From Game Stories to Story Cards: Exploring LLM-Driven Generation of Short Interactive Narratives

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Abstract. Introduction: *Recent advances in Large Language Models (LLMs) have enabled the automatic creation of coherent and contextually rich narratives from minimal input. However, transforming these outputs into structured, interactive story experiences remains a challenge in game and narrative design.* ***Objective:*** *This paper proposes a four-stage process for generating short interactive narratives represented as story cards.* ***Methodology or Steps:*** *The stages include: (1) structured prompt design for game story generation, (2) transformation into a JSON-based story card model, (3) multimedia asset generation, and (4) interactive execution of the JSON model using a quiz-based platform. A case study inspired by a Pac-Man adventure demonstrates the feasibility of the approach.* ***Results:*** *The study shows that LLMs can effectively produce coherent narrative fragments suitable for short interactive narratives. As a result, the proposed card-based process bridges automated narrative generation and playable content, providing a practical foundation for developing narrative-driven experiences across entertainment contexts.*
Keywords *Large Language Models (LLMs), Short Interactive Narratives, Automated Content Generation, Digital Storytelling, Game Design.*

1. Introduction

Interactive narratives can be defined as "stories whose unfolding, pace, and outcome can be influenced by some intervention by a spectator" [Cavazza e Young 2016]. They constitute a key element in various types of games and virtual environments, playing a central role in achieving goals related to entertainment, education, and therapy [Ware et al. 2022]. Furthermore, interactive narratives have shown particular promise for web-based learning interventions due to their effectiveness as active learning formats [Green e Jenkins 2014, Grasse et al. 2021].

Large Language Models (LLMs) have significantly advanced the ability to generate coherent and contextually rich narratives from minimal input [Lanzi e Loiacono 2023]. This progress opens new opportunities for Procedural Content Generation (PCG), particularly in games and interactive systems that rely on narrative depth. However, despite the remarkable improvement in text generation, translating these narratives into structured and interactive storytelling experiences remains a persistent challenge [Chen e Jhala 2025]. Existing PCG approaches often focus on generating isolated scenes or static layouts, neglecting the temporal and causal continuity that characterizes most narrative experiences [Chen e Jhala 2025].

Short interactive narratives, in contrast, emphasize concise storytelling through sequences of events that evolve based on player choices, fostering both thematic coherence and engagement. Building on this idea, this work proposes an LLM-based process for generating short interactive narratives represented as story cards. Each story card encapsulates a narrative segment and presents the user with one or more options to influence subsequent events [Aguiar et al. 2018, Aguiar et al. 2019]. As a result, this structure not only supports temporal progression and interactivity, but also provides a lightweight framework for experimenting a narrative immersion with automated content generation and player-driven storytelling design.

2. Related Work

A search conducted on *Google Scholar*[1] reveals that recent studies have explored the practical application of LLMs through the use of structured prompts for digital game design.

For example, [Junior et al. 2023] investigated the use of ChatGPT in the creation of educational board games conceived as *objects-to-think-with*. The study proposed a framework for educators organized into three design phases: *ideation* (suggesting topics and mechanics aligned with learning objectives), *customization* (providing templates for tailored game development), and *evaluation* (offering feedback mechanisms for improving components and mechanics). In each phase, structured prompts guide the inquiry about the game under design, such as: *"Propose concepts for developing an educational board game for [target audience: adults, youth, etc.], focusing on fostering essential skills in [curricular topic or learning goal, such as financial literacy]"*. As a result, this structured prompting enables iterative refinement of the LLM's responses.

Similarly, [Sarinho 2025] presented a prompt model aimed at generating structured *game stories*, applied to the creation of a children's text-based adventure inspired by the game *Pac-Man*. The proposed prompt was tested across four different LLMs, resulting in a set of narrative and logical structures based on the representation of *User Stories* tailored for game design [Sarinho 2020]. These structures encompass key aspects such as spaces, actors, items, interactions, rules, and challenges related to the proposed game.

In another study, [Serra et al. 2025] introduced *PromptingGameCraft* (PGC), a tool leveraging LLMs to automate key stages of digital game development. The system takes a Game Design Document (GDD) as input and automatically generates a Game Design File (GDF) in JSON format, along with a customized class diagram, project directory structure, and corresponding source code stage prototyping.

Finally, [Chen e Jhala 2025] proposed a lightweight pipeline that transforms short narrative prompts into sequences of 2D tile-based game scenes, reflecting the temporal structure of stories. Given an LLM-generated narrative, the system identifies three key temporal frames, extracts spatial predicates in the form of "Object–Relation–Object" triples, and retrieves visual assets using affordance-aware semantic embeddings from the *GameTileNet* dataset. The approach was evaluated using ten diverse stories, and the results demonstrated a scalable method for narrative-driven scene generation.

[1] `https://scholar.google.com/`

3. Method

To generate and execute short interactive narratives using LLMs, a process consisting of four main stages was designed. The first stage focuses on generating *game stories* that represent an interactive narrative around a chosen theme. The second stage converts these game stories into a JSON structure of *story cards* that together describe a complete short interactive narrative. The third stage produces the multimedia assets required for each card. Finally, the fourth stage executes the resulting story cards interactively, displaying the information in an engaging and dynamic way.

3.1. Stage 1: Structured Prompt Design for Game Stories

For the first stage, a structured *game story* prompt model proposed by [Sarinho 2025] was employed to guide LLM-based narrative generation. This model is grounded in the concept of *User Stories* adapted for game design [Sarinho 2020], incorporating constraints related to spaces, actors, items, interactions, rules, and challenges, as illustrated in Figure 1. By defining these narrative parameters, the approach ensures coherence and gameplay relevance while giving game designers the flexibility to refine or adjust the generated *game stories* according to the desired theme, tone, or progression of the textual adventure.

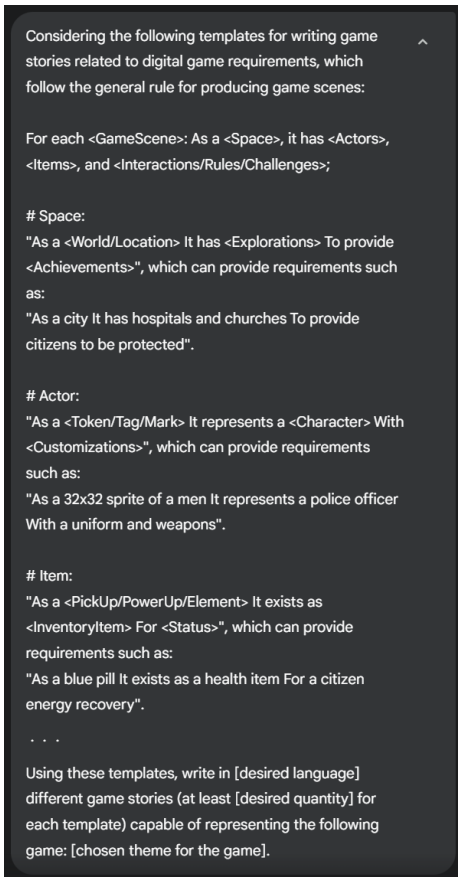

Figura 1. Structured prompt model used for generating game stories.

3.2. Stage 2: Story Card Representation

Once the *game stories* are generated, the second stage transforms them into story cards that follow a defined JSON schema [Sarinho 2018] shown in Figure 2, where each card

contains:

- **id** and **title**: the identification and title of the card;
- **text**: a descriptive narrative segment contextualizing the story;
- **media**: multimedia elements complementing the narrative;
- **actions**: player choices or possible commands;
- **goTo**: the identifier of the next card depending on the chosen action.

```
exports.storyCards = [
    {
        id: "WakingUp",
        title: "Waking Up",
        text: "It's 5:00 a.m., and the work in the fields must begin. "+
              "You woke up late today, but you're still tired and "+
              "very hungry. What do you plan to do?",
        actions: [
            { text: "Go to the kitchen to have some coffee.",
              goTo: "Breakfast" },
            { text: "You're too tired and decide to sleep a little longer.",
              goTo: "Want to sleep a little longer" }
        ],
        start: true
    },
```

Figura 2. JSON model representing the structure of story cards.

The aggregation of multiple cards within this structure allows the formation of decision flows that together represent a short interactive narrative. These stories typically contain 10–15 cards, providing a compact yet immersive experience.

To perform this conversion, a predefined *prompt* guides the LLM to transform each structured *game story* into corresponding story cards (Figure 3). The prompt instructs the LLM to follow the structure defined in a reference file that contains a complete and validated example using the illustrated story card model (Figure 2). By applying this model file as a schema, the system ensures consistency in the generation process and validates the resulting JSON output.

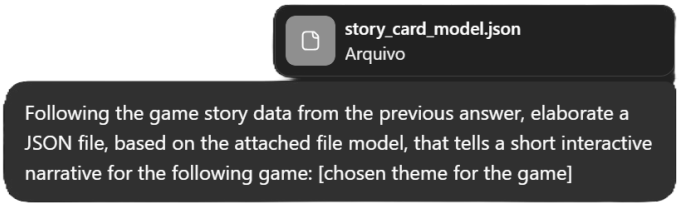

Figura 3. Structured prompt model used for generating story cards.

3.3. Stage 3: Multimedia Generation

In the third stage, multimedia assets (primarily images) were generated for each card. A dedicated script automatically produced prompts for each card, ensuring visual coherence with the narrative tone and context. Because image generation requires more computational resources, each prompt was handled individually to maintain consistency and fidelity, as demonstrated in Figure 4.

```
Given the following storytelling card, could you create a
representative image for it?"
 {
  id: "[ID_NAME]",
  title: "[TITLE]",
  text: "[TEXT_DESCRIPTION]",
  actions: [
   { text: "[ACTION_TEXT]", goTo: "[ID_CARD_TO_GO]" },
   { text: "[ACTION_TEXT]", goTo: "[ID_CARD_TO_GO]" }
  ],
 }"
```

Figura 4. Generated prompt used to produce story card images.

3.4. Stage 4: Interactive Execution with AsKME

The fourth stage used the Assessment of Knownledge Multiplatform Environment (AsKME) [Sarinho et al. 2018], a configurable multiplatform quiz engine capable of running on desktop, web, chatbots, and Arduino devices. A specific configuration was developed to interpret story cards: the system begins at the card marked with the **start** property and terminates when it reaches a card without available actions. Player choices are presented interactively, dynamically shaping the narrative flow according to player responses.

For a better understanding of the proposed process, Figure 5 summarizes its four stages: (1) Structured Prompt Design for Game Stories, (2) Story Card Representation, (3) Multimedia Generation, and (4) Interactive Execution with AsKME.

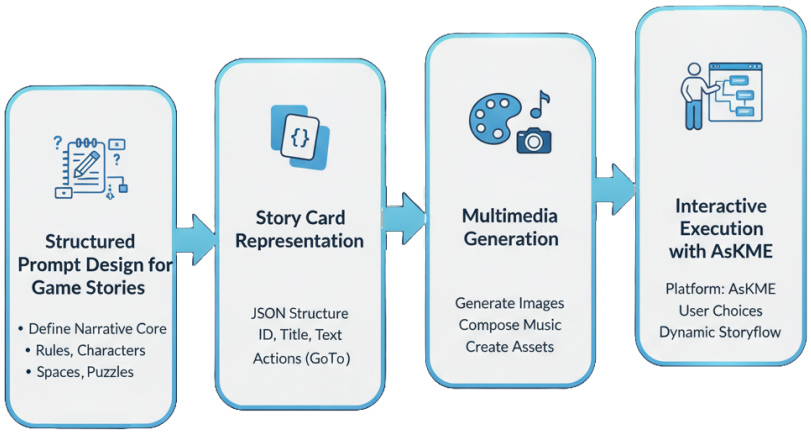

Figura 5. Overview of the four stages in the proposed process.

4. Obtained Results

To demonstrate the feasibility of the proposed process, a text-based adventure inspired by the *Pac-Man* universe [Sarinho 2025] was applied. According to [Sarinho 2025], among different LLMs tested, ChatGPT[2] (GPT-5 version) was selected for the first stage due to its

[2]https://chatgpt.com/

concise and coherent generation of game stories. Table 1 presents examples of generated game stories that were used in the conversion to story cards.

Tabela 1. Examples of generated game stories.

Space: "As a colorful maze, it has glowing corridors and secret tunnels to provide children with discoveries and exploration challenges."
Actor: "As a 32x32 pixel circle with eyes, it represents Pac-Luzinho, with a smiling face and a backpack of stars."
Item: "As a golden key, it exists as an inventory item for opening magic doors inside the maze."
Interaction: "As Pac-Luzinho, given following the trail of stars, when reaching a fork, then the correct path glows, so that he does not get lost."
Rule: "As Pac-Luzinho, he wants to reach the magic portal where, given he gathers the key and fruit, then the portal activates, so that he completes the adventure."
Challenge: "As Pac-Luzinho, in order to escape the ghosts, given they speed up, when his energy is low, then he must find a fruit quickly."

In the second stage, ChatGPT generated a JSON file describing the story cards based on the previously produced game stories (Figure 6). Each game story card serves as a modular narrative unit, encapsulating specific game design patterns derived from the LLM's structured output. An example schema adapted from an available project [Sarinho 2018] was used as a model to ensure functional logic and proper linkage between cards. The **meta** property was also introduced in the generated cards, providing game story data to explain why each narrative element was generated.

Regarding the interactive narrative flow generated for the Pac-Man adventure (Figure 6), each numbered node represents a JSON-encoded story card containing narrative content, player actions, and transition context, while directed edges represent possible choices that determine progression. The experience begins at the awakening in the maze and branches into exploratory paths such as the Light Corridor, Secret Tunnel, and Golden Fruit, illustrating a non-linear structure in which players navigate through interconnected narrative states.

Throughout the flow, certain nodes function as progression mechanisms. For example, the Golden Fruit introduces an optional exploratory branch that expands the player's interaction with the narrative flow. Similarly, the Magic Items Room introduces a narrative progression mechanism that prepares the player for subsequent events in the story. Rather than implementing an explicit inventory system, the current approach uses story card transitions to represent the narrative consequences of obtaining important objects. Conflict-driven states, such as the Ghost Encounter and Scared Ghost, add tension and reactive branching, allowing multiple resolutions before paths converge toward the Treasure Room and ultimately the Final Portal.

Overall, this cohesive set of cards demonstrates the process ability to translate abstract LLM prompts into structured, playable narrative fragments that maintain internal consistency. Moreover, the flow diagram demonstrates how LLM-generated narrative fragments can be structured into a coherent interactive experience using modular story

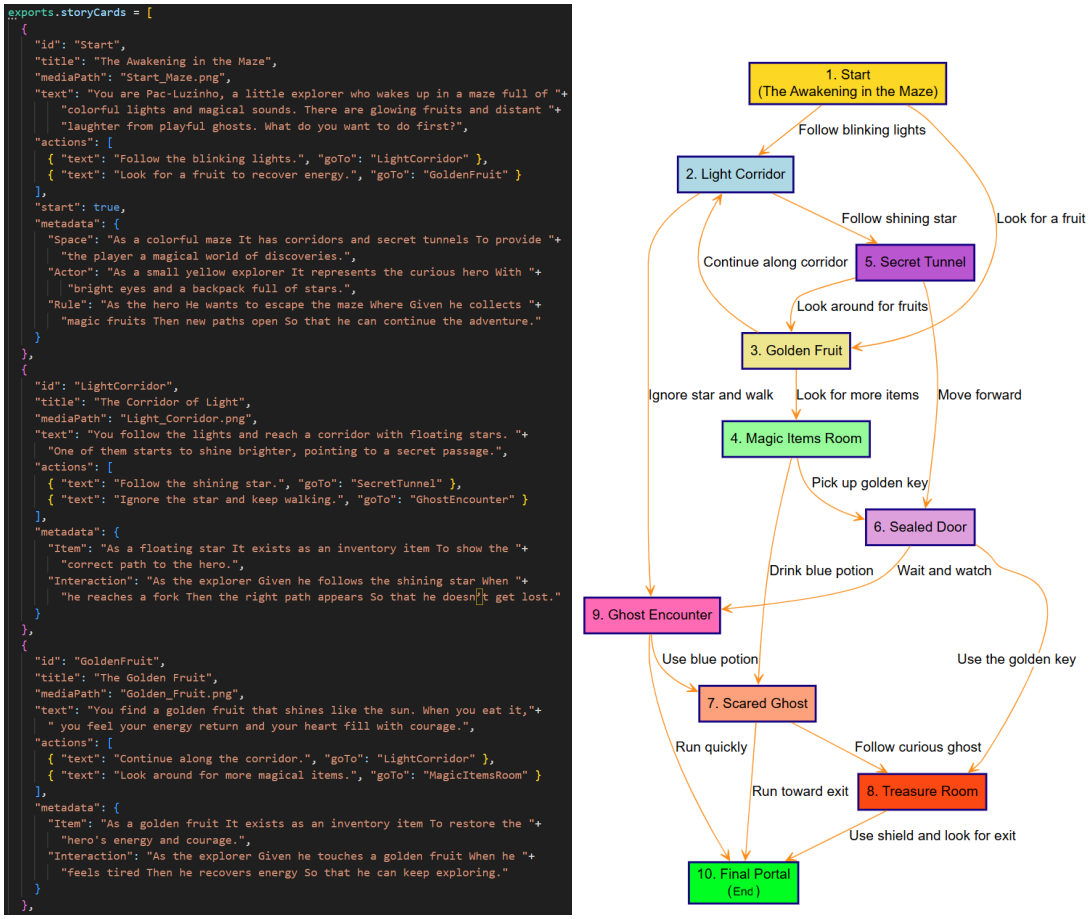

Figura 6. Examples of generated Pac-Man story cards, together with a flow diagram showing transitions between Pac-Man story cards.

cards and explicit transition rules.

In the third stage, images were generated using Gemini[3] (2.5 flash version), which provided faster responses and higher graphical quality than ChatGPT. At this stage, the structured information defined in the story cards was used to guide multimedia asset creation, ensuring visual coherence with the narrative elements previously specified. As a result, Figure 7 presents examples of the generated images aligned with their corresponding story cards, demonstrating how structured narrative representations can effectively support consistent and context-aware multimedia asset generation.

Finally, the JSON and image assets were integrated into the AsKME platform. The platform interprets the structured story card model at runtime, dynamically rendering narrative text, associated images, and interactive choices according to the transition rules defined in the JSON file. This execution layer ensures that player decisions trigger the appropriate state changes, preserving the branching logic and conditional progression designed in the previous stages. The final execution of the Pac-Man adventure is shown in Figure 8, illustrating how text, visuals, and user choices combine to form a cohesive storytelling experience.

[3]https://gemini.google.com/

Figura 7. Examples of images produced by Gemini for Light Corridor, Golden Fruit, Magic Items and Secret Tunnel story cards.

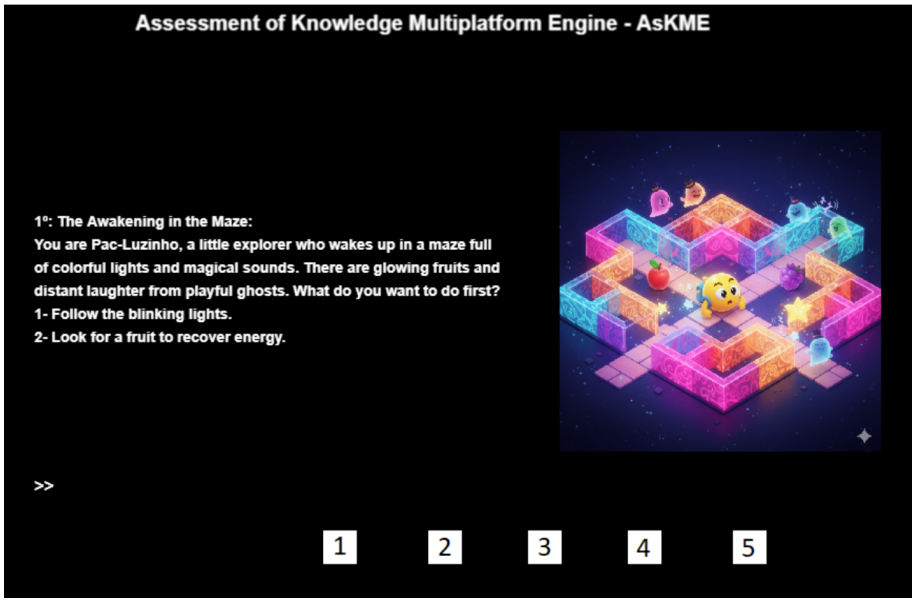

Figura 8. AsKME execution of the generated Pac-Man adventure.

5. Discussion

The obtained results demonstrate that the proposed pipeline is capable of transforming structured game stories into executable interactive narratives. Beyond its technical feasibility, the generated Pac-Man adventure reveals relevant narrative characteristics.

The generated narrative exhibits branching exploration paths, conflict situations, goal-oriented progression, and convergence toward a final resolution. These characteristics suggest that the story card representation can support coherent interactive narratives while maintaining a simple execution model. The modular organization of story cards also helps preserve relationships between events, reducing the likelihood of disconnected narrative fragments.

The branching structure provides opportunities for player agency by allowing different exploration routes and alternative sequences of events. Although the narrative converges toward a common ending, player choices influence how the story unfolds and which situations are experienced. The narrative also incorporates elements such as exploration, challenge, conflict, reward, and resolution. Story elements such as the Golden Fruit and Golden Key act as progression mechanisms, while card transitions represent the narrative consequences of player actions.

From a narrative design perspective, these results indicate that story cards can serve as a lightweight mechanism for organizing LLM-generated branching narratives. However, the present study does not provide evidence regarding player engagement, immersion, or perceived narrative quality. Therefore, the observed qualities should be interpreted as structural characteristics of the generated content rather than validated player experience outcomes.

The study has important limitations. The evaluation was restricted to a single Pac-Man-inspired case study and no user study was conducted to assess engagement, narrative quality, or satisfaction. In addition, multimedia generation remains dependent on the consistency of the selected generative AI model, while the computational cost may increase for larger narrative experiences.

Despite these limitations, the results suggest that the proposed story card approach can serve as a practical intermediate representation between LLM-generated narrative content and interactive storytelling systems, supporting the creation of coherent branching narratives with minimal manual authoring effort.

6. Conclusions and Future Work

This work presented a structured process for generating short interactive narratives using LLMs, combining automated storytelling with visual and interactive design. By decomposing narrative generation into four stages (structured prompt design, story card representation, multimedia synthesis, and interactive execution) the proposed approach bridges the gap between textual creativity and playable content in an automated perspective.

The results obtained from the Pac-Man case study demonstrate that LLMs can effectively generate coherent and engaging story fragments suitable for interactive storytelling. Moreover, the card-based structure proved to be an accessible and flexible way to organize branching narratives, allowing seamless integration with existing game engines such as AsKME.

Beyond entertainment, this methodology has potential applications in education with purposes, where short interactive narratives can serve as adaptive learning or behavioral tools through narrative engagement. Moreover, by leveraging LLMs to dynamically generate and adapt story content, such narratives can be personalized to each user's cognitive profile, emotional state, or learning objectives, enhancing both engagement and pedagogical effectiveness.

Future work will focus on several directions. First, it is necessary to conduct quantitative and qualitative evaluations of story quality, coherence, and player engagement, comparing outputs from different LLMs and prompt strategies. Second, it is necessary to expand the multimedia pipeline to include audio and animation generation, enhancing immersion. Additionally, it is important to develop an authoring tool that allows game designers to create, visualize, and export LLM-based story cards without requiring programming expertise. Finally, there is an intend to explore adaptive storytelling mechanisms in which player feedback dynamically influences narrative generation, enabling real-time procedural storytelling driven by LLMs.

Referências

Aguiar, E., Gomes, V., e Sarinho, V. (2019). Tales of health-tea: Uma proposta de storytelling digital para conscientização do transtorno do espectro do autismo. In *Anais do XIX Simpósio Brasileiro de Computação Aplicada à Saúde*, pages 264–269, Porto Alegre, RS, Brasil. SBC.

Aguiar, E. C., Gomes, V. O., e Sarinho, V. T. (2018). Projeto tales of health: Uma proposta de jogo digital para conscientizaçao do transtorno do espectro do autismo. In *Proceedings of Brazilian Symposium on Computer Games and Digital Entertainment (SBGames)*, pages 1481–1482. SBC.

Cavazza, M. e Young, R. M. (2016). Introduction to interactive storytelling. In *Handbook of digital games and entertainment technologies*, pages 1–16. Springer.

Chen, Y.-C. e Jhala, A. (2025). Narrative-to-scene generation: An llm-driven pipeline for 2d game environments. *arXiv preprint arXiv:2509.04481*.

Grasse, K. M., Melcer, E. F., Kreminski, M., Junius, N., e Wardrip-Fruin, N. (2021). Improving undergraduate attitudes towards responsible conduct of research through an interactive storytelling game. In *Extended abstracts of the 2021 CHI conference on human factors in computing systems*, pages 1–8.

Green, M. C. e Jenkins, K. M. (2014). Interactive narratives: Processes and outcomes in user-directed stories. *Journal of Communication*, 64(3):479–500.

Junior, W. G., Marasco, E., Kim, B., Behjat, L., e Eggermont, M. (2023). How chatgpt can inspire and improve serious board game design. *International Journal of Serious Games*, 10(4):33–54.

Lanzi, P. L. e Loiacono, D. (2023). Chatgpt and other large language models as evolutionary engines for online interactive collaborative game design. In *Proceedings of the Genetic and Evolutionary Computation Conference*, pages 1383–1390.

Sarinho, V. T. (2018). Projeto tales of health: Trabalhando a conscientizaçao da saúde através de histórias de vida de pacientes com câncer de boca. In *Proceedings of Brazilian Symposium on Computer Games and Digital Entertainment (SBGames)*, pages 1479–1480. SBC.

Sarinho, V. T. (2020). Applying user stories as game elements and interactions in a game of games design proposal. In *Proceedings of Brazilian Symposium on Computer Games and Digital Entertainment (SBGames)*, pages 40–46. SBC.

Sarinho, V. T. (2025). Explorando a aplicação de modelos de linguagem de grande escala (llms) para o design de game stories. In *Anais do XXIV Simpósio Brasileiro de Jogos e Entretenimento Digital*, pages 95–105, Porto Alegre, RS, Brasil. SBC.

Sarinho, V. T., de Azevedo, G. S., e Boaventura, F. M. (2018). Askme: A feature-based approach to develop multiplatform quiz games. In *2018 17th Brazilian Symposium on Computer Games and Digital Entertainment (SBGames)*, pages 389–398. IEEE.

Serra, C., Serra, G., e Classe, T. (2025). Digital game development using large language models (llms): An exploratory study. In *Anais do XXIV Simpósio Brasileiro de Jogos e Entretenimento Digital*, pages 538–549, Porto Alegre, RS, Brasil. SBC.

Ware, S., Garcia, E. T., Fisher, M., Shirvani, A., e Farrell, R. (2022). Multiagent narrative experience management as story graph pruning. *IEEE Transactions on Games*, 15(3):378–387.