




Aesthetics, Engagement, and Narration. A Taxonomy of Temporal Constraints for Ludo-Narrative Design

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Abstract. Harmony between narratives and game mechanics is essential for sustaining player interest; temporal structures assume critical importance in this regard. This paper introduces the notion of temporal constraints, a component that researchers and designers can use to quantify and assess the way videogame systems regulate the advancement of players within the game, utilizing empirical observation and a review of the relevant literature. Techno-aesthetic ludo-narrative elements, which merge the ludic and narrative components of the game, are how time limitations are represented in video games. Consequently, a taxonomy of these limitations is suggested after an examination of crucial facets of the novel notion.

Keywords: Engagement · ludo-narrative · Time

1 Introduction

VGs are technological aesthetic pieces. They are aesthetically pleasing, totally practical, and completed. Equally so, the medium and the object are mutually conditioned. Simondon states, “Techno-aesthetics is not primarily concerned with contemplation, but rather with application and action.” Techno-aesthetics is an intercategory fusion that is founded upon the fusing of experience (aesthetic delight) and a technical category (use, goal) [2].

A medium related with technological things is revealed via engagement with the topic. This connected medium, which Torres [3] defines as the collection of interaction alternatives offered to the technological item by its surroundings, is said to be the source from which the functioning of the technological being is conditioned. These potentialities engender discord with the user of a virtual game (VG) and impact the user’s continued involvement in the game, which is referred to as “game engagement.”

In the domains of software development and communication, therefore, it is essential to transcend idle thought and concentrate on implementation. In consideration of the above, this article presents temporal constraint as a valuable variable for striking the balance between reality and fantasy in any video game. This variable emphasizes temporal characteristics of player behaviors as permitted by the game, as opposed to agency,

freedom, and originality, which are the primary narrative property components of video games. In addition to possessing a theoretically different temporal nature, every playing session is also unique. Speed runs, in which the player has unrestricted access to the (real) world, are manifestly extremely unlike to turn-based games, which impose temporal and geographical limits that speed runs ignore. By bearing this in mind, this endeavor proposes a previous taxonomy of this variable and advances the work of investigating empirical evidence of time limitations across all gaming genres.

2 Theoretical Framework

2.1 Ludo-Narrative Games

The popular assertion that Games Studies (GS) production unites broad groups within its domain is supported by empirical data. One is concerned with technological methods for comprehending and designing games (e.g., artificial intelligence, visualization, or computational modeling). Another utilizes a variety of methodologies from the humanities, arts, design, and social sciences to address non-technical elements of video games (e.g., user experience, virtuality, narrativity, communication, semiotics or hermeneutics). Despite their apparent opposition, interactions and synergies can be discovered between the two through ludo-narrativity [4]. This concept, similar to techno-aesthetics, aims to link the functional aspects of technology (rules, functions) with the imaginative aspects of the fictional realm e.g. [5–7].

In her work, Ryan [7] proposes a novel academic discipline that examines the interdependent nature of playfulness and narrative. This discipline consists of the following seven components: a open-ended research into the utilization of narrativity in video games; an examination of diverse functions and expressions of narrative in digital games; a delineation of the variety of narrative structures found in video games (including progression, emergence, and discovery narratives); and an investigation into the symbiotic relationship between playfulness and narrative. This conceptual notion does not attempt to distinguish the tale from the game rules from a literary standpoint; instead, it offers a functional viewpoint that integrates the two and recognizes the merits of both.

This approach has gained traction in scholarly circles and has been used to examine the realm of VGs in a more integrated fashion. The ludo-narrative perspective, as proposed by Ensslin [8], contributes to the analysis of video games (VG) by emphasizing the manner in which these digital games and its producers, through the integration of multimodal features and narrative, express meanings to players. At now, the term “ludo-narrative” have been studied addressed to the congruence or resonance of its constituent parts within the realm of video games. Ludo-narrative dissonance was characterized by Howe [9] as events o moments in games where something prohibits the user from perform an action designated originally as the proper. The concept of resonance -in ludo-narrative terms-, as defined by Watssman [10], pertains to ensuring a cohesive connection between the narrative and gameplay dynamics.

Furthermore, Pynenburg's work [11] presents ludo-narrative harmony. States that "the gameplay and narrative of an interactive story are harmoniously intertwined" (p. 24). To distinguish harmony from resonance in ludo-narrative, he stresses the importance of the game mechanics and story working together to enhance, rather than merely complement, the overall experience. However, by integrating ludological and narrative elements to conduct in-depth research on games, the fundamental notion of ludo-narrativity offers a lens through which the intricacies of video the exploration of ludic narration necessitates a nuanced analysis that transcends the mere consideration of the convergence or divergence of actions within the game, requiring a more intricate examination of the narrative fabric interwoven with the interactive elements.

Therefore, ludo-narrative would come to be linked with the most salient characteristics of video games. Nitsche [12] examines the ways in which game design elements such as game mechanics, places or aesthetics influence the headway of the fantasy and science fiction gaming experience. He recommends assessing the technological elements of VG media in consideration of their intrinsic relationship with story.

2.2 Narrative Time and Temporal Frames in Videogames

Temporal and geographical correlations are crucial for gaining a more comprehensive knowledge of tales than just noting the location and time of occurrences. Time and place are not just allusions in the narrative; they are intrinsic components of it. Their impact on the reader's understanding of the narrative and the cultivation of mental imagery in response to textual stimuli is profoundly significant. [13]. Moreover, player's decisions and actions are critical components in the enactment of time-related elements inside a VG. The gamer's time experience is also influenced by their actions inside the game as well as the behavior of the control software [14]. Numerous academics have delved into the examination of the intricate interplay between temporal dimensions and events within the context of gaming [15–18].

Time and space are both crucial components for a comprehensive understanding of design and experience in VGs. Digital games function as a transitory medium whereby the narrative progressively unveils itself as the player advances. Temporality encompasses not just deceleration and the clock, but also concepts like as Iteration, cadence, narrative trajectory, and culmination [13].

The design of time experience in VGs has been affected by filmmaking and other early platforms, however, because to the increasing processing capacity that enables dynamic, joyful play, time in VGs encompass attributes that concurrently facilitate and mediate the interplay between gameplay dynamics and the corresponding narrative elements. These games need more than passively read; they demand active agency in the unfolding occurrences of the tale and exert influence over the narrative [19].

In addition, these games serve as an illustration of the concept of "parallel linearity" described Sora [20]. Digital games function in a linear fashion responding to data indicative of the player's actions entails a complex and dynamic engagement with the information at hand. Likewise, Sora asserts that game actions means components of the game, thus, inaction aids the system's success; then, the player is obliged to engage in actions that serve as inputs for the generation of solutions.

The heterochrony [15] and interactions across many temporal frames provide a substantial component that distinguishes the temporality of video games. These frameworks provide a coherent theoretical approach to the examination of phenomena associated with various periods. Academic perspectives of time in the ludo narrative have surfaced as a result of the concept of chronotope, which examines the spatio-temporal underpinnings of all stories, language activity, and the canonical times of Bal [21]. A “fuzzy temporality” is a concept introduced by Herman [16]. Hitchens [17] further develops and introduces a novel model for playtime, incorporating elements such as world engine, and game progress time. Juul [22] suggests a binary framework consisting of playtime and fictional time. Nitsche [12] examines the intricate interplay and interdependence between temporal and spatial dimensions, linked to the player’s experience and “positioning” within a game. Four temporal frames that are frequently applicable to the analysis of videogames were identified by Zagal and Mateas [23]: real-world, game world, coordination, and fidictive times. Tychsen and Hitchens [24] proposed seven time frames with a specific emphasis on role-playing games; Adams [25] posits the existence of a sequential or linear structural framework, a divergent and branching structural configuration, and a complex folding or intertwining structural arrangement. All above as a brief compilation of some studies concerning the exploration and examination of the multifaceted relationship between temporal aspects and narrative constructs within the realm of video games.

Additionally, the proposal of Federico Álvarez about time frames in VG is worth mentioning [26]. The temporality of video games is classified by Álvarez as “conditions,” “space-time,” and “change of state.” In defining events, the term “change of state” incorporates all time-related nuances, including the apparent movement or blinking of a pixel inside the game’s state. In the context of navigating from A to B, the time required to reach B increases proportionally with the distance between A and B. To access space-time barriers (barriers or looked entrances, for instance), the player is obligated to resume their quest for the item in question prior to revisiting and retracing the path they had previously taken and continue their path. In the last segment, “Conditions,” an analysis is conducted on the impact of mechanics and temporal regulations. Time gauges serve to display the duration of time allotted for a player to finish a task or monitor the remaining chronometric tenure for a player to complete an activity, both of which have the potential to impact the final payout. Objectives that a player must accomplish may also impact the duration of the game, as the completion of said objectives may result in turns or the advancement of a player avatar within the game world.

In summary, several scholarly papers and books have explored time and space concepts in VGs. However, there is a dearth of research that identifies specific aesthetic phenomena associated with time, engagement, and play. Álvarez’s contributions to this line of thinking are noteworthy; however, there remains scope for disagreement, particularly regarding the detection, evaluation, and utilization of temporal game features to augment the gaming experience and foster heightened levels of player engagement and immersion. A promissory alternative in this regard is to develop temporal constraints.

2.3 Temporal Constraints

Temporal constraints (TCs) mean the temporal parameters that dictate the order in which certain activities or occurrences must transpire or be fulfilled. Furthermore, they are capable of delineating temporal connections among occurrences, as in “event C must transpire within a certain timeframe subsequent to event D” or “event A must precede event B.” In several fields, modeling, planning, and reasoning about time-related issues need temporal constraints because they give structure and direction to assure the accomplishment of desired goals and the efficient and effective use of resources within specified time bounds [27, 28]. Therefore, temporal constraints are time-related limits or restrictions that impact several facets of game design and gameplay within the domain of video games. As to Álvarez’s categorizations, these limitations have the potential to impact game mechanics, design choices, narrative construction, and player experiences; therefore, it is plausible to classify them under the umbrella of ludo-narrative.

The act of successfully completing a computer game can be metaphorically likened to the process of narrating a captivating and immersive story, involving strategic decision-making, skillful execution, and progression through dynamic challenges within the digital realm, and TCs are the technical mediation through which computer games indirectly regulate playing time. As no terminology exist to indicate the events of the tale in computer games [29], “Progress Time” is a more suitable designation to describe the effects of TC. Progress Time (PT) is an integral element of the game time model proposed by Hitchens and Tychsen [24], which posits that game time is a nonlinear and dynamically generated characteristic of game play and gaming.

Tychsen and Hitchens considers PT as a conceptual and individualized perspective of the temporal dimension within the gaming experience that signifies the player’s advancement inside the game. It is possible to represent several elements of advancement inside a single game. It utilizes “happens-before” and “happens-after” linkages to represent events. Since each player may progress at a distinct pace, it is inherently unique to each player. Timeline branching may result from player actions and/or reloads; hence, the game is nonlinear. While discrete branches may symbolize analogous temporal epochs within the gaming milieu, their impact is confined to augmenting the player’s understanding of the revisited segment, rather than exerting influence on their subsequent progress.

In a similar vein, TC may be seen as anisochronies [30] that requires the repetition of actions to achieve a goal that allows for the continuation of the game’s sequences. Anisochronies, as defined by Genette, pertains to a fluctuation in the pace of the narrative and suggests a non-linear transition among the four fundamental movements he delineates. These movements account for the narrative’s velocity or the absence of equivalences between the fabula’s duration and the envisioned temporal extent of the reading endeavor [30]. As a result, TC denotes the means by game designers use to regulate progress time. Game creators may use TCs to offer recurrent tasks that modify the flow of game time to maintain player interest in VGs.

From this standpoint, engaging in computer gaming might be likened to narrating a story. This procedure imparts discernible imprints on the discourse level, which establishes specific correlations with the narrative level, including temporal aspects. The unfolding of plot events in computer games transpires in tandem with the progression

of the narrative discourse, and their instantiation is contingent upon the unfolding discourse itself. As Genette [30] explains, this is an interpolated narration rather than a direct contemporaneous narration; the narrative and the tale may become entangled to the extent that the latter impacts the former. Actual actions, narrative actions, and fake actions all transpire concurrently in computer games. The player is also aware of the fact that alternative routes and outcomes of the game have been established; the objective must be uncovered and achieved over the course of play [29].

Despite the fact that the game design work surpasses the limitations of narrative rhythm speed, prior writers have recognized these time speed control methods without providing enough information. Pérez-Latorre [31] labels this phenomenon “centric temporality,” wherein the overall temporality of the game evolves as a consequence of the player’s actions. These pertain to alterations in the length of the video-ludic story; The authors are compelled to engage in thoughtful deliberation and empirical testing of this artistic decision in collaboration with the player. This collaborative effort aims to ascertain the optimal equilibrium between the imposition of control and the provision of freedom, ensuring a delicate balance that sustains the player’s interest throughout the gaming experience. Aarseth [14] proposes that the structure of the game is comprised of nodes, with players exerting impact on the narration via their narrative choices at each node. As previously stated, task progress is a component of progress time, according to Tychsen & Hitchens [24], the progression of tasks is contingent upon the successful completion of specific objectives, thereby facilitating advancement within the game. Furthermore, Aarseth [32] calls negotiation time to the necessary iteration of activities until a workable array is established. An additional exemplification may be found in Laurel’s [33] metaphorical “flying wedge,” which symbolizes the player’s development from the conceivable to the probable to the necessary.

In summary, while the progress made in studies about heterochrony in VGs, techniques or methods for controlling time remain undefined as a design aspect. Time is a critical determinant of participation in a VG [34]. In the pursuit of player retention, one of the objectives incumbents upon game designers is to exert influence over and guide the temporal dimension within the gaming experience. Consequently, temporal manipulation in virtual games emerges as a pivotal design tool, affording the capacity for deliberate adjustments aimed at augmenting player engagement [24]. As a design feature that balances the rate of narrative on VGs, this represents the transcendence of TCs.

2.4 Videogames Engagement and Temporal Constraints

Ensuring equilibrium is the fundamental attribute of TCs. These TCs represent time in video games and have the potential to increase player involvement [34]. Player involvement will diminish, according to Przybylski et al. [35], if the degree of difficulty is uneven. Thus, through a meticulous examination of Temporal Constructs (TCs), it becomes viable to posit a balanced equilibrium that harmonizes the frequency of narrative rhythm alterations at the functional level with the intricate audiovisual narrative, often referred to as the “art,” within the game. This aesthetic value is ensured regarding the player’s interaction with the VG by means of this techno-aesthetic equilibrium.

In the realm of engagement, Boyle et al. [36] undertook an exhaustive assessment of literature on video game involvement with the aim of identifying the preeminent psychological theories of profound influence. Thus, in accordance with Boyle, theoretical framework address two engagement-relevant topics: the subjective sensations and pleasures of games and the motivations for playing games. Initially, flow theory is the prevailing perspective used to characterize subjective experiences during video game play [37]. The theories that are best suitable to describe video game involvement in the second example are the Self-determination theory [38], the Uses and gratifications theory [39], and the Technology Acceptance Model [40].

At its inception, the notion of flow pertained to a maximally joyful, subjective, and gratifying emotional state that emerged with the execution of actions that were viewed as beneficial. Activities must need a high degree of concentration, a feeling of individual agency, well-defined objectives, immediate and direct feedback, and intrinsic interest and satisfaction in order to promote flow. By using flow theory to video games, Sherry [41] described the level of player involvement that occurs during gameplay.

Ryan et al. [42] used SDT to scenarios including video games. The demonstration revealed that games can function as a wellspring of motivation when the psychological aspirations of connection, proficiency, and self-governance are duly met. Furthermore, according to the uses and gratifications theory, individuals possess unique preferences for amusement and leverage a spectrum of media to gratify their distinct desires. This exploration also delves into elucidating the motives behind individuals engaging in television viewing and music listening [39], this conceptual framework has further been employed to elucidate the rationale behind individuals engaging in the pursuit of computer gaming [43].

Given the incentives behind gaming and the subjective feelings and pleasures associated with video games, unquestionably, players necessitate captivating tasks, demanding scenarios, or worthwhile pursuits to perpetuate their engagement in the medium. Play designers establish time even when players are naturally driven to participate by assigning tasks that need a certain level of difficulty and rhythm in order to maintain players' interest throughout the session. As per this idea, the TCs are used for the purpose of quantifying this temporal design.

Thus, balance is the fundamental property of TCs. Moreover, the aesthetic orchestration of the real-time experience is inherently embedded in the regulation of temporal rhythms within this narrative genre. Players actively partake in an array of time-related activities meticulously curated and tuned by game designers. [34]. Consequently, TCs seem to be significant elements of the attractiveness of a video game.

2.5 Techno-Aesthetic of Gaming

A TC, which lies between the rules and the narrative, is a theoretical unit. A crucial aesthetic device that generates a “transductive” aesthetic placed between the observable and the playable, it permeates the “audiovisual layer” [2, p. 216]. Techno-aesthetics is founded upon an inter-categorical fusion of the aesthetic experience and a technical category (use, aim - aesthetic delight).

Given its distinctive vantage point on technology and culture, Simondon's argument is notably relevant in the context of video games. Simondon believes that individuation, the process by which creatures differentiate themselves from their surroundings, is central to his philosophy [44]. The technical work of Simondon focuses on the misalignment between industrial technology and culture and the way in which philosophy may assist in reestablishing harmony; aesthetic reasoning, thus, is necessary for this regulating role [45].

The design of video games is illuminated by the notion of "individuation." Individualization is promoted by the symbiotic interplay of player agency and immersive experiences within the intricate landscape of video games, which enable players to act and influence game narration and play [45]. Furthermore, this notion profoundly influences the process by which videogame designers fashion worlds and characters, enabling players to customize their experiences via branching narratives, open-world exploration, and character customization; furthermore, it strengthens the player's emotional bond with the virtual world; and ultimately, it increases player engagement [46].

The visual experience of play must take both the player and the game creator into account. Constantly imposing immovable limits on the player is mostly necessary for the game to generate resistance. A player's identity is constructed inside the game in accordance with their own interests and capabilities, the game's narrative, and its gameplay mechanics. The designer then creates the experience indirectly via the establishment of the player's restrictions and agency inside the world in which they reside, explore, and alter, as opposed to directly constructing the game experience. Aesthetics is the philosophical discipline concerned with elucidating the joys that individuals obtain from certain experiences and things; aesthetic experience is not reducible to the formal features of the object or the subject's experience alone [47].

In this instance, temporal manipulation is represented by temporal constraints that, depending on the design of the game, provide the player a greater or lower degree of freedom. Furthermore, TCs necessitates the completion of tasks repeatedly until a certain objective is achieved, hence sustaining the game's narrative. The author must evaluate the player's compatibility and make a technologically artistic decision [48–50].

3 An Effort to Classify Temporal Constraints

In addition to possessing a theoretically different temporal nature, every playing session is also unique. Speed runs, in which the player has unrestricted access to the (real) world, are manifestly extremely unlike to turn-based games, which impose temporal and geographical limits that speed runs ignore. Furthermore, it is essential for a theory of time in games to include either single-player or online games, or both. Can a universal temporal constraint foundation design be identified for all scenarios? Although factual information exists about TCs across all game genres, not all TCs are identical in every scenario.

Mobile, online PC, and console games are quite accessible. Every platform has a multitude of game genres and an extensive selection of titles within each category, with some titles being platform-specific and others being cross-platform. Although these genres are not mutually exclusive, all platforms share consistent game categories (Action,

Sports, Strategy, Role Playing, First Person, Simulation, or Third Person, just to mention a few). Even though each of these categories has distinctive qualities, TCs are used to affect the game time experience of the gamer.

3.1 Method

Electronic Arts, a global leader with more than 450 million registered players, is the most valuable video game corporation based on market capitalization. The EA platform provides a wide variety of games in the same categories than other platforms. This platform's games were utilized in a census.

EA's game platform, EA Play, serves as a template for this undertaking. Using the platform's categories as a reference point, a census research was done. EA Play is a membership service that offers a wide variety of video games. Given that Electronic Arts is a worldwide leader with more than 450 million registered users, it appears to be a fair representation of the interactive digital entertainment business. EA is now the largest video gaming company by market value [51]. Prior to 2019, EA was the third best Game Publisher [52].

It may be a trade-off to consider just titles accessible on EA Play. Given that just one developer's titles will be evaluated, it is plausible to examine the possibility of bias. On the other hand, the platform offers a vast selection of games in several categories (the same categories as a plethora of platforms), and many of the games can be played on PC or consoles (Xbox, PlayStation, Steam) with a single subscription (there is no need to buy 86 games to analyze). In light of the second point, the EA Play platform should be regarded as a reliable choice for convenience sampling.

This study is of a qualitative and analytic character. Using the methods given by Martins et al. [53], a gamer played and recorded 30 min of each game in the EA Play catalog using the "normal" difficulty option. Using the AQUAD CAQDAS software, these recordings have been directly and inductively coded in order to determine and identify the numerous thematic values of each TC. Thus, significant taxonomies are gained for future research.

The researcher coded the videos to differentiate the thematic values of each TC. Thus, taxonomies are obtained for future research. The proposed taxonomies to triangulate were addressed by informants who participated in a prior quantitative TC frequency analysis of the recordings. Through interviews, the content analysis of game recordings was "verified," enlarged, and refined.

3.2 Results

Each of the game recordings from the various EA Play catalog categories have been evaluated, resulting in 10 distinct temporal constraints. The above list covers the ludonarrative techniques employed by videogame designers to restrict player mobility and impede uninterrupted linear play. It is a matter of rhythm, or the control of narrative time.

Table 1. Proposal of taxonomy of temporal constraints

TC-common	A common constraint satisfies all the previously described properties. They are interruptions to the natural flow of the game. It corresponds to spaces where you must eliminate a certain number of enemies (action, adventure, and simulation games), path changes (the appearance of sharp turns in a racing game, for example), complete a level within the allotted number of shots (puzzle games), or run out of resources to build, in a game like SimCity. Corresponds to situations in which the game system must be mastered through the application of elemental game mechanics
TC-advancement	This constraint on advancement happens when a player is unable to access a territory, resource, weapon, or other game variable owing to a need. It might be a lack of knowledge, resources, a product, a pending assignment, or anything else
TC-dialog	These restrictions extend to character interactions inside the game. Occasionally, these conversations are necessary to acquire extra information about the universe to enhance the player's immersion in the game environment. In addition, they produce new occupations inside the same game; for instance, identifying a certain character and conversing with him may result in the discovery of a new TC-quest, which may be compulsory or optional along the hypertextual path of the game
TC-cinematics	They are immersive cinematics, but they are merely reflecting, helping you connect with the game. It may give background, explanation, or narrative ellipsis
TC-battle-cinematics	It is TCs combination. The cinematic instructions or events before a fight. It is both reflection and notice of an approaching occurrence. There is a relationship between the animation or narrative and the tension that ensues
TC-action	The primary distinction between this TC and the standard TC is that the latter includes NPC opposition. The medium establishes criteria for TC-actions that need expertise or dexterity. In addition, action limits may vary in their degree of intricacy. At times, it may be as simple as performing a single motion, and at other times, it may require merging previously learned movements into a sequence of motions. In addition, a solved recurrent issue becomes an action TC since its solution is no longer a mystery; just the taught action must be executed (the same applies for TC-tutorial)
TC-extra	TCs are typical examples of time limitations. When they occur, the player has reached a location that presents a greater obstacle than normal advancement. However, this TC poses an even greater obstacle. Predicts failure owing to the intricacy of the situation. A TC-extra enhances the difficulty and likelihood of losing and having to respawn. It is a protracted stalemate that necessitates a shift in conduct. Either new methods, better equipment, or a higher skill level are required to break the knot

(continued)

Table 1. (continued)

TC-puzzle	The problem TC might consist just of an intervention in space, or it could also involve TC-action. This type of paired tension may be accompanied by other forms of pressure, such as the passage of time or the presence of NPCs seeking to stop the player. In this instance, an issue is selected since there is no prior guidance; only the TC impedes progress, hence the problem must be investigated. There are challenging, time-consuming puzzles with stacked TCs in adventure games. A puzzle is a short labyrinth impediment that requires a combination of actions to overcome. A unique hurdle that is not a tale element
TC-tutorial	A TC-tutorial implies the required completion of a gaming mechanism; it is a portion of the game in which the player is directed by graphics to complete a certain combination that allows them to overcome the provided obstacle. The required nature of this TC is a distinguishing feature; the player must repeat the task till achieving the desired outcome. Games having an RPG component, or a strong Narrative component should be addressed with caution when using immersion as a method. In some situations, any form of constraint is described, and its categorization as one type or another is not easily obvious. In this instance, an instructional limitation may be mistaken for a problem or an action; to differentiate between the three, the sequence must be examined until the game's stated objective is attained
TC-preparation	These limits correspond to situations requiring management in the game. The selection of an avatar's characteristics should only count as one TC, regardless of the number of versions. In games such as sports simulators, TC-preparation entails the selection of a lineup, the programming of a training plan (even if it is automatically filled out), reaching a certain point to manage the inventory, and the distribution of experience points

4 Conclusions and Discussion

This study contends that temporal constraints are a fundamental aspect of video-ludic narrative control and presents and analyzes temporal constraints as a valuable game design asset. Furthermore, by including Games Studies, aesthetics, and engagement, this article investigates the progression of time management system research from a ludic or narrative focus to an integrated ludo-narrative one.

The existence and importance of TCs have been clarified. An examination of the relevant scholarly works indicates that previous authors have noted the impact of ludological structures on time via the growth of games and the manner in which fundamental principles have been incorporated into game design and assessed within the field of Games Studies. Conversely, instances illustrate the prevalence of various forms of TCs that may vary between VG categories. Instead of perceiving TCs as a universally distinctive temporal design element in video games, this study advocates for a taxonomy wherein

certain TCs assume greater prominence in specific game types, yet are not inherently exclusive to those genres.

In terms of the variety of TCs that may be discovered, this works propose ten types of this design elements. Beyond the mere categorization, the analysis performed showed the different thematic value that this ludo-narrative variable may acquire; sometimes the TC could be strategic management and another it may be narrative, ludical, competitive or challenging. Furthermore, TCs could follow an exact rhythm but game designers' creativity might stablish particular or unexpected order in TCs forms, this unequal time design make game designers' work distinctive.

Further comprehensive investigation is required in this domain since our efforts just provide an introductory assemblage of the diverse temporal constraints. However, it is now apparent that genres play a crucial role in offering a wide assortment of TCs.

Increasing is the analytical usefulness of this statement. TCs serve as a visual design resource that impacts player engagement in the game. The examination of whether the duration of a gaming session varies contingent upon the abundance of temporal constraints in a particular game holds inherent value. It is plausible to hypothesize that the player's time interest in a video game is inversely addressed to the quantity of TCs encountered.

Mobile games were excluded from the sample on purpose. TC need to implement a distinct mobile gaming strategy considering their current industry dominance in video games. Most mobile games are available for free with in-app purchases. In such games, it is critical to address player engagement via temporal design and the use of TCs to promote sales rather than produce money.

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