

Chapter 4

Assessing the Core Elements of the Gaming Experience

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Abstract This chapter presents the theory of the Core Elements of the Gaming Experience (CEGE). The CEGE are the necessary but not sufficient conditions to provide a positive experience while playing video-games. This theory, formulated using qualitative methods, is presented with the aim of studying the gaming experience objectively. The theory is abstracted using a model and implemented in questionnaire. This chapter discusses the formulation of the theory, introduces the model, and shows the use of the questionnaire in an experiment to differentiate between two different experiences.

In loving memory of Samson Cairns

4.1 The Experience of Playing Video-games

The experience of playing video-games is usually understood as the subjective relation between the user and the video-game beyond the actual implementation of the game. The implementation is bound by the speed of the microprocessors of the gaming console, the ergonomics of the controllers, and the usability of the interface. Experience is more than that, it is also considered as a personal relationship. Understanding this relationship as personal is problematic under a scientific scope. Personal and subjective knowledge does not allow a theory to be generalised or falsified (Popper 1994). In this chapter, we propose a theory for understanding the experience of playing video-games, or gaming experience, that can be used to assess and compare different experiences.

This section introduces the approach taken towards understanding the gaming experience under the aforementioned perspective. It begins by presenting an

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overview of video-games and user experience in order to familiarise the reader with such concepts. Last, the objective and overview of the whole chapter are presented.

4.1.1 Introduction to Video-games

A video-game is, at its most basic level, the implementation of a game in a computer-based console that uses some type of video output. Providing a formal definition of a video-game was one of the first challenges that game studies faced. Since many things can be considered a game, the following definition is used:

A game is a rule-based system with a variable and quantifiable outcome, where different outcomes are assigned different values, the player exerts effort in order to influence the outcome, the player feels emotionally attached to the outcome, and the consequences of the activity are negotiable (p. 36) (Juul 2005).

We extend the definition by specifying that the rules are covered by a story, as suggested by Koster (2005). The key part in the above definition is that the player “exerts effort”. In other words, the user of the video-game has an active role in the interaction process. Thus, when discussing the experience of playing video-games, we are referring to the process of interaction between player and video-game. Our focus is not on the creation, implementation or design of the video-game. Nor is it the motivation of the user to engage with a particular game or the psychological implications that the user may have after engaging with it. The focus is, as we have called it, the gaming experience, the experience of playing video-games on a one-to-one basis of the interaction between player and game. This concept will be untangled as we move forward within the chapter. First, in order to understand what we mean by experience, we proceed with a discussion of the concept of user experience.

4.1.2 Introduction to User Experience

The concept of user experience is understood as the subjective relationship between user and application (McCarthy and Wright 2004). It goes beyond the usability of the application, focusing on the personal outcome that the user gets from interacting with the application while performing a task. Considering user experience only as a personal or subjective outcome is problematic within the scope of scientific knowledge. Scientific knowledge allows us to generalise about our understanding of the world. If we identify the phenomenon being studied as personal, then it would not be possible to provide a general description of the phenomenon. For this reason, unlike video-games, we do not provide a current definition for user experience. Rather, we will provide a definition which we build and use to understand the experience of playing video-games.

4.1.3 Overview of the Chapter

We divided the chapter into six sections. First, we present a definition for user experience and then we look at how user experience relates to the experience of playing video-games. We proceed by presenting a qualitative study for identifying a theory for the gaming experience. We then present a model and a questionnaire, which is included in the Appendix, based on the theory. Then the theory is used in an example to differentiate among two different gaming experiences. Finally, we present concluding comments.

4.2 The Concept of User Experience

As we have discussed above, defining and understanding the concept of User Experience as only personal or subjective seem to be insufficient for providing a scientific approach. In this section, we present a definition of user experience that helps in bringing the concept of user experience towards an objective understanding. The discussion is grounded in different concepts about user experience, from the colloquial use to the different uses within Human Computer Interaction and philosophy.

4.2.1 Understanding Experience

In our everyday life, we usually do not need further explanation when talking about experiences. In the Merriam-Webster's Collegiate Dictionary (Experience 2009), experience is defined as something intrinsic to human life. Every activity that a human performs constitutes and produces an experience; it is both constituent and product. Experience is the result of the individual interacting with the environment (Dewey 1938). In Human Computer Interaction (HCI), the term designing for experience is about considering the user, the task and the context when designing a computer application (Buxton 2007). But as experience is part of the human everyday life, evaluating experience is not as clear-cut as designing for experience appears to be. Experience is defined as personal and subjective, so evaluating experience is about evaluating a subjective appreciation of the user.

Evaluating experience places the emphasis on going beyond usability by looking at the relation between the user and the task. Usability is how an application is implemented to let the user perform a task effectively and efficiently; the main focus is productivity, to let the user do the tasks with good quality at an optimal time. Secondary goals are user preference and satisfaction (Bevan 1995). It is the evaluation of this relationship between the user with task and context mediated by the application (Beaudouin-Lafon 2004). Preece et al. (2002) define experience as how the interaction *feels* to the users; an application taps into experience, when during the interaction process, factors such as fun, enjoyment, pleasure or aesthetics

have an influence on the user. That is, the evaluation of experience is associated with evaluating enjoyment, fun, pleasure, etc. (Kaye 2007). To evaluate experience, HCI usually focuses on the end result of the experience. The user has a relationship with the object within a specific context (Hassenzahl 2003). From this interaction, the user can isolate or share the experience with more individuals (Forlizzi and Battarbee 2004). Or the experience is just personal and transitory, formed by a series of threads that the users mix together in order to make sense of it (McCarthy and Wright 2004). All these approaches require a close understanding of a user to understand how that particular experience was effected. The explanation cannot be generalisable as it was dependent on an individual sense-making process. The current methods that exist look into the evaluating experience (Light 2006, Mahlke and Thüring 2007, Swallow et al. 2005), while they do offer insight to understand the experience, they do not generate objective knowledge out of it.

However, even if experience is personal, it is possible to share it and empathise with it among social groups. In the interaction process, the individual is not focusing on the application at hand, but on the task being done (Heidegger 1927). The actions performed by the individual using the application have resonance in the world (Winograd and Flores 1986), and even if this resonance is particular to the individual, the process of the interaction is common among many individuals.

4.2.2 Definition of User Experience

Experience is both the process and outcome of the interaction. And here we build on the theories discussed by Winograd and Flores (1986), Dourish (2001) and McCarthy and Wright (2004). During the interaction process, the different elements that form the experience are blended to form a personal outcome. To formalise the discussion, we propose the following definition for experience, based on Dewey's definition of experience (Dewey 1938):

Experience is both the process and outcome of the interaction of a user with the environment at a given time.

In the interaction process, the environment is formed by the goal to be achieved, the tool to be used and the domain in which the interaction is taking place. The domain and tasks are selected by the user, e.g. the user can decide to write a document, this becomes the goal; the domain could be to write the document for college-level class or to be published by a newspaper; the tool could be a personal computer or a PDA, or may even be a typewriter. In order for the user to focus on the task, we identify three properties that have to be present in the application: functional, usable and aesthetically pleasing. The functional quality is the ability of the tool to perform the desired task, e.g. a hammer can be used to nail something to the wall, and so can be a shoe, but not a tomato. Usable relates to how well the properties of the tool match those of the user, using concepts such as effectiveness, efficiency and affordance, e.g. both a hammer and a shoe can be used to nail something to the wall, but a hammer is more usable than a shoe. The final property aesthetics is, in lay

terms, how the tool looks, e.g. given enough options of identically usable hammers for the user to nail the object to the wall, the user would select the most appealing based on aesthetic value. These three properties allow evaluating the application. An application letting the user focuses on the task.

It is doing the task which would lead to a positive experience. By looking at the elements that form the process of this interaction between user and task, we are able to understand the common elements of the experiences among many users. Even though the experience at the end is personal, there are common elements in the process of the experience that allow us to compare and share them with other users with similar experiences. User experience is in a feedback loop, as past experiences affect future experiences (Dewey 1938). The resulting experience can create changes in the mood of the person. This could be optimal experiences such as happiness or Flow (Csikszentmihalyi 1990), or at least a sense of satisfaction. Not satisfaction in the classic usability sense of comfort towards using the tool, but as a holistic approach in which the user is able to integrate all the elements of experience while doing a task. The user should feel that all the elements of the experience acted in symphony during the interaction producing a positive experience. So, evaluating the experience can be done by evaluating the elements that are present in the process of the interaction.

4.3 The Experience of Playing Video-games

A video-game is a game played with the aid of the computer. The computer can take the role of a game companion, either foe or ally. Also, it can be used as a rule enforcer and to draw the story that covers them. The design of current video-games requires a big enterprise to pull together graphics experts, game designers and story tellers involved in a process of pre/post-productions (McCarthy et al. 2005). But even with all the complexities that are demanded for commercial video-games, they are still designed following the guidelines of the experts. Video-games, from the designer's point of view, are formed by a three-tier structure: I/O, program and game (Crawford 1984, Rollings and Adams 2003). The I/O structure defines the interaction between the user and the video-game. The program structure details how the game would be implemented at the code level. Game structure defines the objective and rules of the game. The program structure is not discussed in this chapter. The I/O structure is the interface of the program. Looking at the game as a computer interface does not offer any contradictions in terms of what it is expected to provide: an interface that lets the user perform a task efficiently, effectively and with a sense of satisfaction (Federoff 2002). Interfaces are just tools in order to do a task, so there was no reason to expect that this would differ from traditional interfaces.

To understand the relation between game and interface, the Mechanics, Dynamics and Aesthetics (MDA) model (Hunicke et al. 2004) tries to bridge what the designer is creating with what the player is expecting from the game. The mechanics describes the components of the game, such as representation and

algorithm. Dynamics describes the behaviour of the mechanics as responses of the player's inputs. And Aesthetics is about the desirable emotional responses evoked in the player. For the designer, the game is built from the mechanics on, whereas for the player, the game builds from the aesthetics on. The model explains this relationship in which dynamics is the bridge between aesthetics and mechanics, between player and designer. Considering only the player's perspective, the experience can be explained in terms of different immersions. Looking further at the relation between dynamics and aesthetics, the Sensory, Challenge-based and Imaginative (SCI) immersions for the game-play experience model (Ermi and Mäyrä 2005) integrates the different aspects of game-play that have an effect on the experience. This model is based on what are considered the three different "immersions", sensory, challenge based and imaginative, which occur, and interact, while playing video-games. The sensory immersion is about the player recognising how the implementation of the game. Challenge-based immersion is "when one is able to achieve a satisfying balance of challenges and abilities" (p. 8). Finally, the imaginative immersion is the area when the player "use[s] her imagination, empathise with the characters, or just enjoy the fantasy of the game" (p.8). The intersection between the three senses of immersion is what provides the player with a fully immersive game-play experience. The sensory immersion is the link of the interface with the game, while challenge-based and imaginative immersions are the link of the player with the game. Both the MDA and SCI models make a clear differentiation between the game and the player. The MDA model proposes that it is the interface where the player establishes contact with the game, while the SCI argues through challenge-based and imagination. Both models are in resonance by providing a separation of the "game" with the "play", the implementation from the interaction. These models, however, include an element in which the interface is not only a series of widgets, but a series of realistic graphics which the player manipulates. The imagery produced in the interface is the story that covers the rules of the game; these were called the "aesthetics" in the MDA model and "imagination" and "sensory in the SCI model. These models provide an understanding of the outcome of the experience. They explain how the different parts of the game are needed so the user can have a playing experience; however, they fail in providing an objective metric to understand the process that forms the overall experience.

4.3.1 Optimal and Sub-optimal Experience in Video-games

Playing games is supposed to produce a positive experience. They are usually associated with the term immersion (Brown and Cairns 2004). Besides immersion, other two terms try to describe these states: Flow (Csikszentmihalyi 1990) and Presence (Slater and Wilber 1997). Flow is a state that an individual achieves after completing a series of steps while engaged in a task. Immersion is the sense of being away from the real world, and Presence is the sense of being inside a virtual world. It has been suggested that Flow, the optimal experience, can be achieved by playing video-games (Sweetser and Wyeth 2005). The GameFlow model translates the stages

needed to reach Flow into a series of qualities that video-games offer. Flow was formulated as a model of the stages achieved by the individual, while GameFlow is being proposed as a series of characteristics that video-games posses. That is, this model only suggests that video-games might allow an individual to reach Flow. On the other hand, Immersion and Presence do not automatically mean that the player is having an enjoyable activity, but it is assumed that they are valued but sub-optimal experiences. It is the activity which determines the degree of the experience. Playing video-games can produce an optimal experience, such as Flow, or sub-optimal, such as Immersion; a well-implemented video-game might help the individual to reach a state of Presence.

4.3.2 The Need for a New Approach to Understand Experience in Video-games

The experience is both process and outcome. While playing video-games, the ideal experience is for the player to have fun. In order to build that fun, a series of elements have to be amalgamated together. The MDA and SCI models try to understand the outcome of the experience by looking at the different elements that could form the process, but these elements are not measurable. Outcomes such as Flow, Immersion or Presence, are only concerned with extreme experiences, ignoring the prosaic experience of playing. For example, playing for 5 min while using public transport is overlooked in favour of the extreme experience, such as playing a game for hours and hours until the real world fades away.

In some sense, these theoretical approaches are top down, applying large frameworks to the study of gaming experience. Our approach is, by contrast, bottom up, approaching empirically the question of how the gaming experience feels in order to operationalise such concept within HCI. In order to measure or design for experience, we should be able to look at those elements of the interaction process that are common among users.

4.4 Defining the Gaming Experience

We believe that by looking at the process of experience, it is possible to study objectively and eventually generalise about experience. We are looking at the elements of the process of the interaction that build the basic experience; those elements that without them the experience would be poor. The hygienic factors of the gaming experience (Herzberg 1968). We are deliberately leaving aside the social aspect of playing video-games. The social aspect of playing video-games has been documented (Lazzaro 2004), but this is a secondary aspect of playing, once the bond between the player and the game has been established. We are interested in looking as closely as possible at the process of playing video-games, not just from our own reckoning of what makes a good experience, but with the idea of grounding our

results in qualitative data. We call this one-to-one relationship between player and video-game, the gaming experience.

The section is divided as follows: First, we present an overview of the qualitative method that we used. Second, we present our analysis to formulate the grounded theory. Last, we present an overview of the theory.

4.4.1 A Grounded Theory Approach

The question driving this analysis is what are the necessary conditions to procure a positive gaming experience? The nature of the question suggests that the route to finding the answer should be bounded by qualitative methodologies (Green and Thorogood 2004). In particular, we used Grounded Theory (Strauss and Corbin 1998) to propose a theory for the gaming experience. The interest is to grasp a better understanding of the process of the experience that emerges from the data itself. The method to develop Grounded Theory is composed of a series of coding procedures. First, the data are *openly coded*, in which quotes or words are selected and labelled; this process produces a set of labels, or codes, which can be related to each other producing a set of meta-codes or *axial codes*. These axial codes are the axis on which the forming theory stands. This process is done iteratively until no new codes emerge from the data. The codes are then *selectively coded* where each category is fully developed in order to produce the theory. The data that formulate the theory are different quotations presented throughout the discussion.

The data used for this analysis are game reviews. Game reviews are aimed at telling the general player the reasons that certain games should be played. They do not tell the ending of the game, but just try to describe what it is like to be playing. Game reviews, in some sense, convey the experience of playing video-games. Four over-the-counter magazines from the month of August 2006 and three websites, all of them with a focus on video-games, were used as source data; see Table 4.1 for details of the sources. Besides game reviews, interviews and articles within the magazines were also used on a smaller scale.

The fact that the four magazines are from the same month and year should not hinder the results of the study. One reason is that Grounded Theory is robust enough to overcome the variances that are innate to commercial influences. The second reason is that the interest is in the common parts of the experience. The experience of playing the same video-game described by different magazines should still have the same common elements. Also, the use of websites adds some variance to the types of games reviewed, as well as the fact that two magazines specialised in console games and two in PC games. Since it has been suggested that using only magazines could bias the results of the study, five interviews were conducted once the Grounded Theory study was finished. One game designer, two game reviewers and two players took part in this process. The interviews were semi-structured, transcribed and then analysed. The interviews asked the participants to explain what they focus on while

Table 4.1 Sources of data for the qualitative study. The abbreviation within brackets is how that source is referred within the document. Magazines are quoted, providing the page number from where the quotation was taken; websites are quoted, providing the name of the game from where the quotation was taken, as it is more manageable than providing the complete URL

Source	Material
PC-Gamer. 64, August 2006 – {PCG}	24 Reviews and 2 articles
PlayStation 2 Official magazine, 75, August 2006 – {PSO}	11 Interviews and 1 editorial
Edge. 165 August 2006 – {Edge}	31 Reviews, 3 interviews and 7 articles
PC-Zone. 171, August 2006 – {PCZ}	20 Reviews and 3 articles
GameSpot – {GS}	3 Reviews and rating system
http://www.gamespot.com	
GameFaqS – {GF}	3 Reviews
http://www.gamefaqs.com	
ReviewsGameSpy – {GP}	3 Reviews and rating system
http://www.gamespy.com	
Designer 1 {d1}	Interview
Reviewer 1 {r1}	Interview
Reviewer 2 {r2}	Interview
Player 1 {p1}	Interview
Player 2 {p2}	Interview

playing/designing/reviewing a video-game, what makes a game enjoyable and what factors made them stay playing a game. As the interviews were semi-structured, the questions that followed aimed at deepening the answers that the participants gave to the previous questions.

The objective of this study is to find the core elements of the process of the experience. Core elements are those necessary but not sufficient to ensure a positive experience; they can also be understood as *hygienic factors* (Herzberg 1968). Herzberg argues that the opposite of satisfaction is not dissatisfaction, but no satisfaction; satisfaction and dissatisfaction are then two different concepts that are not necessarily related to each other. He argues that motivator factors are those that lead to satisfaction, and the lack of hygienic factors lead to dissatisfaction. With a similar concept in mind, this study looks for those elements that if missing they would mar the experience, but that their presence would not necessarily imply an optimal experience.

4.4.2 Defining the Core Elements

The Core Elements of the Gaming Experience (CEGE) incorporate the video-game itself and the interaction between it and the user, which we labelled “puppetry”; a full discussion of the selection of this label can be found elsewhere (Calvillo-Gómez and Cairns 2008).

4.4.2.1 About the Video-game

The video-game is intrinsic to the experience, without it there would not be a gaming experience. The forming theory does not try to describe what makes a good video-game, rather it focuses on how it is perceived in terms of the forming experience.

(PCZ, p.20): The premise, if you're not familiar with the multiplayer modes of *Pandora Tomorrow* and *Chaos Theory*, is one of spies versus mercenaries. Three spies must hack three security terminals, controlling from a standard *Splinter Cell* third-person viewpoint and using many of the main game's acrobatic tricks. Three mercs [sic] must prevent the spies from doing this, from a first-person viewpoint, using a gun and a flashlight. Sound familiar? Well it should, because it's based on the much-played ancient Egyptian sport of hide-and-seek, albeit on a far more deadly and technological level.

The preceding quote is the typical way in which a review refers to a video-game. The game being discussed, "Splinter Cell: Double Agent", is related to others with similar story lines or rules. The story of the game is about "spies versus mercenaries", the reader of the review could have a better perception of that story in case of familiarity with the two games mentioned. The rules of the game are bounded by the classic play of hide-and-seek, two teams are playing each with three members. Each team has a different goal in the game, and, presumably, the player can select the team of his choice. This excerpt of the review also describes the basic environment of the game, "security terminals", and a third-person view point (the character is fully visible), or first person (the player can only see what the player sees).

The video-game is perceived by two elements: **game-play** and **environment**. The former can be thought of as the soul of the game while the latter as the body. Game-play defines what the game is about, its rules and scenario. Environment is the way the game is presented to player, the physical implementation into graphics and sounds.

The rules are somehow implicit within a game. This can be due to the fact that the number of rules in a video-game is many to be listed:

(Interview, p. 2): I like games that challenge your intellect: strategy, politics, and so on.

Those types of comment refer to the rules, to the "do's and don'ts" that the player can do in the game. The story is the dressing of the rules, taking the abstraction of the rules into characters and scenarios. Sometimes, the story of the game can be inferred with the title of the game:

(Edge, p. 46): Miami Vice opens with an option screen that says as much about gaming's potential as you wish fulfilment in four words as you could in 40,000.

The story is also presented.

(Edge, p. 42): B-Boy. A dance-combat game that's not so much turn-based as headstand, toprock [sic] and spin based.

Those rules and scenarios are considered within the game-play of the video-game. The video-game is also experienced in terms of the environment it creates. This is done by providing the game with graphics and sound. In the printed data,

they use pictures as aids to describe the graphics, with usually one or two lines to help in the description:

(Edge, p. 89): There is a huge amount of destructible scenery [...] rocks, however, seem to be made of polystyrene.

But not only are the graphics responsible for creating the environment, there are also sounds:

(PCZ, p. 12): Sound is hugely important for creating atmosphere and character in games – can you imagine being as tense in *Counter Strike* without hearing ‘the bomb has been planted’?

Both sound and graphics make the environment of the game. The environment describes then what the game looks and sounds like:

(GameSpy, “Flatout2”): Car impacts are loud and violent, and never fail to be utterly satisfying.

Once the video-game has been defined in terms of the game-play and the environment, it is the turn of the player to take those elements to his disposal.

4.4.2.2 About Puppetry

The interaction of the player with the video-game is the puppetry. Puppetry describes how the player starts approaching the video-game until eventually the game being played is the outcome of the actions of the player. This process of interaction is affected by three conditions: **control**, **ownership** and **facilitators**. Control is formed by the actions and events that the game has available to the player. Once the player takes control of the game, by using the game’s resources the player makes the game respond to his actions, he makes the game his own. Ownership is when the player takes responsibility for the actions of the game, he feels them as his because they are the result of his conscious actions and the game has acknowledged this by rewarding him. Also, there are external factors that have an impact on the interaction process. These external factors relate to the player’s subjectivities, such as previous experiences with similar games or aesthetic value. Even if the player fails to rapidly grasp control, these factors can facilitate the ownership of the game by the player.

Control is the player learning to manipulate the game. It is about the player learning how the objects in the game move, understanding the goals of the game and keeping the player occupied. It is also learning about the controllers, getting used to the objects and angles in which the objects are displayed, and the ability of the player to memorise the relationship between controllers and the actions of the game. The first two elements of control, controllers and small actions, relate the basic actions that the characters in the game can do and the manipulation of the controller to make them do something. Without losing generality and to facilitate the discussion, the manipulable objects of the game would be called characters. The process of gaining control is formed by six members: goal, small actions, controllers, memory, something to do (S2D) and point of view (POV). Goal is the objective, the player has to understand what is the overall objective of the game, even if still not clear on the

details. Small actions are the basic actions that the player can do on the characters, such as moving to the left or right. Controllers are the way through which the player can exercise the small actions, for example pressing a button makes the object move to the left. Memory is the ability of the player to recall the connection between small actions and controllers. S2D refers to the concept that the player must be kept busy, or doing something. Last, POV is the way that the player sees the environment of the game.

The *controllers* are the basic tools that the player needs to take control of the game. This is how the player starts to manipulate the different characters or objects on the screen.

(PCZ, p. 53): Wave your mouse means wave your sword.

Controllers only refer to the player's manipulation of the physical tool, the set of actions that the character can perform is the *Small Actions*. These are the other side of the controllers. Small actions are the basic blocks that allow the player to get the character to do something on the screen. Pressing button "x" is part of the controller, the fact that the character jumps is a small action. Consider the following quote:

(PSO, p. 32): By targeting civilian and pressing L2 to shout at them.

From this quote, the player has to relate the act of pressing with the act of shouting that the character can do. In order to make the character shout, then, the player has to press L2.

Memory is the element of control that gives the player the repertoire of actions to get into the game and that can be recalled at a given moment. After learning about the controller and the small actions, the player has to memorise the bindings between controllers and small actions.

(PCZ, p. 47): 250 skills for you to master.

(Interview, r2): [...] you may find very hard to explain why you need to press that button to reload [...].

Point-of-view is how the information is displayed to the player. The player is able to see what is going on in the game from different angles, depending on the game. The reviews do tell the player what to expect from the point of view, and it is also used as a way to classify games:

(PCZ, p. 52): First person makes a combat that actually works.

Point-of-view is not Environment, POV is how the environment affects the control of the game.

The *goal* is the overall objective of the game. That is, the player learning what is to do. It is the player grasping the game-play of the game:

(PCG, p. 45): Village pillaging is hard work, get your posse of goblin minions to do it for you.

The goal is the top-level objective of the game, as in the preceding quote, there are no details of what the player is exactly to do, but the player understands that the overall objective is to do village pillaging while directing an army of goblins.

The player must be clear in what is the overall objective of the game in order to get control of the game.

The final element is *something to do*, that is, to keep the player busy doing something:

(Interview, r2): Say an interesting example is going to be [...] it is a driving game set in Hawaii, huge free space for you to drive around, but it is just roads like roads on an island, they are not race track roads they are not fake need for space courses they are just roads. And quite a lot of people who kind of sat with thought this just really boring just drive 40 miles and nothing happens and no one chases me and I don't have a gun and you know what is the point and it took all of us I think a while to adjust to this new experience is different kind of driven challenge, it is a different kind of experience the fun is in a different place where you are just used to looking for the game does do at all wrong it is just a genuinely new idea and it takes a while for your brain to adjust.

In the above quote, the player can identify the goal; however, the experience failed to become positive because the player got the sense that there were large spaces without things to do.

Once the player starts to grasp control of the game, the player gears the game with his own intentions in order to make it his. The process of ownership is about using the elements that give the player control in his favour to enjoy the game. The elements that influence ownership are big actions, personal goals, rewards and you-but-not-you. Big actions are those actions that the player implements as strategies, by using a collection of small actions, in order to complete the goal of the game. The player can also draw his personal goals and use big actions to complete them. This process of the player achieving the game and personal goals through his actions is the basis of the process of ownership. The game acknowledges the ownership of the player by providing rewards. Last, you-but-not-you refers to the idea that the player is engaging in activities that are alien to his everyday actions, which allows the player to create his personal goals.

(Interview, d1): But also use tend to set their own challenges in their head, not to how much you script the challenge, or, they are actually really playing their own, you can tell them what to do, but they'll play it by themselves, they made their own mini-challenges subconsciously, they don't even know they are doing it half the time, but if you are playing a game [...], you may be on a mission to do something, but in their back of their heads they are oh, last time I did this bit, I did not this street, how did I get to here? Where am I going? some people are mapping the game in their backs of their heads, other people are searching for radio stations, others are concentrating in shooting civilians, everyone plays the game in their own little way, I think is were game-play comes from, as their own challenge. a lot of multiplayer games tend to take on because want that level of challenge that someone else brings, you have 30 people playing the same game at the same time but not one of them is playing quite the same game, they are all playing from their own viewpoint, from their own idea, and that is comes from.

This quote summarises the concept of ownership quite well. The player gets hold of all the elements of the experience and starts doing his own game. To gain ownership, the player starts implementing *big actions*. Big actions are the set of smaller actions that the player uses in order to achieve the goal of the game.

(PCZ, p. 53): Knock out a strut from a nearby shelf and barrels can tumble your foes.

Besides the objectives that the game imposes, the player also has *personal goals* while playing.

(Interview, p1): On more recent games, sort of on the online games, I actually enjoy helping people, but to be able to help other people you usually have to achieve more than they have. So it is kind of self-fulfilling, the more you achieve the more you can help more people.

The personal goals can also appear while the player is engaging with the game and decides to do something that has no influence on the outcome of the game, but rather just a personal goal:

(PCZ, p. 53): Giving you the option to ally yourself with the good or the ill without actually changing the trajectory of the story-arc.

Or it could also be to use the environment, game-play and controls that the game provides to create your own game:

(Interview, r1): I'll take this as an example, is a game where you are a boy who lives just to wonder around the world which is instead of cars they have this little bumpy trucks they call walking mock machines and part of the game you can indulge in is to get your own mock, customize it, play around with it but also around town is this beautiful cartoonish kind of town, you can join a band you can start playing the harmonica in a street corner and people wouldn't listen until you get better, you can hang out with other people and you will group people to get a band and it is completely pointless and is just another way for you just to enjoy the game, you can play through the entire story with your big robot or you can become many other things as well but you can stay in the corner playing the harmonica people gather around clapping and you play a bump note and it just doesn't matter that it looks a bit rough and it sounds a bit cheap.

The game acknowledges the ownership of the player by providing *Rewards*.

(Interview, d1): [Question: What do you think is the thing that keeps a player for the same game?] It is bit a dough and bullet, it has to be continuously rewarding, but I am not sure, continuously challenging, there is something always that you want to do, even though, there is always rewards given to you, as completing little micro bits, and also larger sections, so there is always a feeling of you moving forward, so you always feels the potential, you can feel this you know, there are more cool things around the corner or something you haven't seen before or just in the next screen, it comes down to I want to find out what is next, I want to find out if I press that button I am so engross that I can't stop now I have to keep going now, until I find a nice place to stop, is not you pushing the user to do more, is the user pushing themselves to do more, to discover what is around the corner, take the next turn, is that little intangibility of the more turn, or next door, or five more minutes.

These rewards can be achieved via sub-goals or by finishing missions:

(Interview, p1): You fight a big boss at the end of may be 5 or 6, or several sub bosses and then a final big boss at the end with many characters over the final area, and then you share the loot and you go off and do something else.

Or a continuum of challenges to the player.

(Edge, p. 83): We were fed up with games that if someone starts to win, it becomes easier for them to win outright.

Or could also be those actions that have no direct impact on the game development, but amuse the player:

(**PSO, p. 36**): Also funny is princess Leia's mêlée attack – a cheek-stinging slap.

(**PCG, p. 45**): It's clearly wrong to run into an inn and cut [sic] decapitate the cook, but your heart melts when one of them puts the chef's hat on.

While the player is taking big actions and personal goals, the player engages in actions that would not necessarily do in real life, it is a *You-but-not-You* effect:

(**PCZ, p. 51**): Before you offer them a quick painful smiting.

Most games would set the player in activities foreign to his everyday life:

(**Interview, p. 2**): [Question: Why do you play video-games?] To have fun, to be someone else.

Until this, activities can be seen as something that the player has done himself:

(**PSO, p. 3**): Movies and books use real life war as rich source material, so why shouldn't games? (Although you don't get to pull the trigger yourself in a movie).

Not only is the player able to do things otherwise illegal or alien to his own reality, but the player is also making the character grow under his control.

(**PCZ, p. 49**): Who you meet, how you treat them and how you solve their problems determines what recruits you can gather.

This suggests players would take responsibility for their actions as if they themselves are to blame, and not the result of lack of control.

(**Interview, p. 2**): I don't like games where you get stuck because you can't do the button combination in the precise second to jump over the pitfall.

Ownership lets the player see the game as part of his daily life activities:

(**PCZ, p.10**): Well let's see. I can leave my house and wander around the streets of east London to witness filthy roads [...] or I can ride around Cyrodiil's beautiful forests on my horse, while slashing any potential thieves.

The last element of the theory to be discussed is the facilitators. Facilitators are the most subjective elements of the CEGE. It has been discussed so far that in order to have a positive experience the player should achieve ownership, and to do so the player must first get control of the game. However, it is possible for the player to achieve a level of ownership, then a positive experience, even if the player fails to get control. Also, the player may fail to achieve ownership even if getting control. This is done by the use of facilitators. These facilitators are time, aesthetic values and previous experiences. The amount of time that the player is willing to play, the previous experiences with similar games or other games, and the aesthetic values of the game.

The *aesthetic values* of the game are important in facilitating ownership. If the game looks attractive to the player, then he may be willing to try longer:

(**PSO, p. 3**): How the increased graphical fidelity changes the way you feel about your action?

These values also influence the player, if the music is attractive:

(**Edge, p. 82**): Locoroco is a nursery rhyme you can play.

Or it may be because they see something about the game that is just amusing to observe.

(PCZ, p. 59): There are also Indian naked female archers that'll have your men furiously polishing their spears.

The *previous experiences* of the player motivate the player to play longer and to assume the consequences, or benefits, of his actions while playing:

(PCZ, p. 2): I don't know about everyone else out there, but I'm really pining for a *Max Payne*. Fans are still churning out mods for the stylish fall of our hero. I'd love nothing more than to see a beautiful new incarnation to empty my clips at. Payne didn't look like he was going anywhere fun after the last game. Well, I say whatever it takes, we want him back. For all I care he can wake up from a cheesy *Dallas*-like dream and start all over again.

Previous experiences may not only be about similar video-games, but just relate to a similar goal:

(PCG, p. 86): I've never lost the heady sense of excitement when I first read about Alexander, and I've been waiting for a game to bring his story to life ever since. Rome: Total war let me live out my fantasies of conquest.

The *time* facilitator is about the time the user is willing to dedicate to play. The time can be intrinsic to the type of game:

(PCG, p. 87): 30 cities in 100 turns is an alarming tight schedule, and it radically changes the way you play. You can't sit back, develop your economy, and gradually build up your mega-army: there isn't time.

Or just to the experience in that moment:

(Interview, d1): [It] is that little intangibility of the more turn, or next door, or five more minutes.

The lack of those extra 5 min could make the player not want to play again, as there is an acknowledgement that without it the game would not be enjoyed fully.

4.4.3 About the Theory

Both elements, video-game and puppetry, are part of the process of the experience. The theory states that if elements are missing, then the experience would be negative. But if they are present, then the experience could be positive. Users first identify the game and then their relationship with it. Ownership is eventually the link that leads to enjoyment. Ownership is achieved when the player has control over the game; if the control is low, then the facilitators have to be high to allow the player to have a sense of ownership. The game is then used by the player to create his own story. The way the player starts making the game his own is by first applying his own actions towards playing the game. Those actions can be used to win the game, or accomplish the player's own goals. As the game progresses, the player starts to receive different types of rewards, which can be helpful towards winning the game, or just something that the player enjoys doing. It is also an opportunity so that the player can do something alien to his reality. The facilitators that influence puppetry

Table 4.2 The core elements of the gaming experience: The two guiding elements are Puppetry and Video-game, followed by Control, Ownership and Facilitators

Puppetry			Video-game	
Control	Ownership	Facilitators	Game-play	Environment
Small actions	Big actions	Time	Rules	Graphics
Controllers	Personal goals	Aesthetic value	Scenario	Sound
Memory	You-but-not-you	Previous experiences	–	–
Point-of-view	Rewards	–	–	–
Goal	–	–	–	–
Something-to-do	–	–	–	–

are part of the subjective relationship of the player with the game: a previous experience with a similar game, the amount of time willing to play or the aesthetic value that the player can perceive from the game. See Table 4.2 for a listing of all the core elements of the gaming experience in their corresponding categories.

4.5 Operationalising the Theory

Once we have formulated the theory, we proceed to operationalise it. We do this in two ways: First, we create a model for the theory and then a questionnaire. The model provides an abstraction of the theory, which shows the relationship among the different elements of the theory. It identifies the elements in two categories, those that can be directly measured versus those that are theoretical constructs. The former are known as observable variables and the latter as latent variables. The questionnaire is created using the observable variables, which allow us to understand the changes for the latent variables.

4.5.1 The CEGE Model

The theory can be summarised in the following three points:

1. A positive experience (enjoyment) while playing games is achieved by the player’s perception of the video-game and the interaction with it. These are the Core Elements of the Gaming Experience: Video-game and Puppetry.
2. Puppetry, the player’s interaction with the game is formed by the player’s sense of control and ownership. Control produces ownership, which in turn produces enjoyment. Ownership is also produced by Facilitators to compensate the sense of control.
3. The player’s perception of the video-game is formed by the environment and the game-play, which also produces enjoyment.

All the elements just mentioned are latent variables. In order to observe the change in the Facilitators, for example, we have to be able to observe the forming

elements, namely, Aesthetic Value, Time and Previous Experiences (Table 4.2). Facilitators are a latent variable, while Aesthetic Value, Time and Previous Experiences are observable variables. These relationships among variables can be modelled graphically in the following way: Latent variables are represented as circles and observable as squares. We draw an arrow from a causing variable to a receiving variable. In Fig. 4.1, we present the relationships among the different latent variables based on above statements.

All the latent variables depend on the observable variables. However, the observable variable is a consequence of the latent one. That is, the observable variable exists because it belongs to the construct specified by the latent variable (Nunnally and Bernstein 1994). See Fig. 4.2 for a graphical representation between latent and observable variables.

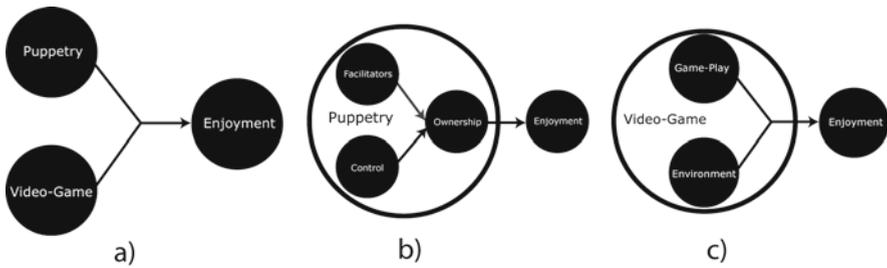


Fig. 4.1 The CEGE model: The figure depicts all the relationships among the latent variables. (a) Inside CEGE, Video-game and Puppetry produce Enjoyment. (b) Inside Puppetry, Control and Facilitators produce Ownership, which produces Enjoyment. (c) Inside Video-game, Game-play and Environment produce Enjoyment

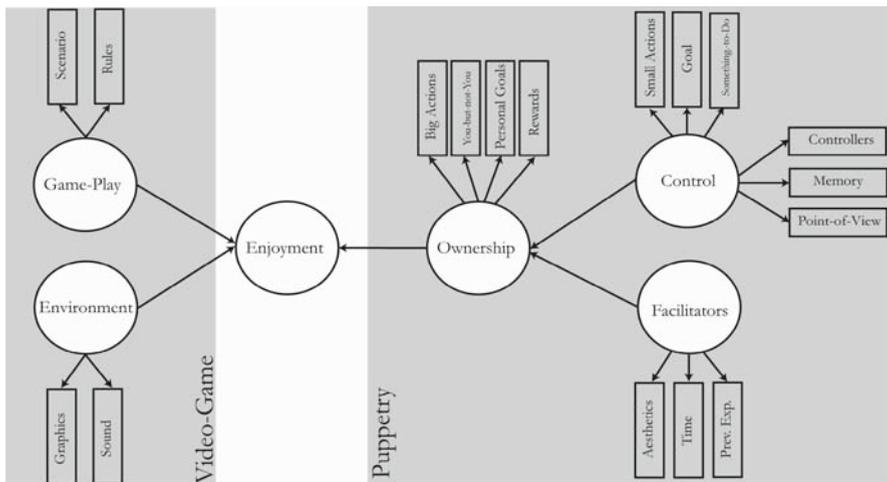


Fig. 4.2 The CEGE model: The figure depicts the relationships among observable (*squares*) and latent (*circles*) variables

4.5.2 A Questionnaire for the Gaming Experience

The CEQE Questionnaire (CEGEQ) was developed to measure the observable variables in order to understand the behaviour of the latent constructs. The questionnaire was developed using an iterative process following the usual psychometric guidance (Loewenthal 2001, Nunnally and Bernstein 1994). The questionnaire is presented in the Appendix.

Observable variables are considered as items in the questionnaire context and latent variables as scales. The questionnaire is created with 38 items and 10 scales. The scales are Enjoyment, Frustration, CEQE, Puppetry, Video-game, Control, Facilitators, Ownership, Game-play and Environment. The first two scales were included as a reference to see the relationships between CEQE and Enjoyment and Frustration. If the CEQE are present, then Frustration should be low and uncorrelated. The remaining scales are the latent variables produced from the theory. See Table 4.3 for a relationship between items and scales. Due to the hierarchical formulation of the theory, items may belong to more than one category. An item can belong to the Puppetry and Control scales, for example.

Table 4.3 The items in the questionnaire belong to different scales

Items	Scale 1	Scale 2
1, 4, 5	Enjoyment	–
2, 3	Frustration	–
6–38	CEQE	–
6–12, 38	Puppetry	Control
13–18	Puppetry	Facilitators
19–24	Puppetry	Ownership
25	Puppetry	Control/ownership
26–31	Video-game	Environment
32–37	Video-game	Game-play

4.6 An Example of Using the Questionnaire

In this section, we present an example of how to use the CEQE theory to differentiate among different experiences. The experiment explores the differences when two different input devices are used to play Tetris. The results of the experiment are discussed using the CEQE theory to differentiate among the different experiences.

4.6.1 Method

4.6.1.1 Design

The experiment used a within-subjects design. The independent variable was the type of controller used. Two types of controllers were used and the order in which

the controllers were used was balanced. The dependent variable was the gaming experience, which was assessed using the CEGEQ.

4.6.1.2 Participants

Fifteen participants took part in the experiment. There were seven women and eight men. The age group of the participants was divided as follows: four were between 18 and 20; two between 21 and 25; two between 26 and 30; two between 31 and 35; two between 36 and 40; one between 41 and 45; and one above 51. Participants were recruited with emails to students within UCL and neighbouring colleges.

4.6.1.3 Apparatus and Materials

Tetris was installed in a PC using a shareware Java-implemented version. This version of Tetris does not have sound. The input devices used were the standard QWERTY keyboard and a knob-like device. Both devices can be used to play Tetris, the mappings of the devices are presented in Table 4.4.

The CEGEQ (see Appendix) has 38 items with a 7-point Likert scale. It was modified by removing the 4 items that query about sound, leaving a total of 34 items. The questionnaire provides seven different scores: Enjoyment, Frustration, CEGE, Puppetry, Video-game, Control, Facilitators, Ownership, Environment and Game-play. A general survey asking about the participants' data, such as age and gender, was also used.

4.6.1.4 Procedure

Participants carried out the experiment individually. They started the experiment with a briefing of the experiment, verbally and written, after which they were asked to sign a consent form and complete the general survey form. Participants were asked to try to forget they were in a lab and think they were in the place where they usually engaged with video-games.

The order in which the participants used the input device was randomised. Each participant was given an explanation of how to play the game with each device. Participants would play for approximately 15 min for each condition and then they would complete the questionnaire and perform the second condition.

Table 4.4 Mappings of both input devices in order to play Tetris

Tetris	Keyboard	Knob
Drop	Down arrow	Push
Move left	Left arrow	Rotate counterclockwise
Move right	Right arrow	Rotate clockwise
Rotate counterclockwise	Up arrow	Push-rotate counterclockwise
Rotate clockwise	Shift-up	Push-rotate clockwise

4.6.2 Results

A related samples t test was used to compare the mean of the Enjoyment score for the Keyboard condition ($M = 0.739$, $SD = 0.176$) with the Knob condition ($M = 0.568$, $SD = 0.169$), as the keyboard provided a better experience. The alpha level was 0.01 two tailed. The test was found to be statistically significant, $t(14) = 3.24$, $p = 0.006$. Since there was significance in the results, we proceeded to look further into the CEGE scores. Comparing with a related samples t test, the mean score for the Keyboard condition ($M = 0.644$, $SD = 0.051$) with the Knob condition ($M = 0.610$, $SD = 0.044$) using the same alpha level as before. The test was found to be statistically significant, $t(14) = 3.08$, $p = 0.008$.

Hence, we proceeded to look into the two major categories of CEGE: Video-game and Puppetry. The t test comparing the means of Video-game (Keyboard condition: $M = 0.485$, $SD = 0.056$; Knob condition: $M = 0.484$, $SD = 0.052$) resulted in a non-significant result, $t(14) = 0.20$, $p = 0.840$. While the t test of the means of the Puppetry score (Keyboard condition: $M = 0.735$, $SD = 0.071$; Knob condition: $M = 0.682$, $SD = 0.063$) was found to be statistically significant, $t(14) = 2.97$, $p = 0.01$.

Pursuing further the variables that constitute Puppetry, it was found that comparing the Control scores of the Keyboard condition ($M = 0.817$, $SD = 0.118$) with the Knob condition ($M = 0.728$, $SD = 0.093$) was significant, $t(14) = 3.28$, $p = 0.005$. The other two variables, facilitators (Keyboard: $M = 0.657$, $SD = 0.118$; Knob: $M = 0.628$, $SD = 0.117$) and ownership (Keyboard: $M = 0.690$, $SD = 0.078$; Knob: $M = 0.666$, $SD = 0.081$) were not significant with the following t test respectively: $t(14) = 1.545$ and $t(14) = 1.221$.

Finally, the score of Frustration (Keyboard: $M = 0.476$, $SD = 0.180$; Knob: $M = 0.685$, $SD = 0.196$), was also found to be statically significant higher for the knob condition, $t(14) = -3.55$, $p = 0.003$.

4.6.3 Discussion

Using the CEGE questionnaire, it is possible to identify what produces the difference in both experiences. The CEGE theory provides a hierarchical approach to understand the gaming experience. This approach allows identifying that there is a significant difference in the level of enjoyment with each device. Methodically, it is identified that this difference is due to the sense of CEGE, the puppetry, specifically to the level of control that the participants had over the game. Participants experienced the video-game in similar way with both devices. This was to be expected as the graphics, rules and scenario of the game did not change. The low score for video-game could be explained by the fact that it had no sound, and the graphics were quite simple. Regarding puppetry, the main difference is in the sense of control. The sense of ownership and facilitators did not change between both games. That meant that players were still able to overcome the lack of control in order to concentrate on the game.

The difference in control did have a final impact on the level of enjoyment. Answering the original question, the difference between both input devices is that the keyboard gives the player better control of the experience. Even though both devices let users perceive the game equally while making it their own, it was the lack of control with the knob made the difference in the gaming experience. Furthermore, there was such a lack of control with the knob that it actually marred the experience. That is, one of the CEGE was missing thus providing a negative experience.

With this example, we have shown how to use the CEGE theory to objectively study different gaming experiences. The theory provided an explanation of the outcome of the experience.

4.7 Summary

In this chapter, we have presented a novel approach to User Experience. We have argued that by looking at the experience as a twofold phenomenon, process and outcome, and by studying the elements of the process it is possible to formulate an objective theory regarding experience. We acknowledged that experience is indeed a personal endeavour, but there are also common elements in the experience that allow it to be shareable among different users.

We presented the Core Elements of the Gaming Experience (CEGE) theory to understand the experience of playing video-games. The theory describes those elements that are necessary, but not sufficient, to provide a positive experience while playing video-games. The formulation of the theory using a grounded theory approach is presented. The theory can be summarised as follows: If the CEGE are present, then there is no guarantee that the experience would be positive, but it will not be negative; if they are missing, then the experience would be negative. A model that abstracts the relationship between the CEGE and a questionnaire to assess them was also presented.

An example of using the theory to study two different experiences was also presented. Following a hierarchical approach to find the element of the process that affected the outcome of the experience, we showed how to compare two different experiences. The results showed that in one case the lack of control produced a negative experience, while in the other example it produced a positive experience. The theory allowed to formulate and test an objective hypothesis regarding the user experience of playing video-games.

The CEGE theory can be used to evaluate different experience. Future work can look at the theory to evaluate single instances of experience, instead of comparing two similar experiences. The CEGE theory can be used to assess experience in an objective way, it is not about assessing the game or the user, but the interaction of both of them. Further work can look at the elements that might be sufficient to obtain a positive experience, or that complement the CEGE.

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Appendix

Core Elements of the Gaming Experience Questionnaire (CEGEQ)

Overview: This questionnaire is used to assess the core elements of the gaming experience. Each item is rated with a 7-point Likert scale. The questionnaire is to be administered after the participant has finished playing with the game.

Scales: There are eight scales in the questionnaire: CEGE, Video-game, Puppetry, Game-play, Environment, Control, Ownership and Facilitators.

Reliability: The Cronbach alpha for the whole questionnaire is 0.794 and for the CEGE scale is 0.803.

Instructions: Please read the following statements and answer by marking one of the numbers that best describes your experience.

1. I enjoyed playing the game
2. I was frustrated at the end of the game
3. I was frustrated whilst playing the game
4. I liked the game
5. I would play this game again
6. I was in control of the game
7. The controllers responded as I expected
8. I remember the actions the controllers performed
9. I was able to see on the screen everything I needed during the game
10. *The point of view of the game that I had spoiled my gaming
11. I knew what I was supposed to do to win the game
12. *There was time when I was doing nothing in the game
13. I liked the way the game looked
14. The graphics of the game were plain
15. *I do not like this type of game
16. I like to spend a lot of time playing this game
17. I got bored playing this time
18. *I usually do not choose this type of game
19. *I did not have a strategy to win the game
20. The game kept constantly motivating me to keep playing
21. I felt what was happening in the game was my own doing
22. I challenged myself even if the game did not require it
23. I played with my own rules
24. *I felt guilty for the actions in the game
25. I knew how to manipulate the game to move forward
26. The graphics were appropriate for the type of game
27. The sound effects of the game were appropriate
28. *I did not like the music of the game
29. The graphics of the game were related to the scenario
30. The graphics and sound effects of the game were related
31. The sound of the game affected the way I was playing

32. *The game was unfair
33. I understood the rules of the game
34. The game was challenging
35. The game was difficult
36. The scenario of the game was interesting
37. *I did not like the scenario of the game
38. I knew all the actions that could be performed in the game

*Denotes items that are negatively worded.

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