



Nelson Zagalo & Rui Prada (eds.)
Actas da Conferência ZON | Digital Games 2008
www.lasics.uminho.pt/ojs/index.php/zongames08/
 Centro de Estudos de Comunicação e Sociedade
 Instituto de Ciências Sociais
 Universidade do Minho
 ISBN: 978-989-95500-2-5

Games – Refining the Model

Pedro A. Santos
 Department of Mathematics,
 Instituto Superior Técnico,
 Technical University of Lisbon,
 Portugal
pasantos@math.ist.utl.pt

Abstract. This paper proposes a definition of games, which is a modification of Juul's classic game model. After analyzing the shortcomings of the classic game model, a new game model is introduced. This model is a list of five features that are necessary and sufficient for an activity to be considered a game. In particular, this model covers classical and computer games which were not covered by the classical game model.

Resumo: Este artigo apresenta uma definição de jogo que é uma modificação do modelo clássico de jogo de Juul. Depois de se analisarem as falhas do modelo clássico de jogo, introduz-se o novo modelo. O modelo é uma lista de cinco propriedades que são necessárias e suficientes para que uma actividade seja considerada um jogo. Em particular, este modelo cobre jogos clássicos e jogos vídeo que não estão cobertos pelo modelo clássico.

Keywords: Game definition, game model

1 Introduction

Jesper Juul (2003) introduced what he named the Classical Game Model. By analyzing previous definitions given by several authors [1, 2, 4, 5, 9, 11, 12] he proposed a game definition with six features. Those features cover three dimensions: the game as a formal system, the relation between the game and the player, and finally, the relation between the game and the rest of the world. He was interested in “understanding both the properties of the games themselves (the artifact designed by the game developers), how you interact with them as a player, and what the relation is between playing and, say, working. In his own words, the six features are:

1. Rules: Games are rule-based (with fixed rules).
2. Variable and quantifiable outcome: Games have variable, quantifiable outcomes.
3. Value assigned to possible outcomes: That the different potential outcomes of the game are assigned different values, some being positive, some being negative.
4. Player effort: That the player invests effort in order to influence the outcome (i.e. games are challenging).
5. Player attached to outcome: That the players are attached to the outcomes of the game in the sense that a player will be the winner and "happy" if a positive outcome happens, and loser and "unhappy" if a negative outcome happens.

6. Negotiable consequences: The same game [set of rules] can be played with or without real-life consequences.

While this definition captures several important and defining features of games, it is too restrictive in certain aspects. Juul himself already pointed out some of the limitations of the classical game model in his work [7], [8, pp 52-54]. But he assumed that the mismatches between the model and the games were due to changes brought by computer games modifying the model.

I will show that is not so. Already “classical” games exhibit some of those characteristics that fall outside Juul’s classical game model. Characteristics like non-fixed rules or player-defined objectives. In this paper I will try to present a simpler and more precise definition, following the same lines as Juul. Here simpler will mean it will have less conditions, and more precise will mean it does not have some of the limitations of the classical game model. I will call the new version of the definition, New Game Model.

A note of warning must be added. As can be seen by the references, this topic has been in the minds of scientists for more than 60 years, and many works have been produced. Juul’s Classical game model and its formalism has generated some controversy in the area of game studies. The objective of this paper is a practical improvement of the model, not an exhaustive comparative and epistemological analysis of it in the area of game studies.

We start in the next section by analyzing some problems with the classical game model as presented by Juul and in the third section we will introduce the new game model. The fourth section will analyze some examples of games and the last section has the conclusions.

2 Critique of the Classical Game Model

Juul, before defining the features of a game, started by setting up the test. He enumerated some “games” to fall inside the definition, some others to be borderline cases, and others still to fall outside the definition (and be thus considered not games). From a logical-mathematical point of view, borderline cases are troublesome. The intent of a definition should be to clearly distinguish between games and not games. To a priori include borderline cases in the test is not the best approach. The existence of borderline cases should not be desirable and the objective should be to find a model that minimizes the number of borderline cases.

Regarding the first feature of games, being rule-based, Juul affirms that games must have fixed rules. Because a game activity consists of the players interacting with a game artifact, Juul here, as he describes in [8, Chapter 3], seems to be thinking of the game-theoretical mandatory knowledge of the rules by the players [10] and its difference from either game-state (which can be partially unknown if the game has no perfect information) or player strategy. But in fact, classical (pen and paper) Role Playing Games (RPGs), many computer games and even sports do not follow this premise. In RPGs, both classical and computer, many rules are either in the human gamemaster mind, or in its computer counterpart, hidden from the player’s knowledge. In fact, they can even change, and the player will not notice it, unless warned. The variation can be due to a hidden game-state factor, random variable, or even game patch. Online games, for instance, have been known to change rules during the play of the game. This is done to correct bugs or as players learn balancing or unbalancing strategies for the current rules, like in the World of Warcraft (WOW) game (see [13] for commentary on rule-changes in WOW). Juul points out that cheat codes are a way for the players to change the rules of the game. Changing difficulty settings in middle-game can also be considered rule-changing. But the point is that the phenomena of non-fixed rules is not unique to computer games. Even in the case of physical sports, the rules can change, due to weather conditions. Playing Tennis with wind (when the wind changes during the course of the game, with quick small bursts, for example, the rules actually can change from second to second; the physics of the ball’s movement is no longer constant) or rain has not the same (physical) rules than playing in perfect weather.

In certain games, there is an entity (i.e.: the computer/gamemaster/game-company/nature) that has some discretionary power over the rules, and there is no reason to consider any of these games as borderline cases.

There is another similar but unrelated phenomena. In certain card-games like Magic-the-Gathering, the cards in play can change the rules. The rules state that at the beginning of its turn to play, the active player should turn his cards upright. This is called the "Untap step". But for instance the card "Mist of Stagnation" changes this rule and the players can't untap their cards anymore in the untap step. Also Halo 3 has a feature called "The Forge" which is basically a map editor that can be operated in-play. This means that a player can act God-like, making for instance vehicles and weapons appear out of nowhere, effectively changing the rules of the game during play. In the above two cases, the rules-changing becomes actually part of the challenge presented by the game, and are done in-game. In fact these games still have fixed meta-rules that rule the way the "normal" rules can be changed.

Of course, allowing arbitrarily rule changing in the definition can raise some problems. A one-player activity where the participant can change the rules at will, is not a game activity, but play.

In short, while clearly games are rule-based, there is no reason for all the rules to be either rigid or known to the players. It must be clear what entities have discretion over the rules. If the players themselves, then meta-rules about rule-changing must exist.

Regarding the second feature of the classical game model, games certainly need to have variable outcome. But quantifiable outcome as interpreted by Juul raises some problems. It seems to be assumed that there is always an ordering to the outcome, a unidimensional score. But many games have what I will call multivariable outcomes. That is, the outcome of the game is given by several different variables. In a game like Simcity those can be population number, population happiness, money, pollution, security, etc. In a RPG, attribute levels, item possession, character experience, for instance. The classical game model implicit need of strictly ordered results gives rise to difficulties in covering open-ended computer RPGs (like Morrowind and WOW), as is already recognized by Juul. But there are problems with classical games too.

Even if a game seems to have a clear unidimensional score, in fact the different strategies can lead to different outcomes whose projection in the game score coincides. For instance in the boardgame World in Flames (WIF), the players incarnate World War II major powers. The board has a hex grid covering the map of the world, and victory by the rules is decided by conquering or dominating victory point cities at the end of the game. One of those hundreds of hexes represents Gibraltar, a location that historically was never conquered by the Axis. Also historically, Italy surrendered in 1943 to the Allies. A game of WIF where Gibraltar falls to the Axis and Italy fights until 1945 will be experienced by the players as having a different outcome than one where Italy surrendered in 1940, albeit the final score being possibly the same.

It is also interesting to note that players of these type of historical games fall between two poles: The competitive players, for whom victory according to the rules is what matters, even if the strategies are unrealistic and unhistorical, and when approaching a game are concerned about balance, and the simulationists, for whom the important is that the game simulates history, and who will not execute an advantageous strategy if they think it could not have been done historically. Many players will play to "check if a new strategy works", even if it will only marginally contribute to victory, or none at all.

The above observations lead us to the classical game model features 3 and 5. To have a game, the valorization of the possible outcomes needs not be external to the player, but is the goal/challenge the player decides to pursue that is important. From the several outcomes/variables, each player can choose the ones he considers more important to achieve. He is fighting to attain his own goals. The above observation regarding WIF shows that even in classical boardgames players choose their own goals from the possible outcomes. That player chosen goals are an important feature of games was already noted by Costikyan [3]. Of course, when allowing multidimensional outcomes, it is necessary that each of the variables comprising those outcomes be quantifiable in Juul's sense. In a competitive multiplayer game, it is important that the players (explicitly or implicitly) agree for each variable on what is a better result. For instance, in the WIF example, Gibraltar falling is in principle a bad result for the Allies and a good result for the Axis. For the Axis is better that Italy hangs on a long as possible. If these conditions are met, then, even if each player chooses non-directly opposed goals, the challenges will exist, and there will be a competitive game.

According to mathematical Game Theory it is possible, for each player, to define a real-valued utility function [10] that can represent in a single quantity, the order of all possible outcomes for a game. But even if a player converts in this way all possible outcomes of a game into a

unidimensional utility function, this function is player-dependent. This is the crucial point of this analysis. It is not the game that defines the value of the outcomes. It is the players, from all the outcome variables that the game allows. Having this in mind, it is possible to drop feature 5 of the classical game model, and include it in a modified feature 3. Because a player will be automatically emotionally attached to the goals he chose.

3 The New Game Model

Having in mind Juul's classical game model, and its critique in the previous section, I propose the following definition of a game. A game is a voluntary activity with

1. Rules: Games are rule-based
2. Variable and quantifiable outcome: Games have variable, quantifiable (not necessarily ordered) outcomes
3. Players assigning values to the outcomes: The different potential outcomes of the game are assigned different values by each player (that is, each player defines its own goals)
4. Player effort: The player invests effort in order to influence the outcome to one he prefers (that is, games are challenging)
5. Negotiable consequences: The same game [artifact] can be played with different real-life consequences

If we do the exercise of classifying the features in the three dimensions of the game, the player and the world, we obtain:

	The game as a formal system	The game and the player	The game and the rest of the world
Rules			
Variable and quantifiable outcomes			
Valorization of outcomes	?		
Player Effort			
Negotiable consequences			

Rules: Games have rules. Rules define both what moves/ choices are allowed and how given the choices by all players the outcomes are calculated. The rules have to be well-defined in the sense it must be possible to play the game, by either implementing the rules in a computer program, through natural laws, and/or through a referee. The players do not need to know all the rules. This is particularly true in complex games, where the rules are physical laws, or computer simulations. A player need only know what strategies (choices) are not allowed. He/she does not even have to know all allowed strategies. In a computer game this is easy, because it is usually not possible to input non-allowed choices.

Variable and quantifiable outcome: The rules must provide for different possible outcomes. The outcome must be a quantity, or a set of quantities. The two above features relate to the game as formal system, or artifact. Note that for instance the game Simcity, described by its creator Will Wright as a software toy, has these two features. It will be the attitude of the player when using the software, that transforms the activity into game-playing. Just like a ball is a toy that when used in a certain way gives rise to a soccer game [3].

Valorization of outcomes: Each player must assign preferences to the different outcomes. In a competitive multiplayer game, players must agree (explicitly or implicitly) for each quantity given in the outcome what results are better and worse for each of them. Of course the weight that each player then gives to each outcome can vary. Valorization of outcomes is player-dependent.

Player Effort: There must exist challenge (in the sense of [6, pp 103-106]) for each player to attain its preferred outcomes.

Negotiable consequences: Albeit occurring within the “real world” (even if only the body of the participant), games maintain a boundary in time and space from that real world [12]. A game is thus characterized by the fact that not all consequences are real-life consequences.

4 Game examples

While all activities considered as games by the classical game model are still covered by the new game model, this last one covers some of the activities considered “borderline cases” in the classical game model. Pen and paper role playing games and open-ended computer role playing games now join their closed-ended counterparts in being considered games by the model. A discretionary referee is now allowed, as is an open-ended game, because the player is allowed to set its own goals. Sandbox type games, like Simcity or The Sims with their player-defined goals are thus covered by the new game model also. In Simcity a player can set as objective to attain 50000 inhabitants with very low pollution for instance. Other can set the goal of creating and then destroying a big metropolis with a cataclysm that creates mayhem. Both are playing a game.

All of Juul’s examples of “not games” (real-world driving, noble war, hyper-text fiction, ring-a-ring o’roses, storytelling, watching a fireplace) are still clearly not games under the new game model, with the exception of free-form play and Conway’s game of life, which merit some discussion. The classical game model excluded free-form play based on variable rules. The new game model accepts variable rules, but puts some restriction on what entity is allowed to change the rules, and how can those rules be changed. As free-form play has no such restrictions, it is also excluded from the new game model. Regarding Conway’s game of life, it can be seen as a toy object. If the user has the capacity to set up initial conditions, then he can play games with the object (defining the goal of creating a self-perpetuating figure, for example). In this case, the activity will be a game.

Now to the undesirable borderline cases. Gambling and games of pure chance are still considered borderline cases, due to the pre-negotiated consequences and no player effort. And when a player uses a cheat code or changes the difficulty in mid game, he is “cheating”, in the classic sense. This will drag his activity from gaming to “borderline gaming”. Those are cases that now fall in the undesirable borderline class.

Given the the new game model accepts more activities as games, one can ask if some “not game” activities under the classical game model fall in the new model, or create borderline cases. A situation worth discussing regards the implication of the players not having to know all the rules. Imagine two people “playing” a game, but such that the rule set each one is following is different (this can happen if the rules changed over time or distance, for instance). If the rules allow for imperfect information and the participants perceived game state changes in accordance with their believes on the rules, the activity can proceed for some time (even to completion) before any of the participants realize something is wrong. Is this activity a game? According to the model, a game must have well-defined rules. In this case, it is not possible to have *one* game, which the participants voluntarily chose to participate in. So this activity does not fall under the model as the play of *one* game.

5 Conclusions

We presented a critique of Jull’s classical game model, in what concerns mainly the exigency of fixed rules and the ordering of outcomes. We then presented a new game model, which is simpler than the classical game model, stresses player-defined goals, and encompasses computer and classical games, some of which are not covered by the classical game model.

Analyzing some examples presented by Juul as borderline cases, we can verify that pen and pencil role playing games are inside the new model and are no longer borderline cases. Sandbox

simulations like Simcity can be used as games, when the participant defines goals to attain. Thus a toy (defined as such by its creator) can also be a game artifact.

The new game model continues to be compatible with a transmedial quality for games. Games are games, whether the material support is card, board, cardboard pieces, computers, the body and nature, or even the mind. We have thus simplified the classical game model, and at the same time increased its reach, reducing the borderline cases.

References

1. Avedon, E.M., Sutton-Smith, Brian: *The Study of Games*. New York: John Wiley & Sons (1981)
2. Caillois, Roger: *Man, play, and games*. New York: The Free Press (1961)
3. Costikyan, Greg: *I Have No Words & I Must Design* Retrieved 2008/03/12
4. Crawford, Chris: *The Art of Computer Game Design*. Osborne/McGraw-Hill (1984)
5. Huizinga, Johan: *Homo Ludens*. Boston: The Beacon Press 1950
6. Iversen, Sara M.: *Struggling towards a Goal: Challenges & the Computer Games*. MA thesis, Aarhus University. Retrieved 2008/03/12
7. Juul, Jesper: *The Game, the Player, the World: Looking for a Heart of Gameness*. In *Level Up: Digital Games Research Conference Proceedings*, 30-45. Utrecht University. Retrieved 2008/03/10
8. Juul, Jesper: *Half-Real: Video Games between Real Rules and Fictional Worlds*. Cambridge, MA: MIT Press (2005)
9. Kelley, David: *The Art of Reasoning*. New York: W. W. Norton & Company (1988)
10. Morgenstern, Oskar, Von Neumann, John: *Theory of Games and Economic Behavior*. Princeton: Princeton University Press (1944)
11. Suits, Bernard: *The Grasshopper*. Toronto, University of Toronto Press (1978)
12. Salen, Katie, Zimmerman, Eric: *Rules of Play - Game Design Fundamentals*. Cambridge: MIT Press (2003)
13. Schramm, Mike: *When it comes to nerfs, maybe change is good*. Post, WOW insider. Retrieved 2008/03/10
14. *World of Warcraft: patchnotes* Retrieved 2008/03/10

Games

Australian Design Group. (1985-2007). *World in Flames*. [Boardgame](<http://www.a-d-g.com.au/>)

Bethesda Softworks (2002). *Morrowind*. [PC, Console] (www.elderscrolls.com/games/morrowind_overview.htm)

Blizzard. (2004-2007). *World of Warcraft*. [PC] (<http://www.wow-europe.co/en/>)

Bungie. (2007). *Halo 3*. [PC, Console] (www.halo3.com/)

Maxis, Electronic Arts. (1989-2004). *Simcity*. [PC] (simcity.ea.com/index.php)

Maxis, Electronic Arts. (2000-2008). *The Sims*. [PC] (thesims2.ea.com/)

Wizards of the coast. (1993-2008). *Magic the Gathering*. [Collectible Card Game] (www.wizards.com/magic/)