Introducing Applied Ludology: Hands-on Methods for Game Studies

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ABSTRACT
The author calls for a more systematic methodology for game studies. The paper introduces a set of methods for 'applied ludology', a practical hands-on analysis and design methodology. It complements theories of games as systems with psychological theories of cognition and emotions. A sample of casual games is used to highlight the use of the methods. In conclusion, the author presents a model that enables analysing the eliciting conditions for game-related emotions, such as suspense.

Author Keywords
ludology, methodology, psychology, emotions, suspense, game analysis, game design

FROM GAMES TO GAMING ENCOUNTERS

What follows is both an introduction to conceptual and practical analysis and design tools. It is based on the author's doctoral thesis: *Games without Frontiers: Theories and Methods fro Game studies and Design*, which has set out to prove two theses: First, that any kind of game can be identified through a limited number of structural features called game elements. Second, the experience of playing a game can be analysed with a set of 'psycho-ludogical' concepts, i.e. psychological principles adapted for the specific purpose of analysing play in games.

In proving these theses, I have employed a number of key concepts. The theory of game elements is based on the notion of *games as systems*, i.e. dynamic wholes with interacting parts [cf. 10]. I have defined nine game elements, which represent different parts found in game systems across various media and technologies.

However, the aim has been to incorporate such a formal model of games into another model that is more sensitive to players and the contexts of play. To achieve this, I have employed sociologist Erwin Goffman's concept of focused gathering: 'social arrangements that occur when persons are in one another's immediate physical presence', which involve, e.g., 'a single visual and cognitive focus of attention'. For Goffman, playing a game presents a specific instance of focused gatherings: he calls them *gaming encounters* [5].

I have embraced this concept in conceptualising the interactions between players and games. Gaming encounter is a concept that emphasizes the behaviour of players, and the contexts where the game takes place, rather than the inner workings of the system. Based on this set of concepts, I have pursued to formulate a theory which aims to explain player behaviour, especially as an emotional and socio-psychological experience. In my review, present theories and models of games and players tend to separate the two, i.e. either theories and studies focus on the game as a formal structure, or the focus is single-handedly on players, and the 'systemic' qualities are ignored. I argue that there is a way to produce analysis tools that bridge aspects of both.

TOWARDS APPLIED LUDOLOGY

This is one of the challenges of applied ludology, and it will be tackled with baby steps, such as the arguments, methodological tools, and examples presented here. One function of the tools is to explore research and design spaces, i.e. help in formulating research questions and design challenges. For example, the tools introduced might not suit a large-scale study of game communities as such, yet I argue that they might enable a student or a scholar to identify the key emotional constituents of a gaming community and continue the analysis on from there.

My methods do suggest a particular way with which to walk the road of game studies, by seemingly excluding others. The methods and tools build on a disposition which became known as 'ludology'. The key point here is that ludology is not a clear-cut, systematic method. Rather, it has been an attitude or disposition to studying and designing games [7].

The result is, in my opinion, that game studies still largely remain a scattered effort. The degree of systematic application is at its best in areas of study where existing methods, e.g., from social sciences, can be applied, as is the case in a number of empirical studies on online multiplayer games.

My goal is to create tools for practical game analysis and design tasks, which could be carried out even without getting familiar with the very intricacies of the theory -- i.e. by reading this paper instead of the dissertation behind it.

Situated Play, Proceedings of DiGRA 2007 Conference

The result would be what I call 'Rapid analysis methods' (RAM), paraphrasing the methods of 'rapid prototyping' from software design. Their audience would be teachers and students of game design, but also game designers who wish to bring systematic processes to the early 'fuzzy' phase of game concept design.

Rapid analysis methods as a toolbox for applied ludology

RAM consists of seven tools, each providing a method for identifying particular aspects of gaming encounters. In the space that I have here, I will introduce four:

a. Method for identifying and analysing game elements

b. Method for identifying game mechanics and the goals they relate to

c. Method for identifying player ability sets

d. Method for identifying eliciting conditions for emotions in gaming encounters

The rest of the paper will provide a brief introduction to each method, its premises and application. I will use examples of so-called 'casual' (browser-based or downloadable) games throughout the paper to illustrate how the tools can be applied into practice.

METHOD FOR IDENTIFYING GAME ELEMENTS

The first step in trying to understand how a game as a system works is to find out what are the parts of the system. The first method introduced is created for the purpose of identifying the parts, i.e. game elements. It is based on a theory which defines nine possible element categories that are found throughout the universe of games. The categories are explained below, proceeding from simpler elements to the more complex:

Components: The resources for play; what is being moved or modified -- physically, virtually, in transactions -- in the game, between players and the system. Tokens, tiles, balls, characters, points, vehicles are common examples of game components.

Environment: The space for play – boards, grids, mazes, levels, worlds.

Ruleset: The procedures with which the game system constrains and moderates play, with *goal hierarchy* as an especially important subset.

Game mechanics: What actions the players take as means to attain goals when playing. Placing, shooting, manoeuvring are examples of what players are put to perform in many games.

Theme: The subject matter of the game which functions as a metaphor for the system and the ruleset.

Information: What the players need to know and what the game system stores and presents in game states: Points, clues, time limits, etc.

Interface: In case there are no direct, physical means for the player to access game elements, interface provides a tool to do that.

Players: Those who play, in various formations and with various motivations, by performing game mechanics in order to attain goals.

Contexts: Where, when, and why the gaming encounter takes place.

By minimum, a game has to have Components, Environment, and at least one Game Mechanic. When the relationships of these three elements are defined and implemented, it means that a Ruleset emerges, as does Information. Then we need Players, and any gaming encounter brings about various Contexts, that may vary from one encounter to the next one.

Ruleset, Game mechanics, Theme, Interface, and Information are compound game elements, which seldom exist as such, but they exist as embodied into other elements. Their compound nature means that they keep the dynamic whole together. For instance, component elements may carry information in the form of their attributes, as the image below illustrates:

Figure 1: Different attributes of the component game element in Bonnie's Bookstore (New Crayon Games / PopCap Games, 2005), a game with a literary theme of combining alphabets into words.

An important principle of the theory is that rules are *embodied* into game elements: goal rules of Diner Dash (Gamelab, 2004, see image below), for instance, are embodied into both component elements (waiter, customers, orders, dishes), environment elements (tables, counter, kitchen, etc.) and information elements (cash earned).

Identifying game element ownership attributes

After identifying the game elements from a game, the next step towards conceptualising their interaction is to identify who they belong to. This is important because often in games, due to conflicting goals between participants, and scarcity of objects in play, ownerships create inherent tensions, and thus prospects for emotions.

The 'who' can be divided into three possible ownership attributes: owned by *self*, *other(s)*, or *system*. This three-fold division articulates the basic relations in a gaming encounter: Oneself as a player, the other players (in case of multiplayer games), and the system as a facilitator and/or player (the latter in case there are AI opponents). The gaming encounter is always dualistic in the sense that just as you are an other to me when we begin play; I become an other to you -- unless we play as a team.

Any game element may belong to one of the three parties, and thus an element in any category can be assigned an ownership status: there can be goals-of-self, game mechanics-of-others, an environment-of-self, information-of-system, and so on. For an analysis task, the consequence is that once a game element is identified, the next step is to identify its ownership attribute.

Figure 2: Goal rules as embodied into component and environment game elements in Diner Dash.

Case Example: Chu Chu Rocket

Let us use an analysis of the game elements in the game Chu Chu Rocket (Sega Enterprises, 1999) as an example. In the game, players try to capture the most mice by leading them into a home base. This happens by placing arrowed tiles on the grid that the mice move on. Cats appear on the grid, eating the mice.

First, we will identify the component elements: What are the resources that each player has, and what objects does the system produce into the game -- what basically is being moved in the game?

Mice, Cats, Arrow tiles, and Cursors are being moved and/or owned, and the points for each player are being added or subtracted. Thus we have five different types of component elements in the game. Of these, the player can directly manipulate only her Arrow cursor. To start with, the Mice and the Cats are controlled by the game system. The initial analysis result can be presented as the three-fold ownership attribute division:

Components-of-self: Cursor, Arrow tiles, points

Components-of-other: Cursors, Arrow tiles, points

Components-of-system: The Mice, The Cats

However, once we begin to consider the ruleset element, and its most important subset -- the goals of the game -- we see that the ownership attributes are subject to change. The goal is to have the most points once time runs out, and points are being scored by capturing mice into one's home base, i.e. a specific location on the game environment in the form of a grid. This leads to an observation that the game revolves around players trying, by placing arrow tiles, to change the ownership attributes of components-of-*system* into components-of-*self*, and thus gain points-of-*self* over points-of-*others*.

Study of game elements as a step towards studying game play

In this way, starting from the lone component element, we have already addressed a number of other elements in the system: Ruleset as goals and scoring procedures, environment as grid with particular locations embodying goal rules, what players do in the game, i.e. perform game mechanics, and how information is embodied into components as player representations (arrow tiles, points, and cursors with particular colour attributes). This illustrates how the parts of a system interact, i.e. how a game system displays *behaviour*, which has been argued to be the essence of games as entertainment [cf. 6].

To summarise, the 'recipe' for the analysis method is simple:

1. Identify, one at a time, what represents each of the game element categories in a given game.

2. Move on to analyse the ownership attributes of the elements identified: Who owns what?

3. Analyse whether the elements have other significant attributes relating to goals, player roles, etc.

The point of this brief exercise was to illustrate how the analysis methods of applied ludology snowball onwards; from an analysis of individual game elements to the behaviour of a game system, and over to dynamics of a gaming encounter, where the focus shifts to the behaviour of players in particular contexts.

METHOD FOR IDENTIFYING GAME MECHANICS AND GOALS

Game mechanics are essential game elements in that they are always about doing something in the game. In everyday experience, performing game mechanics is what playing a game is about. Game mechanics are best described with verbs: Choosing, guessing, moving, aiming, shooting, collecting, kicking, trading, performing, bidding, etc. Thus the nature of a mechanic, i.e. the action it at once allows, but also puts the player to perform, might come to define the game experience for the player. For instance, submitting answers characterizes quiz games, and performing characterizes role-playing games. How these are valorized by self, other, and system, have consequences not only to the outcome of the game but also the players' subjective experiences.

Distinctions between game mechanics and goals

Besides such 'game-defining' individual mechanics, there are often other, less definitive game mechanics in a game -- in a supporting role, so to speak. Manoeuvring to a certain location in the game environment in order to perform the game-defining placing or shooting mechanic presents an example. In this case, it is useful to identify the relationship of the said mechanics: shooting as the *primary* game mechanic, and manoeuvring as its *submechanic* (or vice versa).

A need for another distinction arises from the goal hierarchy of the game. Often in games, the high order goals persist as distal goals, but low order goals are more numerous and frequent; they are embodied in challenges players repeatedly struggle with. Thus goals are present either *globally* or *locally.* (This distinction has been adapted from a similar one concerning variables that affect intensities of emotions, as theorized in [9].) As game mechanics are the means to attain goals and, thus, by necessity directly related to goals, game mechanics are also available either globally or locally.

It would seem, then, that primary and submechanics are available globally, whereas a third type of game mechanic, *a modifier game mechanic*, may be available locally, i.e. for certain duration or only in certain location, or for a certain player with an attribute that allows using the modifier mechanic. A 'speed boost', a 'safe heaven', or a special component resource, e.g. a particular weapon or character ability, are examples of instances when modifier game mechanics might become available.

In their book *Rules of Play*, Katie Salen and Eric Zimmerman talk about the 'core mechanic' which is defined as the actions that players repeat in a game, again and again [10]. In the context of our discussion, core mechanics consist of the possible combinations of primary game mechanics and submechanics, possibly complemented with modifier mechanics. Therefore the analysis method we are proceeding towards will be essentially a method for 'deconstructing' core mechanics. The distinction to three different types of game mechanics is a result of the author's analysis

However, there is one more distinction to be made. The goal of the core mechanics is not necessarily the same as the ultimate, highest order goal of the game. For instance, its goal might be a subgoal of accumulating points, whereas the highest order goal of the game might be to have the most points after a number of rounds, i.e. rounds of core mechanics between players. Thus, the goal of core mechanics is not necessarily always a global goal, yet it is in instrumental relation to one. Therefore I will name these instrumental goals of core mechanics as *glocal* goals. Glocal goals represent a goal hierarchy that is nested within higher order goals. As a consequence, it is the modifier mechanics that relate to local goals.

Analysis template for studying core mechanics

Based on the premises summarised above, I have formulated an analysis template for the study of game mechanics and the goals they relate to. In the template, the student has to identify the 1) global goal, 2) the core mechanic consisting of a primary mechanic and its possible submechanics, 3) the glocal goal that the core mechanics relate to, 4) possible modifier mechanic(s) and 5) the local goal they relate to.

I have analysed the game mechanics of over a hundred games of various types with the method. This process has also produced several iterations of the method before it has evolved into its present form. The process has also served another purpose: the harvesting of a so-called library of game mechanics. The library summarises the wide world of game mechanics into a concise collection. Different game mechanics can be interpreted as specific instances of 40 general categories in the library.

Another typology employed in the analysis method is a set of goal categories, which can be referenced when defining the local, glocal, and global goals of a game. I have adapted the categories by game scholars Staffan Björk and Jussi Holopainen [2] for this purpose, with minor revisions. A sample of the research is found below:

GLOBAL MECHANICS			GOAL TYPE		LOCAL MECHANICS	GOAL TYPE	
Primary mechanics		Submechanic	Global		Modifier mechanic	Local	Game
Aiming & Shooting	&	Choosing	Discard				Zuma
Arranging		Browsing	Configuration				Bejeweled, Zoo Keeper
Arranging		Point-to-point Movement	Configuration	&	Submitting	Match	Bonnie's Bookstore
Enclosing			Accumulate				Loop
Placing		Browsing	Accumulate				Chu Chu Rocket
Placing		Point-to-point Movement	Alignment				Tetris
Point-to-point Movement	&	Choosing	Delivery	&	Placing	Match	Diner Dash

Figure 3: Core mechanics and goals of a sample of casual games according to the analysis template.

This small sample hints at the type of findings analysis can produce: It would seem that in casual games, there is a prevalence of game mechanics in the categories of Arranging, Placing, Browsing, and Point-to-point movement. Furthermore, glocal goals of such as Configuration and Capture seem to often add up to a global goal of accumulating points. In any case, the example serves to show that the method is capable of pointing out structural similarities between games. Their correlation to experiential similarities can be analysed with other methods in the RAM toolset. This also illustrates how the methods help in exploring and defining further research questions.

Expanding the method in face of complexity

The challenges for this method come in the form of games with multiple goals and mechanics, i.e. games with various components and complex goal hierarchies in the form of missions or minigames, or games with so-called asymmetrical goal structures between players -- which often also means that the set of game mechanics available are asymmetrical. World of Warcraft, Grand Theft Auto: San Andreas, or Animal Crossing present examples of such cases: it is difficult to crystallize their gaming encounters into a core mechanics of two to three individual game mechanics and a pair of goals.

However, it is possible to employ the method with games like these by dividing the game into analysable 'slices': e.g., study the core mechanics and goals of the auction house in WoW as one entity, and the respective core mechanics of particular quests and 'grinding' on their own, after which these wholes can be analysed in relation to each other, according to the overall goal hierarchy of the game. The same applies for asymmetrical goal structures, i.e. the relationship of mechanics and goals have to be analysed individually across different player roles and their subsequent goals: goals-of-self versus goals-of-others.

METHOD FOR IDENTIFYING PLAYER ABILITY SETS

The next step is to move towards player experiences by modelling players' abilities. Digital games necessitate both cognitive and psychomotor abilities, but increasingly also physical abilities, with the rise of exergaming, Nintendo Wii, etc. In the context of gaming encounters, I have conceptualised these kind of abilities as *player abilities*. For the purpose of identifying them, I have adapted the extensive work on human abilities by cognitive psychologist John B. Carroll [3].

Abilities are exercised in face of game mechanics and goals, which means that they are experientially closely integrated to the phenomena which we have analysed thus far. Therefore the analysis has to focus on the combination of cognitive, psychomotor, and physical abilities that game mechanics require players to perform. If these abilities are somehow in contradiction to the goal, and the performance of game mechanic, it is relevant to ask whether there is a flaw in the game design -- or study how players experience the contradiction. Therefore the analysis method aims to function also as a tool with which to explore and validate design solutions.

The figure below visualises the process where game mechanics, goals, and player performances combine into the dynamics of a gaming encounter.

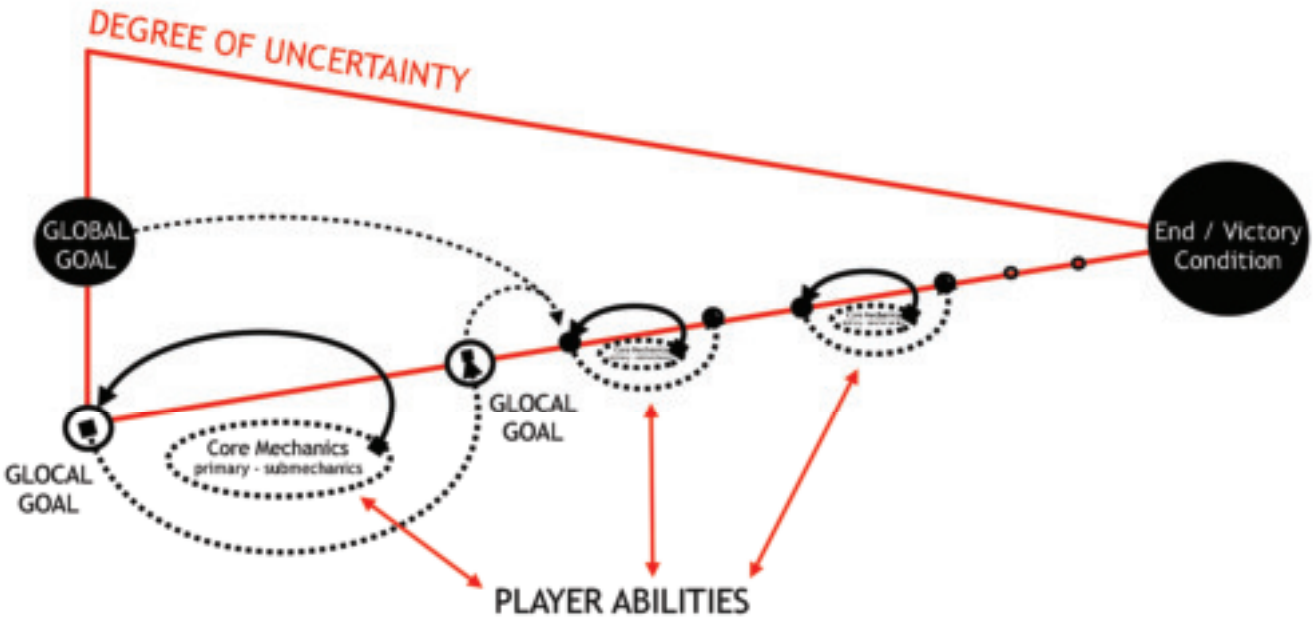

Figure 4: The dynamics of a gaming encounter visualised as a continuum starting from the introduction of a global goal, and proceeding through a number of glocal goals to the end or victory condition. In the process, players perform core mechanics according to their abilities, and degree of uncertainty concerning the outcome of the game decreases through successful play -- yet, the abilities to perform game mechanics always leave room for uncertainty, and thus the lines illustrating advancement from one goal to another are conditional.

Uncertainty factors as cues of non-trivial player abilities

Any game that allows use of skill in attaining goals (instead of, e.g., pure chance) must offer opportunities for the skills to develop. However, it has been shown that after early development of abilities in practicing sports, the use of the abilities soon becomes routinised, as they require less cognitive processing [1]. The same can be assumed of any game, and therefore charting all the possible human abilities that are required in performing a particular game mechanic yields mostly trivial results -- e.g., that abilities of visual perception are required in order to understand what goes on in the game.

In my interpretation, it is relevant to identify the abilities that make a successful performance of the mechanics uncertain, i.e. which player abilities contribute to the margin of error. This choice in focus enables us to identify which abilities are not high level prerequisite abilities (e.g.,. visual and auditory perception) and/or not rapidly routinised to the degree of triviality.

The table below illustrates, with the same set of games as earlier, how the analysis of game mechanics and goals can be complemented with such analysis of player abilities as *uncertainty factors*. The abilities referenced are derived from Carroll's overall model of human cognitive abilities.

GOAL TYPE		CORE MECHANICS				GOAL TYPE	
Global (highest order goal)	UNCERTAINTY FACTORS	Primary game mechanics		Submechanics	UNCERTAINTY FACTORS	Glocal (goal of core mechanics)	Game
Discard	Choice reaction time Wrist-finger speed	Aiming & Shooting	&	Browsing	Choice reaction time Wrist-finger speed	Connection	Zuma
Accumulate	Perceptual speed Wrist-finger speed Choice reaction time	Arranging	&	Browsing	Perceptual speed Wrist-finger speed Choice reaction time	Alignment	Bejeweled, Zoo Keeper
Capture	Lexical knowledge	Arranging	&	Point-to-point Movement	Lexical knowledge	Configuration	Bonnie's Bookstore
Accumulate	Spatial reasoning Wrist-finger speed Choice reaction time	Enclosing	&	Manoeuvring	Spatial reasoning Wrist-finger speed Choice reaction time	Capture	Loop
Survive	Spatial reasoning Wrist-finger speed Choice reaction time	Manoeuvring	&	Browsing	Spatial reasoning Wrist-finger speed Choice reaction time	Connection	Snake
Survive	Spatial reasoning Wrist-finger speed Choice reaction time	Manoeuvring	&	Browsing	Spatial reasoning Wrist-finger speed Choice reaction time	Evade	Pac-Man
Accumulate	Spatial reasoning Wrist-finger speed Choice reaction time	Placing	&	Browsing	Spatial reasoning Wrist-finger speed Choice reaction time	Capture	Chu-Chu Rocket
Accumulate	Spatial reasoning Wrist-finger speed Choice reaction time	Point-to-point Movement	&	Browsing	Spatial reasoning Wrist-finger speed Choice reaction time	Delivery	Diner Dash
Outplay	Spatial reasoning Wrist-finger speed Choice reaction time	Point-to-point Movement	&	Controlling	Spatial Reasoning Wrist-finger speed Choice reaction time	Configuration	Tetris

Figure 5: Analysis of player abilities as uncertainty factors related to game mechanics and their goals in a sample of casual games.

The abilities that are observed to be uncertainty factors constitute *player ability sets:* combinations of cognitive, psychomotor, and physical abilities. The analysis shows that the player ability set for playing Zuma (PopCap Games, 2003) would necessitate skills in abilities known as choice reaction time and wrist-finger speed.

Besides the notion of player ability sets, two findings result from the above analysis: First, it seems apparent that the sample of games necessitates quite similar cognitive and psychomotor player abilities in the domains of visual perception and psychomotor abilities. Second, it is noteworthy that throughout the games, the uncertainty factors both regarding the core mechanics, and their succession in pursuing the global goal, are the same. This points, on one hand, to the fact that the games have few game mechanics available for players, which means that differentiation in player ability sets across the sample remains low. Yet, on the other hand, the finding indicates that the abilities that glocal and global goals necessitate are in harmony, so to speak: abilities to attain subgoals directly support the higher order goals -- which would speak for the popularity and general conception of the analysed games as successful game designs.

The latter finding hints at the use of the method in more complex games with multiple goals and game mechanics: by identifying abilities throughout the goal hierarchy and set of game mechanics, it is possible to spot inconsistencies in the space of player abilities that the game design addresses.

Player abilities are also factors that differentiate players from one another, and thus relate to uncertainty concerning outcomes. Uncertainty is a useful concept to emphasize at this point also because it fuels most games, and motivates players to play, in order to reduce uncertainty -- i.e. to find out the winner, or the success of one's performance, or in general how the gaming encounter turns out.

Thus, uncertainty is a fundamental source of emotions for players, and self-beliefs in one's abilities as a player affect it as an emotional constituent of gaming encounters. This observation functions as a segway to the next method.

METHOD FOR ANALYSING PLAYER EXPERIENCES AS PROSPECTS AND SEQUENCES OF EMOTIONS

I argue that the road to attaining game goals is beset by emotions. The next method is based on a conceptualisation of that road, and how its twists and turns can be analysed.

Emotions as valenced reactions to game elements

I have adapted the cognitive scientists Andrew Ortony, Gerald L. Clore and Allan Collins' theory about the cognitive structure of emotions for a theory of player experiences. Their model of emotions -- the OCC model for short -- states that emotions are valenced reactions, i.e. positive or negative appraisals, to one of three aspects in the world: Agents, Events, or Objects. These three categories produce different types of emotions, i.e. they present different 'eliciting conditions': the conditions under which an emotional process can be triggered in an individual. [9.]

It is widely accepted among emotion theorists that emotions are phasic: first, there is a the recognition of an agent, event, or object as significant, which produces plans to cope with the situation. In the next phase, these plans lead to a so-called action readiness, followed by the bodily and expressive effects of emotions, such as facial expressions and actions. [8.]

Emotion theorists have produced competing categorisations of emotion types, e.g., basic emotions and their subcategories, but it is generally accepted that certain emotions have tendencies to lead to similar kind of action readinesses. Thus common responses become habituated, and they can be predicted, to a certain extent. This has been argued to be especially true with responses to entertainment, as it creates worlds and fictions which offer prospects for emotional and mood-changing experiences outside the complexities of everyday life [11]. I argue that this predictability, with due reservations, applies to games as well.

The issue of predictability has lead emotion theorists talk about *action tendencies,* i.e. the likely courses of action triggered by a particular emotion in a particular situation, or 'tendencies to establish, maintain, or disrupt a relationship with the environment', as prominent emotion theorist Nico H. Frijda has stated [4]. For the study of games as a study of particular entertainment experiences, this opens up the challenge of analysing game-specific eliciting conditions, and the emotions they are likely to trigger. Furthermore, the consequent action tendencies can be analysed through identifying game mechanics.

Another important aspect of the OCC model is that there are a number of variables that affect the intensity of emotions. The reach of these variables, such as 'unexpectedness' or 'degree of likelihood', is either global or local across emotion types -- and it is no coincidence that I have conceptualised the availability of game mechanics according to the same distinction. This conceptual pairing is a result of studying what are the points of appraisal, i.e. the points in games where valenced reactions are likely to occur in the minds of players. With games, valence has to do with general motivation to play, but in a more detailed level of the experience itself, it has to do with player abilities, such as skill and luck concerning the goals of the game.

For the purposes of applied ludology, the task is, then, to relate game elements into the three-fold model of agents, events, and objects, and identify subsequent emotion types that eliciting conditions in games privilege. For the purpose of this paper, I will use a particular compound emotion from the OCC model as an example. It is an emotion which I argue is fundamental to player experiences: suspense.

Suspense as modulation of hopes and fears through elements of uncertainty

Ortony et al list a number of emotion types, token examples of them, and variables affecting their intensity [9]. However, as a result of detailed analysis of them in the light of games, I argue that for applied ludology there are two crucial points to take away from the OCC model: First, that games privilege so-called prospect-based emotions that are always focusing on events and their outcomes. Second, the emotion of suspense is a fundamental emotion of player experiences, because it is a compound emotion where the emotions of *hope*, *fear*, and *uncertainty* come together.

This premise goes hand in hand with the analysis of player abilities, as it emphasizes uncertainty and emotions focusing on uncertain events, such as whether a performance of a game mechanic (e.g., throwing a ball) will lead to a confirmation of a goal (getting the ball through a hoop, for example). The subsequent analysis method focuses on identifying what are the hopes and fears of a player in a given situation in a game, and how do the eliciting conditions for uncertainty emerge in that situation.

In order for a method to work, it has to have an object of analysis. The eliciting conditions for emotions always emerge in relation to a given moment of time in the gaming encounter, i.e. a particular situation. This would mean that eliciting conditions focus on the *game state*, i.e. the state to which all game elements in play are configured at a specific moment, or during a defined period of time, such as a particular sequence of a game -- e.g., a round, a mission, or a level.

The uncertainty of player experiences is uncertainty towards the prospect(s) that the game state(s) embodies. Yet some elements might be more central to the suspense-eliciting conditions than others, which mean that we should identify the individual elements that are prospect to interact -- desirably or undesirably -- in the game state, or the sequence of game states under scrutiny. The states nevertheless contribute to the eliciting condition, as they embody prospects of hopes and fears. As such they suggest predictions of future emotions for the player.

These conditions can be seen through the concept of *proximity*, which, according to the OCC model, is one of the global variables affecting intensity of emotions. It refers to how close in psychological space one feels to the situation which potentially elicits emotions. In terms of the study of player experiences, I propose that proximity as a variable should be understood through the uncertainty concerning goals, i.e. as *how close in psychological space*

the player feels to the confirmation or a disconfirmation of a goal.

The higher the goal resides in the goal hierarchy, the higher is presumably the emotional intensity. With this logic, the proximity to overall end or victory conditions would elicit the most intense emotions. This definition also means that the sense of proximity modulates player focus, i.e. what she will try to do next: the action readiness and tendency. It is a process that essentially equals the phasic process of emotions.

Case example: Modulation of suspense in Zuma, Diner Dash, and Bonnie's Bookstore

The table below illustrates, with three examples, of how I have studied games, with the focus on their core mechanics and corresponding game states, according to the above premises. Basically the table outlines the method: first, the student has to identify the eliciting conditions for hope and fear. After that, by applying the theory of game elements, the next step is to identify how the eliciting conditions are embodied into the design of the elements:

Figure 6: The modulation of the emotion of suspense through eliciting conditions in three casual games.

	EMOTION TYPE			ELICITING CONDITIONS FOR EMOTIONS	
GAME	SUSPENSE (compound emotion of Hope + Fear + Uncertainty) modulated by:			How PROXIMITY TO END CONDITION is embodied into game in terms of *game elements*:	How PROXIMITY TO VICTORY CONDITION is embodied into game in terms of *game elements*:
Zuma 	Hope: Proximity to hitting pairs of balls.	Hope: Proximity of hitting coins or special balls.	Fear: Proximity of first ball in chain to the skull.	As balls moving on the tube towards the skull, i.e. as spatial relations between *component* and *environment* elements.	As decrease in the number of balls in the tube through the prospect of performing Aiming & shooting *game mechanic*.
Diner Dash 	Hope: Proximity to goal score.	Hope: Proximity to achieving stars (through pleased customers).	Fear: Proximity to running out of stars (by customers leaving).	As customer characters and their gestures and heart attributes, i.e. as *component* element *attributes*.	As point score display, i.e. as *information* element.
Bonnie's Bookstore 	Hope: Proximity to completing a word.	Hope: Proximity to grid being completed through using all alphabets.	Fear: Proximity to end of turns.	As a turns left counter, i.e. as *information* element.	As change in the alphabets and environment grid attributes (i.e. *information* element) through the prospect of performing Arranging *game mechanic*.

The analysis shows that suspense as an experience of hope, fear, and uncertainty through engaging with game elements may be elicited through similar conditions across games in similar genres.

However, once we consider different games, varieties in eliciting conditions begin to appear. In a game of Sudoku, it is the lack of information about the missing numbers in the grid that embodies uncertainty for the player. The information element is in central role in the game state that embodies the eliciting conditions of 'puzzlement'. The player of Sudoku will try to minimise uncertainty by using her abilities in quantitative reasoning to come up with the missing information, and then proceed to submit it as numbers to the grid, via the available game mechanic.

Then again, as the above table shows, in Zuma it is the balls and their distance from the skull that contributes to the degree of proximity the player feels towards the end condition. As the balls move irreversibly and quite literally towards the end condition at the end of the tube, it means that the component and environment elements, and their spatial relations, become to embody the eliciting conditions for suspense. The constantly fluctuating distance from the skull to the nearest ball is the focus of player attention, and thus it is the central source of emotions in Zuma. This also means that it motivates the player to act towards minimising fear by preventing the end condition, because it is emotions that help us in setting priorities to goals -- emotions organise our 'ready repertoires of action' as emotion theorists have put it [8].

The suspense model of game entertainment

The results which the method yields can be used for a tentative model of suspense in games, at least in the casual ones analysed. In this light, it would seem that 'good' player experiences are emotional rollercoasters: they manage to produce an oscillation between realization of success and victory condition (hope) and preventation of end condition and failure (fear). This oscillation persists in the behaviour of the system until uncertainty concerning outcome is resolved, but it is also in the nature of the osciallation to be unexpected -- which points to a set of other relevant emotions (shock, surprise) to be studied.

Nevertheless, I will conclude this theory of suspense-elicitation with a model that generalises the modulation of suspense in gaming encounters:

TOWARDS METHODOLOGY OF PLAYER STUDIES

In conclusion, the toolbox of applied ludology is meant to provide systematic methods for practice-orientated game studies and design curricula. My aim has been to illustrate that methods such as these are able to explain the inner workings of both games and their players.

Therefore the analysis method is essentially about modeling player experiences through the concepts introduced here: as the analysis is based on theory, rather than actual player studies, the results are scenarios -- scenarios of how player emotions modulate in gaming encounters. As such they are meant to function also as tools for exploring and setting research questions for empirical studies of player experiences. Moreover, the methods will be implemented as online tools in order to facilitate analysis tasks for a community of students in game studies and game design classrooms.

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Figure 7: The model of suspense elicititation in games: Concerning goal confirmation, the hope of self is the fear of other (opponent) players, as degree of uncertainty about the outcome decreases. The emotion of suspense is modulated through game states that achieve a dynamic similar to the model.