

FINDING LUDEMES IN MODERN BOARD GAMES: ANALYZING THE TOP NUMBER ONE GAMES OF BOARD GAME GEEK

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Abstract: The first profound ludemic studies are being done at the moment. Some projects are exploring the ludemic approach in video games and historic games. However, contemporary games known as modern board games are still underexplored. In this paper, the number one games, according to Board Game Geek since 2000, are analyzed according to a systemic approach. The authors propose exploring the game system and other dimensions of each game in order to find design patterns that help support a ludemic approach. By addressing ludemes, the authors seek to contribute to understanding the success of modern board games in an age of video game domination.

Keywords: Board Game Geek; Ludemes; Modern Board Games; Post-Digital

Introduction

Games are part of human history. All civilization have their games, and nowadays, games are gaining even more importance as video games in economy and culture (Siwek, 2007). Surprisingly, analog games are not obsolete and prosper as a growing hobby and niche activity.

Despite the undeniable importance of games, the study of games is recent, especially the design dimensions. The first solid works about the design of analog games that addressed contemporary games are appearing and available (Engelstein & Shalev, 2019; Engelstein, 2020; Selinker et al., 2011). These previous works focus primarily on the mechanical systems, while others address the storytelling and narratives (Arnaudo, 2018). Because videogames research is dominant, it is easy to find many publications that argue for the need to understand how the game systems work (Adams & Dormans, 2012; Barney, 2020; Fullerton, 2014; Schell,

2008). There are several other influential works of literature about games in general (Elias et al., 2012; Salen & Zimmerman, 2004), though those focusing on analog games seem scarce. Considering ludemes as the elements that pass from game to game (Parlett, 2016), a ludemic approach has the potential to help understand how the game systems work in practice. Linking the ludemic approach to video game design was done years ago. Strangely, it seems to be underexplored for new analog game design. Besides the Ludii project, seeking ludemes in historic games through AI to propose a history of the evolution and dissemination of games in ancient times (Browne et al., 2020; Stephenson et al., 2019), the ludemic approach seems absent in recent games. In this paper, we will try to find ludemes in contemporary board games, described in the literature as hobby games or modern board games (Booth, 2015; Woods, 2012).

We propose to analyze the number one games from the Board Game Geek (BGG) databases because this is the website board gamers hobbyists use the most since the 2000s. We will depart from the systemic analysis of each game of a list, following the dominant frameworks for game design based on the mechanical side of games (MDA, MDE; MMDE).

Although the objective of finding ludemes in Modern Boardgames is not an easy task, we hope to inaugurate a discussion about this issue and use the ludemic approach to understand why these games are gaining new gamers in an age where video games dominate.

From game studies to the importance of Ludemes

When studying a particular issue, it is common to categorize our subject of study. This method usually leads us to classifications and many levels of related subclassifications. Some might be more systematic, while others are more philosophical. Games, including board games, are prone to these same tendencies.

Huizinga's (2014) pioneer work regarding the anthropologic meaning of games as rituals, the difference between playing a game and playing non-game activities led by Caillois (1955), the importance of playing by Bernard Suits (2020), and the many ambiguities of the activity of play (Sutton-Smith, 2009) are classics almost every work about games refer. This literature is mostly on the philosophical side of game studies. These approaches continue to thrive with works like those from Juul about failure in games (Juul, 2013), uncertainty from Costitkyan (2013) and many others that are

constantly discussing the deeper meaning of games from the game design perspective and considering video games. Despite Wittgenstein's argument that analyzing games was an inconclusive quest due to the lack of common traits games may share (Kenny, 2008), research continues to advance.

Several authors tried different systemic approaches to solve the problems Wittgenstein stated. There are many types of games and many ways to analyze and classify them. One of the most impactful books on the game design field that proposes a systematic approach to games is “*The Rules of Play: Game Design Fundamentals*” by Salen and Zimmerman (2004). Analyzing games from their design perspective lens seems to have solved some philosophical problems because games are addressed as interactive player-centered systems, meaning that games can be analyzed as systems that deliver experiences to players. In these complex systems, players are also part of the system, and the system results from the mechanical, narrative, and semiotic dimensions. The game system can be subdivided into game mechanisms, themes and narratives, interfaces, physical components, and many other possible subdivisions. The effort to reveal all these different dimensions may never describe all the complexity of a game, though it helps reveal patterns useful to compare and classify games or parts of games. Characteristics of games emerge like those defined by Elias et al. (2012), departing from their extensive experience as game designers, game scholars, and gamers.

Trying to classify games and finding their characteristics lead some researchers to identify ludemes. The term appears first, in a formal way, in *The Oxford Guide to Card Games* by David Parlett (Browne, 2021; Parlett, 2016). In *The Oxford Guide to Card Games*, David Parlett addresses ludemes directly, stating that they are conceptual elements of games, typically equivalent to the rule of the game and not the physical component itself (Browne, 2021). In a recent paper, David Parlett addresses ludemes directly, stating that they are conceptual elements of games, typically equivalent to the rule of the game and not the physical component itself (Parlett, 2016). Browne (2021) tried to solve some of the ambiguity of the previous definition: “*A ludeme is a discrete unit of information relevant to any game, which may be atomic or compound in nature, and which can be readily transferred between games to change the function of the game in at least one plausible case.*” Departing from the previous definition, a ludeme can be an atomic or compound game conceptual element of the game, one that is transferred from game to game-

changing the type of experiences games provide. There is a proximity to terms like gene and meme. As they, ludeme are defining elements that pass from game to game and transport replicable fundamental information that changes over time while maintaining some game characteristics.

Studying ludemes can be relevant to learn more about games, how game development works and why games generate unique experiences for players because playing is different than watching someone play. Arguably, considering ludemes might complement the systematic approaches for game studies because it proposes to see the atomic and compound dimensions of the elements of the game system. The Ludii project is doing this for historic board games (Browne et al., 2020; Stephenson et al., 2019). New games, particularly those that are very popular among hobbyist players, are still unexplored. Considering the case of analog games, including board games in a broader sense that includes card and dice games, this might be very important to address new design trends. Engelstein and Shalev (2019) argue that mechanisms are the building blocks of tabletop games, among the smallest elements game designers use and combine to build tabletop games. These authors directly address mechanisms seen in recent games, described generally as modern board games (Sousa & Bernardo, 2019). Using a ludemic approach can bring some light to understanding these new games and why they are becoming so popular.

Modern board games and other ways to describe recent analog games

Although many game scholars constantly defy Wittgenstein's arguments, games are not easy to classify. Board games are no different. In the English language, we find many possible words. Board games, as something with a board or played over a board platform. Card played over a table can be a form of board game? We can imagine invisible lines and a playing area for the cards. Many contemporary games, described by the hobbyist literature as modern board games (Woods, 2012), have cards, boards, dice, pawns, miniatures, and even some electronic devices. As David Parlett stated in his updated version of *The Oxford History of Board Games* (Parlett, 2018), these new games are about the players and their face-to-face interactions. Players are "*in the center of the game*" and the central part of the game. Players make decisions and interact in meaningful ways during the games, affecting outcomes. It is this social dimension that seems to be

attracting new players to play modern board games (Booth, 2021; Kosa & Spronck, 2019), as well as the materiality of the new game components, miniatures, and illustrations of the most popular games (Rogerson et al., 2016). However, the systemic approach (Salen & Zimmerman, 2004) argues that the games are not just a sum of elements users interact with. The elements must be combined as an interactive system with inputs, outputs, and feedback loops. The mechanical side seems to be the answer, how the players interact with the system, the system changes between inputs, outputs, and feedback loops that generate the experiences people enjoy. Adding to this, the semiotic side with the narrative meaning and all the stories modern board games can provide, being more or less narrative-driven and with intrinsic or emergent narrative dimensions (Arnaudo, 2018). The versatility of new board games also provides engaging solo experiences without the social playing dimension (Sousa & Silva, 2021).

Despite all the efforts from many researchers, academics, and designers, we do not yet fully understand these complex game systems and do not share a common language to describe them. There is no doubt that games have mechanical systems. However, there is no clear establishment of the most basic definitions. A game mechanic can mean many different things: a mean for the players to interact with the game, the rules of the game, the ways the game system operates, metaphors and data, and many other variations (Sousa, Oliveira, & Zagalo, 2021). And this is even more confusing because game mechanisms and game mechanics are used as synonyms most in the literature. Engelstein and Shalev's "Building Blocks of Tabletop Game Design: An Encyclopedia of Mechanisms" book tries to structure and identify mechanisms by typologies. Sousa et al. (2021) departed from this to state that the mechanisms are the smallest mechanical game elements and that a game mechanic relates more to a combination of mechanisms in motion. Without referring to ludemes, setting this difference between mechanisms and mechanics to approach ludemes as atomic or compound elements. These mechanisms are central dimensions of modern board games because gamers, described as hobbyists, usually can identify them with considerable accuracy (Woods, 2012). The continuous innovation expressed in modern board games results from combining new mechanisms, either totally new ones or reimplemented differently than seen in previous games (Sousa & Bernardo, 2019). There is a recent trend to combine the mechanical and material dimensions to address thematic meaning since

many new successful games rely heavily on detailed miniatures and narrative development (Booth, 2021). Analyzing Board Game Geek (BGG) top games/hottest entries, and the most funded games on Kickstarter, in the last ten years, confirms this effect.

The modern board game movement can seem surprising in this digital age or ours. This option for a physically engaging game activity to socialize might be a reaction and part of the post-digital (Cramer, 2015) effects of over-digitalization in our daily life. The growth for games, expressed in retail sales, events, and shops, was estimated to be approximately two digits per year (Booth, 2015). This trend is why some say were living in a board game golden age (Konieczny, 2019) that was only affected by the COVID-19 Pandemic, leading to a conjunctural reduction in sales (Matalucci, 2021). Before the Pandemic, local groups of hobbyists board gamers organized gatherings to play modern board games, and even board game cafes became an urban trend (Donovan, 2017).

The modern board game community communicates heavily through online platforms since many members live in different cities, regions, and countries. Following Castells' concept of the networked society (Castells, 2011), board game hobbyists seek to find physical hubs to play their games, although they may interact preferably online. Board Game Geek (BGG) (www.boardgamegeek.com) is the leading website with hundreds of thousands of different games and millions of active users. The information BGG provides is so relevant that growing board game literature relies on it (Kritz et al., 2017; Nichol & Blashki, 2006; Samarasinghe et al., 2021; Sousa, Oliveira, et al., 2021). BGG is a crowdsourcing website users can classify the games, contribute to a live rating system (1 to 10), and we can see which are the most preferred games. The BGG users usually prefer long and complex games, some taking more than two hours to play and nearly an hour to explain the rules. The preference for deeper games is a form of bias that affect the BGG rating system (Samarasinghe et al., 2021). Despite these potential pitfalls, BGG has immense information to explore. The BGG rating system helps us to identify since the creation of this website (2000), the evolution and tendency of the hobbyist gamers' preferences, like a reflection of the design traits of the most successful games. By analyzing the top games in the last 20 years, we can expect to find some ludemes that help relate to the characteristics of Modern board Games (MBGs). We

argue that this selection of games is representative of the game design trends and can highlight the overall changes in contemporary board games.

Methodology

BGG is the most suited database to find information about MBGs. However, there was no direct option to identify the top games since the website foundation in 2000. BGG allows users to filter board games by ranking (based on users' classifications). The platform also allows browsing by families, categories, Mechanics, Artists, Designers, Publishers, and more.

After exhausting the automatic filters, we found a post referring to the “BGG Number Ones history - Definitive (ongoing) list with dates” created by OzLeft (2019) that has constantly been updated since then. This source was the best available option to identify the number one games in the last 20 years.

With the available list of games, the next step was to classify the games and find their characteristics according to hobbyists' gamers and general board game design terms. This analysis would support the ludeme proposal for the selection of games.

Because the list of games would have approximately ten games (some stayed more than a year in number one), we could analyze and compare each game with some detail. We read the rules and watched gameplay videos available at BGG. We played all the games on the list, except one. We complemented this information by talking with an experienced gamer about the game as a way to discuss the game interpretation (Paths of Glory). Playing the games helps understand the rules of play interpretation and the emergent and unpredictable experiences games provide.

BGG provides immediate generic information about the games. Though, this unprocessed information is not enough to support a deeper analysis. Learning the rules and playing helps to set a framework to describe the games. We divided the game characteristics into General (directly from BGG), Physical system (the materiality of the game), Dynamic system (the mechanisms and dynamics when activating and combining them), and Interactive Experiences (interactions between players and game outcomes). The Dynamic System and Interactive Experiences are influenced by the MDA (Hunicke et al., 2004) and MDE (Zubek, 2020), where the mechanical and dynamic system (defined by game designers) generates experiences as a result of players' decisions and interactions. MMDE also helped to redefine

the difference between core mechanisms, those that players activate directly, and the others as an auxiliary, to set the system in motion (Sousa, Oliveira, & Zagalo, 2021). Each game characteristic was described according to hobbyists and game design terminology, generating tables that compared them. From this sorted data, we found some patterns that help to approach a ludemic approach.

Analyzing the games

BGG is an immense database. Finding the desired information in BGG might not be as easy as we thought initially. The need to deal with the available data and treat the data is explained in the following sub-sections.

Identifying the number one games

The “BGG Number Ones history - Definitive (ongoing) list with dates” post identifies seven different games that achieved number one in the BGG ranking since 2001 (Table 1). It was difficult to verify if the information in the forum post was accurate since there are no more available records of this as public information. Nonetheless, this post has been updated since its creation and was prone to users' and administrators' reviews. When number one games changed, we considered that the new game would count only for the next year.

Table 1: List of the number one games at BGG since the foundation of the website

GAME ID	Game	Year when it was the number one at BGG
1	Paths of Glory (Raicer, 1999)	2001
2	Tigris and Euphrates (Knizia, 1997)	2002-2003
3	Puerto Rico (Seyfarth, 2002)	2004-2007
4	Agricola (Rosenberg, 2007)	2008-2009
5	Twilight Struggle (Gupta & Matthews, 2005)	2010-2015
6	Pandemic Legacy: season 1 (Rob Daviau, 2015)	2016-2017
7	Gloomhaven (Childres, 2017)	2018-2022

Briefly, it is important to introduce and identify the games on the list. Each game is identified later by ID according to the first games that reached number one.

Paths of Glory (1) is a Wargame for two players that tries to simulate the WWI events through the clash of the two main alliances and powers. Players maneuver their armies and control the territory, and strategic dimensions like logistics are considered. The game uses tokens (tiles) and a map.

Tigris and Euphrates (2) is a strategic multiplayer game that addresses the clashes in the Mesopotamia classical empire ages. The battles and political conquest are abstracted, and the simulation detail is less present, even though it expresses the tactical effects of troops and cities. The game resembles historic games due to its abstract appearance. However, it introduces new game mechanisms that are now typical of MBG, and the components try to address the theme.

Puerto Rico (3) is the first Eurogame on the list. It is a non-confrontational game based on action selection. Players (2 to 4) take one of several available actions and plan to be the most efficient in production, commerce, and construction. There is no luck affecting the players' choices, no output randomness, being a deterministic game.

Agricola (4) is a Eurogame that generalized one of the most typical MBG mechanisms, the worker placement as a form of action points mechanism that renews each game round. It tries to simulate the development of a family farm during the XVII century in Germany. There is no conflictual confrontation between players, and the most efficient and balanced farm will win the game. The game can be played solo or with a maximum of five players simultaneously.

Twilight Struggle (5) is a two players political game that simulates the Cold War. It can be considered a war game in the specific frame of the Cold War, representing the nuclear tensions and the influence of the two superpowers. Players play cards representing historical events and can use them to arrange their power and dominate countries, like compete in other stages like the race to the moon, sports, and other clashes during the Cold War.

Pandemic Legacy: Season 1 (6) is a reimplementation of the game Pandemic. It is a fully cooperative game where players play as a team of virologists. Whether all players win or all lose if unable to control the pandemics advancing throughout the world map. It is a legacy game, with a campaign composed of episodes that bring new challenges to the team. In each episode, players make choices that affect the game's integrity, like destroying, changing, and adding components and rules to the game.

Gloomhaven (7) is a cooperative adventure that also allows solo play. Each player controls a character that will face different adventures. The characters will evolve, become powerful, and gain new abilities, perks, and equipment. In each scenario (adventure), players must defeat enemies and gather loot resources. Players activate their characters by playing multi-use cards and interacting with a scenario board. Solving each scenario will make players progress as characters and reveal the game narrative.

The list includes games that are still popular and, in the past, were the most popular on BGG and among gamers. Paths of Glory is the only game in the top 200 best games (number 193). All the other games are still among the most appreciated 100 games. These changes in the top games reveal how many new games arise fast and the decay of older games like Paths of Glory and Tigris and Euphrates (number 101). All other games are more recent and rate very high in the preferences of hobbyist gamers. It is notorious that new games can climb to the top soon after being released, with Twilight Struggle being an exception. Gloomhaven continues to be the number one game, and the author is responsible for a new title that is the game that obtained until 2022 the most money on Kickstarter until now. Frosthaven collected nearly 13 million dollars and is currently being produced (Childres, 2022).

General information about the games

As defined in the methodology, BGG provides instant information about the games. We collected this generic information that describes the games like “Year”, “Complexity” (1 to 5), and “Duration of play”. The other data in Table 2 was complemented according to indirect information at BGG and directly from reading the rules and playing the games.

Table 2: General characteristics of the games

ID	Theme	Type of game (Hobbyist terminology)	Legacy/Campaign	Players	Year	Complexity	Duration of play (min.)	Average Duration (min.)
1	War	Wargame	No	2	1999	3,84	480	480
2	War	Eurogame/Wargame (?)	No	2 to 4	1997	3,5	90	90
3	Historic Economy	Eurogame	No	2 to 4	2002	3,28	90-150	120
4	Historic Economy	Eurogame	No	1 to 5	2007	3,64	30-150	90
5	War	Wargame (?)	No	2	2005	3,6	120-180	150
6	Disease	Eurogame	Yes	2 to 4	2015	2,83	60	60
7	Fantasy adventure	Thematic (?)	Yes	1 to 4	2017	3,88	60-120	90

BGG does not classify themes directly. Alternately, it defines “Families” of games and types with broad concepts like “Strategy”. We adopted the game types as the hobbyists describe them (Sousa & Bernardo, 2019; Woods, 2012). (Historic/Economy), Disease control and emergency (Disease) and going on adventures and fighting with characters in a fantasy world (Fantasy adventure). Competitive games, either direct conflictual wargames or eurogames about building-up and cumulative development, have risen to be among the most popular games. However, there seems to be a tendency for less conflict between players in the top games. The duration of the games changed, and more recent games tend to play faster, between one to two hours of playtime.

Even though terms like Eurogames are solid among hobbyist games, some doubts persisted. Is Tigris and Euphrates game a Eurogame since there is a constant conflict among players? It is more like an abstract game of domination, someone may argue. The same happens for Gloomhaven. The hobbyist literature considers these games as Ameritrash, which can be offensive and tends to be replaced by Amerigame or American Game type (Booth, 2021). BGG considers these games as Thematic due to the design elements aiming to create meaning and thematic/narrative engagement. Wargames are less prone to doubts. They are more about military conflict (war) and historically situated games where the goal was economic development. However, some gamers state that Twilight Struggle is not a wargame because it lacks the military strategies and tactics as, for example, Paths of Glory explore.

Figure 1 summarizes the changes related to the general characteristics of the top number one BGG games in a sequential way (older to newer games). While some game characteristics are more stable, such as the minimum number of players to play the games (2) and the complexity (usually above 3.5), others, like the duration, are decreasing (games within one to two hours).

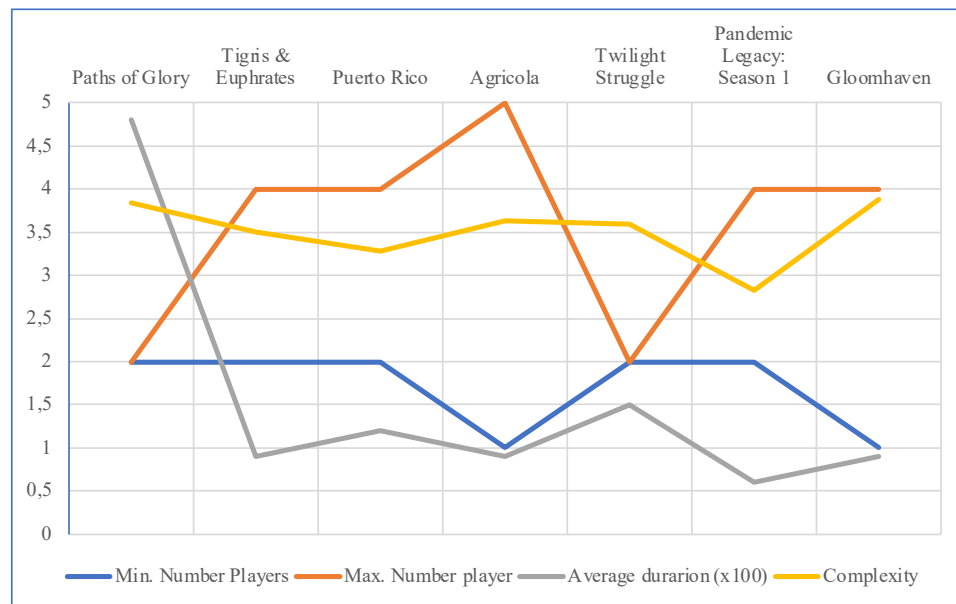


Figure 1: Histogram of the general characteristic of the list of games top BGG games

Analyzing the game system in additional detail

First, we defined a system that described the physical components and the graphical representation of the game, the space, and the boundaries to play in each game. Each game represents its playable area differently, some with more realistic maps and others with divisions and geometric shapes that are thematic metaphors of territory, political or cultural influence. The need to have playable graphical representations follows the generic User interface (UI) and Users Experience (UX) recommendations (Hodent, 2017).

Table 3: Game Physical components and Graphical representations

ID	Maps		Entities representation	Player colours	Handled by players the most
	Overall scale	Scale Units			
1	World	Point to Point	Tiles	Indirect	Cards
2	Region	Square grid	Tiles	Direct	Tiles
3	Region	Square grid	Bits	Direct	Tiles
4	Local	Square grid	Bits	Direct	Bits
5	World	Point to Point	Tiles	Direct	Cards
6	World	Point to Point	Bits	Direct	Cards
7	Region	Hexagon grid	Tiles	Indirect	Cards

We identified different scales to define the environment/space where the game action occurs. Three games were played on a world stage and the same quantity in a regional location (including countries or parts of the world). Only *Agricola* was about local development, expressed as form managing. Each game defined scale units as boundaries to mark progress (moving) or dominating areas (controlling parts of the board) that function as a visual metric. In the selection of games, three types of scale units appeared. Point-to-Point Movement is the most common one to represent the connections and paths over realistic maps. It also allows players to establish hierarchical connections and relationships. Alternatively, grids are standard options when dealing with more uniform areas where the adjacency effects are symmetric. Squared grinds are simpler. They appear in many older games. Hexagonal grids appear in games that try to model territories more realistically because the distances from the center of adjacent hexagons are always the same. Hexagons are the geometric shape with the most overlaying boundaries without generating empty spaces (Adams, 2014).

In the list of games, entities like characters, resources, buildings, and others alike, tend to be represented by tiles (usually as cardboard with illustrations) that can be combined with game bits (cubes, sticks, plates, etc.). Only more recent games or reeditions (like *Agricola*) tend to use miniatures. Defining a color per player is also very common. On the other hand, cards are the dominant physical components players handle, dictating available actions and personal information. Cards are played from players' hands as actions to change the board, adding or removing tiles/bits. This combination happens in recent games like *Twilight Struggle*, *Pandemic Legacy: Season 1*, and *Gloomhaven*.

Analyzing the game mechanical system and respective dynamics

In Table 4, we present a look into the core game mechanisms (considering the main actions players do during the game) and the associated auxiliary mechanisms that help the game progress (Sousa, Oliveira, & Zagalo, 2021). We added information about the symmetry of the game and the randomness effects (all outcome randomness, which is the uncertainty before players make decisions (Engelstein, 2018).

Table 4: Game mechanisms crossing, Progression, Asymmetry and Randomness

ID	Core mechanism	Auxiliary mechanisms				Progression	Player starting asymmetry	Randomness
		Tile placement	Dice rolling	Card Play	Set collection			
1	Card play	1	1	1	0	Control Space Areas	1	Medium
2	Tile placement	1	0	0	1	Control Space Areas	0	Medium
3	Action selection	1	0	0	0	Develop Space Areas	0	None
4	Worker placement	1	0	1	1	Develop Space Areas	1	Low
5	Card Play	1	1	1	1	Control Space Areas	1	Medium
6	Action selection	0	0	1	1	Control Space Areas	1	Low
7	Card play	1	0	1	0	Control Space Areas	1	Low

Table 4 shows that card play dominated as a core mechanism, and tile placement was a mechanism to record the players' decisions on the boards. However, the card mechanisms were also a form of auxiliary mechanism, triggering events and as an option to track game progressions (more buildings and new actions to explore further in the games). Dice rolling is less common, although it is the most common game mechanism in the BGG games database (Samarasinghe et al., 2021). Set collection is also a standard way to represent the effects of combining actions to deliver something more powerful or valuable than isolated actions or achievements. Although BGG does not consider the set collection mechanisms for all the selected games,

reading the rules and playing the games, we included the set collection for Puerto Rico and Twilight Struggle. In these games as in similar ones, players make sets of resources and buildings (transformed combinations of resources) to score or produce more. BGG information might not be complete to the detail needed. Analyzing the games directly (reading rules and playing) is recommended.

Player asymmetry is recurrent in the list, proving different challenges and experiences in a multiplayer game. And the randomness (input randomness) is low or medium, which leads us to conclude that these games promote player agency and have strategic depth.

From the mechanical and dynamic system to experiences

After defining the mechanical and dynamic system, the players' experiences during games should be considered when following the MDA/MDE game design philosophies. Table 5 complements this information. It sets the internal relationships of the interactive dimensions of the games on the list. It aims to propose a ludemic approach for emerging patterns.

Table 5: Game mechanisms crossing, Progression, Asymmetry and Randomness

ID	Players effects		Main component relation to core mechanisms					
	Interaction level	Elimination	Cards affect bits	Cards affect tiles	Tiles affect tiles	Tiles affect bits	Bits affect tiles	Bits affect bits
1	Direct conflict	Arguably (zero-sum)		1	1			
2	Direct conflict	No			1	1	1	
3	Low conflict	No			1	1	1	1
4	Low conflict	No		1	1	1	1	1
5	Direct conflict	Arguably (zero-sum)		1	1			
6	No conflict	Relative (all players)	1			1		1
7	No conflict	Relative (all players)		1	1	1	1	1

The type of conflicts in the list of games clearly tends for games with no player conflict. Besides the two wargames (1;5), all the other games have no direct conflict between players (constructive competition in Agricola and

Puerto Rico, the player who does the most wins) or are cooperative games (6;7).

BGG gives little information about the type of conflict in each game. Some games include player elimination as a mechanism, but none appeared on the list. *Paths of Glory* and *Twilight Struggle* are two-player war games that generate player elimination, although in a different way. If a player wins, the other loses (more like a zero-sum). For one player to win, the other loses and is eliminated from the game. However, several games avoid the classic player elimination effects. Eurogames avoid these mechanisms, delivering more constructive game experiences. Even more radical, are the cooperative games like *Pandemic Legacy: Season 1* and *Gloomhaven*. All players can be eliminated from the games, losing altogether, which is a different form of player elimination.

Analyzing what game components affect other game components as the result of direct and indirect player actions reveals that almost everything affects everything. The most recent games use all types of game components to generate multiple levels of interaction. Players play cards, add tiles, move bits that unlock or trigger other cards, and tiles affect other tiles representing the state of the game, combined or not with bits that represent complex realities. For example, cards represent political options, and tiles and bits simulate dominant forces and tensions between regions (*Twilight Struggle*). Mini boards with tracks and moving pieces represent characters and institutions, their resources, energy, and available options (*Agricola*, *Puerto Rico*, *Pandemic Legacy: Season 1*). Deckbuilding, adding and removing cards, may represent the knowledge and abilities of a character (*Gloomhaven*).

From game analysis to Ludemic analysis

Following Browne (2021), we analyzed the gathered information and searched for discrete (accountable) units of information (atomic or compound) that can be transferred from game to game and change the gameplay. In our own words, we looked for game design concepts associated with the MBG terminologies: the game patterns/characteristic (mechanisms, physical components, and rules) that can be replicated and affect gameplay and player experiences. Next, we grouped the findings into subsections. Although it is not easy to clearly state that a design pattern or characteristic is or is not a ludeme, we tried to show the difficulties in

achieving our purpose as a way to bring some light to this type of analysis for MBG.

Game structure tendencies

There is a clear tendency to add pieces to the game boards to represent progression. Even though, in games where players remove pieces from the board, like in *Pandemic Legacy: Season 1* or *Gloomhaven*, the player progress in the challenge and in the resources spent to overcome them. In the case of the two wargames, especially in *Twilight Struggle*, players accumulate influence in geographical locations, the objectives progress, and general score tracks. The accumulation is constant in *Puerto Rico* and *Agricola*, where there is no direct player conflict, and the player that accumulated more resources, building, or achieving other combinations of resources, tends to be the winner.

After the domination of wargames, now games are tending to be more collaborative forms and avoid player elimination, profiting from the fact that they are a group activity all players involved should appreciate.

Part of the high complexity of the games in the list (approximately 4 in 5) results from combining many different game mechanisms and their interactive effects to change the gamestate. The players activate core mechanisms to change the board, and the board affects players' decisions also. MBGs are continuously introducing new game mechanisms as the lists continue to grow and are never completed (Engelstein & Shalev, 2019). This novelty is part of the fascination MBGs deliver (Sousa & Bernardo, 2019). *Agricola* is a classic example where players' core action is worker placement. In turn order, each player chose a worker to occupy a space in the collective board, but this may lead them to do tile placement, manage their bits, play cards and collect resources. Set collection mechanisms appear during production, conversion cost, and scoring. It affects what resources players collect and actions undertake, affecting what to build, grow and breed on their farm. And this is not even the most complicated game on the list. *Gloomhaven* core action is card play with multiple uses, which seems very simple. However, cards activate avatars over a map with hexagons. There are rules associated with each type or hexagon, the tiles, and miniatures over them. They are all combined in a set collection mechanism that changes movement, attack, and many other special abilities like pushing, healing, cursing, and many others.

Game representations of progression

The games have boards in different formats. They are practical ways to create several spaces to accommodate distinct components (form and meaning), generating complex combinations. The same board can be divided into networks where units of space connect hierarchically to model terrains and relationships of cause and effect. This graphical solution appears as networks of points and arcs, squared or hexagonal grids.

Players and their multiple manifestations on the boards are represented by game bits. Each player tends to have a color that identifies all their set of bits (representing a different thing). Recent games include detailed miniatures such as characters' avatars, resources, and other game elements with additional graphical representations (icons and codified images). Gloomhaven is one of these examples of the tendency for detail. Other games usually use cubes, sticks, and plates of blue, green, red, and yellow (sometimes black and white, but these two colors tend to support progression tracks, NPCs, and other auxiliary elements).

The way games represent accumulation, dominance, and movement have something in common. We propose to define this as a progression as growth/accumulation and moving/advancing. Each game on the list relates, at least, to one of these dimensions. Figure 2 presents a scheme where we placed each game near the most representative dimension of progression (growth/accumulation or moving/advancing). Twilight struggle game appears on the two progression dimensions, but tending more to the moving along a network.

Figure 2 separates the games into two types of progression. In the first type of progression, players add bits and tiles to fill adjacent space and accumulate/grow. In the second type adding and removing bits and tiles represent dynamic movement. Both still depart from the connections and a board (divided sections) that change, accumulate game components, and track players' progression towards the game goals.

Figure 3 abstracts the information presented from each game in figure 2. These are forms of ludemes regarding how the game components are manipulated on the boards to generate a sense of progression, whether they are accumulated/grown or moved/removed.

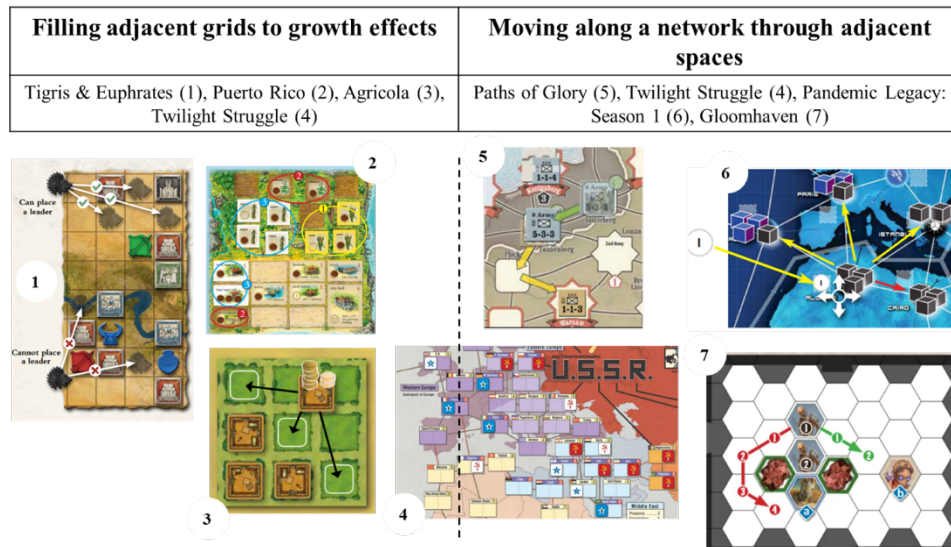


Figure 2: Scheme of the progression dimensions of the games according to growth/accumulation and movement on the boards

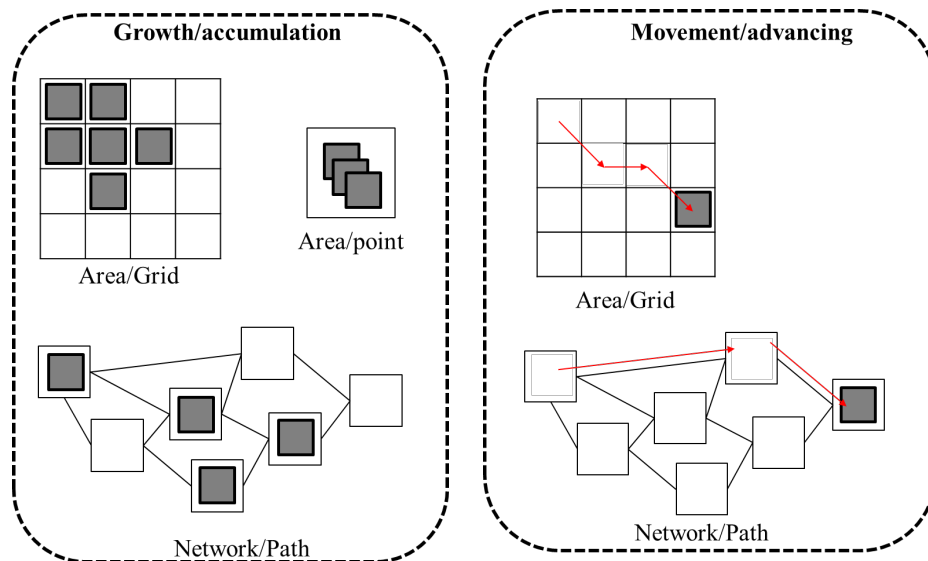


Figure 3: Ludemic approach to growth/accumulation and movement/advancing

Conclusion

After analyzing the number one games since the foundation of BGG, the quest to find ludemes among these games is questionable. The game system analysis focuses on the mechanisms and the way the components are implemented and manipulated by the players. Even the representations, the narrative meaning, and the concerns with interactions and experiences are valuable methods for game analysis.

The ludemic approach might not be the easier to implement. In this case, the ludemic approach was less conclusive than initially predicted. Trying to find ludemes in complex games is a challenging endeavor. It is hard to deal with intricate long rules, many components and mechanisms, and various meanings. This uncertainty is why one must start from some solid foundations. The BGG databases and the game design frameworks based on game system analysis (MDA/MDE/MMDE) were our foundations to overcome this complexity.

The list of games revealed many different games of different types (e.g., Wargames, Eurogames, Thematic). And we are only considering the number one games. Enlarging this for the top 10 could reveal more clear patterns. However, with the available information, we can argue that games are becoming shorter, even though one to two hours is not short according to casual players. Game complexity continues to be high (4 in 5). Player conflicts are decreasing, and recent games are fully cooperative. The games demand players' choices, although some include input random effects. Asymmetric seems to be a recurrent solution to introduce and generate challenges for the multiplayer gameplay dimension.

We have found that the sense of progression in the board tends to be done through networks and grids of connected and hierarchical spaces. This pattern is an influencing framework game designers are using. We argue that this is a possible form of ludeme in MBGs. It is transferred from game to game, changing the experience. It is more on the compound discrete ludemic side, made of spaces and connections. In some cases, represents growing/accumulation (economic games/war games), and in other /movement/advancing (wargames/adventure/fighting). We admit that these compound ludemes appear more clearly as graphically identifiable patterns.

The physical components (e.g., cards, tiles, bits), color schemes, and themes/narratives seem less related to the ludemic approach. These

dimensions must be included for a systemic analysis where the parts of the system must be viewed not just as individual entities. We realized that analyzing a game as a system is confusing when the ludemic approach tends to isolate the game elements. Even though ludemes can be compound, it complexifies the analysis.

Future research could focus on studying groups of games, for example, the BGG families and mechanisms. Going beyond graphical patterns is also recommended. Likely this could reveal other types of ludemes, including those related to narrative virtual board games.

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