CASTLES, influence of Complexity on the plAyer Experience. a Study Towards ameLiorating emergent Storytelling

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November 2014

Abstract

This work addresses the issue of complex game mechanics and their relation to the player experience while engaging with an emergent narrative single-player game. In this document we describe the tests made in order to try and discern a possible correlation between the two, as well as the systems implemented to be able to carry out the tests themselves. In order to achieve this, we present the components of player experience we desire to test, such as Interest, Perceived Competence, Agency, Effort and Tension, and the testing scenarios we built to test these, using Crusader Kings 2 as a base framework. Furthermore we extensively describe our testing methodology as well as our statistical analysis of the data recovered, and how we’ve only found significative differences in the competence dimension. Finally we comment on the results extracted from this experiment and our suggestions for further work and exploration into this topic.

Keywords: Interactive Storytelling, Emergent Narrative, Branching Storyline, Player Experience, Complexity

1. Introduction

Similar to other entertainment media, stories in games play a big role in increasing immersion, and adding interest to the player. However, one main difference that separates videogames to other media formats is that they are interactive; they expect participation from the player and in turn the player expects to interact with them and be involved in the games’ events.

Games have often followed a linear approach in their storytelling, where the sequence of events is presented in a pre-defined way and interactivity is kept only for game play mechanics and in no way can they affect the overarching plot.

However, it can be argued that following a static, pre-defined story can detract from the games’ interactivity, as the players’ interaction is not affecting outcomes and events[15]. So, for videogames to benefit the most from their interactive nature they must embrace non-linear story structures.

Interactive Storytelling involves telling a tale while allowing a user to take part in it, shaping its development. One of the central goals for every Interactive Storytelling system is to provide the user with the feeling of Agency.

To achieve this, we shift the structure of a game from telling a story to presenting a simulation, which presents new challenges. One such challenge lies in the design of the interactive mechanics themselves, how complex should they be? How many actions, and how many variables they need to affect to provide a fulfilling simulation? Does this simulation need to be made of many moving parts, or does a simpler design evoke the same sense of agency as a fuller system?

The aim of this thesis is to explore these issues, the correlation between complexity in the presented simulation and the player experience, such as his sense of agency. Our work attempts to find if there are hints towards the existence of correlations, and which factors affect the experience given to players in scenarios of differing complexities.

1.1. Problem Description

Complexity in game mechanics is often seen as something overly detrimental, and in an effort to avoid risks, simpler mechanics are employed, as in general, "simple to learn, hard to master" is the best way to design an appealing game. We, however, desire to explore complexity, and how it can be effectively used to improve the player experience in emergent narrative story systems. We believe that complex game mechanics have their place on the market, even if only to niche audiences. As such, we will explore the hypothesis that there is a positive correlation to be found between complexity in
the presented simulation and the player experience.

We aim to explore 5 dimensions, in relation to complexity:

D1 - Interest
D2 - Perceived Competence
D3 - Sense of Agency
D4 - Tension Felt
D5 - Effort

In order to achieve our goal of exploring these possible correlations, we endeavor to build two testing scenarios, similar in all aspects apart from how complex they are to a player. We define this complexity, in our scenarios, as the amount of actions a player has to undertake in order to achieve whatever goal he desires. We see as more complex a system where the player needs to successfully realize a number of small tasks that work towards his objective, and as simpler a system where the player can abstract from some of the menial tasks, asking other people to worry about them, and instead only engage in high level decisions of what he wants to do.

After we have the 2 variations constructed, we run player tests using these scenarios. These tests will consist of a play session, followed by a questionnaire so we can collect data on each of our hypothesis. Following this, a statistical analysis occurs where we compare values between the two scenarios of differing complexity and were we hope to find hints towards the validation of the hypothesis presented above.

In the end, contributions from this work aim to empower game designers with data gathered through experimentation towards the potential use of complex game mechanics in order to build a better game for players to feel engaged and empowered with a complex, single player emergent story system.

2. Related Work

In this section we present the theoretical backgrounds on which this work stands.

Unfortunately, there’s very little previous work int this topic. Both because it’s a very fresh field of investigation, but also due to the very specific nature of this work. As such, we will present related works in the field of interactive storytelling in emergent gameplay systems as well as commercial products that have succeeded by using systems like the ones we wish to explore.

Firstly we’ll cover the definition of Agency Following we’ll present existing works in the field of emergent storytelling to better describe the field in which this work took place. And finally that we showcase some commercial videogames that inspired our hypothesis and our work.

2.1. Agency

What we understand as agency in the context of videogames and interactive narrative is as follows “the feeling of empowerment that comes from being able to take actions in the [virtual] world whose effects relate to the players’ intention[11] So we can see that agency mostly refers to the subjective feeling that a given action can affect the world around us in a meaningful way. In other words, it’s the feeling that our choices matter, and our presence in the virtual world will have repercussions in it.

In fact, agency is a bit more complicated than that. “Agency is an experiential pleasure. As such, it can fade in and out; it can fail altogether. Agency is not automatic, and so simulated environments should be cleverly constructed to help users/players get there. [20] A multitude of options and choices is not necessarily agency, any more than a highly structured game with limited choices denies it.

What this means is that the structure and design of a game and the choices available within it communicate information to the player that allows them to make an informed choice of action with a consequence that reflects their intent. Theoretically, if this is achieved, the game will provide a sense of agency, but, as stated above, it isn’t enough. These choices need to be sufficiently interesting, the consequences need to be sufficiently meaningful (not necessarily positive). But we can also ask, how complex must be the structure of the game? If a game’s mechanics are too simple, is it possible for the player to immerse himself in a narrative of his own?

Answering these questions is the focus of testing the agency dimension in this body of work.

2.2. MIST

MIST[14], aims to provide an architectural design for creating open-ended, interactive storytelling systems in which story structure emerges in real time and in response to player actions, thus providing a greater variety of game experiences than more scripted approaches.

MIST, or Multiplayer Interactive StoryTelling, is a system, for interactive storytelling in a dynamic virtual world, where NPC’s (non-player characters) can perform tasks autonomously to satisfy their internal motivations as well as interacting with each other in various ways. An important goal in MISTs’ approach to interactive storytelling is to provide human controlled characters with greater freedom in the interactions that they choose to perform in the world than would be possible in a strictly plot based approach.

The system is based on a two-tiered architecture. The lower tier is a virtual world consisting of locations and game objects, populated by players and autonomous NPCs’.
The actions of these NPCs’ coupled with the players’ action affect the overall state of the game, thus hoping to generate interesting story situations.

MIST didn’t explore the sense of agency provided by their system, but instead focused on stress tests with multiple AIs, obtaining satisfactory results on up to 100 concurrent AIs.

On the one hand, MIST showed that simulation AI’s acting only according to their needs desires and knowledge in an interactive environment has the potential to generate complex sequences of events for each character which in turn become their own little stories, along side the player.

2.3. Character-based interactive storytelling

This is a paper by Marc Cavazza, Fred Charles, and Steven J. Mead, [2] where they discuss a character-based approach where autonomous actors, whose roles are implemented using real-time planning systems, should dynamically interact to generate the story.

They were mainly interested in the emergence of story variants from the interaction of autonomous actors, so the emphasis was on the actors behavior rather than on explicit plot representation or narrative control.

Currently, the system can generate complete stories up to three minutes in duration. During dramatic action the user can switch between viewpoints of various character or freely explore the stage while the plot unfolds. The action progresses until a specific character asks another out, and the story concludes with the other characters’ answer.

The authors concluded that character-based approaches have good potential for story generation. Despite the deterministic nature of their underlying techniques, many different factors contribute to the unfolding plots unpredictability from the users’ perspective. Character-based systems provide a unified principle for story generation and interactivity.

In Character-based interactive storytelling, we can see that even when a system has an underlying deterministic nature, the amount of different parts contribute so that the resulting plot is unpredictable from the user perspective, which is clues us in to our hypothesis, that sufficiently complex systems, can enhance the players’ agency by becoming too unpredictable from their perspective.

2.4. Crusader Kings II

Crusader Kings II is a grand strategy game set in the High and Late Middle Ages developed by Paradox Development Studio and published by Paradox Interactive.

The game is a dynasty simulator where the player controls a Medieval dynasty from 800 to 1500. Through the strategic use of war, marriages and assassinations among many other things, the player works to achieve success for his or her dynasty. The simulation is open-ended so the definition of ‘success’ is completely defined by the player.

This game is of relevance for our work as it naturally provides a great sense of agency in the way it allows the player to completely and irrevocably change history. The amount of information and the continent spanning repercussions of player actions enable him to truly feel like he matters in the world.

This game however, is incredibly complex, filling the needs of a very niche audience as a result. However, we think that this complexity plays an important role in enhancing the sense of agency felt by the player and his choices, as it prevents the player from mathematically determining the best course of action (due to the large amount of variables and the real time nature of the game) and instead rely on subjective and in-character motivations for his choices.

2.5. XCOM: Enemy Unknown

XCOM: Enemy Unknown is a turn-based tactical role-playing video game, developed by Firaxis Games and published by 2K Games. The game is a “re-imagined” remake of the 1994 cult classic strategy game UFO: Enemy Unknown (also known as X-COM: UFO Defense) and a reboot of MicroProse’s 1990s X-COM series.

Due to its high difficulty (and especially if the player is playing in ironman mode where he can’t revert to a previous savegame) and its abundant use of soldier attribute-based randomness in whether a shot will hit or miss, makes it so every alien encounter is extremely stressful as each of the players’ customized and highly trained soldiers can permanently die due to a bad decision or, sometimes, plain bad luck.

This layer of gameplay gives it the ability of creating emergent stories where its players revel in retelling their stories from the battlefield, for example, how their awesome sniper saved the day only to get ambushed as the rest of the squad was retreating and dying a hero, or how a mission went so catastrophically bad that every soldier died.

Due to the way this game generates these moments with a great deal of sentiment of agency, it’s clearly of note for our work and hints that difficulty coupled with hard to predict outcomes can be a possible element that enhances the sense of agency.

3. Solution

In order to achieve our goal of studying the correlation of complexity in game mechanics and a potential improvement in the player experience, our main objectives were the development or modification of a game system that allows for user experimentation and measurement of modifications in complexity.
For this, it was critical to use a design that could be slightly altered while maintaining all of its remaining properties, thus keeping the same overall structure in differing testing scenarios allowing us to be confident that the only change in the design is the one we purposefully build into it.

3.1. Choosing our Framework

To properly achieve our stated goal of evaluating the influence of complexity in an emergent storytelling environment, we needed a base system where we could perform changes and evaluate their effects. These changes needed to be in the shape of at least two differing scenarios where we could tweak the amount of complexity presented to the player and evaluate how that affects the overall experience.

Grand Strategy games, such as Civilization prove to be inherently good at providing an emergent narrative environment, as their usual lack of a storyline, focusing instead on sandbox play with AIs', and their overall abstraction of details, focusing instead on overall events represented through game mechanics and states are key ingredients for emergent play, as defined in Section 1.

Among Grand Strategy games, the one which stood out to us the most was Crusader Kings 2, due to its documented success in generating interesting stories through player interaction [18], its inherent complexity, and above all its ability to be “Modded” (the possibility of a game to be modified by its players. A good number of moddable games provide tools for modding, such as Crusader Kings 2).

Due to these elements, we decided to choose Crusader Kings 2 as the base system where we can build our scenarios for testing.

3.2. Scenario Design

In the base game of Crusader Kings 2, the player is presented with an extensive and detailed map of the entirety of Europe as well a western Asia and northern Africa, where he is free to choose his starting point, as any Count, Duke, King, Emperor, Caliph, etc... that lived in any period from the 800s to the 1500s.

During gameplay all these characters interact amongst themselves and have differing goals, and differing actions that can completely change the landscape and events during the game. It would be extremely difficult to have any kind of insurance that all players would start in equal circumstances, with equal choices and an equal chance at victory.

As such, we felt we needed to depart from the scenario presented in the base game, and implement our own scenario.

In the base game of Crusader Kings 2, these systems are long time goals that have to be manipulated over a span of hours to be of any use. As such, they would mostly be clutter for a contained and (relatively speaking) short test session, that wouldn’t be able to reap any benefits of their use, and potentially waste time that the player could using to manipulate more relevant mechanics.

For these reason, we replaced Europe, with our own island Kingdom of Heathfire (Figure 1). The kingdom is a much simpler use of the Crusader Kings framework, as it is self contained, with a controllable number of characters and intentions.

This section will focus on detailing our methodology in the design and implementation of this scenario within the constraints of Crusader Kings 2. As we were set on building a scenario from the ground up to guarantee the validity of our experimentation tool, we had the following main concerns:

- Overall structure of the land and character hierarchies and titles.
- Starting position and end goals for the player.
- Opponents and Allies.

3.3. Overall Structure

In designing the scenario of the Kingdom of Heathfire, we had, from the very beginning, the goal of making it easy to understand, and for it to be able to present a simple, direct goal for the play testers. This chosen primary goal is Become King. We felt this would be an easy goal to explain and to present. And from this goal, stemmed most, if not all, of our decisions in design.

As such, we set to design an island kingdom, with no other neighboring lands. If the player is to become king, the political map must reinforce this goal, and so we avoided having other kingdoms as distractions.

As there is only one kingdom, becoming King is holding the highest possible title in this world, so we decided to represent this as having a hierarchy of power with the King at the top, followed by the Dukes, each Duke lording over his Counts, and each
Count holding power over cities and castles. These primary decision informed the political landscape that can be observed above, in figure 1. Another major concern in the design of the land was it’s uniqueness and it’s identifiability. Each area of the map, and each duchy, needed to have striking names that described their territory. The purpose of this is to facilitate the first contact a player has with the scenario. In the base game, there are notifications and events that inform the player of the happening in the world, and we maintain these systems in our scenario. However, many times, these notifications and events mention places by name, such as for example The bishop of Westminster tried to have the mayor of Kingsbridge assassinated! My Liege how would you like to respond to this affront?, these mentions are bit confusing when the player still doesn’t have a string grasp of the names and locations of every territory in the realm and to minimize this hindrance we concern ourselves with having distinct and recognizable names that even a first time player can easily find on the map.

3.4. Player Character
Among the created lands and characters, we needed to pick the right one to be the player controlled character. It needed to be a character that had a chance at the throne, and had enough power to make this a feasible goal in the duration of a test session. It was clear that the character needed to be one of the Dukes. As such, we chose to give the player character the title of Duke of the Barrens Duchy. The player character was created as such, and named Then Leywyn (figure 2).

Within the framework of Crusader Kings 2, all character are defined by their aptitude at 5 base abilities (Diplomacy, Martial, Stewardship, Intrigue and Learning) and character traits which influence what tasks the character is good at. For starters, we gave Duke Then a set of base ability points to reinforce the kinds of actions that could most help him gain the throne. We focused on giving him a greater Martial ability, that enhances his ability at leading armies in battle, and Intrigue, which improves his ability to succeed in plots against other characters, such as sneaky assassinations and falsification of claims to titles.

To define the player character and give him the tools needed for his goals while also to defining what kind of man he is, hinting at what kind of actions he would take, we chose a set of character traits we felt could represent a ruthless duke who desires the throne and is willing to do anything for it:

- **Proud**, which gives him a bonus to all actions, as he his proud in his successes.
- **Cynical**, which gives him a bonus in Intrigue, and paints a character who would be unhappy with the current ruler.
- **Ambitious**, which gives him a bonus to all attributes, and presents a character that wishes to rise up in life.
- **And finally, Cruel**, which improves Intrigue, and makes the duke seem like the ruthless character we wish him to be, as we want the players to feel like their characters would be willing to commit murder to achieve their goals.

We also wanted to give the player some diplomatic tools. In Crusader Kings, as it takes place in the middle ages, diplomacy is mostly achieved by carefully arranged marriages. To give the player some, but not too many, options we start the game with Duke Then already having two daughters and a son, which he can marry to the offspring of other characters to obtain a diplomatic bond.

3.5. Goals
As previously stated, we wanted the main goal of the player during the test session to be Becoming King. To give him this goal, and a strict time limit to achieve it, we defined the King as very ill and unable to properly rule. In five in-game years, the King dies, and by that point, the player must have a grasp on the throne, otherwise he fails. To achieve this, we enable the player to engage in a number of possibilities, either sticking to one or pursuing...
The first values we looked towards were the number of tasks within the scenario. In defining complexity in our scenario, we must first state what we understand as complexity. This work focuses only on the effects of a specific type of change in complexity. As such, we instead turn towards the concept of complexity of execution. As stated above, each strategy demands of the player the execution of a number of sub-steps, which usually involves manipulating sub-systems present in the framework of Crusader Kings 2. Our goal was to simplify these sub-steps, while maintaining the overall breadth of goals that can be achieved by the player. In this way, we hope to simplify the game, without compromising its core ideals.

To achieve this goal, we designed The Deputy.

### 3.7. The Deputy

The players Deputy is a character he can consult at any time, and talk about all the main strategic goals available to him. The Deputy not only gives the player some advice on his option, but more than that, takes actions on his behalf. We use this plot device to justify the simplification of tasks that would otherwise be the players responsibility. The deputy did it.

### 3.8. Testing methodology and data collection

Having described the construction of both of the testing scenarios above, we now show how we prepared the test sessions, our methodology in running them, and the data collection that took place both at their start and end. The methodology remains the same regardless if the tester is engaging with the more complex version, or the simpler one.

**Demographic Test**

First off, after greeting the play testers, we presented them with a demographic test, to better categorize the results of their experiments afterwards. This is a very small set of questions, consisting of age, sex and their experience in playing videogames, this questionnaire takes about 1-2 minutes to fill out.

**Explaining Crusader Kings 2**

Afterwards, we engaged the volunteers to know if they have previous experience with Crusader Kings 2. In case they didn’t, we explain the basis of the game, already inside the scenario built for the purpose of the test. We explain all the basic subsystems that are relevant (such as plots, military, etc...) and present the player to the main character, his territory, his subjects and more importantly, their goal in this demo, as well as their time limits to achieve it. We take great care not to influence the player towards any one option in the scenario, as well as not betraying any more.
details that could give them an advantage over other testers. In case the player is playing the simple version of the scenario, we also explain he can consult his deputy, and show him how to do it. Explaining the entirety of the scenario takes about 5-8 minutes, depending if the volunteer desires to ask questions.

**Test session**

When all is explained, the tester is ready to pick up the game himself and get into the experience. During this period, we carefully watch his progress, taking notes of events we wish to ask the tester about in the end of the session. We do not give any hints to the tester, nor do we council him in achieving his goals, even if asked. All we respond to are purely mechanical questions, such as "I don’t remember, where is the plots menu again?". Test sessions take between 20 - 35 minutes, depending on how long the player spends considering his options during events.

**Post Test data collection**

Following the play session, each subject was presented with an Intrinsic Motivation Inventory (IMI). The Intrinsic Motivation Inventory (IMI) is a multidimensional measurement device intended to assess participants’ subjective experience related to a target activity in laboratory experiments. It has been used in several experiments related to intrinsic motivation and self-regulation. The instrument assesses participants’ interest/enjoyment, perceived competence, effort, value/usefulness, felt pressure and tension, and perceived choice while performing a given activity, thus yielding six sub-scale scores.

We use almost the entirety of the IMI questionnaire to provide us with a measurement of 5 components of their experience in the scenario they played:

- Interest.
- Perceived competence.
- Sense of agency.
- Tension felt.
- And effort put into succeeding.

We omit the value/usefulness component as we didn’t feel it relevant to the validation of our hypothesis, nor did we feel it was appropriate in the context of this study.

We setup all of the question of the IMI, slightly altered to be more closely related to this scenario, as is suggested in the IMI documentation, and we then shuffled the questions for each participant, so as to not have all questions of a given component all together.

## 4. Results

Our experiment collected data from thirty individuals, mainly between 20 and 30 years old, averaging on 2.80 interval (With 2 as the interval between 19-23 and 3 being 24-35) and a std. deviation of .805). Most of these people were gamers and had some experience with strategy games, but none of them had ever played Crusader Kings 2. Of these individuals, 5 were women. 16 of the volunteers played the most complex version, and the other 14 engaged with the simplified scenario.

### 4.1. Experimental results

Having conducted our experiment, we used the data collected to evaluate the potential effects of complexity in player experience. In this section we will show our results regarding each of the tested dimensions, Interest, Perceived Competence, Agency, Tension, and Effort. As described by the IMI, all these questions use a scale of 1 to 7, from 1 - not at all true, to 7 - very true.

### 4.2. Interest Dimension

In these questions, we observe that, generally speaking, our test sample were interested in playing the scenarios and were not overly bored, as all means for positive questions approach 5, and 2/3 for negatives. This data helps to ensure us that the demo engaged the players, and thus, we can assume that these volunteers were not overly bored, or disconnected from the experiment, which raises our confidence towards the collected data.

By running an independent sample non-parametric Mann-Whitney U test with the *variant played* variable as the control group, we can observe that apart from the first question, all the others don’t show sufficient variation between the two variants to support a potential correlation between complexity and Interest.

In conclusion, we can’t find hints of a correlation in interest towards playing the scenario. Regarding these results, we can observe that, while in general all tested individuals were somewhat engaged with the experiment, averaging on 4.8 on positive questions and on 2.5 on negative ones, perhaps there wasn’t enough of a gap in complexity between the versions to present any meaningful variation in interest. It’s also possible that the more complex version wasn’t so hard as to the point of absolutely disconnecting the player, which we can only see as a positive outcome. Regarding the easy version,
there is a very slight increase in fun, but nothing sufficiently substantial to suggest that this is maintained outlook.

4.3. Perceived Competence Dimension
In the feeling of competence at playing the scenarios, we observe that, in general, our test sample felt incompetent, or unable to understand the game to it’s fullest, as can be seen by means approaching the value 2. These results don’t come as much of a surprise, as Crusader Kings 2 is a very complex game, unlike many on the market currently. As none of the play-testers were familiar with it, feeling less than competent on a first impact is very natural. Perhaps future tests in this regard should take longer than simply 30 minutes of engagement with the game, to allow a more smooth learning experience for the player.

By running an independent sample non-parametric Mann-Whitney U test with the variant played variable as the control group, we observe that there is a connection in half of the questions, some with a very high degree of certainty. With this result, we can say with some certainty that there are hints of a correlation between complexity and perceived competence, as would be natural to assume.

In conclusion, there are hints of a connection between perceived competence and complexity in our scenarios, and that players engaging with the easier version found themselves more competent at it. These results were to be expected, players should feel more competent when playing the easier version, and the opposite on the hardest version. This data suggests that our scenarios, and the complexity variation between them, were correctly implemented, a conclusion that is compounded by the fact that all of these are independent samples, meaning that a single subject engaged with only one of the versions of the experiment.

4.4. Sense of Agency Dimension
In the questions regarding agency, we observe that, in general, our test sample felt a clear sense of agency in their decisions while playing the scenarios but not an overly strong one. Results hang around 5, in 7.

We see these results as a natural outcome of our experiment, Crusader Kings 2, as been seen as a success in generating interesting stories through player interaction [18]. That said, the values of agency were not very strong. We can attribute this to our results in the competence dimension. As player felt generally incompetent at the game, it’s easy to speculate that they would easily score very high on agency, as they might not have understood their choices and consequences to their full extent. By running an independent sample non-parametric Mann-Whitney U test with the variant played variable as the control group, we can observe that there is no connection between the sense of agency felt by players, and the scenario complexity level. Apart from question A6, which might be more due to it’s regret component rather than agency itself.

There are no hints of a connection between the feeling of agency felt and the differing complexities in our two scenarios. We can speculate that perhaps there wasn’t a sufficient gap in complexity for any relevant results to surface, or perhaps our sample population was too homogeneous, and different people with different degrees of experience with games, age, and personalities could potentially present different results. No hints towards a correlation were felt with out sample, but perhaps wider studies must be conducted to ensure that this is in fact the case.

4.5. Tension Felt Dimension
In this set of questions, we can see that our volunteers didn’t feel overly anxious or tense during the testing session, but they were also not fully relaxed. This is, of course, a natural result, as playing Crusader Kings 2 is generally a calm experience. Due to it being an experimental environment, it’s also expected that people are not entirely at easy, as their actions are being monitored.

As stated, these values are expected due to the nature of the game being play-tested and the testing environment itself. Due to this, we can expect that responses in other dimensions of this experiment were not potentially affected by tension, as for all we can discern, this was not a prominent factor among testers.

By running an independent sample non-parametric Mann-Whitney U test with the variant played variable as the control group, we can see that there is no suggestion of a connection between complexity and tension felt while playing. In this dimension in particular, there isn’t even a single question that dismisses the null hypothesis, as such we can only conclude that with this sample of play-tester, with some experience with video-games and strategy games, there isn’t a noticeable increase, or decrease of tension between our two scenario versions.

4.6. Effort Dimension
In the effort put into succeeding at the scenario, we can see that participants avoid extremes. They didn’t put much effort into success, but simultaneously, they feel they didn’t totally disregard the experiment. Like with tension, these results appear quite normal, and innocuous to the remaining data. By running an independent sample non-parametric Mann-Whitney U test with the variant played variable as the control group, we can see that there is
no suggestion of a connection between the effort put into succeeding and the complexity of the scenario being played. This is also an expected result, as the players were uninformed about what scenario they were playing, and even uninformed about the existence of another scenario, it’s expectable that this data is consistent for both groups.

5. Conclusions
Emergent story systems have the great potential of being able to provide a countless number of personal narratives to players in each new play through, by setting them inside a framework and providing the tools to shape it to their wills. The question is then raise, on how complex these systems must, or can be, in order to engage the player without overwhelming him while also retaining the great sense of agency felt by having the power to change the game world. We began our work with the intent of exploring the effects of complexity in the player experience in a single player emergent narrative system, by trying to find correlations between complexity and five different dimensions, Interest, Perceived Competence, Agency, Tension, and Effort.

We began by defining and designing a set of 2 testing scenarios, with differing complexity levels, in order to run player tests and collect data on the five dimensions. We developed these scenarios within the framework of Crusader Kings 2, as it was an excellent example of a successful emergent story game, which also allowed us to mod it to our purposes. Afterwards, we defined a testing methodology and prepared the experiments to correctly collect our data.

We collected both demographic data as well as data on the 5 dimensions by using the Intrinsic Motivation Inventory, a pre-defined suite of validated questionnaires.

Finally we ran a statistical analysis on the collected data to evaluate if there were hints towards a correlation between complexity and any of the 5 dimensions of the experience we set out to test.

After this analysis we came to the conclusion that no strong correlation can be found, apart from a difference in perceived competence, as 2 scenarios with different complexity levels should have a different level of difficulty in playing them. This result, however, does give us some confidence that our methodology was sound.

While these were the results we observed, we believe that further studies need to be conducted to have a greater degree of certainty in them. Our sample was, unfortunately, very homogeneous, tending towards male subjects between 20 and 30 years old with experience in playing game, and in particular, experience with strategy games. The sample was gathered mostly from individuals closely related to the field of Computer Science, so closeness of personality types is also to be expected.

With a more broad heterogeneous sample, might further cement our results, or perhaps show a correlation that we could not find in our limited sample.

For Future work we suggest an adaptation of this study to incorporate a greater test sample, as well as a longer exposure to the game scenario being tested, to allow the player to get to grips with the system he’s experimenting with. We also suggest careful validation of the questionnaires presented to testers, as even when adapting a validated set of questions we ran into some reliability issues.

We would also suggest, in the dimension of agency, to conduct group sessions with participants, after their individual sessions. As agency is related to how the player perceives the importance of his choices and the uniqueness of his experience, a groups sessions where each participants told his story could potentially simulate the reality of Internet communities and message boards were the sharing of experiences can reveal that in the end, not all choices are are crucial as it initially seems, thus modifying how the player feels about the agency he had.

References


