

# Improve Radiant Story

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**Abstract.** To explore the potential ability of games creating more dynamic, living worlds and stories, we took the existing Radiant Story and AI system created by Bethesda Softworks for Skyrim, which is capable of generating quests at run-time, and sought to understand what were its limitations or what caused it to not be enjoyed, in most parts, by the community and players.

The basis for this project is the research and work done in the areas of procedural generation and interactive storytelling as a way to better dynamically create quests.

As such, we had proposed to improve Skyrim's Radiant system by making this system create chained, that is, interconnected and sequential, events and quests, while attempting to maintain narrative coherence and characters' personalities consistent.

The limitations of the base system however, did not allow for the complete development of the suggested structure, but still allowed the analysis of the potential of this type of work, and whether there is worth in continuing to follow it.

**Keywords:** Story Generation; Dynamic world; Personal narrative; Radiant Story

## 1 Introduction

In order to give meaning to player(s) actions in video games, usually an objective is given, some of them simple and straightforward, other more complex or abstract. In role-playing games (RPGs) objectives tend to come in the form of quests, a singular or group of tasks that reward the player in some way, when, usually, successfully completed. However, creating these quests in a meaningful amount and of reasonable quality, requires a lot of effort, work and time, and in several fields of work, mostly writing and programming. The work necessary involves aspects such as creating non-player characters (NPCs) to give these quests to the player(s) and/or be involved in the quests, the writing of the motivation, reason and story behind the quest, creating the steps/tasks the player(s) must fulfil to finish the task, and possibly different states depending on how the player completed, successfully or not, the quest(s), as well as possible connections between quests.

As such, a solution that was found was to allow the game itself to generate, at run-time, these quests as much as possible. This comes in part as an attempt

to reduce the number of hand-made and designed quests. The generation of quests helps in reducing the workload on those responsible for creating these experiences, while maintaining some of the ability of quests in transmitting the illusion of a living and dynamic world in games and giving purpose and objectives to the player(s). In other words, automatically generate or activate quests at a game's run-time depending on need and/or situation.

Our intention is to help increase the number of experiences and events a player can witness, participate in and share, potentially increasing replay value, retaining and entertaining more players, for a longer period of time. In a way, it can be said that part of the inspiration for this project also comes from the players' sharing of the stories they experienced, the adventures they had, the achievements and discoveries they made in games, and a desire to help increase their number.

These unique experiences and sharing of them can be seen in many games, and we looked at some of them whose gameplay and system(s) had the disposition to allow players to create and share their own unique experiences. An important aspect that was common between different games' ability to provide unique experiences was the randomization of environments, locations, enemies, items and/or other parts of a game, which can be seen in games like *Minecraft* [5] and *Civilization* [4].

We have chosen to explore and work on this problems by modifying the game *Skyrim*, from Bethesda Softworks, known for allowing players to act as they wish.

The reasons that led us to choose *Skyrim*, over other potential games, are its easiness to modify and work with, due to the tool used to create its content (Creation Kit) being made available by the developers themselves, the existing information and documentation on its systems made by the community, the game's community itself, as well as due to being one of the few games which already had a basis for creating its own unique experiences, which is the Radiant system, with it being capable of generating quests.

The Radiant system is defined in two different parts, the Radiant AI, which revolves around making NPCs try to complete their personal objectives, which is their basic behaviour, and the Radiant Story which is a system that dynamically generates new quests, which is the main part that interests us.

The Radiant Story can be seen as an attempt to fulfil the problems mentioned above but, both in its implementation and usage, various limitations and issues can be witnessed. This has caused players to feel the game to be more repetitive, or become so faster, when dealing with the quests and events generated by the Radiant Story.

There some other games that have something akin to quest generation. However, just like with *Skyrim*, they are usually systems that just choose a quest from a pool of existing, potential quests and fill in some blanks, such as characters or items, tending to be effectively random, as well as being mostly simplistic.

In short, we intend to verify if dynamically generating quests will allow a wider range of possible experiences that players of a game can have, while avoiding an increase in the work and time required of developers.

In the next section (Section 2) we look at the subject field(s) that best supports the accomplishment of our goals and their related work.

In the section that follows that (Section 3) we analyse and describe the system that we will be working with.

Afterwards, in Section 4 and 5,

## 2 Related Work

The aspect of providing variable, unique experiences depending on ones actions tends to belong to the area of interactive storytelling, which has seen a large amount of research and work poured into. Interactive storytelling is when the story and narrative change and adapt according to the interaction between a player (or players) and the system(game). Usually, their setting, characters and back story are clearly defined and set, though in some cases these are also dynamic.

A relevant and interesting notion for us and our problem, and which is related in part to interactive storytelling, is that of emergent narratives. They are stories that emerge from the interaction between players and a game's system(s). These are personal to a player, not being authored by anyone in concrete and being something akin to one's own life, that is something that is born from one's decisions and actions in a world.

There are a wide variety of games that are able to provide variable, unique experiences to players, and a number of systems that enable games to do such. That is, there are various techniques and systems that allow each player to have different experiences on different game runs (playthroughs) or sometimes even in the same run, when a player attempts different actions. However, they have a number of limitations and, after some time, the experiences they provide cease to be unique or as varied.

A work that was done revolving around the potential dynamic generation of quests, and also serving as inspiration for us, was a "A Prototype Quest Generator Based on a Structural Analysis of Quests from four MMORPGs" by J. Doran and I. Parberry[2]. In it, they analysed the existing quests of MMORPGs and categorized them depending on the actions required to complete them successfully and the motivation behind them. They also designed a model for the dynamic generation of quests for games based on those categorizations.

Besides this one [2] and out of several works in the area of story generation we looked at, two stood out. This was due to having similarities to our objective, similarities to procedural generation and a decent number of useful aspects we could potentially incorporate in our project.

One of those two main works was "A Framework for Coherent Emergent Stories", by Gail Carmichael and David Mould [1], which talk and take advantage of the fact that stories in games are represented a number of times as graphs.

This work mentions that approaches to designing systems for emergent stories range from character-based to plot-based, or described in another way, from a

bottom-up approach (characters drive the story) to a top-down approach (story drives the characters).

They state that the framework they designed in this work is closer to the plot-based end of the spectrum. Since we seek to avoid having and/or using a fairly large number of high complexity agents (for the NPCs) in our project, this framework will hopefully serve well as inspiration and help us in designing and building our solution.

The other main work was “Minstrel Remixed: Procedurally Generating Stories” by Brandon Tearse, Noah Wardrip-Fruin and Michael Mateas [3]. It consisted in a reverse engineering and re-imagining of the work “Minstrel” by Scott Turner, a system which aimed to generate coherent stories. “Minstrel Remixed” is, quoting the authors, “an imperfect recreation of the original “Minstrel” based on written descriptions, since neither the source nor a working copy is available”.

In “Minstrel Remixed”, like in the work of [1] mentioned above, graphs are used as primitives to represent a story. This system, both the original and remixed, were made up of two main components, the Transform Recall Adapt Method (TRAM) system, a case based reasoner which modifies story details, and the Author Level Planning system, which enforces constraints and improves stories as they are generated.

Both of these works’ algorithms give and offer a way of generating a potential narrative story, while our objective is based on generating and choosing the actions (quests and events) required to (help) drive a narrative in a game. These works done on generating the narrative story itself offers us clues, ideas and a basis for our project to work on, since the actions that are requested of a player must have a certain level of relation and coherence with the provided narrative.

### 3 Proposed Solution Architecture

With this project we aim to improve upon the simplistic template quests and events used to generate “new content” for the player to interact with. The course of action we propose is to create a generator of chained quests, that is, quests made up of interconnected smaller, simpler quests.

To help with this, we use Doran, J., and Parberry, I. work[2] as guideline in order to create the most basic, atomic quests that will make up the chained quests. As for how the generation of the chained quests will be done, we will use their prototype quest generator as base and inspiration.

While the Creation Kit tool of Skyrim does not provide a tool to directly, or specifically, create and manipulate chained quests, new quests can be started by a simple script command. Said command is also used by Skyrim’s developers themselves to create, initiate and control the chained quests that exist in the game. Though the existence of such a tool would help in decreasing development time the development of such a tool will not be part of our work, for this project.

A challenge with generating these interconnected sets of quests is in maintaining their narrative coherence between the different quests that make up a chain quest. That is, to avoid running into situations as described previously

which could cause a dissonance between the game and its narrative, part of our objective will be to maintain a coherent story for each chain quest. This comes from the need to give players the story and reasoning behind the NPCs' request(s), as mentioned in [2], in order to better convince and motivate players to perform the given task(s).

In order to achieve this, we will be making use of the ability to initiate and start quests through scripts by splitting the narrative or story from the system actions that are requested of player, thus having a “narrative” quest, where the story and narrative will be, and a “managing” quest that depending on the stage it is at, different, smaller quests will be initiated that will serve as the steps. This way, we should be able to maintain narrative coherence, and through scripts we can have different quests for the same stage of a given chain quest and even different chain quests for similar narratives, thus increasing the number of possible variations a player can encounter.

As such, we would have the narrative quests, chain or managing quests and base quests. Narrative quests will have the story, reasoning and narrative of a quest, chain or managing quests will connect with the narrative quest and have the control over which quests and events to activate in the game and know which stage a player is at, and the base quests will consist of the simplest and singular actions a player can or has to do, at a certain stage, in order to advance and progress in the quest.

As for choosing which quest (action) to activate (request the player to perform) in order to progress in the chain quest, we will be making partial use of the graph usage in the works mentioned above, [1] and [3]. By having a (basic) quest be similar to a node and attributing it certain values, such as combat involvement, we will be able to better categorize the quests and facilitate choosing the most appropriate ones. In that case, we will have a chain quest be equivalent to a graph. Refer to the figure 1 for a simple exemplification of the intended structure.

Given these aspects, our solution to quest generation seems to be much closer to a top-down approach (story drives the characters), in relation to story and narrative.

So, in summary we have the following components:

**Chain Quest :** Represented as a graph; Manages the structure (possible sequence of events) and conditions to advance in the story

**Base Quest :** Represented as a node of the graph (Chain Quest); A basic form that describes (represents) the most simple of actions that can be executed by the player to advance the quest

**Narrative Quest :** Responsible for managing the story/narrative of a quest and communicating with a corresponding Chain Quest, allowing it to adapt according to that narrative's needs, intentions and/or progress

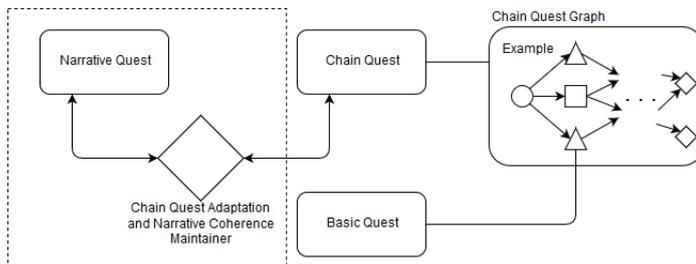


Fig. 1. Exemplification of the basic solution architecture

## 4 Implementation

There were many issues in the development and implementation of this project resulting in a prototype of far less quality than originally intended. These are majorly due to the structure of Skyrim’s system and development platform, Creation Kit, causing a large number of hard to solve problems, further intensified by the system’s black box nature, that is, lack of access to its source, or internal working.

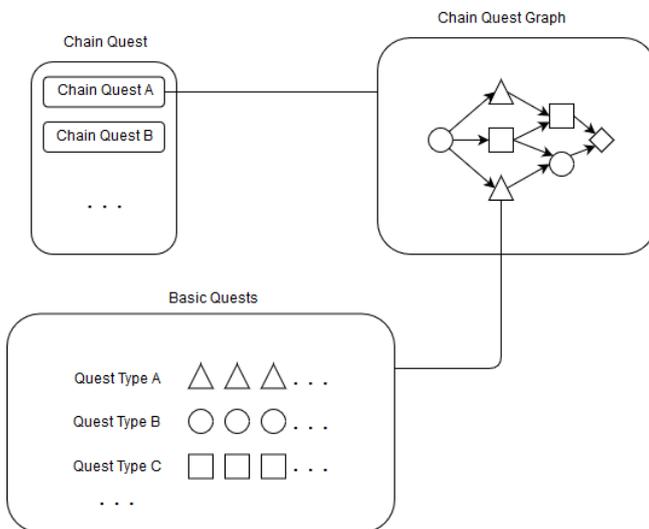


Fig. 2. Exemplification of the implemented architecture

This is why the prototype follows a simplified architecture as can be seen in the image, 2.

Furthermore, the amount of developed content was also of low quantity, and having only 2 Chain quests, of 4 steps/stages each, with only 1 of those steps having a randomly selected group of quests to complete.

## 5 Solution Evaluation Method

In order to evaluate the performance of the prototype, a comparison between the game without the system and the game with the system had to be made. So there was a need for testers to play both versions.

As such, the initially intended method to test and evaluate our hypothesis and its solution, through which we believed we would obtain the most meaningful results, was by creating and releasing a mod to the existing community, and requesting their feedback.

This came from part of the objective being to increase the dynamism of a game's world and allow an additional amount of experiences a player can have, even in different playthroughs. By requesting the existing community we intended to take advantage of the experiences the players have already had playing the original version of the game, thus reducing or even removing the needed for a long testing period.

To complement the reason above, this came from the existence of a reasonably large community, that has already experienced Skyrim's world in many different ways. As such, we would have a larger number of responses and that were better reflective of this work's objective, even if the quality of the responses themselves were to be lower and harder to interpret and process, when compared to local tests.

This however, did not provide the expected results, having obtained few answers through this method. The remaining answers to the questionnaire were gathered from other people which were personally contacted, that did have some experience with games, but may not have been related to the game the project was based and developed on (Skyrim).

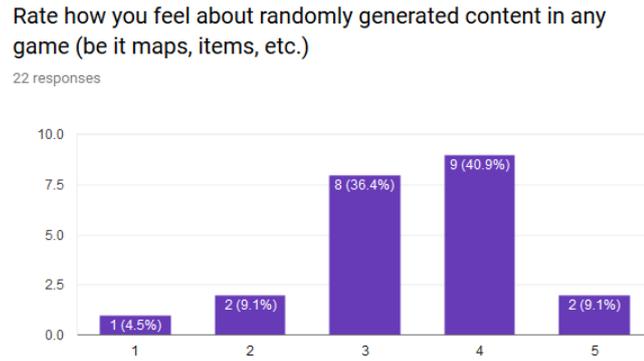
The test itself consisted in asking the players' to complete the developed quests, and then answer a questionnaire. In some of the questions, of the questionnaire, a scale of "1" to "5" was used, with "1" expressing an entirely negative view towards the question's content and "5" a highly positive outlook.

The players were provided with the developed prototype, as a mod, along with previously created save files to decrease the test time. The testing itself was not overseen, and as such not properly enforced, letting the testers perform it when they could or had availability. This was due to the planned approach, of requesting the already existing online community to test the mod, though the same method was used for those directly contacted.

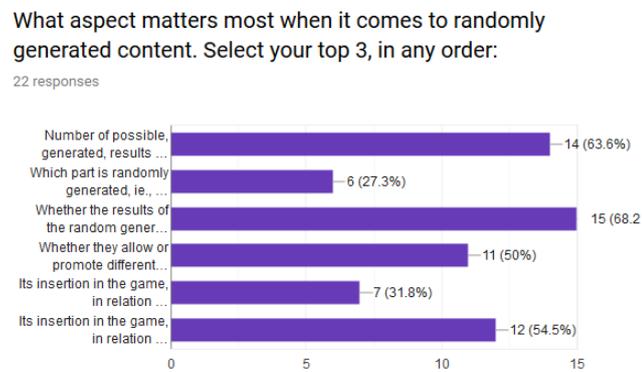
The results of the questionnaire were mostly of a neutral and slightly negative nature in regards to both the original system of Skyrim and the developed prototype.

It was somewhat expected, due to the nature of the prototype and its implementation, that the answers to the questions on the provided quests, were similar to the ones regarding Skyrim's dynamic quests.

Fortunately, most results had also a decent number of slightly positive responses. This, combined with the large amount of neutral responses, causes a form balance between positive and negative responses.



**Fig. 3.** Testers' response regarding interest in random content generation



**Fig. 4.** Testers' opinion on the most important aspects of random content generation

This seems to indicate that despite the issues existent in both standard Skyrim's system and the developed prototype, there is not a rejection towards

Do you think/believe that the idea or intention of having randomly generated content in any game could be good for helping provide content in a game or entirely replace it?

22 responses

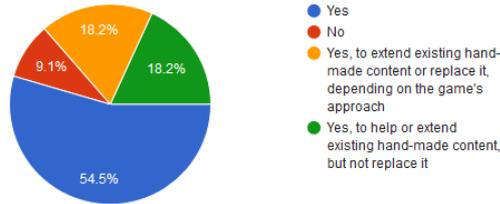


Fig. 5. Testers' response regarding addition of randomly generated content to a game

If you answered yes to the previous question, what for, or how, should randomly generated content be used:

12 responses

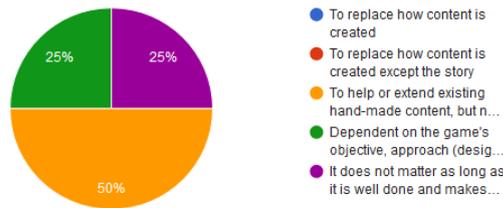


Fig. 6. Testers' response regarding usage of randomly generated content in a game

this type of approach. This is easiest to see in the responses seen in the images: 3, 4, 5, 6. As such, despite the poor results in this work, continued effort in exploring the method of randomly generating content is still worth pursuing, though a slightly different approach may be required.

## 6 Conclusion

It can be said that a large amount of parts of the initial objectives were either not completed or largely simplified or changed, in order to make them work with Skyrim.

Given such points, this work can hardly be considered a success. Whether it should be truly considered a failure we look to the results of user testing.

The results from the questionnaires, relative to the tests on the developed prototype, were mediocre. While not a good result, which can be attributed to a number of different points, it does show that there is not a complete rejection in regards to this type of approach in games.

Overall, the results of this project can be said to be a failure, in regards to its initially stated objectives. However, it does allow to affirm that such an approach is a possible, potential, way to further improve games and their content.

Finally, it should be noted that more work is still needed in this regard, in order to obtain better and more positive, or more conclusive, results.

## References

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5. Minecraft, <https://minecraft.net/>