Sheridan

Faculty of Animation, Arts and Design

Individual Subject Treatment:
Technical Design of Narrative Systems for Games

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Who Am I

I am Coulter Baker, a 23-Year-old Student and Game/Narrative Designer in Sheridan College's Bachelor of Game Design Program. My passion, and the focus for this Individual Subject Treatment, or "Deep Dive," is to explore the applications of narrative and game design, and how they can not only support and propel each other forward. I hereby propose a new methodology for narrative design aimed at immersive experiences in the next evolution of gameplay.

Why?

In recent years, we have seen the rise of more and more diverse game narratives, and systems to support them. From Mass Effect's Grand Space Opera, spanning three games and half a decade, to more recent systems such as Shadow of Mordor, it is becoming clear that narratives are positioned as a major selling point of games. This trend is likely to become even more dominant in the future. To this end, it is wise to conduct a study on the design of emergent narrative systems, which are, for many, the ultimate goal of digital narrative construction. By expanding my knowledge in the field of narrative systems design, and formulating my own design methodology and understanding of the topic, I will be able to assert myself as an expert in the field, opening up opportunities for myself in companies that are in need of someone with a strong technical design aptitude and knowledge of narrative systems design.

What is the Focus of This Deep Dive?

The interactive medium of games affords new opportunities for narrative design, and interactive design within narratives. Currently, a new direction in the future of game narratives appears to be in the construction of narrative systems, such as the nemesis system in games such as Shadow of Mordor. Through analysis of past and potential future examples of such design, I will be conducting a case study on the development of narrative systems in games, and seeking to analyze their potential and the direction that this aspect of game design is taking. The intent of this study is to develop my own understanding of the narrative and technical design of such systems, and how I can position myself as an expert in this aspect of the field of narrative design from both a story and technical angle, to make myself a highly-valued asset to their development from both a narrative and technical angle.

Structure

In this paper, I propose my own methodology of narrative system design, and establish my thoroughness of understanding and application of existing concepts and solutions in the field. The paper will open by establishing the challenge of emergent narrative design in the current market, then giving an overview of history leading into the current state of interactive narrative systems and structures within the games that currently exist on the market, and the lessons that can be learned from their development. From here, it will examine the theories and design philosophies that currently exist for technical and ludological design of emergent narrative systems within games, and suggestions on how they can and will develop in the near future, in order to formulate and propose a design methodology for narrative game systems, and what that system should strive towards in terms of gameplay and narrative relation. The paper will close with a proposal of a new methodology of narrative system design.

Expected Outcome

The objective of this deep dive is to develop a design methodology that can be used to guide the design of emergent narrative systems from both a methodological and technical perspective. In order to achieve this objective, I have been addressing my own current knowledge of this topic, and seeking out the most contemporary sources on it, in order to form a base of knowledge from which to determine my methodology and design values. The objective of this deep dive is for the creation of a personal methodology and values, not an overarching theory or process that is meant to apply to the field of narrative design as a whole, or provide guidelines for larger companies to manage narrative teams.

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1.0 - Introduction to Emergent Narrative Design and Purpose of this Deep Dive

To begin, it's important to define what I mean by emergent narrative design. Emergent narrative design, in the context of this paper, is a subset of narrative design, as outlined by sources such as *The Center for Games and Playable Media at the University of California,* which considers the ability for narratives to be generated through the application of systems that adaptively generate them, allowing narrative flow and direction to be authored and affected through and during the player's experience of playing a game.

The majority of systems currently that approach this ideal achieve such ends through applications of diverse system states, allowing for the expression of results stemming from varying player agencies. Such systems are seen in titles such as Mass Effect or Telltale's walking dead, featuring Libraries of branching paths, character attitudes, and pre-designed reactions to player choices. This gives the illusion of an emergent narrative system which reacts organically to player action. However, truly emergent narrative systems go beyond simply providing cause and effect choices to players in order to diversify potential paths and player agency. The goal in designing an emergent narrative system, as defined by this deep dive, is to create a gameplay and narrative experience in which the narrative has the capability to be defined by, and adapt to, the player's decisions, rather than one in which the player is explicitly provided with decisions that allow them to control the story.

Currently, even the largest state spaces provided by modern games require hours upon hours of pre-recorded and pre-designed dialogue, content, and choices, all of which still leave the player with an narrative experience that is limited in overall scope by the amount of state space the team is able to design - leaving an experience that is not truly emergent. As an example of the discrepancy between what is available, and what is desired here, consider children playing a fantasy game, such as cops and robbers, or knights and dragons, or as a more structured, but still valid example, a group of players in a tabletop rpg. In these cases, the narrative within the game is not bound by pre-designed narrative content. The players and Gamemaster, or GM, have an understanding of the world they are in, and the kind of situations that are expected, and in many cases, they may even have drawn up plans for how the story will unfold, but that does not determine the story. Each action the players take, changes the story, and their perception of it, and because of the inherent creativity and understanding of player motivations that the human "experience manager" possesses, the story can be

updated and changed to suit player desires, a design consideration seldom seen in games up to this point. Which is not to say that there is anything wrong with that, many games tell amazing stories and encapsulate a particular vision for a narrative, however, if we want to capture the same kind of narrative freedom afforded by a child's imagination, and provide truly unique, personal and open-ended narrative experiences for players, then the application of emergent narrative systems is a key element towards achieving that goal. Extending from this, having an expert perspective on the associated design challenges and methodology will be invaluable for such an undertaking. To this end, I have gathered relevant sources on both emergent narrative design methodologies, and relevant design challenges, to apply towards deeper understanding of the field and building my own expert approach.

When considering the challenges to address, it is important to understand the history of the subject and how it has evolved. To this end, I first examine some of the most common narrative design structures from the early days of video games until the modern day, examining the strengths and flaws in each, and how their evolution took place, culminating with a review of the most recent developments as they relate to the design and furtherment of emergent narrative systems. With this base established, I then move on to addressing and investigating individual design challenges, through case study of relevant sources.

Foremost is the issue of immersion and player engagement. If a system is to be responsible for designing a narrative to engage the player, rather than applying a non-emergent story carefully designed and scripted by a team of writers, then the designer of such a system must ensure that the narrative system and resultant experience meets the psychological and emotional needs which are most valued by players. To this end, I have gathered information on self-determination theory and the PENS model of need assessment, typically applied towards the design of gameplay experiences, but which are also closely related, and applicable, towards the design of emergent narrative systems. As we will see, emergent narrative is closely entwined with gameplay and player motivations, as the system is meant to help support player desires and agency within the narrative.

The second issue is that of technical design and applications for emergent systems. I cover a case study by the *Center for Games and Playable Media University of California, Santa Cruz* outlining approaches towards the logical and theoretical issues and requirements for the technical design and implementation of emergent narrative systems, as well as an analysis of one such existing (if rudimentary) emergent narrative structure of *Shadow of Mordor.* The points raised cover such important issues as the

design and recombination of modular content required to support such systems without requiring millions of man-hours of authored content; the design of systems and agents to arrange and deploy such content; as well as how the player's own interpretation of events and gameplay experience influence their interpretation of narrative events; and what lessons *Shadow of Mordor* can teach developers about such design.

The third and final challenge is that of imparting narrative design ability or understanding to narrative directors. In a similar vein to the issue of immersion, this concerns how emergent narrative systems can meaningfully design and recognize narratives that humans will recognize as having literary value, and provide narrative structures to players that will support their style of play, and reflect their actions. This is by far the most challenging of the three topics, as it concerns teaching the logic-driven "experience manager" to recognize and implement stories, a system that, while intuitive for humans with even a rudimentary understanding of narrative structures, poses a more challenging task for a machine without an understanding of narrative, or the emotional impact of stories, or player actions within the game system. To this end, I draw from the prior design and needs theories, as well as the narrative design methodology of *Frictional Games,* from which I seek to define rules and design considerations to help define a system's logical methodology for designing narratives

In the final part of this Deep Dive, I apply the results and theories developed through my research and case studies towards the development of my own design methodology for emergent narrative systems, and provide my projection as to the benefits and future direction of development in the market for emergent narratives, and why the development is worth pursuing.

2.0 - Overview of the Evolution of Narrative Design in Games

We may ask ourselves - exactly when did narrative design and games first start to cross over, and at what point did the field of game design recognize the potential benefits that the incorporation of narrative could add to its potential? From these realizations, what can we then infer about narratives' role in games, and how that has changed? I propose a history of narrative design in five phases, as follows.

2.1 - Phase 1: The Beginning

I would make the argument that, even from some of the earliest days of the industry, the value of games and narratives have been inexorably intertwined, though perhaps not always intentionally, or on the same scale that we witness today. Looking

to Space Invaders, for example, it is hard to justify it as having a "Narrative System" as the narrative there is more implicit. Aliens are attacking, and it is up to the player to fend them off. Jesper Juul argued that such design does not truly represent the traditional folk narrative structure that it evokes, as he elaborates, within *Space Invaders,* "the title suggests… a positive state broken by an external evil force. It is the role of the player to recreate this original positive state… [However,] we cannot actually restore the initial state; we cannot win since every wave of aliens is followed by another. As players we are fighting to *realize* an ideal sequence of events, but the actual playing is not this sequence." [6] (Juul, 2001) This reflects a trend with early attempts at game narrative; players were given a scenario - *Asteroids*, *Space Invaders*, *Zookeeper*, etc. but there was no true beginning or end. They were simply thrust into a narratively inspired situation, and left to infer the specific circumstances, reasoning and consequences of their actions. Interestingly, this same concept of inferred or embedded narrative emerges later, as we explore through games such as *Shadow of Mordor*. In short, the "narrative" of such early games was not so much a driving force for the player to play the game as much as it was a framing device to give player action purpose, and inspire a course of reconciliatory action. Whether or not players were ever able to bring the story to a natural resolution, or if the game would stretch on forever, was not a consideration, so long as the narrative served as an effective frame.

2.2 - Phase 2: Narrative as Gameplay

Moving further into the industry's maturity, the development of early computers as a medium for games, coupled with the fact that they lacked graphical power comparable to the early consoles such as the *Atari* or *Colecovision* led to the creation of narrative text-based games for such processing systems, including titles such as *Colossal Cave Adventure, Zork,* and others. Those games lacked real-time mechanics, and were instead based around text-interfaces and input that allowed players to play through an interactive story through exploring areas, solving puzzles, and collecting items, etc. As computers' power increased, so too did the complexity of games in the "Adventure" Genre. Companies such as *Sierra Online* and *Lucasarts* began expanding the genre through incorporating visuals into what had formerly been text-only interfaces, building up and expanding the possibilities for the genre's narrative presentation. While games such as *King's Quest, Loom,* and countless others helped pave the way for narrative based games, and perhaps larger narratives in games as a whole, most of these titles exhibited an issue opposite to games such as *Space Invaders* - while early arcade and console games had only marginal aspects of narratives, and relied on them to frame gameplay, early adventure games had only marginal aspects of gameplay, which served to provide a means of interaction with the narrative – e.g. *touch object A to object B, give item C to NPC D,* etc. with all gameplay essentially serving as little

more than a form of progression gating for the player; e.g. *you cannot pass the troll until you have the mushroom, which you must go to the cave for, etc*. Furthermore, with some rare exceptions, the majority of these story based games were almost entirely linear, with little opportunity for player agency or problem-solving. If players did not do things just as the designer intended, in exactly the right order, they would get slapped on the wrist, often with a game over, breaking the narrative flow of the game, potentially causing frustration and breaking player immersion as they then flounder about, trying every nonsensical solution until something stuck. This kind of system presents a slew of problems, essentially seeking to convert a "choose-your-own-adventure" book to digital form, creating a game that is little more than a series of choices, but with only one path being correct, and leading to a good ending. In this regard, these early narrative designs represent more traditional stories transposed into an interactive digital medium, but did not truly achieve a blending of both gameplay and story, in the sense that my design methodology will be aiming for, and made limited use of the interactive nature of the medium, since the player's autonomy was actually detrimental to the story's efficient progress.

2.3 - Phase 3: Narrative as Rewards

As time went on, and graphical and memory limitations increased, games began to implement narratives more and more. Games such as the *Legend of Zelda* and *Final Fantasy* began expanding from sentences of dialogue to paragraphs, and from simple frame narratives to a larger, more fleshed out world, allowing gameplay and story design to support each other more directly. Players would be given quests or tasks with grounded meaning in the game's world that possessed a concrete beginning and an end, with a narrative that accompanied the player from along that path. By and large, the game's narrative was used as a "reward" for the player - traditional rewards like high scores were eschewed in favor of the promise of completing the story, or seeing the "end," similarly to adventure games. Now the gameplay had caught up as well, and the ludology and narratology of the game were in sync - you could resolve the conflict, and unlike text-based or point-and-click adventures, you could actively undertake gameplay tasks to achieve it, rather than reading/watching the results of your decisions play out, as in the adventure genre.

2.4 - Phase 4: Narrative and Gameplay Together and Segregated

This form of narrative, focused on supporting gameplay with authored narrative content, and using this narrative as a driving force and reward mechanism for the player's progress, has remained a standard of video games as they have evolved over the past few decades. Graphics and processing power have increased, and text has

given way to full voice acting and motion capture, with paragraphs of dialogue expanding into hours of 3D cutscenes, but the narrative and gameplay relationship, as a whole, has remained largely static. Players are presented with systems framed and supported by narratives, progressing through the same kind of relationships that were employed 20+ years ago. The narrative-driven choose-your-own-adventure style of old adventure games has also seen a resurgence through the evolution of games such as those in the telltale series, which do away with the obtuse puzzles, abrupt narrative-halting deaths, and awkward interfaces in favor of more focus on player decisions. The minimalist gameplay focus is still maintained, however, and in spite of the decisions that can be made, the stories still maintain the same largely linear nature.

Overall, even as games have become more complex as a whole, and their narratives expand and become more lengthy and diverse, the ways and systems that have been produced to combine gameplay and narrative in meaningful ways have, for the most part, not developed at the same pace - *The Legend of Zelda* series still follows the same linear tale of a green-hatted hero entering dungeons to collect magic artifacts in order to overcome a great evil, with gameplay and story being segregated, pre authored pieces that do not truly make use of the unique interactive nature of the medium, and instead attempt to adopt the nature of other narrative forms, such as literature or cinema, failing to make use of the user agency and interactivity that the medium offers, within their story creation. *Frictional Games*, makers of the acclaimed *Amnesia* series and *SOMA*, discussed the issue that can arise due to this segregation, if the player's actions are viewed as just "pure progress" needed to reach the next story segment, this can "remove the experience of being inside a story, [and] the player stops seeing their actions as part of a story and instead sees them as steps towards an abstract gameplay goal." [7] (Frictional Games, 2014)

2.5 - Phase 5: Immersive Narratives

However, the modern era of game design and development has also led to some unique game experiences and theories on narratives that show promise in developing a deeper understanding of how games and narratives can be used to support one another. Games such as *Mass Effect* have created huge plots, which, while not fully responsive to player action, seek to expand the borders of what is possible in terms of choice-driven narrative in games, creating a multi-game storyline that took half a decade to release. More relevant to the design of interactive and gameplay-driven narrative systems, however, are games like *Shadow of Mordor*, which, ironically, had a fairly basic and linear authored-narrative experience, but incorporated the unique and groundbreaking "Nemesis System." Nemesis allowed players' decisions to be

remembered by a number of modularly-designed orc NPCs within the game, as well as influence the fluid social standings within their ranks, leading to the orcs gaining promotions, fighting rivals, increasing in status, and so on. Companies such as *Frictional games* have proposed their own methodologies for narrative driven gameplay, which are focused on allowing narrative design to inform gameplay, rather than the other way around. Meanwhile, narrative and human needs design have been studied and assessed by sources such as *Immersyve Inc.* and *The Centre for Games and Playable Media* in California. It is these developments and new design methodologies that I will be exploring, in order to inform my own design methodology and develop a deeper understanding and theory on where game narratives are headed and how I can position myself at the forefront of the developing field.

3.0 - Modern-Day Developments in the Field of Narrative Design for Games - Shadow of Mordor

To start, let's review *Shadow of Mordor,* by *Monolith studio*. This title garnered significant media attention from critics and players alike for its innovative and open-ended "Nemesis system," which allowed for emergent narratives to be generated for the player alongside the game's more traditional, authored narrative. The Nemesis systems is centered around the Among the orcs players fight, there are "Captains" These are powerful individuals with unique traits, who speak to players personally, and remember past conflicts with them. If a player ran away the first time they met one, the Captain will comment on this. Burn a Captain with an explosion, and he'll show the burns the next time around. This creates a unique narrative, wherein you, as the player, shape your relationship with these enemies by fighting and playing alongside them. Furthermore, if an enemy should kill a player, that individual, nameless NPC will be promoted, becoming a Captain, and thusly, a much more serious foe, who remembers their victory over the player. The player can also take part in missions to assist or punish captains that are currently undertaking them – power struggles, etc. However, even if the player does not intervene, these events will still play out as time passes. The characters within game world will move and evolve with or without the player's attention. Captains fight each other, die, rank up, and get promoted. New captains will emerge, and the hierarchy will evolve. In this way, the game has an emergent, inherent narrative that is different for each player.

The game's design director, Michael de Plater, gave talks and post-mortems covered by Gamasutra concerning some of the key design choices and objectives that drove the system's design, as well as the lessons learned in the design of the game's emergent "nemesis system." The question at the core of the design was simply "How

can we make a narrative out of the gameplay." [5] (Graft, 2015) Though simple, this question represents a core consideration in the development of interactive narrative systems, which other narrative designers have spoken on, and is an effective lens through which to look at narrative development.

One of the angles that the design team took to address this challenge was through assessing how the nemesis system would satisfy psychological needs for players. De Plater explained that "[b]y breaking down human needs and identifying psychological motivation, the team was able to get more clarity than they would have if they just chased the amorphous, subjective idea of "fun."" [5] (Graft, 2015) Furthermore, de Plater elaborated that the designers had "to put aside their desires to tell their own grand story, and focus on how to instead focus on ways players can create and share their own experiences."[5] (Graft, 2015) This represents a core consideration which plagues the connection of game and narrative design as a whole - how much establishing narrative can be used alongside open-ended gameplay and emergent freedom can the designer give the players before "ludonarrative dissonance" begins to emerge. For example, within a game, the main character's story arc may concern their desire to escape their ties to the mob, and settle down to a quiet life, but the player is given the freedom to spend missions running down civilians in tanks, shooting down innocent bystanders, and blowing up hospitals. Then the narrative begins to become ludicrous alongside the mechanics, as the player's actions become antithetical to the story that the narrative side of the game and the embedded narrative that the designers have intended to tell.

De Plater's answer to these concerns, and creating a meaningful, exciting emergent experience for players, was through application of psychological theories such as "GNS Theory, and the Player Experience of Need Satisfaction, or PENS model." [5] (Graft, 2015)   In following with this, I will now be exploring these models for application towards my own methodology, and theorizing the potential applications and lessons they can provide in the development of emergent narrative systems, and in answering the question of "how to make narratives from gameplay." [5] (Graft, 2015)

4.0 - The PENS Model of Motivational Needs, and Its Applications for Narrative Design

Designed by *Immersyve* Inc. The PENS model is a methodology for assessing and "measur[ing] those elements of the player experience that are most deeply

satisfying and valued." [11] (Rigby & Ryan, Pg. 2, 2007) As the model serves to outline and investigate those elements, I will be seeking to address how those elements tie into the question of how to make a narrative from gameplay in order to be able to isolate and assess each of those areas in turn, and apply the model to the development of my own design methodology for emergent narrative systems.

At the core of the PENS model is the belief that there is a misconception about the nature of fun - with designers being content to assume that fun is a self-explanatory construct that is:

(1) uniformly understood conceptually,
(2) most meaningfully assessed by asking about it directly during playtesting
(3) the strongest indicator of a game's long-term success.
[11] (Rigby & Ryan, Pg. 3, 2007)

As a result of this, PENS model seeks to provide a more measurable and quantifiable measurement of positive and important traits of games and their mechanics, grounded in psychology, outlining three core "motivational needs" that are crucial in supporting players "motivation and satisfaction," and in "predicting important outcomes of success" [11] (Rigby & Ryan, Pg. 3, 2007) in achieving the goals of an experience, which tie into the concept of Self-Determination Theory, as Discussed by Michael de Plater in Gamasutra's prior article. Self-Determination Theory asserts that:

"Human beings have three fundamental needs: Competence (they need to feel effective in dealing with environment); Autonomy (they need to control the course of their lives); Relatedness (they need to have relationships with others)." [5] (Graft, 2015)

Each of these concepts is defined and discussed by PENS for its relation to game design, mechanics, and outcomes. I will be seeking to explore these applications, and furthermore, how they apply to the design of emergent narrative, and what lessons I can put towards my own design methodology.

4.1 - Competence

Competence is defined by *Immersyve* as, "the intrinsic need to feel a sense of mastery or *effectance* in what one is doing." Competence is a driving force behind almost all games we witness today. PENS outlines that competence, with regards to "Game mechanics" is simply the players ability to utilize the game's mechanics to be able to run, jump, swim, and so on, in order to navigate the game world. *Immersyve*

holds that "if players are not able to feel mastery… of both the interface… and basic rules that govern the experience," such as gravity, physics, etc. their experience will be frustrating and unenjoyable. [11] (Rigby & Ryan, Pg. 6, 2007)

The next aspect of competence they explore is in "Satisfying competence needs through core gameplay" [11] (Rigby & Ryan, Pg. 7, 2007) - A player naturally expects to become more competent and skilled through application and honing of the skills they possess with relation to the game's systems and entering the state of flow, wherein challenges are appropriately suited to their level of skill, walking the line of competence, without making the challenges overbearingly difficult, or falling into mediocrity with challenges that are too easy. Immersyve's research corroborated that it is players "intrinsic need for competence that energizes and is subsequently satisfied by the optimal challenges games provide." [11] (Rigby & Ryan, Pg. 3, 2007)

Finally, Immersyve discussed the importance for allowing players a chance for what they call a "Mastery in action" experience, with regards to long-term interest in games and experience. This is an experience wherein players are able to easily overcome challenges using the skills they mastered, rather than continually maintaining a state of constant flow. It can be good to allow players times to show off and easily conquer challenges using their mastery. Immersyve establishes that having moment by moment engagement and challenge is important, but without providing this change for a more casual "play" oriented experience, players may show less interest in returning to the game. [11] (Rigby & Ryan, Pg. 9, 2007)

How then, do these three concepts of Competence: that players should be afforded ideal control, challenges that test their skill, and moments of cathartic "Mastery in Action," apply to how the design of narratives and emergent narrative systems within games and their related systems? To begin, we can consider how both traditional and emergent narrative structures have, thus far, handled this concept.

Within traditional narrative structures - story driven, choice based, with a set beginning and end, the narrative is generally used as a means of reinforcing the players' actions. Upon completing missions, players will be shown indications of the outcomes of their actions, and as the narrative progresses, these displayed consequences will ramp up towards a climax, closing out the game, and, in the case of games offering branching paths, reflecting the choices or actions the player took. This is a very simple way of showcasing competence and autonomy through narrative - by simply using the narrative as a reward and expository platform - *beat level x, see cutscene y, describing the results of your success in beating level x.* It is a reasonably

effective system, but problematic for the design of emergent narrative systems due to the "State Space" they require, as we will cover. Designers must also take caution with such applications of narrative, as they may be incorrectly applied as an attempt to satisfy the "mastery in action" experience that *Immersyve* outlined - in exchange for beating a difficult level, or mastering skills, players are given a cutscene as a reward. However, this reward methodology misses out on the active component of the mastery in action aspect of the design, as players are not actually allowed to take action during such cutscenes, and thus may feel un-invested, or cheated, as characters are shown doing things that the players cannot do, or worse still, things they can, and would rather have been able to do themselves. This disconnect between player action and narrative is in contrast to the goal of making narrative from gameplay, and diminishes the impact of the narrative with regards to fostering player competence, potentially leading players to lose interest in the narrative if overused.

An alternative example of how emergent narrative can foster competence can be seen through more narratively-light, exploratory or survival based games, such as *Don't Starve,* or *Darkest Dungeon*. In each case, the narrative provided is minimalistic to the point where it could be considered a framing narrative, similar to older games such as *Asteroids or Space Invaders*. The names of these games even evoke their frame narratives, and goal in a manner similar to their predecessors - "do not starve, or overcome the darkest dungeon." Within each game, the player is given mechanics, supported by random generation, that lead to emergent gameplay and experiences, and allow them to author their own narrative through their play experience. In *Don't Starve,* for example, the player must collect food and build shelter to survive the hostile environment, however, the game world and allocation of resources throughout the map are different each time the game is played, and through the player's interaction with this emergent system, a gameplay-driven narrative emerges. As time progresses, the challenges presented become greater and greater, and as the player learns the game mechanics and applies them to overcome greater and greater challenges, the value of the emergent narrative supported by game mechanics increases, with players being left to infer and create their own story of how they survived a harsh winter by eating a stash of berries they found, or escaping from the mighty Dragonfly, etc. The story of the game is formed intrinsically from the game's emergent mechanics, which create scenarios that the player must prove their competence over, and through this, the marginal value of emergent narrative that the player creates grows, a product of the story's individual value to the player who created it.

We can also consider how *Shadow of Mordor* applies this concept of competence to its gameplay and story. It creates and supports most of the mechanics

the player is given through its story, right down to the failure states within the game. As the player is fused with a wraith, they cannot truly die, thus, they are afforded the unique experience of seeing how their deaths, or failure to display competence, affects the world around them. Getting killed by nearly any enemy in the game will cause them to be promoted, becoming a named boss that players will have to work to overcome. In this way, the game presents a unique way of showing competence, by showing the consequences of the player's failure - for them; it was just another in a long line of deaths, but for the NPC who "killed" them, it was a career defining moment. If the player tries to kill the new, now named NPC, and fails, that NPC will get stronger still, and will make reference to how they killed the player before. Even when the player kills a Captain, that Captain may actually survive, and if so, upon returning, they will display signs of their brush with death, acknowledging and reminding the player of the competence they displayed in besting them. For example, if a player stabs a captain through the back - they'll be wearing a shield for defense; shoot them in the head - they will show signs of the trauma, and their skull may be held together by iron and bolts. In this way, the game acknowledges and builds off of the emergent actions players take, showcasing them in subsequent meetings with NPCs, providing a dynamic experience that feels like it grows and evolves alongside the player.

Extending from this, the player gains new abilities throughout the storyline, and *Shadow of Mordor* also supports its narrative in this way, as new abilities and upgrades to the player's weapons are provided through completion of challenges, requesting players to prove their skills and competence in order to receive them - kill enemies, complete quests, etc. with each being tied to a narrative fragment. Other abilities are provided through the storyline, which is more standard, but does a nice job of tying them into the world and making them feel grounded and natural. Their mastery, and even their mistakes, are taken into account and reflected in the world around them. This is related to the concept of *Autonomy,* which is covered below.

4.2 - Autonomy

This is a concept that is tied most intrinsically to game narratives, particularly those that lean toward the emergent side of the equation, as it concerns "the experience of volition or choice in one's decisions and actions." [11] (Rigby & Ryan, Pg. 11, 2007) *Immersyve* outlines that immersion can be fostered by maximizing what they define as "Opportunities for Action - options that the player perceives as available to them at any given moment in gameplay." In particular, they define them as being "a function of the interactive objects (NPCS, items, etc.) perceived by the player, and what meaningful choices the player can make about how to interact with them, and what goals can be

achieved/opportunities created through these interactions." [11] (Rigby & Ryan, Pg. 11, 2007) Other aspects defined by *Immersyve* as crucial, include the player's "subjective sense of personal agency" stemming from the autonomy in "deciding who they will be in the game world, and when, where, and how they take action." [11] (Rigby & Ryan, Pg. 12, 2007)

When considering gameplay, the concept of autonomy is one that comes intrinsically to games, indeed, respected designers such as Sid Meier have gone so far as to define games as "a series of interesting decisions." [1] (Alexander, 2012) The exact amount and nature of these decisions changes between games and genres, but generally holds true. If decisions are not interesting, then the game is not terribly interesting, either. What is far more challenging to consider is that the relationship between narratives and autonomy is considerably more complex, as narratives, save for *Choose Your Own Adventure books*, upon which the structure of early attempts at game narrative tended to be inspired, generally tend to be linear, non-interactive affairs. Other fields such as movies, radio dramas, and live performances, with rare exceptions, such as improvisation, rarely allow any form of audience participation. How then, can narrative apply the concepts outlined by PENS, and what can I glean from this to put towards the design of my own narrative methodology?

Many narrative games in recent years, such as *Mass Effect*, *Dragon Age*, etc. have been aiming for this kind of player autonomy in the same kind of choose-your-own-adventure format. Players are given clearly presented choices at different stages in the game, and afforded the chance to design their characters themselves, and work through a lengthy branching tree of decisions throughout the game's sequence, with different factions, karma, morality, etc. Even so, the choices in such games are still ultimately limited by the amount of effort required to author the resultant "material used to express the underlying system state to the player" - cutscenes, alternate dialogue or events, changes in available future options, and so on. All potential options must be produced by the designers, and scripted, as well as their opposites, and "the more states a system can get into, the more states that must be expressible by the system, and thus the more content that must be authored for it." [12] (Ryan, et al, Pg. 4, 2015) As a result of this design challenge, none thus far have a truly open decision making process tree, which is the aim of truly emergent narrative structures.

Working with increasingly complex autonomy trees within games, and approaching towards completely open narrative experiences becomes an increasingly difficult task, as the amount of decisions that must be designed, and "'authorial burden'

grows monotonically with a system's state space" as outlined by Ryan, et al. in their research paper *Open Design Challenges for Interactive Emergent Narrative.* [12] (Pg. 4, 2015) They elaborate that the more complex the narrative structure, and the greater the number of "State Spaces" that it can get into, the more likely that expressive authorial content will be lacking, the result of which will be that if "a system cannot express many or most of the states that its simulation yields, the latter will appear to the player much simpler than it in fact is," meaning that all the effort put into developing underlying systems will go unnoticed, and the value for players will decrease. [12] (Ryan, et al. Pg. 4, 2015) Consider the community backlash against Mass Effect's initial endings, which did not have sufficient authorial content to give credence to the multitude of decisions and systems underpinning the entire series, which spanned three games, and was founded on the concept of meaningful decisions. There was significant outcry, as players felt this rendered their decisions meaningless. Ryan's paper explains that this problem of lacking content "is best alleviated" (rather obviously) "by more content, but for games with particularly massive state spaces, it is not feasible to author by hand as much content as would be needed." [12] (Pg. 4, 2015) To this end, they propose the application of modular content as a means of expanding the base of representational content without demanding additional authorial efforts, acknowledging that there have been attempts, but presenting considerations for improvement, such as that "good content in emergent narrative should express one or few specific aspects of system state and should be as context-independent as possible, while still supporting content sequencing and recombination."[11] (Ryan, et al, Pg. 4, 2015) By allowing content to be broken down and rearranged, it allows the maximum amount of uses for a particular element. i.e., having 2 narrative blocks for an NPC - "I am sad" and "my dog is missing" are more useful in a modular system than "I am sad because my dog is missing" as the first two can be placed into far more scenarios. This is a mundane example, but illustrates a larger concept of modularity that has many applications. In *Shadow of Mordor* for example, this technique is used in designing the appearance of Captains, with each being assigned a random class, body type, and then, based on their class and body type, variable voices, weaponry, body parts, and names, allowing for hundreds of thousands of unique characters to be generated from a base of a pool of a few hundred modular components. These modular systems, while rare in game narratives, are readily employed on the gameplay side of design, in the form of modular generation for objects, mechanics, gameplay, and challenges, creating near endless variations of their core player experience. To reconsider the concepts of meta/emergent narratives and their relation to modular content, we can return to the earlier examples of *Don't Starve* and *Darkest Dungeon*. The modular nature of these games mechanics are in their random biomes, dungeons, resource allocation, etc. these systems generate a wealth of randomized challenges and events that allow for the construction of nearly

endless emergent gameplay-driven experiences, yielding a similar number of autonomy-driven player choices. In an interview with the *Darkest Dungeon's* lead designer, Tyler Sigman, he described why having a smaller base of authored narrative content was important to the emergent narrative experience they were aiming for, which could generate harsh do-or-die tales of heroics and terror centered around the exploits of players, rather than anything the designers themselves had scripted. As he explained,

"Ultimately, what we were after was kind of like these old Roguelikes, where you create your character and you go on these crazy adventures, and then you can string together this story… We wanted you to do this with the characters… The more [narrative] we were to force-feed down your throat, the less that would've happened." [14](Sigman, 2016)

It is thus, through the gameplay that emerges from randomized events that the player is able to form an emergent narrative experience, similar to *Shadow of Mordor.* However, one potential weakness to this kind of design is that while narrative may emerge from gameplay, there is very little room for "Authorial Intent," [8] (Kroon, 2016) that is to say, the amount of scripted narrative that can be included, while still relying on the gameplay-driven narrative, is rather limited. For example, if a player barely scrapes by one winter in *Don't Starve*, heralding spring by showing the character confidently heading into the new year with a big pack of supplies would be incongruous with the player's experience. However, it is also worth noting that the sheer volume of states and results an emergent system can produce makes creating scripted segments, that faithfully represent it a daunting task.

Thus, what is apparent from both *Immersyve* and Ryan's analyses is that autonomy in narratives, as in gameplay, is a crucial element for emergent narratives. Furthermore, designers must also consider and weigh the value of emergent narrative systems and system states against the need for authorial content, and what level of content can be supported. Whether this is through modular generation, reliance on gameplay to generate emergent gameplay-driven narratives, or simply judging the amount of content that will need to be produced, and limiting it, as has been the case thus far.

4.3 - Relatedness

This aspect of the self-determination model is defined by *Immersyve* as "the intrinsic desire to connect with others in a way that feels authentic and supportive." [11]

(Rigby and Ryan, Pg. 13, 2007) While they quantify that it is most commonly seen through multiplayer experiences with other human players, they note that "relatedness turns out to be important even in single player games, whenever computer generated figures interact, communicate, provide support, or even exist just to be "saved" or "conquered" by the player," [10] (Rigby and Ryan, Pg. 13, 2007) and they seek to address and define interactions that support this need, rather than breaking immersion.

In terms of narrative design, it is this latter concept that concerns us more, as the facilitation of inter-player interaction is more centered around the design of UI, chat functionality, or other inter-player systems, than narrative specifically. However, to touch briefly on the concept of player-to-player relatedness as it pertains to narratives, there are very few branching or emergently-driven narrative games that are designed to be played by two players, and attribute consequences to player actions. This is likely due to the fact that the immersion value of a story in which two players are externally debating about which actions to take would be limited, as each may have different views on how the story is unfolding, and may argue or converse about which decision is correct, or best to take, pulling both players out of the experience. Furthermore, the resultant potential for Ludonarrative Dissonance is very high, not to mention the amount of state space that would be required for a system in which not one, but two characters who could act independently would be massive. However, by its nature, having more than one player can drastically expand or alter the emergent or gameplay-driven narrative experience. Many games such as *Everquest and World of Warcraft* present a unique emergent narrative experience in this regard, with players interacting, playing together, and forming guilds within the world, or becoming legendary heroes that are known by other players, and may even branch into the official narrative of the game itself. In this way, the relatedness factor of multiplayer games actually allows their emergent player-driven narrative component to actively crossover and influence the lives of players, leading to unprecedented and unique consequences and situations. Overall, the concept of multiplayer narrative design is another research paper in itself.

Returning to the concept of authored narratives and relatedness, *Immersyve* outlines that "NPC characters can have a significant motivational impact on players through the satisfaction of relatedness needs, with specific design implications for such things as NPC scripts for interactive dialogue with players." [11] (Rigby and Ryan, Pg. 14, 2007) *Immersyve* looks at the concept of narratives being used reinforce player actions and autonomy, as discussed earlier, citing that "an important aspect of scripting is to support the player's autonomy and sense of competence whenever possible, by providing feedback that is relevant to a player's actual achievements in the game (e.g. completion of a quest or victory in a battle)." They elaborate that this can extend to

NPCs as well, as having them relate to or acknowledge player actions and autonomy, what they define as "Positive Contextual Feedback" [11] (Rigby and Ryan, Pg. 15, 2007) is one of the best ways to satisfy relatedness needs. We see this reality in a variety of games, such as the *Elder Scrolls*, *Mass effect*, etc. Characters will rattle off lines as the character passes by, based on their skills and actions. "You look like someone with a grasp of potion making; wow, it's the dragonborn; hands to yourself," and so on. All pertain to mastery skills that players may have acquired. *Shadow of Mordor* displays this element through the way in which the Captains greet the players. If the player narrowly escaped from a particular Captain in the past, they will bark "You're not getting away this time," or perhaps they killed several of their peers, prompting the captain to remark on that occurrence, etc.

4.4 - Immersion

These three concepts of Competence, Autonomy, and Relatedness tie closely into PENS three categories of player immersion, which can be applied to help determine the effectiveness of player involvement and control over a game's narrative, and help us define whether the design of the narrative structure helps satisfy player needs. These three elements are:

"Physical presence [which]... measures the extent to which the player feels that they have been physically transported into the game environment during play." [11] (Rigby and Ryan, Pg. 13, 2007) This ties most closely to the mechanical and gameplay oriented aspects of the game design, and the concept of competence. When playing within the game world, the user should feel that they are a part of the world, and have the ability to influence it. Similarly, with regards to the narrative, they should feel that their actions have a physical impact on the narrative. In games such as *Don't Starve,* for example, the player can harvest resources, or raze areas of the world, with their physical influence helping to create a record of the emergent narrative of their attempts to survive.

"Emotional presence [which] measures the extent to which the game action elicits emotion that feels authentic to the player, much like they may feel in response to real life events." [11] (Rigby and Ryan, Pg. 15, 2007) This can easily be related to narrative construction, and the level of relatedness that the designers have been successful in generating. If the NPCs in the game relate to the player in a way that feels authentic, and acknowledge the player's actions, as would be expected from real people, the player will feel more emotionally involved. This may be one of the more challenging aspects for emergent game narratives or attempts to make narrative from

gameplay, as computers have not yet reached the capacity to recognize an emotionally-driven sequence of events. This design challenge is an important one, which I seek to address through my case study of Ryan's *Open Design Challenges for Interactive Emergent Narrative*, as creating characters and narratives that truly resonate with players can be a difficult task for an accomplished writer, to say nothing of handing the task off to a computer. However, Ryan and his colleagues have some strategies to address such issues.

Finally, there is narrative presence, [which] looks at the involvement of the player in the story or narrative of the game." [11] (Rigby and Ryan, Pg. 15, 2007) This relates most closely to the concept of autonomy, and draws from the amount of impact the player feels that they have on the story. Again, this may be limited by the size of the state space, and the flexibility of the authored narrative elements, and is one of the main purposes for the design of emergent narratives - ideally, they would create a narrative around the player's actions.

In conclusion, *Immersyve's* PENS model provides designers with some core considerations to work into the design of their narrative design - gameplay and story should both instill a sense of competence in the player by allowing them to take action, and blend embedded and emergent narratives in ways beyond the traditional separated sequence that has traditionally been used by the industry, as well as allowing gameplay and story to blend wherever possible. Narratives need to support player autonomy, and must provide sufficient options for customization, and approaching problems. However, the design methodology must also anticipate the resultant states that will be generated as a result of player choices, and the underlying systems, and have a means of dealing with the exponential growth that occurs within large state trees. In order for player decisions to have real value, representational content must exist, in order to provide feedback and show the player that their autonomy has meaning. Whether this is through modular generation or trying to develop and expand the narrative out from a more basic frame through the emergent gameplay-driven narrative experience, as with games such as *Shadow of Mordor* or *Darkest Dungeon,* may vary, but is a critical aspect of a system's design. Finally, with regard to relatedness, designers need to recognize the importance of creating a narrative that acknowledges player autonomy and competence, making players feel relatedness between themselves and the NPC's within the game world. These are all considerations I take forward into my next case study.

5.0 - Design Challenges for Emergent Narratives

Another area of concern for designers is that of design challenges facing emergent narrative systems, and how they might be resolved. In order to familiarize myself with these issues, and solutions, I undertook a case study of James Owen Ryan's, Michael Mathias' and Noah Wardrip-Fruin's *Open Design Challenges for Interactive Emergent Narrative,* serves to outline challenges in designing emergent narrative systems, and offering potential solutions for their implementation. The paper asserts that emergent narrative intrinsically arises "bottom up, usually from the actions of autonomous characters within the game world," [12] (Ryan, et al. Pg. 1, 2015) a contention supported and established by examples covered, such as *Shadow of Mordor* and *Don't Starve,* wherein the player's emergent narrative experience is driven wholly by the systems and their variable states. The advantage of this, as described by the research, is that it enables the narrative systems to overcome the issue of "accommodating player actions." [11] (Ryan, et al. Pg. 1, 2015) As outlined earlier, the issue of ludonarrative dissonance is one that threatens narrative structures in game, and facilitates the value and need for emergent narratives. If players can juxtapose their autonomous gameplay actions against the story being told, then the story's believability and value is decreased, as it does not accurately reflect their choices or actions. By having the narrative emerge from gameplay, and be defined by player and NPC interactions, designers are able to intrinsically overcome this issue. Ryan et al. outline that many games and systems have been designed that attempt to address this issue, and create emergent stories, but they uphold that shortcomings persist within such systems that, until addressed, will prevent the systems from being truly successful. The focus of Ryan's paper, and its relevance, is in presenting a research framework towards development of such systems. The four main areas of focus covered were *Modular Content, Compositional Representational Strategies, Story Recognition*, and *Story Support.*

5.1 - Modular Content

Ryan defines the value of modular content in relation to defining the increasingly large state-spaces that emergent narrative systems generate, and the larger concern of the "expressive content" that allows the system to represent and display the system state and its complexity to the player. Because emergent narratives intrinsically have massive state spaces, Ryan, et al. thus outline that there is little hope that authored content could ever provide enough content to effectively express even a portion of the

possible narrative state space. [12] (Ryan, et al. Pg. 4, 2015) Therefore, they describe some potential directions for resolving this conflict. They outline that any system designed be such that "a human should be able to produce many units of content that each express specific aspects of underlying state" and that "these units of content should be largely independent of one another, but in a way that still affords sequencing and recombination." [12] (Ryan, et al. Pg. 4, 2015) The two main takeaways they present are that:

"[G]ood content in emergent narrative should express… few specific aspects of system state and should be as context-independent as possible… This way, small units that each express individual things may be flexibly recombined into larger content units that express all those things simultaneously. Moreover, by being sequenceable, content units may be used in a coordinated way that affords emergent linear experiences (e.g., by having units reference earlier ones). Content should also be explicitly marked up for what it expresses about underlying state. When this is done, a system may be able to reason about its current state at any time in order to select content (or recombine content into a larger unit) that expresses that state." [12] (Ryan, et al. Pg. 5, 2015)

In this way, modular content can be linked to other elements, and used freely and also sequentially to show the underlying systems memory and awareness of player action, making the complexity and value of the system apparent to the player. This ability for a system to combine and apply pieces of modular content to express system states is further explored in the next challenge, "compositional representational strategies."

5.2 - Compositional Representational Strategies

It is understood that modular content's purpose is to create a means with which to express underlying systems states. However, narrative systems with more than a rudimentary level of emergence, or that need to represent the results of more than one central defining plot feature at a time require modular content that can be repurposed and combined to express a variety of different states. One comparison between these two ideals might be *Choose Your Own Adventure* books versus traditional role playing games like *Dungeons and Dragons*. The former has finite, singular narrative scenarios that cannot be combined, and form many different linear paths, while the other is constructed of countless modular pieces that can be repurposed, recombined and reused to express theoretically infinite states. By providing a system with "content units" which can be deployed together in composition in order to "collectively express all active simulation primitives and procedures," [11] (Ryan, et al. Pg. 5, 2015) designers will be

able to produce a system with an ability to express states far beyond those that would otherwise be possible in a game that is based around branching paths. For example, *60 seconds!* This game features a very rudimentary emergent narrative system, wherein players lead a nuclear family through the nuclear apocalypse, and are shown a state space in the form of a fallout shelter with the family inside. Each of the family members is an individual modular element with a variety of expressive states: sick, crazy, mutated etc. The surrounding environment of the fallout shelter is also made up of state spaces - whether they have certain items, whether there are holes in it, or rats, and so on. Each of these states is independent, and the narrative that plays out is both dependent upon the system state, and leads to changes in the underlying system and subsequent expressive values. As a result, each of the individual modules can change independently, compositionally displaying a wide variety of compositional system states. This is but a small-scale example of the potential that compositional representation allows for emergent narratives.

5.3 - Story Recognition

The third challenge presented by the research, story recognition, concerns the need for an emergent narrative system to be able to recognize the stories it generates for itself. Much like the role of the dungeon master in a tabletop RPG, the program needs to be able to use modular content to assemble stories, and recognize when it has come across what humans would recognize and value as a story. Ryan, et al. acknowledge fully that, at the time of writing, "systems whose narratives emerge from simulations currently have no way of discerning the very stories they support," [12] (Ryan, et al. Pg. 6, 2015) and that, even in the case of games like *Dwarf Fortress*, which are lauded for the stories they generate, the story creation actually comes down to players' interpretation of "remarkable event sequences among a huge boiling stew of things happening." [12] (Ryan, et al. Pg. 7, 2015) The majority of "emergent" narrative systems today still depend upon human pattern recognition and understanding of narratives to have their players do the work for them, and interpret the events of their own emergent gameplay experience as a story. In *Shadow of Mordor*, for example, if a player is killed by an Uruk, who is then promoted and rises through the ranks only to have a huge confrontation with the player later on - and return from death several times before finally being converted to the player's' side - the player might construe a narrative of an early rival who rose to greatness and proved to be a worthy opponent before finally acquiescing to the players will and acknowledging their superiority. But the system had no knowledge of this narrative that unfolded, and did nothing to encourage it. The system merely ran its underlying calculations and algorithms, and fed the player the data that came up. It had no knowledge of the recognizable narrative structuring it

inadvertently generated.

So how can designers approach this issue? Ryan relates this challenge to what is referred to as "Story Understanding... in which a system processes an event sequence and attempts to understand the story it represents by attributing explanations to the events that account for causal and temporal relations among them." [12] (Ryan, et al. Pg. 7, 2015) Ryan outlines this as a task that is "preliminary" to allowing a system to isolate and identify a story, and offers several potential ways that a system could seek to understand and recognize stories as they occur. "One approach would be to assume that the trace of player actions in a system playthrough will typically represent a story like sequence, since it may be expected that players will tend to interact with the story world in interesting or meaningful ways." [12] (Ryan, et al. Pg. 5, 2015) Essentially, drawing from the player's interactions to give the system indication of the direction they are seeking to go. If, for example, a player kills all the NPCs they create, the game will recognize that they are acting evil and start constructing the story such that they are given towns to raid, and heroes trying to stop them, etc. If, on the other hand, they refuse to fight enemies, or seek peaceful discourse, then the game will model more experiences that involve diplomacy, or potentially give them the chance to establish peace. This particular approach to story understanding is particularly relevant to the design philosophy I am aiming towards, as it provides the player with a narrative structure that attempts to build narratives reflecting and supporting their actions, and shows that the player's actions have a tangible, driving effect on the game world, accommodating them just as a human game master aims to, while still applying the underlying concepts of emergent design to create greater variety of potential narratives, and avoid running into the aforementioned issue with non-emergent games, wherein a player has to be told that they are "wrong" in the way they are approaching the narrative.

5.4 - Story Support

The fourth and final challenge is outlined as "Story Support" which concerns what happens beyond a system's ability to understand and recognize stories. Ryan, et al. ask the question, "Once a system has recognized a story like event sequence that has emerged from its simulation, what should it do with it?" [12] (Ryan, et al. Pg. 8, 2015) That is to say, once a system has planned out what will happen next, how does it present that story to the player? The article outlines potential for displaying events or reiterating them through NPCS, tying back to Immersyve's concepts of autonomy and relatability, which suggested such avenues as NPC acknowledgement of player action as a means of story communication and acknowledgement of player action. Ryan, et al.

suggest a more active approach, insofar that "a system could recognize partial event sequences as they are happening in order to influence the simulation or gameplay in a way that would support the emergence of interesting stories (i.e. interesting completions of those partial event sequences)" with this serving as their definition of what story support is. [12] (Ryan, et al. Pg. 8, 2015) They note that this is similar to concepts such as a GM in tabletop role playing games, or the concept of a experience manager, but less explicit in its actions, not serving to "compromise" the player's narrative, "but rather gently nudge it toward the emergence of certain desirable event sequences. In other words, story support is not about enforcing some degree of narrativity on the simulation, but rather subtly manipulating it to facilitate and foreground emergent stories."

As an example of how to achieve this, they draw attention to the *Sims*, which sought to identify:

"Event sequences by which certain fears or aspirations may be realized. As gameplay proceeds, the system parses its event stream to check for partial completions of the sequences specified in characters' trees, and if a match is found, the system may nudge the simulation toward the event that would lead to that sequence's completion. Once a given sequence culminates, the system triggers content that will showcase the story it represents." [12] (Ryan, et al. Pg. 9, 2015)

This design consideration ties into concepts outlined by Riedl and Bulitko, relating to the challenge of designing authoring systems for interactive or emergent narratives, where they outline the central challenge as being "how to balance the need for a coherent story progression with user agency, which are often at odds." [10] (Pg. 3, 2013) Part of their proposed solution is the experience manager concept that has been previously mentioned, and which I will be seeking to apply in my own methodology. They explain that "An experience manager drives the narrative forward by intervening in the fictional world, typically by directing computer-controlled characters (called non-player characters (NPCs)) in how to respond to the user's actions… An experience manager must generally look ahead into possible futures of the user's experience to determine the best intervention, if any, to bring about a structurally coherent experience," [10] (Riedl and Bulitko, Pg. 3, 2013) by being able to "evaluate the global structure of possible player experiences in a way that cannot be achieved by looking at any single world state in isolation. Armed with this knowledge, the experience manager must reason about the effects of its interventions in the virtual world to bring about the desired narrative experience." [10] (Riedl and Bulitko, Pg. 3, 2013) This concept of an experience manager's need to be able to look forward into the future and map out

possible directions and paths towards its defined narrative goals is an important design consideration, and one that I will be taking forwards into my own methodology.

In conclusion, the framework of design challenges proposed by Ryan, Mathias and Fruin proposes a number of important design considerations and solutions that I have sought to draw from in order to inform my own design methodology, and considerations and allowances that should be made by designers on their own behalf, in order to lead to the creation of a system that is capable of minimizing the amount of individually authored content required through the creation and implementation of modular content; able to deploy and rearrange content in order to produce a variety of scenarios; make the best use of each piece of "descriptive narrative content" provided for its application; able to understand, design, and recognize its own stories, and those generated by the player's actions in order to actively design emergent narrative paths; able to purposefully drive towards those ends, planning out ways to achieve its end goals; and make them apparent to players through more than just coincidence stemming from underlying systems.

6.0 - The Allowance and Effect of Authorial Intent in Emergent Narrative Systems.

When discussing the design of emergent narrative systems for games, and the ability and methodology behind these systems, it is important to consider how emergent narrative systems in games such as *Shadow of Mordor* can work or exist in harmony with "authorial narrative content," and or how the one can bolster the other. We have already discussed the nature of emergence within these games, but what of the existing predesigned narratives that exist, and are independent of the "Emergent" narrative that arises from player action and agency? As covered in the paper by Ryan, et al. an important takeaway from both story understanding and support concerns the ability for a narrative system to draw from the player's actions, both past and present, and apply them towards shaping the narrative experience. In order to better understand how systems have sought to achieve these concepts already, I have undertaken a small case study of a thesis paper on the topic of "embedded and emergent narratives."

In his thesis paper for Utrecht University, Jesse Kroon discussed these two overarching forms of narrative found within games, with specific focus given to how they were represented in *Shadow of Mordor's* Nemesis System. "Embedded narrative" was defined as any narrative found within the game world, from the storyline, to the characters, to the design of the environment and locations that the player walks

through. He draws from Salen and Zimmerman's definition, that embedded narrative is "pre-generated narrative content that exists prior to the player's interaction with the game." [8] (Kroon, Pg. 12, 2016) "Emergent" narrative, on the other hand, is described as "the experiential narrative, constructed by the player as they play the game." [8] (Kroon, Pg. 2, 2016) He draws from a concept, termed by Calleja, as "alterbiography" or "experiential," narrative, being defined as: "the here and now interactions with the game environment that generate story through the player's interpretation of events occurring within the game environment, their interaction with the game rules, human and AI entities and objects." [3] (Calleja, Pg. 1, 2009)

However, this leaves the question, if emergent narrative offers the potential for narratives that are driven by player agency, is it possible to retain and maintain the designer's narrative intent within an emergent narrative system without compromising the player's emergent experience, and if so, what amount of narrative can be included before the value of the emergence is lost? Within *Shadow of Mordor*, the designers described that they had to set aside their own desire to tell a grand story in order to give more focus to the player's actions. However, there is still an overarching narrative at play within *Shadow of Mordor*, even if it is typically glossed over in favor of the emergent narrative experience. I would make the argument that this is a sliding scale, which can really be left off anywhere between 1-100%, but that it is worth noting that the value of an emergent narrative system will lessen if players are realize their actions are having little impact on the overall experience, and it is important to consider this when designing this balance. For example, if the player is able to meet a lot of emergent characters, but only some pre-authored characters placed by the designers have any real narrative meaning, then the value of the player's interaction with those character's is cheapened. It ties into concepts of relatedness and, as we will see in the next case study, the player's mental model. If the disconnect between the parts of the game that are emergent or not becomes apparent, as was common in *Shadow of Mordor*, wherein you had to break away from the emergent overworld to go through a bunch of missions tied into the routine storyline, then that experience is cheapened, as your actions outside of the missions lose value. However, *Shadow of Mordor* does also seek to circumvent this issue, as you can place mind-controlled Orc Captains as plants among the armies of those you have yet to take down, thus providing an example of how value can be given to emergent actions, albeit a fairly simplistic manner.

Kroon gives his opinion that *Shadow of Mordor* is able to show an early example of an attempt to hybridize both emergent and authored narrative pertaining to the play experience and mastery. Kroon outlines how the game's embedded narrative, is actually dependent upon the player's emergent actions: which Captains the player kills

or turns to their side will impact the story, as they will appear within cutscenes and some of the game's final confrontations. Kroon elaborates and argues that:

"In this way, the game challenges the framework of hierarchical association flowing from embedded to emergent narrative, and proposes an alternative structure. The marriage of an embedded narrative framework with an emergent narrative journey makes this game a compelling example of how players can be given a truly active role in generating the story of a game." [8] (Kroon, Pg. 30, 2016)

The way that this plays off of the player's actions is that their experience with emergent narrative-generation through their failures and successes "does not exist in a vacuum, it is also an essential part of the overarching storyline of *Shadow of Mordor*. The narrative they experience is not merely unique in their minds, but reflects a unique instance of the game itself." In this way, the nature of the individual's gameplay choices informs the narrative, and vice-versa. [8] (Kroon, Pg. 30, 2016) This is a simple cause-and effect relationship that shows us but a small example of the design potential that exists with the possibility of a more integrated, constant narrative

Having considered the value of linear narrative in relation to emergent narratives, I now move on to explore the related issue of how to design meaningful narratives through an experience manager's modular design principles. The following case study, which I conducted on frictional games' Four-Layers Approach, draws some conclusions based on their approach to narrative design which are applied in an attempt to address this issue, and provide potential solutions.

7.0 - Design Methodologies - Frictional Games Four-Layers Approach

When considering how an emergent narrative system will be able to author its own stories, and have understanding of them, it's important to consider some existing rhetoric, and the lessons that can be derived from it. To this end, I undertook the following case study of the Four-Layers Approach*, designed by *Frictional Games,* developers of the acclaimed *Amnesia* series of narrative horror games, which focuses on how to make narrative from gameplay, and presents numerous considerations that can be applied to the design of modules for emergent narrative design, and/or design goals to have an experience manager account for.

The first important point of consideration when exploring this approach is to

understand *Frictional's* outlook on what narrative is within games. Their definition draws and combines both Salen and Zimmerman's concept of embedded narrative, and Calleja's concept of alterbiography narrative, choosing to combine both into an overarching concept of narrative as being "what happens as you play the game over a longer period. It is basically the totality of the experience; something that happens when all elements are taken together: gameplay, dialog, notes, setting, graphics etc.; the player's subjective journey through the game." [7] (Frictional Games, 2014) This definition is considerably more open than many other definitions which would seek to separate narrative and mechanical or gameplay structures, but is well suited as a source for the design of more immersive and emergent narratives systems, as it gives credence to player action, narrative design, and mechanical design within a game, and seeks to view each as part of the overall narrative experience received by the player.

Frictional argues that "almost all game design takes place on the lower levels of design, mechanics and tactics, and narrative mostly comes out as a by-product," and that in order to create better stories for games, "as least as much focus to the narrative layer as to the other two layers, mechanics and tactics" while also quantifying that "having a symbiosis between all of layers is a core element of what makes video games special." and that, "[i]f we want proper interactive story, we need to preserve this." [7] (Frictional Games, 2014)

The components that the methodology upholds as being a core part of games with focus on narrative were: "The focus be on storytelling - that is, the main goal of the game should be for the player to experience a specific story; The bulk of the gameplay time is spent playing - players should spend the bulk of the time playing, rather than reading notes, watching cutscenes, etc.; Interactions should make sense, move the story forwards, be coherent with the narrative, etc." [7] (Frictional Games, 2014) That is they should avoid falling into the concept of ludonarrative dissonance discussed earlier. "There should be no repetition - this leads to noticing patterns, which leads to players seeking to optimize them, drawing focus off the narrative; and finally, there are no major progression blocks - challenge is good, but if the goal is to tell a story, players shouldn't be expected to spend too long on any one puzzle or challenge, as this will likewise detract from the focus on the story." [7] (Frictional Games, 2014)

The Four-Layers Approach itself maintains a unique view of narrative or game progression structuring, which is that the narrative should "broken into 'scenes' with each being a separate puzzle, encounter, etc." [7] (Frictional Games, 2014) The system as a whole is focused more on the creation of linear, narrative driven experiences, rather than emergent systems, and can be taken as disparate to the concept of more

open emergent narratives, such as seen in games like *Shadow of Mordor*, which offer large open-ended, non-linear play spaces in which to generate emergent encounters and play events. The Four-Layers Approach, instead, prioritizes that - "instead of having the gameplay describe the player's overall experience of the game, the narrative will provide this structure." [7] (Frictional Games, 2014) However, the central concepts still offer considerably important ideas and concepts for the field of emergent narrative design, which I will be exploring below.

The four layers in question are those of Gameplay, Narrative Goal, Narrative Background, and Mental Modelling. As with PENS model, I will be assessing each layer in its context, and then addressing how its lessons can be taken and applied from its traditional context of more linear narrative design, and adapted to the design of emergent narrative systems.

7.1 - Gameplay

This layer concerns the idea that all narrative designs that are envisioned be considered from the start of gameplay development, to avoid issues that may emerge from the gameplay failing to fit the story. Again, this is an important consideration that ties back to ludonarrative dissonance, and ensuring consistency between both aspects of design. The model provides four rules that can be used to enforce the gameplay layer of design.

7.1.1 - Coherency

Simply put, gameplay needs to match the story and world it's taking place in, "There should be no need for double-thinking when performing an action; it should fit with what has been laid out by the narrative." [7] (Frictional Games, 2014) Applying this to emergent narrative systems is similar, but extends to the system's design.

In applying this to emergent narrative systems, and modular design, we can draw the lesson that - An emergent narrative system should not be able to create scenarios that reach outside of the context that the game occurs in, and should have methodology in place to avoid creating events or plotlines that are non-sequiturs of previous events. In their article, *Interactive Narrative, an Intelligent Systems Approach*, Riedl and Bulitko discuss the application of an "experience manager" to mediate the progression of emergent or multi-path narratives, in a similar vein to the story recognition proposal made by Ryan, et al. [7] (Frictional Games, 2014) An emergent narrative system should ensure that the stories it creates give credence to past player actions, and that future actions fit that narrative. Drawing from Ryan's paper once again, the concept that player actions can help to inform the narratives the game seeks to generate comes up, as they

describe that "Since it may be expected that players will tend to interact with the story-world in interesting or meaningful ways… a system attempts to infer a player's goals (and plans) from her playing behavior. This is often done as part of a player adaptation scheme, wherein a system dynamically adapts gameplay to improve player satisfaction." [12] (Ryan, et al. Pg. 8, 2015)*)* In this way, we can quantify that an emergent system should be able to gain some knowledge of a player's habits, in order to produce a story and gameplay that is coherent and targeted towards them, so that they do not have to second guess their actions based on the information provided.

7.1.2 - Streamlining

Holds, rather self-evidently, that "it is important that the gameplay is not too convoluted and doesn't have too many steps." [7] (Frictional Games, 2014) Frictional's reasoning for this is similar to what was covered earlier in this analysis, with regards to early narrative driven games such as *King's Quest*. If players lose their way, or become frustrated by poor puzzle or game design, and are unable to progress the story, they will lose interest in the narrative, and become disillusioned. Frictional elaborates that this is due to the fact that "When the player is stuck for longer periods they focus on the mechanics or tactics for gameplay… [and] If the steps required for any moment are too complicated, it's very easy to lose immersion and to lose track of the goal." [7] (Frictional Games, 2014)

Within the design of emergent narrative systems, this principle of streamlining can help support the design of modular events within the game. One takeaway is that no particular modular element should be overly complex to navigate or apply, and that whatever experience management is applied should seek to weed out overly complex or unfair modular strings of gameplay-centered events which could interrupt or fracture gameplay.

7.1.3 - A Sense of Accomplishment

Frictional acknowledges that "this sort of thing is normally built into the core gameplay, but might not be as straightforward in a narrative-focused game." They suggest a variety of different methods that can be applied to make a player feel agency within the narrative system, including "grind, difficult story choice, sequence breaks, plot understanding" etc. with the intent of helping to avoid what they call "press button to progress gameplay." [7] (Frictional Games, 2014)

Interestingly, within games such as *Don't Starve* or *FTL*, where Calleja's previously mentioned concept of alterbiography is in play, and the core narrative is

made from the gameplay, and the player's moment-to-moment decisions and triumphs or failures, each moment of gameplay or emergent "alterbiography" narrative is made up of micro-accomplishments, individual modular elements that blend together to create unique challenges and narrative scenarios constructed of modular elements. In *FTL*, for example, you may meet a space pirate (one element) armed with a rocket launcher and railgun (two more unique elements) within a dust storm (another element). Thus, when considering how to apply these to gameplay design for an emergent narrative system, each modular element or piece of narrative should have its own "solution" and sense of accomplishment tied to it. Meanwhile, in *Don't Starve*, the collection of resources and overall survival in the modular world and emerging alterbiography involves the player engaging in dozens of micro-accomplishments - fishing, setting traps for rabbits, chopping down trees, burning areas of forest to create charcoal or make room for farms, befriending pigmen, clearing a spider nest, etc. and each requires specific but simple strategy to complete. A player can plant trees in a pattern to make cutting easier, or gather pigs to help them fight the spiders, and so on, and with each completed task the player's alterbiography grows, as does their sense of accomplishment. Based on the success of these examples, I would then propose that the design of modular elements in emergent narrative systems should support this design mantra of micro-accomplishments, with each module having a self-contained challenge and subsequent accomplishment to be completed, designed in such a way that multiple micro-accomplishments can be combined to form unique situations for the player to tackle.

7.1.4 - Action Confirmation

Referring to a player being able to understand what they are doing, and why, so that they seek the narrative purpose, rather than the mechanical purpose of their action, as if the player is forced to often to consider the latter - they may start "optimizing their thinking and stop reasoning about their actions. This then leads to an experience where the player feels as if they are just pulled along," i.e. if the player is given a room with a bunch of levers, but they are poorly explained, then they may start pulling them at random, perhaps opening a path for some reason they do not fully comprehend, and thereafter, make the connotation that levers equal progress, as opposed to a simpler or more thoroughly explained scenario, such as getting keys to free a prisoner, wherein they understand their narrative direction, and can clearly understand their part in it.

When considering how this relates to the design of emergent narrative systems, I propose that the design of emergent modular elements should be such that the purpose of any one element in an emergent narrative system can be easily understood by the

player, but also such that those elements connect effectively to one another and frame their purpose within the narrative, and a variety of possible purposes. One example element that could appear in such a system might be a barrel of explosives with a fuse. Intrinsically, the player understands that, if they have access to a piece of modular content that provides fire, they can light the fuse, and detonate the barrel. The barrel has a clear purpose that is understood, however, the system then needs to ensure that the barrel is coupled with an element that reinforces its purpose in the story. This could be one of several, depending upon the situation. For example, if the player is currently trying to make their way out of a cavern, they might reach a rock wall with a TNT barrel near it; in this case, they understand that the purpose of the barrel is to blow themselves an escape route out of the cave. Another scenario might be that they need a distraction to sneak into an Orc camp, and there is a TNT barrel a small distance outside; in this case, they understand that the barrel's purpose is to make a loud noise to draw attention while they sneak away and into the enemy camp. A final scenario might be that the player is standing at the top of a staircase, with a barrel next to them, and enemies are chasing them up the stairs; thus, the player would actually have two possible courses of action: throw the barrel down to trip up the approaching enemies, or light it first, possibly killing as well as tripping them up. In this way, one modular element fulfills multiple easily understood and narratively supported courses of action, giving a generation system a wide variety of potential applications for it.

To conclude the gameplay section of their design philosophy, Frictional outlines the application of these four concepts in the design of what they call a "room" referring to a single narrative beat in the game, a single puzzle or experience in the larger linear story.

When applying these four gameplay concepts to emergent narrative design, we may consider their applications towards the design of individual modular items or elements (beats) within the system, and consider that beats should be applied by the "experience manager," (or other similar systems) in such a manner as makes sense in the story, relying on knowledge of prior player actions and the kind of story the player is aiming towards. Each beat should also be sufficiently simple on its own, such that the player can easily understand it independently, and as covered in *Open Design Challenges'* section on "compositional representational strategies" it may be deployed alongside and in combination with other beats, in order to create a greater variety of content. The system being designed should also be able to recognize the outcomes of combinations of beats, and judge if there is too great or convoluted a challenge being presented, as a result of its own generation method. Beats should provide players with a sense of accomplishment, with each having a related challenge to overcome. As with

the generation of content, the challenges contained within beats should be easily combinable with one another, in order to allow diversification of challenges and scenarios for players to accomplish. Finally, beats should be designed and presented in such a way that their purpose is immediately apparent to the player, but also in a way that supports recombination and a variety of narrative purposes, as outlined with the barrel of TNT. By following these takeaways from Frictional's gameplay design model, as they apply to emergent narrative design, designers can more effectively design modules that can be applied and recombined to produce a wide range of gameplay for emergent narrative systems, while ensuring that the narrative purpose of the object is clearly communicated.

7.2 - Narrative Goal

The second layer outlined is that of "Narrative Goal," which speaks more to the overarching narrative of the game in question. Frictional outlines the need for the narrative goal to extend into each gameplay segment, as they elaborate, that typically, players can lose sight of long-term narrative goals, and as a result, lose interest in the unfolding narrative and related gameplay, viewing them more as obstacles in the way of the goal, than incremental and important steps towards it. Frictional outlines that the best way around this is to establish "short-term narrative goals, which are directly connected to the current gameplay," in order to keep the two synonymous, and "keep the narrative goal in sight, such that It is no longer about 'doing stuff to get the story going,' instead it is about 'doing stuff because of the story.'" [7] (Frictional Games, 2014)

This design consideration is also particularly relevant in relation to emergent narratives, as the long-term goal may not have yet been determined by the game algorithms, or else, the player may not be aware of it until later in the game, and thus, the story generation incorporated, needs to be able to engage the player in the short term, and help keep them invested in moving forward and toward the conclusion. An important consideration for emergent narrative systems left responsible for modeling short-term goals is how they fit into the larger story structure, or what has currently been planned out for it, and how to preserve the "authorial intent" of the story while still affording the generation of emergent challenges/beats in the story, and a level of player freedom. In his paper "Incorporating Authorial Intent into Generative Narrative Systems," Riedl addresses this challenge through a system defined as "Author Goals" which have the dual purpose of "constrain[ing] the narrative search space such that it is impossible for a planner to produce a narrative that does not meet certain [designer defined] criteria" and that such criteria "can be used to force complexity in narrative generation." [9] (Riedl, Pg. 2, 2009) The existence of such goals is important for

short-term engagement, but through their application as part of an overarching narrative structure, games like *Bioshock* have also made long-term meaning out of their short-term narrative goals. The now famous "would you kindly" line being used to tie the players underlying motivations together and show the deeper meaning behind their actions, for example, or in *Dragon Age*, how the results of small, short-term player choices are all recapped at the end. However, due to the aforementioned complexity of having emergent narrative systems, the application of such sequencing or temporal relation between beats remains largely theoretical at this point in time. A potential solution that I would consider, would be to have the system plan backwards from a goal, in order to form a narrative chain of events that leads the player towards what is currently projected to be the end goal based on the results of "Story support," as defined earlier by Ryan, et al. in *Design Challenges for Emergent Narrative Systems.* If the experience manager knows where the player could end up, and the kinds of resources it has available, in the context of the world, to generate short term goals, it may be able to build a narrative path to nudge the player towards. If they reject or move away from this path, it will then adjust its narrative goal, and attempt to extend a new plot thread and short term goal to the player, in order to nudge them towards the story.

As an example, let's consider a scenario wherein the player, in their travels, has come across a farm. (Modules denoted as *module.*) The experience manager knows that this area of *farmlands* is infected with the narrative module *Black Crop Rot.* However, this *farm* module has been flagged as *uncorrupted.* The experience manager knows that, in order to solve the issue of the *black crop rot,* which is a minor one, the player must first be given a short term goal of finding a clue about its source, which will lead to them having the short term goal of finding the source of the black crop rot. Once the author goals, of finding a clue about, and then discovering the source of the contagion, have been resolved, then they will be allowed to confront and defeat that source, resolving the plot thread. As the player moves in to investigate, the experience manager generates two NPCs that exist at the farm. They are an *elderly* *farmer* and his *young adult* *daughter*. The manager sees that the value of an uncorrupted farm is different from the surroundings, and notes it as a point of interest. It then assigns values to the NPCs, they *live alone* and *are being threatened by* *a greedy sheriff*. At this point, the NPCs provide this narrative hook to the player, providing them with a short-term objective of *protecting them* from *the sheriff* which will lead to the castle where one potential source of the black crop rot, *evil King* lives. This, theoretically, would be just one of many potential sources that could be flagged as potentially causing the blight. But suppose that the player does not display interest, and leaves. The system then looks for another short-term hook, and finds another one related to the farm. *The daughter* tells the player *they should* *stay the night* *for their own protection* *from

wolves*. If the player refuses again, then the *farm* is dropped, and the manager begins looking for another possible hook in the next part of the story. If the player agrees, then the director would generate another thread. An example might be that *the basement* *of the farm* *houses a* *cult* *which the farmer and his daughter* *are leading* *summoning demons* *that have caused* *the Black Rot.* In this way, the experience manager seeks to generate short term goals from a library of narrative modules that it pieces together based on the current location and known factors about it.

7.3 - Narrative Background

The third layer defined by Frictional applies to the effect that the player perceives their actions as having within the game world, and how they allow background elements to change this perception of their actions beyond the previous dimension of the Narrative goal, making it apparent to the player that their "actions are no longer just a means to an end, they are what causes the story to emerge as you play." [7] (Frictional Games, 2014) Frictional offers the inclusion of elements such as "story fragments" - embedded hints or elements that present history as to what has been happening, or give background context - Frictional also holds that these should go beyond the simple diary entries or audio logs that are typically seen, and indeed, many games display examples of how modular elements can be used to generate story fragments that can be applied to the game world. As an example, *Don't Starve* has numerous pre-seeded "set-pieces" that can be found in the world, serving as their own story fragment, or implying something took place. For instance, players can find abandoned camps or stockpiles of food or items with human bones lying on the ground nearby, implying that other unfortunate adventurers have met the fate that the player is trying to avoid. Another element outlined by Frictional is that of complementary dialogue, which is a running, active narrative or indication of what is going on for the player as they play. Emergent systems typically cannot effectively manage voice acted complementary dialogue, as the number of situations is likely too large for spoken lines to cover, but games like *Don't Starve* and *Dwarf Fortress* get by through having the characters narrate their actions and providing detailed modularly created, written descriptions explaining the appearance/history/mood of NPCs and/or Objects, respectively. Finally, Frictional outlines the potential application of emotionally significant objects within design of narrative systems. Extending from the concepts of story fragments or complementary dialogue, this concept involves giving otherwise mundane items some means of tying into the greater world at large, and assigning them some form of unique nature, or backstory, with their example being that "There is a huge difference in finding 'standard knife A' and 'the murder weapon from a hideous crime'" [7] (Frictional Games,

2014)

These considerations and design choices, as outlined by Frictional, and other designers such as Ryan and Riedl, lead me to propose the following principles for the design of emergent narrative systems and modular content, with regards to assisting in world-building:

1. An experience manager should understand the context of the world it exists in, and what is the norm in terms of physical laws, precursory narrative, history, etc. and apply these rules towards the creation of set pieces, or other story fragments if applicable.

1. Players should be encouraged to interact with modules in order to unearth the story related to them, and the experience manager should be able to assemble these descriptions based on knowledge about the world and story. If the player is exploring ancient ruins, for example, the Director may search for "ancient" modules, settling on a civilization to pull from, hypothetically, *"the Bebenese, a people that were known for their peaceful nature, and love of nature, as well as skill in magical healing."* Thus, the modules would be assigned traits reflecting this branch of world-establishment. There might be healing power to be unearthed, or murals of natural scenes, etc.

1. Modules within the game should have some way of being assigned individual significance in the context of the greater experience. Whether this is through descriptions or implicit world-building aspects attached to modular elements, e.g. *Dwarf Fortress*, or through how the modular system opts to arrange elements - such as in *Don't Starve*, where modular pieces are arranged into set-pieces, albeit by the designers in this case. For example, if the narrative system is currently planning a path in which the likely sequence of events is that the player is going towards the city of Bertina, and will come across a band of thieves, who have a rose as their insignia and deal in deadly poisons, it might use modular knowledge to alter the knife's description to be something along the lines of *a dagger* *it has* *a rose* *on its* *handle* and *it is poisoned* Thus, creating a description from a number of generic descriptors that could be applied to designing a wide variety of weapons and objects, all with significance determined by the story's needs and current path.

7.4 - Mental Modelling

This final layer relates to the player's perception and reception of the game

experience, and pays particular attention to the role that underlying game systems and mechanics have in coloring the player's understanding of the world, and relates to concepts covered earlier in Kroon and Calleja's analyses, such as alterbiography and embedded and emergent narratives. The important points that Frictional's mental modelling analysis stresses pertain to how the player may or may not notice underlying systems and the effect this has on the player's perception, how the player can construct narratives in their mind, and how these factors affect the input-output loop of player perception. [7] (Frictional Games, 2014)

With regards to underlying systems, Frictional's model outlines the fact that a player's perception is typically not concerned primarily with gameplay mechanics, and, in fact, only really notices the gameplay systems "if they do something wrong or when they directly contradict their mental model." [7] (Frictional Games, 2014) A particular example given of just how a gameplay system could betray a mental model is in the case of human enemies that cannot jump. [7] (Frictional Games, 2014) Everything the player knows about humans in their mental model will lead them to assume that they can jump. If, however, the player jumps over a fence, and the enemies haplessly ram against it, unable to pursue, then the player's mental model of the game world is updated.[7] (Frictional Games, 2014) However, the more important aspect that Frictional points out is that, this kind of dissonance between the existing mental model and the game's underlying systems, once revealed, "can have devastating effect on a narrative-focused game," [7] (Frictional Games, 2014) shattering the player's suspension of disbelief, and breaking their sense of "relatedness" towards characters that may seem far less believable.

I would propose that, when considering this concept in emergent narratives, the issue ties into Ryan, et al's. concept of "expressive authorial content" [12] (Ryan, et al, Pg. 4, 2015) issue. The concern posited was that, without appropriate content to represent and communicate system states in an emergent narrative system, the user would be unaware of the complexity of the system that had been designed. However, the same logic can be applied here to the issue of lacking system behaviors, or representational content to express what is expected in the player's mental model, or that content is incorrectly applied in the context of the world, causing a break in the player's suspension of disbelief, as their mental model incorporates new illogical, but relevant knowledge - enemies can't jump - there is a pattern to the spawn rate for this particular event, or it will only occur under specific circumstances, etc. How then, can one design modular content that will not lead to breaks in the player's mental model, or an experience manager which will attempt to curb these issues, and seek to deliver a more consistent player experience? I would propose a starting point through application

of self-determination theory, and the concept of relatedness for such systems, and having the experience manager prioritize, applying features to characters to make them believable, where possible, i.e. grant humanoids the ability to jump, grant all NPCs the player can speak with the logic to reference player choices, and so on. In addition, the experience manager should avoid combining modules that create incompatible clashes in system logic – do not place jumpable modules near enemies without the ability to jump, etc.

As covered earlier in Ryan's analysis, and concepts such as Calleja's alterbiography, the construction of narrative significance within the player's mind has long been an accepted occurrence even within emergent systems which are not focused towards narratives, such as *Dwarf Fortress.* Frictional outlines how, even in non-emergent, linearly-focused games, a player will develop this same sense of significance through their mental modelling of the situation they find themselves in. Frictional defines the relationship between narratives and mental modelling as such that "The mental model and the narrative lie on the same level… if we can get them to work together, then what we have is the purest form of playable story where all your gameplay choices are made inside the narrative space." [7] (Frictional Games, 2014) This leads to the conclusion that such considerations of player perception of narrative structure within emergent systems may be as important as the design of the narrative itself, in terms of defining its interpretation and value to the player as a story. If the player perceives a less explicitly framed narrative as being a structured narrative, this has an equal or greater amount of value to a narrative that has been more explicitly designed, but limits player interpretation and potentially breaks their mental model.

In closing, Frictional Games' Four-Layers Approach provides a unique and intriguing perspective into the logic and design strategies that human designers can apply in order to develop gameplay and player agency that is dependent upon and derives from narrative design. In doing so, they provide lessons that can be taken toward the design of experience managers for emergent narrative systems, with relation to how the designer should prioritize aspects of module design, Gameplay, development of both long and short term goals, the importance of educating the manager on the world it inhabits, and taking player interpretation into account. These points will be covered further in the next, and final, section of this paper, wherein I propose my own design methodology and approach to emergent narrative design, founded upon the research and case studies I have conducted.

8.0 - A New Narrative Design Methodology for Emergent Narrative Systems - 3 Pillars of Emergence - Design and Application

Based on the different methodologies I have presented, and the lessons and design insights that can be gathered from them, the following is the model I have designed for my own application tentatively called the 3 Pillars of Emergence, founded around three core design considerations or "pillars" drawn from my research.

The first pillar is founded on the concept of designing emergent narratives that fulfill human needs. When designing an emergent narrative system, one must ensure that the system's design is informed by human needs, and conforms to and provides feedback that satisfies those emotional needs, as informed by the PENS model. It is not simply enough to design an emergent narrative system that seeks to tell stories. An emergent system should seek to fulfill the core human needs of Competence, Autonomy, and Relatedness in order to create a system that is meaningful to players on a deeper psychological, as well as a narrative level.

The second pillar is the application of the proposed solution of an "experience manager," in order to allow an emergent narrative system to support core goals and avenues that are required to build a viable and engaging emergent narrative experience. These core goals include: allowing the system to author successful narrative structures from modular content, infer player direction and story structures from their actions, to plan potential narrative paths, and nudge the narrative direction and player towards them if required, with the goal of keeping the direction of the narrative progression tied to the player's agency, and leaving them in control.

The third pillar is that of story design and integration within such a system. Taking direction from existing methodologies for linear narrative design such as the *Four-Layers Approach*, the story design is dependent upon the designer, but constructed by the experience manager at runtime. This means the designer is responsible for providing the manager with the logistics that will allow it to author stories that meet standards for player engagement and believability. These design goals include: Designing effective modular elements; application of author goals to help the system drive the narrative; providing the system with understanding of the world it is in; and enabling it to encourage players to interact and explore the narrative in order to learn more about the world. Furthermore, the designers must take the player's mental model into account when designing the system, so that it can take advantage of players'

expectations and interpretation, and avoid breaking their mental model and immersion. Emergent narrative presentation must also take place in such a manner that gameplay and story are unobtrusive to one another, and support and emerge naturally from each other.

8.1 - Pillar #1: Player Needs and Immersion

This first pillar concerns the concept of self-determination theory as it can be worked into this system. As previously outlined, one of the core goals in emergent narrative design, from my perspective, is to provide more self-driven and personal player experiences that recapture the open-ended sense of wonder that children's imagination or tabletop RPG's offer. These kinds of real-world emergent narrative experiences are also founded on self-determination theory. Players take on the roles of bold adventurers and heroes, setting off on quests to save princesses, gather treasure, and so on, fulfilling their competence needs. They have autonomy over the direction they wish to embark in, and while the designer may try to nudge them back in the right direction of an overall event chain, just as we would expect an experience manager to do, the short-term goals and moment to moment decisions belong to the players. Finally, within such real-world systems, NPC's are controlled by the human experience manager, giving them a high level of relatedness, as their actions are controlled, word by word, based on player's interaction with them. In order to translate this system into a digital narrative system, we draw from PENS model of understanding for games, and transpose the lessons into the design of narratives.

Where the tenant of competence is concerned, players must be given the ability to control their progress through the story effectively, and such an emergent system should seek to avoid taking control from players, even for the sake of the narrative, due to the disconnect such segregation will cause in the experience. This also extends to how players should be shown the effects of their competence. As is seen in examples, such as *Shadow of Mordor*, the player's actions and successes, as well that their failures, should have a tangible effect on the game world. Following from this, ideally, the system should not implement death and reloading as part of the narrative experience. When the player dies, they should be injected back into the narrative somehow, without needing to step into the interface to reload a saved game. Many games, such as *Don't Starve* and *Dwarf Fortress*, feature permadeath - as allowing players to reload would cheapen the randomized, emergent experience. For games with more than one life, however, this may involve something akin to *Bioshock's* vita chambers, or *Shadow of Mordor's* wraith depending on the context, but this should always be a consideration that is taken into account in the narrative, and supported by

the game's mechanics, rather than forcing the player to reload after failures, thus breaking the narrative experience. Difficulty curve and mastery experiences in this kind of system are something that should be facilitated through the advancement of player skill allowing them to take on the experiences that gradually become more challenging, as determined by underlying systems assessment of relative player skill. An example of this kind of system is in *Don't Starve*, wherein probability of random negative events increases the longer the player survives, with the assumption that the player will have a greater base of resources and skills available in order to overcome them.

Autonomy is also core to this system, and should stem from the open-ended nature of the world, rather than pre-designed choices. The level of surrender of authorial intent required to make this autonomy work, varies based on ratio of emergent to non-emergent content. *Shadow of Mordor's* Nemesis system, for example, exists alongside a pre existing linear embedded narrative. However, the essential consideration should always be to make the player's actions within the emergent narrative system extend into the embedded narrative, so as to show the player that their autonomy outside of the embedded content still has meaning within it.

Relatedness within emergent systems should be achieved through the system's ability to update NPC and underlying system states with knowledge of player actions, thusly, the design of the system incorporates the ability to record memory of, and draw from, player actions: how the player approached situations, resolved them, etc. in order to inform how NPC's should treat the player, and what topics they should bring up. This is informed by relatedness strategies proposed by the PENS model. Furthermore, this awareness of player action is also vitally important in relation to pillars #2 and #3, being necessary to inform the experience manager's understanding of player actions and their "favored direction," and recognize stories which would appeal to the player, based on their play habits and style.

8.2 - Pillar #2: Design of Experience Manager and Underlying Systems

In order to produce an emergent narrative system, I believe there is strong reasoning to follow the concept of an experience manager, as outlined by Riedl and Bulitko. There needs to be some form of central management or intelligence to process the player's actions in relation to the state space and NPC's, and the resultant outcomes, and attempt to reason their connotations. Otherwise, it would prove very difficult to have a narrative system that behaves in any kind of coherent manner, or has purposeful narrative structure, rather than just relying entirely on human interpretation, as non-narrative emergent systems do. In order to allow this system to serve as the

manager for the narrative and player experience, its design needs to provide it with the ability to assemble story paths and scenarios from modular pieces which are provided to it.

A potential example of a way that this could be achieved would be to set up each modular element with a number of sorting "flags," to help the manager understand how they can connect to one another. For example, if the manager wants to generate a narrative scenario for the player, it needs to reason which elements are necessary or appropriate. Let's assume, for a moment, that the manager has assessed its next goal to be the generation of a dangerous scenario, to provide short-term competence goals for the player through providing the player with a challenge to overcome. It would first filter for modules with the flag *danger*. This would return a list of all potential hazards. Next, the manager would read the current underlying system state. It returns that the player is currently in a desert area, and that their health is low, and supplies are dwindling. Looking back at their previous actions, it notes that they were attacked by bandits, and chose to escape into the desert by necessity. It then looks at potential future paths that the narrative could take. The player could find an oasis to help them survive, could run into more bandits, could be rescued by nomads, or die in the desert. When the experience manager cross-references these and lines up flags against hazards, it finds that the modules heatstroke, vultures, and dehydration return as meeting these flags. So, it activates the three of modules within the system state to change the narrative. Now the player is beginning to suffer from heatstroke and dehydration, and vultures have begun swarming overhead, anticipating their demise. The player's choice to flee into the desert has had consequences, and with this new information, the player now has to decide how they will proceed. In order to nudge the player in the direction of a narrative beat, the director also makes reference to a plume of smoke in the distance, providing a potential direction towards civilization, and nudging the player in the direction of the nomads that could help them, planning a potential future path. Meanwhile, the player has still been left in control of their own agency.

This kind of flag or trait-based filtering would be implemented alongside other judgment defining systems, like Riedl's "author goals" concept. Through specifying short-term events that the system must drive towards before reaching other, more completed states, the designer is able to inject "Authorial intent" into the system, and guide the direction or sequencing of particular event chains. For example, if there are modular elements for a disease that is released from an ancient tomb, author goals can be used to lock off those modules until the author goal of *someone opening the tomb* has passed. Riedl defines this relation specifically: "in terms of authorial intent, an

author goal indicates that there is a state of the world that must be achieved between the time the narrative starts and the outcome, and that any plan cannot be considered complete unless that world state is at least momentarily true." [9] (Riedl, Pg. 2, 2009) By combining both these systems, we provide an experience manager with a means of determining player goals and responding by encouraging player's movement towards specific relevant event streams, as well as a form of authorial intent that can be used to generate story direction and support for the player.

8.3 - Pillar #3: Gameplay and Story Balance and Integration

When designing an experience management system, methodology must account for how a designer will impart such a system with the logic and capacity to produce content from the modules it has been provided with, which both takes into account narrative practices, and seeks to uphold them.

Conclusions drawn from my case study of Frictional's design methodology leads me to propose the value of careful design for the modular content for the game. As the combining of modular elements provides the system with its means of constructing story and gameplay, the design of these elements an important part of controlling the experience from the design side, and providing the designers with an avenue to exercise authorial intent. In order to have the modules support the needs of the two earlier pillars each should be able to satisfy and work with the components of self-determination theory, providing some combination of competence, autonomy, and relatedness experiences. If a module fails to achieve any of these aspects, we may ask ourselves, why is this in the game? Some examples of these modules might be survival-focused modules, allowing players to experience competence; diplomacy-driven modules, fueling competence and autonomy; or social modules, such as NPC's that the player can talk to about world events. Extending from this concept, I would argue that any individual module should provide a miniature challenge in and of itself, and which can be combined with other modules in order to build more demanding challenges. Additionally, each module should be kept simple and streamlined, in order to make its purpose clear to the player. After all, the objective in designing modules is to allow the system to develop its own complexity, and allow designers and the experience manager to develop scenarios from individual pieces, not to enforce overly complex modules into the system. As discussed by Ryan et al. said, the smaller a module, the more possible applications it has.

In order to create the story in a more emergent manner, such that it is produced and upheld by underlying systems and not forcibly thrust upon the player, the authoring

system should be designed to understand the nature of the world it is in, in order to enable it to design environments in a way that effectively reflect the world and provide the player with an effective narrative frame which they will be encouraged to explore. An effective way to achieve this is to provide individual modules with context-specific descriptors or slots that can have descriptive or environmental attributes added. For example, if the player sees the same modular pig animal throughout the world, it may seem boring. However, if a slot is given for the pigs, size, health, and hair length, then this leaves the manager the ability to build a variety of pig modules that reflect their environment. If the player is exploring a toxic swamp, the pigs may be thin, sickly, and have hair missing, whereas in the cold north, pigs, like all animals in that climate, may have their modules set to make them large, robust, and with thick hair to insulate them. These kinds of environmental storytelling aspects will go a long way in differentiating and fostering the believability of environments and locations, providing an underlying meta-story that the player can observe.

When considering how to present such environments and subtle narratives, it's also crucial to consider the player's mental model as it pertains to the stories being generated, as this can help inform both the designer and experience manager as to how they can handle the story. For this reason, it's important to impart logic, allowing an experience manager to understand what a player may anticipate. Again, the flagging system is of use, as you can flag areas such as tombs etc. with indicators such as *haunted,* and then provide data to the manager that this area is likely to put the player on edge, so other unnerving elements, such as surprise attacks, or zombies/skeletons in the case of fantasy, will help play into that mental model. Designing alongside the player's mental model also means avoiding scenarios wherein the player's mental model is broken, unless that is an intentional part of the narrative path intended to catch the player off guard. For this reason, flags can be used to indicate elements that should not be combined with others - a system should not be able to generate fire underwater, for example.

The final consideration, which ties back to some of the earliest concepts covered, when designing the presentation for story elements in such a system, is the importance of gameplay and story not being segregated, but instead extending from one another, in order to avoid separating the player's interpretation of the two, and leading to the devaluing one or the other. This can be achieved through a variety of methods previously explained, such as having the narrative or results of player action be revealed through the state of the game environment, or way that NPC's react, furthering the sense of relatedness between the player and such characters, or potentially, even just allowing the player to move during such cutscene-like elements of gameplay, and

move around freely during such events.

With the three pillars thusly outlined, let us look at some theoretical applications of them towards an emergent narrative system.

9.0 - Example System: Kingdoms of Lothar - Emergent Fantasy-Driven Narrative System

Below is a theoretical case of a system in which the Three Pillars of Emergence design methodology has been applied. This is a very small scale example, meant to showcase how the experience manager works, and how the system seeks to fulfill player experience needs and provide generated narrative experiences. *Kingdoms of Lothar* is an open-world RPG with underlying systems forming the base for emergent narrative. The world setting is within four main kingdoms, with predefined attributes that are known by the experience manager.

9.1 Example World/Area Definition Breakdown:

Location	Western Kingdom of Jennia
Mental Modelling	Based around Asian tropes and mythology. Players will know the relations of some of these: ninjas/samurai, the emperor, high court, etc.
NPC Inhabitants	Catfolk, humans (nobles, ninjas, samurai, peasants), snakefolk, dragons, pandas, tigers, antelope, carp fish, ogres, and demons.
Environment	Subtropical forests, bamboo forests, lakes, small mountain ranges.
Modular Events	Dragon attacks, brushfires, wild animal attacks, random travelers, bandits, booby traps, ninjas, samurai patrols, cliffs that restrict progress.
Organizations	Mages' guild, Fighters' Guild, Samurai Shogunate, Ninja Guild. High Court, Serf class, Emperor's Palace

Example Event Chains & *Author Goals*	**Overthrow the high court** *(needs to meet with ninjas, join rebellion, work to undermine emperor's position, spread dissent, start insurgency, etc.)* **Crush the rebellion** *(become a samurai, have audience with emperor, root out ninja insurgence, do not join insurgence, kill ninjas, claim victory.)* **Settle the snakefolk vs catfolk disputes** *(Pick a side, one side's leader will be assassinated, chaos will ensue, the player must reveal the real killer to be a human from the royal caste - can tie into rebellion plot.)*

Location	Eastern Kingdom of Slonnia
Mental Modelling	This kingdom is a rugged desert waste filled with scattered towns and primitive firearms, evoking western film tropes. Players are likely to understand relationships between bandit outlaws and sheriffs, etc.
NPC Inhabitants	Dwarves, humans, beastmen, orcs, goblins, dragons, giant sandworms.
Environment	Arid deserts, rocky wastes, great grass plains, cactus clusters, mountain ranges and volcanoes towards the interior.
Modular Events	Dragons, dehydration, outlaws, vultures, high heat levels, sandstorms, etc.
Organizations	Sheriff's Commission, Dwarven Kingdoms, Bandit Alliance, Beastmen Tribes.
Example Event Chains & *Author Goals*	**Become leader of outlaws** *(enter into their raiding party, rise through ranks, kill sheriff, survive assassination attempt, kill old leader.)* **Restore justice to the kingdom** (sign on as law enforcer, root out outlaws, fight leader, be appointed new lead sheriff.)

Location	Southern Kingdom of Marshen

Mental Modelling	Players recognize a thick jungle as a dangerous place
NPC Inhabitants	Humans, lizardfolk, demons, catfolk, mermaids.
Environment	Thick, tropical rainforest and toxic swamplands, ancient temples and forgotten civilizations, mangrove glades and coastlines.
Modular Events	Disease, poison, animal attacks, monsoons,
Organizations	Cult of the Night, Assassin's Guild, Druids Circle, Mermaid Society.
Example Event Chains & *Author Goals*	**Join the Assassins** *(Must kill an innocent, and receive invitation)* **Purify the swamps and heal the forest** (ask about contagion, find its source, fight against the cult of night, and overthrow them to restore nature's balance.)

Location	Northern Kingdom of Icerrion
Mental Modelling	This is a snow-covered and icebound area. Players will anticipate the danger of the cold and the mountains, and may be inclined to bring extra warm clothes for their character, etc.
NPC Inhabitants	Snow elves, humans, dwarves, yetis, ice wyrms, giants,
Environment	Frozen Wastes, tall ice capped mountains, crystal caverns, vast tundra.
Modular Events	Wolf attacks, yeti attacks, crystal geodes, ice dragons, snowstorms, icy mountains, ice wraiths, famine, ice storms, extreme cold, barbarian raids. Avalanches,
Organizations	Guild of the North, Barbarian Alliance, Northern King's Court, Resistance Fighters.

Example Event Chains & *Author Goals*	**Defeating the Frozen Scourge of the North** *(Learn of the legend, seek beast-hunters, learn of its weaknesses, track the monster, take it down.)* **Bring peace between Icerrion and the other kingdoms** *(Variable author goals.)* **Overthrow the high king of Icerrion** *(Join Barbarian Alliance, plan coup, bring down king, establish new government.)* **Defend the throne of Icerrion** *(join royal guard, find dissenters, stop barbarian insurgency.)*

This general information would branch out far more than is shown here, and be associated with a much larger catalogue of modular content for the manager to apply and combine to generate different situations and events. As an example of the world's modular systems and logistics, consider the categorization for some of these events, the logic presented and event chains outlined below.

9.2 - Character Motivations Breakdown Example

This presents an example hierarchy through which the experience manager would assess the player's short and long term interests. Whenever the player took action or completed modular goals, the experience manager would take note, and use this to calculate the overall direction of the player's interest, in order to find modules with flags matching both the location and player's interests. After an action, has been taken, it's value on influencing the experience manager's decisions decays linearly with time, allowing a player to change their direction of influence over time, but not immediately

Player Action/Decision Matrix

Recent actions (<0.5Hrs)	Saved people from bandit raiders	Gave money to the poor.	Helped apprehend a thief.	Undertook some tasks to benefit the town.
Semi recent actions (<2Hrs)	Was beaten up by bandits and left for dead.	Was healed by a travelling cleric in an act of altruism.	Opted not to steal from a passing caravan.	Made their way to a new town.
Less	Attacked village	Stole money	Started a fire	Fought against

recent actions (<4Hrs)	and ransacked (Evil, criminal, destructive.)	from a store.	to panic townsfolk.	guards trying to apprehend them.
Overall weight of actions	Evil and destructive. However, the new actions weight towards a more heroic path. Because of this, the experience manager decides that the narrative seems to resemble a path of redemption, and as a result, will reason that it is worth giving the player events, or nudging them in the direction of events, which encourage autonomous choice of altruistic actions to help facilitate the player's change of heart, if it is genuine.			

9.3 Modular Element Breakdown

This is an example of how a few different modular elements or results within the system would have its traits mapped out for the experience manager to consider.

Element:	Fire
Element Flags	Fire, Danger, Damaging, Destroyer, Fear, Not Underwater.
Need Fulfillment	Competence goal: Put fire out – micro accomplishment. Autonomy goal: Creating fire – leads to arsonist and criminal player goals.
Author Goals Required for Activation	None - base level module, can be called in whenever an element flag *flame* meets element flag *flammable*.
Location Flags	Jennia, Slonnia, Snowden, Marshen - global module can be applied anywhere.
Modular Pieces Required	None - Base level module.

Element:	Large Scale Brushfire.
Element Flags	Fire, numerous, large event, reoccurring.

Need Fulfillment	Competence Goal - survival of major threat – large accomplishment.
Author Goals Required for Activation	One of Following: Player abandoned a burning campfire module. Lightning Strike igniting dry vegetation. Any event sequence that starts 20 or more fires in close proximity within 20 seconds. Extreme drought environment module - increasing chance of brushfire for every 24Hrs of drought.
Location Flags	Slonnia, Plains.
Modular Pieces Required	Fire module *20+, Stampede module - 20x module with *animal* flag with AI state set to panic.

Element:	Burning down the palace in the kingdom of Jennia.
Element Flags	Fire, Palace, Nobles, Numerous, Political, Rebellion Questline, Large event, Ninja alignment required, Criminal Act, One Time Only.
Need Fulfillment	**Competence Goal**: mastery experience culminating from player skill and choices. **Autonomy goal:** choice to lead rebellion to burn palace, **Relatedness goal:** results of action on people - rebellion overthrows court, courtesans panicking and later hate player, player held as hero by rebellion.
Author Goals Required for Activation	Numerous: join rebellion, destabilize court, sneak into palace, place firework charges, detonate charges.
Location Flags	Jennia, interior, capital city, palace, unique

Modular Pieces Required	Palace location module and all child modules. Fire module *20+, all modules with flag NPC within castle, set AI state to panic.

        This is an example of how a simple modular element, *Fire*, can be applied upwards to more specific events, each with their own quantifying flags and location data, in order to recycle the element and reuse it for a number of purposes. The entire modular system would be made of such flags and dependences, allowing the experience manager to choose those with a relation to one another in order to create consistent scenarios and emergent plot points.

9.4 - Example of Emergent Results and Narrative Planning Stemming from Above Systems

Situation and Environment:
        Player enters into the kingdom of *Marshen* for the first time, having just come from the kingdom of Slonnia where they engaged in numerous less-than noble activities, such as starting brush fires, ransacking towns and teaming up with bandits to continue their ransacking activities.

Experience Manager Response:
        The experience manager looks at both the player's choices and the location that they are now in, searching for modules that seem to fit with the player's actions and would be likely to interest them. It locates the assassin's guild as a potential point of interest, with a chain of events involving criminal acts and ransacking/murder, and begins to nudge the player towards it, by having an assassin NPC appear in the jungle, running away from the player with the intent that they may give chase, as well as seeding the module for the guild's insignia, a bloodshot eye, as a detail on visual modules and slots, such as on trees.

Player Response:
        The player ignores the first NPC, but soon begins to investigate the strange symbols. They begin searching for them, and the experience manager notes this as tied to the *assassin's guild* and *Information* flags so it spawns an NPC that explains the meaning of the symbol, and the way to join the assassin's guild, telling the player that legends say you need to kill an innocent. With this new information received, the player then kills the messenger.

Experience Manager Response:

Since the experience manager's author goal of the player *learning about the assassins' guild's entry methods* has been completed through the messenger NPC, and so reasons that the player's killing of the NPC was an act committed with the intent of being admitted. With this second author goal of *Killing an innocent NPC* now completed, the experience manager queues up the event for the player to be sent an invitation to the assassin's guild.

Player Response:

The player comes across an assassin inviting them to the guild, however, they take the autonomous and unexpected choice to kill that NPC as well, looting the body and moving on.

Experience Manager Response:

The experience manager processes this new information into the underlying system state. The player has earned the animosity of the assassin's guild through their action, so it adjusts the value to hostile, opening up new modular events such as assassin ambushes, etc. In addition, the action of killing so mindlessly is noted as seeming to be related to their competence need. Their increased violence leads to the experience manager searching for another evil chain of events, and it finds the Cult of Night, an evil, destructive force. It attempts to nudge the player towards one of their ritualistic ceremonies. The manager indicates chanting and strange lights off in the forest, nudging the player to investigate.

Player Response:

The player heads in the direction of the lights, and meets with the Cult of Night.

Experience Manager Response:

The manager fulfills the relatedness need by having their dialogue congratulate the player on the killing of their foes, fulfilling relatedness needs by showing the NPCs awareness of the player's choices and influence on the world. The NPCs then ask the player to join them, and the cult of night, and reveal that they have gathered the modules for the two NPCs the player killed onto an altar for sacrifice, showing the impact of player competence.

Player Response:

As a result of the needs being fulfilled, and their motivations, the player joins the Cult of Night.

Experience Manager Response:

Once again, the experience manager updates the underlying system with the player's allegiance to the Cult of Night, and updates all non-Cult of Night NPC's to be more distrustful of the player. The author goal *Join the Cult of Night* is fulfilled, and modules related to being in the cult of night open up. From here, the experience manager has a new base from which to draw decisions on player motivation.

Takeaways and Closing on Model:

These were just some small examples of the potential applications which I hope my proposed model will make possible, and a tiny sliver of the potential that such an "experience management" system can offer. The generation of such systems will inevitably be a complex design process, which was why I chose to educate myself on the topic. Since the technical side will be so complex, it is critical that designers be well-versed in the design prospect of such a system. Using the base of knowledge I have gathered, and the design methodology I have outlined for myself, I will move forward as an individual with significant knowledge to contribute as a designer on any team seeking to take advantage of the new opportunities offered by emergent narrative design, and emergent narrative systems.

10.0 - Predictions of the future and Closing

Based on the significant evidence for the power of emergent narrative systems as an authoring tool, both to save costs for designers by cutting down on the amount of authored content required for their games, and the potential opportunities they open up for making more variable, exciting and personalized narrative and gameplay experiences for players, I feel confident in stating that, in my expert opinion, emergent narrative systems will become the next major direction in narrative design for games. Narrative has become an unmistakably huge part of our industry, and just as the evolution from frame narratives and adventure games to games with integrated, side-by-side gameplay occurred back in the 90's, we are sitting at the cusp of a new age of narrative possibilities for game design. As artificial intelligence and technology increases, so too will the possibility for emergent narrative systems to create unique narratives and experiences for games and their players. Perhaps 10 years from now, such systems will be designing the linear narratives for games that still employ them. If such narratives even exist at all. After all, isn't the ultimate experience that the games industry seeks to offer freedom? Freedom to do things we never could, be people we could never be? I propose that emergent narrative is the next step in that path - to give

players the chance to interact with worlds and shape stories freely, and choose the path they want to follow, rather than feeling that the choices have already been made for them. Games such as *Mass Effect* have already tried this, but have come up short in the end, not truly capturing the goal. Meanwhile, smaller scale, less expensive and hyped projects like *Shadow of Mordor* have truly innovated, and given players a taste of the possibilities offered, and it did not go unnoticed. *Shadow of Mordor* won game of the year at GDC 2015, and was nominated for best narrative, in spite of a fairly standard-fare central story - and it was just scratching the surface of the possibilities with its nemesis system. Meanwhile, other hugely successful games have already been able to develop emergent gameplay systems that support player alterbiography - *Minecraft*, *Don't Starve*, and so on. These games feature gameplay-driven emergent narratives that are left up to the players to infer. But the day is coming when emergent narrative systems will erupt into the market, and when that day comes, the first design team to break through in this new field stands to profit heavily. Through my research, I have been able to acquire insight into the elements required to develop successful emergent narrative systems, and propose a framework for building them, to the ends of positioning myself as someone with experience in the theory of development for these systems, with the aim of being a key role-player and designer in their development on a design team, and helping to take narrative forward into the next stage within game design.

11.0 - Annotated Bibliography

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[2] De Plater, M. (2015, January 20). Postmortem: Monolith Productions' Middle-earth: Shadow of Mordor. Retrieved January 22, 2017, from http://www.gamasutra.com/view/news/234421/Postmortem_Monolith_Productions_Middleearth_Shadow_of_Mordor.php#tophead

[3] Calleja, G. (n.d.). EXPERIENTIAL NARRATIVE IN GAME ENVIRONMENTS. Retrieved February 12, 2017, from http://www.academia.edu/2962402/Experiential_Narrative_in_Game_Environments

[4] Eunyoung , H., P. Rowe, J., W. Mott, B., & C. Lester, J. (2011, January). Goal Recognition with Markov Logic Networks for Player ... Retrieved February 6, 2017, from https://www.researchgate.net/publication/220978325_Goal_Recognition_with_Markov_Logic_Networks_for_Player-Adaptive_Games

[5] Graft, K. (2015, February 4). *Designing Shadow of Mordor's Nemesis system*. Retrieved October 06, 2016, from http://www.gamasutra.com/view/news/235777/Designing_Shadow_of_Mordors_Nemesis_system.php

This article provides a brief overview and summary of the of *Shadow of Mordor's* 'Nemesis System,' along with insights from Michael De Plater - the game director, into the design choices, objectives, and outcomes of the system. These elements include Self-Determination Theory, Player Experience of Need Satisfaction, and GNS Theory. The article elaborates on how traditional narrative was allowed to slide in order to facilitate the emergent. The article includes insights on how aspects of sports, and allowing the player to construe the greater stories and fill in the blanks were used to the design's benefit. In concluding, it presents recommendations on how the lessons learned can help designers to create more engaging player-driven narratives in the future.

This serves as an important resource, providing some firsthand advice and insights from the designer of one of the most potentially influential emergent narrative systems of recent years, as well as providing information on other theories such as the aforementioned Need Satisfaction and GNS, which can

provide a further research topic to develop understanding as to what needs narrative/game experiences fulfill, and how these influence the design of their underlying narrative systems.

[6] Juul, J. (1998, November). A Clash between Game and Narrative. Retrieved January 22, 2017, from https://www.jesperjuul.net/text/clash_between_game_and_narrative.html

[7] KL, T. (2014, April 29). 4-Layers, a Narrative Design Approach. Retrieved October 06, 2016, from **http://frictionalgames.blogspot.ca/2014/04/4-layers-narrative-design-approach.html**

This article, published on Frictional Games' Official Blog, presents an alternative approach to game and narrative design, deemed the 4-Layer approach, which maintains that story and gameplay must entwine and support each other in order for a game to present a well-rounded narrative experience. Through addressing four layers of design – Gameplay – that is, ensuring that gameplay supports story, and that they are congruent; Narrative Goal – providing short-lived narrative reasons for short-term goals, tying the player's motivation more closely to the story; Narrative Background – designing narrative, such that the player's actions make it appear, tying narrative and gameplay even more closely together, to that they are aligned in beats, etc.; and finally Mental Modeling – which outlines how the designer can consider the player's mental model of the game, and how this can extend into the activity of play, and help expand the experience beyond what is onscreen, the article makes a case for the model's value in that it incorporates considerations of story directly into game design, making it an essential part of the process.

This is a valuable perspective to consider, as it presents a unique view of narrative design, and how game designers can work to more closely entwine narratives and gameplay. In turn, this can be used to gain insight into how one can design systems that more effectively draw in the player, and create more valuable experiences through emergent narratives that stem from gameplay, through tying the two more closely to one another. The article also provides clarifications as to where the approach's weaknesses are, giving quantifying information for consideration.

[8] Kroon, J. (2016). Nemesis Narratives: The relationship between embedded and emergent narrative in Middle Earth: Shadow of Mordor. Retrieved October 07, 2016, from **http://dspace.library.uu.nl/handle/1874/335676**

This paper, written as the thesis of a MA student, concerns the interplay between embedded and emergent narrative within the game *Shadow of Mordor*, and what this design means for narrative design in games as a whole. The author supports this thesis through thorough analysis of narrative structures within and without games, and references to theories of narrative design within games, such as Celia Pearce's Six Narrative Operators, among others. The first three chapters are used to establish cause, and the author's stance on theories of narrative design within games, leading up to the fourth, wherein he analyses the game based on his parameters, explaining its context, and the fifth, where he draws his conclusion, and proposes that the game marks a key point in the development of game narratives, and potentially represents the beginning of a new direction for game stories overall.

This source is valuable for its thorough analysis of the intricacies of Shadow of Mordor's emergent narrative systems, and its situation of them amongst the larger theories on game narrative as a whole. At the same time, this is the work of another student, and while it is developed in a scholarly manner, it is worth cross-referencing with other sources, and its own sources, to corroborate and ensure the validity and factual soundness of the information and opinions presented.

[9] Riedl, M. O. (2009). Incorporating Authorial Intent into Generative Narrative ... Retrieved February 18, 2017, from http://www.cc.gatech.edu/~riedl/pubs/riedl-aaai-ss09.pdf

[10] Riedl, M. O., & Bulitko, V. (2013, March 22). Interactive Narrative: An Intelligent Systems Approach. *AI Magazine*, *34*(1), 67-78. Retrieved From: **http://www.cc.gatech.edu/~riedl/pubs/aimag.pdf**

This article concerns the development of interactive narrative systems throughout the past 20 years or so, and some of the questions it still poses, with particular note being given to the concepts of authorial intent – that is, the elements of narrative designed by human minds; Virtual Character Autonomy – how characters in the game can perform independently, thus developing emergent narratives without the need for specific authorial intent; and Player Modeling – which relates to how interactive systems can change their experience and direction based on the player's preferred method of play, e.g., a player with a more aggressive playstyle will be given more challenges/plot points that require fighting to solve. The article closes by posing questions related to the furthering of interactive narratives, and intelligent systems, and reviewing the progress that had been made at the time of its publishing, and asserting the value of this direction for the field of narrative design, and as a mode of entertainment and its value to human nature.

This article is useful as it takes a look at different approaches to narrative design,

and how designers can blend and use them to generate differing experiences. However, it is less recent than the others, and presents a somewhat different approach to narrative design. For this reason, it will need to be weighed against the information in the other articles, and supplemented with the knowledge that has been gained since its publishing.

[11] Rigby, S., & Ryan, R. (2015). The Player Experience of Need Satisfaction (PENS). Retrieved November 12, 2016, from http://immersyve.com/white-paper-the-player-experience-of-need-satisfaction-pens-2007/

[12] Ryan, J. O., Mateas, M., & Wardrip-Fruin, N. (2015, December). Open Design Challenges for Interactive Emergent Narrative. *Interactive Storytelling Lecture Notes in Computer Science,* 14-26. doi:10.1007/978-3-319-27036-4_2 Retreived from **https://games.soe.ucsc.edu/sites/default/files/ryanEtAl_OpenDesignChallengesForInteractiveEmergentNarrative.pdf**

This paper, from the Center for Games and Playable Media at the University of California, proposes a number of research questions through which to approach the design challenges for emergent narrative systems. These challenges include the means for creation for modular content; representational strategies for said content; means of enabling the systems created to recognize their story elements; and story support, pertaining to the decisions a system makes on how to deploy and utilize story-like series of events that it has generated. In each case, the article provides a breakdown of the challenge, and suggestions as to how designers can approach and attempt to overcome it, in order to direct research and hopefully aid in the creation of solutions to these design challenges. There is also thorough reference to numerous other research undertakings and games that have made strides towards addressing these challenges, presented as supporting evidence for its claims. The article concludes by summarizing these elements and posing potential directions to guide to those seeking to develop emergent narratives in the future.

This source is particularly important, not only for the questions it asks, and its own assertions with regards to the considerations in designing narrative systems, but also for the wealth corroborating evidence and sources it offers. With 90+ citations from other supporting and related resources, the paper provides an excellent central source, from which many others can be obtained, and used to support the direction of the deep dive and elaborate further on the development of emergent narrative systems and their development/design.

[13] Shirinian, A. (2010, January 26). You Got Gameplay in My Narrative... or

Narrative in My Gameplay? Retrieved January 22, 2017, from http://www.gamasutra.com/view/feature/4253/the_uneasy_merging_of_narrative_php?print=1

[14] Darkest Dungeon: A Design Post-Mortem. Dir. Tyler Sigman. Perf. Tyler Sigman. Gdcvault.com. GDC Vault, 16-18 Mar. 2016. Web. 28 May 2016. http://www.gdcvault.com/play/1023435/ Darkest-Dungeon-A-Design