	Slk	HB	Cin	GP	O
Non-deterministic					1
Deterministic					2
Rules	Slk	HB	Cin	GP	A
Topological					
Time-based					
Objective-based					
Strategic Objective					A
Win race					
Win battle					
Build empire					
Solve puzzles					
Operate simulation					
Grow points/rewards					
Overcome Evil					
Other					

REFERENCES