The Dynamic Loop Model: A Systemic-Cybernetic Meta-Theoretical Framework for Understanding Tabletop Role-Playing Games

Abstract: Tabletop Role-Playing Games (TRPGs) function as dynamic, adaptive systems integrating narrative creation, collaborative decision-making, and mechanical resolution. Despite their growing relevance in entertainment, education, and social engagement, current Game Studies often lack a systemic approach to understanding TRPGs. This paper introduces the Dynamic Loop Model (DLM), a cybernetic framework that draws from Stafford Beer's Viable System Model (VSM) and Niklas Luhmann's Social Systems Theory to analyze TRPGs as self-regulating systems. By incorporating concepts such as autopoiesis, feedback loops, and reflexivity, the DLM offers a structured lens to examine the interactions between game rules, narrative structures, and player agency. The model highlights how TRPGs maintain internal coherence while adapting to emergent player behaviors and external influences. Additionally, this research explores the implications of the DLM for game design, emphasizing its applicability in enhancing engagement, adaptability, and systemic complexity in TRPGs. By bridging theoretical and practical perspectives, this study contributes to the academic discourse on TRPGs while providing actionable insights for designers and scholars interested in systemic approaches to games.

Keywords: Tabletop Role-Playing Games (TRPGs), Game Studies, Cybernetics, Viable System Model (VSM), Social Systems Theory, Autopoiesis, Reflexivity, Feedback Loops

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1. INTRODUCTION

Tabletop role-playing games (Tabletop RPGs) are collaborative systems in which players enact fictional roles and co-create an evolving world under a rule framework. In *Dungeons & Dragons* (*D&D*) (Crawford et al. 2014), a Game Master (GM) guides fantasy heroes through dungeons; in *Apocalypse World* (Baker and Baker 2010), rules prompt post-apocalyptic drama; in experimental titles like *Bad Sex: The Roleplaying Game* (Pettersson 2020), players improvise awkward or comic scenes from prompts. Across cases, play emerges from decisions mediated by mechanics (dice, statistics, procedures). Unlike contests with win conditions, Tabletop RPGs aim to weave a shared narrative through improvised storytelling, strategic procedures, and social interaction around a (physical or virtual) table.

Tabletop RPGs are widely used beyond leisure as tools for education, therapy, and community building, yet scholarship around them remains fragmented. While studies often isolate narrative, psychology, or culture, TRPG play is multidimensional: rules, story, and social interaction co-produce the experience in real time. A systemic account is missing. We need to ask how rule frameworks shape—and are reshaped by—creative choices moment to moment, and how player behavior feeds back into the unfolding fiction.

This paper proposes the Dynamic Loop Model (DLM), a cybernetic framework that treats TRPG sessions as self-regulating systems of communication and feedback. The model views play as a network of coupled subsystems (players' cognition, narrative events, mechanics) that together form an autopoietic process—one that reproduces its own structure through play. Unlike team sports or contests with fixed paths to victory, Tabletop RPGs are open-ended co-creations: goals and even rules may shift by consensus. Sustaining play requires a continual balance between creative freedom and constraint; the DLM is designed to describe that balancing act.

TRPG play also varies culturally and over time. Groups develop styles and "house rules"; playstyles differ radically (e.g., GURPS's tactical combat versus the freeform ethos of Nordic larp); dynamics change across scenes, sessions, and campaigns. A robust model should be effective at describing casual one-shots, years-long campaigns, and even live-action art events, irrespective of aesthetic judgment—whether "good," "boring," or even sustained by misunderstandings. We therefore frame the internal logic of Tabletop RPGs as keeping their own operations going.

Prior work spans sociological, psychological, narrative, and design perspectives. Constructionist approaches (Stenros and Montola 2024) treat games as socially constructed activities with their own internal reality. Indigenous theories such as the GNS model (Edwards 2001a; White 2020) classify creative agendas, such as common debates around the primacy of story or rigorous mechanics during play (Torner 2024). These accounts are insightful but often separate narrative from mechanics or evaluate them normatively.

Systems-theoretical analyses remain comparatively rare. Markus Montola (2004) cast larp as a chaotic system—sensitive yet patterned. Bo Kampann Walther (2003) approached games as social systems of communication. Christian Mehrstam (2022) applied Niklas Luhmann's theory to TRPG organization, showing how players reference genre conventions and rules in a double-layered communication. A shared conclusion is that TRPG play is a social system coupled to a game system whose rules function as a "code" for deciding what happens next—a premise central to our approach.

Building on these foundations, the DLM is explicitly meta-theoretical. Following Niklas Luhmann's "supertheoretical" ambitions (1995, 4–5), it offers a high-level structure for situating existing findings rather than competing with them, providing a common language that connects narrative analysis, psychology, culture, and design.

The model can accommodate Simon Brind's (2022) "combat narratology" by showing how combat procedures pressure narrative updates within the loop and, alongside work on bleed, identify which elements of the play situation shape specific decisions. It aligns with simulation-and-gaming design principles that see games as complex system models (Klabbers 2008) and with recent transformative RPG design aimed at personal and social change (Bowman et al. 2024).

Our aim is a holistic yet tractable account of Tabletop RPGs as living systems—fun and engaging, but also analytically rich windows into collective meaning-making.

2. METHODOLOGY

This study follows Jaakkola's (2020) conceptual research design—specifically Theory Adaptation and Model Building—to revise and extend existing theory for Tabletop RPGs. We adapt Niklas Luhmann's Social Systems Theory and Stafford Beer's Viable System Model (VSM), grounded in a Game Studies problematization, to explain dynamic interactions between game systems and players.

2.1 Theory Adaptation

Our core method is theory adaptation: we integrate complementary frameworks to address gaps in how Game Studies treats emergent, systemic TRPG dynamics (Jaakkola 2020). In our case, we have chosen to review Stafford Beer's cybernetic approach as expressed in his Viable System Model (VSM) and Niklas Luhmann's Social System Theory.

Cybernetics is the study of control and communication in systems, focusing on how stability and adaptability emerge through feedback (Wiener 1948). Stafford Beer developed the Viable System Model (VSM) to apply cybernetic principles to organizational contexts (Beer 1979; 1984). A viable system, in Beer's terms, is one that can self-regulate, learn, and adapt without losing its core identity. Meanwhile, Luhmann proposed a theory for social systems that is based on communication over action, and that similarly to Beer, describes systems as autopoietic, or self-producing. He described his theory as "radically anti-humanistic, radically anti-regional, and radically constructivist" (2012, 12) because it focuses on the organization of operations and the specific context in which they are maintained, rejecting essentialist or ontological claims (Luhmann 1995, 20–23).

2.2 Model Building

Model building complements adaptation by specifying a conceptual architecture that maps how TRPG elements interact in a dynamic system (Jaakkola 2020). Therefore, we will produce a reading of TRPG play through the lens of these two theoretical perspectives, which will then lead us to developing a model that describes its own operations in a systemic-cybernetic manner.

2.3 Methodological Steps

a. **Problematization:** Identify gaps in Game Studies literature regarding the emergent and systemic properties of Tabletop RPGs.
b. **Theory Adaptation:** Integrate Luhmann's Social Systems Theory and Beer's Viable System Model to examine Tabletop RPGs as adaptive, self-regulating systems.
c. **Model Construction:** Develop a systemic model illustrating how TRPG components interact through feedback mechanisms to maintain viability.
d. **Theoretical and Practical Implications:** Use the developed model to provide actionable insights for TRPG designers, focusing on optimizing player engagement and systemic adaptability.

3. PROBLEMATIZATION: GAME STUDIES AND TABLETOP RPGS

Game studies is multidisciplinary, drawing from humanities, social sciences, and design (Mäyrä 2008). For Tabletop RPGs, this plurality is intensified by para-academic production (Torner 2024), yielding a rich yet fragmented literature (Deterding and Zagal 2024). Humanities work treats Tabletop RPGs via ritual theory and textual production (Hoover et al. 2024; Jara and Torner 2024); social science studies examine shared meaning-making and interpersonal development (Williams et al. 2024; Bowman and Lieberoth 2024); design research analyzes emergent play and negotiated rules (Björk and Zagal 2024; Torner 2024). These strands rarely converge in a shared conceptual frame.

Bridging attempts include Stenros and Montola's constructionist ludology (2024), grounded in Searle's (1995) social constructionism, which models games as institutions whose rules both enable and constrain action. However, the term "system" in TRPG research is still used mostly in a colloquial, mechanical sense—either as procedures (Harviainen et al. 2024) or as transformations of fiction (White et al. 2019)—rather than its formal meaning.

Nevertheless, systems-theoretical uses exist. Markus Montola (2004) characterizes larp as a chaotic system—unpredictable yet patterned (cf. Salen and Zimmerman 2004).

Christian Mehrstam (2022) offers a Luhmannian account of TRPG organization, showing how play emulates genre through simultaneous reference to conventions and rules; Bo Kampmann Walther (2003) similarly treats games as social systems of communication. Despite disagreements, both converge on a key point: TRPG play is a social system coupled to a game system whose rules function as the code that actualizes events. This affords methodological leverage for accessing play's recursive operations while attending to constitutive elements—a view echoed in calls for systems-based approaches to gameplay (Ermi and Mäyrä 2005; Malaby 2007; Giddings and Kennedy 2008).

Foundational TRPG theories each supply a distinct lens. The Threefold Model (in Torner 2024) posits Drama/Simulation/Game as core priorities. GNS Theory frames agendas as Gamism, Narrativism, Simulationism within layered structures (Edwards 2001a). GEN Theory distinguishes suprastructural intentions from infrastructural mechanics (Powell 2001). Color Theory treats design values as composable "primary colors" (Niñoles 2003). Channel Theory models modular mediation (Hols 2003). The Wunderkammer-Gesamtkunstwerk model situates Tabletop RPGs as holistic artworks (Konzack 2015). The Turku School emphasizes immersive embodiment (Pohjola 2003), and the Meilahti School defines role-play as interaction within a shared diegetic frame (Stenros and Hakkarainen 2010). While influential, these models often isolate intentions, mechanics, aesthetics, or immersion, leaving blind spots around dynamic interaction, adaptation under emergent conditions, and the maintenance of the game's ongoing viability as a social system. No meta-theoretical framework yet integrates these systemic perspectives while accounting for cultural, temporal, and structural variability.

The Dynamic Loop Model addresses this gap by unifying narrative, mechanical, social, and experiential processes within a systemic, autopoietic account of Tabletop RPGs. It bridges disciplinary silos and surfaces interdependencies that prior approaches often leave implicit.

4. TABLETOP RPGS AS DYNAMIC, SELF-REGULATING SYSTEMS

Our model locates TRPG play within cybernetics and social systems theory (Beer 1979; 1984; 1985; Luhmann 1995; 2012). Applied here, these principles reveal Tabletop RPGs as interlocking feedback loops—players, rules, expectations, and fiction—jointly selecting which events become actual (Ashby 1956; Beer 1979). TRPG play is autopoietic: from an initial ruleset and premise, each session generates situations, developments, and even house rules that fuel further play (Maturana and Varela 1987; Luhmann 1995). This circularity—action → event → new situation → action—is what the Dynamic Loop Model (DLM) maps (Beer 1979; 1984).

We therefore treat TRPG play as a social system: oriented to viability and meaning-making, autopoietic, and operationally closed. A system is a functional organization—an arrangement of elements and operations, not a fixed purpose (Beer 1979; 1984; Luhmann 1995). So long as the organization is sustained, its composition is contingent (Luhmann 1995, 25); hence "GM-less" games can still be recognized as Tabletop RPGs because their operations resemble GM-led play.

What are those operations? In Luhmann's account, social systems operate through communication—utterances that change a system's state (1995). In Tabletop RPGs, a claim that contrasts with the current scene ("I enter through the window") alters the situation, whereas repeating known facts does not. When rulebooks call TRPG play "a conversation" they recognize it as a temporal series of event-selecting communications.

Ashby calls the asymmetry between innumerable possibilities and limited selections complexity (1956; Luhmann 1995, 24). Systems reduce complexity by narrowing options (Beer 1979; Luhmann 1995), establishing expectations for play, specific rulesets, group etiquette,

and others. Tabletop RPGs do so explicitly in Session Zero—aligning genre, themes, and touchstones to set boundaries (White et al. 2024). Yet because "anything can be attempted" (Peterson 2012), off-genre moves (e.g., a ray gun in fantasy) can still be proposed, putting the system under strain: can this instance of play process the input?

This is the question of viability—the capacity to absorb variety, adapt, and continue (Beer 1979). Failure to incorporate relevant inputs risks collapse (e.g., a GM who blocks player impact drives attrition). Viability is sustained via meaning: linking the actual and the plausible to chart possible communicative paths (Luhmann 1995; Baraldi et al. 2021). If the group deems a ray gun sensible to the ongoing story, the element is integrated, expanding what can meaningfully be chosen. In this sense, past events can be generalized into memories, elements of the plot, or even rules (Luhmann 2012), and then re-incorporated into play as needed.

Accordingly, TRPG play seeks to prolong itself by adapting through new networks of meaning; engagement and coherence hinge on balancing structure and surprise. Rules and established fiction supply structure; player choices and chance supply novelty (Beer 1985). Fully scripted play ceases to be interactive; fully random activity ceases to be a recognizable game (Ashby 1956; Beer 1979; 1984).

Feedback loops drive this balance (Beer 1979). A move like "I persuade the king" triggers social uptake, mechanical handling (a roll/skill), and a narrative update, which players then use to adjust next actions—a reflexive cycle (Luhmann 1995, 443). Loops are nested (recursion): scenes within missions within campaigns, with lower-level outcomes updating higher-level states and vice versa—precisely the cross-scale coupling the DLM will diagram.

Tabletop RPGs also combine operational closure with cognitive openness. Closure means only communicated, rule-/fiction-appropriate acts "count," preserving identity through constraints. The GM mediates this closure, translating contributions into the game's code—invoking procedures or disallowing actions that violate established reality (Hammer 2007). Simultaneously, cognitive openness denotes receptivity to unforeseen inputs (Beer 1984): human adjudication accommodates novel ideas (e.g., befriend the dragon; solve conflict with a performance), which helps explain cultural and group variability.

Viability thus requires an equilibrium: excessive closure yields railroading; excessive openness yields incoherence. A viable TRPG absorbs player-generated variety without breaking (Beer 1984). In sum, TRPG play is self-organizing (players/GM co-produce evolving structures) and adaptive (responses to ideas, dice, disruptions adjust system state), sustained by multi-scale feedback while maintaining a stable identity (genre, rules) that can evolve.
With this foundation, the DLM formalizes components, boundaries (inside/outside), and the operation of a single loop from input to updated state.

5. THE DYNAMIC LOOP MODEL

The DLM is a theoretical tool for examining how Tabletop RPGs select "what happens next". A system reduces complexity by delimiting what may be considered when actualizing an event. The DLM integrates player motives, social expectations, game goals and rules, and environmental inputs to answer two questions: how is the next event determined, and what options are available to select?

5.1 Establishing Boundaries

For operations to proceed, complexity is first reduced by defining which utterances count as play. We set two contextual dimensions: Setting and Narrative.

Setting is the boundary of plausibility: genre, the fictional world, governing logics, and possible interactions. Events during play are expected to fall within this scope. For example, in a post-apocalyptic TRPG, the setting defines constraints such as resource scarcity, fragmented social structures, and technological decay, while in a fantasy TRPG, elements such as the presence of magic or fantastical creatures may be taken as a given, but other aspects such as technological progress may be open to discussion. In both of these cases, locales such as mountains, underground passages, oceans or cities are plausible, while holding adventures in outer space would be more unlikely.

Narrative is the time-ordered sequence of events. Options must cohere with established pasts and anticipated futures and may reuse available elements. For example, in the post-apocalyptic TRPG, the narrative will include the specific moment and situation in which the inciting apocalypse happened, while in the fantasy TRPG the histories of kingdoms and empires will be relevant. In both of these games, it could be possible to situate play in the ancient past, or even allude and modify them from the "present", such as establishing relevant details of past incidents through characters' backstories.

Both dimensions evolve as new information is accepted or old information altered. Proposals aligned with established play are more likely to be admitted. Within Setting and Narrative, participants can access different elements that help narrow selection.

5.2 Selecting in the DLM: Scene, Character, and Resource

Setting and Narrative provide context; almost any action may be proposed, but reductions make some choices more likely. As an example, let us consider the following situation: a group of players is playing a TRPG where the Setting is loosely defined as medieval fantasy, and the Narrative so far has established that their characters were tasked to go on a quest to find an ancient artifact in a forest temple. The acting player narrows the scope by selecting a Scene, a Character, and a Resource, which may or may not happen in this order.

A Scene is a specific intersection of Setting and Narrative framing the action—features of t he location and the events that led to this specific moment. For example, let us suppose the GM begins the loop by establishing a specific Scene: the edge of a dark forest, with tales of an ancient temple hidden within. The GM further defines the Scene by indicating elements such as a meandering trail into the forest or how moonlight does not seem to go too far into the grove. This Scene provides not just a backdrop, but sets up challenges and decision points such as deciding whether or not to venture into the dark. In response, a player may say that their Character would have bought torches back in the town market—this brief indication is, effectively, the player temporarily selecting a prior Scene to justify actions in the current one.

A Character (be it a player- or non-player Character, or even a collective actor) focalizes agency. Selecting one further constrains plausible actions via abilities, qualities, and relationships. Let us say that the Character that bought the torches is a ranger experienced in traversing the wilderness. They are joined by two other characters: a valiant knight, who is familiar with the area, and a mage, who is scholarly in the arcane and in ancient ruins, but who rarely ventures out of their tower. Usually, each one of these Characters would be governed by different Players, such as in games where combat situations function similar to a turn-based wargame such as *D&D*. However, say that the Player controlling the knight jokes

about the mage being spooked by the forest's darkness and thus dropping their spellbook: this statement, if not opposed by any other participant, may very well be seamlessly incorporated into play, establishing the mage as a Character liable to be scared. Here we see that, in the correct circumstances, any Player may select any Character to establish an action.

A Resource is a supporting element anchored in either Character or Scene—abilities, items, knowledge, terrain, relationships—used conventionally or inventively. For example, suppose the group of Characters choose to enter the dark forest, with the ranger leading while holding a lit torch. Eventually, the GM describes, they reach the edge of what appears to be a large pit, too dark to see the bottom of. The warrior suggests that they could explore the pit, and that since they are sturdy, they could go in and climb down first in case they run into possible dangers—this would be using their own Resource in a known manner. However, the mage comes up with a different idea: they know a spell that allows them to instantly know the location of an object by writing down a sigil on it, so they propose to pick up a stone, write the sigil on it, and throw it down the pit, so they can instantly know how deep it is—hence, the mage uses their own Resource in an unexpected way. The ranger agrees with the idea, and even suggests to use a small flare they were carrying instead of a stone, so that the light it emits allows them to use it later as a guide for descending if need be, or in other words, the ranger uses a Resource that is not their own as part of their action.

We model Scene–Character–Resource because they are concrete, observable selections driving recursive reduction:

"In (Scene), (Character) does (Action) with (Resource)."

Theme, mood, tone, and similar descriptors are meta-level qualities that shape boundaries and interpretations but are not direct selection points.

5.3 Incoming Variety: Mechanical Resolution in the DLM

After selection, the table checks the proposal against the expectations for play. If it aligns with its own terms, it is integrated into it and a new action is called; if its alignment is uncertain, a Mechanical Resolution may be invoked: these are algorithmic procedures with specified inputs and outputs that externalize part of decision-making but require contextual interpretation to re-enter play.

Suppose, then, that the GM replies to the proposed action by stating that there is a chance that the mage will not be able to detect the presence of the thrown item. As such, they ask the Player to make use of a method to determine whether the action works as intended or not, which would be their Spellcasting skill. This consists of throwing a 10-sided die and adding the number that represents their proficiency at casting spells to the result. The GM adds that a result of 8 or higher will mean that they get their way.

Once the Mechanical Resolution method offers an output, let us say a total of 9, the Players now interpret the result in the terms defined by the game rule. Since the target result was an 8 or higher, according to the agreed method, the proposed action succeeds, and this establishes the conditions upon which the system's state is to be updated.

5.4 Outcomes, System Updates and Standby for New Actions

As a result, one run of the Dynamic Loop looks like this: select Scene → select Character → choose Resource → state "In (Scene), (Character) does (Action) with (Resource)". If the

routine expectations do not allow the event to integrate into play, then resolve mechanically, and the result defines the update.

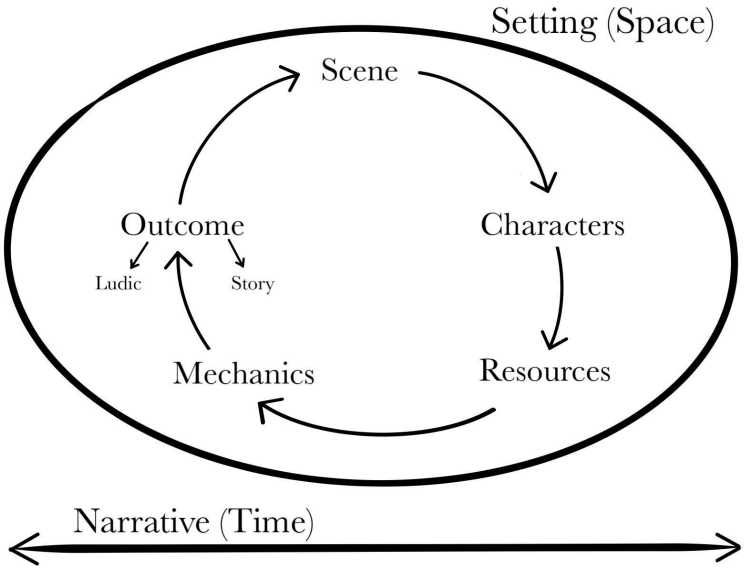
Following our example, the die roll indicates that the mage will be successful in precisely pinpointing the location of the enchanted flare down the pit, which prompts the GM to now update the current Scene as a new event: the flare now falls down and tumbles down a slope, but the mage knows that it is no more than a couple meters downwards. Thanks to the light, they now know that the pit is more similar to a cave opening, and they manage to see the entrance to the ruins they were looking for. However, the GM continues, this also made something down the hole screech, and they can see some figures moving in the dark. This is now the new state of the system, and the players are prompted to select a new action to continue play.

To make the Dynamic Loop Model (DLM) concrete, the following two mini-walkthroughs sketch how the same abstract loop plays out in different rules frameworks.

In *D&D 5e* (Crawford et al. 2014) the loop is: Setting/Narrative → select Scene–Character–Resource → pick Mechanic → Resolution → update. The distinctive feature is that the selection can be fragmented across the player's turn: you can decide scene elements (grid distances, positioning), then character options (attack type, feat), then resources (which weapon, which slot), and only then lock a mechanic (attack roll, shove, grapple, save). The result is numeric and must be translated back into fiction; resources act as hard affordances that gate eligibility, but intention and procedure can be chosen stepwise, even with table suggestions, and only cohere at the moment of the roll and its fictional update.

In a Powered by the Apocalypse game like *Dungeon World* (Latorra & Koebel, 2012), the loop is the same schema, but the selection must be integrated: the player's declaration needs to present a coherent Scene–Character–Resource bundle that already points to a specific move's trigger ("close in and drive the close-tag sword through the ogre's guard"). Because the trigger ties fiction to mechanic, the mechanic is effectively auto-selected when the S–C–R intersection is right; resolution returns categorized consequences that immediately update fiction and resources (spend hold, apply +1 forward). Less procedural shopping, more alignment upfront: the intention, the affordance, and the rule must arrive together, which tightens coupling and increases moment-to-moment cognitive integration.

Figure 1: The Dynamic Loop Model (Own Elaboration).



6. THE SYSTEMIC FRAMEWORK BEHIND THE DLM

The Dynamic Loop Model, as stated above, is meant to be a theoretical tool that closely analyzes the process of complexity reduction that players make during a TRPG play session. As such, it assists in describing the available choices for each given moment during play, and how each successive decision narrows down the possibilities for action until one becomes actualized in play. However, we have been describing those available elements in vague terms so far, and this is because the DLM is nested in the intersection of several different systems that interact with each other. We will now address this by offering a description of the systemic-cybernetic framework that informs it, which is composed of four inter-locking systems: the Play System, the Game System, and the Psychic System along with the Biosystem.

6.1 The Play System

Tabletop RPGs play operates as a social system—the Play System—where participants' utterances update the shared state; only what is uttered belongs to the operation of play. Which utterances count? Three scenarios clarify this.

First, a system distinguishes inside from outside: what it can process becomes part of the system; what it cannot, is its environment (Luhmann 1995, 16–17). "Pass me the chips" is outside and does not alter play.

Second, even utterances within play may "not fit" the fiction (e.g., a laser gun in high fantasy) or the group's aims (e.g., topics others find uncomfortable). Although "anything can be attempted" (Peterson 2012), the scope of "anything" is bounded by local culture, genre expectations, rule knowledge, and prior events. Systemically, this network of plausible actions is meaning production (Luhmann 1995, 59–61; Baraldi et al. 2021, 137–39).

Third, selection is further tuned by expectations—contextual adjustments to meaning that define what we expect of others and what we expect they expect of us (Luhmann 1995, 96). Typical expectations include a GM describing and adjudicating and players acting in character with some consistency; these reduce complexity at each decision.

Beyond expectations, systems refine boundaries via a code—a binary distinction—and programs—decision rules that apply the code (Luhmann 1995, 317; 1996, 143–44; 2000, 194–96). In law, the code is legal/illegal and statutes are programs. For the Play System, the code must admit utterances that sustain play and exclude those that do not. We propose three main sources that supply expectations and programs: "socio-cultural rules," i.e., condensed prior communications such as etiquette and good practices (Luhmann 2012, 37–38; Baraldi et al. 2021, 71–74; Stenros and Montola 2024); "genres of fiction," i.e., tropes and structures that guide plausibility (Mehrstam 2022); and "formal rules," i.e., rulebooks, mechanics, and house rules (Stenros and Montola 2024).

We further propose the code of playfulness (see Masek and Stenros 2021; cf. Mehrstam 2022) with the binary engagement-aligned/not engagement-aligned: the operative question for any utterance is "Does this keep play, as defined here, going?" Utterances that prioritize continuing operations are admitted to future selections.

This recursive, autopoietic view accommodates diverse forms and qualities of TRPG play. It includes groups that clearly communicate aims and regularly re-validate expectations, as well as groups where a GM's vision overrides others and the game is dull yet uncontested. So long as the next utterance is included, makes sufficient sense within the established framing, and no participant or element effectively vetoes it, play proceeds (Luhmann 1995; Baraldi et al. 2021).

6.2 The Game System

Not all utterances can be integrated merely because they sustain engagement; some require Mechanical Resolution (dice, resources, etc.). At that moment, the Play System's event irritates—i.e., triggers—another social system: the Game System.

The Game System parses those events through its own code, "rule-alignment" (rules-aligned/non-rules-aligned). Unlike the Play System's recursive code, it relies on Formal Rules as programs—instructions that refine the code and yield determinate outputs.

In turn, the Game System irritates the Play System: mechanical outputs are interpreted back into fiction, updating state only when they align with both systems' codes—rules and engagement. This mediates a cognitive opening between systems, shifting from static rules to dynamic processes (Luhmann 1995).

Because selections are contingent, a negative code outcome does not erase possibilities; it invites reflexivity. Via second-order observation, the Play System can re-evaluate what is actualized and redefine boundaries (Luhmann 1995, 443; 1996). This affords flexibility to reinterpret—or even discard—Formal, Social, or Internal rules when they conflict with emergent needs, making play a negotiated balance between designed intent and emergent practice.

6.3 But Where Are the Players? Psychic Systems and Biosystems

A common objection is that the model foregrounds systemic operations while sidelining players and GM–player distinctions. Here we treat participants (assumed human) as additional systems interacting with the Play and Game Systems.

Following Luhmann (1995), a human participant interpenetrates two non-social systems: the Biosystem (biological/physiological substrate) and the Psychic System (conscious mind). This is not Cartesian dualism but an operational distinction: one processes biochemical regulation, the other processes meaning. Collapsing them would reduce thought to biochemistry (or vice versa), obscuring different kinds of operations.

Although one might model a single bio-psychic unit, such integration hides distinctions the DLM needs. Luhmann (1995; 2012) keeps them separate because each reduces a different complexity and couples to social systems through distinct channels. Keeping the split lets us track, for example, a physiological change without communication, or an unspoken plan that never enters play—crucial for seeing when each system contributes (or fails to) to the loop.

Interpenetration means mutual observation: each system conditions the other's possibility and influences it at points of irritation. Where one observes and translates the other into its own operations, a structural coupling occurs (Luhmann 1996, 58–60; 2012, 54–60).

Both Biosystem and Psychic System are structurally coupled to the Play System. In a horror TRPG, the monster's reveal irritates both: fear responses arise and escape plans form. For the plan to affect play, the Psychic System must translate thought into communication by irritating the Biosystem to produce speech; only then does it enter the Play System.

The Psychic System also internalizes characters as Internal Rules—self-imposed constraints such as traits, motives, and goals (Stenros and Montola 2024). It likewise attends to Genre of Fiction, Formal Rules, and Socio/Cultural Rules, using them to reduce option complexity and judge what counts as "in-character."

6.4 The Systemic-Cybernetic Framework for TRPG play

How the diagram works:

1. **Center of gravity — PS:** The Play System (PS) is the hub. Only communicated utterances enter PS. PS observes FR, GF, and S/CR to decide what "makes sense" next.

2. **Players as systems — PsyS and BS:** The Psychic System (PsyS) and Biosystem (BS) interpenetrate (dotted). PsyS observes PS and S/CR and turns thoughts into utterances by "irritating" BS (speaking, acting). BS affects PsyS (arousal, fatigue) but does not enter play unless PsyS communicates it.

3. **Rules as procedures — GS and FR:** When PS needs a mechanical decision, it irritates the Game System (GS). GS observes Formal Rules (FR) as programs (instructions) and returns an outcome. PS then interprets that outcome into fiction if it fits both engagement and rules.

4. **Characters as self-constraints — IR:** Characters (IR) are the players' Internal Rules—traits, goals, bonds—that PS observes when deciding actions. IR condense over time from both PS and GS outcomes (dashed from PS/GS to IR): play and mechanics gradually redefine who the characters are and what they can do.

5. **Culture and fiction — S/CR and GF:** Social/Cultural Rules (S/CR) condense from prior PS operations (table etiquette, safety norms, house customs) and are observed by PS and PsyS to guide moment-to-moment choices. Genres of Fiction (GF) are observed by PS to shape plausibility and style.

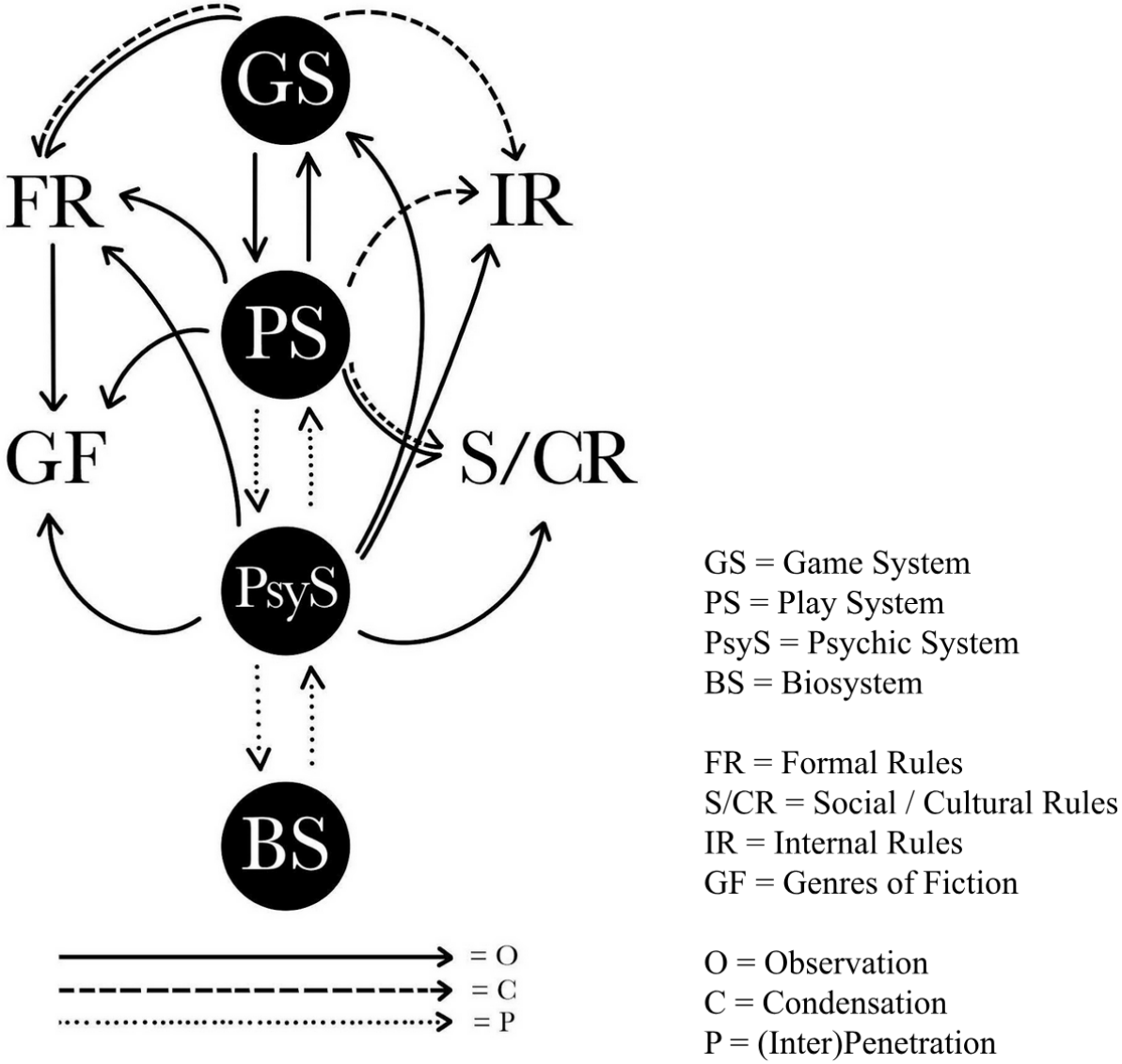
6. **Memory and evolution — Condensations:** Dashed lines show where past operations get recorded for future use: PS → S/CR (customs), PS/GS → IR (character development), GS → FR (rule formalization).

Reading a single loop:

a) PsyS forms an intention; via BS it becomes an utterance that enters PS.
b) PS checks plausibility by observing GF, S/CR, IR, and FR.
c) If needed, PS irritates GS; GS applies FR and returns a result.
d) PS updates the fiction; IR and S/CR may condense changes for future play.

In short, PS is the live conversation; GS is the mechanical decision engine; PsyS/BS are the human substrate that turns thoughts into utterances; FR, S/CR, IR, and GF are the knowledge stores that PS consults and continually updates. Some elements are not connected (e.g., IR and S/CR) because they are mediated via PS/GS, thus avoiding double-counting non-communicated states.

Figure 2: Interactions Between the Play System and Game System (Own Elaboration)



7. THEORETICAL IMPLICATIONS AND PRACTICAL APPLICATIONS

With the Dynamic Loop Model and the systemic-cybernetic framework established, we outline three contributions. First, the model fills the need for a meta-theoretical lens that integrates siloed TRPG scholarship. Second, it advances a radical social-constructionist view of TRPG play. Third, it offers a framework that supports practical applications of Tabletop RPGs beyond entertainment.

7.1 A Meta-Theoretical Approach to TRPG Play

As a meta-theory, the DLM plus our systemic account addresses the field's fragmentation by providing a shared frame that situates diverse objects of study (Deterding and Zagal 2024). It supplies common language to relate adjacent theories of player action—Steering (Montola et al. 2015), Stance (Edwards 2001b), and work on character–player identity (Bowman 2010).

Within the DLM, these specify how participants prioritize complexity reduction and which element of the systemic-cybernetic framework anchors a decision: a Pawn stance tends to foreground Formal Rules and the Game/Play coupling, whereas exploring a Taboo Self consults the broader environment before translating choices into play.

The model also incorporates TRPG production into play's operation. Because the effective ruleset is contingent and multi-sourced, designing a ruleset sets expectations for future communication; creating or reading one is an utterance that reduces systemic complexity, completing a communication loop even without immediate play. By similar logic, watching actual-play streams counts as observing operations while remaining engaged on their terms.

Finally, framing play as recursive systemic operations aligns with the Maps and Loops approach in larp (Saitta et al. 2020): though interested in different domains of reduction, it is largely compatible. This opens space for further systemic models across role-playing forms, helping bridge currently fragmented lines of research.

7.2 A Radical Social Constructionist Proposal for TRPG Play

Systems are operationally closed: they remain autopoietic only by processing their own kind of information; other inputs affect them only via translation. Thus a thought must be verbalized to enter play, and a die roll must be interpreted to bear consequences. The controversial implication is that people are not part of the Play System (Luhmann 1995, 210–13). This does not deny players' influence, but rejects reducing play to mental models: TRPG play arises from multiple coupled systems and is not organizationally dependent on any specific actor.

Following Luhmann (1990; 1995, 20–23; 2012, 12; see also Baraldi et al. 2021, 100), our stance is "radical social constructionist": play is irreducible to human action, so nonhuman or absent actors may participate so long as operations continue. "Player" is a role defined in context; any actor producing the expected utterances can fill it. Hence solo campaigns, a large language model acting as GM, or leaving instructions so others run one's character while one steps away are analyzable as TRPG play on the same terms.

This implies much of TRPG play exists outside minds as a temporalized record of conversation, paralleling larp's distinction between designed, played, and remembered (Stenros and MacDonald 2020). Systemically, these map to Play System expectations, operations, and later reconstructions. Consequently, the DLM and systemic-cybernetic framework treat internal motives and emotions only insofar as they shape selections—a limitation that invites methodological development for empirical use.

7.3 Facilitating Practical Applications for TRPG Play

A key advantage of a systemic-cybernetic lens is reach beyond play. Many social systems—education, law, economy, public/private organizations—also reduce complexity through communication and seek viability. Our model therefore clarifies why TRPG-based interventions can work in non-play domains and how to design and document them more precisely.

Systemic interconnectivity fosters resilience and adaptability (Chalmers 2013); Tabletop RPGs can mirror real-world complexity by embedding interconnected subsystems, enriching immersion. A systemic-cybernetic approach informs game-based innovation in teacher education (Boysen et al. 2023), disaster preparedness (Evans et al. 2023), organizational development (Espejo and Reyes 2011; García-Soriano et al. 2023), psychological therapy (Kilmer et al. 2024), and community building (Bennett 2023).

These directions are already recognized by designers (Björk and Zagal 2024) and academic/para-academic thinkers (Torner 2024), and macro-level design models exist (Stenros and Hakkarainen 2010; White 2020). Our contribution is a clearer big-picture model of simultaneous elements in TRPG play, reducing reliance on tacit know-how and making design practice more accessible to newcomers.

8. CONCLUSION

The Dynamic Loop Model (DLM) advances understanding of Tabletop Role-Playing Games as complex, autopoietic systems. Drawing on cybernetic principles from the Viable System Model and Social Systems Theory, it unifies mechanics, narrative, social practices, and player agency under a single lens. Tabletop RPGs balance structure and variety through recursive feedback, enabling emergent complexity while preserving coherence and addressing a meta-theoretical gap in TRPG studies.

At its core, the DLM frames Tabletop RPGs as adaptive processes rather than static rule sets. Multi-level feedback sustains engagement and viability, allowing games to evolve with unpredictable inputs and embody reflexivity and self-regulation. This perspective clarifies the medium's transformative potential—as entertainment and as a vehicle for connection and exploration.

Practically, the DLM offers designers actionable guidance: harmonize player-driven content with structured procedures so emergent narratives flourish without destabilizing the system. Building feedback loops into mechanics and encouraging reflexive design supports more engaging, inclusive, and adaptable experiences across diverse audiences.

Beyond design, the DLM highlights non-ludic applications. Understanding Tabletop RPGs as adaptive systems supports uses in education, therapy, and organizational training. Their recursive loops can model real-world complexity, foster systems thinking, collaboration, and resilience, and simulate consequential decision-making in safe, demanding settings.

Future work should test the DLM empirically across domains: explain long-term campaign dynamics, assess relevance to digital role-playing, and inform serious games, training simulations, and organizational tools—both to validate the model and expand its utility. Interdisciplinary collaboration among sociology, education, psychology, and organizational studies can refine the framework for increasingly complex interactive systems.

Overall, the DLM positions Tabletop RPGs as bounded yet flexible platforms that navigate complexity, reduce uncertainty, and enable collective meaning-making. By integrating theoretical innovation with practical utility, it reframes Tabletop RPGs as dynamic, resilient systems bridging entertainment, education, and social transformation—credible tools for addressing the complexities of contemporary life.

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