ATTRACTIVENESS OF PARKOUR GAMES ON MOBILE DEVICES

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Abstract - In order to capture the attractiveness of Parkour Games, this study based on Miryoku Engineering and Evaluation Grid Method to extract frequent users' abstract feelings and corresponded these feelings with the concrete elements for game designing. Moreover, players were grouped according to their involvement to explore whether different players had different perceptions toward the attractiveness factors of Parkour Games. In the EGM diagram, this study obtained 49 concrete attractiveness factors and eight dimensions of game design. This study also found that there were two significant attractiveness factors influencing all three groups, including "Comic styles or illustrative styles", "Rhythmic music", and "Intuitive operation (dodging, jumping, bending) to immediately derive enjoyment". This study builds a process obtaining attractiveness of mobile games through this case and the results can serve as an orientation during decision-making in game design.

Index Terms - Attractiveness, EGM, Game, Involvement, Mobile Device, Parkour.

INTRODUCTION

The increasing availability of mobile games in the current market is being propelled by faster mobile carrier networks and powerful handset operability [1]. Mobile games have currently replaced other game platforms and have become the leading trend in the game market. The development of the field of game design is entering a prosperous new era.Parkour Games are a kind of mobile games, which became an instant hit worldwide. Those refer to a game genre in which players control two-feet protagonists to move forward, using movements such as running, jumping, bending, accelerating, and turning.

In 2011, Temple Run appeared and pushed Parkour Games on mobile devices to a peak level, attracting nearly all mobile game players worldwide to control characters whose main tasks are to run, leap, and hide.Afterward, a lot of Parkour Games released in the market from 2011 to 2016, and almost all of them obtained substantial popularity and income. Why were Parkour Games capable of attracting so many players? Why were players willing to invest huge amounts of time and money in the game? What is the charm of Parkour Games that makes players so obsessed with it? These are all topics worth investigating! This study selected Parkour Games for a case study to investigate the relationship between the charm of Parkour Games and player behavior, with an aim to develop a process for extracting the attractiveness of games based on this case. In this study, a more scientific method was employed to examine the reasons making this game appealing; simultaneously, we also explored how the attractiveness of the game influenced player behavior. According to the studies regarding the attractiveness of games, most literatures have focused on researching players' emotions or perceptions [2-5] and have scarcely explored player behaviors by focusing on games' concrete attractiveness factors. For Parkour Games, the "concrete" attractiveness factors refer to the fact that the game provides a user designs to earn points or gold coins, offers soft colors which are not irritating to the eyes, and more (see Figure 1). This study conducted in-depth interviews with frequent users about their feelings. The researchers extracted the factors related to their emotions or perceptions, and found the "concrete" attractiveness factors. Relatively more scientific and objective methods were adopted to construct a research process for extracting concrete attractiveness factors.

II. LITERATURE REVIEW

Up to now, the related literature about the attractiveness factors of games has been mostly aimed at exploring the reasons why players plunge into games. Lu and Wang [4] explored the role that addiction to online games plays in the relationship between online satisfaction and loyalty. Mohamed and Jaafar [5] used a comprehensive evaluation method to evaluate elements of fun and education in games. Chu[6] evaluated player experience of games through a playability matrix, which was constructed from an analysis of the literature. In the study of Chen, Shen [7], "ease and convenience", the design factors of social network games in usability were found through the methods of Kansei Engineering and the concrete factors included "having fun instantly" and "playing anywhere via the internet". Grodal [8] researched how games evoked players' much stronger emotions. Yee [9] also studied the emotional investment of players and argued that the large amount of time spent by MMORPG players implies that they invest a significant level of emotion in playing this game. Lin, Hung [10] utilized focus group interview and statistical analysis of network survey to find that driving highly involved MMORPG gamers is coming from six main reasons: satisfaction, adventure, victory, socialization ability, self-actualization, and advancement of wealth and status. Cota etc.[11] applied a questionnaire and interviews to find that motivated the elderly to play mobile games was to help in the treatment of cognitive disorders due to aging.

The aforementioned studies pertain to research related to players' feelings/ emotions toward games. For example, Chen et al. focused on discussing how the charm of games attracts players and how games can bring satisfaction to the players and arouse their emotions [7]. However, for game designers, merely understanding the satisfaction and emotions of game players is not enough; instead, further explanation on what characteristics in game playing can arouse players' abstract satisfaction or emotions are required.
In this study, Parkour Games serve as the research cases to explore players' feelings and their correspondence to the actual game design elements. The Evaluation Grid Method (EGM) was adopted to analyze the abstract feelings of players toward the game and to find the corresponded concrete attractiveness factors for design (see Figure 1). Those can serve as a reference for game designing. Moreover, players were grouped according to their levels of game involvement, to explore whether players with different levels of game involvement had different perceptions toward the attractiveness factors of Parkour Games. The results can serve as an orientation during decision-making in game design.

III. RESEARCH STEPS AND RESULTS

In order to prove the above point of view, explore the users' thoughts, and obtain the attractiveness factors of Parkour Games to provide concrete design strategies to game designers, this study utilizes Miryoku Engineering with the methods of in-depth interviews, evaluation grid, questionnaire, and statistical analysis to extract characteristics of attractiveness in Parkour Games. The detailed steps are explained as follows.

3.1. Sample Collection and In-depth Interviews of Parkour Games

Considering the time to market and the number of downloads, this study selected 12 popular Parkour Games on mobile devices, including Temple Run, Subway Surfers, Angry Gran Run, Sonic Dash, Quick Boy, Temple Run 2, Banana Kong, Zombie Tsunami, LINE Cookie Run, Despicable Me: Minion Rush, Looney Tunes Dash, and Candy Ninja Cat. This study recruited 7 researchers who had practical game design experience and had received research interview training. They were asked to search for frequent users of any one of the aforementioned 12 games as interviewees in this study. The criteria for deciding whether a player is a frequent user in this study are that the duration a player use that game is more than three months and the accumulative operation time is more than three hours per week. This study interviewed 14 frequent users of the Parkour Games on mobile game, comprising 9 males and 5 females, aged between 18 and 32 years old. Besides one game the interviewees were familiar with, they were asked to choose any one of the other 11 games to experience and operate for 10 minutes. After comparison, they answered the reasons why they were attracted by a game. For example, an interviewer would ask: "which one is attractive between the two games?" "What is the reason?"
After obtaining answers, the interviewer would continue to ask for more concrete reasons and abstract reasons. Ultimately, the interviewer might go back to ask for other advantages of another game that did not attract interviewee more, and for the more concrete reasons and the abstract reasons.
All the reasons provided by the interviewees were classified into upper, middle, and lower items (Figure 1). Generally, their first response served as the original middle item, and the abstract meaning behind the response would be the upper item. In contrast, the concrete conditions and characteristics that contributed to the first response constituted the lower items.
The interviewee's first response was "I think the art style of the game looks nice." Therefore, the art style of the game was extracted as the original attractiveness reason (middle item), according to which the interviewer further asked: "Why do you think the art style is attractive?" If the interviewee answered "I like the 3D reality of the game scenes," the "3D reality of the game scenes" would be extracted as the concrete attractiveness reason (lower item).
The interviewer continued to ask, "What aspect of the 3D reality scenes attracts you? Could you describe your feelings?" If the interviewee answered "I feel the 3D scenes make the game look exquisite," then the reply "exquisite" would be extracted as the abstract attractiveness reason (upper item).

3.2. EGM Diagram for Parkour Games

Then, all evaluation items to Parkour Games are compiled into a diagram. The upper items are on the left, the middle ones in the middle, and the lower ones on the right. All items are connected with straight lines to indicate the hierarchical relationships. This gives the EGM diagram shown in Figure 1, which integrates the data and determines relationships among the upper items (abstract reasons), the middle items (original reasons) and the lower items (concrete reasons).
Basically, after this step was completed, this study could clearly present why the interviewee was attracted by a particular event, shown in Figure 1.

3.3 Questionnaire Survey and Statistical Analysis of Parkour Games

In the EGM diagram, we obtain 38 concrete attractiveness factors and six dimensions of game design, according to the 49 concrete reasons of the lower items (right side in Figure 1) and the eight original reasons of the middle items (middle of Figure 1).
These items are obtained from qualitative research methods. Furthermore, this study needs quantitative research methods to verify them. Therefore, we turn these items, derived from a small number of frequent users, into a large number of questionnaires with measurable questions. We use a five point Likert scale

to have subjects circle the number on the degree of agreement. There are two parts in the questionnaire, including analysis of player involvement, and analysis of attractiveness factors which different groups are concerned about in every dimension. This study rewarded the subjects with gift cards of convenience stores, and 192 valid questionnaires were collected.

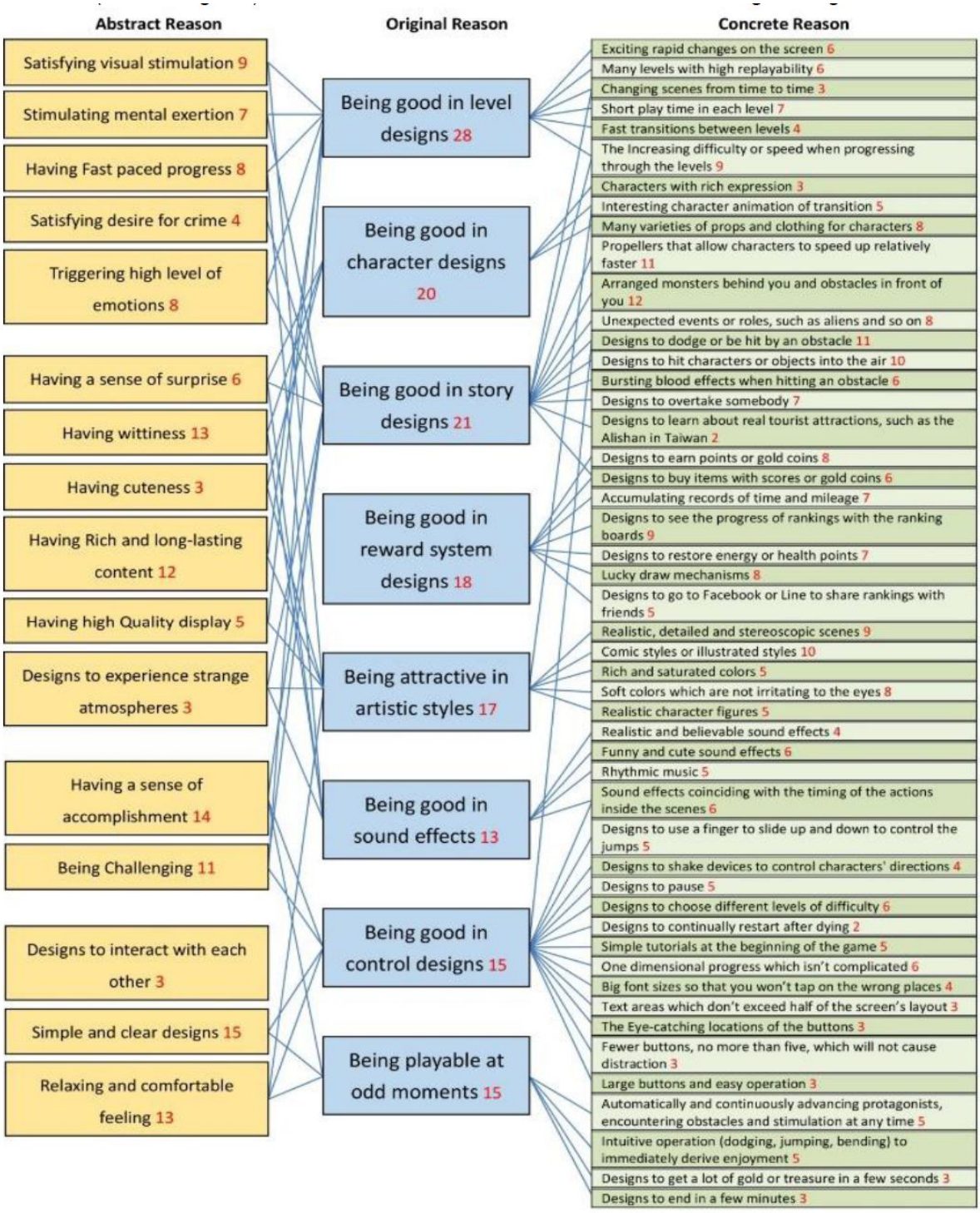


Figure 1. EGM of Parkour Games

3.3.1. Analysis of Players' Level of Game Involvement

According to the studies related to games and the levels of game involvement [12], the feelings and needs of players with different game involvement levels differ. Therefore, players' level of game involvement must be considered during game design. This study adopted the consumer involvement profile proposed by Kapferer and Laurent [13] as a basic form to measure involvement according to the relevant literature, and designed questions coordinating the characteristics of mobile games to do the questionnaire

and find out the groups of different involvement.

Finally, we considered that these concrete attractiveness factors may have different significance and meaning to players at different levels of involvement in different game types.

Consumer Involvement Profiles measures the level of relevance between games/services and players through questions, and the Likert 5- point scale was adopted to assess the following 13 questions on the level of involvement:

(1) Playing mobile games is important in your life.
(2) Playing mobile games makes you feel happy and contented.
(3) You can be very anxious if you cannot find a phone or tablet to play a game.
(4) You will be very anxious if you cannot find a mobile game you like.
(5) You often pay to purchase the items or points in mobile games.
(6) You spend more than an hour per day playing mobile games.
(7) You will pay attention to related news about mobile games.
(8) You know all the functions and characteristics of the mobile games you play.
(9) Playing mobile games makes you feel a sense of achievement.
(10) Getting a high score, rankings, and items in a game is important to you.
(11) You love discussing the topic of playing mobile games with your friends.
(12) You mind what people think about the fact that you play mobile games.
(13) You can find out other people's preferences from the mobile games they play.

With regard to grouping in involvement, this study adopts the quartile method based on the players' total scores in assessment questions of involvement. They are divided into three groups, including high involvement (first 25%), medium involvement (middle 50%) and low involvement (last 25%). The total scores come from the degree of the subjects' agreement in every assessment question with 1 to 5. Every subject's 13 scores are summed up. The highest sum in the questionnaire is 65 points and the lowest sum is 13. The grouping result of involvement is shown in Table 1.

Sum of score	Involvement	Number of subjects
43-65	High involvement	48
27-42	Medium involvement	93
13-26	Low involvement	51

Table 1. Grouping of involvement

3.3.2. Analysis of Attractiveness Factors which Different Groups are Concerned about in Every Dimension

This study will conduct the multiple regression analysis separately with the three groups to explore how the three groups of involvement are affected by the attractiveness factors in the eight attractiveness dimensions. In the multiple regression analysis of this study, the dependent variables are subjects' scores (1 ~ 7) of the importance to the attractiveness dimensions in the questionnaires, and the independent variables are their degree of agreement (1 ~ 5) in each attractiveness factor. There are eight dimensions each with three groups of involvement, so 24 times of multiple regression analysis are carried out in total. Next, this study compares the three groups' attractiveness factors reaching significant levels for every dimension, shown in Table 2. Table 2 shows that the factors every group of involvement cares are different, but there are some identical.

Let us see the parts which the three groups' cognitions tend to be the same. There is one significant attractiveness factor influencing all groups each in three dimensions of "D5. Being attractive in artistic styles", "D6. Being good in sound effects", and "D8. Being playable at odd moments."

These three factors individually are that "B. Comic styles or illustrative styles" is influential to "D5. Being attractive in artistic styles"; "C. Rhythmic music" is influential to "D6. Being good in sound effects"; "B. Intuitive operation (dodging, jumping, bending) to immediately derive enjoyment" is influential to "D8. Being playable at odd moments." Thus, these three attractiveness factors are necessary to be considered in designs for this kind of game no matter which market segment is targeted. In other dimensions, the significantly influential factors of high, medium, and low involvement groups are individually different.

CONCLUSION AND DISCUSSION

Different from the previous research of video games [2-5], in which scholars only focus on abstract emotions or cognitions, the aforementioned "upper items" and the "middle items" in this paper, this study also analyzed the concrete designing factors, the aforementioned "lower items" in this paper. Hence, this study not only explores players' abstract feelings, but also discovers game designers' concrete methods to build a complete research process and produce specific attractiveness factors for game designs.

On the basis of the relevant literature on the level of involvement and on online games and services, player groups at different levels of involvement have different perceptions toward the same service or product. Likewise, the experiment conducted in this study also yielded the same results. The results indicated that groups at different levels of involvement in Parkour Games had different preferences toward the game's attractiveness factors, and that these concrete attractiveness factors were certainly significant and meaningful to players at different levels of game involvement. The following focus on the attractiveness factors based on the eight dimensions in Parkour Games, and the research findings will be employed to conduct an in-depth analysis and explanation.

Attractiveness Dimension	High Group	Medium Group	Low Group
D1.Being good in level designs	D. Short play time in each level	B. Many levels with high replayability	C. Changing scenes from time to time
D2.Being good in character designs	C. Many varieties of items and clothing for characters	B. Interesting character animation of transition	A. Characters with rich expression
D3.Being good in story designs	G. Designs to overtake somebody.	E. Designs to hit characters or objects into the air	H. Designs to learn about real tourist attractions, such as the Alishan in Taiwan
D4.Being good in reward system designs	F. Lucky draw mechanisms	A. Designs to earn points or gold coins.	C. Accumulating records of time and mileage
D5.Being attractive in artistic styles	B. Comic styles or illustrative styles C. Rich and saturated colors	B. Comic styles or illustrative styles	B. Comic styles or illustrative styles
D6.Being good in sound effects	C. Rhythmic music	C. Rhythmic music	A. Realistic and believable sound effects C. Rhythmic music
D7.Being good in control designs	D. Designs to choose different levels of difficulty. K. Fewer buttons, no more than five, which will not cause distraction.	C. Designs to pause. L. Large buttons and easy operation	J. The Eye-catching locations of the buttons
D8.Being playable at odd moments	B. Intuitive operation (dodging, jumping, bending) to immediately derive enjoyment	B. Intuitive operation (dodging, jumping, bending) to immediately derive enjoyment	B. Intuitive operation (dodging, jumping, bending) to immediately derive enjoyment

Table 2. Comparison of factors with significant impacts in every group

(1) Being good in level designs

In regard to "level designs", there are six attractiveness factors which most players express their favor. It can be known that what game players need from this type of game is the sense of excitement and challenges that cannot be satisfied in everyday life. Through game playing, players enter rapidly changing and exciting scenes, thereby helping them to relieve their stress. Although the three groups seem to pay particular attention to different points, they all hope that the number of different scenes can be increased, or the scenes can be rapidly switched to bring excitement to routine daily life.

(2) Being good in character designs

In regard to "character designs" there are three attractiveness factors which most players express their favor. On the basis of these factors, "interest" and "loveliness" are the main reasons why game players are drawn to the characters in Parkour Games. The concrete methods involve fine illustrations of characters, which are presented through various abundant facial expressions, items, clothing, and animation. Here the three groups are concerned about different points. However, these three attractiveness factors should be criterion for game designers to strive.

(3) Being good in story designs

In regard to "story designs", there are eight attractiveness factors which most players express their favor. On the basis of these factors, the charm of Parkour Game plots stems from various types of creativity. These diverse plots have guided the overall game style and brought players out of reality, enabling them to satisfy their desire for taboo experiences, to escape to a different world, and experience the emotions and feelings that cannot be experienced in everyday life. These experiences can help game players relieve their stress from daily life. Moreover, if the goal of the market is to target players with high involvement which is equivalent to core gamers in previous studies [14], then game developers should focus on designing stories that contain elements such as competition and speed. If the goal is to target players with medium involvement, then game developers should focus on designing stories relevant to relieving players' negative emotions. In addition, the story design should focus on elements such as knowledge, education, or other relevant topics if the aim is to develop for players with low involvement.

(4) Being good in reward system designs

In regard to "reward system", there are seven attractiveness factors which most players express their favor. These include the internal and external parts. Scores, gold coins, mileage, health points, and lucky draw mechanisms are the internal rewards designed for general Racing Games, and are extremely effective rewards for Parkour Games. These factors can prompt players to feel a sense of accomplishment and challenges overcome; thus, this design mechanism should not be neglected.The external reward design refers to players' competition over ranking, and even sharing rank with friends in the community. This result matches up with what Campbell [15] and Radoff[16] have said about game communities attracting players to discuss and share their game experiences, achievements, or photos with other friends.

(5) Being attractive in artistic styles

In regard to "artistic styles", there are five attractiveness factors which most players express their favor. These can be categorized into two aspects in the art profession: the presentation of colors and lines. In terms of colors, Parkour Game players prefer bright colors with soft contrast; in terms of lines, players hope

that game scenes can be presented with hand-painted style and fine illustrations. Thus, players are not drawn by the mature, simulated, or realistic art styles in Parkour Games; instead, they are drawn by the fairy tale-like and fun-oriented art styles. Corresponding with the requirement for interesting and cute elements as indicated in the previous character design, the style which tends to be comic or illustrative makes sense and is a reasonable finding. The high involvement group focuses on the attractiveness factor "C. Rich and saturated colors" and can be correlated and correspondent with "B. Comic styles or illustrative styles."

(6) Being good in sound effects

In regard to "sound effects", there are four attractiveness factors which most players express their favor. These factors respectively correspond to, and highlight, players' need in story designs to escape from reality, as well as their demands for speed and excitement in level designs, and requirement of interest and loveliness in character designs. Therefore, regarding the dimension of sound effects, this study realized the important features in Parkour Games: speed and excitement.This is an atmosphere created through strong rhythms derived from the sound of drums or other sound effects, enabling the three groups to have a consistent tendency in cognition regarding the importance of this attractiveness factor.

(7) Being good in control designs

In regard to "control designs", there are 12 attractiveness factors which Parkour Games attract players. The interface controls in Parkour Games are, just like Browne and Anand [17] said, taking advantage of the motion-sensor controls and touch-screen interfaces of smartphones, and this, resulted in games that are both easier to play and more enjoyable. These factors are concrete methods for designers to simplify the controls of Parkour Games.

(8) Being playable at odd moments

In regard to "Being playable at odd moments", there are four attractiveness factors which players care concretely. In this dimension, this study discovered another important feature of Parkour Games: players can use their finger to swipe the screen to intuitively and easily control the game character. It can be seen that a good use of the touch screen technology of mobile devices enables the three groups to develop consistent viewpoints toward the importance of this attractiveness factors.This also matches up with what Browne and Anand [17] demonstrated about taking advantage of the unique interfaces of a smartphone, such as motion-sensor controls and touch-screen interfaces, resulted in games that were both easier to play and more enjoyable as a result.

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