Journal on Interactive Systems, 2026, 17:1
ISSN: 2763-7719 • doi: 10.5753/jis.2026.7962

Research Paper

G.A.M.E.: Guide for the Adaptation of Modern Board Games to Digital Environments

Camila Belmont Mesquita [Federal University of Ceará | *camilabelmont@alu.ufc.br*]
Paulyne Matthews Jucá [Federal University of Ceará | *paulyne@ufc.br*]

Universidade Federal do Ceará, Campus de Quixadá, Av. José de Freitas Queiroz, s/n, Cedro, Quixadá, CE, 63902-580, Brazil.

Abstract. The adaptation of board games to digital platforms, while preserving elements familiar to players, requires developing strategies that maintain the consistency of these characteristics across both versions. However, the scarcity of technical references makes this process complex, especially for game developers without specific knowledge on the subject. This article presents the creation, validation, and refinement of a guide to support this process, structured around the common core elements of games — defined as mechanics, rules, narrative, aesthetics, and technology. The methodology comprised a bibliographic review to establish an operational definition of the concept of core, the development of a guide structured around the core, its application in the adaptation of a real game as an example model, and, finally, its validation through semi-structured interviews with experienced professionals. The specialists' observations resulted in 24 positive points and 13 points for improvement, organized into 15 questions distributed across four criteria: applicability and practical usefulness; clarity and structure; currency and relevance; and guidance for use. Approximately 34.2% of the observations were favorable to the guide, indicating that it constitutes a promising tool to assist in the identification and maintenance of the core during the adaptation of analog games, while the remaining 34.2% reinforce the final stage of the methodology through adjustments and additions aimed at making the guide more robust and concise.

Keywords: Adaptation, Board game adaptation, Digital platforms, Game core, Board games, Digital games.

Edited by: Marcelo da Silva Hounsell | **Received:** 31 March 2026 • **Accepted:** 05 May 2026 • **Published:** 25 May 2026

1 Introduction

Board games are non-digital games played on a flat surface, most commonly a table [Novak, 2011]. Such games are composed of a variety of elements that are appealing to the public, such as the intellectual stimulation provided by challenges; the variety in terms of theme, genre, and mechanics; the materiality of the playable physical components; and sociality, understood as the social experience among players that lends dynamism to the matches [Rogerson *et al*., 2016].

With the rise of digital technologies, this social experience — largely limited to face-to-face interactions — has undergone a significant transformation, enabling the creation of virtual systems that connect and communicate people across different parts of the world, overcoming geographical barriers. This modernization, however, is not restricted to games developed exclusively in the digital medium; it also opens space for the incorporation of traditionally analog elements into the virtual environment, as in Digital Board Games, which adapt board games to digital platforms.

This process involves not only the digitization of physical components but also the reinterpretation of game mechanics and social dynamics for the virtual environment, requiring strategies that preserve the core elements of the game, since it is impossible to guarantee a direct, identical transposition of the original analog elements. This impossibility is corroborated by Philippe Dao, commercial director of Asmodee Digital, who states: "You cannot really recreate the exact transposition of a physical board game to a digital platform; it is not possible, [...] You cannot replace the fact that you are playing with friends or family around the table and all the social interactions that you can have..." [Taylor, 2018].

At the same time, adaptation to the digital medium serves as a means to add new features and facilitate understanding of the game — for example, through automated moves, round management, and interactive tutorials. In this sense, by preserving the core that has already won over players and integrating the inherent benefits of the virtual medium, the digital version creates a unique competitive advantage: encouraging new audiences to acquire both versions. According to Rogerson *et al*. [2016], players tend to adopt a parallel usage approach, in which experiences in digital and analog environments complement one another, influencing the decision to consume the same game in multiple formats.

This strategy has attracted the interest of two main actors in the sector. On the one hand, large companies invest significantly in adapting already established titles, aiming to capitalize on the growing market and expand the visibility of their catalogs [Taylor, 2018]. On the other hand, it represents a strategic opportunity for independent developers, who find in it a pathway to commercial reach and enhanced player experience, without needing to compete directly for initial recognition in the analog market.

However, for independent developers, adopting this approach is complex due to the lack of clear guidelines for the adaptation process. Although the arsenal of techniques for creating digital games considered, these methods prove insufficient or inappropriate, since adapting a game from one platform to another is a different process from creating a game from scratch.

Based on this problem, this work constitutes an extension of the article *Construção de um Guia para Auxiliar*

no Processo de Adaptação de Jogos de Tabuleiro para uma Versão Digital presented at the XXIV Brazilian Symposium on Games and Digital Entertainment by Mesquita and Jucá [2025]. The present study aims to present and detail the creation of this guide, structured around the core — defined by mechanics, rules, narrative, aesthetics, and technology — in order to assist in the development of strategies for adapting board games to the digital medium, offering practical steps that guide and simplify the process according to the needs of each project.

In the work of Mesquita and Jucá [2025], the following methodological steps were defined: (1) Mapping and analysis of the core elements common to most modern board games; (2) Development of a guide that assist in the justification and delimitation of these elements for adaptation purposes; (3) Creation of an example model and application of the guide in the adaptation of an existing game; (4) Evaluation of the guide through semi-structured interviews with game designers and developers, aiming to collect impressions and suggestions regarding the material; (5) Adjustment and refinement of the guide based on the contributions obtained.

The main differences in this work lie in the expansion of the background and related work, as well as in the greater level of detail in the methodology, including the full incorporation of interviewee comments, the analysis of results, and a brief quantitative consolidation. The data show that, out of the 38 categorized comments, 63.2% indicated positive aspects of the guide (requiring no changes or offering favorable observations regarding its usefulness), while 34.2% pointed to potential improvements and relevant additions, and the remaining 2.6% were classified as neutral (not indicating any improvement). In addition, this study continues the final phase of the methodology by incorporating the improvements suggested by the interviewed specialists and implementing the proposed actions as future work.

Specifically, this version includes the creation of a new example model using the board game Catan, chosen for having well-established digital versions that allow for comparative analysis, unlike the previously used material, which did not offer the same validity as a reference for understanding the guide. Another improvement was the inclusion of a glossary of terms, a suggestion incorporated to promote greater understanding among users with different levels of technical knowledge on the subject.

This paper includes the results of the previous research by Mesquita and Jucá [2025], as well as new results from the continuation of the final methodological stage, namely adjustments and refinements to the guide.

2 Background

As established in Section 1, Digital Board Games (DBGs) are the adaptation of board games to digital platforms, a process that involves more than a direct transposition of components; rather, it entails a reinterpretation and reworking of game mechanics and experiences within a new platform. The success of this transposition, however, lies in a central challenge: identifying and preserving the essential elements — referred to in this work as the core — that give the game its identity and make it recognizable to its players, even in a new medium. This section, therefore, explores the theoretical debate surrounding this concept and defines how it will be understood in this research, thereby grounding the proposed methodology.

2.1 Theoretical Debate on the Core

The adaptation of board games to digital platforms goes beyond mere transfer of components. It requires meticulous attention to determine what one intends to convey and the motivation behind this adaptation, as it is essential not only to translate but also to understand the game's integral dynamics when migrating it. This implies identifying which elements and characteristics must be preserved as part of the experience and which improvements and opportunities digitalization can offer to the audience, without compromising the player's understanding of the game [Rogerson *et al.*, 2016].

It must also be recognized that board games have built an audience that values the original experiences and remains loyal to them. As highlighted by Philippe Dao, "If you come up with a digital adaptation that is not able to deliver the quality that fans would expect, we lose twice... We will lose on the digital adaptation but also we really lose credibility among the huge community we have built over the years with the physical board game" [Taylor, 2018]. Therefore, it is important to identify and preserve the core elements that give the game its identity, as these are what make it memorable and engaging in both versions.

It is precisely in the core that players' sense of familiarity resides. Brathwaite and Schreiber [2008] define it as the unique gameplay experience one intends to convey, whose origin lies in a central mechanic. It is through the execution of and interaction with this mechanic that the core dynamic emerges, understood as the pattern of behavior and the essence of the game. In other words, it is the core dynamic that represents what the game truly is — how it is perceived, remembered, and played — even though it derives from a primary element.

Salen and Zimmerman [2004], on the other hand, define the core within a conceptual framework that organizes the study of games and provides a comprehensive view of their design. Proposed as a facilitator for identifying and organizing the essential elements that compose the core, it consists of three main schemas [1], namely rules, play, and culture, which are described below.

- **Rules**: An element considered a formal schema that organizes and directs games.
- **Play**: An element centered on the experience and interaction with the game and other players, being considered an experiential schema that takes into account the rules and their application to create an interactive context capable of providing experiences to players.
- **Culture**: An element that encompasses the space and time external to the game itself. As a contextual schema, culture broadens the view of the game to the environment

[1] Defined as lenses or general structures for understanding games and the practice of game design, schemas are useful because they allow us to classify the complex phenomena of games in a free and intuitive way, highlighting specific characteristics of games. Schemas are not defined concepts. They are ways of thinking that enable us to assimilate knowledge about a game. [Salen and Zimmerman, 2004]

and explores its relationship with the context in which it is embedded, whether by incorporating cultural aspects or exerting its cultural influence.

Although the mentioned schemas are part of a conceptual structure and complementary to one another, rules should be emphasized as an element that conveys the essence of the game and defines its characteristics. In a comparative analysis conducted by Salen and Zimmerman [2004] of the game Go across different types of play (by platform, motivation, or material used), it is possible to observe that all its versions are still recognized as Go. This occurs because the rules remain consistent and are commonly shared among them [Salen and Zimmerman, 2004].

From another perspective, Schell [2008] identifies four elements that compose the core: mechanics, story, aesthetics, and technology. For the author, each element has equal importance and can influence design decisions due to the impact they exert on one another, as they are complementary and together have the capacity to structure and create the desired experience for players. "It is important to understand that none of the elements is more important than the others. [...] The important thing to understand about the four elements is that all of them are essential" [Schell, 2008]. The definition of each element follows below:

- **Mechanics**: Element that establishes what is required to progress in the game, guiding players' actions and determining the possibilities for interaction with the environment and with one another.
- **Story**: Element responsible for defining the events of the game, whether through a pre-programmed linear narrative or more subjectively and organically, interconnected with the game's mechanics.
- **Aesthetics**: Element related to the player's experience, interpretation, and immersion, as it conveys the tone, sensations, and visuals, in addition to influencing how players connect with and interact with the game.
- **Technology**: Element referring to the game's material substrate, which may include digital devices (such as computers, consoles, and smartphones) or physical materials, such as boards and dice. It is technology that delimits or expands the possibilities for interaction.

However, despite this interrelation and interdependence among the elements, mechanics play a more significant role in ensuring the essence of a game. According to Schell [2008], "Game mechanics are the core of what a game truly is. They are the interactions and relationships that remain when all aesthetics, technology, and story are stripped away."

Martins [2021] emphasizes this idea by defining mechanics as one of the central elements of games, alongside narrative and challenge. Narrative, although guided by mechanics, is also responsible for directing the functioning of the game and creating an interactive and interpretative connection for players. Challenge, in turn, involves a sense of achievement through intrinsic rewards and the establishment of problems to be faced in order to reach the objectives.

2.2 Operational Definition of the Core

Although mechanics are cited unanimously by some authors — and rules are highlighted for their importance as a guiding structure — it is necessary to recognize that a game is not composed solely of these aspects. Mechanics gain interest and relevance for players when they are embedded in a coherent context, whether through story, as noted by Schell [2008], or through narrative, as proposed by Martins [2021]. Likewise, rules must be balanced in order to integrate the mechanics and enhance their functioning, since, as stated by Adams [2010], it is the set of rules that forms the game, but, in isolation, they are not capable of providing fun.

Each element must be developed in a balanced and careful manner, avoiding neglect or excessive prioritization of any of them. Ultimately, the core can be defined as an experience constructed from affective memory, sustained by the game's identity, and maintained by a set of elements that transcends the mechanics and standardizations of the system [Martins, 2021].

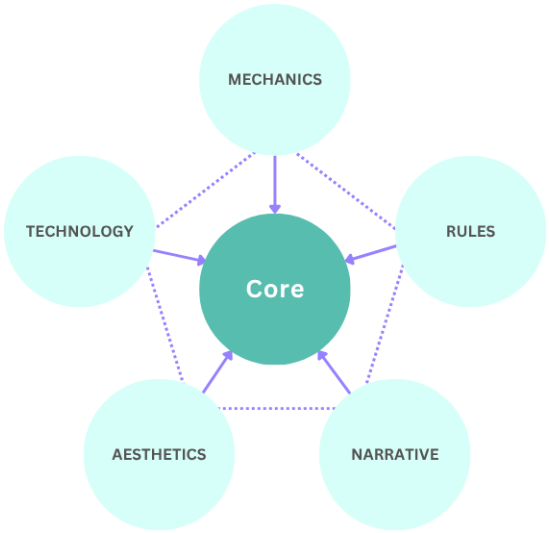

Figure 1. Structural Diagram of the Core of the Games.

Thus, the core, presented in Figure 1, is operationally composed of the elements that incorporate and materialize these dimensions, namely:

- **Mechanics**, which structure the actions of the game and are the primary vehicle for the formation of the player's affective memory.
- **Rules**, which organize and direct all interaction, serving as a pillar of the game's identity.
- **Narrative**, which encompasses the entire sequence of the story, organizing the other elements around a central idea, and guides the player's interpretation, providing depth and meaning to the game's identity.
- **Aesthetics**, which promote immersion linked to the player's sensations, completing the expression of the game's identity.
- **Technology**, which establishes the limits and possibilities of resources and interactions according to the platform, constituting the physical materiality that enables the entire experience.

3 Related Work

In this section, studies were selected that address the process of adapting games from analog to digital formats and vice versa. This joint analysis provides a contextualized understanding not only of the challenges and opportunities inherent to migration across platforms but also of the methodologies employed and the application contexts of these processes.

3.1 From Digital to Board: a Methodology for Identifying the Core

It is precisely within the scope of methodology that the contribution of Martins [2021] is situated. The author proposes a definition of the central elements (core) that can convey, in adaptations to the analog medium, the sensations and experiences of the original digital games. To this end, he conducted a study of adaptation concepts for other media and investigated what constitutes the essence of digital games. As a result, the author defines the core as a triad composed of mechanics, challenges, and narrative.

Although Martins [2021] focused on digital games adapted to the analog medium, the research methodology he developed offers valuable insights into the essence of games more broadly. This is evident in his argument that the essence lies in gameplay and in the ability to generate a cognitive connection with the player, implying the reconfiguration of the game's universe and its constituent elements, and transcending the mere narrative transposition in the context of an adaptation [Martins, 2021].

Other aspects of his methodology concern the application of the core triad to case studies of games that underwent adaptations, as well as the comparison of the positive and negative points identified in players' evaluations. This approach contributes to identifying of best practices and recurring pitfalls, considering both successful cases and those that received negative evaluations from the public.

3.2 Transposition of mathematical board games to the digital format

Another approach is offered by Campana [2017]. The author, whose interdisciplinary work focuses on the transposition of board games from the physical to the digital format in mathematics education, seeks to assist educators and developers in creating digital games for this field. To this end, she draws on analog games already recognized by educators as references for the application of her study.

Although the work addresses a form of transposition between media, the author deliberately adopts this term to align her research with the concept of Didactic Transposition proposed by Chevallard [1985]. This concept concerns the adaptation of scientific knowledge (scholarly knowledge) into teachable content (taught knowledge). Thus, the work is configured as a double adaptation: a technological one (from the physical to the digital) and a pedagogical one (from mathematical content to the game format).

In the methodology applied by Campana [2017], three major stages stand out: the first consists of a literature review covering digital games and board games and their use in mathematics education; the second comprises the selection and transposition of analog mathematical games recognized for their pedagogical effectiveness; finally, the third corresponds to the evaluation of the resulting digital game by game design professionals and mathematics educators.

The results played an important role in identifying the adaptation aspects that may influence the success of the adaptation, highlighting both the positive and negative aspects related to the author's technical choices, including the flawed elements and those subject to improvement in the adapted digital game — such as visual identity and feedback.

The analyzes provided by professionals in the results highlight the importance of investigating the reasons and obstacles to adapting a game, as well as emphasizing the need to consider the particularities of the game and the players' demands. This approach, aligned with the ideas of Martins [2021], reinforces the need to analyze the characteristics (core) of games and to understand the impacts of adaptations on players.

3.3 Comparative UX analysis between tabletop and its digital version

Larsson *et al*. [2020] complements the perspective on the impacts of adaptations by investigating how user experience (UX) is affected when physical board games are transposed to digital platforms. In this comparative analysis of seven popular games (such as Carcassonne, UNO, and Ticket to Ride), the aim was to determine whether digitalization degrades or enhances enjoyment and interaction, based on five pillars of the player experience: Usability, Engagement, Social Connectivity, Aesthetics, and Enjoyment.

The applied methodology began with the selection of board games, adopting rigorous criteria: the titles had to represent different game genres, have official adaptations released after the analog version, maintain the main mechanics and nearly identical artwork, and present good evaluations in both versions. Subsequently, a mixed approach was adopted, combining a technical comparative analysis of the selected games, both analog and digital, with a user study, the latter intended to measure the player experience (UX) through a questionnaire based on an adapted version of the Game User Experience Satisfaction Scale (GUESS) [Larsson *et al*., 2020].

3.4 Game-Literary Adaptation: a proposed category of analysis

Melo [2025] proposes the analytical category "literary game-adaptation" to refer to digital games created from literary works that promote dialogues with the adapted text in their systems according to the intentionality and creative expression of the adaptors.

The proposed category is defined based on a bibliographic review of studies by authors such as Salen and Zimmerman [2004] to characterize the perspective from the concepts as "game" and "adaptation" and how they can be combined to constitute literary game-adaptation.

Melo [2025] proposes an analytical category to elucidate the experience of playing a literary game-adaptation and its relationship with the adapted text.

The study revealed significant contrasts between the physical and digital versions. Players expressed a preference for physical experience, which received higher scores across four of the five evaluated pillars. On the other hand, the digital

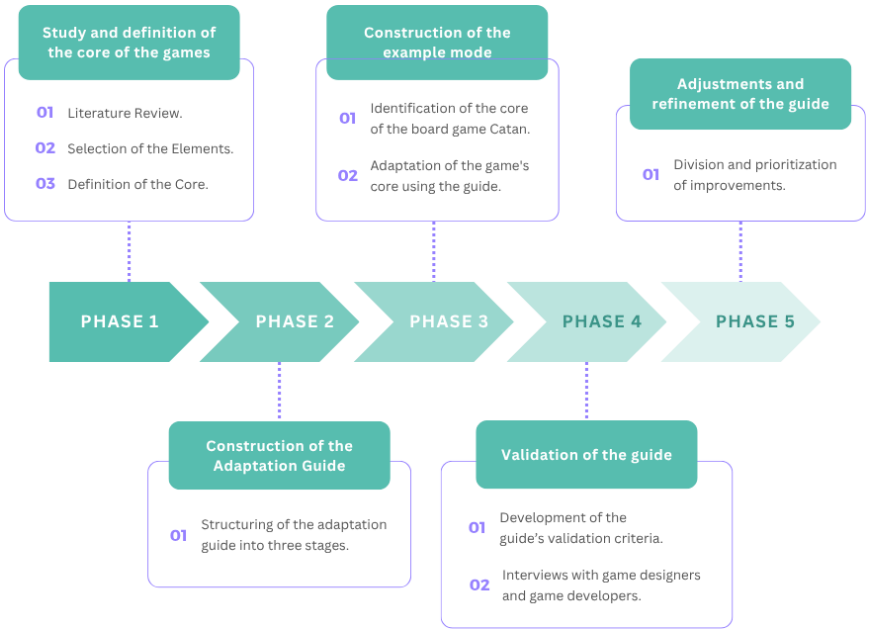

Figure 2. Diagram of the methodological steps.

version stood out for its usability, benefiting from automated mechanics, component management, and the facilitation of understanding and applying the rules. It was also observed that the digital format increased accessibility by allowing groups to gather quickly and spontaneously in the online environment [Larsson *et al*., 2020].

In conclusion, the study indicates that although digital versions offer technical convenience, they still cannot replicate the depth of social interaction and engagement found in physical versions. However, the availability and ease of bringing groups together online quickly and spontaneously make digital versions valuable and relevant tools — even though some digital games fail to provide efficient native communication. Moreover, automation has the potential to make gameplay more fluid and easier to learn, provided it is applied intelligently without removing players' control and, consequently, reducing their engagement.

4 Methodology

This section details the methodology adopted in this work. The structuring and application of this methodology were developed to study, construct, apply, and evaluate the guide. To achieve this objective, a methodology composed of five phases was employed, as shown in Figure 2.

4.1 Phase 1: Study and Definition of the Core of the Games

The survey of core definitions was conducted through research in different sources, such as books, articles, and academic works related to the topic, to identify the different interpretations and, primarily, the elements that compose and define the core in the context of game creation and development, both analog and digital.

This survey provided the basis for constructing a consistent theoretical framework, from which a proprietary definition of the core was synthesized. This proposed definition integrates the elements of mechanics, rules, narrative, aesthetics, and technology (detailed in Section 2), whose selection is justified by their practical relevance and the ease of identification within game structures on both platforms.

4.2 Phase 2: Construction of the Adaptation Guide

Based on the research results obtained in the previous stage, the first version of G.A.M.E.[2] was developed in this phase. The guide was designed to address adaptations in the most generic way possible, making it sufficiently comprehensive to be applied to any type of board game and allowing adaptations to different digital media, such as computers, consoles, and augmented reality, among others.

This is possible because the guide does not impose a rigid, step-by-step process or specific rules on how to adapt or for which platform. Instead, it serves as a facilitator for independent developers who already have programming and game development knowledge. Thus, the process is organized into simple yet essential stages: it begins with preliminary research that justifies the adaptation, identifying motivations, advantages, and commercial differentiators; proceeds to the identification of the game's core; and concludes with the development of strategies to adapt the core to the digital medium.

As part of the structure, an introductory text was included that presented the purpose and stages of the guide, along with a glossary of terms used, to allow developers without prior experience in the adaptation process to clearly understand the content. Details on the construction of the guide can be found in Section 5.

[2]Access the full G.A.M.E: `https://osf.io/xq7y4/files/xpdct`. Accessed on 21 May 2026

4.3 Phase 3: Construction of the Example Model

With the guide finalized, this phase consisted of applying the material to construct an example model, to demonstrate its practical use. Initially, the game *O Suspeito da Casa 187*, developed by the author herself, was selected — since it represented a complete practical application, with available materials such as prototypes, GDDs, and playtest records. However, based on recommendations from interviewees during the guide validation stage, it was decided to create the example model based on a game already recognized in the market and easily identifiable by the public. This change aims to prevent the guide's user from having to learn an unfamiliar game, allowing them to focus on identifying the elements necessary to apply the guide.

Thus, it was decided to create a new example model using Catan, available online[3], since its existing digital versions[4] [5] [6] already allow users to compare across different media. The game was analyzed and organized according to the guide's recommendations, in a simulation of a real adaptation process. The core of the game was identified and strategies were developed for a web adaptation supporting both desktop and mobile, without, however, advancing to technical implementation, remaining limited to the conceptualization of the example model.

For a more realistic contextualization of the process, an exploratory — not validation-focused — playtest was conducted with five volunteers from the Federal University of Ceará, aiming to obtain preliminary qualitative insights into the overall player experience and to understand the game's rules and mechanics in practice. The playtest was then recorded and transcribed to evaluate all comments and natural observations expressed throughout the session, considering the difficulties and ease encountered.

Among the observations collected, the players' admiration for the aesthetics was noticeable. At various moments, they made brief comments about the beauty of the illustrations and the game components (board and cards), referring to one of the pieces as "really pretty" and to the construction of a road as "beautiful." Specifically, one player commented: "I think building the road is beautiful."

Considering the comments, the adaptation in the example model took into account the players' preferences, avoiding highly impactful visual, auditory, or atmospheric changes. In this way, everything that was already well-received was preserved, while the experience was enhanced by adding special effects to components such as illustrations, miniatures, and sound effects.

As a point of comparison, the user should observe the different approaches to digital versions regarding the preservation of the aesthetic core and the visual improvements implemented, compared to the planned approach in the example model.

[3]Access the full exemple model: `https://osf.io/xq7y4/files/sz86m`. Accessed on 21 May 2026

[4]Catan Universe: `https://catanuniverse.com/en/`. Accessed on 21 May 2026

[5]Board Game Arena (BGA): `https://pt.boardgamearena.com/gamepanel?game=catan`. Accessed on 21 May 2026

[6]The Colonist: `https://colonist.io`. Accessed on 21 May 2026

Other positive observations collected refer to the trading mechanics, highlighted in statements such as "I love this trading [negotiation] part, it is really cool, very funny," as well as to the simplicity of the rules, expressed in comments like "[...] I think it is very simple. Like, all the rules are very simple, they are well spaced [...]".

In the example model, these mechanics were taken into account and maintained in a way similar to the analog version in their application, but with additions related to process automation. As for the rules, they were kept unchanged in structure, incorporating only mechanisms for automation, verification, and validation in the background, to promote greater practicality and time efficiency for players.

An example of this approach can be seen in the scoring rules and victory condition. The game establishes that the match ends when one of the players reaches 10 victory points. However, this score is composed of different elements, such as the number of settlements and cities, the Longest Road card, and specific development cards — often not revealed to the other players.

During the playtest, an external participant was responsible for tracking the score, which made the experience easier for the players. However, in the absence of this role, the players themselves would need to manage both their own scores and those of their opponents, which would directly influence decision-making and strategic planning. In digital versions, this responsibility is assigned to the system, which automatically handles score tracking, simplifying the end of the match and reducing the players' cognitive load.

This automation also contributes to the flow and duration of the match. Although the game establishes an average duration of approximately 75 minutes, the playtest conducted lasted close to two hours. This difference may be due to participants needing to read, interpret, and discuss rules, as well as to the more relaxed environment. In this sense, reducing the time spent on rule interpretation tends to benefit players, allowing them to dedicate more time to enjoyment, relaxation, and engagement with the gameplay experience.

Based on these observations, the automation of these processes was incorporated into the example model and can also be identified in its application within digital versions of Catan. In this context, the model not only practically highlights the advantages of adapting from a physical to a digital medium (whether in terms of flow, reduced cognitive load, or optimized playtime) but also serves as a foundation for users, helping them gain insights into possible approaches to different aspects in their own adaptation projects.

4.4 Phase 4: Guide Validation

The evaluation of the guide was conducted to identify possible errors, adjustments, improvements, and additions not considered in its first version. To this end, four evaluation criteria were defined: (1) applicability and practical usefulness; (2) clarity and structure; (3) timeliness and relevance; and (4) length and usage guidelines. Based on these criteria, questions were developed for each topic (Table 1), to support semi-structured interviews with a qualitative approach to analyze the material produced in this work.

The interviews were directed at game designers, developers, and other professionals in the gaming industry with

Table 1. Questions used in the interviews, organized according to the guide validation criteria.

	Criterion 1: Applicability and Practical Utility
1.1	In your opinion, does the guide seem easy to apply in this context?
1.2	Do you believe it meets the needs of game designers and independent developers, who are the main target audience?
1.3	In your opinion, are the examples and guidelines practical and useful for those who wish to apply them?
1.4	Is there any specific aspect that you believe could make the guide more applicable?
	Criterion 2: Clarity and Structure
2.1	Do you consider the guide to be well organized?
2.2	Does the structure have good flow, that is, are the information and steps presented in a logical and continuous way?
2.3	Is the language used in the guide accessible and easy to understand for the target audience?
2.4	Is there any part that you consider confusing or that could be better structured?
	Criterion 3: Timeliness and Relevance
3.1	Is there anything that you believe should be updated or included to make it more relevant?
3.2	In your view, does the guide address the current challenges faced in game adaptation projects?
	Criterion 4: Length and Usage Guidance
4.1	Does the guide seem concise and to the point, or did you feel that it contains redundant or excessive information?
4.2	Is the length of the guide appropriate for its purpose, or do you believe it could be more concise or more detailed?
4.3	Are the instructions on how to fill out or use the guide clear and intuitive?
4.4	Are there example steps or tutorials in the guide that help explain how to apply it? In your opinion, are they sufficient?
4.5	If you could suggest an improvement to the format or level of detail of the guide, what would it be?

experience creating both analog and digital games. This criterion was fundamental for selection, while prior experience in cross-platform adaptations was considered a relevant, though not exclusive, advantage. The invitation to participate, accompanied by a Google Forms questionnaire to collect contact information and profile participants, was shared across specialized online gaming communities, including the IGDA Fortaleza, Sebrae Game Hub, and Mentorias Games Brasil servers, as well as the Ceará Games Forum.

At the end of the data collection period, seven responses were obtained. However, two volunteers did not meet the criterion of experience with analog games, and two others did not respond to subsequent contact attempts. Thus, three valid participants remained, who were contacted to deliver the analysis material and schedule interviews.

Despite the limited number of interviewees, the selection followed rigorous criteria, ensuring that only individuals with relevant experience and knowledge were included. Therefore, the three participants represent a qualified sample capable of providing significant contributions. With consistent responses and similar suggestions, it was observed that the main aspects of the material were addressed in the evaluation; thus, even with a reduced sample, the interviews were sufficient to validate the proposed material.

Once the selection process was completed, the interviews were conducted synchronously via Google Meet, lasting between 40 and 50 minutes, over a two-week period that best accommodated the participants' availability. The interviews were recorded and later transcribed to enable a more thorough analysis of perceptions, suggestions for improvement, and relevant points regarding the material. The details of the comments and considerations obtained in each interview can be found in the Section 6.

At the end of the interviews, the reports were transcribed and, subsequently, the interviewees' comments were organized according to the questions asked. After this separation, the responses were analyzed and classified into three distinct categories: (1) negative aspects of the material; (2) positive aspects of the material; and (3) areas for improvement.

4.5 Phase 5: Guide Refinement and Adjustments

During the validation process, new insights and adjustments related to the clarity of information, completeness of materials, and re-elaboration of supporting materials emerged, which made it necessary to carry out a refinement based on the main considerations raised by the interviewees, which were categorized and presented in Section 6. This stage proved essential to ensure a more accessible, useful, efficient, and relevant guide for its target audience, better meeting the needs of developers who will use it, especially those without prior experience in game adaptation.

5 Construction of the G.A.M.E.

Inspired by the structuring of the game creation process outlined by Schuytema [2008] and the remodeling of the methodology by Campana [2017], the adaptation process follows similar steps; however, it considers a pre-existing core as the basis for all stages. In this way, what was previously organized into three major cycles by Schuytema [2008] (namely preproduction, production, and post-production) is then divided into only three stages with the addition of some sub-stages within them, as illustrated in Figure 3. To contextualize and follow this stage, refer to the complete guide and the example model available online [7].

[7] Access the full project: `https://osf.io/xq7y4/overview`. Accessed on 21 May 2026

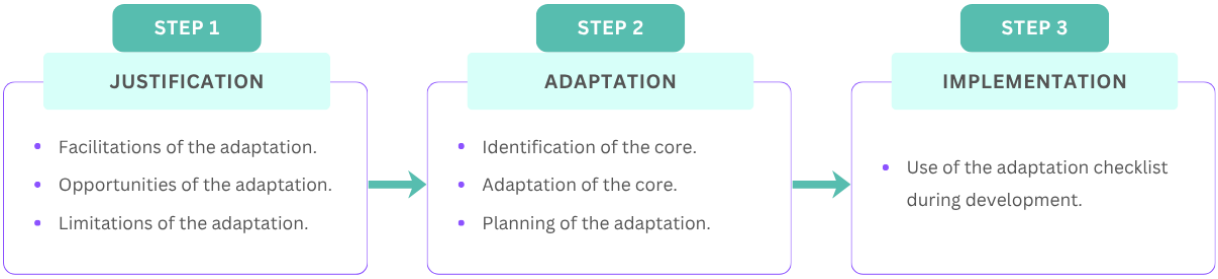

Figure 3. Adaptation process diagram.

5.1 Step 1: Justification

Campana [2017] presents, in the final stages of their methodology, an evaluative framework that analyzes the advantages and disadvantages of transposing educational games. However, it is proposed here that this stage be brought forward and restructured becoming into a preliminary stage called justification, which aims to identify the reasons for adapting a game, as well as the opportunities and limitations associated with it. This restructuring becomes necessary since considering the justification behind the adaptation is fundamental for identifying the main factors that motivate this decision.

It is through this stage that the set of aspects that may add value to the digital game or, alternatively, delimit certain characteristics of the board game is defined. In this way, the justification allows a preliminary view of the aspects that require greater attention at the beginning of the adaptation process. The main aspects to be identified are:

- **Facilitations:** additional resources or modifications that the digital game can offer to the player through technology. This includes, for example, facilitating understanding of mechanics, automating complex rules, or controlling rounds.
- **Opportunities:** elements complicated to execute in the analog format, but that can be added in the digital version. For example, the insertion of dynamic soundtracks, narrative cutscenes to increase immersion, or even visual improvement of components.
- **Limitations:** characteristics of the analog game that may be harmed or even eliminated in the transition to digital. A common example is the loss of the social and tactile aspects of physical components.

To organize and describe these aspects, the **Guiding Justification Questions** were developed and are available in Table 2. These questions address, in a simplified manner, some issues related to the core, although this is not yet the main focus at this stage. By answering the questions, it is possible to obtain substantial information to justify the choice of the adaptation and to highlight some elements of the analog game that should be analyzed with greater emphasis during the adaptation stage.

5.2 Step 2: Adaptation

Once the justification is completed, the adaptation stage begins. At this point, the core elements are identified and prepared before implementation begins. Thus, the first sub-stage is the identification of the core.

5.2.1 *Identification of the core*

As previously established, the core is composed of mechanics, rules, narrative, aesthetics, and technology. In this sub-stage of the adaptation, it is both recommended and a responsibility to conduct an in-depth study of the original board game to identify and categorize these elements, prioritizing those that most effectively preserve of the core. To facilitate this process, it is proposed to adopt an analysis order based on the sensations conveyed to the player, starting with the more abstract elements and progressing to the more technical ones, as illustrated in Figure 4.

This organization is based on the Elemental Tetrad Schell [2008], originally structured in a diamond format to reflect the visibility of game components to the player. In Schell [2008] model, the most visible elements, such as aesthetics, occupy the top of the diamond; intermediate elements, such as mechanics and narrative, are placed in the middle; and the least visible elements, such as technology, are at the base. This structure is sufficiently flexible to be adapted according to the project's needs and the focus one wishes to apply.

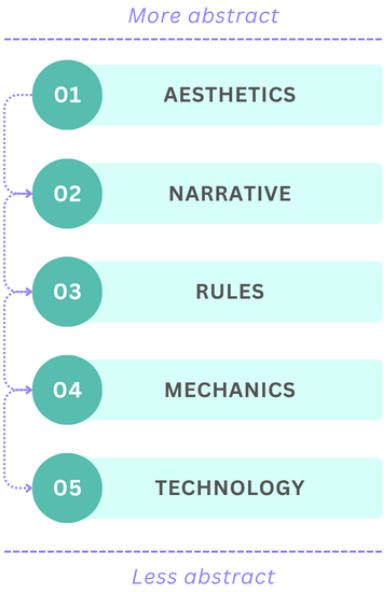

Figure 4. Core analysis order diagram.

Table 2. Guiding Justification Questions.

Facilities		
In what ways can the digitization of the game contribute to:	1	The player's understanding of and interaction with the mechanics?
	2	The players' understanding and application of the rules?
	3	The players' immersion and experiences?
Opportunities		
Are there any elements that can be added or enhanced through digitization:	1	That contribute to improving the mechanics?
	2	That contribute to improving the rules?
	3	That contribute to improving the game's narrative?
	4	That contribute to improving the game's aesthetics?
Limitations		
Regarding challenges faced in adapting to the digital version:	1	Is any game mechanic impaired, or does it need to be adapted?
	2	Does any game rule need to be modified in the transition to digital?
	3	Is any narrative element of the game compromised in the digital version?
	4	Does the aesthetic aspect of the game suffer any negative changes?

In this work, the organization proposed by Schell [2008] is maintained, but in a horizontal flow rather than the original diamond format. This new arrangement of the adapted model aims to assist planning by prioritizing the elements most perceptible to the player before moving on to technical decisions, ensuring the relevance of all components.

The G.A.M.E. thus includes the **Core Identification Framework**, which breaks the core elements into smaller components and organizes them in a questionnaire format to assist in their identification. This breakdown was developed based on research by various authors and organized according to the previously proposed core analysis order, ensuring coherence and systematicity.

The first element broken down is aesthetics, which is subdivided into visual, auditory, tactile, and bodily elements [Niedenthal, 2009]. Since this work does not aim to explore the relationship of bodily aspects or their application in board games, this aspect was excluded from individual treatment in the guide and included under tactile aspects. Thus, the combination of the remaining three elements, described below, defines the game's aesthetic standard and establishes the atmosphere (fourth element) intended to be conveyed to the player [Rocha *et al*., 2006].

- **Visual Aesthetics:** Graphical elements responsible for communicating essential information to the player, facilitating the understanding of mechanics, promoting familiarity, and reinforcing the game's visual identity.
- **Auditory Aesthetics:** Sound elements responsible for complementing the player's experience, providing feedback, reinforcing the atmosphere, and aiding in the understanding of actions and events in the game.
- **Tactile Aesthetics:** Physical elements responsible for enabling and supporting the game's mechanics, acting as mediators of player interaction. In addition to their operational function, they also contribute to the construction of the visual aesthetics and the game's identity.
- **Atmosphere:** Set of emotions evoked by the game, responsible for shaping experience and sustaining immersion. These emotions guide perception, engagement, and the player's response throughout the interaction.

The narrative, in turn, is broken down into objectives, conflicts, narrative descriptors, and core mechanics, which, depending on their application, may play a narrative role [Salen and Zimmerman, 2004]. These elements are defined based on the understanding that the application of core mechanics, through narrative descriptors that represent actions and events, generates conflicts that the player must resolve in order to achieve their objectives. The description of each element is presented below:

- **Narrative Objectives:** Represent what the player needs to achieve within the game's story to progress or win, guiding their actions and decisions throughout the match and contributing to the sense of progression. Examples include completing a mission, expanding a territory, defeating an opponent, or reaching a certain number of points within the game's context.
- **Narrative Conflicts:** Challenges that structure the player's experience and sustain immersion by requiring choices, disputes, or overcoming obstacles within the game. These may involve, for example, resource conflicts (scarcity), decision conflicts (choices with consequences), identity conflicts (opposing roles or objectives), time conflicts (time pressure), or conflicts inherent to the narrative itself.
- **Narrative Descriptors:** Elements that help the player understand what is happening in the game's story during gameplay. They connect in-game actions with narrative

Table 3. Interviewee Information.

Category	Interviewee 1	Interviewee 2	Interviewee 3
Field of Work	Game Designer Professor/Researcher of Game Development	2D/3D Artist & UI/UX Designer	Game Designer
Years of Experience	7 years or more	1 to 3 years	7 years or more
Experience with Analog Games	Yes	Yes	Yes
Experience with Digital Games	Yes	Yes	Yes
Experience with Game Adaptation	Yes	Yes	Yes

meaning. For example, event cards may represent situations such as an ambush or a mission; texts, such as descriptions or dialogues, explain the context of these situations; and visual elements, such as icons, illustrations, or board design, quickly indicate actions, environments, or characters.

- **Core Mechanics:** A set of mechanics that define how the game works and how the player interacts with it, being responsible for the main gameplay experience. Depending on their application, they may also contribute to the construction of the narrative. Examples include auction mechanics (as in resource-trading games); deduction (as in mystery games); world-building (by expanding territories or structures), and time control (by limiting actions or creating pressure during gameplay).

Mechanics and rules, however, are not broken down, as they are too unique and specific to each game. As for the technology element, its role in identification is to determine the main analog components and how they expand or limit interactions between the player and the game; therefore, this element was also not subdivided into smaller parts.

5.2.2 Adaptation of the core

Once the core identification is complete, the next sub-stage is developing strategies to adapt the elements to the digital medium. Presented in the G.A.M.E. under the **Adaptation Guide Tables** section, this process follows the same core analysis diagram but with the flow reversed. This is justified because, at this stage, technical aspects become more relevant and should be considered first.

It is important to emphasize that not all analog elements can be transferred to the digital medium exactly as they are, whether due to implementation difficulties or the physical limitations of certain components. Therefore, at this stage of the process, it is essential to have already identified and delineated, during the justification phase, the elements that may be subject to such impacts.

5.3 Step 3: Implementation

The final stage of the adaptation process consists of applying the strategies developed in the G.A.M.E. to a virtual environment. In this implementation phase, it is up to the developer to define the methodologies, processes, or frameworks to be used, given the inherent flexibility of digital game development that adapts to the team's context and the specific needs of the game itself. There are no fixed rules for creating a game; there are only best practices and guidelines to follow to ensure a more efficient development process.

However, it is necessary to follow a development cycle integrated with the adaptation guide. Step 2 is connected to a continuous cycle with Step 3, since during development various elements may undergo changes, requiring constant updating of the guide. In practice, the adaptation plan may not always align with the reality of implementation. Therefore, modifications and decisions regarding the adaptation, especially those that make the original plan unfeasible, must be addressed simultaneously with implementation.

Another important part of this stage is ensuring that all pre-development and development phases are executed. To do this, the implementation includes a **Verification Checklist** that helps check and organize tasks such as creating art and sound effects, integrating the adapted core elements, coding the game's functionalities, and fixing bugs. This checklist aims to generally cover the stages of digital game creation in the context of an adaptation, while respecting the particularities of each project. However, since they are not the focus of this work, elements related to marketing and distribution are disregarded.

6 Results

This section aims to present the results of the validation phase of the adaptation guide, bringing forward considerations, opinions, and suggestions for improvement collected in response to the validation criteria established in the methodology. Table 3 presents the details of each interviewee's experience, as well as the selection criteria used to choose them.

6.1 Interview notes

The first interviewee, Interviewee 1, demonstrated a deep understanding of the topic, providing practical examples from both academic and professional experience, which helped establish clear connections between their observations and the validation criteria. Their contributions not only validated the current structure of the guide but also highlighted opportunities for future revisions and improvements.

Table 4 organizes and categorizes some of the interviewee's relevant comments in response to the guided interview questions. However, as this was a semi-structured interview, the participant was able to freely discuss the topics they considered most important, leading to some redundancy in certain comments.

Despite the positive points, the interviewee raised rele-

Table 4. Participant 1 comments organized by evaluation criterion (comments translated to English).

Question	Comment	Category
Criterion 1. Applicability and Practical Utility		
1.1	"think that like this, I think that in a general way, yes."	Positive Point
1.2	"I think that for this beginning, yes."	Positive Point
1.3	"For me, it was easier to understand how to use the manual after I read [the example model][...]"	Positive Point
1.4	"There are some terms that I find confusing. For example, you use the term token."	Improvement Point 1
Criterion 2. Clarity and Structure		
2.1	"I found the layout really nice, both this one and the others. I thought the layout was very well done [...]"	Positive Point
2.2 and 4.2	"[...] I found it short, not in a bad sense. Especially because at the end it has some large tables. But then I saw that it is very direct to the point."	Positive Point
2.3 and 2.4	"For example, you use the term token. But you also use token, pawn, lid, token piece... And for me, these terms are not interchangeable?"	Improvement Point 2
Criterion 3. Timeliness and Relevance		
3.1	"Maybe it is a… an interesting step to have, right? To have this… a kind of brainstorm first. Before making the manual [guide], right?"	Improvement Point 3
3.2	"I think so, but it is an entire context [...]"	Positive Point
Criterion 4. Length and Usage Guidance		
4.1	"[...] but no, I read it quickly and understood it right away."	Positive Point
4.3	"No, actually, as I said, after I read everything, the pieces fit together better."	Positive Point
4.4	"No, they help."	Positive Point
4.5	"[the game used in the example model] was confusing, like, if I had to explain how to play the game I think I have an idea, but I think some information is missing [...]"	Improvement Point 4

vant considerations about the challenges of applying the guide to game designers, especially given the different, sometimes conflicting, perspectives these professionals may have regarding the terms and definitions used. In light of this, it was advised that the guide be directed exclusively at the production process, primarily serving independent developers and indie game adaptations. Furthermore, they suggested creating an example model using a simpler and widely known game, as they considered *O Suspeito da Casa 187* to be overly complex for this purpose.

Interviewee 2, although not directly a developer or game designer, has an academic background in Digital Media and Systems, combined with practical experience in game development and participation in game jams, which justifies their inclusion in the research. Furthermore, a relevant factor in their profile was their attempt to adapt a game to the digital medium, albeit unsuccessfully. Their perspective, organized in Table 5, proved essential for validating the guide, as it represents a real case where the complexity of development prevented the project's completion. This type of account provided insight into the challenges other professionals might face in similar contexts, thereby contributing to a more realistic understanding of the difficulties involved in the process and how the guide could assist them in this regard.

Other considerations highlighted by the interviewee — and which will be addressed in future work — include the fact that, although the guide seems practical, he believes it is necessary to test it exhaustively in real cases to assess its true effectiveness. Furthermore, he suggested creating an editable digital version of the guide, which would allow greater flexibility in filling it out and more efficient adaptation.

Finally, Interviewee 3 has a solid academic background and extensive professional experience in the games field, which adds significant value to the interview. Working as a game designer since 2003, he has participated in several projects, including serious games. Throughout his career, he has faced various challenges in adapting an analog game into a digital one, due to the complexity of the processes of the game developed of his workplace and the need to adapt it to a specific social environment. In summary, his combination of practical experience, theoretical knowledge, critical perspective, and openness to new ideas enriches the interview, offering a valuable perspective on the guide. His detailed analysis, presented in Table 6, contributes constructively to the development and improvement of G.A.M.E.

Interviewee 3, making use of the freedom provided by

Table 5. Participant 2 comments organized by evaluation criterion (comments translated to English).

Question	Comment	Category
Criterion 1. Applicability and Practical Utility		
1.1	"He seems well directed. But I think I would need to see it in practice, actually, to do it… to practice using it."	Positive Point
1.2	"He seems well structured. [...] He considers at least the basic options. [...] And he leaves space for you to write down what you know about your game, and what can be used, what needs to be modified, and what perhaps needs to be removed."	Positive Point
1.3 and 1.4	"Yes, it helps with some things. However, I noticed some items throughout the questionnaire while filling it out… They were a bit ambiguous and perhaps even repeated."	Improvement Point 5
Criterion 2. Clarity and Structure		
2.1 and 2.2	"Yes. It is quite complete. Complete enough for you to cover all the foundations of a game."	Positive Point
2.3	"There are several terms in game design that even game designers themselves have not clearly defined or fully understood. [...] So I am not sure whether it is up to you to deal with that, because it is really a matter of people learning properly what each concept actually means."	Neutral Point
2.4	"In the section on core mechanics [...] that item about time limitation—I found it a bit confusing because it could be interpreted, for example, as a limitation related to the time period."	Improvement Point 6
Criterion 3. Timeliness and Relevance		
3.1	"I could consider [analyzing] the digital games market to see whether there is room for that game to be transformed into a digital game."	Improvement Point 7
3.2	"It is a bit complicated. [Because it is not just,] "let us make a digital version," right? So it is important to raise that awareness [to analyze the market]."	Improvement Point 8
Criterion 4. Length and Usage Guidance		
4.1	"I did not find it repetitive. I thought it was quite well organized. Well categorized."	Positive Point
4.2	"I think it is [...]"	Positive Point
4.3	"For me, I think they turned out well."	Positive Point
4.4	"I think so."	Positive Point
4.5	"This part about opportunities and limitations has a passage in every item that gets repeated a lot."	Improvement Point 9

the interview to comment on the aspects he considered most relevant, highlighted that the ease of applying the guide is relative, varying according to the type of game and the level of digital transition desired. In addition, he emphasized that adapting a game to the digital format requires special attention to the game's feedback systems, since in the physical world players receive tactile stimuli. In contrast, in the digital environment, it is necessary to create visual and auditory feedback to compensate for this difference.

6.1.1 Considerations on Potential Improvements

Considering the points raised by the interviewees, it was observed that no negative or exclusionary aspects regarding the guide were noted, only suggestions for improvement were offered. Therefore, as the final stage of the methodology, the guide was refined based on some comments, while points that required greater dedication and time were reserved for future work.

The first improvement points (1 and 2) implemented referred to the guide's terminology. The interviewee highlighted that the inconsistent use of terms such as "token," "pawn," "miniature," and "counter" could cause confusion for users. As a solution, these technical terms were standardized, prioritizing the use of terms that ensure simplicity of understanding and clarity of information.

Improvement point 6 followed a similar idea regarding terminology. It was highlighted that the term "temporal limitation" could be confused with a limitation related to a historical period rather than a time limit. To resolve this ambiguity, the expression was changed to "game time," which is clearer for referring to time control during gameplay.

Regarding improvement points 5 and 9, Interviewee 2

Table 6. Participant 3 comments organized by evaluation criterion (comments translated to English).

Question	Comment	Category
Criterion 1. Applicability and Practical Utility		
1.1	"[...] I think it varies a lot depending on the game' style for which you are making this adaptation. [...] So, it depends a lot on the level you want to transition to the digital format."	Improvement Point 10
1.2	"I think your guide is already working for the audience it intends to reach."	Positive Point
1.3	"I think it already does some research on these things and includes indications of good practices, perhaps."	Positive Point
1.4	"Perhaps, thinking about these other people [beginner developers], maybe I could reach more people with a glossary. A glossary, right? Of these terms [used within the guide]."	Improvement Point 11
Criterion 2. Clarity and Structure		
2.1 and 2.2	"From what I saw, I do not know exactly everything it was going to present, but it seemed ok to me, [...] although I found it a bit beginner-oriented. Like the first steps [...] where I am going to venture."	Positive Point
2.3	"[...] for this type of material, the language, the person needs to know the correct language [the terms used in the guide], which is the formal version [...]. There is no way to lower the level just because people cannot understand the language."	Positive Point
2.4	"There is a lack of a glossary of words, of terminology, because for us who make games, there is a lot of terminology."	Improvement Point 12
Criterion 3. Timeliness and Relevance		
3.1 and 3.2	"So, thinking about these other people [beginner developers], maybe I could reach more people with a glossary. [...] I think it would not hurt, it would deepen your work even more and allow it to expand to other things as well."	Improvement Point 13
Criterion 4. Length and Usage Guidance		
4.1	"No [there is no redundant or excessive information], right?"	Positive Point
4.2	"[...] it is ok. It really is a big guide."	Positive Point
4.3	"But, as I told you, I would answer it easily. So, for me it was smooth."	Positive Point
4.4	"[...] regarding the format as well, I do not see what would suggest otherwise. [...] I think the way it was laid out is working in the format."	Positive Point

highlighted that the wording of the items in the Justification section repeated certain passages unnecessarily, making the reading tiring. Therefore, the structure was reformulated to avoid repetition, consolidating the general information first and then detailing the specific aspects in subtopics.

Regarding improvement point 10, the interviewee highlighted that adapting an analog game to a digital format depends on the game' style and the desired level of transition, indicating that there is no single method for this process. Since this is not necessarily something to be adjusted in the guide itself, this comment was incorporated as a conceptual addition: the guide' introductory text was updated to emphasize that the success of the adaptation depends on these factors, guiding users to consider them when using the guide.

Still regarding the topic of writing and comprehension, improvement points 11, 12, and 13 of the immediate changes applied to the guide highlighted the importance of including a glossary to assist beginner developers, ensuring that all terms used are understood clearly and consistently. It was emphasized that the specific terminology of the field can make understanding difficult for those without prior experience, and that including a glossary would make the material more accessible, thereby expanding its reach. Following this recommendation, the current version of the guide incorporates a glossary of technical terms that explains the concepts objectively. This promotes accessibility and ensures a unified interpretation, facilitating the application of the content by any audience.

It is worth noting that improvement point 3, mentioned by Interviewee 1, was disregarded after analysis. According to him, the guide could include an initial brainstorming stage to help designers reflect on the adaptation. However, there was no need to consider this addition, since the guide already uses the Justification stage for this purpose.

In this work, the implementation of improvement point 4 is presented in response to the comment by Interviewee 1, who highlighted the importance of using a different, more widely recognized game as an example model. The previous

example used a game unfamiliar to the public and required additional explanatory material to understand, resulting in the extra effort of interpreting two separate materials, which could hinder comprehension. Therefore, in Section 4.3, the game Catan is used for this purpose.

Finally, improvement points 7 and 8 were considered extensive enough to be addressed in future research. Raised by Interviewee 2, these points indicated that the guide could give the impression that it is sufficient to simply transform a board game into a digital one without considering the industry challenges, as well as the impact of digitalization on the perception of the original game and its reach on digital platforms.

Initially, it was considered adding a topic to the Justification section with guiding questions to analyze the adaptation from a commercial perspective. However, incorporating this would require an in-depth study of which commercial aspects should be addressed, whether related to technical choices for promotion or to comparisons with competing digital games. Therefore, this improvement suggestion was postponed to allow for a more thorough study of what should be considered in a market analysis.

6.2 Consolidation of Results

In summary, the categorized comments total 38 evaluated points, of which 24 (63.2%) correspond to positive points, 13 (34.2%) refer to points evaluated as improvements (whether future or immediate), and only one (2.6%) is classified as a neutral point. Figure 5 presents a graphical representation of these values.

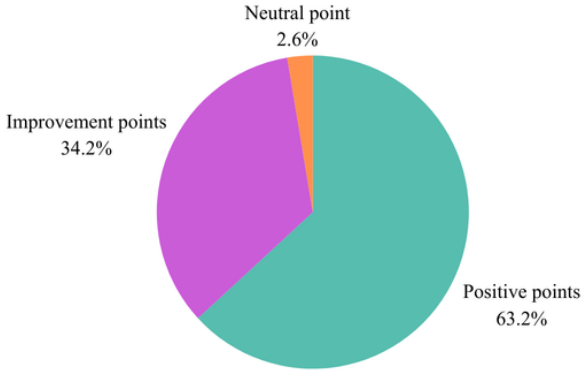

Figure 5. Category Frequency Chart.

Regarding the frequency of the validation criteria presented in Table 7, it can be observed that the interviewees' comments are concentrated on positive points within the Length and Usage Guidance criterion, highlighting that the guide is well structured, objective, and provides clear and intuitive instructions, in addition to presenting sufficient example materials to support the understanding of its use and context. The Applicability and Practical Utility criterion also shows a high volume of positive comments, thus indicating that the guide is applicable and meets the needs of different projects and audiences, offering clear examples and guidance to assist them throughout the process.

Regarding the points for improvement, it can be observed that the number of suggestions does not vary significantly across the criteria, ranging between three and four for Applicability and Practical Utility, Clarity and Structure, and Timeliness and Relevance, while Length and Usage Guidance registers only two improvement points — supporting the idea that the guide is sufficiently well structured and does not require many significant changes to its format.

7 Ethical Issues

All playtest participants were properly informed of the study's objectives and how their contributions would be used in the text and in the construction of the example model. All participants were asked for authorization to record the playtest session, which was granted without reservations.

For the professionals responsible for validating the guide, an initial inquiry of general interest was conducted across different groups, as presented in Section 4.4, including the provision of a form for scheduling interviews, accompanied by an introductory text and confirmation of voluntary participation.

During the interview, study objectives were emphasized, and participants were again informed about the procedures for recording and using the data, as well as their contribution to the validation process. Personal information and identifiable data were not included in this work to ensure participant confidentiality; only comments and observations were used with prior authorization.

Regarding artificial intelligence (AI) tools, they were used in a limited and complementary manner during the preparation of this work. ChatGPT and DeepSeek were employed exclusively for translation into English, without altering the original meaning or structure of the text. NotebookLM was used for the preliminary screening and organization of references, which were critically evaluated by the authors whenever content relevant to the topic was presented.

The TurboScribe tool was used to transcribe recordings of the playtests and interviews, with the transcriptions reviewed and corrected whenever inconsistencies with the recordings were identified, while Grammarly was used exclusively for grammatical revision of the translation. No AI tool was used to generate scientific content, interpret results, or draw conclusions. All analyses, interpretations, and final decisions were conducted exclusively by the authors, who assume full responsibility for the content of this work.

8 Conclusion and Final Considerations

This work highlights the importance of adapting board games to digital platforms as a strategy capable of expanding market reach, including new players at long distances, facilitating player understanding, and enabling the addition of new features, further enhancing the player experience while keeping them familiar with the original analog dynamics.

Throughout the research, the need to understand which core elements structure both board and digital games became evident, to ensure greater fidelity in migrating analog elements to a virtual environment, given the lack of similar frameworks to support this process.

Thus, elements of consensus among certain authors, as well as those best suited to the proposal — identified as facil-

Table 7. Frequency of coded comments by evaluation criterion.

Criterion	Positive	Improvement	Neutral	Total
Applicability and Practical Utility	7	4	0	11
Clarity and Structure	5	3	1	9
Timeliness and Relevance	1	4	0	5
Length and Usage Guidance	11	2	0	13
Total	**24**	**13**	**1**	**38**

itators of the game understanding process for adaptation — were studied, categorized, and organized in order to more precisely establish what should be prioritized in the adaptation process. As a result, mechanics, rules, narrative, aesthetics, and technology were defined as the core elements, which were then broken down into smaller components and subsequently used in the construction of the G.A.M.E. guide.

Such a guide, aimed primarily at independent developers, was structured into three stages of adaptation: the justification, which includes an analysis of the benefits of adaptation, the opportunities offered by technology, and possible limitations of transitioning to digital; the identification of the board game's core, through guiding questions that cover each of the elements previously mentioned; and the adaptation of this core, consisting of the development of strategies to migrate it to digital platforms such as PC, consoles, smartphones, or virtual reality.

Simultaneously, an example model was developed using the game *O Suspeito da Casa 187*, which was later replaced by a new version based on the adaptation of Catan: The Game, chosen for being a well-known commercial title in the market and for having digital versions available for comparison.

Although the initially chosen game was discarded due to the difficulty users had in understanding the example model — since it would require learning an unfamiliar game before applying it — using a game already known by the author, with available GDD, prototypes, initial playtests, and a solid understanding of its mechanics, was essential for the development of the guide, as both materials were created simultaneously. The experience of developing the model influenced improvements to the guide, as at certain points it became evident that there were elements of the game that were not covered by the guide itself.

To ensure its effectiveness, the guide underwent a validation process with professionals from the gaming field, carefully selected based on their experience with both digital and analog games. Their feedback and discussions were essential for refining the guide, making it more accessible and understandable, and for identifying improvement proposals for the continuous evolution of the material, which were explored in this work.

At the end of the validation stage, it was observed that, despite the overall positive feedback regarding the structure, clarity of instructions, example materials, as well as practical applicability and usability, there were also identified improvement suggestions related to G.A.M.E. in different aspects. These ranged from adjustments in writing and the addition of complementary elements, such as a glossary of terms, to the reformulation of supporting materials.

Such observations, together with the identified positive aspects, demonstrate that the guide has strong potential as a technical and structural reference for adaptations, by formalizing the process into well-defined stages and enabling the development of strategies applicable to different projects on digital platforms.

At the same time, it highlights the existence of room for continuous improvement — such as, for example, the inclusion of an evaluation stage focused on the commercial context — especially through real-world applications and more extensive validation processes.

Finally, it is expected that this guide will serve as a valuable tool for developing digital board games that preserve the characteristics of their original versions while also exploring the opportunities offered by new platforms. Although some improvements and further developments have been left for future work, this study represents a significant step toward creating a reference material for game adaptation, encouraging innovation and growth in this market.

Acknowledgements

The authors would like to thank the Federal University of Ceará for providing the necessary infrastructure and access to referenced books.

Authors' Contributions

Camila conceptualization this research. Camila is also the main contributor and writer of this manuscript. Camila formulated research goals, research questions and hypotheses. Camila performed the experiments. Paulyne supervised the research, tracking tracking progress and ensuring quality of deliverables. Paulyne refined methods and contributed in interpreting results. Paulyne provided a copy of Catan and access to some books on game design. All authors read and approved the final manuscript.

Competing interests

The authors declare that they have no competing interests.

Availability of data and materials

Access the full project: `https://osf.io/xq7y4/overview`. Accessed on 21 May 2026

Further relevant information

Google translate and Grammarly were the only Artificial Intelligence tools used in the production of the manuscript, to translate from portuguese to english.

References

Adams, E. (2010). *Fundamentals of Game Design*. New Riders, Berkeley, CA, 2nd edition.

Brathwaite, B. and Schreiber, I. (2008). *Challenges for Game Designers*. Charles River Media, Boston.

Campana, S. B. d. C. (2017). Transposição de jogos de tabuleiro utilizados no ensino de matemática para o formato digital. Master's thesis, Universidade Estadual Paulista. Faculdade de Arquitetura, Artes e Comunicação, Bauru. Disponível em: https://repositorio.unesp.br/entities/publication/f88257d9-d827-417f-b58f-bd23ae552e03. Accessed on 21 May 2026.

Chevallard, Y. (1985). *La transposition didactique: du savoir au savoir enseigné*. La Pensée Sauvage, Paris, FR.

Larsson, A., Ekblad, J., Alvarez, A., and Font, J. (2020). A comparative ux analysis between tabletop games and their digital counterparts. In *Extended Abstracts of the 2020 Annual Symposium on Computer-Human Interaction in Play*, CHI PLAY '20, page 301–305, New York, NY, USA. Association for Computing Machinery. DOI: https://doi.org/10.1145/3383668.3419899.

Martins, J. A. V. (2021). Adaptação de jogos digitais para jogos de tabuleiro. Master's thesis, Pontifícia Universidade Católica de São Paulo - campus Consolação, São Paulo. Disponível em: https://repositorio.pucsp.br/jspui/bitstream/handle/23842/1/JosÃľ%20Arthur%20Vigilante%20Martins.pdf. Accessed on 21 May 2026.

Melo, P. (2025). Game-adaptação literária: uma proposta de categoria de análise. In *Anais Estendidos do XXIV Simpósio Brasileiro de Jogos e Entretenimento Digital*, pages 58–64, Porto Alegre, RS, Brasil. SBC. DOI: https://doi.org/10.5753/sbgames_estendido.2025.9592.

Mesquita, C. and Jucá, P. (2025). Construção de um guia para auxiliar no processo de adaptação de jogos de tabuleiro para uma versão digital. In *Anais do XXIV Simpósio Brasileiro de Jogos e Entretenimento Digital*, pages 243–253, Porto Alegre, RS, Brasil. SBC. DOI: https://doi.org/10.5753/sbgames.2025.10131.

Niedenthal, S. (2009). What we talk about when we talk about game aesthetics. In *Proceedings of the DiGRA Conference*. DOI: https://doi.org/10.26503/dl.v2009i1.409.

Novak, J. (2011). *Desenvolvimento de Games*. Cengage Learning, São Paulo, 2 edition.

Rocha, D. *et al*. (2006). Avaliação estética de games. In *Proceedings do SBGAMES*, volume 5, pages 1–5, Recife. SBGames. Disponível em: http://www.cin.ufpe.br/~sbgames/proceedings/aprovados/23648.pdf. Accessed on 21 May 2026.

Rogerson, M. J., Gibbs, M., and Smith, W. (2016). "i love all the bits": The materiality of boardgames. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems*, CHI '16, pages 3956–3969, New York, NY, USA. Association for Computing Machinery. DOI: https://doi.org/10.1145/2858036.2858433.

Salen, K. and Zimmerman, E. (2004). *Rules of Play: Game Design Fundamentals*. Massachusetts Institute of Technology, London, England, 1.ed edition.

Schell, J. (2008). *The Art of Game Design: A Book of Lenses*. Morgan Kaufmann, Burlington, MA, 1st edition.

Schuytema, P. (2008). *Design de Games*. Cengage Learning Edições LTDA, São Paulo, 1st edition.

Taylor, I. (2018). Tabletop games are bigger than ever, and its driving growth in the digital sector. https://www.gamesindustry.biz/asmodee-digital, Accessed on 21 May 2026.