Mechanics or Mechanisms: defining differences in analog games to support game design

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***Abstract*— This research intends to clarify the difference between game mechanisms and mechanics. We propose the reinforcement of game mechanisms as building blocks for game design. After analyzing Board Game Geek (BGG) mechanisms databases and crossing it with the literature review and game examples, we provide a new classification for board game mechanisms. Departing from the Mechanics-Dynamics-Aesthetics (MDA) framework, we propose the Mechanisms, Mechanics, Dynamics, and Experience (MMDE) approach to fit the different concepts of mechanics and mechanisms to analog game systems. These findings should clarify the concept of mechanisms as building blocks for analog game design, which is also useful for hybrid and digital game design.**

Keywords*— *Game Mechanisms, Game Design, Analog Games, Mechanics

I. INTRODUCTION

Game design is a challenging activity full of uncertainties, as much as the games themselves [1]. Designing a game is not easy, so game designers need to master general techniques and to establish support processes. Designing digital or analog games depart from the same basic concepts of designing games as systems with rules and challenges [2], despite their different platforms and resources [3], [4]. Mixing mechanics or mechanisms allows designers and players to make games interactive in practice [5], which is valid to any game type. But one of the most challenging game effects is their emergence dimension [2], in other words, how game designers can predict and understand the process by which players interact with the game system and what is experienced by players.

Going deep into game design elements, the importance of the mechanics and mechanisms emerge. They are fundamental to generate an interactive game system, but what are game mechanisms and mechanics? We see these concepts as synonyms in the literature [6], [7], but are they the same? Are they the same for analog and digital games? Is it helpful for game design to consider them as so? Can the analog and digital game design use mechanics and mechanisms concepts in the same way? Can the division of mechanics and mechanisms concepts help to analyze and design analog, digital or hybrid games?

This separation of concepts might seem artificial, and splitting game design approaches in analog or digital games might be a pointless exercise. We acknowledge the dangers of these exercises. But, without clear definitions related to each game platform and format, substantial practical differences of designing each type of game can be confused. Games are not all the same, and designing different games may demand specific crafting knowledge and skills. We believe that there are game design particularities that distinguish the design of an analog game from a digital one, such as properties related to players' agency. In an ideal world, game designers should dominate the digital and analog game design, being able to explore the experiences that each provides. That is not possible due to the immense knowledge and skills it demands. But we can aim to build a foundation from which analog and digital game developers can use as a starting point for their designs [4], [8]. At least, we aim to contribute to the first steps of a future common language and hope that game design teaching acknowledges this.

We intend to address the differences of meaning between mechanics and mechanisms. Clearing these concepts should help to design analog and digital games by defining the boundaries, limitations, and potential of each one. We intend to answer the questions previously asked through a critical reflection of the literature, discussing analog and digital game design as a whole.

The MDA framework [9], adapted by Zubek [8] and Duarte & Battaiola [10], will inspire the proposed Mechanisms, Mechanics, Dynamics and Experiences (MMDE) approach, which intends to define the differences between mechanics and mechanisms, as their relationships with dynamics and the whole game system. Establishing the differences between mechanics and mechanisms strengthens the concept of mechanisms as the building blocks for game development. The MMDE approach allowed us to understand the mechanisms identified by BGG, providing application examples for future game development.

Clearing the definition between mechanics and mechanisms and adopting the proposed MMDE framework should be useful to develop analog games, digital game design that departs from analog prototyping, and hybrid game design.

II. MECHANICS AND MECHANISMS

A. Seeking the concept of mechanics in the literature

The literature of game design is still influenced by the MDA Framework, by Hunicke et al. [9], despite the passing years. Nevertheless, there have been many critics for the absence of other game dimensions, like narratives. These criticisms lead to several improvement proposals to update the MDA framework, keeping its systemic approach to game design [11]–[13]. The MDA simplicity makes it very useful for game design and game analysis. The flow between designer and players is easy to grasp and support game development, with mechanics that provide dynamics able to generate aesthetics (or experiences). The role that this

"Fundação para a Ciência e a Tecnologia" (FCT), under the grant PD/BD/146491/2019 and also the research project "FlavourGame – Participate and Change, Playing with textures and flavours" (POCI-01-0145-FEDER-031024) supported this research.

978-1-6654-3886-5/21/$31.00 ©2021 IEEE

systematic flow gives to mechanics is evident. In one of the most recent updates for game design practice, Zubek [8] renamed these three layers of the MDA framework to propose a new basic model named "*Mechanics and Systems, Gameplay, and Player Experience*", which seems more flexible than the original MDA conception.

We should analyze what game mechanics are in more detail because mechanics are central to MDA and other variations that departed from it. Hunicke et al. [9] say that mechanics "describes the particular components of the game, at the level of data representation and algorithms" and are related to rules. Järvinen [7] argues that this relation is necessary for games to exist. Fullerton [4] seems to approach mechanics less directly, expressing them also as rules. In the chapter related to formal game elements, she defined rules as formal game elements and the actions that players can take. Brathwaite & Schreiber [14] are more direct, saying the mechanics are the ingredients for game design and the same as the rules. Besides this, Brathwaite & Schreiber [14] also say that mechanics are the way that players can alter the game state. Salen & Zimmerman [2] highlight that rules are the relations that bound all game elements together in an artificial way, providing necessary restrictions for players in the game system. Considering that games are systems, like Salen & Zimmerman [2] do, they require a dynamic combination of elements, acting like mechanics [3].

Sicart [5] simplifies the definition of mechanics by saying that they are the way players can interact with the game system, while Adams [15] argues that they are the way games operate, in other words, the way everything in the game world behaves as a manifestation of the game rules. Mechanics can define the relations and the behavior of one entity or several. So, we can say that rules define mechanics because games are rule bounded systems in which players can use mechanics to influence game state. Mechanics are also metaphors that provide meaning to players' actions when they interact with the game system by moving and putting objects in motion [8]. For example, a card drafting mechanic allows players to choose cards, but rules determine card limits and costs.

If games were language, game mechanics could be described as verbs [7], alluding to action and movement. On the other hand, in the particular case of board games, the pieces are the nouns that describe things, and the rules are the grammar that binds all together [8]. So, mechanics are the building blocks [6] and constructs within the game [16].

TABLE I. GROUPING CHARACTERISTICS AND DEFINITION OF MECHANICS

Concepts in the literature	**References**										
	[15]	[14]	[16]	[6]	[4]	[9]	[7]	[3]	[2]	[5]	[8]
Components of the game		x				x		x			x
Building blocks for game design			x	x							x
Metaphors and data						x	x		x		x
Related to the rules or the rules themselves		x	x		x		x				
Ways games work and operate	x						x		x		
Ways that players interact with the game to affect gamestate		x								x	x

In Table I, we grouped the many definitions and characteristics of mechanics according to several of the previously cited authors.

B. Are Mechanics and mechanisms synonmous?

From the aforementioned definitions of game mechanics, some differences between analog and digital games arise. The concept of objects and pieces players interact with exist in the both kinds of games, but in analog games, the absence of automation demands players to make the mechanics move. This trait makes analog game mechanics much more implicit and predictable, which does not happen in digital games [8]. Also different is the centrality of the mechanics for analog game players. One example of this is the BGG game databases organized by mechanics [14].

There is no accepted taxonomy for game mechanics, and there is a lack of shared common language for game development [8]. When we compare analog and digital game mechanics, it is evident that they are not the same[14], [17]. Despite these differences, Zubek [8] proposes grouping mechanics by families: Control mechanics; Progression Mechanics; Uncertainty Mechanics; and Resource Mechanics. Engelstein and Shalev [6] followed a similar approach for tabletop games, when they grouped their mechanisms in types of mechanisms with many different variations, for example: "card mechanisms"; "set collection"; "worker placement"; and dozens of others that do not match digital game mechanics.

In "Building blocks of Tabletop Design: an Encyclopedia of Mechanisms" Engelstein and Shalev [6] stated that they used mechanics and mechanisms as interchangeable concepts. But their preference to adopt game mechanisms as the building blocks that help construct the mechanical game systems is evident. Zubek [8] also established a similar allusion, that mechanics are building blocks for game design, saying that mechanics are "the basic activities and mechanisms that are afforded to the players". In this case, mechanics appear described as mechanisms. However, Zubeck [8] highlighted these mechanisms are composed of small and simpler game elements. Moreover, in tabletop games, the pieces and actions are combined according to the game rules. Players' experiences depend how they do these mechanical activations.

Järvinen [7] tried to tackle these semantic problems the most, considering analog and digital games. He tried to analyze each definition and found that *mechanics* are related to the energy and forces that affect bodies, while *mechanisms* are the parts of a mechanic system. *The Oxford Learners Dictionary* (www.oxfordlearnersdictionaries.com) states that *mechanics* is: "the science of movement and force". The same source says that *mechanisms* are "a set of moving parts in a machine that performs a task", and the *Cambridge Dictionary* (www.dictionary.cambridge.org) says mostly the same "a part of a piece of equipment that does a particular job". Looking for the definition of *mechanics* in a physics dictionary does not differ, stating that it is "The study of the interactions between matter and the forces acting on it" [18]. It is now clear that the terms *mechanics* and *mechanisms* may mean different things. Järvinen [7] also did not go further in these semantic analyses, transposing them to the context of games. He concluded that these were fuzzy concepts and that designers tend to use them as synonymous.

But if the term *mechanics* refers to processes as the laws of motion and the term *mechanisms* refer to the sum of interconnected parts of a mechanical object – this can be useful for game design analyses. Despite semantic considerations, this can have repercussions on game definitions and game frameworks, like the MDA and their variations. Many of these frameworks divide game systems into mechanical and dynamic layers. We propose to divide the mechanical layer into other sublayers.

C. *Mechanics and mechanisms are diferent in analog games?*

We have seen that abstracted game mechanics and mechanisms can be the same for analog and digital games. But when specifying them as the concrete elements game designers use to build games, it is undeniable that they can be different for each game type.

Woods [19] defines eurogame mechanics as "One of the distinctive traits of eurogames is the way in which mechanics (those that are available to players at all the time) and submechanics (those that are supportive of the primary mechanics) and modifier mechanics (those that are available to the player either conditionally or at specific times)". This concept of multi-level mechanics was a position from Järvinen [7], but we can find similar connections to the core mechanics by Adams [15]. Alternatively, Zubek [8] separated mechanics in explicit and implicit. Explicit ones are proper to analog games, where players need to know all to mechanics and rules to play the games. But in digital games the implicit mechanics they can be gradually presented to player creating surprise effects. A way analog game designers created some alternative implicit mechanics is through expansions and enabling legacy experiences. In these legacy games, players change the game system during gameplay, played over campaigns, and producing unique objects after the sequence of challenges and narrative is done [20]. Going back to Woods [19], he worked on eurogames, which are those board games where the active choices and lack of direct conflict play dominate. Despite the narrow domain of study, his findings on eurogames are useful to approach other analog games. Woods [19] highlighted the differences between game design theory and practice, how designers and games use and interact with the game mechanics and mechanisms at different levels.

Despite the definitions that scholars provided for mechanics or mechanisms, analog game designers and players created their own vocabulary [19]. Englestein & Shalev [6], and the transition from mechanics to mechanisms typologies adopted by BGG, are part of the movement to establish these concepts. These tendencies for systematization and establish definitions are far from matching the main mechanics identified for digital games [17]. Even the attempt of Järvinen [7] did not succeed. The typologies of game mechanics he proposed for analog and digital games were not adopted by analog game design practice.

Kritz et al. [21] characterized BGG mechanics as algorithms and data representation, following the MDA definitions [9]. But this was before BGG abandoned the term mechanics and adopted the concept of mechanisms. Departing from the MDA, Kritz et al. [21] found that some mechanics resulted from the combination of several other simpler mechanics. And some other mechanics were more like Dynamics. These mixes between mechanics and dynamics are one of the main reasons why Engelstein & Shalev's [6] work is so relevant for analog game design. The authors settled the concept of mechanisms as the building blocks for game design, allowing defining mechanics as something else, as the properties and relations of game objects in motion. It is the players, directly or indirectly, that activate these objects, these mechanisms that generate mechanics and dynamics. In analog games, these player central activation role is mandatory, and even when the game does not unfold as intended by the designer, it can still produce gaming experiences [20]. The player-centric approach to game design recommended by Fullerton [4] suggests exploring these traits of analog games.

But, in practice, it is hard to address the mechanical game elements without considering their dynamics side as well. Duarte & Battaiola [10] contributed to explain why this is even difficult to establish in analog games. They realized that the MDA framework was not well fitted for analog games. The bidirectional flow between designers and gamers did not express what they observed in tabletop gameplay because players interact with the game system differently than in digital games. In analog games, players experience all layers simultaneously, interacting with the mechanics and dynamics directly and in a non-linear way. Players need to learn the rules before and while playing, and learning and exploring the game, even when players are not playing, can be enjoyable.

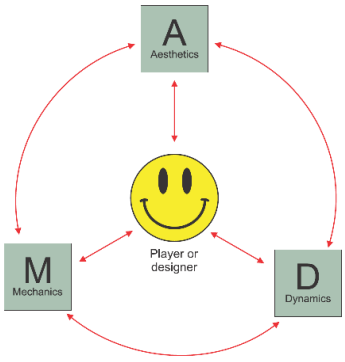

Fig. 1. The modified MDA agency diagram. [10]

III. ANALYZING GAME MECHANISMS IN MODERN BOARD GAMES

Board Game Geek (BGG) (www.boardgamegeek.com) is the first database for analog, tabletop, and board games [22], [23]. Since 2000, BGG has hosted more than 125.000 game entries, and in 2021 it should reach 3.000.000 users. There is no real and complete alternative to access boardgame data. Other websites exist, and even *Reddit* have board game threads, but they lack openness, systematization, and quantity of users that BGG have been building in the last 20 years. BGG contents are added by users, individual players, designers, and game companies. Users vote for game rankings and their classification are based on a "Bayesian averaging" system which grants stability. But the changing process from game mechanics to mechanisms is still occurring in BGG. This changing process is not immune to polemics and debate, as seen in some discussion threads (www.boardgamegeek.com/guild/3623). BGG displays the list of game mechanics, showing 182 different ones (www.boardgamegeek.com/browse/boardgamemechanic). Although, when we look at BGG for a specific game, the

website identifies each game by having several distinctive mechanisms. When we cross the global mechanisms list with the mechanisms describing each game on BGG, we realize they are the same. The confusion is evident and may mislead analysis. It forced us to read all the mechanisms descriptions.

However, BGG Mechanisms are all considered to be at the same level. The same occurs in Engelstein and Shalev's [6] work. Once we considered following the subdivisions prescribed by Järvinen [7], Woods [19], and Zubek [8], some groups started to appear. Recognizing BGG mechanisms as multilevel entities follows Kritz et al. [21] findings. These subdivisions highlight the identification of mechanisms as building blocks for game design, which can be considered as the core mechanisms or simple individual mechanisms. In this way, the auxiliary or sub mechanisms only work when related to a core or simple main mechanism. The auxiliary mechanisms, that can generate game chores for players to execute, are a possible source of pleasure for players, despite seeming to be the opposite [24]. Some of the identified mechanisms were directed related to passive game components and pieces, like "Hexagon grid", "Squared Grid" and "Pieces on Map".

We propose the following subdivisions in order to explain the specific differences of BGG mechanisms: Simple action or mechanism; Auxiliary or sub mechanism; Components or pieces. As expected, some of the BGG mechanisms result from combined different individual blocks. And each of these building block mechanisms can be classified by typologies related to their function in a game system. We recognized these combinations as mechanics that result from mechanisms in motion. Other BGG mechanisms refer directly to dynamics which result from the motion of other different mechanics. Table II presents the classification of the BGG mechanisms according to the proposed subdivisions. It also expresses the concept of mechanics and dynamics, as well as their relations to the mechanisms.

TABLE II. EXPLORING BGG MECHANISMS AS MMDE MECHANISMS, MECHANICS AND DYNAMICS IN ORDER TO REORGANIZE MECHANISMS IN SUBDIVISIONS

		BGG Mechanisms
Mechanisms	**Simple action or mechanism**	Action Drafting Action Points Area Movement Auction/Bidding Card Drafting Chit-Pull System Command Cards Cube Tower Dice Rolling Different Dice Movement Drafting Flicking Grid Coverage Grid Movement Layering Line Drawing Mancala Matching Measurement Movement Melding and Splaying Movement Points Movement Template Network and Route Building Once-Per-Game Abilities Paper-and-Pencil Pattern Movement Pattern Recognition Physical Removal Point to Point Movement Predictive Bid Push Your Luck Relative Movement Re-rolling and Locking Resource to Move Roll / Spin and Move Rondel Secret Unit Deployment Selection Order Bid Singing Slide/Push Stacking and Balancing Static Capture Three Dimensional Movement Tile Placement Trading Voting Worker Placement Worker Placement with Dice Workers Worker Placement, Different Worker Types
	Auxiliary or sub mechanism	Action Queue; Action Retrieval Action Timer Action/Event Advantage Token Automatic Resource Growth Communication Limits Constrained Bidding Contracts Critical Hits and Failures Deck Construction Deck, Bag, and Pool Building Die Icon Resolution Elapsed Real Time Ending End Game Bonuses Events Finale Ending Hidden Roles Hidden Victory Points Highest-Lowest Scoring Income Increase Value of Unchosen Resources Interrupts Line of Sight Loans Map Addition Map Deformation Map Reduction Minimap Resolution Modular Board Multiple Maps Order Counters Passed Action Token Pattern Building Random Production Ratio / Combat Results Table Roles with Asymmetric Information Scenario / Mission / Campaign Game Score-and-Reset Game Stat Check Resolution Stock Holding Sudden Death Ending Targeted Clues Tech Trees / Tech Tracks Time Track Track Movement Tug of War Turn Order: Auction Turn Order: Claim Action Turn Order: Pass Order Turn Order: Progressive Turn Order: Random Turn Order: Role Order Turn Order: Stat-Based

		Variable Phase Order Variable Player Powers Variable Set-up Victory Points as a Resource Zone of Control
	Components and pieces	Hexagon Grid Pieces as Map Square Grid
Mechanics	**Need a set of mechanisms**	Area Majority / Influence Auction: Dexterity Auction: Dutch Auction: Dutch Priority Auction: English Auction: Fixed Placement Auction: Once Around Auction: Sealed Bid Auction: Turn Order Until Pass Bribery Chaining Connections Crayon Rail System Delayed Purchase Enclosure Follow Force Commitment Hand Management Hidden Movement Hot Potato I Cut, You Choose Impulse Movement Investment Ladder Climbing Lose a Turn Market Memory Move Through Deck Moving Multiple Units Multiple-Lot Auction Narrative Choice / Paragraph Pick-up and Deliver Player Judge Programmed Movement Set Collection Simultaneous Action Selection Single Loser Game Speed Matching Trick-taking
Dynamics	**Dynamics resulting from Mechanics**	Acting Alliances Area-Impulse Betting and Bluffing Bias Bingo Campaign / Battle Card Driven Card Play Conflict Resolution Catch the Leader Closed Economy Auction Commodity Speculation Cooperative Game Deduction Induction Kill Steal King of the Hill Legacy Game Negotiation Ownership Player Elimination Prisoner's Dilemma Race Real-Time Rock-Paper-Scissors Role Playing Semi-Cooperative Game Simulation Solo / Solitaire Game Storytelling Take That
		Team-Based Game Traitor Game

The previous classification expressed in Table II was prone to some doubts. When analyzing each mechanism, the absence of a context made it a very abstract exercise. This approach should be taken as a guide to frame how game designs can benefit from the invented mechanisms. Each mechanism is better understood when related to a specific game. The difference between being a simple action or mechanism (related or not to the core mechanisms), and an auxiliary or sub mechanics depends on the game where they are applied. The same problem of lacking a context influences the division between mechanics and dynamics because they are closely related.

A. Finding game examples of mechanisms and mechanics

After identifying the BGG mechanisms, it is necessary to analyze some games where they are applied. These examples allow us to compare what players need to do (as actions) in digital and analog games, giving examples of digital game mechanics and analog game mechanisms.

Let's consider the case of a classic adventure game. In the videogame Diablo II [25], in order to move the player character we use the mouse to indicate the place to go. The character will reach that specific point and, if it is an enemy, it will attach. The time it takes to get the selected target is calculated by considering the character's attributes and equipment that determines its moving speed. This descriptive result is an example of a move mechanic. When comparing it to Mage Knight [26] board game, when players decide to make their move action, they must activate several game mechanisms to perform that action. Players need to choose several multiple-use cards to move their character (hand management). The selected cards generate action points that can be converted to move the players' miniatures through the board. These action points perform a point-to-point mechanism of movement through the hexagons that simulate the territory. These sets of hexagons allow players to build a modular board. Players assemble the hexagons at the start of the game, according to defined scenarios and player counts.

Strategy games provide other different examples. In Warcraft II [27], players assign workers to gather gold or wood by selecting the worker and point at mines or trees. It is similar to a move mechanic, but instead of attacking, the workers start collecting resources after moving. When comparing it to Architects of the West Kingdom [28] board game, using just the worker placement mechanism produces the same effect of getting the resources. But they do not need to be transported. In Warcraft II videogame, players only get the resources if their worker collects and transports them back to the main building. But this is done automatically when the player sends the worker to gather the resources. When comparing this resource collection mechanic to analog games, which also simulate the need to transport resources, other sets of mechanisms appear. In Scythe [29] board game, players need to control the hexagons where the resources are stored, which demands the mechanic of control/majority. To produce resources is an action selection and to move resources is another one.

Despite Diablo II and Warcraft II not being recent games, they represent the standard for the digital game types of Role Play Game (RPG) and Real-Time Strategy (RTS) and they

also illustrate the core mechanics that still mark the industry today. In these games, for example, there is the “Fog of War” mechanic. In board games cases, the information hidden by the "Fog of War" solutions is performed differently, with specific game mechanisms. For instance, in Eclipse [30] and Archipelago [31] board games, players must draw tiles and place them according to the terrain adjacency restrains. The tile drawing and placement represent the exploration of the territory. But the application of these mechanics delivers a different game experience because players build the game scenario differently every play session. In these board games, the game designers did not predefine the boards. This freedom and uncertainty does not happen in Warcraft II and in many other RTS where designers build the game scenarios and environments. The player’s agency is higher in the referred board game cases, although it can lead to challenging and unbalanced scenario solutions. In Xia: Legends of a Drift System [32] board game, there are exploration tokens in the maps that players only discover when they arrive there with their ship, acting as a type of “Fog of War”. Here the game mechanisms are as simple as grabbing the tile, turning it, and gain its benefits.

Analyzing analog game actions through the BGG mechanisms or Engelstein and Shalev's [6] catalogs allows understanding how player actions and game dynamics occur and build up. The multiple mechanisms build game mechanics as combined single elements in motion. In the case of analog games, they move only because the player activates multiple mechanisms to generate the notion of mechanics and dynamics. And the game state also changes because players activate several auxiliary game mechanisms. All these mechanical motions are part of the game experiences.

IV. Proposing Mechanisms as Building Block and a New Framework for Analog Games

To adapt the MDA framework to support analog game design, we should consider different levels of mechanisms, including the combinations of mechanisms that became mechanics and approach dynamics. In digital games, this might be automatic. But in analog games, if players do not activate each single mechanism, the game does not work or become something else. The player agency in analog games is determinant. We propose the Mechanisms, Mechanics, Dynamics, and Experiences (MMDE) approach, departing from MDA modified agency from Duarte & Battaiola [10] and the broader adaptation from Zubek [8] (MDA to MDE) notion experiences. We considered experiences to include the emoticons beyond the aesthetical dimensions, including all possible human feeling and emoticons [33], [34].

The mechanics are composed of many types of mechanisms and are connected directly to dynamics. Players can interact directly with each game mechanism and or with the mechanics also. Following Duarte & Battaiola [10] model, we propose that players and designers are at the center of the game system. Designers need to define all the mechanisms to set the game. But players also need to identify and directly control all the game mechanisms for the game to function as defined by the designer. It is common for hobby games to discuss game mechanisms and game system balance [19] since player agency effects are higher than in digital games [20].

We maintained the notion of dynamics and avoided the term gameplay because the gameplay results from all the existing layers in an analog game, which is inevitable due to the lack of automation analog games have. Players need to activate the mechanisms and mechanics for a game to exist [24], [35], [36]. Like in Duarte & Battaiola [10], the MMDE puts the player and designers at the center of the system, allowing them to interact with all the layers, but replacing mechanics by mechanisms and adding the new layer of mechanics between the individual game mechanisms and the dynamics. Dynamics result from a general mechanic motion.

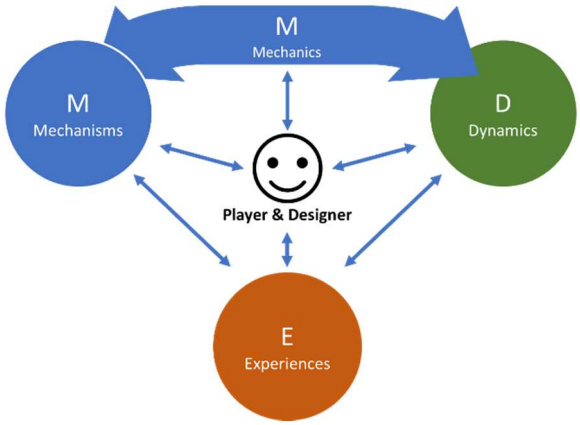

Fig. 2. The MMDE approach diagram. (*Own source*)

In the MMDE approach, mechanics result from the combination of multiple activated mechanisms. Mechanics is something between Mechanisms and Dynamics. Dynamics demand player activation of the mechanisms. Mechanisms on the move are the general mechanics of the system. Nevertheless, exploring game mechanics and mechanisms without concrete game examples can be tricky and misleading, as seen before.

Table III summaries the percentages regarding the association of the BGG Mechanisms (182) with the Mechanisms, Mechanics, and Dynamics from the MMDE approach. On the other hand, Table IV specifies the percentages of the proposed subdivision for the MMDE Mechanisms.

TABLE III. Grouping the BGG Mechanics by the MMDE Elements

BGG Mechanisms	Mechanism	Mechanics	Dynamics
182	111	39	32
100%	60.99%	21.43%	17.58%

TABLE IV. Grouping the MMDE Mechanisms, Mechanics, Dynamics, and their related Mechanisms Subdivisions

Mechanisms			Mechanics	Dynamics
Simple action or mechanism	Auxiliary or sub mechanism	Components or pieces	Need a set of mechanisms	Dynamics resulting from Mechanics
49	59	3	40	32
26.92%	32.42%	1.65%	21.98%	17.58%

Table IV provides the notion of how broad the concept of BGG mechanisms is, allowing them to be divided into small

elements and classify each of them in different uses for game systems. In Table III, 60.99% of the BGG Mechanisms relate directly with the MMDE Mechanisms, while 21.43% relate to Mechanics. What may be more surprising is the quantity of Dynamics (17.58%). These classifications may result from some subjectivity criteria due to the lack of concrete game context to analyze the BGG Mechanics. But it shows how fuzzy the concept of Mechanisms is in practice.

Considering Table IV, the subdivision and subclassification of mechanisms from the MMDE approach reveal that most are auxiliary or sub mechanisms (32.42%), used in most games to support the simple actions or other different game mechanisms (26.92%). A small percentage relates directly to pieces and game components (1.65%).

V. Discussion

The fuzziness and confusion about the definition of game mechanism and mechanics are real. We can find that in the literature but also online databases for the hobby analog players like BGG. Designers, scholars, and players do not share some common languages about the games to support the game development process, study, and play. But the core concepts are not settled yet. Settling a definition for game mechanisms is relevant for analog games because mechanisms are the most referred game elements in analog games literature and the ones providing innovation for hobby games [19], [23]. Table I expresses the many meanings from mechanics and mechanisms found in the literature.

As we have seen, frameworks like the MDA, and the many others that departed from it, are not well fitted to analog game systems. Players interact with all the game systems at the same time. Players directly activate each mechanism, activating them individually or in a mechanic motion. At the same time, players see their effects, the global mechanics, generating dynamics. These player actions are part of the experiences analog games provide, and the pleasure of these interactions may not require playing the entire game at all. The MMDE offers a new way to explore and design analog games, but it is prone to future improvements, especially when defining the subdivisions for each of the Mechanisms. We believe the MMDE can also be useful to design digital games since it contributes to identifying the building blocks of a game, which may facilitate the prototyping. Digital game design can start from building a physical prototype, and the playtest observation can show what mechanisms players activate and how players react to them. This playtesting may show designers what mechanisms to automatize or hide from players in their game design, hybrid or full digital ones.

Learning the rules, how to activate the mechanisms can be enough for some players. The game chores can be a source of pleasure [24]. And even just handling the pieces can be engaging [37]. Analog game designers know how important it is how they build their games from mechanics as building blocks. Designers know by practice that players will need to activate the game system directly for the game to work. Designers need to use auxiliary mechanisms to have a mechanical system. Choosing single game mechanisms and combining them must make the game as tangible as possible, provide the necessary metaphors for the theme and narrative, and make the overall game easy to learn and grasp. The quantity of mechanics can increase the game complexity, which might be engaging for some player but not for other [4]. Table IV shows that 32.42% of the mechanisms can be auxiliary of sub mechanisms, being essential for game design but demanding combination with other game mechanisms.

Although analog game designers select and combine the different mechanisms, players' agency can produce unexpected game results. Without rules enforcement, analog game players can change how they activate every single game mechanism or combinations of game mechanisms that generate mechanics in motion and dynamics. These changes affect gameplay and the provided feedback to players. Players can depart from the experiences to adjust the way they activate game mechanisms and mechanics. This freedom can be a challenge to analog game designers because players do not need to follow what designers have built. But this agency effect is also a valuable asset for digital game designers who use physical game prototypes with their board game mechanisms. Designers can test what experiences should be enforced or avoided in their digital games since they can do it easier and with different tools than board game designers. But the transparency of analog game systems may force the use of elements to hide information (decks of cards, dice, etc.) that digital games might not need.

VI. Conclusion

We believe that assuming the concept of game mechanisms as building blocks for analog game design is useful for designers because it provides them with clear concepts to apply in practice. After all, they can consult and choose from a list of available mechanisms, and when realizing they do not have the ones they need, designers can create new ones. Managing and combining these small mechanical elements can help to build engaging complex systems. Designers can approach game design by adding and removing mechanisms, test how players interact with them and how mechanics as metaphors help build narratives. It also helps researchers and reviewers to analyze games. The accurate identification of each game element and its effect and role in the game system makes these relationships emerge.

The proposed Mechanisms, Mechanics, Dynamics and Experiences (MMDE) seems to be a promising approach to explore the differences between mechanics and mechanisms and to settle game mechanisms as building blocks for game design, especially in analog games. It allows considering the unique space the player and the designer have when interacting with an analog game system. Transposing these relationships to hybrid and digital games can be a new source of innovation in game design. Understanding analog game design can improve and complement hybrid and digital game design teaching.

Nevertheless, the exact distinction between mechanisms, mechanics, dynamics, and experiences is tricky. It is even harder to achieve when ignoring the game context where they occur. Specifying the context effects can help approach these gaps and difficulties. Giving game examples is helpful to contextualize the mechanisms' applications. But to support design practices, it might be necessary to explore how the different sets of game mechanisms are related to each different game type. Should we specify each mechanism relating to RPG, RTS, or even other strategy games played in turn-based systems? We did not test this hypothesis.

We also did not analyze the game design patterns or explored the concept of Ludemes. These inclusions could improve future research on game mechanics and mechanisms.

The necessity of auxiliary and submechanics proves how dependent analog games are from player action to activate the game system through their game mechanisms. Identifying these mechanisms is useful for hybrid and digital game development because not all automation is required or desirable. But even for analog game designs, it is relevant to realize how much of the chores influence players' enjoyment of the game.

In summary, we can say game mechanisms are not the same as game mechanics, and that game designers can profit from acknowledging their differences.

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