

The relationship between difficulty and hedonic satisfaction of video games

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Abstract: One of most important reasons of playing video games is to acquire hedonic satisfaction. A structured and measurable model to help us understand and evaluate user's hedonic satisfaction while playing video games is needed. The research chose two games as experiment objects based on their popularity and difficulty. A series of contextual inquiries was carried out as the core method to understand game experience. Subjects were asked to play two games. All the behaviors and facial expressions were recorded by video cameras. Subjects' actions were documented along with the video. After playing the game, there was a debriefing session where they were asked to evaluate their experience over four major hedonic factors: comfort, excitement, immersion and achievement. The result shows certain patterns of hedonic satisfaction acquired from video games follow a certain model. The successful control of each hedonic factor is crucial to video game design.

Key words: *Video games, hedonic, game difficulty, contextual inquiry.*

1. Introduction

Theories and researches on video games have undergone a dramatic increase in recent years. One of the topics in this field is hedonic experiences during playing. To acquire hedonic satisfaction is one of most important reasons of playing video games (Chanel, 2008), which means that hedonic factors are crucial to video games.

Usability and Playability

Usability is one of the most basic and fundamental guideline for designing interactive products. Researches on usability and user experience in games presented many heuristics (Nielsen, 1994) for designing and evaluating games. Models to integrate those heuristics are also being developed to explain and analyze media enjoyment. (Jorgensen, 2004; Sweetser, 2005; Pinelle, 2008)

However, researchers always feel "not enough" to use the usability only to evaluate the experience video games can present. Some tried to define the frame of usability evaluation according to the genre. They believed in spite of the variety seen in games, most games from the same genre still have many similarities. (Pinelle, 2008)

People cannot be satisfied by only adopting usability into game studies. (Pagulayan, 2004) The idea of playability was under fast development in recent years. The usability affects overall experience in short terms now and then in the game play while the playability have a constant, pervasive influence on the quality of gaming experience. (Febretti, 2009) To evaluate playability is still an issue to consider. Using Heuristic Method is still the main stream of current study. (Desurvire, 2004; Korhonen, 2006)

Overall, current research on evaluating video games is mostly focused on heuristic methods, which are effective for ordinary usability testing. To understand hedonic experience is difficult as it is subjective and hard to describe. The exploration of new methods is required.

Hedonic experience

Hedonic experience is not as an explicit information processing event but from a contextual-related experiential view. It includes various playful activities, sensory pleasures, daydreams, aesthetic enjoyment, and emotional responses. (Lacher 1994) The feeling of hedonic occurs in a reasonable way. The reason why rational and stable feelings are made during playing games and how to explain it is the focused topic in this study.

This study is to find the how hedonic experience affects players' emotion during playing video games and why some games give players a higher hedonic experience and some lower. Defining the questions above will give a better solution on how to build hedonic experience for games. It is very important for designing video games. In the study, several aspects related to hedonic experience are mentioned, such as players' skill level and its upgrade, different action game genres and its different hedonic experience, achievement, immersion and etc.

Game's Difficulty

Based on Flow Theory, players will be bored when the difficulty of game is low, anxious when the difficulty is high (Csikszentmihályi, 1975, 1998). In other words, games are boring when they are too easy, frustrating when they are too difficult. The balance is required to reach the best game play experience. Traditional games treat users as equal and give the fixed game difficulty as called game-centered design. Dynamic difficulty was discussed and give approaches by researchers. Though behavior observation (Hunicke, 2005) and control feedback in the game (Yun, 2009), new difficulty models are given.

Some other researchers suggest different difficulty models can give different experience, rising different emotional states. A model explaining the relationship between engagement, competence of the player and the difficulty of the game was given. (Chanel, 208)

2. Research aims and questions

The aim of this study is to develop a structured and measurable model to help us understand and evaluate user's hedonic satisfaction while playing video games. Based on literature review of hedonic satisfaction in games, three major research hypotheses were set up: (1) types of hedonic satisfaction can be aroused by different

reasons (2) Different types of hedonic satisfaction have are aroused in different time. (3) Hedonic satisfaction is strongly related to game's level of difficulty and player's skill.

3. Experiment

A series of contextual inquiries with 3 qualified game players was carried out as the core method to understand game experience. Subjects were asked to play two games in certain situations (i.e. artificial walkthrough). All the behaviors and facial expressions were recorded by video cameras. Subjects' actions were documented along with the video. After playing the game, there was a debriefing session where they were asked to evaluate their experience over four major hedonic factors: comfort, excitement, immersion and achievement.

3.1 Participants

Three participants were selected as the subject of contextual inquiry experiment according to the criteria as: (1) hardcore game player (2) know the game and have experience in playing it before.

According to the definition of in Wikipedia, hardcore gamer is a widely used term applied to describe a type of video game player. They prefer to take significant time and practice on games. In contrast to a casual gamer, who can spend hundreds of hours on games blindly even without ever mastering them, hardcore gamers enjoys certain kinds of game, skilled in them. Unlike casual gamers playing different games blindly (if they do) and get hedonic experience randomly; they know how to pursuit their own hedonic experience during playing the games they like. The hedonic experience hardcore gamers after is always a rational and stable feeling. The reason why rational and stable feelings are made during playing games and how to explain it is the focused topic in this study.

3.2 Experimental instrument

A Sony PSP 2000 was used to conduct the experiment. The selection of games is crucial. The target games should be successful, relatively typical and also present the main stream preference. Two games were chosen as experiment objects based on their popularity and difficulty: (1) *Monster Hunter Portable 2G* (Capcom, 2007) and (2) *Warriors Orochi 2* (Koei, 2006).

The different experience between these two games lies in their different difficulties. The former one *Monster Hunter Portable 2G* is to try one's best to kill a giant monster, it is hard and challenging. After it is beaten, the sense of achievement is enormous. The latter one is also to kill, to beat enemy, but it is more like being an ancient war field to have a dogfight with enemy state. Sensory stimulation and relief from mental pressure is what a player is after during playing. The images are as follows, left one is *Monster Hunter Portable 2G*, and the right one is *Warriors Orochi 2*. The study will focus on the interactive part of games, which means control, feedback, challenge and etc.

Figure 1. Object games



Figure 1 Object games

The PSP was connected to a computer to capture the video of game play for further analysis. A video camera was set to capture the instant facial expression and behavior during the game play of the participants.

4. Methodology

After asking and answering some simple warm-up questions, the participants will be asked to play the previously provided games as they usually do. Each play will last for one stage in the game, and will usually take around one hour. In this way, they can have relatively holistic hedonic experience. After each play the evaluation form will be presented to the participants for them to have a debriefing session. Forms were made by the researchers during the game play, recording the main events happen. According to the events and video records, they can recall their emotion at those certain moments. They were asked to evaluate their experience over four major hedonic factors: comfort, excitement, immersion and achievement in the 5 point likert scale. The form is attached as a table below. As the consistency of emotional flow should not be interrupted, to analyze the subjective issue as hedonic is difficult. However self debriefing along with video and textual record can help to reconstruct the past emotion.

Table 1, Recorded form, *Monster Hunter Portable 2G*, participant 1

Time	Event	Comfort	Excitement	Immersion	Achievement
0:16	Preparation is ready	3	1	0	2
1:34	Found the boss	1	3	1	0
2:33	Heavily injured	2	1	4	0
2:41	Healed	4	1	3	0
3:10	Continuously injured	1	1	4	0
3:21	Died while trying to heal	0	1	3	0
3:30	Revived in camp	3	1	0	0
	...				
21:24	The boss showed some sign of near death	5	4	4	3
21:50	The boss retreated	4	2	3	3
22:00	Puzzled, Looking for	2	0	4	0
23:50	Found the boss's hideout	3	3	4	4
25:13	Win the hunt	3	5	4	5

Table.1 Recorded form, *Monster Hunter Portable 2G*, participant 1

Table 2, Recorded form, *Warriors Orochi 2*, participant 1

Time	Event	Comfort	Excitement	Immersion	Achievement
1:42	Sub-boss encountered	2	1	2	0
2:14	Sub-boss beaten	3	1	1	1
4:26	50 pawns killed	4	3	1	3
5:12	Go around the war field to find a cure	0	5	3	0
	...				
17:00	Boss encountered	2	3	1	0
17:22	Own boss in dangerous	0	0	2	0
18:07	Went back to home to save own boss	0	0	1	0
18:13	500 pawns killed	3	3	0	5
18:38	Home clear	3	2	1	1
18:53	Back to enemy boss	4	2	1	1
20:02	Won the fight	4	1	0	2

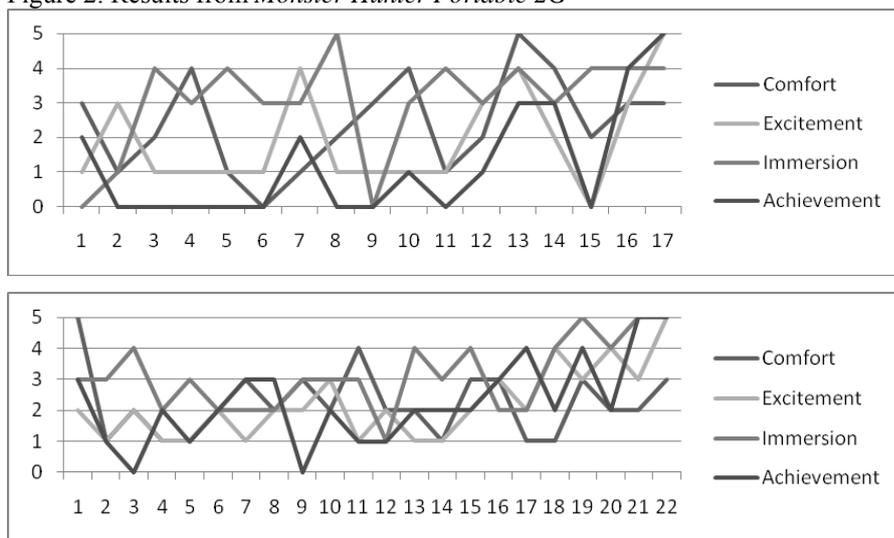
Table.2 Recorded form, *Warriors Orochi 2*, participant 1

For *Warriors Orochi 2*, participants played easy mode with a basic level character. Artifact walkthrough was also conducted; one participant played *Monster Hunter Portable 2G* again in an “amateur’s” perspective, challenged the weakest monster with basic skills. Some warp-up questions and discussions were held after finishing the experiment.

5. Experimental Results

The main results are the 6 forms from the 3 participants with two games. The data can be categorized into the diagrams as follows:

Figure 2. Results from *Monster Hunter Portable 2G*



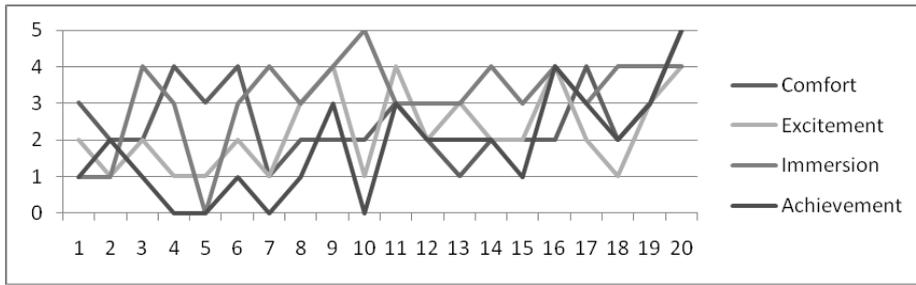


Figure 2. Results from *Monster Hunter Portable 2G*

Figure 3. Results from *Warriors Orochi 2*

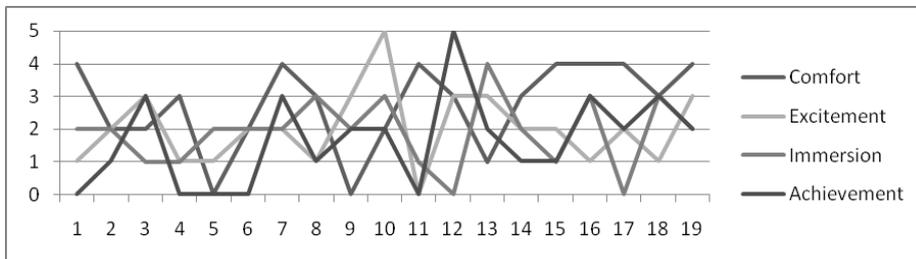
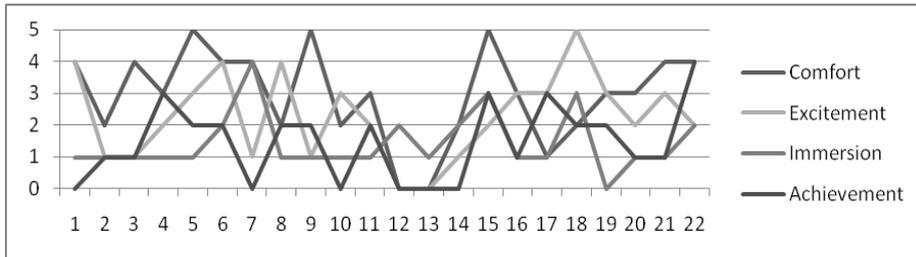
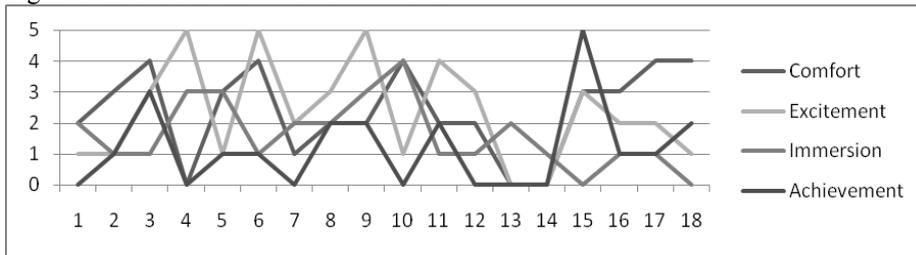


Figure 3. Results from *Warriors Orochi 2*

6. Conclusion

Analysis of data and insights from the talk with participants shows that certain patterns of hedonic satisfaction acquired from video games follow a certain model. Four factors were found to have different effects on user's hedonic satisfaction as follows: (1) when the level of difficulty is low, hedonic factor of comfort increases and the factor of excitement is relatively high. (2) When the level of difficulty is high, the factor of comfort gets low, and the factor of excitement is relatively low and stable, whereas the factor of achievement gets extremely high after a long passage of time. The factor of achievement is difficult to acquire, but once aroused, it lasts long. (3) The factor of immersion is not clearly shown but it is positively correlated with the level of difficulty.

Different kinds of Hedonic Experiences

As figure 4 shows. Hedonic experience can be acquired from different ways. The distance (d) between the play's skill and the game's difficulty is the key. Normally the game's difficulty should be flexible and kept a bit higher than the player's skill. (Left)

If the game's difficulty is much higher than the normal player's skill, the comfort value should be low. Sense of achievement is very important for it encourages the player to continue trying. (*Monster Hunter Portable 2G's* case, middle)

Sometimes, player's skill is higher than the game's difficulty. This could also be fine if the comfort value is high. Comfort value requires sensory stimulation. High comfort value can be a way of relief from mental pressure. Relief itself can be a kind of hedonic experience. (*Warriors Orochi 2's* case, right)

Figure 4. Different kinds of Hedonic Experiences

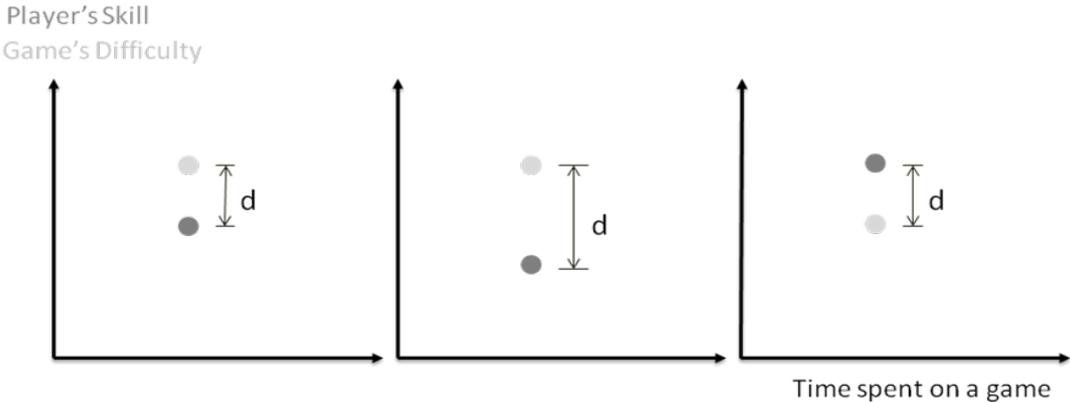


Figure 4. Different kinds of Hedonic Experiences

Target Visibility

A clear difficulty or target of the game is important. The distance d decides how hedonic experience comes. Players know where their skill points are. A game may have many sub-missions or sub-bosses, those sub-difficulty points should be visible to the players. As figure 5 shows.

Figure 5. Target Visibility

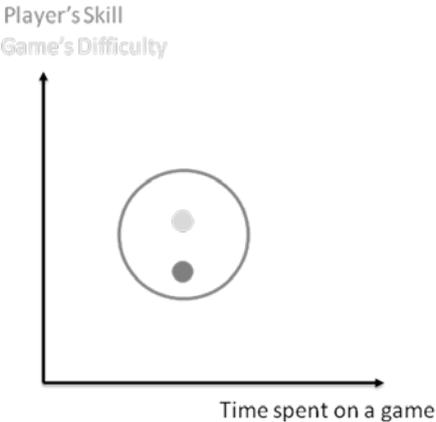


Figure 5. Target Visibility

Time changes the experience

As figure 6 shows, the two lines go up with the time spent on the game but the speed might be different. The changing distance between two points might determine how long a game can be popular. The hedonic style can be changed while the distance is changing. Which means one can earn totally different hedonic experiences the first time and later playing the same game.

Figure 6. Time changes the experience



Figure 6. Time changes the experience

Difficulty types

As figure 7 shows, *Warriors Orochi 2* provides a range of difficulties so that everyone can have his or her own hedonic experience according to his or her skill level. *Monster Hunter Portable 2G* have no more option in difficulty, but it guarantees a higher excitement and great achievement in the game play.

Figure 7. Difficulty types

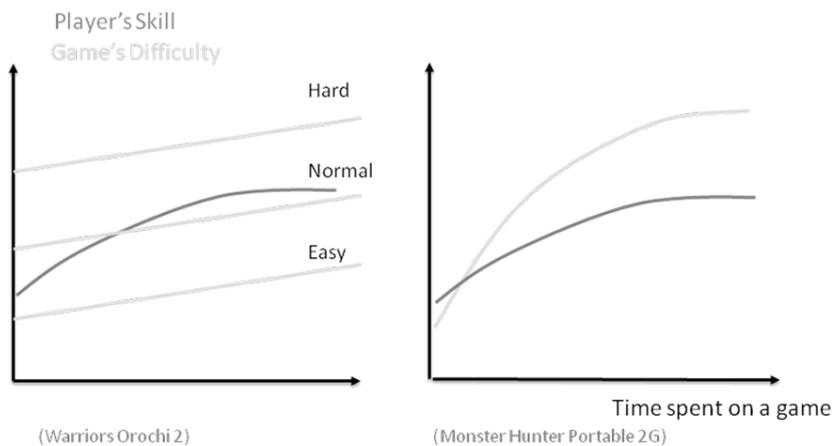


Figure 7. Difficulty types

7. Discussions and Future work

Though we have got quantitative data, the research is still more like a qualitative one. The discussions with participants contributed more than half in this research. Further work has already started to collect a large amount of data based on survey to testify the models we have talked in this paper.

As a conclusion, the success of video game's design is dependent on the control of each hedonic factor. This study can help game designers decide the level of difficulty curve according to players and their levels. In addition, the finding can be applied to classify and review games. Further work will provide tools for designing and evaluating hedonic value in games.

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